Universidade de Aveiro Departamento de Comunicação e Arte
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Para um design de interação de inspiração biológica

Volume II
Anexos

ANEXOS

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Seleção de evidências científicas para a construção da taxonomia

A necessidade de apresentar, pormenorizadamente, um corpo credível de informação que demonstrasse a rigorosa investigação efetuada na área da biologia, com vista ao preenchimento dos parâmetros da taxonomia foi, desde o início, uma premissa desta investigação. Neste sentido, a informação recolhida foi encontrada através da leitura de artigos científicos, artigos publicados em jornais ou revistas de reconhecido rigor científico, nomeadamente o The Telegraph e o The New York Times, complementada com informação recolhida em endereços web de Instituições de inquestionável competência científica no campo da biologia, como a Scientific American, National Geographic, BBC Earth ou Cornell Lab of Ornithology – Cornell University, assim como nos documentários de David Attenborough.

Sempre que necessário, houve o recurso ao contacto por e-mail com autores de estudos científicos relativos à espécie selecionada, de forma a encontrar as respostas necessárias, uma vez que, sendo alguns parâmetros demasiado específicos, nem sempre foi possível encontrar esclarecimento na informação já publicada. Salientamos o parâmetro da duração de cada ritual como tendo sido o que maior dificuldade apresentou, uma vez que é uma informação pormenorizada e especifica, e em alguns animais pouco documentada. As respostas apresentadas para cada parâmetro dizem respeito, exatamente, à espécie selecionada e não apenas ao grupo animal.

Apresenta-se, de seguida, uma breve sinopse descritiva do ritual de cada animal que integra a taxonomia, assim como, evidência da resposta mais representativa para o preenchimento do respetivo parâmetro, de um vasto manancial de informação recolhida ao longo desta investigação, encontrando-se a sua totalidade nos anexos do documento.

A apresentação de cada resposta segue a estrutura ordenada dos parâmetros da taxonomia. Inicia-se pela resposta à zona geográfica da espécie (A), seguido da iniciativa (B), duração (C), sentidos (D), tipo de comportamento (E), finalizando com as características (F).

Decorrente das respostas obtidas foi realizado um diagrama visual do desenvolvimento de cada ritual.

As citações apresentadas estão na sua linguagem de origem, de forma a comunicar, exatamente, a informação utilizada para enunciar cada resposta.

Aquáticos

Caranguejo (Uca Lactea)

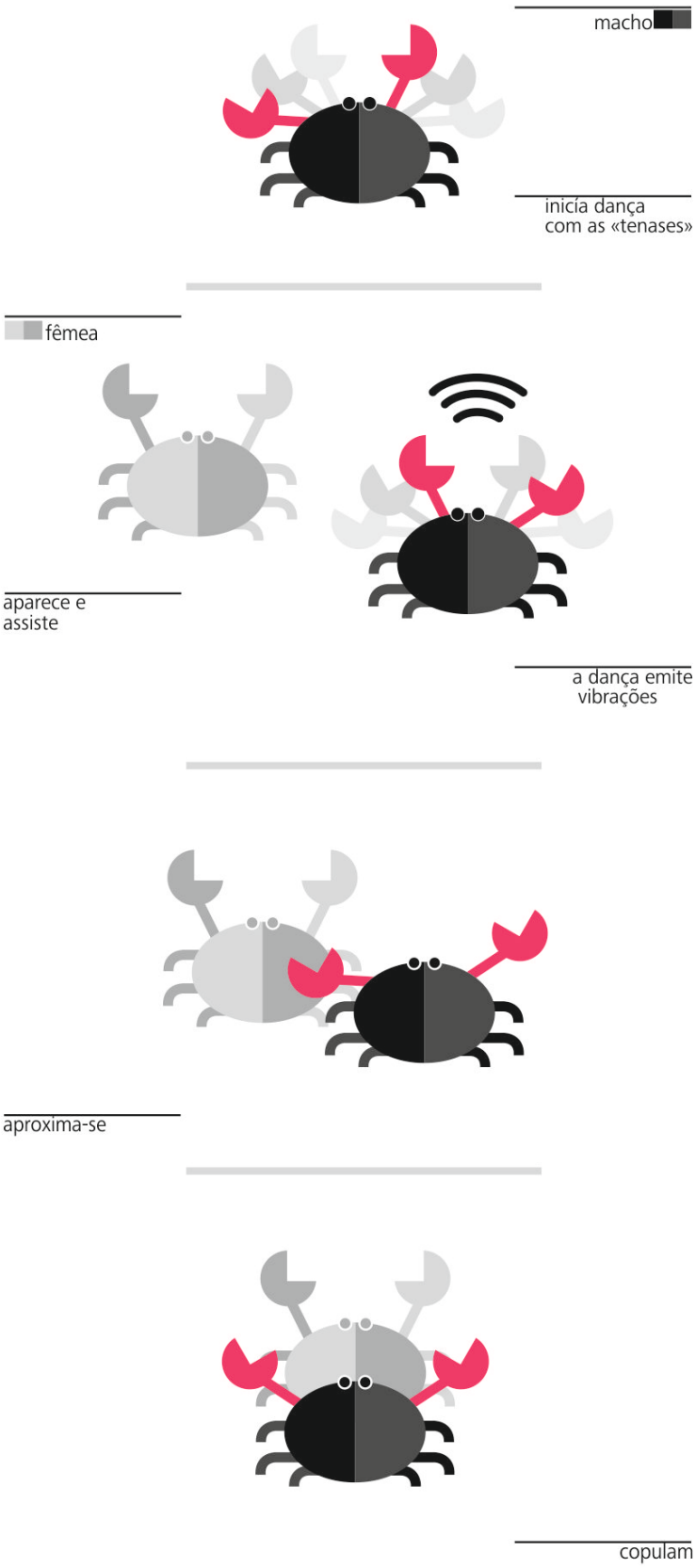


Figura 1: Diagrama do ritual (arquivo do autor).

Figura 2: Caranguejo.
Fonte:http://www.fiddlercrab.info/photos/U_lactea12.jpg, https://www.google.pt/

Takeshita & Murai (2016) referem que, durante o ritual, o macho move a sua pinça no ar e emite vibrações do interior da sua toca, mostrando assim o seu tamanho e vigor. O artigo online do periódico Dailymail (Beall, A., 2016) acrescenta que este "Código Morse" ajuda as fêmeas a escolherem qual a toca onde entrar para acasalar. Uma vez no interior, a construção e estrutura da toca são características que a fêmea terá em consideração.

Evidências que contribuíram para responder aos parâmetros da taxonomia:

a). A zona geográfica desta espécie é a costa Indo-Pacifico (China, Tailândia, Coreia do Sul e japão). (Rosenberg, M.S., 2014)

b). A iniciativa do ritual é do macho.

> *"In some fiddler crab species, males emit vibrations from their burrows to mate-searching females after they have attracted a female to the burrow entrance using a waving display. Although the vibrations are considered acoustic signals to induce mating, it has not been demonstrated whether the vibrations attract the females into the burrow and, consequently, influence females' mating decisions.".*
> (Takeshita, F. & Murai, M., 2016, p.1)

c). A Duração do ritual é média (<dia).
Resposta obtida por email, do autor Fumio Takeshita (2016), cujo teor se reproduz de seguida:
No dia 14/08/2016, às 06:30, 竹下文雄 <takeshitaf@gmail.com> escreveu:
Dear Pedro,
Thank you for your interesting in our paper.

I briefly describe their courtship behaviours. There are 3 stages in their courtship behaviours as the follows.
1) Broadcasting: males show display behaviour with their large claw for unspecified females (and males). This behaviour is found during 3-4 hour.
2) Waving: males show ritualized courtship behaviour, is called as "waving" a specified female when the female approach to the male burrow (the duration is about 10 sec - 5 min, i.e., until females come into the male burrow).
3) Vibration: After females came into burrows by waving, males emit vibrational signals (please see our paper). the duration is from several seconds to several minutes.

If you have any question else, please contact me again.
Best wishes,
Fumio Takeshita

d). Os sentidos utilizados são a visão, audição e tato.
Visão:
"Broadcasting: males show display behaviour with their large claw for unspecified females (and males).". (F. & Murai, M., 2016, p.1)
Audição:
"The acoustic signals consisted of repetitions of pulses…". (F. & Murai, M., 2016, p.1)
Tato:
"These factors imply that the vibrations convey information on male characteristics, such as body size and stamina.". (F. & Murai, M., 2016, p.1)

e). O tipo de comportamento é brando e ritualizado.
Brando:
"Broadcasting: males show display behaviour with their large claw for unspecified females (and males).". (Takeshita, F., 2016) - Resposta por email de dia 14-08-2016.
Ritualizado:
"Waving: males show ritualized courtship behaviour, is called as "waving" a specified female when the female approach to the male burrow, …". (Takeshita, F., 2016) - Resposta por email de dia 14-08-2016.

f). As características e ações identificadas são a exibição, dinâmica e construção.
Exibição:

"Waving: males show ritualized courtship behaviour, is called as "waving" a specified female when the female approach to the male burrow". (Takeshita, F., 2016) - Resposta por email de dia 14-08-2016.

Dinâmica:

"One hypothesis to explain why females prefer vigorous signals by males in mate selection is that the signals reflect stamina in the males, which is required for the continuous emission of the signals (Byers et al. 2010; Mowles 2014)." (Takeshita, F. & Murai, M., 2016, p. 6)

Construção:

"The vibrations inside the burrow might influence a female's decision by interaction with other male traits such as the burrow structure.". (Takeshita, F. & Murai, M., 2016, p. 1)

Cavalo-marinho (Hippocampus)

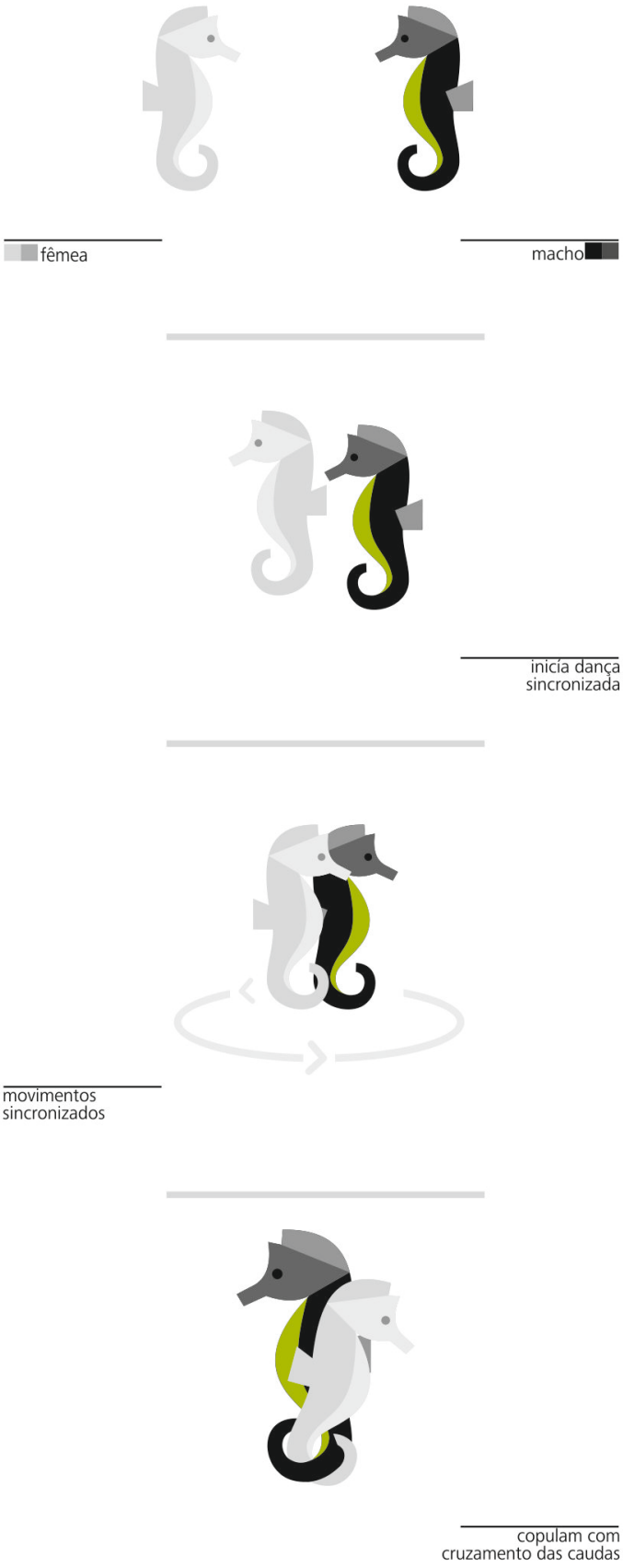


Figura 3: Diagrama do ritual (arquivo do autor).

Figura 4: Cavalo-marinho.
Fonte:http://hippozoo.com/documents/image/10/1009/hippocampus-whitei-1009.png, https://

De acordo com o periódico online The Telegraph (Gray, R., 2011), os cavalos marinhos entrelaçam as suas caudas e nadam juntos durante os seus carinhosos rituais. Ao longo deste passeio acariciam-se, um ao outro, com os seus tentáculos, tendo como intuito descobrir se são adequados um para o outro.

a). Esta espécie é originária do oceano Atlântico. (Irey, B., 2004)

b). É o macho que maioritariamente toma a iniciativa, embora a fêmea, por vezes, também o faça, conforme verificámos na tabela (Masanjones, H. & Lewis, S., 1996, p. 634).

	Courtship Phase			
	Phase 1	Phase 2	Phase 3	Phase 4
Approach Initiated By:				
Male	11	12	6	9
Female	2	2	6	4
Brightening Initiated By:				
Male	11	9	2	2
Female	3	1	1	1
First Courtship Behavior By:				
Male	9	3	6	7
Female	5	12	8	8
Courtship Terminated By:				
Male	4	5	9	—
Female	9	7	3	—
Courtship Behaviors Exhibited:				
Male	Quiver	Quiver	Point	Point/Rise
Female	Quiver	Point	Point	Point/Rise

Figura 5: Hippocampus zosterae.[1]

[1] Fases de namoro com o número de casais em que a abordagem, o namoro e o término do namoro foram iniciados por cada sexo.

c). A Duração do ritual é prolongada (>dia).

"Four distinct phases of seahorse courtship are marked by prominent behavioral changes, as well as by differences in the intensity of courtship. The first courtship phase occurs for one or two mornings preceding the day of copulation and is characterized by reciprocal quivering, consisting of rapid side-to-side body vibrations displayed alternately by males and females. The remaining courtship phases are restricted to the day of copulation, with the second courtship phase distinguished by females pointing, during which the head is raised upward.". (Masanjones, H. & Lewis, S., 1996, pág. 634)

d). Os sentidos utilizados são a visão e o tato.

Visão:

"second courtship phase distinguished by females pointing, during which the head is raised upward. In the third courtship phase, males begin to point in response to female pointing." . Masanjones, H. & Lewis, S. (1996, p.634)

Tato:

"...is characterized by reciprocal quivering, consisting of rapid side-to-side body vibrations displayed alternately by males and females.". (Masanjones, H. & Lewis, S., 1996, pag. 634)

e). O tipo de comportamento é brando e ritualizado.

Brando:

"The first courtship phase occurs for one or two mornings preceding the day of copulation and is characterized by reciprocal quivering, consisting of rapid side-to-side body vibrations displayed alternately by males and females.". (Masanjones, H. & Lewis, S., 1996, pag. 634)

Ritualizado:

"The remaining courtship phases are restricted to the day of copulation, with the second courtship phase distinguished by females pointing, during which the head is raised upward. In the third courtship phase, males begin to point in response to female pointing. During the final phase of courtship, seahorse pairs repeatedly rise together in the water column, eventually leading to females transferring their eggs directly into the male brood pouch during a brief midwater copulation.". (Masanjones, H. & Lewis, S., 1996, pag. 634)

f). As características e ações identificadas são a reciprocidade, cortesia, dinâmica e sincronização.

Reciprocidade e Cortesia:

"The first courtship phase occurs for one or two mornings preceding the day of copulation and is characterized by reciprocal quivering, consisting of rapid side-to-side body vibrations displayed alternately by males and females.". (Masanjones, H. & Lewis, S., 1996, pag. 634)

Dinâmica e Sincronização:

"During the final phase of courtship, seahorse pairs repeatedly rise together in the water column, eventually leading to females transferring their eggs directly into the male brood pouch during a brief midwater copulation. Courtship activity level (representing the percentage of time spent in courtship) increased from relatively low levels during the first courtship phase to highly active courtship on the day of copulation. Males more actively initiated courtship on the days preceding copulation, indicating that these seahorses are not courtship-role reversed, as has previously been assumed.". (Masanjones, H. & Lewis, S., 1996, pag. 634)

Lula (Sepia plangon)

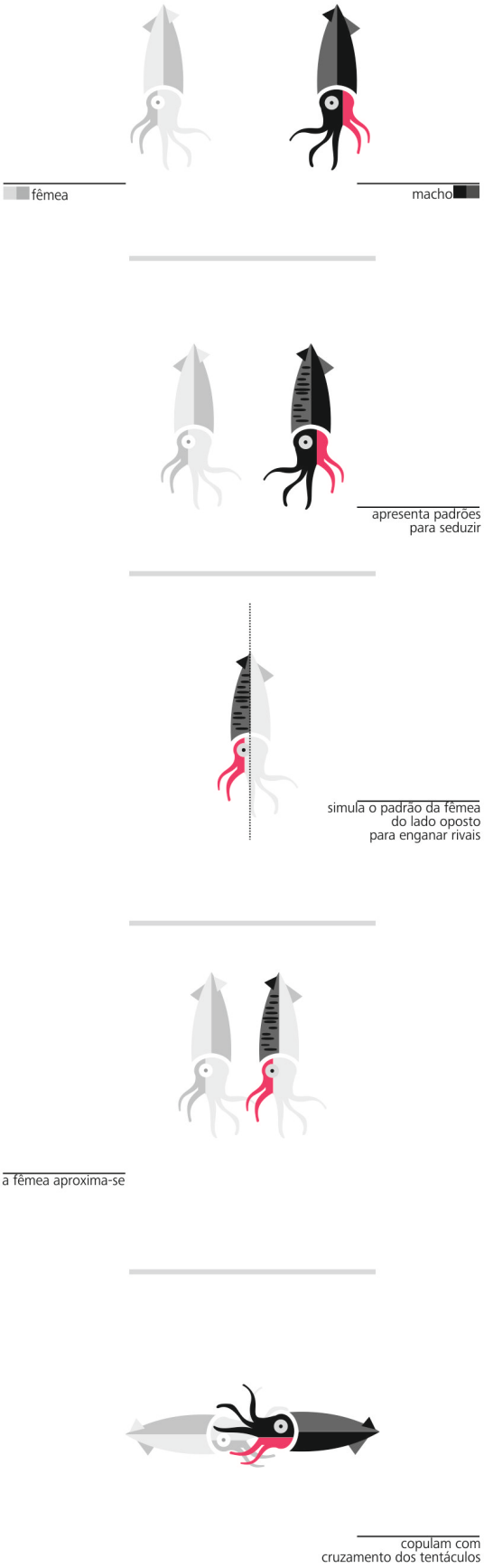


Figura 6: Diagrama do ritual (arquivo do autor).

Figura 7: Lula.
Fonte:http://www.duskyswondersite.com/animals
/bower-birds/).

Referindo a investigação da BBC online (Goldman, J. G., 2013), a lula controla a aparência da sua pele com excelente precisão. Quando um macho tenta seduzir uma fêmea, ele oferece uma exibição de cortejo, controlando a disposição dos pigmentos que aparecem na superfície da sua pele. Se um rival masculino se aproxima, ele muda a sua pele no lado virado para o rival para parecer feminina. A fêmea ainda vê a exibição de sedução, o intruso, no entanto, acha que existem duas fêmeas.

a). A zona geográfica desta espécie é a região sudoeste do oceano Pacífico, nas águas costeiras do leste da Austrália, do Golfo de Carpentaria até Sydney. "Sepia plangon is found in the Southwestern Pacific region, in coastal waters of eastern Australia from the Gulf of Carpentaria to Sydney.". (Runck, A., 2012)

b) A iniciativa do ritual é do macho.
"When a male cuttlefish attempts to seduce a nearby female, he offers her a courtship display by controlling the arrangement of pigments that appear on the surface of his skin.".
(Goldman, J. G., 2013)

c). A Duração do ritual é curta (<h).
Resposta obtida por email, no dia 21 de Março de 2017, da professora Jane Williamson (2016), Macquarie University, Austrália, cujo teor se reproduz de seguida:
No dia 21/03/2017, às 11:11, Jane Williamson
<jane.williamson@mq.edu.au> escreveu:

Less than an hour.

J

From: Pedro Bandeira maia <pedrobandeiramaia@amadesign.net>

Date: Tuesday, 21 March 2017 at 10:08 pm

To: Jane Williamson <jane.williamson@mq.edu.au>

Subject: Re: I´m sorry for being so insistent - PhD student in interaction design - cuttlefish (Sepia plangon) ritual

Dear Jane,

Thank you very much. I´m sorry for being insistent…

By your experience and imagination, if you have to select one of this answers about courtship duration,

less then 10m, less a hour, less a day or more than one day.

Witch one you select?

Best regards,

pedro

d). O sentido utilizado é a visão.

"During courtship the females remain plain coloured, while males put on brilliant displays. Narrow, wavy, light-coloured transverse stripes appear across the upper body, and wide iridescent green bands along the base of their fins.". (Runck, A., 2012)

e). O tipo de comportamento é brando.

"When a male cuttlefish is wooing a lady, he often "cheats" by painting typical female patterns on one side of his body, while the other side, the one facing the female, shows off typical male patterns. This gender-bending disguise fools rival males into thinking they're seeing just a couple of ladies hanging out.". (Pappas, S., 2012)

f). As características e ações identificadas são a exibição, estratégia e camuflagem.

Exibição:

"When a male cuttlefish attempts to seduce a nearby female, he offers her a courtship display by controlling the arrangement of pigments that appear on the surface of his skin.".

(Goldman, J. G., 2013)

Estratégia:

"The researchers noticed that the males sometimes displayed a strange, split-down-the-middle coloration. On the side facing the female, they'd show

pulsating stripes. On the side facing a rival male, they'd show mottled camouflage, a typical female look.". (Goldman, J. G., 2013)

Camuflagem:

"When a male cuttlefish attempts to seduce a nearby female, he offers her a courtship display by controlling the arrangement of pigments that appear on the surface of his skin. If a rival male approaches, he changes his skin on the side facing the rival to appear female. The female still sees the courtship display, the intruder, however, thinks there are two females – leaving the original male to complete his reproductive business in peace.". (Goldman, J. G., 2013)

Baiacu (Torquigener albomaculosus sp.)

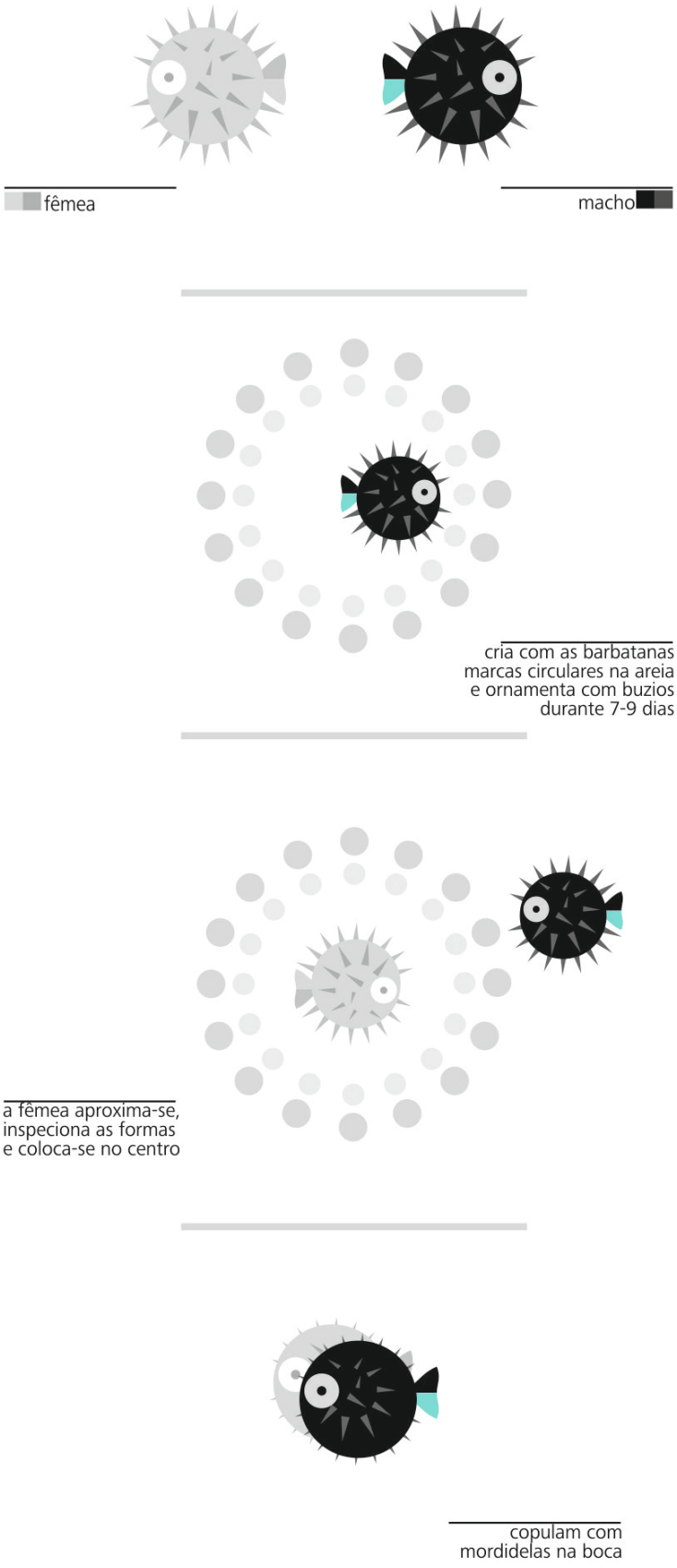


Figura 8: Diagrama do ritual (arquivo do autor).

Figura 9: Baiacu.
Fonte:http://www.duskyswondersite.com/animals/bower-birds/)

Kawase, H., Okata, Y. & Ito, K. (2013), relatam que os peixes machos (Torquigener sp., Tetraodontidae) constroem grandes estruturas circulares geométricas no fundo do mar que desempenham um importante papel no processo de escolha da fêmea. O macho escava vales seguindo vários ângulos numa direção radial, construindo ninhos rodeados por picos e vales alinhados radialmente. Criam ainda padrões irregulares no ninho, com partículas de areia fina. A estrutura circular não só influencia a escolha da fêmea, como também ajuda a reunir partículas de areia fina no ninho. Os machos nunca reutilizam o ninho, construindo sempre uma nova estrutura circular, o que implica um enorme esforço na construção. Esta situação ocorre porque os vales não conseguem manter partículas de areia fina suficientes para múltiplos ciclos reprodutivos.

a). A zona geográfica desta espécie é nas ilhas Ryukyu (Japão).
"Torquigener albomaculosus sp. nov. is described based on two specimens collected from sandy bottoms at depths of 15 and 18 m along the south coast of Amami-oshima Island in the Ryukyu Islands.". (Matsuura, K., 2014, p.207).

b). A iniciativa do ritual é do macho.
"Males of Torquigener albomaculosus build unique circles as spawing nests, these being 2m in diameter on sandy bottoms at depths from 10 t0 30 at Amami-oshima Island.". (Matsuura, K., 2014, p.207).

c). A Duração do ritual é prolongada (>dia).

"Each of the males constructed a circular structure on the seabed (Fig. 3), which required 7–9 days to complete (Fig. 2; K1, K3 and K4). The behavioural patterns of the males changed during construction (Fig. 4).". (Kawase, H., Okata, Y. & Ito, K., 2013, p.1)

d). Os sentidos utilizados são a visão.

"When the circles are finished, females come to inspect them. If they like what they see, they reproduce with the males, said Hiroshi Kawase, the curator of the Coastal Branch of Natural History Museum and Institute in Chiba, Japan.". (Main, D., 2013)

e). O tipo de comportamento é brando, ritualizado e material.

Brando:

"When the female entered the nest, the male retreated from the central zone and rushed towards her several times.". (Kawase, H., Okata, Y. & Ito, K., 2013, p.2)

Ritualizado:

"First, they involve radially aligned ridges and valleys outside the nest site. Second, the male decorates these ridges with fragments of shells. Third, the male gathers fine sediments to give the resulting formation a distinctive look and coloring, Kawase said.". (Main, D., 2013)

Material:

"He arranges the sand, with mathematical perfection, into elegant and intricately designed "crop circles" and uses shells to decorate the ridges of his artwork.". (CBC, 1999)

f). As características e ações identificadas são a imaginação, dinâmica, construção, decoração e exibição.

Imaginação:

"First, they involve radially aligned ridges and valleys outside the nest site. Second, the male decorates these ridges with fragments of shells. Third, the male gathers fine sediments to give the resulting formation a distinctive look and coloring, Kawase said.". (Main, D., 2013)

Dinâmica:

"Males laboriously flap their fins as they swim along the seafloor, resulting in disrupted sediment and amazing circular patterns.". (Main, D., 2013)

Construção:

"We report that male pufferfishes (Torquigener sp., Tetraodontidae) constructed large geometric circular structures on the seabed that played an

important role in female mate choice.". (Kawase, H., Okata, Y. & Ito, K., 2013, p.1)

Decoração:

"He arranges the sand, with mathematical perfection, into elegant and intricately designed "crop circles" and uses shells to decorate the ridges of his artwork. He then lures the female into his sand lair (in the style of The Phantom of the Opera of course) and she takes a moment to inspect his work (just like Christine did).". (Main, D., 2013)

Exibição:

"When the circles are finished, females come to inspect them. If they like what they see, they reproduce with the males, said Hiroshi Kawase, the curator of the Coastal Branch of Natural History Museum and Institute in Chiba, Japan.". (Main, D., 2013)

Tartaruga verde (Chelonia mydas)

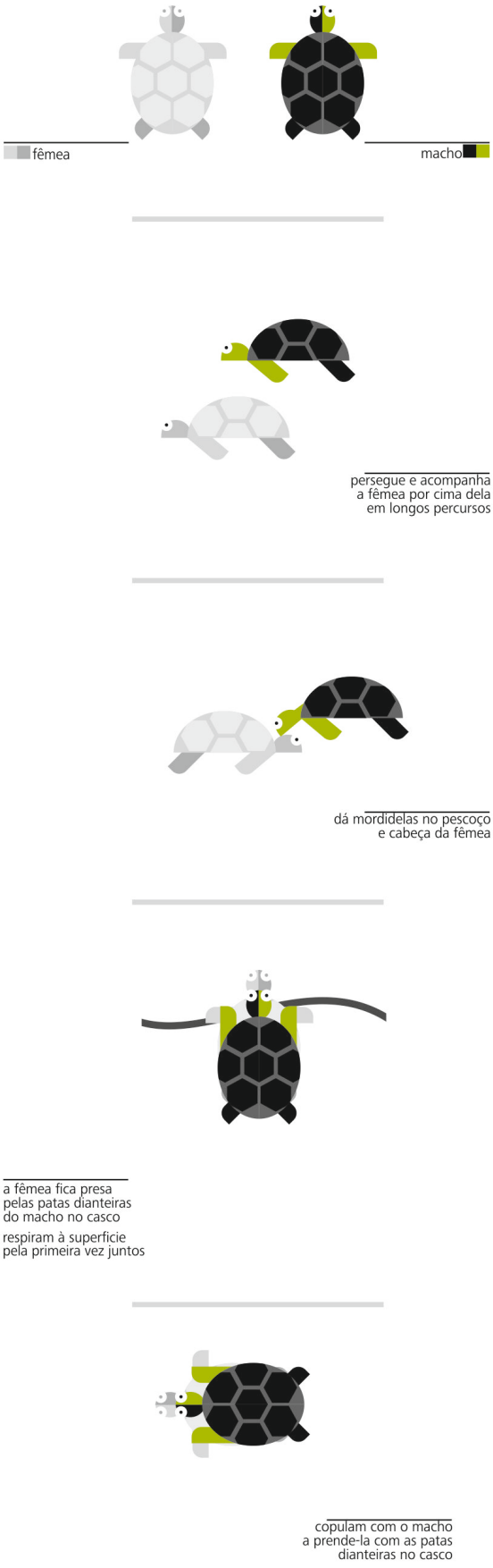


Figura 10: Diagrama do ritual (arquivo do autor).

Figura 11: Tartaruga
Fonte: http://www.pictorem.com/collection/

A plataforma online da CBC (1999), Canadá, descreve o ritual de namoro da tartaruga como breve e intenso. Começa com suaves e coordenados movimentos circulares, seguido de uma vinda à superfície para um primeiro respiro em conjunto, marcando aquilo que poderá ser o início de várias horas de acasalamento. O ritual de namoro incluí várias interações como a fricção, mordida, perseguição, montagem e escolta.

a). A zona geográfica desta espécie são os oceanos Índico, Atlântico, Pacífico e mar Mediterrânico.
"(…) these areas include parts of the Pacific Ocean, Atlantic Ocean, Mediterranean Sea, and Northern Indian Ocean. ("Status and distribution of the green turtle, Chelonia mydas, in the wider Caribbean region", 2001; Hirth, 1997; Sminoff, 2001; Stokes, et al, 2015)". (Hersh, K., 2016)

b). A iniciativa do ritual é do macho.
"The unreceptive female rejects a courting male by assuming the 'refusal' position. As the male swims along behind her, she will turn toward him and assume a vertical position in the water, with the plastron facing the male, and all limbs wide-spread.". (Booth, J. & Peters, J., 1972, p.809)

c). A Duração do ritual é curta (<h).
Resposta obtida por email com o autor, David William Owens (1990), cujo teor se reproduz de seguida:
No dia 06/09/2016, às 16:58, Owens, David William <OwensD@cofc.edu> escreveu:
Hi Pedro,

I am only guessing but I would think quick would be less than an hour but not less than 10 minutes.
Dave

From: Pedro Bandeira maia <pedrobandeiramaia@amadesign.net>
Sent: Tuesday, September 6, 2016 5:22:57 PM
To: Owens, David William
Cc: Pedro Bandeira maia
Subject: Re: PhD student in interaction design - Green sea turtles (Chelonia mydas) courtship ritual

Dear Professor,
When you say rather quick, is less then 10 minutes?

Thank you for your help.

best regards,
pedro bandeira maia

No dia 06/09/2016, às 03:48, Owens, David William <OwensD@cofc.edu> escreveu:
Dear Pedro,
The two key papers of which I am aware are :

Booth, Julie. and A. Peters. 1972. Behavioral studies on the green sea turtle (Chelonia mydas) in sea. Animal Behavior, 20:808-812. .

Comuzzie, D.C. and D. W. Owens. 1990. A quantitative analysis of courtship behavior in captive green sea turtles (Chelonia mydas). Herpetologica. 46:195-202.

The Booth paper is the classic in this poorly studied field and the Comuzzie is the only more quantitative paper I have seen. Sorry I do not have PDFs available for these papers.

Courtship may take several hours or be rather quick. This depends on the level of receptivity of the female. Mating on the other hand often lasts for several hours (even days apparently, but I can not confirm this old belief), and usually includes multiple mounted males on the same female.

Hope this helps,
Best regards,
Dave Owens
Fulbright Senior Scholar, Burma 2016

d). Os sentidos utilizados são a visão e o tato.
Visão:
"The unreceptive female rejects a courting male by assuming the 'refusal' position. As the male swims along behind her, she will turn toward him and assume a vertical position in the water, with the plastron facing the male, and all limbs wide-spread (Plate XV, Fig. 1A). Males treated in this way usually swim off and leave that female undisturbed.". (Booth, J. & Peters, J., 1972, p.809)
Tato:
"Observed components of courtship behavior included gular rubbing, biting, cloacal checking, circling and biting, chasing, following, attempted mounting, mounting, and escorting.". (Comuzzie, D., K., C. & Owens., D., W. (1990, p.195)

e). O tipo de comportamento é intimidatório e ritualizado.
Intimidatório:
"The female is completely in control of whether mating occurs or not, because the males are almost continuously sexually aggressive during the breeding season, constantly patrolling off shore and in the lagoon, attacking any large object in the water.". (Booth, J. & Peters, J., 1972, p.809)

Ritualizado:
"Courtship begins in shallow Malaysian waters with gentle, coordinated circling that is truly enchanting to watch. Together, the couple surfaces to take their first breath together, which marks the beginning of several hours of mating.". (CBC., 1999)

f). As características e ações identificadas são a reciprocidade, vigilância, persistência, intimidação, agressividade e análise.
Reciprocidade:
"But occasionally biting plays a role in the courtship, with the male nipping gently at her neck, pinching the skin lightly and releasing it. This type of bite can be seen in Plate XV, Fig. lB. The female will sometimes respond by biting him in what appears to be a playful or certainly non-aggressive manner, and

such an exchange of bites is almost invariably a prelude to copulation.". (Booth, J. & Peters, J., 1972, p.809)

Vigilância:

"The unreceptive female rejects a courting male by assuming the 'refusal' position. As the male swims along behind her, she will turn toward him and assume a vertical position in the water, with the plastron facing the male, and all limbs wide-spread (Plate XV, Fig. 1A). Males treated in this way usually swim off and leave that female undisturbed.". (Booth, J. & Peters, J., 1972, p.809)

Persistência:

"Acceptance of the refusal sign seems to be correlated with the availability of females, and a male that has accepted the refusal signal will sometimes return after cruising around the lagoon without locating a receptive female, or after finding all other females already mating.". (Booth, J. & Peters, J., 1972, p.809)

Intimidação:

"If she is not receptive, she swims away at a comparatively rapid pace, but, if pursued closely, she will circle quickly to face the male (also noted by Hendrickson 1958). Since the male prefers to approach her from behind, he swims out and around her circle, with the pair thus following an elliptical path through the water.". (Booth, J. & Peters, J., 1972, p.809).

Agressividade:

"As noted above, females not interested in courtship will bite a courting male on occasion and can inflict a deep gash.". (Booth, J. & Peters, J., 1972, p.809)

"Cloacal checks may be used by both males and females to assess reproductive condition of females.". (Comuzzie, D., K., C. & Owens., D., W. (1990, p.195)

Terrestres

Aranha (Maratus volans)

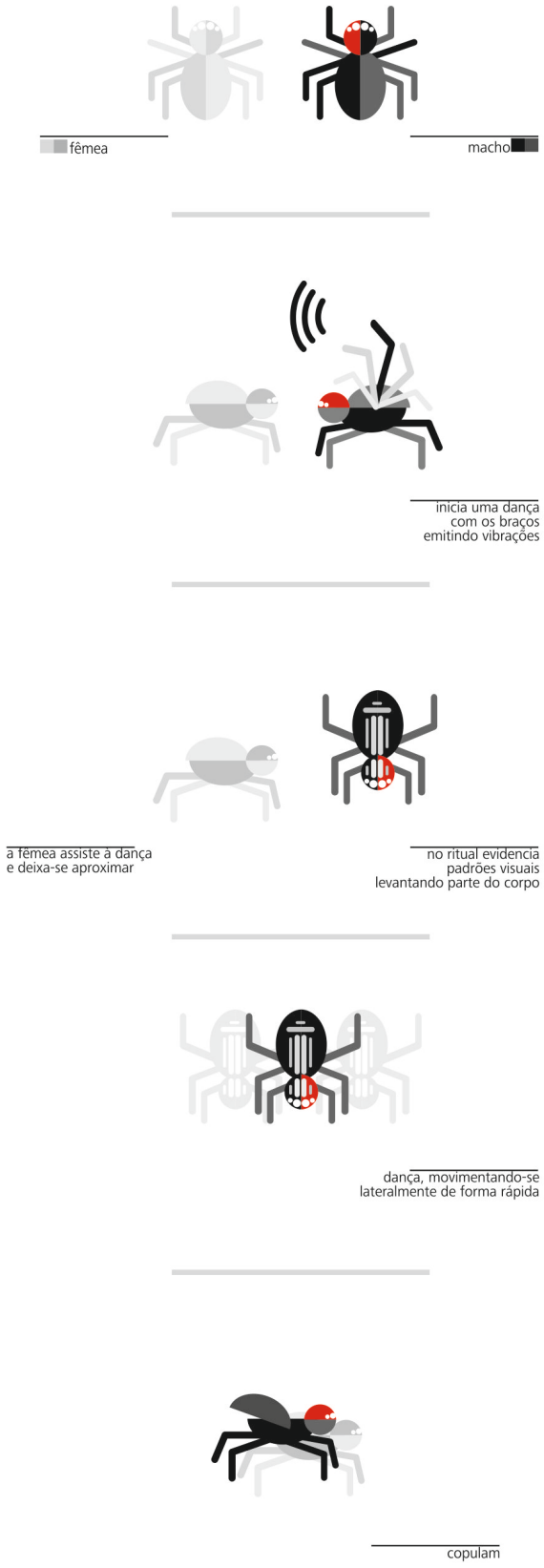


Figura 12: Diagrama do ritual (arquivo do autor).

Figura 13: Aranha.
Fonte:http://www.duskyswondersite.com/animals/bower-birds/).

De acordo com Greshko (2015), este ritual inicia-se com uma série de danças que enviam vibrações através do pavimento em direção à fêmea. Esta pequena criatura salta, levanta as pernas alternadamente, "gesticulando" freneticamente. Assim que consegue despertar o interesse da fêmea, o macho abre uma aba abdominal brilhantemente colorida e, de seguida, pavoneia-se para frente e para trás, acenando freneticamente, com as suas pernas longas e coloridas.

a). A zona geográfica desta espécie é a Austrália.
"Due to their tiny size, and perhaps because they only live in certain areas in Australia, the animals haven't been well-documented.". (Main, D., 2013)

b). A iniciativa do ritual é do macho.
" When a male peacock spider thinks he has spotted a female, "the world pretty much disappears," says Michael Kasumovic of Australia's University of New South Wales, one of the study's co-authors. The spider then begins a series of dances—including moves scientists have dubbed the "rumble-rump" and "grind-rev"—that send literal good vibrations through the ground toward the female.". (Greshko, M., 2015)

c). A Duração do ritual é curta (<h).
"Total courtship time of Maratus volans ranged from 6–51 minutes (mean= 24.35619.49 min, N=5). Use of visual and vibrational signals varied although overall patterns in the sequence of mating behavior included many distinct, stereotyped behavioral elements that could be consistently identified across individuals.".(Girard M. B., Kasumovic M.M., Elias D.O., 2011, p.1)

d). Os sentidos utilizados são a visão e o tato.

"We show that males of this species make use of both visual and vibratory modalities in their courtship efforts.". (Girard M. B., Kasumovic M.M., Elias D.O., 2011, p.1)

e). O tipo de comportamento é ritualizado.

"Once he has piqued her interest, the male unfolds a brilliantly colored abdominal flap and then struts back and forth, all the while frantically waving specially colored, lengthy legs.". (Greshko, M., 2015)

f). As características e ações identificadas são a dinâmica, a exibição e a complexidade.

Dinâmica:

"The animal dances and lifts up its tail-flap, which, once unfurled, resembles an abstract Indian blanket of intense color. The tiny creature hops about, lifts up its legs alternately like an air traffic controller, gesturing this way and that. Its large, furry mouthparts almost make it look like it's smiling, or at least mildly amused at this outrageous act.". (Main, D., 2013)

Exibição:

"The animal dances and lifts up its tail-flap, which, once unfurled, resembles an abstract Indian blanket of intense color. The tiny creature hops about, lifts up its legs alternately like an air traffic controller, gesturing this way and that. Its large, furry mouthparts almost make it look like it's smiling, or at least mildly amused at this outrageous act.". (Main, D., 2013)

Complexidade:

"For a creature so tiny — most species are around an eighth of an inch (a few millimeters) long — the display is surprisingly complex and visual.". (Main, D., 2013)

Camaleão (Chamaeleo chamaeleon)

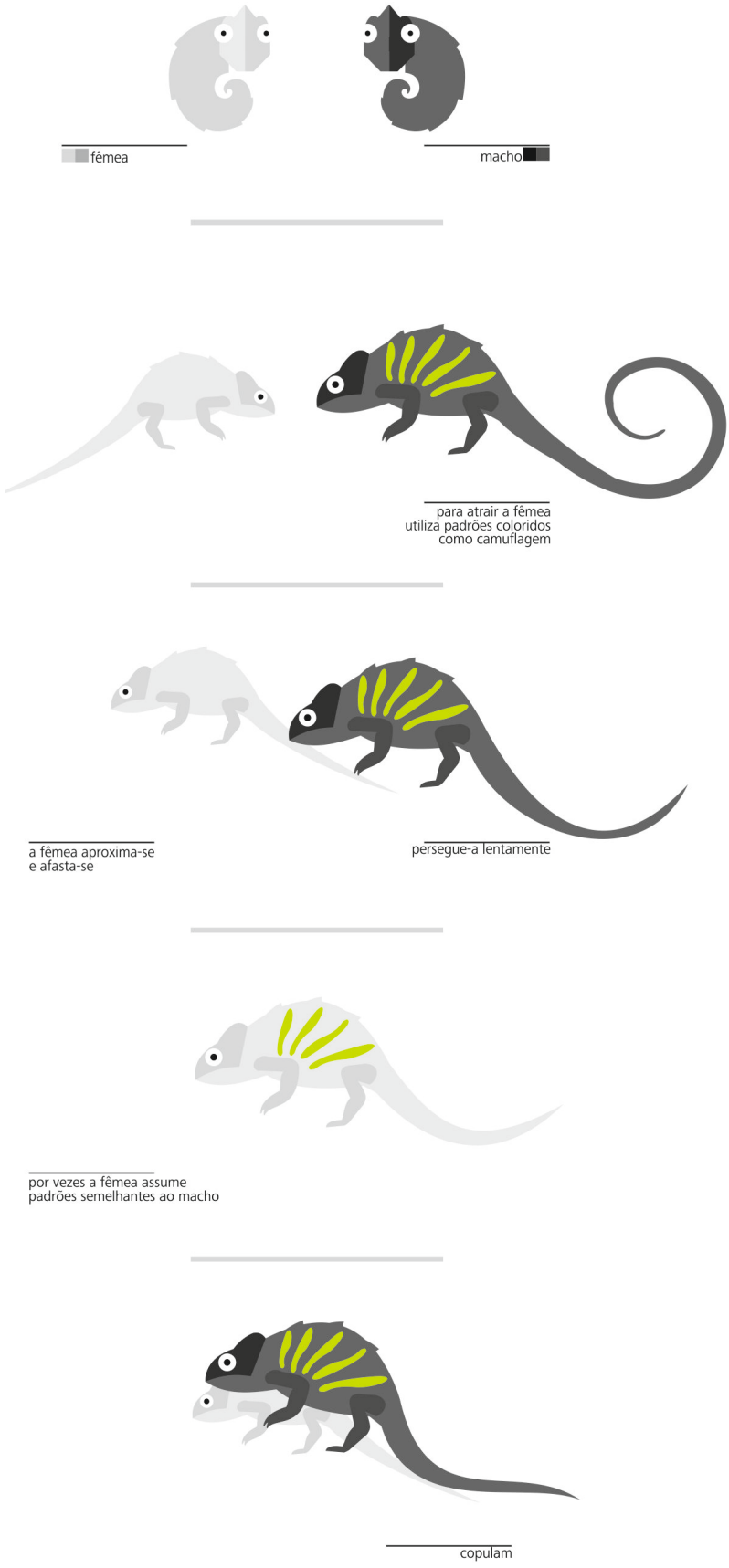


Figura 14: Diagrama do ritual (arquivo do autor).

Figura 15: Camaleão.
Fonte:http://www.duskyswondersite.com/animals/bower-birds/

Segundo a descrição publicada na revista National Geographic (Berg, E. 2008, p.89-90), os camaleões, por serem praticamente surdos, comunicam com base em sinais visuais, formas, cores e padrões, que usam para reconhecer a sua parceira, um rival, membros de outras espécies ou as suas congéneres. Os camaleões não mudam de cor só para se camuflarem, fazem-no também para se relacionarem com os seus congéneres, exercendo atração sexual ou evidenciando atividade de combate, de submissão ou de domínio.

a). A zona geográfica desta espécie é a África do Norte, Sul da Europa e Médio oriente.
"The species is found in North Africa, Southern Europe and in the Middle East (Hillenius, 1978).". (Cuadrado, M. 2000, p.426)

b). A iniciativa do ritual é do macho.
"On average, male common chameleons encountered 4.2+_ females (range 1-11,n=34) during the mating season. The male always initiated the contact.". (Cuadrado, M. 2000, p.427)

c). A duração do ritual é prolongada (>dia).
"En promedio, la fase de cortejo y emparejamiento dura aproximadamente dos semanas si bien, su duración parece estar relacionado con el tamaño de la hembra. Así, las hembras de mayor tamaño (generalmente de mayor edad) están emparejadas y son custodiadas por los machos durante un periodo de tiempo más largo que las de menor tamaño (generalmente más jóvenes).". (Cuadrado, M. 2000, p.6)
d). O sentido utilizado é a visão.

"El cortejo incluye dos pautas bien diferenciadas. En primer lugar, la exhibición (o display) del macho en lugares bien visibles y generalmente, muy próximo a la hembra. Para ello, el macho comprime su cuerpo lateralmente mostrando uno de sus flancos, se orienta
perpendicularmente con respecto a la posición que ocupa la hembra e hincha sus pulmones. El macho suele enroscar la cola y exhibe una librea (o coloración específica) de 'macho en celo' caracterizada por un color verde oscuro intenso con manchas difusas de color negro.". (Cuadrado, M. 2000, p.5)

e). O tipo de comportamento é ritualizado, enganador, brando, de exibição, amável, cortês, persistente, vigilante, utilizando também a camuflagem/alteração de cor.
Ritualizado:
"Este comportamiento está fuertemente ritualizado y dura poco tiempo (por lo general, un par de minutos).". (Cuadrado, M. 2000, p.5)
Enganador:
"Con este comportamiento los machos tratan de aparentan un mayor tamaño corporal
lo que posiblemente les confiere un mayor atractivo sexual durante el cortejo. Esta exhibición también se produce en los encuentros agresivos entre machos durante el periodo de celo. La librea de 'macho en celo' es mantenida durante la mayor parte del tiempo que el macho se encuentra emparejado si bien, durante el cortejo (y las peleas entre machos) esta coloración es mucho más intensa.". (Cuadrado, M. 2000, p.5)
Brando:
"El segundo componente del cortejo se caracteriza por el cuidado, vigilancia y persecución de la hembra (Fig. 2). El macho persigue a la hembra en sus desplazamientos, sin perderla de vista y a veces, literalmente tras sus pasos, pudiendo recorrer juntos varias decenas de metros em un sólo día.". (Cuadrado, M. 2000, p.5)

f). As características e ações identificadas são a exibição, amabilidade, cortesia, persistência, vigilância e camuflagem/alteração de cor.
Exibição:
"El cortejo incluye dos pautas bien diferenciadas. En primer lugar, la exhibición (o display) del macho en lugares bien visibles y generalmente, muy próximo a la hembra. Para ello, el macho comprime su cuerpo lateralmente mostrando uno de sus flancos, se orienta perpendicularmente con respecto a la posición que ocupa la hembra e hincha sus pulmones. El macho suele

enroscar la cola y exhibe una librea (o coloración específica) de 'macho en celo' caracterizada por un color verde oscuro intenso con manchas difusas de color negro (Fig. 1).". (Cuadrado, M. 2000, p.5)

Amabilidade e Cortesia:

"El segundo componente del cortejo se caracteriza por el cuidado, vigilancia y persecución de la hembra (Fig. 2).". (Cuadrado, M. 2000, p.5)

Persistência e Vigilância:

"El macho persigue a la hembra en sus desplazamientos, sin perderla de vista y a veces, literalmente tras sus pasos, pudiendo recorrer juntos varias decenas de metros en

un sólo día. A veces, el desplazamiento de las hembras se limita a un área muy concreta

definiendo así un área de campeo determinada. En otros casos, los movimientos de la hembra (y del macho que la persigue) son más erráticos. El cuidado de la hembra tiene por objeto evitar el acoso, cortejo y cópula con otros machos.". (Cuadrado, M. 2000, p.5)

Camuflagem/alt. Cor:

"El macho suele enroscar la cola y exhibe una librea (o coloración específica) de 'macho en celo' caracterizada por un color verde oscuro intenso con manchas difusas de color negro (Fig. 1).". (Cuadrado, M. 2000, p.5)

Caracol (Helix aspersa)

Figura 16: Diagrama do ritual (arquivo do autor).

Figura 17: Caracol.
Fonte:http://www.duskyswondersite.com/animals/bower-birds/

Referindo a investigação do National Geographic online (Mayell, H. 2004), os caracóis de jardim (Helix aspersa) usam "dardos de amor" para alcançar o seu objetivo. O ritual, consiste em circundarem-se um ao outro, de forma a obter a melhor posição para atirar um "dardo de amor", mas não ser espetado pelo companheiro.

a). As zonas geográficas de origem desta espécie são, as Ilhas Britânicas, Europa Ocidental e o Mediterrâneo.
"The Helix aspersa was originally found in the British islands, western Europe and the Mediterraneo, reaching some regions of north Africa, and the middle east.". (http://www.snail-world.com/garden-snail/)

b). A iniciativa do ritual é de ambos.
"The hermaphroditic snails have both male and female characteristics, but do not self-fertilize. Courtship, which could take anywhere from 15 minutes to several hours, consists of circling one another to get in the best position to shoot a love dart but not be shot.
"Love is coming down to war in a way," said Ronald Chase, a biologist at McGill University in Montreal. "Sexual conflict plays out, even though both members of the mating pair are hermaphrodites.". (Mayell, H. 2004)

c). A duração do ritual pode ser curta (<h) ou média (<dia).
"The hermaphroditic snails have both male and female characteristics, but do not self-fertilize. Courtship, which could take anywhere from 15 minutes to several hours, consists of circling one another to get in the best position to shoot a love dart but not be shot.". (Mayell, H. 2004)

d). Os sentidos utilizados são o tato.

"Courtship, which could take anywhere from 15 minutes to several hours, consists of circling one another to get in the best position to shoot a love dart but not be shot.". (Mayell, H. 2004)

e). O tipo de comportamento é enganador, intimidatório, brando, amável, cortês, mas dominador.

Enganador:

"Courtship, which could take anywhere from 15 minutes to several hours, consists of circling one another to get in the best position to shoot a love dart but not be shot.". (Mayell, H. 2004)

Intimidatório:

"The marine flatworm Pseudobiceros hancockanus takes the mating fight one step further, in what scientists call penis fencing. Each flatworm is a hermaphrodite with two penises. The mating ritual consists of dueling penises, each flatworm trying to pierce the skin of the other with its sharp-tipped organ. The winner—the stabber—transfers its sperm. The loser gets what scientists call the burden of motherhood: the considerable energy costs of caring for the developing eggs.". (Mayell, H. 2004)

Brando:

"Reproduction takes place in early summer, and begins with pairing and courtship. After a period in which the members of the pair caress each other with their tentacles, each snail pierces the skin of its partner with a calcareous 'love dart', a spiny projection which is covered in mucus. The function of this love dart is unclear, but it is thought that the mucus may act to improve the survival of sperm. Mating then takes place; each snail inserts its penis into its partner at the same time (6).". (Koene, J. M. & Chase, R., 1998)

f). As características e ações identificadas são a amabilidade, cortesia e o domínio.

Amabilidade e Cortesia:

"After a period in which the members of the pair caress each other with their tentacles, …". . (Koene, J. M. & Chase, R., 1998)

Domínio:

"Successful dart shooting seems to only benefit the dart shooter, not the recipient," Chase said. "It causes damage"—although Chase has seen snails shot through the brain and still live—"it hurts, and it increases the number of babies the shooter is going to get.". (Mayell, H. 2004)

Ouriço (Erinaceus europaeus)

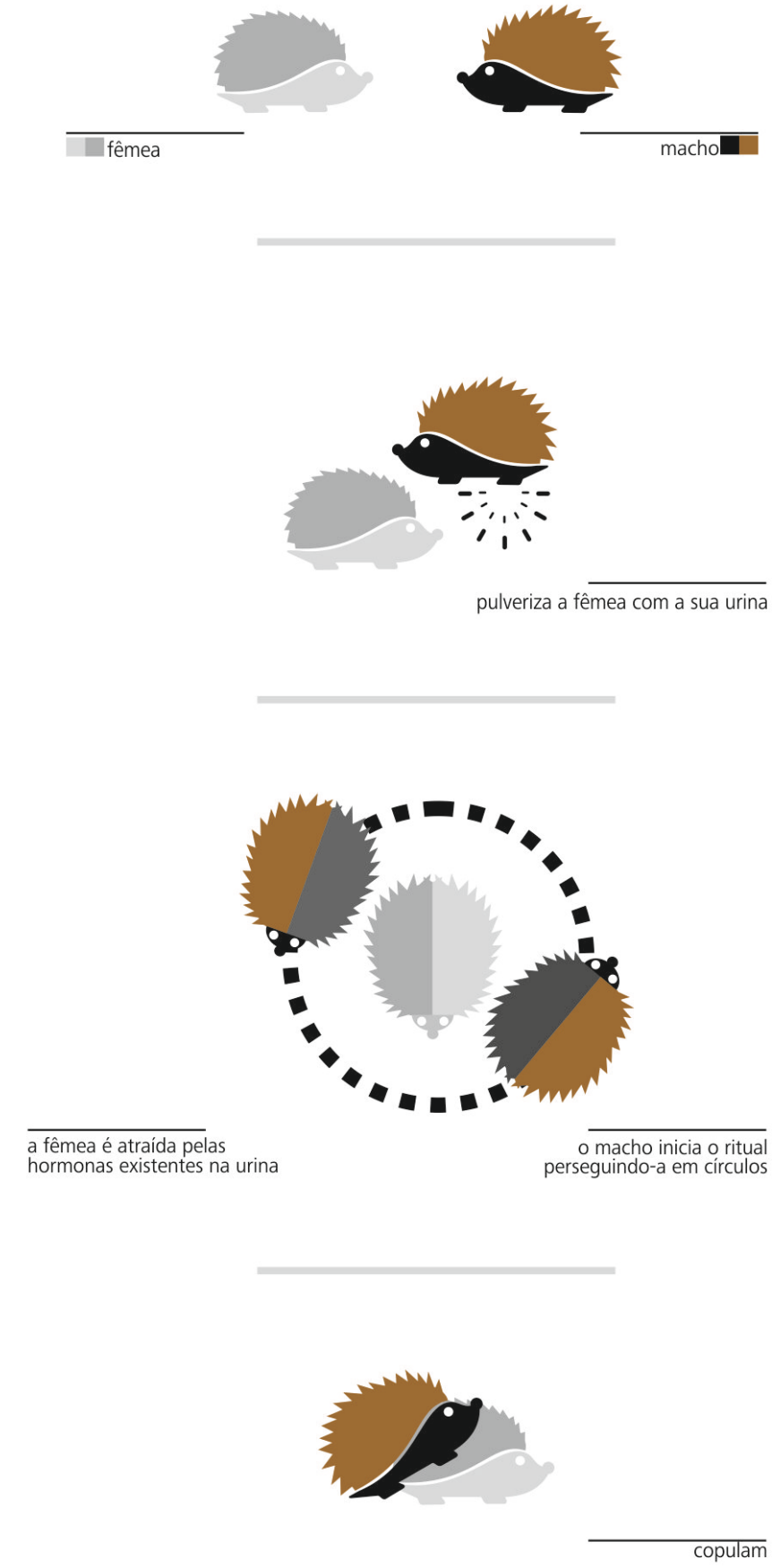


Figura 18: Diagrama do ritual (arquivo do autor).

Figura 19: Ouriço.
Fonte:http://www.moment.ee/aju/siil_0122.jpg

Haigh & O'Riordan (2012) referem que, quando os ouriços machos encontram o parceiro ideal para copular, começam o ritual por se aproximar da fêmea de forma persistente, circundando-a e fazendo sonoridades elevadas, de forma a tentar chamar a sua atenção, o que, por vezes, pode durar horas. O odor desempenha um papel importante neste comportamento.

a). A zona geográfica desta espécie é a Europa e Ásia Central.
"Erinaceus europaeus (European hedgehog) is commonly found across Europe and into central Asia. Native of this region, it can be found from the Archipelago of the Azore and as far east as Khazakstan.". (Roberts, C., 2011)

b). A iniciativa do ritual é do macho.
"Courtship behaviour in hedgehogs is characterised by the male circling around the female with one or both sexes snorting loudly (Reeve & Morris 1986).". (Haigh & O'Riordan, 2012, p.41)

c). A Duração do ritual é média (<dia).
"Courtship behaviour in hedgehogs is characterised by the male circling around the female with one or both sexes snorting loudly (Reeve & Morris 1986). According to Jackson (2006) this ritual may continue for over an hour, with the majority of displays failing to end in a successful mating.". (Haigh & O'Riordan, 2012, p.41)

d). Os sentidos utilizados são o olfato, a audição e o tato.
Olfato:
"Reeve (1994) suggested that odour plays an important part in hedgehogs' pre-mating behaviour, with males attracted to females in oestrus and certainly in this study this appeared to be the case with a male seen running

towards a lone female from the other side of the nine ha pasture in June 2010.". (Haigh & O'Riordan, 2012, p.50)

Audição:

"courtship involves the male circling closely around the female, with one or both sexes snorting loudly". When courtship behavior was observed, the identification of individuals involved was recorded, in addition to their location, the length of time which they spent engaged in courtship behaviour and whether the behaviour concluded in a successful mating.". (Haigh & O'Riordan, 2012, p.44)

Tato:

"Courtship behaviour was usually first obvious by the loud hisses of the female. The hedgehogs faced each other, the male attempting to approach the female who would lunge forward, pushing her head underneath his body, while she forcefully pushed him away. The male would again edge forward and attempt to move behind the female, progressing in wide circles, and moving behind large clumps of grass. The female quickly circled around to avoid the male approaching behind her and again the hissing resumed.". (Haigh & O'Riordan, 2012, p.45)

e). O tipo de comportamento é intimidatório.

"When a male finds a mate, he circle for several hours, making several attempts to mount. If the female continually rejects the male, he eventually leaves to find a receptive female. If she accepts him, she flattens her spines and lowers herself to the ground, wich gives the male better access.". (Roberts, C., 2011)

f). As características e ações identificadas são a persistência, a intimidação, a subserviência e interação física.

Persistência e intimidação:

"When a male finds a mate, he circle for several hours, making several attempts to mount. If the female continually rejects the male, he eventually leaves to find a receptive female.". (Roberts, C., 2011)

Subserviência:

"If she accepts him, she flattens her spines and lowers herself to the ground, wich gives the male better access.". (Roberts, C., 2011)

Interacção física:

"Courtship behaviour was usually first obvious by the loud hisses of the female. The hedgehogs faced each other, the male attempting to approach the female who would lunge forward, pushing her head underneath his body, while she forcefully pushed him away. The male would again edge

forward and attempt to move behind the female, progressing in wide circles, and moving behind large clumps of grass.". (Haigh & O'Riordan, 2012, p.45)

Intimidatório:

"When a male finds a mate, he circle for several hours, making several attempts to mount. If the female continually rejects the male, he eventually leaves to find a receptive female. If she accepts him, she flattens her spines and lowers herself to the ground, wich gives the male better access.". (Roberts, C., 2011)

Pirilampo (Photinus pyralis)

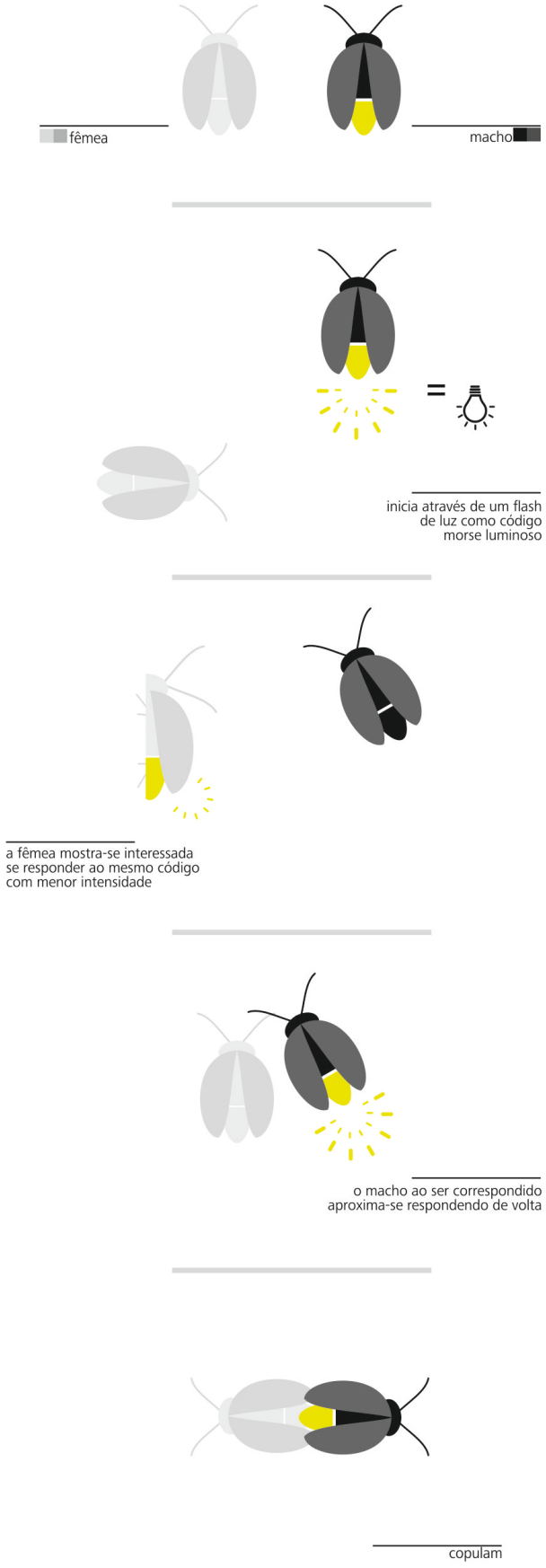


Figura 20: Diagrama do ritual (arquivo do autor).

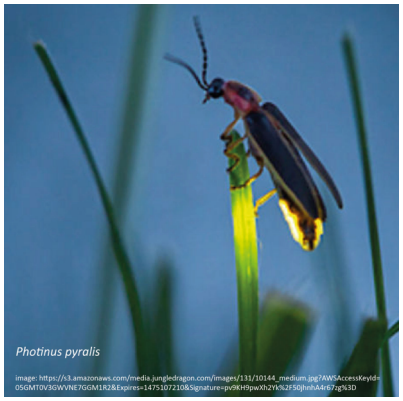


Figura 21: Pirilampo.
Fonte:https://s3.amazonaws.com/media.jungledragon.com/images/131/10144_medium.jpg?AWSAccessKeyId=05GMT0V3GWVNE7GGM1R2&Expires=1475107210&Signature=pv9KH9pwXh2Yk%2F50jhnhA4r67zg%3D

Stilwell (2012), alude que não é só a luz fria produzida (bioluminescência) que serve para atrair os parceiros, mas também o ritmo e a frequência com que se acende e apaga, parecendo que estão a comunicar por código morse. São na verdade canções de amor silenciosas. Quando uma fêmea vê uma cintilação de um macho que lhe interesse, aponta a sua lanterna na direção dele e responde com outra cintilação. Voa para mais perto e ele cintila de novo.

a). A zona geográfica desta espécie é a América do Norte.
"The common eastern firefly, or North American firefly, ranges throughout the United States east of the Rocky Mountains.". (McKenzie, J. 2001)

b). A iniciativa do ritual é do macho.
"Rhythmically flashing males fly individual patrols over low vegetation in witch females are perched. If a female answers the signal of a male the two fireflies may begin a courtship involving a series of alternating, timed flashes (McDermott 1910-1917, 1914; Mast 1912; Buck 1937a; Lloyd 1966, 1971).". (Buck, J. & Buck, E., 1978, p.471)

c). A Duração do ritual é rápida (<10m).
"During courting, the solitary Photinus pyralis male flies along slowly, flashing about every 6 s (23°), and the sedentary female answers each of his signals after a 2-s delay (latency) (McDermott, 1911; Mast, 1912). The roving male responds to the female if, and only if, her answering flash occurs during the "early window;' 1.5 to 2.5 s after his flash (Buck, 1937b; Case, 1984). Responses involve orientation and approach, but not giving a flashed answer. In addition, when two males are less than a meter apart and A flashes during B's "late window;' 3.5 s or more after B's flash, B may flash immediately (0.4

s) (Buck, 1938; Case, 1984; Buck, Buck, Case and Hanson, unpub.). Ns stimulus flash and B's response are thus closely clumped in time in comparison with the 6-s species interflash interval- i.e., A has caused B to synchronize with him.". (Buck, J., 1988, p.268)

d). Os sentidos utilizados são a visão.
"Synchronized flashing in firefly congregations implies that each participant is responding to visual input from others.". (Buck, J., 1988, p.268)

e). O tipo de comportamento é ritualizado.
"Synchronized flashing in firefly congregations implies that each participant is responding to visual input from others. There is a large literature demonstrating that single male and female fireflies of both synchronizing and nonsynchronizing species respond to flashes from other fireflies and to light signals from artificial sources, and that both spontaneous and responsive flashing are under nervous control.". (Buck, J., 1988, p.268)

f). As características e ações identificadas são o ritmo, a reciprocidade, a sincronização, a exibição e a reciprocidade.
Ritmada e Reciprocidade:
"In practice, firefly "synchrony" refers to coordinated rhythmic group flashing, a definition covering serial responses to rhythmic photic driving (led or triggered synchrony), sequential individual-to-individual excitation (wave synchrony) and other types of mutual flashing discussed below.". (Buck, J., 1988, p.267)
Sincronização:
"Synchronized flashing in firefly congregations implies that each participant is responding to visual input from others. There is a large literature demonstrating that single male and female fireflies of both synchronizing and nonsynchronizing species respond to flashes from other fireflies and to light signals from artificial sources, and that both spontaneous and responsive flashing are under nervous control.". (Buck, J., 1988, p.268)
Exibição e Reciprocidade:
"… as fêmeas estão no chão a espreguiçar-se e a avaliar as suas opções. Têm muitos machos para escolher e são muito exigentes. Quando uma fêmea vê uma cintilação de um macho, aponta a sua lanterna na direção dele e responde com outra cintilação. Voa para mais perto e ele cintila de novo.". (Lewis, S. 2014, 7m51s).

Voadores

Ave-lira (Menura novaehollandiae)

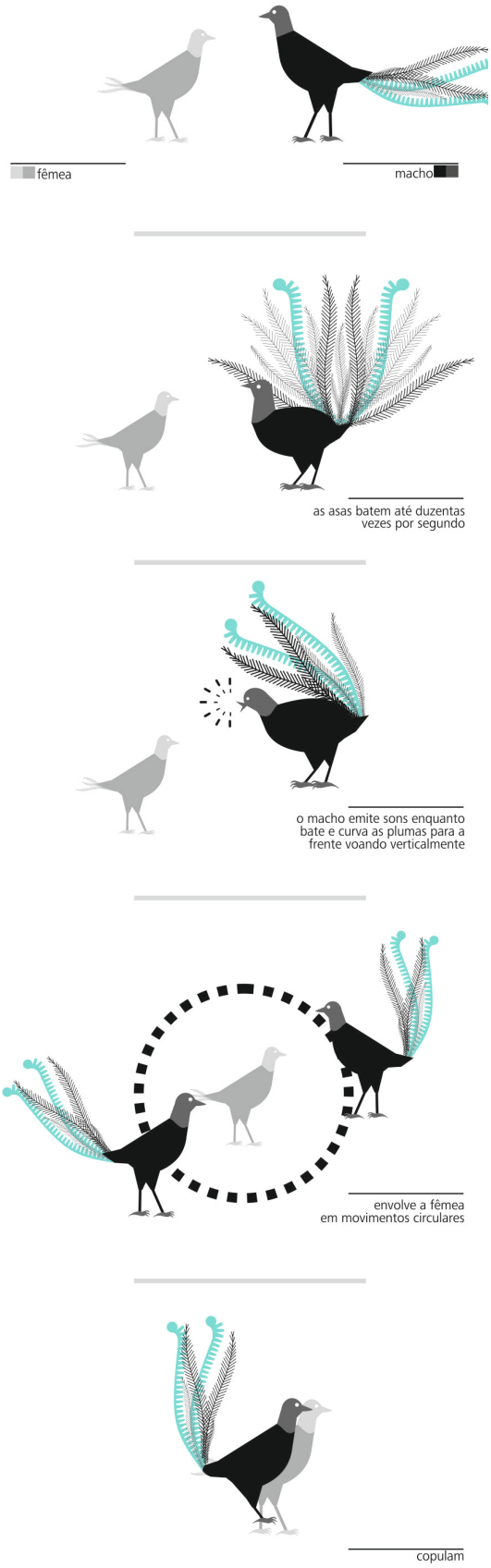


Figura 22: Diagrama do ritual (arquivo do autor).

Figura 23: Ave-lira.
Fonte:http://farm8.staticflickr.com/7401/9319608165_2aaabea989_o.jpg,

Anderson (2013), no artigo publicado na plataforma online do site SCI-News (www.sci-news.com), descreve este comportamento como um elaborado ritual de acasalamento onde a ave-lira coordena a canção com a dança. Os machos ave-lira cantam quatro tipos de músicas diferentes, combinando cada um com um conjunto único de movimentos, apresentando os tipos de música e dança através de uma sequência previsível. Os movimentos de dança das aves-lira são um embelezamento voluntário do canto, uma vez que eles podem e cantam sem dançar.

a). A zona geográfica desta espécie é a Austrália.
Conforme quadro apresentado no site da International Union for Conservation of Nature (IUCN). (BirdLife International, 2016)

b). A iniciativa do ritual é do macho.
"To entice females into plumage-viewing range, the lyrebird sings the most elaborate and complex song he can muster, by copying the calls of all the other creatures in the forest and mixing them in with his own.". (Perkins, C., 2015)

c). A Duração do ritual é rápida (<10m).
Resposta obtida por email com autora Anastasia Dalziell (2013), cujo teor se reproduz de seguida:
No dia 27/08/2016, às 00:50, Anastasia Helen Dalziell <anastasia.dalziell@cornell.edu> escreveu:
Dear Pedro,
Thank you for your interest in our work on lyrebirds.
Your question - what is the duration of courtship - is slightly complicated in lyrebirds because females probably listen to males singing for several days before she visits a male.

However, the final courtship display that occurs immediately (minuets) before copulation is a song and dance display.

d). Os sentidos utilizados são a audição e visão.

Audição:

"During displays, male superb lyre- birds (Menura novaehollandiae) sing four different song types, matching each with a unique set of movements and delivering song and dance types in a predictable sequence. Crucially, display movements are both unnecessary for the production of sound and voluntary, because males some- times sing without dancing.". (Dalziell, A. H. et al. 2013, p.1113)

Visão:

"During the courtship display, the male emphasises his long extravagant tail by flipping it over his head and fanning it across his back. In 2013, researchers discovered the male lyrebird has one final trick up his sleeve: coordinating choreographed dance steps with specific songs.". (Perkins, C., 2015)

e). O tipo de comportamento é brando e ritualizado.

Brando:

"Breeding occurs in winter, when males prepare raised display mounds of scratched earth. To entice females into plumage-viewing range, the lyrebird sings the most elaborate and complex song he can muster, by copying the calls of all the other creatures in the forest and mixing them in with his own.

This grand master of mimicry can convincingly rattle off the calls of up to 20 other species in a five-minute window, and has even been known to steal more unnatural sounds for his show, including camera shutters, chain saws and car alarms. Ornithologists think that female lyrebirds judge potential mates on both mimetic accuracy and versatility.". (Perkins, C., 2015)

Ritualizado:

"Male lyrebirds ordered their songs and associated gestures into a predictable sequence.". (Dalziell, A. H. et al. 2013, p.1113)

f). As características e ações identificadas são a imitação, a exibição, a sincronização, a dinâmica e a aprendizagem.

Imitação:

"To entice females into plumage-viewing range, the lyrebird sings the most elaborate and complex song he can muster, by copying the calls of all the other creatures in the forest and mixing them in with his own.

This grand master of mimicry can convincingly rattle off the calls of up to 20 other species in a five-minute window, ...". (Perkins, C., 2015)

Exibição:

"During the courtship display, the male emphasises his long extravagant tail by flipping it over his head and fanning it across his back. In 2013, researchers discovered the male lyrebird has one final trick up his sleeve: coordinating choreographed dance steps with specific songs.". (Perkins, C., 2015)

Sincronização:

"Male lyrebirds sing four different song types (A – D), matching each with a unique set of movements and delivering song and dance types in a predictable sequence.". Anderson, N. (2013).

Dinâmica:

"While singing song A – which sounds like a 1980s video game – a male lyrebird typically steps sidewise with his tail spread over his head like a veil; but when he sings song C he narrows his tail so it resembles a mohawk, flaps his wings, and performs little jumps and bobs.". Anderson, N. (2013).

Aprendizagem:

"Lyrebirds aren't born good mimics. Young male lyrebirds are really bad mimics and they are hopeless at imitating grey strike-thrush songs. They improve as they get older, but that takes years and years of practice.". Anderson, N. (2013).

Ave-do-paraíso (Parotia lawesii)

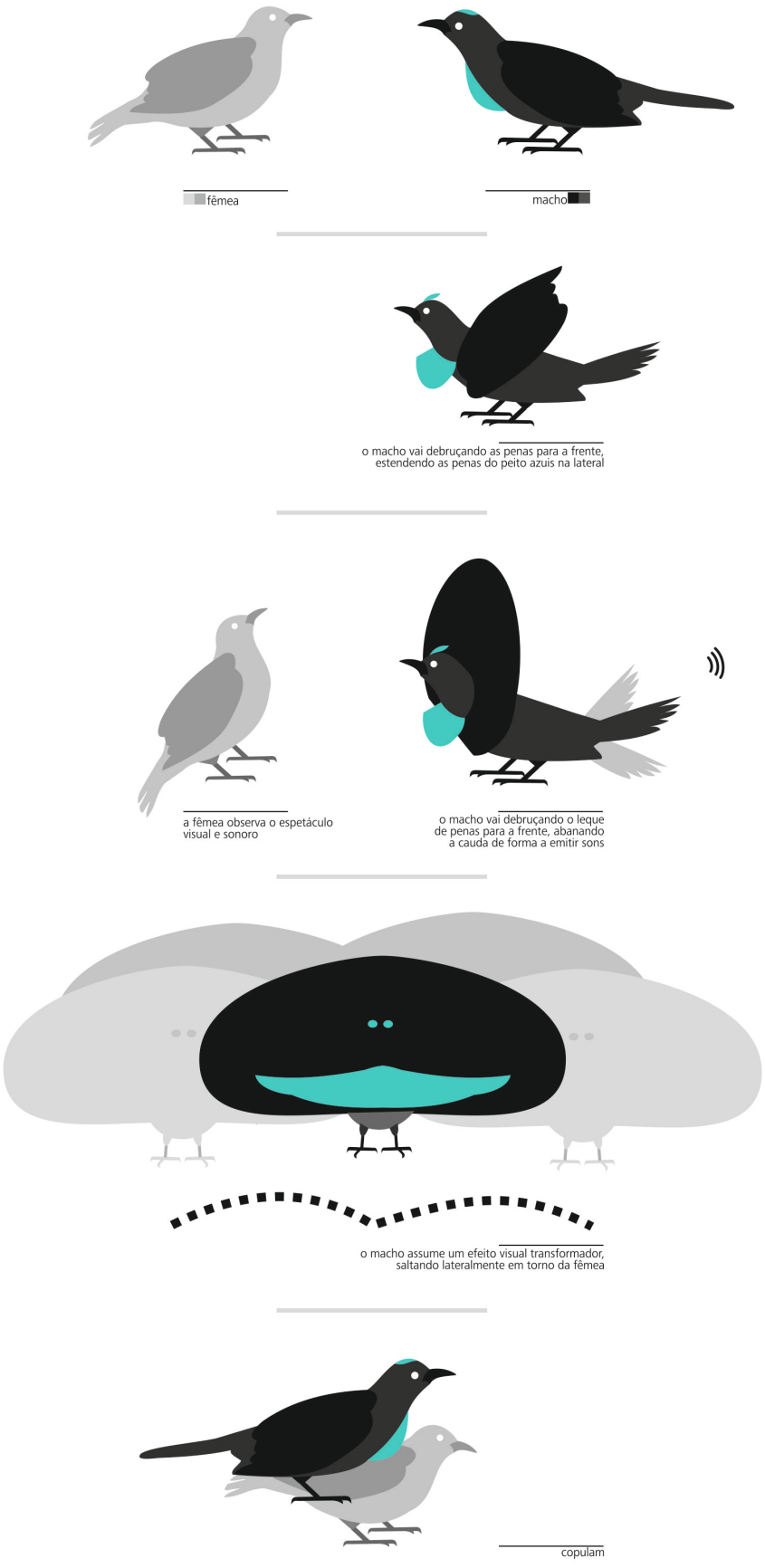


Figura 24: Diagrama do ritual (arquivo do autor).

Figura 25: Ave do Paraíso.
Fonte:http://cdn.lightgalleries.net/4bd5ec0079abc/images/BOP-111017-015---Version-2-1.jpg

Stilwell (2012, p.29) identifica a associação entre a graciosidade dos movimentos e a eminência das cores como uma importante característica deste ritual. A ave-do-paraíso conjuga a melhor "roupagem" com uma soberba coreografia, abrindo a cauda e as suas asas coloridas. Esvoaçam continuamente entre árvores, rodam acrobaticamente sobre os ramos, e contorcionam a cabeça sobre o dorso.

a). A zona geográfica desta espécie é a Papua Nova Guiné, de acordo com a informação apresentada no site da BirdLife International (http://www.iucnredlist.org/).

b). A iniciativa do ritual é do macho.
"Male advertisement calls were frequently heard during observation sessions and of those recorded, 24 were suitable for analysis. The most common call is a single loud raspy squawk that sounds like a nasal ''nyaack '' from a distance, especially when repeated multiple times. At close range, the sound is a more defined throaty ''yaack ''.". (Scholes, E., 2007, p. 264)

c). A Duração do ritual é rápida (<10m).
Informação recolhida através da visualização do vídeo do Cornell Lab of Ornithology (2013).

d). Os sentidos utilizados são a visão, audição e tato.
Visão:
"The ballerina dance is considered to be a presentation display (Fig. 3) because it is directed toward females observing at close range from the main court perch and because of its complexity and focal emphasis on plumage ornamentation. During the display, the male erects the flank plumes around the body – resembling a ballerina's tutu – while performing an intricate

dance. The display has one version (stationary waggle; Fig. 7 ; see additional comments below), five phases (stand, bow, walk, pause, and waggle; Fig. 7), and 24 elements.". (Scholes, E., 2007, p. 267)

Audição:

"Male advertisement calls were frequently heard during observation sessions and of those recorded, 24 were suitable for analysis. The most common call is a single loud raspy squawk that sounds like a nasal ''nyaack '' from a distance, especially when repeated multiple times. At close range, the sound is a more defined throaty ''yaack ''.". (Scholes, E., 2007, p. 264)

Tato:

"This behavior is hypothesized to be a mate-sampling behavior (Fig. 3). Females pick up objects placed on the court floor by the male, hold them in the bill, and carry them away.". (Scholes, E., 2007, p. 264)

e). O tipo de comportamento é ritualizado, enganador e material.

Ritualizado:

Informação recolhida através da visualização do vídeo do Cornell Lab of Ornithology (2013, 23s - 1:18s).

Enganador:

"This behavior pattern is hypothesized to be displacement behavior (Fig. 3) because it appears similar in form to court clearing, but takes place in the presence of females prior to the courtship display sequence. The male lowers his head to the ground as if pecking to remove minute debris, but the bill usually does not touch the surface and nothing is actually moved or cleared from the court.". (Scholes, E., 2007, p. 265)

Material:

"This behavior is hypothesized to be a mate-sampling behavior (Fig. 3). Females pick up objects placed on the court floor by the male, hold them in the bill, and carry them away.". (Scholes, E., 2007, p. 265)

f). As características e ações identificadas são a dinâmica, a exibição e a complexidade.

Amabilidade e Cortesia:

"Limpa os galhos das árvores e o seu local.". (BBC Earth, 2015, 23s)

Dinâmica:

"The ballerina dance is considered to be a presentation display (Fig. 3) because it is directed toward females observing at close range from the main court perch and because of its complexity and focal emphasis on plumage ornamentation.". (Scholes, E., 2007, p. 267)

Exibição:

"During the display, the male erects the flank plumes around the body – resembling a ballerina's tutu – while performing an intricate dance. The display has one version (stationary waggle; Fig. 7 ; see additional comments below), five phases (stand, bow, walk, pause, and waggle; Fig. 7), and 24 elements.". (Scholes, E., 2007, p. 267)

Passaro-cetim (Ptilonorhynchus violaceus)

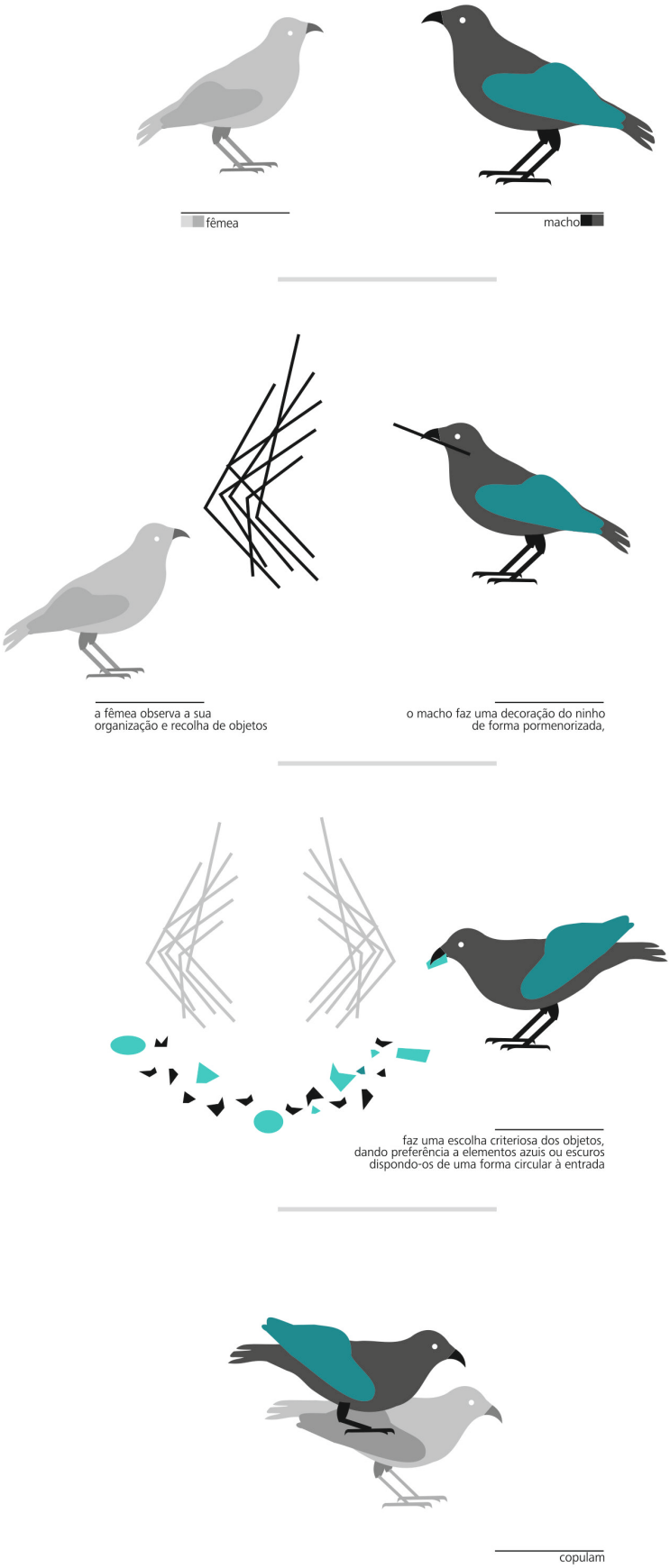


Figura 26: Diagrama do ritual (arquivo do autor).

Figura 27: Pássaro jardineiro.
Fonte:http://www.bbc.com/earth/story/20141124-animal-apprentices-the-complex-relationships-required-to-succeed

Segundo a revista National Geographic (2010, p.36 e 37), o pássaro jardineiro para conquistar as fêmeas, pavoneia-se, canta e torna-se "decorador". Para impressionar as fêmeas, os machos constroem estruturas, apanham meticulosamente, seixos brancos e cinzentos, cascas de caracol, tiras de plástico coloridas, arame, tampas de garrafa, folha de alumínio, espelhos, entre outros desperdícios. Na disputa pela fêmea, lutam entre si, roubam enfeites uns aos outros e destroem estruturas alheias.
Stilwell (2012, p. 34) acrescenta que, quando a fêmea visita a estrutura, o pássaro-cetim segue-a exibindo os seus presentes e pavoneando-se orgulhoso. Alguns estudos indicam que as fêmeas mais novas deixam-se convencer pelos presentes, mas que as mais experientes, preferem os machos que investem mais na dança e no canto.

a). A zona geográfica desta espécie é a Austrália.
"This spectacular courtship ritual during the November and December mating season has long attracted ornithologists to the species formally known as satin bowerbirds, native to Australia.". (Trivedi, B., P., 2003)

b). A iniciativa do ritual é do macho.
"Male bowerbirds famously woo females by fashioning elaborate bowers — not nests but Ushaped showplaces with parallel walls of twigs. There the males prance and noisily serenade the females.". (Trivedi, B., P., 2003)

c). A Duração do ritual é curta (<h).
Resposta obtida por email, de dia 25 de Agosto de 2016, com o professor Gail Patricelli (2013), cujo teor se reproduz:
Dear Pedro,

Apologies for my slow answer; I've been travelling this summer. Typically female mate searching involves 2 bouts of courtships (described in Uy et al 2001). First there are short courtships (~2+ minutes) with a few males, then females take a break during which they may build their nests, then there is a second round of courtships with the top-choice males, which are usually longer (~10 minutes). A later study by Coleman et al. (2004) found that females often visit briefly while males are absent and then preferentially return for courtship by males with nice bowers and nice decorations. So it's like a job search. Females start by checking the resume, then they do short interviews with the best applicants, then they call back the top few for extended interviews. It's pretty cool! My own PhD research addresses the details of how males and females interact during courtship. I used robotic females to show that successful males respond to subtle female behaviors by adjusting their courtship behaviors.
I have attached a bunch of papers that deal with satin bowerbird courtship.
Hope this helps!
-Gail
(Departament of Evolution and Ecology – University of California)

d). Os sentidos utilizados são a audição e a visão.
Audição:
"male satin bowerbirds mimic the calls of other bird species to attract a mate.". (Trivedi, B., P., 2003)
Visão:
"When a female enters a bower, the male ruffles his feathers, stretches his wings and makes loud buzzing sounds as he struts and runs about. Meanwhile the female also is apparently checking out his architectural talent—the bower's symmetry and decoration (females are partial to anything blue like a feather, a bottle cap or a shell).". (Trivedi, B., P., 2003)

e). O tipo de comportamento é material e ritualizado.
Ritualizado:
"When a female enters a bower, the male ruffles his feathers, stretches his wings and makes loud buzzing sounds as he struts and runs about. Meanwhile the female also is apparently checking out his architectural talent—the bower's symmetry and decoration (females are partial to anything blue like a feather, a bottle cap or a shell).". (Trivedi, B., P., 2003)
Materiais:
"Male bowerbirds are famous for their courtship rituals. They carefully decorate their bowers—Ushaped platforms built from twigs and grass—with

strictly blue objects like berries and flowers, and even bottle caps and string, to attract prospective mates.". (Trivedi, B., P., 2003)

f). As características e ações identificadas são a exibição, construção, decoração, cortesia, adaptação e imitação.

Exibição:

"When a female enters a bower, the male ruffles his feathers, stretches his wings and makes loud buzzing sounds as he struts and runs about.". (Trivedi, B., P., 2003)

Construção, Decoração e Cortesia:

"Meanwhile the female also is apparently checking out his architectural talent—the bower's symmetry and decoration (females are partial to anything blue like a feather, a bottle cap or a shell).". (Trivedi, B., P., 2003)

Adaptação:

"In satin bowerbirds (Ptilonorhynchus violaceus), successful males give highly aggressive, intense behavioural displays without startling females. Males do this by modulating their displays in response to female crouching, which signals the display intensity that females will tolerate without being startled." (Patricelli, Uy & Borgia, 2003, p.2390)

Imitação:

"This suggests that mimicry is pretty important in the final decision of Mate choice¨ Coleman says. He described his results at the Conference on Acoustic Communication by Animals¨ hosted by the University of Maryland in July.". (Trivedi, B., P., 2003)

Borboleta (Danaus gilippus)

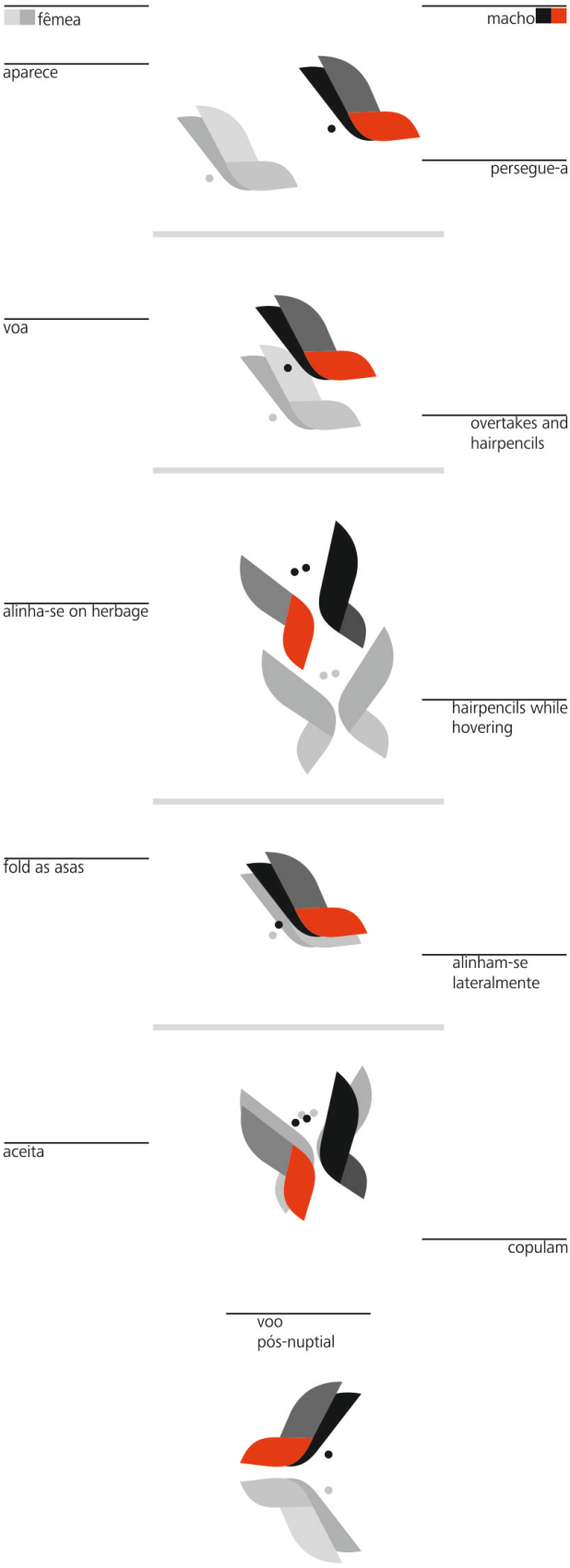


Figura 28: Diagrama do ritual (arquivo do autor).

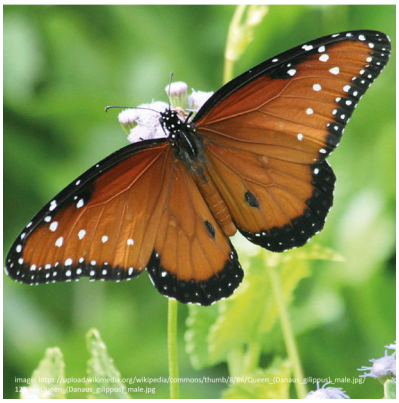


Figura 29: Borboleta.
Fonte:https://upload.wikimedia.org/wikipedia/commons/thumb/8/86/Queen_(Danaus_gilippus)_male.jpg/1280pxQueen_(Danaus_gilippus)_male.jpg,

Brower, L., P., Brower, J., V., Z. & Cranston, F., P. (1965, p.14), referem que, quando a fêmea aparece no campo visual do macho, ele voa atrás dela numa complexa perseguição aérea. Assim que o macho se consegue colocar a pouco milímetros do dorso da fêmea, o modo de voo muda rapidamente para um balancear, de forma a disseminar o seu "perfume" sobre a fêmea. Posteriormente o macho exibe movimentos de dança à sua frente. O bater das asas por parte da fêmea corresponde a uma reação positiva, incitando o macho a prosseguir.

a). A zona geográfica desta espécie, estende-se desde o Brasil até à Florida e Costa do Golfo.
"Do Brasil até florida e costa do golfo. Califórnia, Texas, Arizona e Novo México. (Douglas, 1986, Ehrlich and Ehrlich, 1961; Holland, 1907).". (Fyffe, B. 2000)

b). A iniciativa do ritual é do macho.
"To find females, males patrol all day. Females lay eggs singly on leaves, stems, and flower buds, which the larvae will eat. Adults roost communally. Males have pheromones, specific scents, which aid in mating and attract females. (Struttman 2000)". (Fyffe, B. 2000)

c). A Duração do ritual é rápida (<10m).
Resposta obtida por email, de dia 4 de Setembro de 2016, do professor Lincoln Brower (1965), Sweet Briar College, Virginia, Estados Unidos da América, cujo teor se reproduz:
No dia 04/09/2016, às 17:23, Lincoln Brower <brower@sbc.edu> escreveu:
Dear Pedro,
You will find detailed answers to your questions in:

Brower, L. P., J. V. Z. Brower, and F. P. Cranston. 1965. Courtship behavior of the queen butterfly, Danaus gilippus berenice (Cramer). Zoologica 50:1-39, 37 plates.

The short answer is less than 10 minutes.

Lincoln Brower

Research Professor – Sweet Briar College (Virginia, USA)

d). Os sentidos utilizados são olfato, tato e visão.

Olfato:

"The hairpencilling apparently serves to disseminate the perfume over the female´s antennae as she flies through the air and may also act as a tactile stimulus. She responded to this activity by slowing her forward motion and by descending towards the ground where she alighted on available herbage.". (Brower, L., P., et al., 1965, p.14)

Tato:

"The queen can mate up to 15 times and as a result the males patrol in search for a female. When found, the courtship between the female and male must be followed rigidly. The female is chased by the male and he brushes her antennae with a scent to induce her to alight."

https://sta.uwi.edu/fst/lifesciences/documents/Danaus_gilippus.pdf - ultimo acesso a 3 de setembro de 2016

Visão:

"When the female appeared in the visual field of the male, he flew after her in na aerial pursuit (phase 1). She continued to fly and might accelerate, but the male is capable of flying faster and rapidly overtook her in the air.". (Brower, L., P., et al., 1965, p.14)

e). O tipo de comportamento é intimidatório e ritualizado.

Intimidatório:

"The male chases the female and overtakes her from above. He brushes her antennae with his abdominal hairpencils, which disseminate scent, and induces the female to alight. The male continues to hover over the female, hairpencils still active, until the female becomes submissive. He alights alongside the female and copulation takes place.". (Fyffe, B. 2000)

Ritualizado:

"The queen can mate up to 15 times and as a result the males patrol in search for a female. When found, the courtship between the female and male must be followed rigidly. The female is chased by the male and he brushes her antennae with a scent to induce her to alight. Mating can last for

more than an hour (New, 1991). The females will then fly close to the ground to find a host plant for egg deposition.". Singh, N. (2015).

f). As características e ações identificadas são subserviência, perseguição e persistência.

Subserviência:

"The male chases the female and overtakes her from above. He brushes her antennae with his abdominal hairpencils, which disseminate scent, and induces the female to alight. The male continues to hover over the female, hairpencils still active, until the female becomes submissive. He alights alongside the female and copulation takes place.". Singh, N. (2015).

Perseguição:

"When the female appeared in the visual field of the male, he flew after her in na aerial pursuit (phase 1). She continued to fly and might accelerate, but the male is capable of flying faster and rapidly overtook her in the air.". (Brower, L., P., et al., 1965, p.14)

Persistência:

"O galã, quando encontra uma fêmea disponível, persegue-a num voo nupcial complexo, …, a parceira vai adiando, e adiando, o consumar da relação. O galã impaciente liberta então uma substancia que imobiliza a noiva permitindo que a noite acabe bem.". (Stilwell, G., 2012, p.33)

Cisne preto (Cygnus atratus)

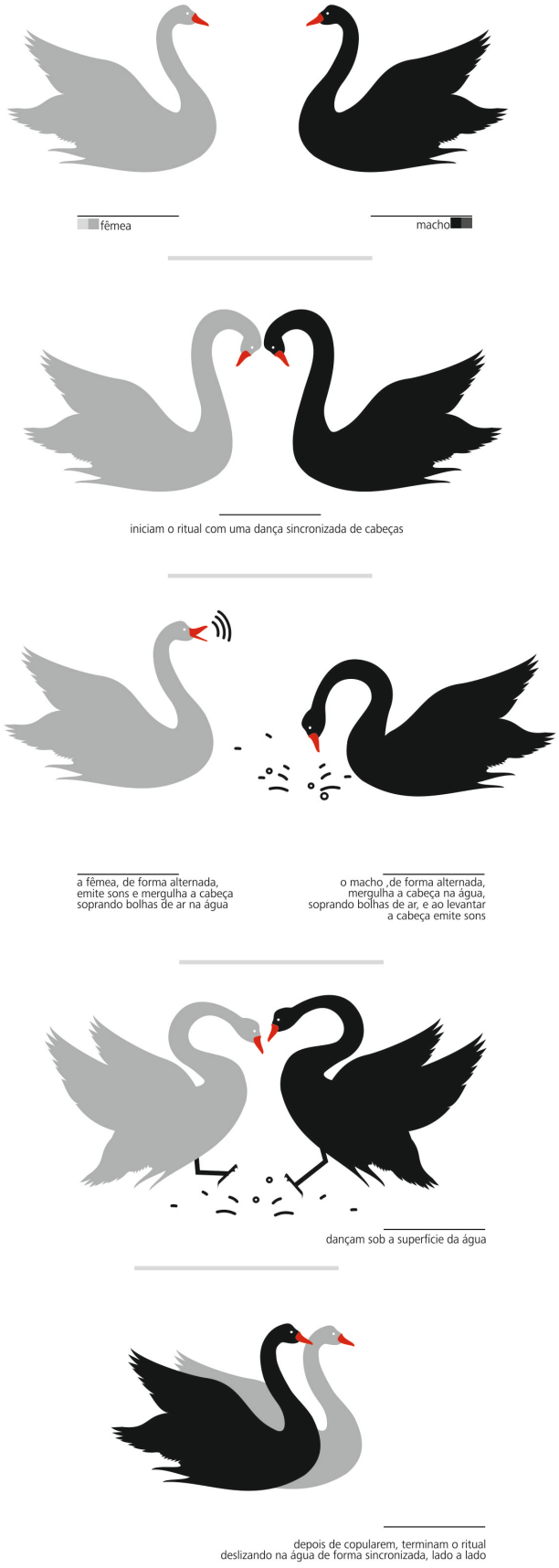


Figura 30: Diagrama do ritual (arquivo do autor).

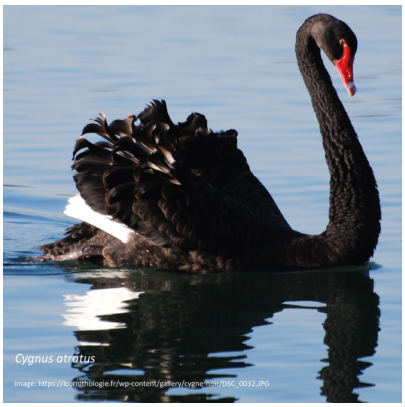


Figura 31: Cisne Preto.
Fonte:https://lcornithologie.fr/wp-content/gallery/cygne-noir/DSC_0032.JPG

De acordo com a descrição do site Myswan (http//:myswan.org.au), dinamizado por uma equipa de investigadores da universidade de Melbourne, Austrália, um elaborado ritual precede e segue o acasalamento. O macho, ou a fêmea, podem aproximar-se do seu companheiro com o pescoço esticado sobre a água, por vezes mergulhando-o. Esta ação, configura uma sugestão para que o parceiro responda com um comportamento idêntico. Conforme o processo de interação evolui, o balé aquático começa. Os cisnes cruzam os seus pescoços, graciosamente curvados e arqueados sobre o corpo do parceiro, começando a mergulhar o pescoço em sincronia, numa movimentação que pode ir até aos 20 minutos.

a). A zona geográfica desta espécie é a Austrália.

"Cygnus atratus, commonly known as black swans, are native to Australia (including Tasmania) and have been introduced to New Zealand, Europe, and North America. Black swans are found mainly in the wetlands of southern Australia and tend to avoid the northern tropics. They can also be found in across the rest of southern Australia, and in the southeast of Tasmania. After being introduced to Europe as pets, they can now be found there in the wild. (del Hoyo, et al., 1992; Delacour, 1954).". (Jackson, C. 2004)

b). A iniciativa do ritual é de ambos.

"An elaborate ritual precedes and follows mating. Either the male, or the female, may approach its mate with its neck stretched out low over the water, at times dipping it under the surface. This is a cue for its partner to respond with identical behaviour.". (Myswan_ADM, 2013)

c). A Duração do ritual é curta (<h).

Resposta obtida por email, de dia 28 Julho de 2016, do professor Raoul Mulder, da universidade de Melbourne, Austrália, cujo teor se reproduz:

No dia 28/07/2016, às 07:41, Raoul Mulder <r.mulder@unimelb.edu.au> escreveu:

Dear Pedro

This link may give you the information you need.

http://www.myswan.org.au/index.php/faqs/how-do-black-swans-mate/

In short, either sex may initiate. With respect to courtship, this will depend on how it is defined. Courtship preceding each copulation bout lasts <1h, but a pair may copulate several times over the space of a week or two.

Best wishes,

Raoul

Professor Raoul Mulder

Associate Dean, Academic Innovation | Faculty of Science

School of BioSciences

University of Melbourne

VIC 3010 AUSTRALIA

www.biosciences.unimelb.edu.au

d). Os sentidos utilizados são a visão, audição e tato.

Visão e Tato:

"Swan courtship is both beautiful, and noisy. Mute swans form the classic image of devotion, with their curved necks entwined in a perfect love heart. It's part of a courtship ritual, in which pairs face each other and, with a ruffle of feathers and lifted wings, bow gracefully.". (Crane, L., 2004)

Audição:

"Trumpeter swans go in for synchronized swimming, head bobbing and "singing"

But despite their name, mute swans are anything but silent. Their courtship "dance" is accompanied by a range of hissing and grunting sounds. The idea that swans only sing when they are dying, the so-called swan song, is a myth.". (Crane, L., 2004)

e). O tipo de comportamento é brando e ritualizado.

Brando e Ritualizado:

"Mute swans form the classic image of devotion, with their curved necks entwined in a perfect love heart. It's part of a courtship ritual, in which pairs face each other and, with a ruffle of feathers and lifted wings, bow gracefully.

Trumpeter swans go in for synchronized swimming, head bobbing and "singing".". (Crane, L., 2004)

f). As características e ações identificadas são a amabilidade, cortesia, sincronização, carinhos, reciprocidade e imitação.

Amabilidade, Cortesia, Sincronização e Carinhos:

"Swan courtship is both beautiful, and noisy. Mute swans form the classic image of devotion, with their curved necks entwined in a perfect love heart. It's part of a courtship ritual, in which pairs face each other and, with a ruffle of feathers and lifted wings, bow gracefully. Trumpeter swans go in for synchronized swimming, head bobbing and "singing". But despite their name, mute swans are anything but silent. Their courtship "dance" is accompanied by a range of hissing and grunting sounds.". (Crane, L., 2004)

Reciprocidade e Imitação:

"An elaborate ritual precedes and follows mating. Either the male, or the female, may approach its mate with its neck stretched out low over the water, at times dipping it under the surface. This is a cue for its partner to respond with identical behaviour. As the two birds come together, the aquatic ballet begins in earnest.". (Myswan_ADM, 2013)

Combatente (Philomachus pugnax)

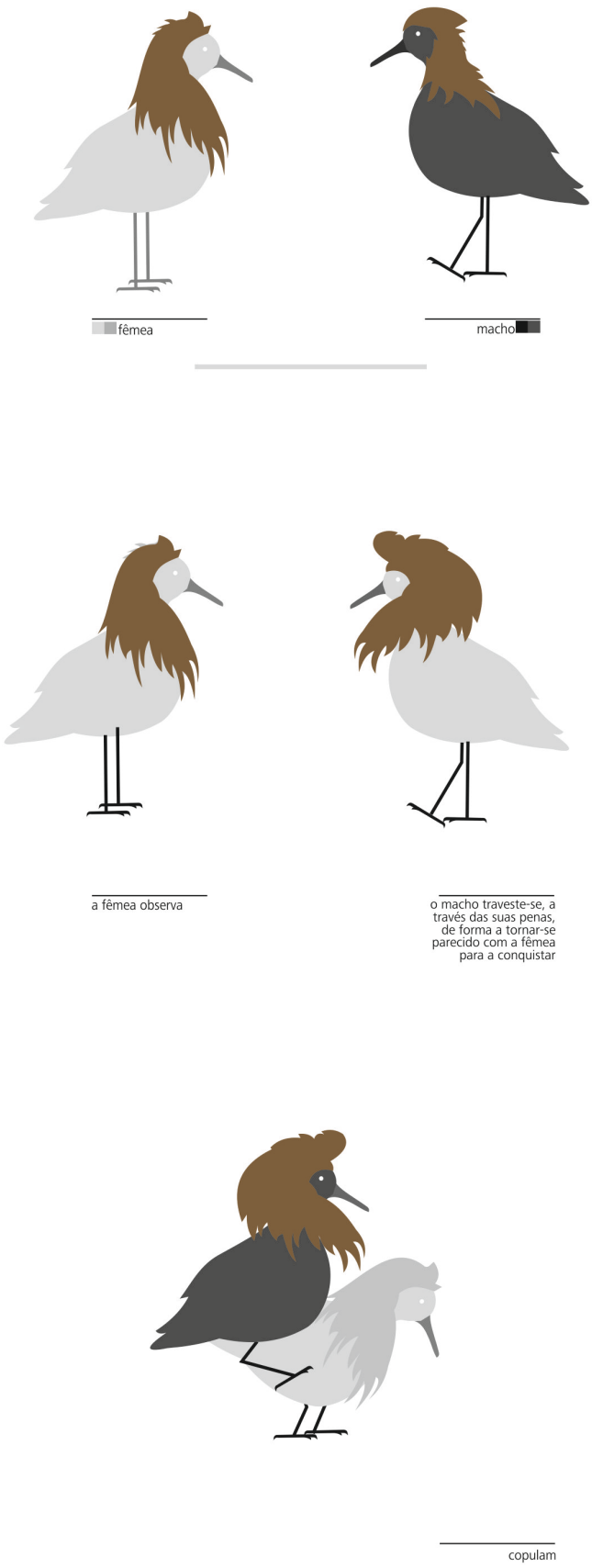


Figura 32: Diagrama do ritual (arquivo do autor).

Figura 33: Combatente.
Fonte:http://www.chainimage.com/download.php?img=images/bing-images-philomachus-pugnax-male-ruff-in-breeding-plumage.jpg

Segundo Owen, J. (2014), o macho do combatente traveste-se de fêmea para se aproximar mais das verdadeiras fêmeas e acasalar. Os machos exibem grandes golas de penas e penachos auriculares, que variam individualmente na cor e padrão. Eles são capazes de inflar a plumagem do pescoço, formando um colar majestoso e multicolorido. Os machos exibem-se, competindo uns com os outros numa área de terreno plano, para impressionar as fêmeas.

a). A zona geográfica desta espécie é a Europa, Ásia e África.
"There is evidence to suggest that the European population (200,000-510,000 pairs, occupying 50-74% of the global breeding range) has declined by up to 30% over ten years (three generations), but this may reflect shifts in breeding populations, populations in Asia are not thought to be declining and wintering populations in Africa appear to be increasing.". (BirdLife International, 2016)

b). A iniciativa do ritual é do macho.
"We defined three spacing tactics that male ruffs use to position themselves to court females: "Following" - directly pursuing females, …". (Lank, D. & Smith, C., 1987, p. 137)

c). A duração do ritual é prolongada (>dia).
Resposta obtida por email, de dia 26 Agosto de 2016, do professor Raoul Mulder, da universidade Simon Fraser, Canada, cujo teor se reproduz:
No dia 26/08/2016, às 21:54, David B Lank <dlank@sfu.ca> escreveu:
Hello Pedro Bandeira Maia.
The answer depends on exactly what question you are asking.

Ruff males assemble in all-male groups (called 'leks) of e.g. 5 or so males, which then await visits from females.
Females circulate among several different leks for 3-4 days, and mate during that period.
On most visits they do not mate at all - they are sampling the population.
On visits where they do mate, they likely do so within 10 minutes.
So if you want a measure of search time, it is in days. If you want a measure of mating on a particular visit once they have made up their mind, it is 10 minutes.

The searching time (days) reference is:
Lank, D.B. and C.M. Smith. 1987. Conditional lekking in ruff (Philomachus pugnax). Behavioral Ecology and Sociobiology 20:137–145. (attached).
For detailed courtship descriptions: Hogan-Warburg 1966 and van Rhihn 1973 (attached).

David B. Lank
www.sfu.ca/biology/wildberg/lank.html
Dept. of Biological Sciences Simon Fraser University
Burnaby BC V5A 1S6 Canada
phone: 778-782-3010; FAX: 778-782-3496 Attn: D. Lank

d). O sentido utilizado é a visão.
"In contrast to most other birds, male Ruffs are silent during their lek displays. The function of identifying themselves appears to have been transferred to a visual modality for which variation is transmitted genetically (Lank and Dale 2001, Auk 118:759-765), rather than by voice.". (Blank, D., B. & Dale, 2001)

e). O tipo de comportamento é ritualizado, intimidatório e enganador.
Ritualizado:
"We defined three spacing tactics that male ruffs use to position themselves to court females : "Following" - directly pursuing females, and two types of lekking behavior, "Intercepting"
- waiting for females at resource-rich sites, and "True Lekking" - waiting for females at places without any resources other than the males themselves.". (Lank, D. & Smith, C., 1987, p. 137)
Intimidatórios:
""Following" - directly pursuing females, and two types of lekking behavior, "Intercepting" - waiting for females at resource-rich sites, and "True Lekking"

- waiting for females at places without any resources other than the males themselves.". (Lank, D. & Smith, C., 1987, p. 137)

Enganadores:

"Travestismo. É muito comum encontrar fêmeas fingindo serem machos – e vice-versa – entre algumas espécies de peixes, répteis e insetos. Já entre as aves, esse comportamento é bastante raro. É por isso que as duas únicas espécies de pássaros que gostam de se travestir pelo resto da vida são tão especiais. O macho do combatente (Philomachus pugnax) foi o primeiro animal que se traveste de fêmea a ser documentado. Alguns deles adotam uma aparência de fêmea para se aproximarem mais das verdadeiras fêmeas e acasalarem.

Já o macho da águia-sapeira (Circus aeruginosus), quando está cuidando do ninho, também se "disfarça" de fêmea para evitar ser atacado por outros machos. Alguns desses machos também observam as verdadeiras fêmeas e se comportam como elas, algo que os cientistas ainda não conseguiram explicar.". Gough, Z. (2015)

f). As características e ações identificadas são a exibição, persistência e vigilância.

Exibição:

"(…) o caso dos combatentes (Philomachus pugnax), cujo nome se tornará claro mais abaixo, entre os quais existem cerca de 1% de machos com plumagem idêntica às fêmeas e que se ocupam de as cobrir* enquanto os outros 99%, com plumagem marcial, se ocupam de espalhafatosas exibições e batalhas para garantir o seu quinhão de sexo. São aquelas raras ocasiões em que o desígnio máxima da Natureza é deturpado e adulterado por uma outra personagem engraçada – o oportunismo.". (Stilwell, G., 2012, p.20)

Persistência + Vigilância:

"We defined three spacing tactics that male ruffs use to position themselves to court females : "Following" - directly pursuing females, and two types of lekking behavior, "Intercepting" - waiting for females at resource-rich sites, and "True Lekking" - waiting for females at places without any resources other than the males themselves.". (Lank, D. & Smith, C., 1987, p. 137)

Fragata (Fregata magnificens)

Figura 34: Diagrama do ritual (arquivo do autor).

Figura 35: Fragata.
Fonte:https://images.robertharding.com/preview/RM/RH/

Segundo David Attenborough (1998), a fragata seduz através de sons e imagem. Têm uma espécie de insuflável no peito de cor vermelha, que demora cerca 20 minutos a insuflar totalmente para, em conjunto com os sons, atrair as parceiras. O tamanho do balão dá indicações às fêmeas das condições de saúde do macho.

a). A zonas geográficas desta espécie são a Gronelândia, Arquipélago Ártico Canadiano e toda a América do Norte até ao sul de terras altas do centro do México.
"Magnificent frigatebirds live along American, tropival coastlines. They bred as far north as 25 degrees north latitute in Mexico and Florida and as far south 27 degrees south latitude in Brazil. They are especially common in Southern Florida, the Gulf Coast, The Caribbean islands and the West coast of mexico. (Diamond and Schreiber, 2002, Stefferud, 1966).". (Calcutt, M. 2006)

b). A iniciativa do ritual é do macho.
"During the breeding season, male magnificent frigatebirds congregate at male display sites. They inflate their large, red, gular sacs. These sacs, while inflated, can get so large that they obscure the bird´s head. Males rapidly vibrate their wings and sit back on their tails. They stretch their wings out and throw theis heads back for maximum display of the gular sac. Females then inspect the males. As females attempt to find a preferred mate, males twist and bend to make their gular sac look as large a possible, theu also make loud, drumming noise during display. Magnificent frigatebirds form monogomous pairs each breeding season once females have selected mates. However, they rarely maintain the same partner from season to season. (Diamond and Schreiber, 2002; Diamond, 1973; Madsen, et al, 2004).". (Calcutt, M. 2006)

c). A duração do ritual é curto (<h).

"(...) alguns pássaros enviam não só sinais através de sons mas também através de imagem (1m43s), Têm uma espécie de insuflável no peito de cor vermelha, que demora +/- 20 minutos a insuflar totalmente para em conjunto com os sons atrair as parceira (2m4s). O tamanho do balão dá indicações às fêmeas das condições de saúde do macho (2m29s). As fêmeas não têm o insuflável.". (David Attenborough, 1998)

d). Os sentidos utilizados são a visão e audição.

Visão:

"During the breeding season, male magnificent frigatebirds congregate at male display sites. They inflate their large, red, gular sacs. These sacs, while inflated, can get so large that they obscure the bird´s head. Males rapidly vibrate their wings and sit back on their tails. They stretch their wings out and throw their heads back for maximum display of the gular sac. Females then inspect the males.". (Calcutt, M. 2006)

As females attempt to find a preferred mate, males twist and bend to make their gular sac look as large a possible, theu also make loud, drumming noise during display. Magnificent frigatebirds form monogomous pairs each breeding season once females have selected mates. However, they rarely maintain the same partner from season to season." - (Diamond and Schreiber, 2002; Diamond, 1973; Madsen, et al, 2004).". (Calcutt, M. 2006)

e). O tipo de comportamento é ritualizado.

Ritualizado:

"During the breeding season, male magnificent frigatebirds congregate at male display sites. They inflate their large, red, gular sacs. These sacs, while inflated, can get so large that they obscure the bird´s head. Males rapidly vibrate their wings and sit back on their tails. They stretch their wings out and throw theis heads back for maximum display of the gular sac. Females then inspect the males. As females attempt to find a preferred mate, males twist and bend to make their gular sac look as large a possible, theu also make loud, drumming noise during display. Magnificent frigatebirds form monogomous pairs each breeding season once females have selected mates. However, they rarely maintain the same partner from season to season. (Diamond and Schreiber, 2002; Diamond, 1973; Madsen, et al, 2004)". (Calcutt, M. 2006)

f). As características e ações identificadas são a "transformação física" ou metamorfose, dinâmica e exibição.

"Transformação física" ou "metamoforse":

"They inflate their large, red, gular sacs. These sacs, while inflated, can get so large that they obscure the bird´s head."

Dinâmica + exibição:

"Males rapidly vibrate their wings and sit back on their tails. They stretch their wings out and throw theis heads back for maximum display of the gular sac. Females then inspect the males. As females attempt to find a preferred mate, males twist and bend to make their gular sac look as large a possible, they also make loud, drumming noise during display.". (Calcutt, M. 2006)

Grou japonês (Grus japonensis)

Figura 36: Diagrama do ritual (arquivo do autor).

Figura 37: Grou-japonês.
Fonte:http://www.hbw.com/sites/default/files/styles/ibc_2k/public/ibc/p/IBCCrane_Dance_moves.jpg?itok=m3BLjQfh,

De acordo com a descrição apresentada online da International Crane Foundation (https://www.savingcranes.org/), o Grou de coroa vermelha inicia o seu ritual com uma complexa série de chamamentos sonoros coordenados. Os pássaros adotam uma postura específica durante a exibição, geralmente com a cabeça atirada para trás e bico para o céu. O macho levanta as asas sobre as costas durante a chamada sonora, enquanto a fêmea mantém suas asas dobradas. Os machos de coroa vermelha iniciam a exibição e a fêmea pronuncia duas chamadas sonoras para cada chamada masculina. Todos os Grous se envolvem em danças, que incluem vários comportamentos, tais como curvaturas, saltos, corrida, atirando ao ar vegetação e batendo as asas. A dança pode ocorrer em qualquer idade e é comumente associada ao namoro.

a). As zonas geográficas onde é possível encontrar esta espécie são a Rússia, Sudoeste Asiático incluindo a China e o Japão.
"Grus japonensis is the second rarest crane in the world. They can be found at the Amur River basin in eastern Russia and in southeastern Asia, including China and Japan.". (DeCarlo, V. 2004)

b). A iniciativa do ritual é do macho.
"Male Red-crowned Cranes initiate the display and the female utters two calls for each male call.". (International Crane Foundation)

c). A Duração do ritual é rápida (<10m).
Resposta obtida por email, de dia 12 de Setembro de 2016, da International Crane Foundation, cujo teor se reproduz:
No dia 12/09/2016, às 22:08, CEDIntern <CEDIntern@savingcranes.org> escreveu:

Hello Mr. Bandeira Maia,

Thank you for writing to the International Crane Foundation with your question about Red-crowned Crane courtship behaviors. While we couldn't find any papers that describe the length of a crane mating dance, we know from our staff observations on site that the dancing ritual takes less than ten minutes. Copulation itself is very quick (seconds) but the dancing and shadowing behaviors can take place for minutes before. Not all dancing rituals lead to copulation however – cranes dance for exercise, to strengthen pair bonds, and to teach chicks the sequence. We're sorry we can't cite a published scientific paper that describes the time budget of the courtship ritual of Red-crowned cranes but encourage you to visit our species field guide at:https://www.savingcranes.org/species-field-guide/ and to email us back with any additional questions or comments!

Thank you again for contacting the International Crane Foundation and best of luck with your research!

Sincerely,
Emma Shelly
Interpretive Naturalist

INTERNATIONAL CRANE FOUNDATION
E11376 Shady Lane Road, P.O. Box 447
Baraboo, WI 53913 USA
(p) 608.356.9462 ext.127 (f) 608.356.9465
www.savingcranes.org

d). Os sentidos utilizados são a visão e a audição.

Visão:

"Red-crowned cranes use their courtship dance, which consists of bowing, head bobbing and leaping in order to communicate with each other.". (DeCarlo, V. 2004)

Audição:

"Red-cowned Crane utters penetrating vocalizations. It has wide repertoire from low-pitched purrs to loud calls given by both mates during the courtship displays. Unison calls are given by both sexes before the dances.". (Oiseaux-birds)

e). O tipo de comportamento é brando, ritualizado e material.

Brando:

"The birds stand in a specific posture, usually with their heads thrown back and beaks skyward during the display. The male always lifts up his wings over his back during the unison call while the female keeps her wings folded at her sides. Male Red-crowned Cranes initiate the display and the female utters two calls for each male call. All cranes engage in dancing, which includes various behaviors such as bowing, jumping, running, stick or grass tossing, and wing flapping. Dancing can occur at any age and is commonly associated with courtship.". (International Crane Foundation)

Ritualizado:

"The birds stand in a specific posture, usually with their heads thrown back and beaks skyward during the display. The male always lifts up his wings over his back during the unison call while the female keeps her wings folded at her sides. Male Red-crowned Cranes initiate the display and the female utters two calls for each male call. All cranes engage in dancing, which includes various behaviors such as bowing, jumping, running, stick or grass tossing, and wing flapping. Dancing can occur at any age and is commonly associated with courtship.". (International Crane Foundation)

Material:

"(…) that begin with a courtship consisting of bowing, posing, bobbing, pirouetting and leaping excitedly in the air. When they really get worked up, they can be seen tossing sticks, leaves and grass high into the air and pecking at the debris as it falls to the ground. Taking the top spot in our countdown, this bird is an elegant performer and a symbol of good luck and happiness throughout its range.". (Animal Planet)

f). As características e ações identificadas são a amabilidade, cortesia, dinâmica, sincronização, exibição e reciprocidade.

Amabilidade:

"(…) that begin with a courtship consisting of bowing, posing, bobbing, pirouetting and leaping excitedly in the air.". (Animal Planet)

Cortesia:

"Also known as the Japanese and the Manchurian crane, these animals form lifelong romantic partnerships that begin with a courtship consisting of bowing, posing, bobbing, pirouetting and leaping excitedly in the air. When they really get worked up, they can be seen tossing sticks, leaves and grass high into the air and pecking at the debris as it falls to the ground. Taking the top spot in our countdown, this bird is an elegant performer and a symbol of good luck and happiness throughout its range.". (Animal Planet)

Dinâmica:

"Also known as the Japanese and the Manchurian crane, these animals form lifelong romantic partnerships that begin with a courtship consisting of bowing, posing, bobbing, pirouetting and leaping excitedly in the air. When they really get worked up, they can be seen tossing sticks, leaves and grass high into the air and pecking at the debris as it falls to the ground. Taking the top spot in our countdown, this bird is an elegant performer and a symbol of good luck and happiness throughout its range.". (Animal Planet)

Sincronização:

"Mated pairs of cranes, including Red-crowned Cranes, engage in unison calling, which is a complex and extended series of coordinated calls.". (International Crane Foundation)

Exibição:

"Also known as the Japanese and the Manchurian crane, these animals form lifelong romantic partnerships that begin with a courtship consisting of bowing, posing, bobbing, pirouetting and leaping excitedly in the air. When they really get worked up, they can be seen tossing sticks, leaves and grass high into the air and pecking at the debris as it falls to the ground. Taking the top spot in our countdown, this bird is an elegant performer and a symbol of good luck and happiness throughout its range.". (Animal Planet)

Reciprocidade:

"Male Red-crowned Cranes initiate the display and the female utters two calls for each male call. All cranes engage in dancing, which includes various behaviors such as bowing, jumping, running, stick or grass tossing, and wing flapping.". (International Crane Foundation)

Patola-de-pés-azuis (Sula nebouxii)

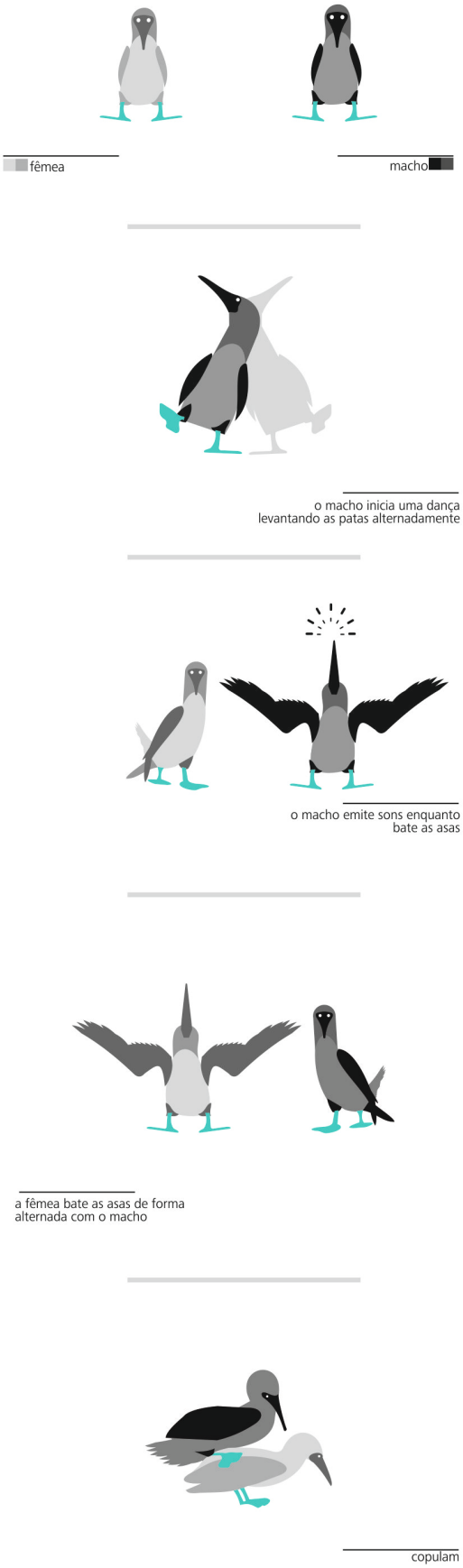


Figura 38: Diagrama do ritual (arquivo do autor).

Figura 39: Patola-pés-azuis.
Fonte: http://4.bp.blogspot.com/-73vZRH3uAgk/VEXaGCimp6I/AAAAAAAAAYkQ/LQIuiPHpjus/s1600/ boobiesandred-1.jpg

O site online Galapagos Conservation Trust (http://galapagosconservation.org.uk/wildlife/blue-footed-booby/), refere que o acasalamento é precedido por um elaborado ritual de namoro, que começa com o macho presenteando a fêmea com uma pequena vara ou pedra. Seguidamente inclina o bico, a cauda e as asas para o céu, assobia e marcha em volta da fêmea levantando bem alto as suas patas para que sejam efetivamente apreciadas. Quanto mais azuis os pés, mais atraente é o companheiro.

a). As zonas geográficas desta espécie são a Costa ocidental da América tropical, México e norte da América do Sul.
"These boobies live off the western coasts of Central and South America. The Galápagos Islands population includes about half of all breeding pairs of blue-footed boobies.". (National Geographic, n.d.)

b). A iniciativa do ritual é do macho.
"Mating is preceded by an elaborate courtship ritual, which begins with the male presenting the female with a small stick or stone.". (GTC - Galapagos Conservation Trust, n.d.)

c). A Duração do ritual é rápida (<10m).
Resposta obtida por email, de dia 22 de Agosto de 2016, do Professor Hugh Drummond da universidade Autónoma do México, cujo teor se reproduz:
No dia 22/08/2016, às 21:21, hugh <hugh@unam.mx> escreveu:
Pedro:
These might help a little bit, and give you an entry into the literature, but what you probably need is JB Nelson´s 1975 book The Sulidae: Gannets and Boobies, which will probably be very hard to find now.

If you search on the internet you will probably find videos of courtship. A bout of courtship in a bonded pair can last as little as a few seconds or as long as a few minutes, and often there is a sequence of several bouts.

Good luck!
Hugh

d). O sentido utilizado é a visão.
Visão:
"During courtship, the female booby honks and the male whistles. They perform a dance which includes showing off their feet and "sky-pointing."
The male, eager to impress the female, flashes his brightly colored feet, and struts around her.". (Mendoza, C., n.d.)

e). O tipo de comportamento é brando, ritualizado e material.
Brando:
"The courtship displays recorded were sky-pointing (when the bird's neck was lengthening with the bill pointing skywards, accompanied by elevation of the tail and lateral spreading of the wings), parading (when the bird performed an exaggerated footraising, flaunting the webs upwards and outwards), (…).". (Torres, R. & Velando, A., 2004, p. 61)
Ritualizado:
"(…) and ritualized nest material presentation (when the bird picked up a fragment of any type of material and with an upward movement of the head in a smooth high arc deposited it near the feet of the courting bird; Nelson 1978).". (Torres, R. & Velando, A., 2004, p. 61)
"(…) and ritualized nest material presentation (when the bird picked up a fragment of any type of material and with an upward movement of the head in a smooth high arc deposited it near the feet of the courting bird; Nelson 1978).". (Torres, R. & Velando, A., 2004, p. 61)

f). As características e ações identificadas são a sincronização, amabilidade, cortesia, carinhos, exibição e reciprocidade.
Sincronização:
"During courtship, the female booby honks and the male whistles. They perform a dance which includes showing off their feet and "sky-pointing."
The male, eager to impress the female, flashes his brightly colored feet, and struts around her.". (Mendoza, C., n.d.)
Amabilidade:

“Boobies don't nest, so he'll pick up a stone or a twig with his beak as an offering—sort of like presenting a wedding ring, or signing a mortgage. He says, "Well I don't have my own place yet, but things are looking pretty good (…)".(Merchant, B., 2008)

Cortesia:

“Boobies don't nest, so he'll pick up a stone or a twig with his beak as an offering—sort of like presenting a wedding ring, or signing a mortgage. He says, "Well I don't have my own place yet, but things are looking pretty good (…)".(Merchant, B., 2008)

Carinhos:

“She'll allow him to preen her with his beak, which is a big sign of trust. The beak is the boobies' most dangerous weapon, and to let him use it in such intimate context is much when we human touch tooth-filled mouths in our own weird ritual.”. (Merchant, B., 2008)

Exibição:

“The courtship ritual continues with the male showing off potential nest building materials. Then, since female blue-footed boobies are essentially podophilists because of their intense sexual interest in feet, the male continues to show off his bright blue feet. However, this heated encounter also features a male displaying its wings and sky-pointing. As the name suggests, in sky-pointing, the male booby points its head to the sky, and as it spreads out its wings, he whistles to the female.”. (Mendoza, C., n.d.)

Reciprocidade:

“The male will initiate this supremely bizarre dance, wobbling back and forth, raising one leg after another, and continuing to make high-pitched calls. If she's into it, she'll join him on the dance floor.”. (Merchant, B., 2008)

Pavão (Pavo cristatus)

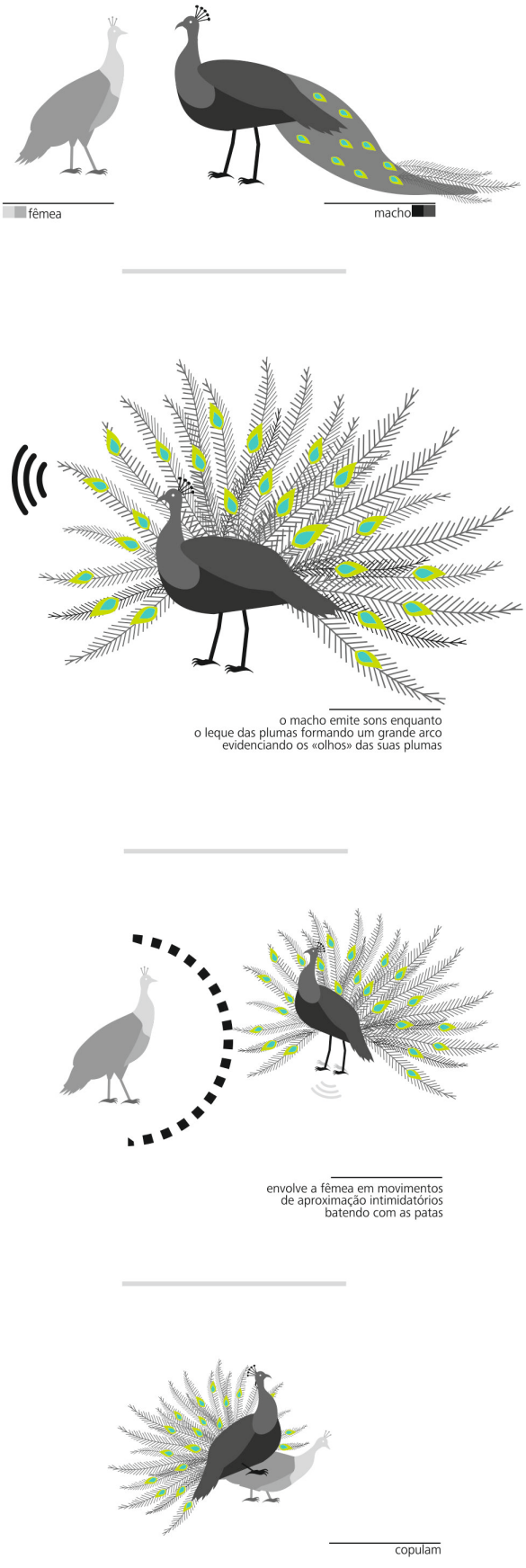


Figura 40: Diagrama do ritual (arquivo do autor).

Figura 41: Pavão.
Fonte:https://c2.staticflickr.com/4/3785/8939766718_2f90a572cc_b.jpg

No site online do National Geographic[2], é referido que os pavões são grandes faisões coloridos (maioritariamente a azul e verde), conhecidos pelas suas caudas iridescentes. As penas, espalham-se pela cauda e representam mais de sessenta por cento do comprimento total do corpo do pássaro. Possuiem marcas coloridas, designadas de "olho" (desenhos bem redondos, esverdeados ou azulados que se encontram na extremidade de cada pena da cauda) azuis, ouro, vermelho e outros matizes. Quando aberta, a cauda é arqueada formando um magnifico leque que atravessa as costas do pássaro e toca o chão de cada lado. Este enorme leque é utilizado em rituais de acasalamento e exibições de namoro e acredita-se que as fêmeas escolhem os seus companheiros de acordo com o tamanho, cor e qualidade da cauda.

a). As zonas geográficas desta espécie são o Sri Lanka e a Índia.
"(…) Pavo cristatus, (also known as peacocks) are native to Sri Lanka and India, but can also be found naturally in Pakistan, Kashmir, Nepal, Assam, Nagaland, Burma, Java, Ceylon, Malaya, and the Congo.". (Fowler, E., 2011)

b). A iniciativa do ritual é do macho.
"It was found that male peafowl spent their maximum time in walking, calling and displaying in open areas to attract females (…)". (Dookia, S., Singh, R. & Anoop K. R., 2015, p.97)

c). A Duração do ritual é rápida (<10m).
"The mean display duration for the adult male Indian peafowl recorded from 32 displays was 430.03 ± 34.29 seconds with a maximum of 1060.00 seconds, and a minimum of 28.50 seconds. The median display duration was 384.85 seconds. The display duration was not influenced by mean number of females per scan during the breeding season ($r = -0.04$, $P > 0.05$, $N = 32$). We observed five copulations performed by four different adult males, and all of

[2] http://www.nationalgeographic.com/

them occurred in the second half of the study period.". (Harikrishnan, S., Vasudevan, K. & Sivakumar, K., 2010, p.15)

d). Os sentidos utilizados são a visão e a audição.

Visão:

"Nevertheless, several lines of observational and experimental evidence indicate that eyespot number is an important cue for mate choice by peahens: (1) the number of eyespots visible in the train is correlated with the number of copulations a male achieves during a breeding season (Petrie et al. 1991; Loyau et al. 2005a); (2) male copulation success declined precipitously when 20 of the outermost eyespots were removed experimentally (Petrie & Halliday 1994); (3) peahens biased the sex ratio of their offspring towards females when they were mated, experimentally, with males from which 20 eyespots were removed (Pike & Petrie 2005); and (4) female investment of resources into eggs increased with the number of eyespots visible on the train of her experimentally chosen mate (Loyau et al. 2007a).". (Dakin, R. & Montgomerie, R., 2011, p.21)

Audição:

"(…) These calls could be more important than the actual visual display of the males trains in which even the most elaborate can have varying rates of mating success. Vocal calls with more than five notes are generally more successful and it is believed that these types of calls are sexually selected by the females.". (Fowler, E., 2011)

e). O tipo de comportamento é ritualizado:

"Mating commenced when the male lunged forward after displaying, to mount the female once it crouched.". (Harikrishnan, S., Vasudevan, K. & Sivakumar, K., 2010, p.17)

f). As características presentes neste ritual, são a exibição e a análise.

Exibição:

"The iridescent train of the lek-breeding peacock is an obvious visual display, long thought to be the result of sexual selection for increased ornament size and complexity (Darwin 1871)." (Dakin, R. & Montgomerie, R., 2011, p.21)

Análise:

"(…) females prefer to mate with males that display a greater number of eyespots in their trains during courtship (Petrie et al. 1991; Petrie & Halliday 1994; Loyau et al. 2005a), lending support to Darwin's (1871) idea that elaboration of the train is the result of selection mediated by female mate preferences.". (Dakin, R. & Montgomerie, R., 2011, p.21)

Ficheiro com recolha completa de informação para a taxonomia

AQUÁTICOS

CARANGUEJO
(UCA LACTEA)

TIPO DE AGENTE
Aquático

ZONAS GEOGRÁFICAS
Indo-West Pacific – China, Tailândia, Coreia do Sul e japão

Common Names

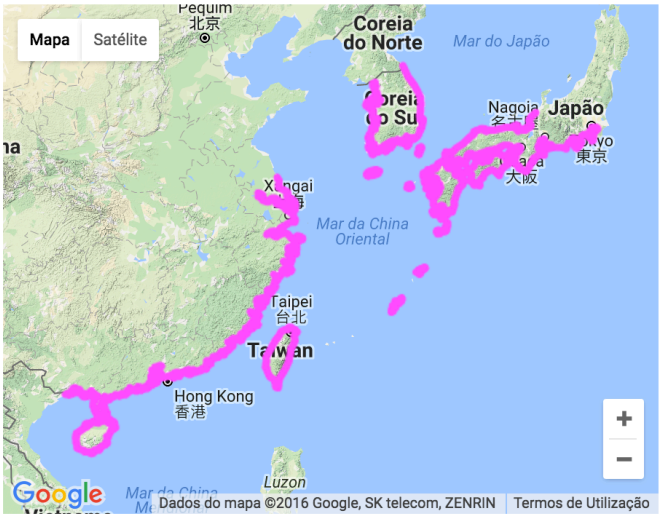
Milky Fiddler Crab

Synonyms, Alternate Spellings, & Name Forms

Austruca lactea, *Gelasimus annulipes var. lacteus*, *Gelasimus lac*
Uca (Minuca) lactea, *Uca (Paraleptuca) lactea*, *Uca laclaea*, *Uca l*

Geographic Range

Indo-West Pacific: China, Taiwan, South Korea, Japan



Map data derived from: Naderloo *et al.* (2010); Shih *et al.* (2009)

http://www.fiddlercrab.info/u_lactea.html - ultimo acesso em 17 de Agosto 2016

QUEM TOMA INICIATIVA (M | F)
Masculino - 1) Broadcasting: males show display behaviour with their large claw for unspecified females (and males). This behaviour is found during 3-4 hour. – mail Takeshita

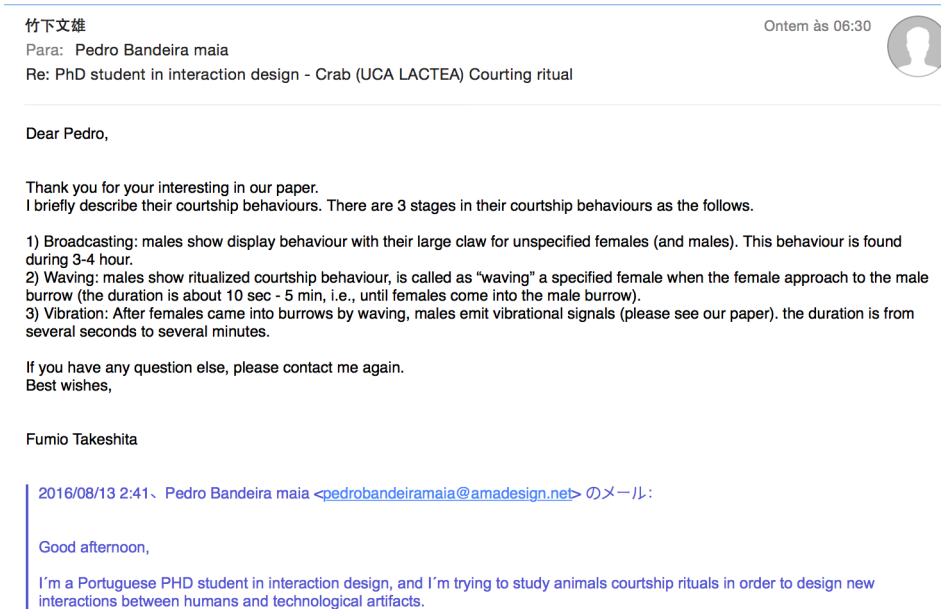
Masculino - In some fiddler crab species, males emit vibrations from their burrows to mate-searching females after they have attracted a female to the burrow entrance using a waving display. Although the vibrations are considered acoustic signals to induce mating, it has not been demonstrated whether the vibrations attract the females into the burrow and, consequently, influence females' mating decisions. (p. 1/9)

Takeshita, F. & Murai, M. (2016). The vibrational signals that male fiddler crabs (Uca lactea)
use to attract females into their burrows. Sci Nat 103: 49.

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Médio - <dia -

1) Broadcasting: males show display behaviour with their large claw for unspecified females (and males). This behaviour is found during 3-4 hour.
2) Waving: males show ritualized courtship behaviour, is called as "waving" a specified female when the female approach to the male burrow (the duration is about 10 sec - 5 min, i.e., until females come into the male burrow).
3) Vibration: After females came into burrows by waving, males emit vibrational signals (please see our paper). the duration is from several seconds to several minutes.



竹下文雄 Ontem às 06:30

Para: Pedro Bandeira maia

Re: PhD student in interaction design - Crab (UCA LACTEA) Courting ritual

Dear Pedro,

Thank you for your interesting in our paper.
I briefly describe their courtship behaviours. There are 3 stages in their courtship behaviours as the follows.

1) Broadcasting: males show display behaviour with their large claw for unspecified females (and males). This behaviour is found during 3-4 hour.
2) Waving: males show ritualized courtship behaviour, is called as "waving" a specified female when the female approach to the male burrow (the duration is about 10 sec - 5 min, i.e., until females come into the male burrow).
3) Vibration: After females came into burrows by waving, males emit vibrational signals (please see our paper). the duration is from several seconds to several minutes.

If you have any question else, please contact me again.
Best wishes,

Fumio Takeshita

2016/08/13 2:41、Pedro Bandeira maia <pedrobandeiramaia@amadesign.net> のメール:

Good afternoon,

I´m a Portuguese PHD student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.

RESPOSTA DADA POR EMAIL PELO AUTOR DO PAPER - Takeshita, F. & Murai, M. (2016). The vibrational signals that male fiddler crabs (Uca lactea)
use to attract females into their burrows. Sci Nat 103: 49.

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Brandos - 1) Broadcasting: males show display behaviour with their large claw for unspecified females (and males). This behaviour is found during 3-4 hour. – mail Takeshita

Ritualizados - 2) Waving: males show ritualized courtship behaviour, is called as "waving" a specified female when the female approach to the male burrow (the duration is about 10 sec - 5 min, i.e., until females come into the male burrow). – mail Takeshita

3) Vibration: After females came into burrows by waving, males emit vibrational signals (please see our paper). the duration is from several seconds to several minutes. – mail Takeshita

Materiais???? - The vibrations inside the burrow might influence a female's decision by interaction with other male traits such as the burrow structure. (p. 1/9)

Takeshita, F. & Murai, M. (2016). The vibrational signals that male fiddler crabs (Uca lactea)
use to attract females into their burrows. Sci Nat 103: 49.

TRIGGERS - **Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)**

Visão - 1) Broadcasting: males show display behaviour with their large claw for unspecified females (and males). This behaviour is found during 3-4 hour. – mail Takeshita

Visão - 2) Waving: males show ritualized courtship behaviour, is called as "waving" a specified female when the female approach to the male burrow (the duration is about 10 sec - 5 min, i.e., until females come into the male burrow). – mail Takeshita

Audição + tacto??? - 3) Vibration: After females came into burrows by waving, males emit vibrational signals (please see our paper). the duration is from several seconds to several minutes. – mail Takeshita

Audição + tacto??? - The male Uca lactea emits vibrations in courtship behaviors (Crane 1975 and see Results), although the method of production of the vibrations has not been identified. (2/9)

Audição + tacto??? - The acoustic signals consisted of repetitions of pulses. The dominant frequency of the pulses decreased with male carapace width. The pulse length decreased slightly with an increasing number of vibrational repetitions, and the pulse interval increased with increasing repetitions. These factors imply that the vibrations convey information on male characteristics, such as body size and stamina. In the experiment on female mate choice, the females significantly preferred males with higher pulse repetition rates when they were positioned at the entrance of the burrow, indicating that the females use the male vibrational signals to decide whether to enter the burrow. However, females showed no preference for the vibrations once they were inside a burrow, i.e., whether they decided to copulate, suggesting that the vibrations do not independently affect a female's final decision of mate choice. The vibrations inside the burrow might influence a female's decision by interaction with other male traits such as the burrow structure. (p. 1/9)

Audição - Fiddler crabs employ acoustic signals in intraspecific communications (e.g., Burkenroad 1947; Salmon 1967; Salmon and Atsaides 1968; Altevogt 1970; Crane 1975; von Hagen 1984, 2000;Müller 1989). (p. 1/9)

Takeshita, F. & Murai, M. (2016). The vibrational signals that male fiddler crabs (Uca lactea)
use to attract females into their burrows. Sci Nat 103: 49.

INTENSITY - **Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade etc.)**

Exibição - 1) Broadcasting: males show display behaviour with their large claw for unspecified females (and males). This behaviour is found during 3-4 hour.

2) Waving: males show ritualized courtship behaviour, is called as "waving" a specified female when the female approach to the male burrow (the duration is about 10 sec - 5 min, i.e., until females come into the male burrow).

3) Vibration: After females came into burrows by waving, males emit vibrational signals (please see our paper). the duration is from several seconds to several minutes.

Takeshita, F. & Murai, M. (2016). The vibrational signals that male fiddler crabs (Uca lactea) use to attract females into their burrows. Sci Nat 103: 49.

Construção - The vibrations inside the burrow might influence a female's decision by interaction with other male traits such as the burrow structure. (p. 1/9)

Takeshita, F. & Murai, M. (2016). The vibrational signals that male fiddler crabs (Uca lactea) use to attract females into their burrows. Sci Nat 103: 49.

Resumo descritivo

In some fiddler crab species, males emit vibrations from their burrows to mate-searching females after they have attracted a female to the burrow entrance using a waving display. Although the vibrations are considered acoustic signals to induce mating, it has not been demonstrated whether the vibrations attract the females into the burrow and, consequently, influence females' mating decisions. (p. 1/9)

The acoustic signals consisted of repetitions of pulses. The dominant frequency of the pulses decreased with male carapace width. The pulse length decreased slightly with an increasing number of vibrational repetitions, and the pulse interval increased with increasing repetitions. These factors imply that the vibrations convey information on male characteristics, such as body size and stamina. In the experiment on female mate choice, the females significantly preferred males with higher pulse repetition rates when they were positioned at the entrance of the burrow, indicating that the females use the male vibrational signals to decide whether to enter the burrow. However, females showed no preference for the vibrations once they were inside a burrow, i.e., whether they decided to copulate, suggesting that the vibrations do not independently affect a female's final decision of mate choice. The vibrations inside the burrow might influence a female's decision by interaction with other male traits such as the burrow structure. (p. 1/9)

Fiddler crabs employ acoustic signals in intraspecific communications (e.g., Burkenroad 1947; Salmon 1967; Salmon and Atsaides 1968; Altevogt 1970; Crane 1975; von Hagen 1984, 2000;Müller 1989). (p. 1/9)

The male Uca lactea emits vibrations in courtship behaviors (Crane 1975 and see Results), although the method of production of the vibrations has not been identified. During the reproductive season, males construct a raised mound, called a **B**semidome, close to the burrow (Kim et al. 2004; Yamaguchi et al. 2006) and perform a waving display (Yamaguchi 1971; Goshima and Murai 1988; Muramatsu 2011). There are two reproductive tactics: surface and underground mating (Yamaguchi 1971, 2001a; Murai et al. 1987; Goshima and Murai 1988). In surface mating, a nearby resident or burrowless male approaches the burrow of a female. The male then places one of his legs into the
female's burrow and taps at the entrance of the burrow. The female subsequently ascends to the burrow entrance, and the crabs copulate at the surface (Yamaguchi 1971; Murai et al. 1987). In underground mating, mate-searching females wander around searching for mates, and the males perform a waving display to the females. When a female approaches within a certain distance from a male burrow, the male enters the burrow and the female follows the male into the burrow. If courtship is successful, the pair copulates inside the burrow (Yamaguchi 1971; Goshima and Murai 1988). In the latter mating behavior, the male emits vibrations to the female from inside the burrow
while the female is at the burrow entrance and then also while the female is inside the burrow (see Results and ESM 1). Therefore, the vibrations may convey information about males to mate-searching females and be used by the females in mate selection. (p. 2/9)

We hypothesized that if females use the vibrations in mate selection, the vibrations would reflect information about the male related to traits such as body size, morphology of the large claw, and condition. In some Uca species, male body size represents one of the criteria in female mate preference (e.g., Backwell and Passmore 1996; deRivera 2005; Reaney and Backwell 2007). (p. 2/9)

Additionally, the patterns of the vibrational repetitions reflect the stamina of the male due to the energy expenditure required to produce the vibrations, because courtship displays are often energetically costly (e.g., Kotiaho 2000; Matsumasa and Murai 2005; Allen and Levinton 2007; Murai et al. 2009; Byers et al. 2010; Mowles 2014). Therefore, it is likely that body size, morphology of the large claw, and male condition are associated with the structure and pattern of the vibrational signals, and that the vibrations may consequently affect female mate choices. (p.2/9)

The male courtship vibrations consisted of a series of repeated vibrations. We called the unit of vibration a **B**pulse^ and a group of repeated pulses a **B**train (of pulses)^ (see Fig. 1). (3/9)

Female mate preference for the courtship vibrations was analyzed for two stages of mate choice: at the entrance (first stage), and inside the male**'**s burrow (second stage). In the first stage, the females temporarily remained at the entrance of the burrow, only partially placing their body inside the burrow, and then decided whether to enter the burrow or leave. We measured the length of time that the female stayed at the entrance, according to the video, using a time scale in seconds, and analyzed all of the pulses within this period. In the second stage of mate selection, the female determined whether to stay (and then copulate with the male) or to leave the burrow having entered it in the first stage.We measured the length of stay inside the male**'**s burrow, which ended when the female exited. If the positional relationship was interchanged between the sexes in the burrow (i.e., if only themale exited from the burrowafter the female had entered), or the female remained inside the burrow formore than 10 min, we finished the trial and considered mating to have occurred. We analyzed all pulses emitted during the female**'**s stay inside the burrow. In the latter stage of mate choice, other males sometimes intercepted the female**'**s selection by chasing the female into the burrow. Since these interactions were considered to affect the female**'**s decision-making, such trials were excluded from the subsequent analysis. (3/9)

Female U. lactea positioned at the entrance of a male**'**s burrow preferred males that rapidly emitted pulses. This preference by the female for vigorous signals has been observed in numerous taxa (Byers et al. 2010). (p. 6/9)

One hypothesis to explain why females prefer vigorous signals by males in mate selection is that the signals reflect stamina in the males, which is required for the continuous emission of the signals (Byers et al. 2010; Mowles 2014). (p. 6/9)

However, U. lacteal females do have several opportunities to evaluate mate size during the courtship and mating process. Females possibly use the vibrational signals to assess male size if they are able to distinguish differences in the dominant frequency of the pulses among individuals, because the frequency was correlated with carapace width (Fig. 3). (8/9)

In addition to vibrational frequency, female fiddler crabs can visually evaluate the size of the male outside the burrow, and burrow structures may also reflect individual body size (Backwell and Passmore 1996; Reaney and Backwell 2007). Thus, females may use multiple signals that express male body size during the several stages of mate choice. (8/9)

The vigor of the vibrational signals decreased with an increasing number of repetitions. Females preferred males with higher pulse repetition rates, indicating that the male acoustic signal affects mate selection in females. Our results suggest that the vibrational signals reflect male quality, which is related to the emitting pattern. Uca males use multimodal signals in courtship (Candolin 2003; Habets and Papaj 2005), i.e., visual (semidome and waving) and acoustic signals (vibrations); females
may hierarchically choose mates based on these signals and the burrow structure in each stage of mate selection. (p. 8/9)

Takeshita, F. & Murai, M. (2016). The vibrational signals that male fiddler crabs (Uca lactea)
use to attract females into their burrows. Sci Nat 103: 49.

ARTIGO DAILYMAIL

Fiddler crabs' 'morse code' attracts Mrs Right: Males create vibrations from inside their burrows to show off size and stamina

Fiddler crabs wave a claw in the air, then make vibrations from inside lairs

'Morse code' helps females work out which burrows to go into to mate

Once inside, things like the structure of the burrow will also come into play

By ABIGAIL BEALL FOR MAILONLINE

PUBLISHED: 15:33 GMT, 1 June 2016 | **UPDATED:** 19:35 GMT, 1 June 2016

Read more: http://www.dailymail.co.uk/sciencetech/article-3620095/Fiddler-crabs-morse-code-attracts-Mrs-Right-Males-create-vibrations-inside-burrows-size-stamina.html#ixzz4H6d58kD7

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Males have been known to try a lot of things to try and attract a lady.

Fiddler crabs do this in a stranger way than most, by going into their lairs and letting out pulses of vibrations.

A new study shows these vibrations are surprisingly informative, telling the females important information about the stamina and size of their potential mate.

The vibrations and pulses that male fiddler crabs produce when they are trying to lure females into their burrows to mate are surprisingly informative, according to a new study in the journal **The Science of Nature**.

Japanese researchers Fumio Takeshita of Nagasaki University and Minoru Murai of the University of the Ryukyu looked into the behaviour of these crabs.

They found these signals serve as a type of 'Morse code' the females decipher to learn more about the size and stamina of their suitors.

During mating season, the males of some fiddler crab species construct a raised mound or semidome near their burrows.

They stay close to their burrows and wave their one distinctively large claw to attract females to their burrow's entrance.

The ones able to wave their claws higher and for a longer period of time have the most success.

Read more: http://www.dailymail.co.uk/sciencetech/article-3620095/Fiddler-

crabs-morse-code-attracts-Mrs-Right-Males-create-vibrations-inside-burrows-size-stamina.html#ixzz4H6dF3Y1N
Follow us: @MailOnline on Twitter | DailyMail on Facebook
WHAT THE VIBRATIONS MEAN
Once a female comes closer, the male repeatedly emits vibrations to lure her even further inside his hide-out, with the intention to eventually mate.
These acoustic signals consist of repetitive pulses.
The lower the dominant frequency, the more likely it was that the male's body or carapace would be quite large.
Females were more likely to enter the burrow of males that could repeatedly produce a higher rate of pulses in succession.
Read more: http://www.dailymail.co.uk/sciencetech/article-3620095/Fiddler-crabs-morse-code-attracts-Mrs-Right-Males-create-vibrations-inside-burrows-size-stamina.html#ixzz4H6dJtQfM
Follow us: @MailOnline on Twitter | DailyMail on Facebook
http://www.dailymail.co.uk/sciencetech/article-3620095/Fiddler-crabs-morse-code-attracts-Mrs-Right-Males-create-vibrations-inside-burrows-size-stamina.html - ULTIMO ACESSO A 12 AGOSTO 2016

Observação Visual **(vídeo)**

https://www.youtube.com/watch?v=gXceF_kx2h0

https://www.youtube.com/watch?v=Z8U89EoUhuo

https://www.youtube.com/watch?v=Gwet0JLuqWY

https://www.youtube.com/watch?v=8WPdNw6TZUE

https://www.youtube.com/watch?v=E0Ldm3tRE3k

img - http://www.fiddlercrab.info/u_lactea.html#pics

Referências bibliográficas

Takeshita, F. & Murai, M. (2016). The vibrational signals that male fiddler crabs (Uca lactea)
use to attract females into their burrows. Sci Nat 103: 49.

http://www.dailymail.co.uk/sciencetech/article-3620095/Fiddler-crabs-morse-code-attracts-Mrs-Right-Males-create-vibrations-inside-burrows-size-stamina.html - ULTIMO ACESSO A 12 AGOSTO 2016

http://www.fiddlercrab.info/u_lactea.html - ultimo acesso em 17 de Agosto 2016

CAVALO MARINHO
(hippocampus zosterae)

TIPO DE AGENTE
Aquático

ZONAS GEOGRÁFICAS
Hippocampus zosterae, commonly known as the dwarf seahorse, inhabits coastal waters of the **western Atlantic Ocean**, including the **Caribbean sea, the Gulf of Mexico, and the continental shelf of the southeastern United States** (Jordan and Gilbert, 1882). (Jordan and Gilbert, 1882)
Biogeographic Regions
atlantic ocean (native)
http://animaldiversity.org/accounts/Hippocampus_zosterae/

Quem toma iniciativa (M | F ! Ambos?)
Maioritariamente pelo macho (embora a fêmea, por vezes, também tome iniciativa) – ver tabela 1 (em baixo)

The first courtship phase occurs for one or two mornings preceding the day of copulation and is characterized by reciprocal quivering, consisting of rapid side-to-side body vibrations displayed alternately by males and females.
Masanjones, H. & Lewis, S. (1996). Courtship Behavior in the Dwarf Seahorse. American Society of Ichthyologists and Herpetologists, Copeia (pp.634)

	Courtship Phase			
	Phase 1	Phase 2	Phase 3	Phase 4
Approach Initiated By:				
Male	11	12	6	9
Female	2	2	6	4
Brightening Initiated By:				
Male	11	9	2	2
Female	3	1	1	1
First Courtship Behavior By:				
Male	9	3	6	7
Female	5	12	8	8
Courtship Terminated By:				
Male	4	5	9	—
Female	9	7	3	—
Courtship Behaviors Exhibited:				
Male	Quiver	Quiver	Point	Point/Rise
Female	Quiver	Point	Point	Point/Rise

table 1. hippocampus zosterae courtship phases with the number of pairs in which approach, brightening, courtship, and courtship termination were initiated by each sex and the most frequent courtship behaviors displayed by each sex. seahorse pairs (n = 15) were observed from the
day of introduction through the day of copulation (pairs in which both fish exhibited behaviors simultaneously are excluded).
Masanjones, H. & Lewis, S. (1996). Courtship Behavior in the Dwarf Seahorse. American Society of Ichthyologists and Herpetologists, Copeia (pp.637)

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)
Prolongado - Four distinct phases of seahorse courtship are marked by prominent behavioral changes, as well as by differences in the intensity of courtship. The first courtship phase occurs for one or two mornings preceding the day of copulation and is characterized by reciprocal quivering, consisting of rapid side-to-side body vibrations displayed alternately by males and females. The remaining courtship phases are restricted to the day of copulation, with the second courtship phase distinguished by females

pointing, during which the head is raised upward.
Masanjones, H. & Lewis, S. (1996). Courtship Behavior in the Dwarf Seahorse. American Society of Ichthyologists and Herpetologists, Copeia (pp.634)

INTERACTION - **Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)**

Brando + Ritualizado - Four distinct phases of seahorse courtship are marked by prominent behavioral changes, as well as by differences in the intensity of courtship. The first courtship phase occurs for one or two mornings preceding the day of copulation and is characterized by reciprocal quivering, consisting of rapid side-to-side body vibrations displayed alternately by males and females. The remaining courtship phases are restricted to the day of copulation, with the second courtship phase distinguished by females pointing, during which the head is raised upward. In the third courtship phase, males begin to point in response to female pointing. During the final phase of courtship, seahorse pairs repeatedly rise together in the water column, eventually leading to females transferring their eggs directly into the male brood pouch during a brief midwater copulation. Courtship activity level (representing the percentage of time spent in courtship) increased from relatively low levels during the first courtship phase to highly active courtship on the day of copulation. Males more actively initiated courtship on the days preceding copulation, indicating that these seahorses are not courtship-role reversed, as has previously been assumed.
Masanjones, H. & Lewis, S. (1996). Courtship Behavior in the Dwarf Seahorse. American Society of Ichthyologists and Herpetologists, Copeia (pp.634)

TRIGGERS - **Sentido/s utilizado/s ou mais evidenciados (visão | audição | paladar | tacto | olfato)**

Tacto - Four distinct phases of seahorse courtship are marked by prominent behavioral changes, as well as by differences in the intensity of courtship. The first courtship phase occurs for one or two mornings preceding the day of copulation and is characterized by reciprocal quivering, consisting of rapid side-to-side body vibrations displayed alternately by males and females. The remaining courtship phases are restricted to the day of copulation, with the

Visão - second courtship phase distinguished by females pointing, during which the head is raised upward. In the third courtship phase, males begin to point in response to female pointing.

Tacto - During the final phase of courtship, seahorse pairs repeatedly rise together in the water column, eventually leading to females transferring their eggs directly into the male brood pouch during a brief midwater copulation. Courtship activity level (representing the percentage of time spent in courtship) increased from relatively low levels during the first courtship phase to highly active courtship on the day of copulation. Males more actively initiated courtship on the days preceding copulation, indicating that these seahorses are not courtship-role reversed, as has previously been assumed.
(pp.634)
Masanjones, H. & Lewis, S. (1996). Courtship Behavior in the Dwarf Seahorse. American Society of Ichthyologists and Herpetologists, Copeia

INTENSITY - **Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade etc.)**

Four distinct phases of seahorse courtship are marked by prominent behavioral changes, as well as by differences in the intensity of courtship.

Reciprocidade + Cortesia - The first courtship phase occurs for one or two

mornings preceding the day of copulation and is characterized by reciprocal quivering, consisting of rapid side-to-side body vibrations displayed alternately by males and females. The remaining courtship phases are restricted to the day of copulation, with the second courtship phase distinguished by females pointing, during which the head is raised upward. In the third courtship phase, males begin to point in response to female pointing.
Dinâmica + Sincronização + Cortesia - During the final phase of courtship, seahorse pairs repeatedly rise together in the water column, eventually leading to females transferring their eggs directly into the male brood pouch during a brief midwater copulation. Courtship activity level (representing the percentage of time spent in courtship) increased from relatively low levels during the first courtship phase to highly active courtship on the day of copulation. Males more actively initiated courtship on the days preceding copulation, indicating that these seahorses are not courtship-role reversed, as has previously been assumed. (pp.634)
Masanjones, H. & Lewis, S. (1996). Courtship Behavior in the Dwarf Seahorse. American Society of Ichthyologists and Herpetologists, Copeia

Hippocampus zosterae courtship is par- titioned into four discrete phases, distinguished by marked behavioral changes as well as by dif- ferences in courtship intensity. (pp.635)

RESUMO DESCRITIVO

Os cientistas acreditam que o comportamento de corte sincroniza os movimentos dos animais, para que o macho possa receber os ovos quando a fêmea está pronta para depositá-los. Durante esse tempo eles podem mudar de cor, nadar lado a lado segurando caudas ou aderência a vertente da mesma grama do mar com suas caudas e roda em torno de em uníssono no que é conhecido como a "dança da madrugada". Eles finalmente encaixam-se numa verdadeira "dança do acasalamento "com duração de cerca de 8 horas, durante o qual o macho bombeia água através da bolsa de ovo no seu tronco, que se expande e abre.
Sea horses entwine their tails together and swim together in tandem during their tender courtships while snails caress each other with their tentacles in order to find out if they are suited for each other.
http://www.allthesea.com/Seahorses.html

Sea horses entwine their tails together and swim together in tandem during their tender courtships while snails caress each other with their tentacles in order to find out if they are suited for each other. For humans getting close to someone can send out a strong signal and touching them briefly on the arm or hand can be a hard signal to miss. Fonte:
http://www.telegraph.co.uk/news/science/science-news/8771138/How-to-flirt-what-animals-teach-us-about-charming-the-opposite-sex.html

OBSERVAÇÃO VISUAL (VÍDEO)

Seahorse Mating Dance - The Great British Year: Episode 2 Preview - BBC One - https://www.youtube.com/watch?v=oa3lt7ewW9U

REFERÊNCIAS BIBLIOGRÁFICAS

Masanjones, H. & Lewis, S. (1996). Courtship Behavior in the Dwarf Seahorse. American Society of Ichthyologists and Herpetologists, Copeia (pp.634-640)
Copeia, 1996(3), pp. 634-640
Courtship Behavior in the Dwarf Seahorse,
Hippocampus zosterae
HEATHER D. MASONJONES AND SARA M. LEWIS

University of Michigan – Museum of Zoology - http://animaldiversity.org/accounts/Hippocampus_zosterae/ - ultimo acesso a 17 de Agosto de 2016

Encyclopedia of Live (http://eol.org/pages/24646/overview) - ultimo acesso a 17 de Agosto de 2016

http://www.telegraph.co.uk/news/science/science-news/8771138/How-to-flirt-what-animals-teach-us-about-charming-the-opposite-sex.html - ultimo acesso a 17 de Agosto de 2016

LULA – FALTA DURAÇÃO!!!!!!!

(*Sepia plangon*)

TIPO DE AGENTE

Aquático

ZONAS GEOGRÁFICAS

Região sudoeste do Pacífico, nas águas costeiras do leste da Austrália a partir do Golfo de Carpentaria para Sydney - *Sepia plangon* is found in the Southwestern Pacific region, in coastal waters of eastern Australia from the Gulf of Carpentaria to Sydney.
http://australianmuseum.net.au/mourning-cuttlefish-sepia-plangon-gray-1849 - ultimo acesso a 18 de Agosto de 2016

QUEM TOMA INICIATIVA (M | F)

Masculino - When a male cuttlefish attempts to seduce a nearby female, he offers her a courtship display by controlling the arrangement of pigments that appear on the surface of his skin.
http://www.bbc.com/future/story/20130221-the-wilder-side-of-sex - ultimo acesso a 18 de Agosto 2016

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Enviei e-mail a 18 Agosto

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Brandos - When a male cuttlefish attempts to seduce a nearby female, he offers her a courtship display by controlling the arrangement of pigments that appear on the surface of his skin.
http://www.bbc.com/future/story/20130221-the-wilder-side-of-sex - ultimo acesso a 18 de Agosto 2016

Enganadores (não para a fêmea, mas para os outros machos...) **-** When a male cuttlefish attempts to seduce a nearby female, he offers her a courtship display by controlling the arrangement of pigments that appear on the surface of his skin. If a rival male approaches, he changes his skin on the side facing the rival to appear female. The female still sees the courtship display, the intruder, however, thinks there are two females – leaving the original male to complete his reproductive business in peace.
http://www.bbc.com/future/story/20130221-the-wilder-side-of-sex - ultimo acesso a 18 de Agosto 2016

Enganadores (não para a fêmea, mas para os outros machos...) **-** When a male cuttlefish is wooing a lady, he often "cheats" by painting typical female patterns on one side of his body, while the other side ? the one facing the female ? shows off typical male patterns. This gender-bending disguise fools rival males into thinking they're seeing just a couple of ladies hanging out. That means more of an opportunity for the cheater cuttlefish to mate.
"By using this sneaky display, the males are buying more time to convince the girls to mate before they are discovered by other males," said study researcher Culum Brown, a biologist at Macquarie University in Australia.
http://www.livescience.com/21374-cuttlefish-gender-bending-disguise.html - ultimo acesso em 18 Agosto 2016

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)

Visão - They also have sophisticated visual systems that allow them to choose the perfect camouflage for any situation.
http://www.livescience.com/21374-cuttlefish-gender-bending-disguise.html - ultimo acesso em 18 Agosto 2016

Visão - During courtship the females remain plain coloured, while males put on brilliant displays. Narrow, wavy, light-coloured transverse stripes appear across the upper body, and wide iridescent green bands along the base of their fins.
http://australianmuseum.net.au/mourning-cuttlefish-sepia-plangon-gray-1849 - ultimo acesso a 18 de Agosto de 2016

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, estratégia, reciprocidade, camuflagem/alt. cor, etc.)

Exibição - When a male cuttlefish attempts to seduce a nearby female, he offers her a courtship display by controlling the arrangement of pigments that appear on the surface of his skin.
http://www.bbc.com/future/story/20130221-the-wilder-side-of-sex - ultimo acesso a 18 de Agosto 2016

Estratégia -The researchers noticed that the males sometimes displayed a strange, split-down-the-middle coloration. On the side facing the female, they'd show pulsating stripes. On the side facing a rival male, they'd show mottled camouflage, a typical female look.

Camuflagem/alt. cor - When a male cuttlefish attempts to seduce a nearby female, he offers her a courtship display by controlling the arrangement of pigments that appear on the surface of his skin. If a rival male approaches, he changes his skin on the side facing the rival to appear female. The female still sees the courtship display, the intruder, however, thinks there are two females – leaving the original male to complete his reproductive business in peace.
http://www.bbc.com/future/story/20130221-the-wilder-side-of-sex - ultimo acesso a 18 de Agosto 2016

Camuflagem/alt. cor - When a male cuttlefish is wooing a lady, he often "cheats" by painting typical female patterns on one side of his body, while the other side ? the one facing the female ? shows off typical male patterns. This gender-bending disguise fools rival males into thinking they're seeing just a couple of ladies hanging out. That means more of an opportunity for the cheater cuttlefish to mate.
"By using this sneaky display, the males are buying more time to convince the girls to mate before they are discovered by other males," said study researcher Culum Brown, a biologist at Macquarie University in Australia.
http://www.livescience.com/21374-cuttlefish-gender-bending-disguise.html - ultimo acesso em 18 Agosto 2016

RESUMO DESCRITIVO

7. Male Cuttlefish pass themselves off as females. When a male cuttlefish is wooing a lady, he often 'cheats' by painting typical female patterns on one side of his body while the other side, the one facing the female, shows off typical male patterns. This gender-bending disguise fools rival males and gives more of an opportunity for the cheater cuttlefish to mate.
Source: **Live Science**. Picture source: **Cephalopost**
http://earthhour.wwf.org.uk/top-10-animal-courting-rituals/#.V6174JMrKRs - ultimo acesso a 18 agosto 2016

Tricky Cuttlefish Put on Gender-Bending Disguise
By Stephanie Pappas, Live Science Contributor | July 3, 2012 07:01pm ET

A male cuttlefish (right) displays male patterns on the side of his body facing a potential female mate. On the left side he wears a mottled pattern typical of females, an attempt to fool rival males into thinking he's not a threat.

Credit: © Culum Brown

Squid-like cuttlefish are known for their amazing camouflage abilities, thanks to specialized skin cells that allow them to change color in the blink of an eye. Now research finds that these clever mollusks use their color-changing abilities in creative ways: by pretending to be the other gender.
Well, half-pretending, that is.
When a male cuttlefish is wooing a lady, he often "cheats" by painting typical female patterns on one side of his body, while the other side ? the one facing the female ? shows off typical male patterns. This gender-bending disguise fools rival males into thinking they're seeing just a couple of ladies hanging out. That means more of an opportunity for the cheater cuttlefish to mate.
"By using this sneaky display, the males are buying more time to convince the girls to mate before they are discovered by other males," said study researcher Culum Brown, a biologist at Macquarie University in Australia.
[Photos: Cute, Color-Changing Cuttlefish]
Clever cuttlefish

Cuttlefish are close relatives of squid and octopuses. Despite their name, they're not fish but mollusks, a group that includes snails and slugs. Still, cuttlefish are quite a bit brighter than your average garden pest. They also have sophisticated visual systems that allow them to choose the perfect camouflage for any situation.
Brown and his colleagues first noticed the cuttlefish's "two-face" disguise in their laboratory, where they have a semi-natural enclosure for the mollusks. The scientists were conducting a study on anti-predator behavior when a group of *Sepia plangon,* or mourning cuttlefish, began courting. The researchers noticed that the males sometimes displayed a strange, split-down-the-middle coloration. On the side facing the female, they'd show pulsating stripes. On the side facing a rival male, they'd show mottled camouflage, a typical female look.
The researchers then turned to photographs taken in the Sydney Harbor in Australia, looking for examples of this sneaky behavior in the wild. From other research, they had photographs of 108 cuttlefish groups taken over six years, including 138 individual males.
Putting on a disguise

A male cuttlefish shows his masculine colors to a female while displaying feminine patterns on his opposite side.

Credit: © Culum Brown

In 39 percent of the photographed groups containing males, a courting male was sporting gender-bending camouflage. The behavior occurred only in groups where there were two males and one female, the researchers found. Extra females might have disrupted the male's concentration or simply made it hard for him to orient his disguise in the right direction, they wrote Tuesday (July 3) in the journal Biology Letters.

It might be too risky for the cuttlefish to split his coloring in the presence of more than one rival male, Brown told LiveScience. If another male caught onto the ruse, he'd most likely want to brawl — and fights can ensure that a less-dominant cheating male gets no chance to mate at all. More males hanging around means a greater likelihood of a fight.

For animals that are "effectively snails," cuttlefish are showing off their smarts, Brown said.

"The fact that the males only perform this behavior in a very specific context clearly shows that they are very well aware of the social context in which they find themselves and behave accordingly," he said. Complex social

interactions have been put forth to explain why primates and birds show intelligence, he said, and it may be the same for the humble cuttlefish.

Follow Stephanie Pappas on Twitter @sipappas or LiveScience@livescience. We're also on Facebook & Google+.
http://www.livescience.com/21374-cuttlefish-gender-bending-disguise.html - ultimo acesso em 18 Agosto 2016

The wilder side of sex
Humans may look down upon certain sexual interests as odd or gross, though chances are that animals indulge in a spot of similar behaviour too.
By Jason G Goldman
22 February 2013
The mourning cuttlefish (*Sepia plangon*) takes its cross dressing even further. This cephalopod, found in the waters off the eastern coast of Australia, controls the appearance of its skin **with exquisite precision**. When a male cuttlefish attempts to seduce a nearby female, he offers her a courtship display by controlling the arrangement of pigments that appear on the surface of his skin. If a rival male approaches, he changes his skin on the side facing the rival to appear female. The female still sees the courtship display, the intruder, however, thinks there are two females – leaving the original male to complete his reproductive business in peace.
http://www.bbc.com/future/story/20130221-the-wilder-side-of-sex - ultimo acesso a 18 de Agosto 2016

Mating and reproduction
During courtship the females remain plain coloured, while males put on brilliant displays. Narrow, wavy, light-coloured transverse stripes appear across the upper body, and wide iridescent green bands along the base of their fins.
http://australianmuseum.net.au/mourning-cuttlefish-sepia-plangon-gray-1849 - ultimo acesso a 18 de Agosto de 2016

OBSERVAÇÃO VISUAL (vídeo)

http://australianmuseum.net.au/mourning-cuttlefish-sepia-plangon-gray-1849 - ultimo acesso a 18 de Agosto de 2016

https://www.youtube.com/watch?v=fR7Dqf0vzzQ - ultimo acesso a 18 de Agosto de 2016

https://www.youtube.com/watch?v=JDR3zDxwebA - ultimo acesso a 18 de Agosto de 2016

REFERÊNCIAS BIBLIOGRÁFICAS

http://australianmuseum.net.au/mourning-cuttlefish-sepia-plangon-gray-1849 - ultimo acesso a 18 de Agosto de 2016

http://www.bbc.com/future/story/20130221-the-wilder-side-of-sex - ultimo acesso a 18 de Agosto 2016

http://www.livescience.com/21374-cuttlefish-gender-bending-disguise.html - ultimo acesso em 18 Agosto 2016

http://earthhour.wwf.org.uk/top-10-animal-courting-rituals/#.V6174JMrKRs - ultimo acesso a 18 agosto 2016

PUFFERFISH
(Torquigener albomaculosus sp.)

TIPO DE AGENTE
AQUÁTICO

ZONAS GEOGRÁFICAS
Amami-oshima island in the Ryukyu Islands. – japão

Abstract

Torquigener albomaculosus sp. nov. is described based on two specimens collected from sandy bottoms at depths of 15 and 18 m along the south coast of Amami-oshima Island in the Ryukyu Islands. This new species is distinguished from all other species of *Torquigener* by the following

Matsuura, K. Ichthyol Res (2015) 62: 207. doi:10.1007/s10228-014-0428-5

QUEM TOMA INICIATIVA (M | F)
MASCULINO - Further study showed these small pufferfish make the ornate circles to attract mates.
http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

MASCULINO – Males of Torquigener albomaculosus build unique circles as spawing nests, these being 2m in diameter on sandy bottoms at depths from 10 t0 30 at Amami-oshima Island.

silvery white covered by many white spots from chin to above anal-fin origin; dorsal rim of eye light yellow; and many two-rooted spinules on head and body. Males of *T. albomaculosus* build unique circles as spawning nests, these being 2 m in diameter on sandy bottoms at depths from 10 to 30 m at Amami-oshima Island.

Matsuura, K. Ichthyol Res (2015) 62: 207. doi:10.1007/s10228-014-0428-5

When the circles are finished, females come to inspect them. If they like what they see, they reproduce with the males, said Hiroshi Kawase, the curator of the Coastal Branch of Natural History Museum and Institute in Chiba, Japan.
http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)
Prolongado >dia – Each of the males constructed a circular structure on the seabed (Fig. 3), which required 7–9 days to complete (Fig. 2; K1, K3 and K4). The behavioural patterns of the males changed during construction (Fig. 4). (p.1)
Kawase, H., Okata, Y. & Ito, K. (2013). Role of Huge Geometric Circular Structures in the Reproduction of a Marine Pufferfish. Scientific Reports | 3 : 2106.

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Brandos – When the female entered the nest, the male retreated from the central zone and rushed towards her several times. (p. 2)
Kawase, H., Okata, Y. & Ito, K. (2013). Role of Huge Geometric Circular Structures in the Reproduction of a Marine Pufferfish. Scientific Reports | 3 : 2106.

Ritualizados – When a female approached the circular structure, the male stirred up the sand particles in the central zone of the nest. When the female entered the nest, the male retreated from the central zone and rushed towards her several times. (p. 2)
Kawase, H., Okata, Y. & Ito, K. (2013). Role of Huge Geometric Circular Structures in the Reproduction of a Marine Pufferfish. Scientific Reports | 3 : 2106.

Materiais - He arranges the sand, with mathematical perfection, into elegant and intricately designed "crop circles" and uses shells to decorate the ridges of his artwork.
http://www.cbc.ca/lifestory/extras/stories/animal-courtship

Materiais - During this stage, males also decorated the radially aligned peaks with shell and coral fragments, and the frequency of the behaviour was significantly higher than that during other stages (Dec; Fig. 4). They chose fragments from the seafloor of the central zone and valleys and placed them on the peaks. Females were observed to visit the male's nest only during this stage of construction. (p. 2)
Kawase, H., Okata, Y. & Ito, K. (2013). Role of Huge Geometric Circular Structures in the Reproduction of a Marine Pufferfish. Scientific Reports | 3 : 2106.

Ritualizados + Materiais - First, they involve radially aligned ridges and valleys outside the nest site. Second, the male decorates these ridges with fragments of shells. Third, the male gathers fine sediments to give the resulting formation a distinctive look and coloring, Kawase said.
http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)

Visão - When the circles are finished, females come to inspect them. If they like what they see, they reproduce with the males, said Hiroshi Kawase, the curator of the Coastal Branch of Natural History Museum and Institute in Chiba, Japan.
http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

Visão - He then lures the female into his sand lair (in the style of *The Phantom of the Opera* of course) and she takes a moment to inspect his work (just like Christine did).
http://www.cbc.ca/lifestory/extras/stories/animal-courtship

Males laboriously flap their fins as they swim along the seafloor, resulting in disrupted sediment and amazing circular patterns. Although the fish are only about 12 centimeters (5 inches) long, the formations they make measure about 2 meters (7 feet) in diameter.
http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

First, they involve radially aligned ridges and valleys outside the nest site. Second, the male decorates these ridges with fragments of shells. Third, the male gathers fine sediments to give the resulting formation a distinctive look and coloring, Kawase said.
http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, "imaginação", construção, dinâmica, persistência, sincronização, carinhos, exibição, decoração, vigilância, reciprocidade etc.)

"Imaginação" - First, they involve radially aligned ridges and valleys outside the nest site. Second, the male decorates these ridges with fragments of shells. Third, the male gathers fine sediments to give the resulting formation a distinctive look and coloring, Kawase said.
http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

Dinâmica - Males laboriously flap their fins as they swim along the seafloor, resulting in disrupted sediment and amazing circular patterns.
http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

Construção - First, they involve radially aligned ridges and valleys outside the nest site. Second, the male decorates these ridges with fragments of shells. Third, the male gathers fine sediments to give the resulting formation a distinctive look and coloring, Kawase said.
http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

Decoração- He arranges the sand, with mathematical perfection, into elegant and intricately designed "crop circles" and uses shells to decorate the ridges of his artwork. He then lures the female into his sand lair (in the style of *The Phantom of the Opera* of course) and she takes a moment to inspect his work (just like Christine did).
http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

Construção - We report that male pufferfishes (Torquigener sp., Tetraodontidae) constructed large geometric circular structures on the seabed that played an important role in female mate choice. (p.1)
Kawase, H., Okata, Y. & Ito, K. (2013). Role of Huge Geometric Circular Structures in the Reproduction of a Marine Pufferfish. Scientific Reports | 3 : 2106.

Construção - Males dug valleys at various angles in a radial direction, constructing nests surrounded by radially aligned peaks and valleys. Furthermore, they created irregular patterns in the nest comprising fine sand particles. (p.1)
Kawase, H., Okata, Y. & Ito, K. (2013). Role of Huge Geometric Circular Structures in the Reproduction of a Marine Pufferfish. Scientific Reports | 3 : 2106

Construção - During the early stages of construction (on the day of and the day after construction of the new circular structure), each male created a basic circular shape (Fig. 3a)… During the middle stage of construction (between the early and final stages of construction), additional male behaviour refined the circular structure (Figs. 3b, 4)… During the final stage of construction (on the day of and the day before spawning), the circular structure was completed. The most remarkable change that occurred during this stage was the formation of an irregular pattern in the central zone (Fig. 3c). (p.2)

Kawase, H., Okata, Y. & Ito, K. (2013). Role of Huge Geometric Circular Structures in the Reproduction of a Marine Pufferfish. Scientific Reports | 3 : 2106

Construção - The circular structure not only influences female mate choice but also functions to gather fine sand particles in nests, which are important in female mate choice. Strangely enough, the males never reuse the nest, always constructing a new circular structure at the huge cost of construction. This is because the valleys may not contain sufficient fine sand particles for multiple reproductive cycles. (p.1)
Kawase, H., Okata, Y. & Ito, K. (2013). Role of Huge Geometric Circular Structures in the Reproduction of a Marine Pufferfish. Scientific Reports | 3 : 2106

Exibição - When the circles are finished, females come to inspect them. If they like what they see, they reproduce with the males, said Hiroshi Kawase, the curator of the Coastal Branch of Natural History Museum and Institute in Chiba, Japan.
http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

RESUMO DESCRITIVO

4. Japanese puffer fish show off their artistic talent
In a technicolor, underwater world, it's hard for a male Japanese puffer fish to get noticed. With his dull colours, he's practically invisible to those around him. But to compensate, he uses a unique, extraordinary talent to attract a female. He arranges the sand, with mathematical perfection, into elegant and intricately designed "crop circles" and uses shells to decorate the ridges of his artwork. He then lures the female into his sand lair (in the style of *The Phantom of the Opera* of course) and she takes a moment to inspect his work (just like Christine did). She never would have noticed him otherwise, but he certainly has her attention now — enough to let him fertilize her eggs and lay them in his sand construction. But while he stays until the eggs hatch, she leaves him as his art fades away. Watch more on the puffer fish's incredible nest-building behaviour »
http://www.cbc.ca/lifestory/extras/stories/animal-courtship - ultimo acesso a 23 de agosto de 2016

Pufferfish Love Explains Mysterious Underwater Circles
By Douglas Main, Staff Writer | October 2, 2013 03:30pm ET
In 1995, divers noticed a beautiful, strange circular pattern on the seafloor off Japan, and soon after, more circles were discovered nearby. Some likened these formations to "underwater crop circles." The geometric formations mysteriously came and went, and for more than a decade, nobody knew what made them.
Finally, the creator of these remarkable formations was found: a newly discovered species of pufferfish. Further study showed these smallpufferfish make the ornate circles to attract mates. Males laboriously flap their fins as they swim along the seafloor, resulting in disrupted sediment and amazing circular patterns. Although the fish are only about 12 centimeters (5 inches) long, the formations they make measure about 2 meters (7 feet) in diameter. When the circles are finished, females come to inspect them. If they like what they see, they reproduce with the males, said Hiroshi Kawase, the curator of the Coastal Branch of Natural History Museum and Institute in Chiba, Japan. But nobody knows exactly what the females are looking for in these circles or what traits they find desirable, Kawase told LiveScience. [See Video of Pufferfish Making Seafloor Circles]

http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

Unique circles

Pufferfish mating involves females laying eggs in the fine sediments in the center of the circles, and then the males fertilizing them externally. Then, the females vanish, and the males stay for another six days, perhaps to guard the eggs, the study noted.

Males of some species of cichlids (a type of fish) are known to construct crater-shaped mounds that females visit to have their eggs fertilized, Kawase said. For example, male featherfin cichlids in Africa's Lake Tanganyika build small bowls out of the sand, and display them to females before mating there, said Alex Jordan, a researcher at the University of Texas at Austin who wasn't involved in this study.

A male pufferfish making a valley in the seafloor with his fins on April 23, 2012.

Credit: K. Ito

But this new pufferfish's geometric patterns have three features never seen before. First, they involve radially aligned ridges and valleys outside the nest site. Second, the male decorates these ridges with fragments of shells. Third, the male gathers fine sediments to give the resulting formation a distinctive look and coloring, Kawase said. [Photos: Pufferfish Make Seafloor Circles to Mate]

Strangely enough, the male "gathers" the fine sediments using the circular pattern itself, Kawase said. A fluid dynamics test using a half-size model of one of these circles found that the upstream portion of the circle funnels water and fine sediments toward the center. Then, the downstream peaks and valleys funnel the water outward. The speed of water was slowed by nearly 25 percent in the center, where the eggs are laid, the study noted.

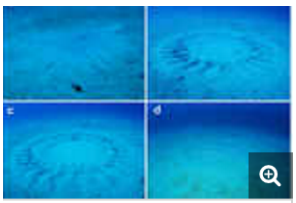
Bowerbirds of the sea?

It takes about seven to nine days for the pufferfish to construct the circles. The male pufferfish don't maintain these formations, and underwater currents wash them away relatively quickly. Kawase said they likely give up their old formations because the circles exhaust the fine sediment in the area, and thus must be built anew in areas with fresh sediment.

When Jordan first heard about the circles, he guessed a much bigger fish would have made them. The fact that such a small animal makes such a large formation is "pretty cool, and suggests some underlying biological reason for the size, like poor visibility at depth, or distance between individuals that means males have to make large nests to be found by females," he told LiveScience.

Research describing the pufferfish formations was published in July in the journal Scientific Reports. "It's a nice clean study because it provides a definite answer to the question — something that is very rare in biology," Jordan said.

The formations are very similar to so-called "bowers" — display sites built by various animals like bowerbirds in which to strut their stuff before mating. In this case, the formations may serve solely to gather fine sediments, which females could use to choose their mate, Jordan said.



One of the circular formations in various stages of completion. "A" represents the early stage, B the middle stage and C the final stage. D shows the same circle one week after spawning.

Credit: Y. Okata

But until this idea is tested, nobody will know. "The one caveat I have is that there is no evidence that females care about anything more than the fine sand, and even that's a stretch," Jordan said. "The beautiful lines and structure could serve only to channel those particles to the center, and have no aesthetic purpose."
Although Jordan said he doesn't think that's the case, the idea that the fine sediments are important to females would be "biologically interesting, because it would suggest that function is more important than appearance," he said.
Email Douglas Main or follow him on Twitter or Google+. Follow us@livescience, Facebookor Google+. Article originally on LiveScience.
http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

OBSERVAÇÃO VISUAL (vídeo)

http://www.livescience.com/40119-pufferfish-make-seafloor-circles-to-attract-mates-video.html - ultimo acesso a 23 de agosto de 2016

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Kawase, H., Okata, Y. & Ito, K. (2013). Role of Huge Geometric Circular Structures in the Reproduction of a Marine Pufferfish. Scientific Reports | 3 : 2106.

Matsuura, K. Ichthyol Res (2015) 62: 207. doi:10.1007/s10228-014-0428-5

http://www.livescience.com/40132-underwater-mystery-circles.html - ultimo acesso a 23 de agosto de 2016

http://www.cbc.ca/lifestory/extras/stories/animal-courtship - ultimo acesso a 23 de agosto de 2016

TARTARUGA VERDE
(Chelonia mydas)

TIPO DE AGENTE
Aquático

ZONAS GEOGRÁFICAS
Oceano Indico, atlântico, pacifico e mar mediterrânico

Geographic Range

Green turtles are found in tropical and portions of subtropical oceans worldwide. They are found in the Atlantic Ocean from the eastern United States along coastal South America to South Africa. They are found throughout the Caribbean Sea and portion of the Mediterranean. They are also found throughout the warm waters of the Indian and Pacific Oceans. (Ernst, et al., 1994)

> **Biogeographic Regions:** indian ocean (native) ; atlantic ocean (native) ; pacific ocean (native) ; mediterranean sea (native)

http://animaldiversity.org/accounts/Chelonia_mydas/ - ultimo acesso a 5 de setembro de 2016

QUEM TOMA INICIATIVA (M | F)

The unreceptive female rejects a courting male by assuming the 'refusal' position. As the male swims along behind her, she will turn toward him and assume a vertical position in the water, with the plastron facing the male, and all limbs wide-spread. (p. 809)
Booth, J. & Peters, J. (1972). Behavioural studies on the green turtle (chelonia mydas) in the sea. Anim. Behav., 1972, 20, 808-812.

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

curto - <h

No dia 06/09/2016, às 16:58, Owens, David William <OwensD@cofc.edu> escreveu:
Hi Pedro,
I am only guessing but I would think quick would be less than an hour but not less than 10 minutes.

médio - <dia

No dia 06/09/2016, às 03:48, Owens, David William <OwensD@cofc.edu> escreveu:
Dear Pedro,
The two key papers of which I am aware are :

Booth, Julie. and A. Peters. 1972. Behavioral studies on the green sea turtle (Chelonia mydas) in sea. Animal Behavior, 20:808-812. .

Comuzzie, D.C. and D. W. Owens. 1990. A quantitative analysis of courtship behavior in captive green sea turtles (Chelonia mydas). Herpetologica. 46:195-202.

The Booth paper is the classic in this poorly studied field and the Comuzzie is the only more quantitative paper I have seen. Sorry I do not have PDFs available for these papers.

Courtship may take several hours or be rather quick. This depends on the level of receptivity of the female. Mating on the other hand often lasts for several hours (even days apparently, but I can not confirm this old belief), and usually includes multiple mounted males on the same female.

Hope this helps,
Best regards,
Dave Owens
Fulbright Senior Scholar, Burma 2016

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Intimidatórios - The female is completely in control of whether mating occurs or not, because the males are almost continuously sexually aggressive during the breeding season, constantly patrolling off shore and in the lagoon, attacking any large object in the water. (p. 809)
Booth, J. & Peters, J. (1972). Behavioural studies on the green turtle (chelonia mydas) in the sea. Anim. Behav., 1972, 20, 808-812.

Ritualizados - Courtship begins in shallow Malaysian waters with gentle, coordinated circling that is truly enchanting to watch. Together, the couple surfaces to take their first breath together, which marks the beginning of several hours of mating.
http://www.cbc.ca/lifestory/extras/stories/animal-courtship - ultimo acesso a 26 de Agosto de 2016

Intimidatórios - Sexually aroused males will pursue any large swimming object divers, but they generally respond to the same signal from a diver as from an unresponsive female, relieving an observer of the danger of harm from the heavy limbs. (p. 809)
Booth, J. & Peters, J. (1972). Behavioural studies on the green turtle (chelonia mydas) in the sea. Anim. Behav., 1972, 20, 808-812.

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)

Tacto - But occasionally biting plays a role in the courtship, with the male nipping gently at her neck, pinching the skin lightly and releasing it. This type of bite can be seen in Plate XV, Fig. lB. The female will sometimes respond by biting him in what appears to be a playful or certainly non-aggressive manner, and such an exchange of bites is almost invariably a prelude to copulation. (p. 809)
Booth, J. & Peters, J. (1972). Behavioural studies on the green turtle (chelonia mydas) in the sea. Anim. Behav., 1972, 20, 808-812.

Visão - The unreceptive female rejects a courting male by assuming the 'refusal' position. As the male swims along behind her, she will turn toward him and assume a vertical position in the water, with the plastron facing the male, and all limbs wide-spread (Plate XV, Fig. 1A). Males treated in this way usually swim off and leave that female undisturbed. (p. 809)
Booth, J. & Peters, J. (1972). Behavioural studies on the green turtle (chelonia mydas) in the sea. Anim. Behav., 1972, 20, 808-812.

Tacto - Observed components of courtship behavior included gular rubbing, biting, cloacal checking, circling and biting, chasing, following, attempted mounting, mounting, and escorting.
Diana K. Crowell Comuzzie, & David Wm. Owens. (1990). A Quantitative Analysis of Courtship Behavior in Captive Green Sea Turtles (Chelonia Mydas). *Herpetologica,46*(2), 195-202. Retrieved from http://www.jstor.org/stable/3892904

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade, agressividade, análise/aferição, etc.)

Análise/aferição - Cloacal checks may be used by both males and females to assess reproductive condition of females.
Diana K. Crowell Comuzzie, & David Wm. Owens. (1990). A Quantitative Analysis of Courtship Behavior in Captive Green Sea Turtles (Chelonia Mydas). *Herpetologica,46*(2), 195-202. Retrieved from http://www.jstor.org/stable/3892904

Reciprocidade - But occasionally biting plays a role in the courtship, with the male nipping gently at her neck, pinching the skin lightly and releasing it. This type of bite can be seen in Plate XV, Fig. lB. The female will sometimes respond by biting him in what appears to be a playful or certainly non-aggressive manner, and such an exchange of bites is almost invariably a prelude to copulation. (p. 809)
Booth, J. & Peters, J. (1972). Behavioural studies on the green turtle (chelonia mydas) in the sea. Anim. Behav., 1972, 20, 808-812.

Vigilância - The unreceptive female rejects a courting male by assuming the 'refusal' position. As the male swims along behind her, she will turn toward him and assume a vertical position in the water, with the plastron facing the male, and all limbs wide-spread (Plate XV, Fig. 1A). Males treated in this way usually swim off and leave that female undisturbed. (p. 809)
Booth, J. & Peters, J. (1972). Behavioural studies on the green turtle (chelonia mydas) in the sea. Anim. Behav., 1972, 20, 808-812.

Persistência - Acceptance of the refusal sign seems to be correlated with the availability of females, and a male that has accepted the refusal signal will sometimes return after cruising around the lagoon without locating a receptive female, or after finding all other females already mating. (p. 809)
Booth, J. & Peters, J. (1972). Behavioural studies on the green turtle (chelonia mydas) in the sea. Anim. Behav., 1972, 20, 808-812.

Agressividade - As noted above, females not interested in courtship will bite a courting male on occasion and can inflict a deep gash. (p. 809)
Booth, J. & Peters, J. (1972). Behavioural studies on the green turtle (chelonia mydas) in the sea. Anim. Behav., 1972, 20, 808-812.

RESUMO DESCRITIVO

Green turtles have brief but intense flings
It takes 30 years of maturity before a female green turtle has her first encounter with a male mate. Courtship begins in shallow Malaysian waters with gentle, coordinated circling that is truly enchanting to watch. Together, the couple surfaces to take their first breath together, which marks the beginning of several hours of mating.
http://www.cbc.ca/lifestory/extras/stories/animal-courtship - ultimo acesso a 26 de Agosto de 2016

Sea turtles are visually spectacular when swimming, providing the appearance of underwater flight, very much like a large graceful bird on the wing.

Reproduction of Marine Life, Birth of New Life! Investigating the Mysteries of Reproduction

Owens & Blanvillain: Captive Reproduction of Sea Turtles 23

Captive Reproduction of Sea Turtles: An Important Success Story

David Wm. Owens and Gaëlle Blanvillain
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Charleston, SC 29412, USA
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As in many chelonids (Carpenter & Ferguson 1977) courtship and mating are relatively stereotyped in marine turtles (see Frick et al. 2000 for review). The first detailed field descriptions of the ethology of
courtship in green turtles were given by Booth & Peters (1972), and these were augmented by detailed studies under farmed conditions (Ulrich & Parkes 1978, Wood & Wood 1980, Comuzzie & Owens 1990). In general, female choice appears to be in operation with males undertaking what has been described as elaborate courtship behaviour. (p.126)
Godley, B., Broderick, A., Frauenstein, R., Glen, F. & Hays, G. (2002). Reproductive seasonality and sexual dimorphism in green turtles. Mar Ecol Prog Ser. Vol. 226: 125–133.

It appears that, although females can be receptive for a period of 15 d, most mating is carried out over a period of some 2 to 4 d (Booth & Peters 1972, Ulrich & Parkes 1978, Wood & Wood 1980, Comuzzie & Owens 1990). (p.126)
Godley, B., Broderick, A., Frauenstein, R., Glen, F. & Hays, G. (2002). Reproductive seasonality and sexual dimorphism in green turtles. Mar Ecol Prog Ser. Vol. 226: 125–133.

…, terrestrial species were more likely to engage in male combat and demonstrate males which were larger than conspecific females; semi-aquatic and bottom walking species were shown to have larger males than females and behaviour suggestive of forced insemination; aquatic species appeared to have elaborate courtship, suggestive of female choice and almost universally showed sexual dimorphism where males were smaller than females. (p.126)
Godley, B., Broderick, A., Frauenstein, R., Glen, F. & Hays, G. (2002). Reproductive seasonality and sexual dimorphism in green turtles. Mar Ecol Prog Ser. Vol. 226: 125–133.

Courtship.
The female is completely in control of whether mating occurs or not, because the males are almost continuously sexually aggressive during the breeding season, constantly patrolling off shore and in the lagoon, attacking any large object in the water. The female is not in a continuous state of receptivity, however, and has developed several mechanisms for avoiding copulation. There seems to be a vaguely hierarchical sequence of avoidance reactions by the females, and we arrange them here in apparent increasing order of significance. An unreceptive female will both swim and lie quiescent with the hind flippers carefully folded together in the position shown in Plate XVIII, Fig. 4 (top). Whether this is properly interpreted as a sign of rejection or not is uncertain, but the position is commonly assumed by females just returning from egg deposition or immediately after termination of copulation. Any female outside the 'female reserve' (see below) is certain to be approached by a male, and the male will mount immediately, if permitted. If she is not

receptive, she swims away at a comparatively rapid pace, but, if pursued closely, she will circle quickly to face the male (also noted by Hendrickson 1958). Since the male prefers to approach her from behind, he swims out and around her circle, with the pair thus following an elliptical path through the water. She does not hesitate to bite him in the head or neck if he gets too dose, and older males are usually badly scarred from this and combat with other males. If her rejection is complete, she will usually use the vertical 'refusal' position (see below), which almost always concludes courtship. If she is caught in water too shallow to permit assumption of the refusal position, she will often beach herself.
The males generally will not follow her, and even one which has successfully mounted but not yet penetrated the female will disengage rather than be dragged ashore, so beaching is a successful avoidance procedure. Males that have successfully engaged in copulatory penetration will remain in position even though the pair may be washed ashore. At least one female has been seen to leave the water on the lagoon side of the island and drag herself across the sandspit back to the water on the seaward side, to avoid pursuing males.
As noted above, females not interested in courtship will bite a courting male on occasion and can inflict a deep gash. But occasionally biting plays a role in the courtship, with the male nipping gently at her neck, pinching the skin lightly and releasing it. This type of bite can be seen in Plate XV, Fig. lB. The female will sometimes respond by biting him in what appears to be a playful or certainly non-aggressive manner, and such an exchange of bites is almost invariably a prelude to copulation.
The unreceptive female rejects a courting male by assuming the 'refusal' position. As the male swims along behind her, she will turn toward him and assume a vertical position in the water, with the plastron facing the male, and all limbs wide-spread (Plate XV, Fig. 1A). Males treated in this way usually swim off and leave that female undisturbed. Acceptance of the refusal sign seems to be correlated with the availability of females, and a male that has accepted the refusal signal will sometimes return after cruising around the lagoon without locating a receptive female, or after finding all other females already mating. After such a cruise he is less likely to accept the signal again. This was verified several times by dinging to the tail of a male as he was repelled by a female, circled the lagoon, and returned to the original female with reinforced vigour. In the instance shown in Plate XV, Fig. 1A, the male pressed his attack until the female was forced back, and he seized the soft skin of her throat in his beak (Plate XV, Fig. 1B). Sexually aroused males will pursue any large
swimming object divers, but they generally respond to the same signal from a diver as from an unresponsive female, relieving an observer of the danger of harm from the heavy limbs. Occasionally the 'large swimming object' in the water is another male, but no male under attack by a second male has ever been seen to assume the 'refusal' position of a female. He will attempt to escape by frantic splashing, wild lunges, and bursts of speed. If caught, he generally manages to dislodge the aggressor by turning completely upside down. (p. 808 e 809)
Booth, J. & Peters, J. (1972). Behavioural studies on the green turtle (chelonia mydas) in the sea. Anim. Behav., 1972, 20, 808-812.

Carregado a 22/10/2008
One turtle is intent on forcing the other below the water using his body and claws to block the other from rising. The waving of the claws is supposed to be sexy?

Answer from the aquarium
You actually observed the mating dance of these basking turtles. The males tend to be smaller than females. Males sport long straight claws which are

used as part of the mating dance. After detecting what may be a pheromone signal while sniffing at a female's tail, a male cooter will court a female by swimming above her, vibrating his long nails and stroking her face. Females have also been observed doing this to initiate courtship. If the female is receptive, she will sink to the bottom and will allow the male to mount for mating.
https://www.youtube.com/watch?v=lOQxQJzrQGk **- ultimo acesso a 6 de Setembro de 2016**

Abstract
Reproductive behavior of captive green sea turtles (Chelonia mydas) was observed at the Cayman Turtle Farm, British West Indies. Observed components of courtship behavior included gular rubbing, biting, cloacal checking, circling and biting, chasing, following, attempted mounting, mounting, and escorting. Data analysis indicated that in each of the observed components, reproductively attractive females were the target of the behavior significantly more often than reproductively nonattractive females. Cloacal checks may be used by both males and females to assess reproductive condition of females. Males may escort mounted pairs to disrupt copulation attempts by rivals and increase their own reproductive success; females may act as escorts to enhance later mate availability. In general, females appear to signal approaching reproductive receptivity to males, but females may exercise mate selectivity by avoiding mounting.
Diana K. Crowell Comuzzie, & David Wm. Owens. (1990). A Quantitative Analysis of Courtship Behavior in Captive Green Sea Turtles (Chelonia Mydas). *Herpetologica,46*(2), 195-202. Retrieved from http://www.jstor.org/stable/3892904

Bustard (1973) reported a courtship sequence for *Chelonia mydas* consisting of the male facing and nuzzling the female,

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then biting her neck and rear flippers, and finally chasing her if she swam away. If a female was in water deeper than the height of her carapace, a male was able to mount by swimming onto her back and hooking his foreflipper claws over the anterior rim of her carapace. A female could avoid

p.195

observed. Data from 1984 indicated that females were initially attractive, but not receptive, to males although they did nothing to solicit male attentions. In fact, females initially ignored or repelled male courtship by biting, swimming away, or beaching themselves.

Females did not initiate interactions as often as males did. Over the entire 1985 and 1986 seasons, males initiated 943 interactions with females, but females initiated only 251 interactions with males.

p.197

The following components are selected steps in the courtship sequence and are listed in the approximate order in which they occurred.

Gular rub.—Gular rubs occurred when a male or female rubbed its gular region along a recipient's head or carapace. Males gular rubbed breeding females significantly more than they rubbed nonbreeding females. Nonbreeding females also gular rubbed breeding females significantly more than they rubbed other nonbreeding females (Table 1). There was only one record of a gular rub by a female on a male, and only one record of a gular rub by a breeding female on a nonbreeding female.

Bite.—One of the most common courtship components was biting, and its milder form, nipping. In nipping, smaller amounts of the recipient's skin were taken into the mouth. Turtles were bitten all over the body, but especially in the soft skin areas around the shoulders, neck, and around

p.197

the mouth. Fresh bite scars were not seen after the mating season. Biting by males and females was described by Booth and Peters (1972) as a non-aggressive prelude to mating, and similarly was suggested by Bustard (1973) to be an extension of nuzzling which induces female arousal. Male *C. mydas* bit breeding females significantly more than they bit nonbreeding females, and breeding females bit males significantly more than nonbreeding females bit males (Table 1).

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Cloacal check.—A cloacal check occurred when the external nares and beak of a turtle were placed in the recipient turtle's inguinal region, between the Rathke's gland and the cloaca. In freshwater species of turtles, the tail, cloaca, or rear portion of the shell may be sampled by males (Carpenter, 1966; Carpenter and Ferguson, 1977; Harless and Lambiotte, 1971; Jackson and Davis, 1972*a*,*b*); however, this behavior has not been previously reported in marine turtles. Bustard (1973)

p.198

described loose biting of the rear flippers by males which may be somewhat similar to cloacal checking. In our study, both males and females checked the cloacas of breeding females significantly more than they did nonbreeding females (Table 1).

Circle and bite.—Male turtles continually swam around to the backs of females in order to mount. A female, however, would counter the male's movements so that she continually faced him, and thus avoided being mounted. This resulted in the female turning in a circle. During this circling, females bit males, which caused males to withdraw. Also during circling, males often bit the female's neck, which held her in place while he mounted from the side. Similar circling behavior was reported by Booth and Peters (1972). Males circled and bit breeding females significantly more than they did nonbreeding females (Table 1). Bites that occurred during circle and biting were not also included in the counts of bites.

Chase.—A female may break out of the circling and biting mode and swim rapidly away (>1 m/s), as may a female being disturbed in some other way. This movement appeared to incite most of the males and other females in the section to chase her. Both Booth and Peters (1972) and Bustard (1973) reported females fleeing at speed and being pursued by males. At the turtle farm, slower following (<0.20 m/s) also occurred, but usually involved only two animals. Males chased breeding fe-

p.199

males significantly more than nonbreeding females (Table 1).

Attempted mounts.—Attempted mounts included all incidences of incorrect copulatory positions on females by male *C. mydas*, and all mounts of < 5 min. Mounts of <5 min were not included in the mounts category, because very short mounts generally do not involve intromission in these captive animals (Wood and Wood, 1980). Males occasionally mounted in reverse orientation or were unable to position themselves properly because the female was beached or was in water too shallow for mounting. Female beaching was noted by both Booth and Peters (1972) and Bustard (1973), and Bustard also described unsuccessful positioning of males on females. At the Cayman Turtle Farm, male *C. mydas* attempted to mount breeding females significantly more often than nonbreeding females (Table 1).

Mounts.—A male attached to a female by hooking his foreclaws on the anterior margin of her carapace and his rear flippers to the posterior margin of her carapace (cf. Booth and Peters, 1972; Bustard, 1973). A pair may remain mounted in this manner for up to 119 h (Wood and Wood, 1980). Because of the position of the male on the female, it is difficult to determine the extent of intromission and time of ejaculation during the mount. Statistical comparisons of the number of mounts of breeding and nonbreeding females were not made, because the mount data were used

p.199

TABLE 1.—Descriptive statistics for observed components of courtship behavior. n = number of individuals displaying the behavior, $\bar{x}$ = mean standardized number of occurrences of the behavior (data standardized by dividing raw counts by the number of days in the breeding or nonbreeding state), SE = one standard error of the group mean. z scores calculated from Mann-Whitney U-test.

	Breeding females			Nonbreeding females				
	n	$\bar{x}$	SE	n	$\bar{x}$	SE	z	P
Male gular rubs	5	0.172	0.045	7	0.075	0.002	2.84	0.005*
Female gular rubs	2	0.276	0.109	10	0.085	0.008	2.15	0.032*
Male bites	24	0.500	0.153	63	0.143	0.155	4.68	0.00002*
Female bites	19	0.292	0.088	42	0.137	0.013	3.66	0.0003*
Male cloacal checks	9	0.344	0.133	11	0.105	0.013	2.47	0.014*
Female cloacal checks	7	0.198	0.039	9	0.073	0.002	3.33	0.001*
Male circle and bites	20	0.376	0.12	28	0.136	0.022	2.55	0.011*
Male chases	14	0.446	0.520	24	0.128	0.120	4.92	0.00001*
Male attempted mounts	30	0.712	0.243	67	0.132	0.020	5.23	0.00001*

* Significant difference at $\alpha = 0.05$.

p.199

to define the period of reproductive activity.

Copulation interference.—There are several accounts in the literature of mounted pairs being escorted by conspecific individuals or groups (Booth and Peters, 1972; Hendrickson, 1958; Hirth, 1971). The function of this behavior is unclear. At the turtle farm, mounted pairs were often accompanied by escort groups which were usually males, but sometimes included females. Escorting turtles bit the flippers or tail of the mounted male, and/or rammed their heads between the mounted pair's shells. Of 459 attempted and successful mounts, 114 (24.8%) were disrupted by interfering males and females. Of the 114, there were 21 (18.4%) subsequent attempted mounts of the female by a male from the escort group, but no subsequent successful mounts. The number of times a male escorted and the number of times he mounted over the entire season were positively correlated (Spearman's coefficient, $r_s = 0.430$, $t = 2.286$, 25 df, $P < 0.05$). Males escorted before, during, and after their own mating periods. Among breeding females, those that engaged in mount interference were subsequently mounted significantly more often than those that did not interfere with mounted pairs (Fig. 2).

p.200

The first phase of courtship in *C. mydas* was determination of female reproductive status by the male. Although gular rubs and cloacal checks may provide tactile stimulation in preliminary courtship, they are also potential means by which conspecifics may assess a female's reproductive state. However, because breeding females

p.200

fied. Cloacal checks may represent chemosensory investigation of the approximate readiness of the female for mating. The presence of a chemical releaser (pheromone?) emanating from the cloaca has

p.200

tected, the next stages of courtship were the attempts by male *C. mydas* to properly position themselves for mounting. Females generally avoided mounting by biting, circling and biting, or swimming away (resulting in a chase). These behaviors may allow a female to exercise some control over which males mount her. The final stage of reproductive behavior was mounting (and intromission).

p.201

Diana K. Crowell Comuzzie, & David Wm. Owens. (1990). A Quantitative Analysis of Courtship Behavior in Captive Green Sea Turtles (Chelonia Mydas). *Herpetologica,46*(2), 195-202. Retrieved from http://www.jstor.org/stable/3892904

Animal Sex: How Sea Turtles Do It

By Joseph Castro, Live Science Contributor | May 5, 2014 01:38pm ET

Modern sea turtles have been around for more than 100 million years. Given the ancient reptiles' longevity, one might expect the animals to have a highly successful breeding system. So just how do sea turtles do it?

Seven species of sea turtles exist today, including the leatherback, flatback, hawksbill, loggerhead, Kemp's ridley, olive ridley and green sea turtle.

Mating green sea turtles (Chelonia mydas) in the Galapagos Islands.

Credit: Ryan M. Bolton | Shutterstock.com

Across all species, sea turtles are, for the most part, loners that only come together during the mating season. But this isn't necessarily true for all populations.

For example, Hawaiian green sea turtles— locally referred to as *honu*— are known to spend quite a bit of time together all year round. [In Photos: Tagging Baby Sea Turtles]

"*Honu* rest together, forage together and nest together," said George Balazs, a Hawaiian sea turtle expert with the National Oceanic and Atmospheric Administration. "Clearly, they are woven together into a kind of a community."

Coming together

For each sea turtle population, the mating season typically occurs when the photoperiod (day length) and local temperature begin to increase. This is likely because incubation temperature drives the determination of each hatching's sex.

Warmer temperatures produce females and cooler temperatures produce males, so adults need to lay their eggs when the temperature is just right to produce both male and female hatchings. "What they really want is a nesting season where the incubation temperature is sitting around 29 degrees Celsius

[84.2 degrees F]," said Graeme Hays, a marine scientist at Deakin University in Australia.
During this time, breeding females and males both return to the beacheswhere they hatched — females know it's a suitable nesting location, while males know they'll find females there, Hays said. Males generally arrive much earlier than females, because sea turtle mating runs on a first-come-first-serve basis.
As is the case with most other species, males will mate with any female they can. But female sea turtles aren't very choosy either, in that they don't seem to actively seek out the best, fittest males.
A rough act
To mate, a male will climb onto a female's back while she is swimming horizontally in the water. On their front flippers, males have long claws, which they use to hook on to the leading edge of the female's shell — these claws are quite sharp and will often cut into the female's soft flesh near her shell.
Male and female sea turtles have cloaca — waste and reproductive orifices — at the base of their tails, and the male's cloaca houses his penis. During mating, the male will reach his tail underneath the back end of the female's shell. His long penis, which can be almost half the length of his shell, will emerge from his cloaca to penetrate and inseminate the female's cloaca.
"The male hangs on for dear life for up to 24 hours," said Dave Owens, a marine biologist at the College of Charleston in South Carolina. By remaining attached to the female, the male can prevent other males from mating with her. But his competition doesn't take this injustice lightly — they bite his tail and flippers (hard enough to draw blood and tear flesh) repeatedly to try to get him to let go.
After the pair separates, they go on to mate with other sea turtles. The female stops mating once she has enough sperm to fertilize all of her clutches for the season. "If a male approaches, she'll rip into him," Owens said.
Mating done, the female will climb on to the beach, lay her first clutch of eggs, bury them under sand and then return to the water; about two weeks later, she'll return to the beach to lay her second clutch. In a single season, the female may lay up to eight clutches before leaving the nesting grounds, Balazs said.
When the next breeding season rolls around, the male sea turtles return to the nesting site and begin the love game with new females; females from the previous season, on the other hand, don't come back for another few years, likely due to the energy required to produce those hundreds of eggs.
Follow Joseph Castro on Twitter. Follow us @livescience, Facebook &Google+.

http://www.livescience.com/45354-animal-sex-sea-turtles.html - ultima consulta a 26 de agosto de 2016

Observação Visual **(vídeo)**

http://video.nationalgeographic.com/video/crittercam/crittercam-leatherback-turtle **- ultima consulta a 26 de agosto de 2016**

https://www.youtube.com/watch?v=lOQxQJzrQGk **- ultima consulta a 26 de agosto de 2016**

https://www.youtube.com/watch?v=jG8HzeyCAF4 **- ultima consulta a 26 de agosto de 2016**

https://www.youtube.com/watch?v=jwd6R3vNVII **- ultima consulta a 26 de agosto de 2016**

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Godley, B., Broderick, A., Frauenstein, R., Glen, F. & Hays, G. (2002). Reproductive seasonality and sexual dimorphism in green turtles. Mar Ecol Prog Ser. Vol. 226: 125–133.

http://www.livescience.com/45354-animal-sex-sea-turtles.html - ultima consulta a 26 de agosto de 2016

http://animaldiversity.org/accounts/Chelonia_mydas/ - ultimo acesso a 5 de setembro de 2016

TERRESTRES

ARANHA

(Australian peacock spider, Maratus volans)

TIPO DE AGENTE

Terrestre

ZONAS GEOGRÁFICAS

Austrália - Due to their tiny size, and perhaps because they only live in certain areas in Australia, the animals haven't been well-documented.
http://www.livescience.com/39052-peacock-spider-mating-dance.html - ultimo acesso a 23 de Agosto de 2016

QUEM TOMA INICIATIVA (M | F)

Masculino - When a male peacock spider thinks he has spotted a female, "the world pretty much disappears," says Michael Kasumovic of Australia's University of New South Wales, one of the study's co-authors. The spider then begins a series of dances—including moves scientists have dubbed the "rumble-rump" and "grind-rev"—that send literal good vibrations through the ground toward the female.
http://news.nationalgeographic.com/2015/12/151201-australia-peacock-spider-colorful-courtship-sex-animals-science/ - último acesso a 23 de Agosto de 2016

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Curto - <h – Total courtship time of Maratus volans ranged from 6–51 minutes (mean= 24.35**6**19.49 min, N=5). Use of visual and vibrational signals varied although overall patterns in the sequence of mating behavior included many distinct, stereotyped behavioral elements that could be consistently identified across individuals.

Girard MB, Kasumovic MM, Elias DO (2011) Multi-Modal Courtship in the Peacock Spider, Maratus volans (O.P.-Cambridge, 1874). PLoS ONE 6(9): e25390. doi:10.1371/journal.pone.0025390

Rápido – até 10m – Através da observação do vídeo - https://www.youtube.com/watch?v=9GgAbyYDFeg - ultimo acesso a 23 de Agosto de 2016 – o visionamento do vídeo tem 6m22s e filma o ritual na sua totalidade até (neste caso) a fêmea ter rejeitado a corte.

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Ritualizado – During courtship, a male peacock spider unfurls its brightly colored opisthosomal flaps, which are typically kept tucked around the abdomen [33]. The whole structure, which bears resemblance to the fan of a peacock, is then waved at a female in synchrony with an ornamented 3rd pair of legs. (p.1)

Girard MB, Kasumovic MM, Elias DO (2011) Multi-Modal Courtship in the Peacock Spider, Maratus volans (O.P.-Cambridge, 1874). PLoS ONE 6(9): e25390. doi:10.1371/journal.pone.0025390

Ritualizado - Once he has piqued her interest, the male unfolds a brilliantly colored abdominal flap and then struts back and forth, all the while frantically waving specially colored, lengthy legs.

http://news.nationalgeographic.com/2015/12/151201-australia-peacock-spider-colorful-courtship-sex-animals-science/ - último acesso a 23 de Agosto de 2016

Ritualizado - The animal dances and lifts up its tail-flap, which, once unfurled, resembles an abstract Indian blanket of intense color. The tiny creature hops about, lifts up its legs alternately like an air traffic controller, gesturing this way and that. Its large, furry mouthparts almost make it look like it's smiling, or at least mildly amused at this outrageous act.

http://www.livescience.com/39052-peacock-spider-mating-dance.html - ultimo acesso a 23 de Agosto de 2016

Ritualizado - It is the fact that they perform some complex rituals on a scale at which it appears almost surreal, to the point where it is hard to believe. People associate complex behavior usually with large animals, usually vertebrates [animals with backbones], so it is very unexpected to see a similar behavior in much smaller invertebrates, in particular spiders that most people hate so much. [Incredible Photos of Peacock Spiders]

http://www.livescience.com/39052-peacock-spider-mating-dance.html - ultimo acesso a 23 de Agosto de 2016

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)

Visão + **Tacto -** We show that males of this species make use of both visual and vibratory modalities in their courtship efforts. (p.1)

Girard MB, Kasumovic MM, Elias DO (2011) Multi-Modal Courtship in the Peacock Spider, Maratus volans (O.P.-Cambridge, 1874). PLoS ONE 6(9): e25390. doi:10.1371/journal.pone.0025390

Visão - Perhaps it's not surprising that the spiders rely on visuals. Peacock spiders have an excellent sense of vision, honed by a need to stalk and then pounce on prey without the aid of a web.

Researchers praise the study for explicitly proving that "all these male shenanigans have evolved through females preferentially mating with males that display colorful, complex courtship displays," says Marie Herberstein of Australia's Macquarie University

http://news.nationalgeographic.com/2015/12/151201-australia-peacock-spider-colorful-courtship-sex-animals-science/ - último acesso a 23 de Agosto de 2016

Visão - Girard found that males' looks were about twice as important as their dance moves, though each plays a slightly different role in piquing and retaining a female's interest.
http://news.nationalgeographic.com/2015/12/151201-australia-peacock-spider-colorful-courtship-sex-animals-science/ - último acesso a 23 de Agosto de 2016

Tacto - The spider then begins a series of dances—including moves scientists have dubbed the "rumble-rump" and "grind-rev"—that send literal good vibrations through the ground toward the female.
http://news.nationalgeographic.com/2015/12/151201-australia-peacock-spider-colorful-courtship-sex-animals-science/ - último acesso a 23 de Agosto de 2016

Tacto - The homespun setup allowed Girard to detect the vibrational dances and leg-waving movements of *M. volans* males, while tracking how the females responded.
http://news.nationalgeographic.com/2015/12/151201-australia-peacock-spider-colorful-courtship-sex-animals-science/ - último acesso a 23 de Agosto de 2016

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade, complexidade, etc.)

Dinâmica - The animal dances and lifts up its tail-flap, which, once unfurled, resembles an abstract Indian blanket of intense color. The tiny creature hops about, lifts up its legs alternately like an air traffic controller, gesturing this way and that. Its large, furry mouthparts almost make it look like it's smiling, or at least mildly amused at this outrageous act.
http://www.livescience.com/39052-peacock-spider-mating-dance.html - ultimo acesso a 23 de Agosto de 2016

Exibição - The animal dances and lifts up its tail-flap, which, once unfurled, resembles an abstract Indian blanket of intense color. The tiny creature hops about, lifts up its legs alternately like an air traffic controller, gesturing this way and that. Its large, furry mouthparts almost make it look like it's smiling, or at least mildly amused at this outrageous act.
http://www.livescience.com/39052-peacock-spider-mating-dance.html - ultimo acesso a 23 de Agosto de 2016

Complexidade - For a creature so tiny — most species are around an eighth of an inch (a few millimeters) long — the display is surprisingly complex and visual.
http://www.livescience.com/39052-peacock-spider-mating-dance.html - ultimo acesso a 23 de Agosto de 2016

RESUMO DESCRITIVO

The peacock spider, Maratus volans, has one of the most elaborate courtship displays in arthropods. Using regular and highspeed video segments captured in the lab, we provide detailed descriptions of complete male courtship dances. As research on jumping spiders has demonstrated that males of some species produce vibrations concurrently with visual displays, we also used laser vibrometry to uncover such elements for this species. Our recordings reveal and describe for the first time,
that M. volans males use vibratory signals in addition to complex body ornaments and motion displays. The peacock spider and other closely related species are outstanding study organisms for testing hypotheses about the evolution and functional significance of complex displays, thus, this descriptive study establishes a new model system for behavioral ecology, one that certainly stands to make important contributions to the field. (p.1)

Behaviors are presented in the general order of their appearance within a courtship sequence.

Pedipalp flicker. Pedipalp flickers were observed to occur intermittently throughout the entire duration of courtship, alone or in conjunction with all other displays. (p.2)

Table 1. Visual ethogram for *Maratus volans*.

Behavior	Description	Occurrence	Measurement
pedipalp flicker*	The pedipalps are brought together in the front of the carapace and moved up and down in unison.	intermittently throughout courtship	**Rate:** 3.5±1.6 flicks/sec (N = 5)
opisthosomal bobbing*	The abdomen, or opisthosoma, is moved up and down in a rapid manner. It can be parallel with the substrate or more vertically oriented, with fan flaps either splayed out (expanded) or folded around opisthosoma (retracted). During production, the male is stationary, with either all leg pairs contacting the substrate, or with the 3rd legs in an erect leg wave stance.	(1) when males approached females from a distance, preceding all other courtship behaviors (excluding pedipalp flickering), (2) between bouts of leg waving/fan dancing.	**Number of bouts:** 2–11 (N = 5) **Bout duration:** 75.5±58.6 secs
3rd leg wave	The 3rd legs are swiftly extended and raised to an approximately vertical, erect leg wave stance. Almost immediately, the 3rd legs, while still extended, are lowered and simultaneously brought back towards the abdomen slightly to form a bilateral "V". At their lowest point, the 3rd legs are flexed at the patella briefly before they are quickly rotated up and forward to their original position. This motion appears seamless and is repeated several times with no gaps between leg waves.	following several bouts of opisthosomal bobbing, while males are facing a female	**Bout duration**: 6.7±3.2 secs (N = 5) **Rate:** 3.2±0.6 waves/sec (N = 5) **Angle ranges:** (Fig. 2, N = 5) #1 = 36–71° #2 = 72–120° #3 = 124–168°
fan dance*	Open opisthosomal fan (flaps expanded) moves back and forth laterally, similar to a metronome, at varying speeds. Most often produced in synchrony with leg waving, but sometimes the male is stationary either with the 3rd legs in an erect leg wave stance, or in contact with the substrate.	when male is in close proximity to a female	**Rate:** 3.2±1.5 cycles/sec **Angle range:** (Fig. 2, N = 5) #4 = 19–35°
fan-flapping	While opisthosoma is vertically oriented, fan flaps are extended and retracted several times in a sequence. The male is stationary with 3rd legs in an erect leg wave stance.	periodically during pauses in movement that follow fan dances	**Rate:** 2.5±1.8 flaps/sec
pre-mount display	The 3rd legs are rotated forward, and the carapace is brought up over the 1st and 2nd legs. Simultaneously, opisthosomal fan flaps are retracted and the abdomen is tilted until the posterior portion is close to the substrate. Regularly spaced bouts of opisthosomal bobbing follow, each of which correspond with tremors and lowering of 3rd legs. Later, the 1st legs are flexed and raised slightly while the 3rd are rotated all the way down and behind the 1st and 2nd legs where they are held extended in an upside down "V". The 1st legs are now held erect out in front of the carapace and moved down closer to female during bouts of opisthosomal bobbing.	occurs at the end of the courtship display, immediately preceding and leading into a mounting attempt	**Duration:** 54.1±7.4 secs **Angle range:** (Fig. 4, N = 5) #5 = 126–148°

*after behavioral descriptions similar to that of two related species, *M. pavonis* and *M. splendens* [36].

doi:10.1371/journal.pone.0025390.t001

(p.3)

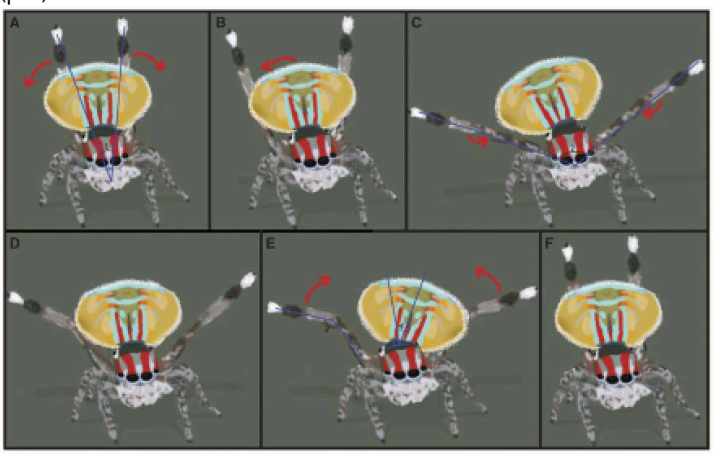

Figure 2. Fan dance of Maratus volans. (A) Males begin this display by swiftly raising the 3rd legs to an erect leg wave stance. (B) Immediately after, extended 3rd legs are lowered and (C) brought forward slightly until they are just above the top of the carapace. (D) At this point 3rd legs are slightly bent at the patella and (E) quickly raised until they are returned to their initial position. One cycle of fan dancing occurs between (B) and (F). Angle measurements (#1–4) are provided in Table 1.

doi:10.1371/journal.pone.0025390.g002

(p.4)

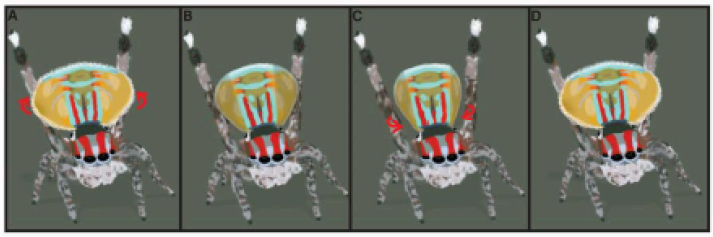

Figure 3. Fan-flapping of *M. volans*. (A) 3rd legs in erect leg wave stance, (B) initial retraction of the distal portion of the flaps commences. (C) Flaps are further contracted before (D) being quickly expanded again.
doi:10.1371/journal.pone.0025390.g003

(p.5)

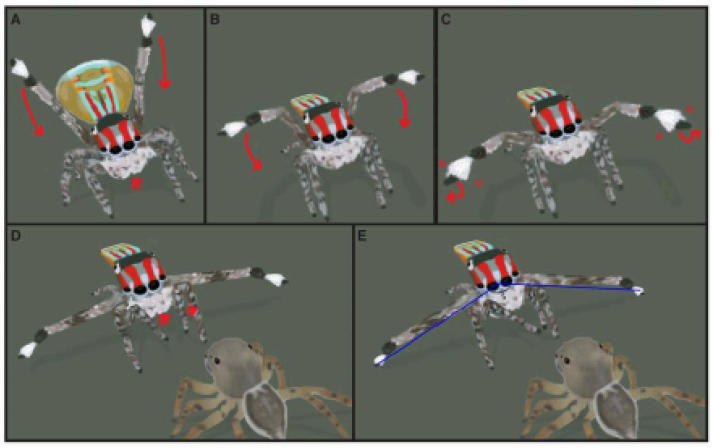

Figure 4. Pre-mount display of *M. volans*. (A) From an initial leg wave stance, the 3rd legs are rotated forward and (B), (C) the carapace is brought up over the 1st and 2nd legs. Simultaneously, opisthosomal fan flaps are retracted and the abdomen is tilted until the posterior portion is close to the substrate. (D) Regularly spaced tremors following paired lowering of the 3rd legs. Once legs are lowered to be approximately parallel to the substrate, the 1st legs are flexed and raised slightly while (E) the 3rd legs are rotated all the way down and held extended in an upside down "V" behind the 2nd legs. The 1st legs are now held erect out in front of the carapace and gradually moved down closer to female. Angle measurement (#5) is provided in Table 1.
doi:10.1371/journal.pone.0025390.g004

(p.6)

Girard MB, Kasumovic MM, Elias DO (2011) Multi-Modal Courtship in the Peacock Spider, Maratus volans (O.P.-Cambridge, 1874). PLoS ONE 6(9): e25390. doi:10.1371/journal.pone.0025390

Female Peacock Spiders Underwhelmed By Disco-Dancing Suitors
By **Michael Greshko**,
National Geographic
PUBLISHED DECEMBER 1, 2015

Earning stage names like Skeletorus and Sparklemuffin, male peacock spiders perform a colorful song and dance nearly unrivaled in the animal kingdom. But a new study shows that their main audience—the females they aim to woo—don't impress so easily.

The new findings, published Tuesday in the *Proceedings of the Royal Society B*, emphasize the remarkable extent to which males across the animal kingdom compete for the affection of a single female.

Peacock spiders' recently discovered courtship displays are among the gaudiest and most complex ever discovered, a fact made all the more surprising by their size. The little audiovisual spectacle measures less than a quarter-inch (five millimeters) long.

"The combination of complex mammal-like behaviours, their small size, [and] their color patterns [are] simply irresistible," says Jürgen Otto, a mite biologist with Australia's Department of Agriculture and Water Resources whose groundbreaking hobby videos first gave peacock spiders a wide human audience. "It is difficult not to get obsessed with them."

When a male peacock spider thinks he has spotted a female, "the world pretty much disappears," says Michael Kasumovic of Australia's University of New South Wales, one of the study's co-authors. The spider then begins a series of dances—including moves scientists have dubbed the "rumble-rump" and "grind-rev"—that send literal good vibrations through the ground toward the female.

Once he has piqued her interest, the male unfolds a brilliantly colored abdominal flap and then struts back and forth, all the while frantically waving specially colored, lengthy legs.

What a Girl Wants

But it takes two to tango, and researchers didn't know exactly how females were participating in and responding to the ritual. What were the ladies looking for in a strutting, shivering suitor? And were the males' bright colors actually related to finding a mate?

To find out, Ph.D. student Madeline Girard of the University of California, Berkeley, traveled to Sydney, Australia, and collected 64 pairs of the peacock spider *Maratus volans,* each duo consisting of a male and virgin female. Each pair went into what Kasumovic calls a "courtship arena," an enclosure surrounded by cameras with a floor made of stretched pantyhose.

The homespun setup allowed Girard to detect the vibrational dances and leg-waving movements of *M. volans* males, while tracking how the females responded.

The team found that females don't automatically swoon to the males' advances, instead turning toward or away from them during their initial vibrations, based on interest. Some females also had more aggressive responses, rebuffing males with quick shakes of their abdomens—or worse. "If females don't like a male, they'll eat them," says Kasumovic.

The females liked only 16 of the 64 courtship dances. In these uncommon instances, Girard found that males' looks were about twice as important as their dance moves, though each plays a slightly different role in piquing and retaining a female's interest.

Perhaps it's not surprising that the spiders rely on visuals. Peacock spiders have an excellent sense of vision, honed by a need to stalk and then pounce on prey without the aid of a web.

Researchers praise the study for explicitly proving that "all these male shenanigans have evolved through females preferentially mating with males that display colorful, complex courtship displays," says Marie Herberstein of Australia's Macquarie University, who wasn't involved with the study. "This link is rarely directly established."

But questions remain. It's unclear what females are homing in on within the males' colorful patterns. And how peacock spiders became so showy in the first place remains a mystery. "Did it all start off with the dance and the color followed?" asks Herberstein. "Or did color, movement and vibration evolve simultaneously?"

What is clear, though, is that when it comes to sex, male peacock spiders have a life-or-death imperative to listen to their partners.

"There's an amazing amount of control that females have over the entire thing," says Kasumovic. "If a male doesn't listen to her feedback, not only will he be unsuccessful—he's likely going to die."

http://news.nationalgeographic.com/2015/12/151201-australia-peacock-spider-colorful-courtship-sex-animals-science/ - último acesso a 23 de Agosto de 2016

6. Peacock spiders bust a move

It takes two to tango, but when a male peacock spider gets the attention of a potential female mate, their dance becomes a chase. In fact, the peacock spider has to simultaneously dance his way to survival while jumping out of

her reach — otherwise, if she's not impressed, she's having him for dinner. So the peacock spider pulls out all the stops to woo her with his brilliantly coloured fan and agile, lateral movements a la MC Hammer. How fitting, since *U Can't Touch This* seems like an appropriate theme song for these jumping spiders.
http://www.cbc.ca/lifestory/extras/stories/animal-courtship

Carregado a 23/03/2011
Courtship of peacock spider Maratus volans from Australia, one of the most amazing spectacles in the animal world, filmed, edited and narrated by myself (Jurgen Otto). This was the FIRST EVER footage of this spider and I don't know anybody who has actually seen this behaviour in this species before I did ! But what I am mostly proud of its that I was able to shoot the entire video in the wild, and with a very simple setup (Canon 7d SLR), in contrast to all other footage of this species that has since been broadcast. I am also proud of f the fact that with this video I introduced David Attenborough to peacock spiders a couple of years ago !

If you watch the episode courtship in "Life stories" you might get the impression that the female of this species eats the male after they mated. This is "artistic licence". I watched them mating countless times and have not once observed the male being eaten by the female after they mated. Males get sometimes eaten by females, that is true, but this does not seem to involve the male they actually mated with, but rather those that are "silly" enough to continue to court gravid (fertilised) females. From the female's perspective these males have become useless as partner but are very useful as additional nourishment for her developing brood, they die anyway at the end of the season, whether they are eaten by females or not.

I also doubt that females judge the male's performance and eat those that don't stack up. From what I have seen virgin females will mate with pretty much every male they come across, it seems to be more a matter of the right place and time rather than the quality of its performance, but I believe that is still being studied and it will be interesting to see the results of that. If a female is not happy to mate with a particular female her first reaction is to walk away from him, as you would expect.

Check out my other movies Peacock Spider 2,3,4,5,6,7,8,9,10,11 which show a couple of different specieshttp://www.youtube.com/user/Peacocksp.... For updates on my peacock spider filming or photography
visit http://www.facebook.com/PeacockSpider

For still photographs of this species visit my flickr album
http://www.flickr.com/photos/59431731...

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Categoria
Animais
Licença
Licença padrão do YouTube
https://www.youtube.com/watch?v=9GgAbyYDFeg - ultimo acesso a 23 de Agosto de 2016

The Amazing Mating Dance of the Peacock Spider
By Douglas Main, Staff Writer | August 21, 2013 01:00pm ET
The animal dances and lifts up its tail-flap, which, once unfurled, resembles an abstract Indian blanket of intense color. The tiny creature hops about, lifts

up its legs alternately like an air traffic controller, gesturing this way and that. Its large, furry mouthparts almost make it look like it's smiling, or at least mildly amused at this outrageous act.
Meet the peacock spider. Males from several species within this group of spiders put on remarkable mating displays to win over mates of the opposite gender. Jürgen Otto has done perhaps more than anybody else to document and share footage of this arachnid's terrific breeding ritual — it has even won over people who previously hated spiders, Otto told LiveScience. [Watch the Peacock Spider's Mating Dance]
For a creature so tiny — most species are around an eighth of an inch (a few millimeters) long — the display is surprisingly complex and visual. Due to their tiny size, and perhaps because they only live in certain areas in Australia, the animals haven't been well-documented. But Otto, an entomologist who usually studies marine mites, is working to change that. LiveScience corresponded with Otto to hear more about his experiences with these remarkable animals.
Jürgen Otto: I realize that they are colorful, but to me, that is not the most important aspect, since I am partially colorblind. It is the fact that they perform some complex rituals on a scale at which it appears almost surreal, to the point where it is hard to believe. People associate complex behavior usually with large animals, usually vertebrates [animals with backbones], so it is very unexpected to see a similar behavior in much smaller invertebrates, in particular spiders that most people hate so much. [Incredible Photos of Peacock Spiders]

I also love the way they interact with their environment, how they exhibit fear, excitement and curiosity. In fact, somebody has called them "kittens with too many legs," and I think that is a very good description. Obviously the two large front eyes contribute a lot to that impression. These spiders are perceived as cute, even by the staunchest of arachnophobes, and I regularly get comments from people telling me how watching my videos have helped them to overcome their fear of spiders. I also like that it requires a lot of patience and persistence to observe, photograph or film them. And only those who are prepared to invest the effort will be rewarded.

The Purcell's peacock spider, like most of its ilk, is quite tiny.

Credit: Jürgen Otto

LS: How did you first get interested in peacock spiders?
J.O.: I did not know anything about them until I stumbled over one during a walk in nearby bushland [near Sydney], purely by accident. It attracted my attention in the way it jumped — it seemed more nimble than other spiders. The specimen I saw then was one of *Maratus volans*, and I had no idea at the time what it was or that there were other similar species.
While doing some more research I found … that there was a suspicion that *Maratus volans* would use its flaps in courtship. But nobody had actually seen [this].
A couple of years later, I finally got lucky and was able to observe and photograph the courtship of that spider [for the first time]. I realized that this was something very special and exciting, not only for me, but the entire world.

So I kept going, photographing this species at first and later filming it, once I figured out how to use the video mode in my digital SLR [camera]. Then I learned that there are many more species out there, most of them still not described who had a similar behavior. One by one, I tracked those down … some were completely unknown to science. The biggest buzz for me was when I managed to get the first photographs of the color pattern of one species' tail flaps.

LS: What is your favorite type of peacock spider?

J.O.: That's a really a hard question to answer. In a way I like them all, and all of them have their special charm. *Maratus volans,* I think, is still the most flamboyant of all, so probably is my favorite, probably also because my obsession with peacock spiders started with that species. However,*Maratus vespertilio* is probably a close second. I do think it is extraordinarily cute, and I like this species for its male-male hopping contests as well, something I have not seen in any species. [Creepy, Crawly & Incredible: Photos of Spiders]

LS: How do you film peacock spiders?

J.O.: When I started to film them, I had no idea about how to go about it. I simply thought one day to explore the video option on my DSLR, a Canon 7D with a 100 mm macro lens. So I just kept filming them and added scene after scene to my collection. I had no prior experience in editing video footage. The equipment that professional documentary makers use is very different from mine, much larger cameras, big steady tripods etc., and for a while I thought that getting such equipment would be something to strive for. However, I now realize that the small, simple and cheap setup I used was almost ideal for the job as it allowed me to follow the spiders on the ground and use natural lighting. Once you find a place where they occur, you simply have to search for specimens and watch them, or better find a pair that is already engaged in some courtship.

This is the peacock spider Maratus speciosus.

Credit: Jürgen Otto

LS: How might this have evolved?

J.O.: I am not sure, but it evolved probably in a similar fashion as it did in birds of paradise or peacocks, a result of sexual selection. [Sexual selection involves the development of exaggerated features, like the tail-feathers of a peacock, which broadcast an animal's evolutionary fitness.]

Email Douglas Main or follow him on Twitter or Google+. Follow us@livescience*,* Facebook*or* Google+*. Article originally on LiveScience.*

http://www.livescience.com/39052-peacock-spider-mating-dance.html - ultimo acesso a 23 de Agosto de 2016

OBSERVAÇÃO VISUAL (vídeo)

https://www.youtube.com/watch?v=9GgAbyYDFeg - ultimo acesso a 23 de Agosto de 2016

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CAMALEÃO

Chamaeleo chamaeleon

TIPO DE AGENTE

Terrestre

ZONAS GEOGRÁFICAS

África do Norte, Sul da Europa e Médio oriente - The species is found in North Africa, Southern Europe and in the Middle East (Hillenius, 1978). Pág. 426
Cuadrado, M. (2000). Mate guarding and social mating system in male common chameleons (chamaeleo chamaeleon). The Zoological Society of London (255, 425-435): United kingdom.

QUEM TOMA INICIATIVA (M | F)

Masculino - On average, male common chameleons encountered 4.2+_ females (range 1-11,n=34) during the mating season. The male always initiated the contact. (Pág. 427)
Cuadrado, M. (2000). Mate guarding and social mating system in male common chameleons (chamaeleo chamaeleon). The Zoological Society of London (255, 425-435): United kingdom.

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Prolongado >dia
En promedio, la fase de cortejo y emparejamiento dura aproximadamente dos semanas si bien, su duración parece estar relacionado con el tamaño de la hembra. Así, las hembras de mayor tamaño (generalmente de mayor edad) están emparejadas y son custodiadas por los machos durante un periodo de tiempo más largo que las de menor tamaño (generalmente más jóvenes). (p. 6)
Cuadrado, M. (2009). Camaleón común – Chamaeleo chamaeleon. En: Enciclopedia Virtual de los Vertebrados Españoles. Salvador, A., Marco, A. (Eds.). Museo Nacional de Ciencias Naturales, Madrid.

male, and copulations. Courting behaviors by a male include sidewise display of a laterally flattened body, a tightly curled tail and the male's specific colors (Cuadrado and Loman, in press). Courted females are closely followed by the male, and both individuals may cover several tens of meters a day. In this study, I defined a female as being courted when the male either actively displayed towards her or followed her. Each day, the time elapsed between the first and the last observation of a female (net observation time per day, hereafter) was recorded, and the pooled data for each female were used for further analyses.

(p. 397)
Cuadrado, M. (1998). The use of yellow spot colors as a sexual receptivity signal in females of chamaeleo chamaeleon. Herpetologica 54, 395-402.

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Ritualizado - El cortejo incluye dos pautas bien diferenciadas. En primer lugar, la exhibición (o display) del macho en lugares bien visibles y generalmente, muy próximo a la hembra. Para ello, el macho comprime su cuerpo lateralmente mostrando uno de sus flancos, se orienta perpendicularmente con respecto a la posición que ocupa la hembra e hincha sus pulmones. El macho suele enroscar la cola y exhibe una librea (o coloración específica) de 'macho en celo' caracterizada por un color verde oscuro intenso con manchas difusas de color negro (Fig. 1).
Este comportamiento está fuertemente ritualizado y dura poco tiempo (por lo general, un par de minutos). (p. 5)

Enganador - Con este comportamiento los machos tratan de aparentan un mayor tamaño corporal lo que posiblemente les confiere un mayor atractivo sexual durante el cortejo. Esta exhibición también se produce en los encuentros agresivos entre machos durante el periodo de celo. La librea de 'macho en celo' es mantenida durante la mayor parte del tiempo que el macho se encuentra emparejado si bien, durante el cortejo (y las peleas entre machos) esta coloración es mucho más intensa. (p. 5)

Brando - El segundo componente del cortejo se caracteriza por el cuidado, vigilancia y persecución de la hembra (Fig. 2). El macho persigue a la hembra en sus desplazamientos, sin perderla de vista y a veces, literalmente tras sus pasos, pudiendo recorrer juntos varias decenas de metros en un sólo día. (p. 5)

Cuadrado, M. (2009). Camaleón común – Chamaeleo chamaeleon. En: Enciclopedia Virtual de los Vertebrados Españoles. Salvador, A., Marco, A. (Eds.). Museo Nacional de Ciencias Naturales, Madrid.

TRIGGERS - **Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)**

Visão – El cortejo incluye dos pautas bien diferenciadas. En primer lugar, la exhibición (o display) del
macho en lugares bien visibles y generalmente, muy próximo a la hembra. Para ello, el macho
comprime su cuerpo lateralmente mostrando uno de sus flancos, se orienta perpendicularmente con respecto a la posición que ocupa la hembra e hincha sus pulmones. El
macho suele enroscar la cola y exhibe una librea (o coloración específica) de 'macho en celo'
caracterizada por un color verde oscuro intenso con manchas difusas de color negro (Fig. 1).
Este comportamiento está fuertemente ritualizado y dura poco tiempo (por lo general, un par de
minutos). Con este comportamiento los machos tratan de aparentan un mayor tamaño corporal
lo que posiblemente les confiere un mayor atractivo sexual durante el cortejo. Esta exhibición
también se produce en los encuentros agresivos entre machos durante el periodo de celo. La
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Cuadrado, M. (2009). Camaleón común – Chamaeleo chamaeleon. En: Enciclopedia Virtual de los Vertebrados Españoles. Salvador, A., Marco, A. (Eds.). Museo Nacional de Ciencias Naturales, Madrid.

The results suggest that the yellow spots are indeed a sexually related signal used for communication between individuals (sensu Dawkins and Krebs, 1978). Therefore, the obvious question is what kind of information does this signal convey? It is reasonable to assume that this visual pattern is related to the females' receptivity. There are several reasons for this assumption. First, females do not exhibit yellow spots outside of the mating season, suggesting that the information is probably directed towards potential mates. Second, most copulations took place when females exhibited the yellow spots. Third, soon after copulation, females attain a bizarre coloration characterized by a black body background with bluish and yellow spots while performing an aggressive "crazy dance" (sensu Fernández, 1994) in front of approaching males. It has been suggested that these displays might signal to potential mates that the female is no longer receptive (e.g., Blasco et al., 1985; Fernández, 1994; Valverde, 1982). According
(p. 400)

inson, 1978). Females of the Mediterranean chameleon, *Chamaeleo chamaeleon*, change their body color throughout the mating season in synchrony with changes in their receptivity (e.g., Blasco et al., 1985; Valverde, 1982). From a given day

(p. 396)

Cuadrado, M. (1998). The use of yellow spot colors as a sexual receptivity signal in females of chamaeleo chamaeleon. Herpetologica 54, 395-402.

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, camuflagem/alt. cor, etc.)

Exibição - El cortejo incluye dos pautas bien diferenciadas. En primer lugar, la exhibición (o display) del macho en lugares bien visibles y generalmente, muy próximo a la hembra. Para ello, el macho
comprime su cuerpo lateralmente mostrando uno de sus flancos, se orienta perpendicularmente con respecto a la posición que ocupa la hembra e hincha sus pulmones. El macho suele enroscar la cola y exhibe una librea (o coloración específica) de 'macho en celo' caracterizada por un color verde oscuro intenso con manchas difusas de color negro (Fig. 1). (p. 5)

Amabilidade, Cortesia - El segundo componente del cortejo se caracteriza por el cuidado, vigilancia y persecución de la hembra (Fig. 2). (p. 5)

Persistência, Vigilância - El macho persigue a la hembra en sus desplazamientos, sin perderla de vista
y a veces, literalmente tras sus pasos, pudiendo recorrer juntos varias decenas de metros en
un sólo día. A veces, el desplazamiento de las hembras se limita a un área muy concreta
definiendo así un área de campeo determinada. En otros casos, los movimientos de la hembra
(y del macho que la persigue) son más erráticos. El cuidado de la hembra tiene por objeto
evitar el acoso, cortejo y cópula con otros machos. (p. 5)

Camuflagem/alt. cor – El macho suele enroscar la cola y exhibe una librea (o coloración específica) de 'macho en celo' caracterizada por un color verde oscuro intenso con manchas difusas de color negro (Fig. 1). (p. 5)

Cuadrado, M. (2009). Camaleón común – Chamaeleo chamaeleon. En: Enciclopedia Virtual de los Vertebrados Españoles. Salvador, A., Marco, A. (Eds.). Museo Nacional de Ciencias Naturales, Madrid.

RESUMO DESCRITIVO

…por serem praticamente surdos, comunicarem com base em sinais visuais, formas, cores e padrões, que usam para reconhecer a sua parceira, um rival, membros de outras espécies ou as suas congéneres, e que desempenha um importante papel no processo de evolução. (pág.89) ... os camaleões não mudam de cor só para se camuflarem. Fazem-no também para se relacionarem com os seus congéneres, exercendo atracção sexual ou evidenciando actividade de combate, de submissão, de dominio... ou permitindo que casais "estabelecidos" possam reconhecer-se entre si.

Inclusivamente as femeas tambem podem utilizar cores e padrões especificos para avisar que estão grávidas. (pág. 90)
National Geographic - maio 2008 - pág 89 e 90

Female common chameleons, Chamaeleo chamaeleon, show temporary body color changes during the reproductive season, probably in synchrony with their
reproductive status. (p. 69)
The data show strong evidence that temporary body color changes in female common chameleons are associated with changes in their reproductive status and hence, function as signals used in inter-sex communication. (p. 69)
In vertebrates, body colors are known to have important consequences for Thermoregulation, mimicry, antipredatory behavior and signaling between individuals (Bellairs 1970; Hamilton 1973; Herán 1976; Burtt 1979). Body colors used by animals in social contexts (or social coloration, hereafter) are especially common for males during the reproductive season and, as other visual signals, convey information about the sender such as dominance status… (p. 80)
In female lizards, social coloration is known to facilitate sexual recognition during mate choice or, more often, to signal the reproductive status of individuals. (p. 80)
In females, body colors are known to signal receptivity (Zucker 1989) or nonreceptivity (see Cooper & Greenberg 1992 for a review). (p. 80)
In this paper, I analyze the intersex communication function of some color phases recorded in females of common chameleons, Chamaeleo chamaeleon, throughout the mating season. (p. 80)
Female Body Colors - Three female color phases were recognized: 1. Leaf-green body color (sometimes, brown) with two yellowish (sometimes brown or white) broken stripes on the sides (background colors sometimes showed a more complex pattern, but side stripes were always distinguishable), abbreviated hereafter to GYL (green body and two yellow lines); 2.leaf-green (sometimes brown) body color with conspicuous
yellow (sometimes orange or greenish) spots, abbreviated to GYS hereafter (green body with yellow spots); and 3. black body color (sometimes dark brown) with conspicuous yellow\ orange\ green and bluish spots\ abbreviated to BYS "black body with yellow spots). (p. 82)
Cuadrado, M. (1999). Body colors indicate the reproductive status of female common chameleons:
Experimental evidence for the intersex communication function. Ethology 106, p.p. 79-91.

Body color patterns in chameleons are used for communication between individuals (Blasco et al., 1985; Fernández, 1994; Ramón y Cajal, 1900; Romero, 1984; Valverde, 1982), thermoregulation (Blasco et

(p. 395)

inson, 1978). Females of the Mediterranean chameleon, *Chamaeleo chamaeleon*, change their body color throughout the mating season in synchrony with changes in their receptivity (e.g., Blasco et al., 1985; Valverde, 1982). From a given day onwards, most females exhibit a very conspicuous yellow-spot color pattern that disappears soon after egg-laying. Here I an-

(p. 396)

Cuadrado, M. (1998). The use of yellow spot colors as a sexual receptivity signal in females of chamaeleo chamaeleon. Herpetologica 54, 395-402.

Reproducción

El cortejo incluye dos pautas bien diferenciadas. En primer lugar, la exhibición (o display) del macho en lugares bien visibles y generalmente, muy próximo a la hembra. Para ello, el macho comprime su cuerpo lateralmente mostrando uno de sus flancos, se orienta perpendicularmente con respecto a la posición que ocupa la hembra e hincha sus pulmones. El macho suele enroscar la cola y exhibe una librea (o coloración específica) de 'macho en celo' caracterizada por un color verde oscuro intenso con manchas difusas de color negro (Fig. 1).

Este comportamiento está fuertemente ritualizado y dura poco tiempo (por lo general, un par de minutos). Con este comportamiento los machos tratan de aparentan un mayor tamaño corporal lo que posiblemente les confiere un mayor atractivo sexual durante el cortejo. Esta exhibición también se produce en los encuentros agresivos entre machos durante el periodo de celo. La librea de 'macho en celo' es mantenida durante la mayor parte del tiempo que el macho se encuentra emparejado si bien, durante el cortejo (y las peleas entre machos) esta coloración es mucho más intensa.

El segundo componente del cortejo se caracteriza por el cuidado, vigilancia y persecución de la hembra (Fig. 2). El macho persigue a la hembra en sus desplazamientos, sin perderla de vista y a veces, literalmente tras sus pasos, pudiendo recorrer juntos varias decenas de metros em un sólo día. A veces, el desplazamiento de las hembras se limita a un área muy concreta definiendo así un área de campeo determinada. En otros casos, los movimientos de la hembra (y del macho que la persigue) son más erráticos. El cuidado de la hembra tiene por objeto evitar el acoso, cortejo y cópula con otros machos. Si durante estos desplazamientos la pareja encuentra algún otro macho (emparejado o no) tiene lugar una pelea y si el vencedor resulta ser el intruso, éste comenzará inmediatamente el cortejo de la hembra. Resulta bien sencillo reconocer el perdedor de las peleas entre machos ya que éste adquiere una librea de sumisión caracterizada por un color corporal pardo-negruzco. (p. 5)

La mayor parte de las hembras son cortejadas (y forman pareja) con al menos un macho durante el verano. Algunas hembras parecen ser sexualmente poco atractivas ya que no son cortejadas, no forman parejas y por tanto, permanecen ingrávidas al final del verano. Otras por el contrario, son cortejadas intensamente y custodiadas por diferentes machos durante toda la estación reproductora. En promedio, la fase de cortejo y emparejamiento dura aproximadamente dos semanas si bien, su duración parece estar relacionado con el tamaño de la hembra. Así, las hembras de mayor tamaño (generalmente de mayor edad) están emparejadas y son custodiadas por los machos durante un periodo de tiempo más largo que las de menor tamaño (generalmente más jóvenes). El macho emparejado intenta la cópula frecuentemente. Los intentos de cópula pueden ser rechazados por la hembra bien huyendo o bien, atacando al macho de forma activa. Las causas de este rechazo no están claras y pudiera ser que de esta forma las hembras eviten el apareamiento fuera de su periodo receptivo (algo muy común para la mayoría de los reptiles) o bien al contrario, muestren cierto grado de selección sexual por los machos que les resulten sexualmente atractivos.

Las cópulas tienen lugar desde mediados de agosto a mediados de septiembre. Tras uma aproximación rápida, el macho agarra fuertemente a la hembra con las patas anteriores (del lomo, rabo o de donde puede) y colocándose lateralmente a ella le introduce uno de sus hemipenes en la cloaca (Fig. 3). Las cópulas duran por lo general de 2 a 3 minutos como máximo y se repiten varias veces durante el mismo día o bien al día siguiente. Las hembras se aparean por lo general con un sólo macho durante el verano si bien en algunos casos, se registra la cópula con más de un macho.

Poco después de la cópula, las hembras presentan una nueva librea caracterizada por um cuerpo de color negro intenso con lunares amarillos y azulados que está relacionada con su gravidez. Poco tiempo después de la aparición de esta librea, las hembras rechazan a su (p. 6) pareja (a veces de forma muy violenta) y permanecen a partir de entonces solitarias. Si este macho o cualquier otro, intenta la cópula una vez que la hembra muestra esta librea, éste es rechazado violentamente. Muestra su rechazo de una forma muy particular. Las hembras, com las patas extendidas y separadas, balancean violentamente su cuerpo, mueven la cabeza em todas direcciones, abren la boca en actitud intimidatoria y emiten una especie de bufido al tiempo que exhiben la librea de gravidez en todo su esplendor. (p. 7)

Cuadrado, M. (2009). Camaleón común – Chamaeleo chamaeleon. En: Enciclopedia Virtual de los Vertebrados Españoles. Salvador, A., Marco, A. (Eds.). Museo Nacional de Ciencias Naturales, Madrid.

OBSERVAÇÃO VISUAL (VÍDEO)

https://www.youtube.com/watch?v=JrgJYaC2j1o

https://www.youtube.com/watch?v=1QpMMk5gr8c

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Cuadrado, M. (2009). Camaleón común – Chamaeleo chamaeleon. En: Enciclopedia Virtual de los Vertebrados Españoles. Salvador, A., Marco, A. (Eds.). Museo Nacional de Ciencias Naturales, Madrid.

CARACOL

(Helix aspersa)

TIPO DE AGENTE

Terrestre

ZONAS GEOGRÁFICAS

British Islands, Western Europe and the Mediterraneo - The Helix aspersa was originally found in the British islands, western Europe and the Mediterraneo, reaching some regions of north Africa, and the middle east. However, this snail has been introduced to several places where they have become agricultural pests. These places include the United States, Canada,

South Africa, Australia, New Zealand, Mexico, Chile, Argentina and some others. This snail has arrived to these places either by accidentally hidden in plant or vegetable shipments or intentionally imported for some purpose.
http://www.snail-world.com/garden-snail/ - ultimo acesso a 3 de setemebro de 2016

QUEM TOMA INICIATIVA (M | F | AMBOS)

Ambos - The hermaphroditic snails have both male and female characteristics, but do not self-fertilize. Courtship, which could take anywhere from 15 minutes to several hours, consists of circling one another to get in the best position to shoot a love dart but not be shot.
"Love is coming down to war in a way," said Ronald Chase, a biologist at McGill University in Montreal. "Sexual conflict plays out, even though both members of the mating pair are hermaphrodites."
http://news.nationalgeographic.com/news/2004/02/0212_040213_lovebirds_2.html - ACEDIDO A 4 JULHO DE 2016

Leonard (1992) argued that dart-shooting signals the shooter's intention to mate as a male, not only to indicate direct fertility benefits, but also to stimulate the partner to reciprocate in kind. (p. 126)
Rogers, D.W. & Chase, R. (2001). Dart receipt promotes sperm storage in the garden snail ***Helix aspersa.*** Behavioral Ecology and Sociobiology, July 2001, Volume 50, Issue 2, pp 122–127.
doi:10.1007/s002650100345

HERMAFRODITA - H. aspersa is a simultaneous reciprocal hermaphrodite. (p.123)
Rogers, D.W. & Chase, R. (2001). Dart receipt promotes sperm storage in the garden snail ***Helix aspersa.*** Behavioral Ecology and Sociobiology, July 2001, Volume 50, Issue 2, pp 122–127.
doi:10.1007/s002650100345

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Curto - <h + médio - <dia - The hermaphroditic snails have both male and female characteristics, but do not self-fertilize. Courtship, which could take anywhere from 15 minutes to several hours, consists of circling one another to get in the best position to shoot a love dart but not be shot.
http://news.nationalgeographic.com/news/2004/02/0212_040213_lovebirds_2.html - ACEDIDO A 4 JULHO DE 2016

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Enganador - Courtship, which could take anywhere from 15 minutes to several hours, consists of circling one another to get in the best position to shoot a love dart but not be shot.
Enganador - "Successful dart shooting seems to only benefit the dart shooter, not the recipient," Chase said. "It causes damage"—although Chase has seen snails shot through the brain and still live—"it hurts, and it increases the number of babies the shooter is going to get." **(Intimidatório?)**
Intimidatório - The marine flatworm *Pseudobiceros hancockanus* takes the mating fight one step further, in what scientists call penis fencing. Each flatworm is a hermaphrodite with two penises. The mating ritual consists of dueling penises, each flatworm trying to pierce the skin of the other with its sharp-tipped organ. The winner—the stabber—transfers its sperm. The loser

gets what scientists call the burden of motherhood: the considerable energy costs of caring for the developing eggs.
http://news.nationalgeographic.com/news/2004/02/0212_040213_lovebirds_2.html - ACEDIDO A 4 JULHO DE 2016
Brando - Reproduction takes place in early summer, and begins with pairing and courtship. After a period in which the members of the pair caress each other with their tentacles, each snail pierces the skin of its partner with a calcareous 'love dart', a spiny projection which is covered in mucus. The function of this love dart is unclear, but it is thought that the mucus may act to improve the survival of sperm. Mating then takes place; each snail inserts its penis into its partner at the same time (6).
http://eol.org/pages/449907/overview - acedido a 4 de Julho de 2016

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)
Tacto – Reproduction takes place in early summer, and begins with pairing and courtship. After a period in which the members of the pair caress each other with their tentacles, each snail pierces the skin of its partner with a calcareous 'love dart', a spiny projection which is covered in mucus.

http://eol.org/pages/449907/overview - acedido a 4 de Julho de 2016

Tacto – The hermaphroditic snails have both male and female characteristics, but do not self-fertilize. Courtship, which could take anywhere from 15 minutes to several hours, consists of circling one another to get in the best position to shoot a love dart but not be shot.
Once the love darts are fired—and about one-third of the time they miss—the snails transfer sperm to one another in a separate process that lasts as long as six hours. What's the point of the love dart if hitting or missing makes no difference to whether the pair copulates?
http://news.nationalgeographic.com/news/2004/02/0212_040213_lovebirds_2.html - ACEDIDO A 4 JULHO DE 2016

INTENSITY - Características/ações (amabilidade, cortesia, proibição, domínio, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade, etc.)

Amabilidade + Cortesia - After a period in which the members of the pair caress each other with their tentacles, http://eol.org/pages/449907/overview - acedido a 4 de Julho de 2016
Dominio - each snail pierces the skin of its partner with a calcareous 'love dart', a spiny projection which is covered in mucus. The function of this love dart is unclear, but it is thought that the mucus may act to improve the survival of sperm. Mating then takes place; each snail inserts its penis into its partner at the same time (6).
http://eol.org/pages/449907/overview - acedido a 4 de Julho de 2016

Dominio - But back to the arrow-shooting Cupid. Garden snails *(Helix aspersa)* use "love darts" to get their point across.
http://news.nationalgeographic.com/news/2004/02/0212_040213_lovebirds_2.html - ACEDIDO A 4 JULHO DE 2016
Dominio - Successful dart shooters father more babies than do snails that miss with their darts.
"Successful dart shooting seems to only benefit the dart shooter, not the recipient," Chase said. "It causes damage"—although Chase has seen snails shot through the brain and still live—"it hurts, and it increases the number of babies the shooter is going to get."

http://news.nationalgeographic.com/news/2004/02/0212_040213_lovebirds_2.html - ACEDIDO A 4 JULHO DE 2016

RESUMO DESCRITIVO

Caracóis terrestres, inclusive o caracol popular romano que é comido como escargot, esfaqueiam-se uns aos outros com "dardos do amor" real antes de copular.
O dardo, que tem a forma de agulha hipodérmica, injeta uma hormôna no outro caracol, causando no seu comportamento uma alteração. Esta substância também é importante para aumentar a probabilidade de fertilização, quando os caracóis finalmente acasalar. (fonte: ???) - Os caracois são hermafroditas e seus genitais estão localizados próximos aos pescoços, bem atrás de seus olhos. Antes de que dois caracoles se acasalem, lançam "dardos de amor", feitos de cálcio, o que permite armazenar mais espermas em seus úteros (http://cogumelolouco.com/10-rituais-estranhos-de-acasalamento-animal/)

Reproduction takes place in early summer, and begins with pairing and courtship. After a period in which the members of the pair caress each other with their tentacles, each snail pierces the skin of its partner with a calcareous 'love dart', a spiny projection which is covered in mucus. The function of this love dart is unclear, but it is thought that the mucus may act to improve the survival of sperm. Mating then takes place; each snail inserts its penis into its partner at the same time (6).

http://eol.org/pages/449907/overview - acedido a 4 de Julho de 2016

During courtship, many helicid snails attempt to pierce the body walls of their mating partners with mucus-coated calcareous darts. The mucus covering the dart induces conformational changes in the female reproductive tract of the recipient, closing off the entrance to the gametolytic bursa copulatrix. (p.122)

During the final stage of courtship, helicid land snails attempt to push sharp calcareous darts into their mating partners. The darts are coated with mucus from specialized digitiform glands immediately prior to being shot. Koene and Chase (1998a) demonstrated that mucus extracted from the digitiform glands induced contractions and conformational changes in the female reproductive tract. (p.122)

The exact taxonomic status of this species is controversial; it is variously assigned to the genera Cornu, Cantareus, and Cryptomphalus. Since none of these names has emerged as the standard, we retain the use of Helix to be consistent with the existing behavioral literature. (p.122)

H. aspersa is a simultaneous reciprocal hermaphrodite. (p.123)

Since each snail in a mating pair acted as both sperm donor and sperm recipient, we included mating pair as a blocking variable in an early model. (p. 124)

Leonard (1992) argued that dart-shooting signals the shooter's intention to mate as a male, not only to indicate direct fertility benefits, but also to stimulate the partner to reciprocate in kind. (p. 126)

Rogers, D.W. & Chase, R. (2001). Dart receipt promotes sperm storage in the garden snail ***Helix aspersa.*** Behavioral Ecology and Sociobiology, July 2001, Volume 50, Issue 2, pp 122–127.
doi:10.1007/s002650100345

A spectacular example of a bizarre mating behavior in land snails is the shooting of so-called love darts (for example, Adamo and Chase 1988; Koene and Chase 1998a, Koene and Chase 1998b). Note that the term "shoot" is used loosely because the dart does not actually fly through the air. Rather, this pointed calcareous structure is forcefully stabbed through the skin of the mating partner. (p. 420)

This behavior is mainly controlled by the right mesocerebrum, a brain region that has an evolutionarily conserved function in gastropod mollusks (Koene and others 1999, 2000). During the initial stages of courtship the genital atrium is everted and becomes visible as a gradually increasing white bulge on the right side of the animal's head (Adamo and Chase 1988). During this phase pairs can still separate, but once a dart has been shot they rarely do. Dart shooting marks the end of courtship behavior and is typically performed by both animals, though not at the same time (Adamo
and Chase 1988). Upon dart shooting, the dart sac—which produces and stores the dart—is forcefully everted from the genital pore, thereby expelling the dart. On its way out, the dart is covered with mucus from the glands associated with the dart sac (often referred to as the digitiform glands). The general result of dart shooting, which is performed once by each partner, is that the dart perforates the skin of the mating partner and in nearly half of those cases the dart remains lodged in the
partner's skin (Adamo and Chase 1988). (p. 421)

That the main function of the dart cannot depend on permanent lodging of the dart in the recipient is also supported by observations in other dart-possessing species because darts can also be retained by the shooters and can even be used repeatedly in the same or a different copulation (J. M. Koene and S. Chiba unpublished data; B. Reyes-Tur and J. M. Koene unpublished data; Webb 1952; Reyes-Tur and others 2000). (p. 421)

Adamo and Chase (1990), again using H. aspersa, were able to demonstrate that the mucus that is present on the love dart is introduced into the blood of the partner. This finding indicated that the dart could indeed act as a hypodermic device to deliver a bioactive substance to the interior of the recipient. In a series of physiological experiments I was subsequently able to show that the mucus affects the recipient's female reproductive system (Koene and Chase 1998b). (p. 423)

Koene, J. (2006). Tales of two snails: sexual selection and sexual conflict in Lymnaea stagnalis and Helix aspersa. Oxford Journals, Volume 46, Issue 4, Pp. 419-429. Published by Oxford University Press on behalf of the Society for Integrative and Comparative Biology.
doi:10.1093/icb/icj040

NATIONAL GEOGRAPHIC
Lovebirds and Love Darts: The Wild World of Mating
Females benefit from promiscuity by improving the genetic quality of their young. A good provider is not necessarily the best sperm donor, so while the female builds a nest with her mate, she may sneak out and go sperm

shopping for a male with brighter feathers, bigger body size, or a more glorious singing voice—all indicators of good health.
This widespread lack of fidelity led scientists to coin a new term: social monogamy—living in pairs but sexually unfaithful.

While genetic testing shattered the halos of birds as monogamous creatures, they were not the only species revealed as promiscuous. Only about 3 percent of mammals are thought to be monogamous, mating and bonding with one partner for life. Humans are not one of these naturally monogamous animals. Black vultures, termites, and prairie voles are.

Dueling Love Darts

But back to the arrow-shooting Cupid. Garden snails *(Helix aspersa)* use "love darts" to get their point across.
The hermaphroditic snails have both male and female characteristics, but do not self-fertilize. Courtship, which could take anywhere from 15 minutes to several hours, consists of circling one another to get in the best position to shoot a love dart but not be shot.
"Love is coming down to war in a way," said Ronald Chase, a biologist at McGill University in Montreal. "Sexual conflict plays out, even though both members of the mating pair are hermaphrodites."
Once the love darts are fired—and about one-third of the time they miss—the snails transfer sperm to one another in a separate process that lasts as long as six hours. What's the point of the love dart if hitting or missing makes no difference to whether the pair copulates?
The mucus covering the dart causes part of the recipient's female reproductive tract to contract, resulting in a significant increase in the amount of sperm stored. Successful dart shooters father more babies than do snails that miss with their darts.
"Successful dart shooting seems to only benefit the dart shooter, not the recipient," Chase said. "It causes damage"—although Chase has seen snails shot through the brain and still live—"it hurts, and it increases the number of babies the shooter is going to get."
Does Cupid enter the picture?
"I believe the myth of Cupid and his arrows has its basis in this snail species, which is native to Greece," Chase said. "The Greeks probably knew about this behavior because they were pretty good naturalists and observers."
The marine flatworm *Pseudobiceros hancockanus* takes the mating fight one step further, in what scientists call penis fencing. Each flatworm is a hermaphrodite with two penises. The mating ritual consists of dueling penises, each flatworm trying to pierce the skin of the other with its sharp-tipped organ. The winner—the stabber—transfers its sperm. The loser gets what scientists call the burden of motherhood: the considerable energy costs of caring for the developing eggs.
Finally, is there anything in the animal world that parallels the "opposites attract" theory of romance in humans? Yes, according to recent bird research.
A study of the mating habits of great tits *(Parus major)* in the wild, conducted by scientists at the Netherlands Institute of Ecology, found that the offspring of parents with opposing personalities had much higher rates of survival than the chicks of parents with similar "extreme" personalities.
Niels Dingemanse and Christiaan Both found that when two birds with "extreme" personality traits—very fast and aggressive or very slow and cautious—mated, they produced chicks with more extreme behaviors. These chicks tended to die early and reproduce less. The "average types" resulting from a fast and aggressive bird mating with a slow and cautious bird had the highest survival and reproduction rates.

More Valentine's Day Specials

• Read "Finding a Valentine Can Be Tough for Animals Too, Cameras Show"
• Watch *National Geographic Presents: When Animals Attract* on Fox TV tonight at 9 p.m. ET.

http://news.nationalgeographic.com/news/2004/02/0212_040213_lovebirds_2.html - ACEDIDO A 4 JULHO DE 2016

WIKIPÉDIA – PROCURAR ARTIGOS QUE COMPROVEM...
Mating begins with a courting ritual. For example, in land snails of the genus *Helix*, including theescargot *Helix pomatia*, and the common garden snail *Helix aspersa* (also known as *Cornu aspersum* and *Cantareus aspersus*), copulation is preceded by an elaborate tactile courtship. The two snails circle around each other for up to six hours, touching with their tentacles, and biting lips and the area of the genital pore, which shows some preliminary signs of the eversion of the penis. As the snails approach mating, hydraulic pressure builds up in the blood sinus surrounding the organ housing the dart. Each snail manoeuvres to get its genital pore in the best position, close to the other snail's body. Then, when the body of one snail touches the other snail's genital pore, it triggers the firing of the dart.[3]
The darting can sometimes be so forceful that the dart ends up buried in the internal organs.[4] It can also happen that a dart will pierce the body or head entirely, and protrude on the other side.[5]
After both snails have fired their darts, the snails copulate and exchange sperm.
A snail does not have a dart to fire the very first time it mates, because the first mating is necessary to trigger the process of dart formation.[1] Once a snail has mated, it fires a dart before some, but not all, subsequent matings. A snail often mates without having a dart to use,[6] because it takes time to create a replacement dart. In the case of the garden snail *Cornu aspersum*, it takes a week for a new dart to form.[7]
The dart is shot with some variation in force, and with considerable inaccuracy, such that one-third of the darts that are fired in *Cornu aspersum* either fail to penetrate the skin, or miss the target altogether.[8] Snails have only very simple visual systems and cannot see well enough to use vision to help aim the darts.
https://en.wikipedia.org/wiki/Love_dart#cite_note-3

OBSERVAÇÃO VISUAL

https://www.youtube.com/watch?v=jcuWb40IHmw

https://www.youtube.com/watch?v=-GjDQ7upbbs

https://www.youtube.com/watch?v=jcuWb40IHmw

https://www.youtube.com/watch?v=SnGrV1-dx3A

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Rogers, D.W. & Chase, R. (2001). Dart receipt promotes sperm storage in the garden snail ***Helix aspersa.*** Behavioral Ecology and Sociobiology, July 2001, Volume 50, Issue 2, pp 122–127.
doi:10.1007/s002650100345

Koene, J. (2006). Tales of two snails: sexual selection and sexual conflict in Lymnaea stagnalis and Helix aspersa. Oxford Journals, Volume 46, Issue 4, Pp. 419-429. Published by Oxford University Press on behalf of the Society for Integrative and Comparative Biology.
doi:10.1093/icb/icj040

http://news.nationalgeographic.com/news/2004/02/0212_040213_lovebirds_2.html - ACEDIDO A 4 JULHO DE 2016

http://eol.org/pages/449907/overview - acedido a 4 de Julho de 2016

http://www.snail-world.com/garden-snail/ - ultimo acesso a 3 de setemebro de 2016

OURIÇO
(Erinaceus europaeus)

TIPO DE AGENTE
Terrestre

ZONAS GEOGRÁFICAS
Europa, Ásia e Norte de África -

Geographic Range

Erinaceus europaeus (European hedgehog) is commonly found across Europe and into central Asia. Native to this region, it can be found from the Archipelago of the Azores and as far east as Khazakstan. It is commonly seen in northern Europe, as far as Scandinavia. While it is generally not found south of the Mediterranean Sea, it has been seen in Lebanon. *Erinaceus europaeus* is also found in New Zealand, where they were introduced in the late 1800s. (Bogdanov, et al., 2009; Brockie, 1959; Mathias, et al., 1998; "Division of Mammals Collections: Search "Erinaceus europaeus"", 2011)

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central Asia. Native to this region, it can be found from the Archipelago of the
and as far east as Khazakstan. It is
dinavia. While it is generally not f
seen in Lebanon. *Erinaceus europaeu*
troduced in the late 1800s. (Bogdar
"Division of Mammals Collections: S

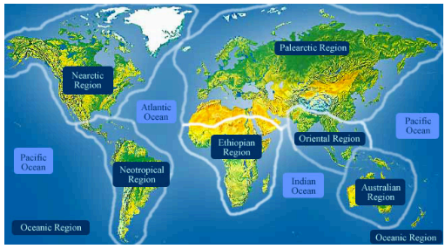
Biogeographic Regions: palearctic (

Habitat

The European hedgehog is found
hedgerows. They prefer drier areas
found in scrub and sand dunes. E
found in home gardens, cemeteries, parks, agroecosystems, and other areas th

Palearctic

living in the northern part of the Old World. In otherwords, Europe and Asia and northern Africa.



http://animaldiversity.org/accounts/Erinaceus_europaeus/ - ultimo acesso em 19 agosto 2016

QUEM TOMA INICIATIVA (M | F)
Macho - Courtship behaviour in hedgehogs is characterised by the male circling around the female with one or both sexes snorting loudly (Reeve & Morris 1986). (p. 41)
Haigh, A. Butler, F. and O'Riordan, R. M. (2012) Courtship behavior of western hedgehogs (Erinaceus europaeus) in a rural
landscape in Ireland and the first appearance of offspring', Lutra, 55(1), pp. 41-54.

Reproduction

European hedgehogs are solitary and non-territorial. They begin the mating process when a male encounters a female, at which time the male encircles the female while she lowers her head and makes a variety snorts, grunts, and hisses. If the male is successful in courting the female, he attempts to mount her several times. After numerous copulations, the male leaves the female, and does not provide any parental care to his offspring. He continues to roam alone and attempts to mate with other females until he begins preparing for hibernation. Males and females have multiple mates each season. (Burton, 1969; Hof and Bright, 2010; Rondinini, 2007; Southern, 1964; Walker, 1968)

http://animaldiversity.org/accounts/Erinaceus_europaeus/ - ultimo acesso em 19 agosot 2016

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Médio - <dia - Courtship behaviour in hedgehogs is characterised by the male circling around the female with one or both sexes snorting loudly (Reeve & Morris 1986). According to Jackson (2006) this ritual may continue for over an hour, with the majority of displays failing to end in a successful mating. (p. 41)

Médio - <dia - Bouts of courtship behaviour had a mean duration of 60 (± 0.05) minutes. However, on one occasion in 2009 a bout lasted for up to 140 minutes. (p. 45)

Médio - <dia - Jackson (2006) felt that this reflected the brevity of mating (minutes) relative to the time spent courting (up to an hour or more). (p. 49)

Haigh, A. Butler, F. and O'Riordan, R. M. (2012) Courtship behavior of western hedgehogs (Erinaceus europaeus) in a rural landscape in Ireland and the first appearance of offspring', Lutra, 55(1), pp. 41-54.

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Intimidatório - When a male finds a mate, he circle for several hours, making several attempts to mount. If the female continually rejects the male, he eventually leaves to find a receptive female. If she accepts him, she flattens her spines and lowers herself to the ground, wich gives the male better access.

http://animaldiversity.org/accounts/Erinaceus_europaeus/ - ultimo acesso em 19 agosto 2016

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)

Olfato - Reeve (1994) suggested that odour plays an important part in hedgehogs' pre-mating behaviour, with males attracted to females in oestrus and certainly in this study this appeared to be the case with a male seen running towards a lone female from the other side of the nine ha pasture in June 2010. (p.50)

Haigh, A. Butler, F. and O'Riordan, R. M. (2012) Courtship behavior of western hedgehogs (Erinaceus europaeus) in a rural landscape in Ireland and the first appearance of offspring', Lutra, 55(1), pp. 41-54.

Audição - They begin the mating process when a male encounters a female, at wich time the male encircles the female while she lowers her head and makes a variety snorts, grunts, and hisses.

http://animaldiversity.org/accounts/Erinaceus_europaeus/ - ultimo acesso em 19 agosto 2016

Audição - Courtship behaviour was identified based on the description by Reeve & Morris (1986), i.e.

"courtship involves the male circling closely around the female, with one or both sexes snorting loudly". When courtship behavior was observed, the identification of individuals involved was recorded, in addition to their location, the length of time which they spent engaged in courtship behaviour and whether the behaviour concluded in a successful mating. (p. 44)
Haigh, A. Butler, F. and O'Riordan, R. M. (2012) Courtship behavior of western hedgehogs (Erinaceus europaeus) in a rural landscape in Ireland and the first appearance of offspring', Lutra, 55(1), pp. 41-54.

Audição + Olfato -

Communication and Perception

European hedgehogs are not particularly noisy, and make mostly grunting, snorting, and hoarse squeaking sounds. Adults are vocal during mating, while feeding, and occasionally when captured. Young may squeak and whistle while in the nest. Due to its nocturnal behavior, European hedgehogs rely heavily on their senses of smell and hearing. In addition to having a well developed sense of smell, they, like many mammals, have a Jacobson's organ in their palate. The organ may have a role in social behavior as both male and female hedgehogs have a variety of scent glands. While the mechanisms of hearing in *E. europaeus* have not been well studied, research on a related species, the Long-eared hedgehog, has found it capable of processing high-frequency sounds up to 45kHz. (Burton, 1969; Forrest, 1899; Johnston, 1903; Rondinini, 2007; Southern, 1964; Step, 1921)

http://animaldiversity.org/accounts/Erinaceus_europaeus/ - ultimo acesso em 19 agosto 2016

Tacto - Courtship behaviour was usually first obvious by the loud hisses of the female. The hedgehogs faced each other, the male attempting to approach the female who would lunge forward, pushing her head underneath his body, while she forcefully pushed him away. The male would again edge forward and attempt to move behind the female, progressing in wide circles, and moving behind large clumps of grass. The female quickly circled around to avoid the male approaching behind her and again the hissing resumed. (p. 45)
Haigh, A. Butler, F. and O'Riordan, R. M. (2012) Courtship behavior of western hedgehogs (Erinaceus europaeus) in a rural landscape in Ireland and the first appearance of offspring', Lutra, 55(1), pp. 41-54.

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade, "interacção física", etc.)

Persistência + Intimidação???- When a male finds a mate, he circle for several hours, making several attempts to mount. If the female continually rejects the male, he eventually leaves to find a receptive female.
Subserviência - If she accepts him, she flattens her spines and lowers herself to the ground, wich gives the male better access.
http://animaldiversity.org/accounts/Erinaceus_europaeus/ - ultimo acesso em 19 agosto 2016
"Interacção física" - Courtship behaviour was usually first obvious by the loud hisses of the female. The hedgehogs faced each other, the male attempting to approach the female who would lunge forward, pushing her head underneath his body, while she forcefully pushed him away. The male would again edge forward and attempt to move behind the female, progressing in wide circles, and moving behind large clumps of grass. The female quickly circled around to avoid the male approaching behind her and again the hissing resumed. (p. 45)
Haigh, A. Butler, F. and O'Riordan, R. M. (2012) Courtship behavior of western hedgehogs (Erinaceus europaeus) in a rural landscape in Ireland and the first appearance of offspring', Lutra,

55(1), pp. 41-54.

RESUMO DESCRITIVO

Porcos-espinhos do sexo masculino têm um hábito bastante desagradável. Eles pulverizam as fêmeas com a sua urina numa tentativa de atraí-los. A urina está repleta de hormonas que "obrigam" as fêmeas a ficarem sexualmente atraídas. (fonte: ?????) REPRODUÇÃO
A época de reprodução ocorre de Abril a Agosto (quando os machos estão fecundos), sendo fácil de notar os rituais de acasalamento, pois macho e fêmea andam cerca de uma hora em volta um do outro, enquanto vão fazendo um ruído semelhante ao resfolegar. Depois da cópula, o macho abandona a fêmea e só a ela cabe a responsabilidade de criar os jovens. Podem existir duas ninhadas por ano, com picos de nascimento em Maio-Julho e Setembro. O período de gestação é de 12 a 13 semanas, após o que nascem 4-6 crias, embora possam nascer entre 2 e10. A mortalidade das crias antes de saírem do ninho é de 20% e ao longo do primeiro ano ronda os 60-70%. Este último valor deve-se em parte a crias que não atingem o peso necessário para sobreviver à hibernação, nomeadamente as da segunda ninhada. As crias nascem de olhos fechados e peladas, mas ao fim de poucas horas despontam os primeiros espinhos. Abandonam o ninho após 22 dias e atingem a maturidade sexual ao fim de um ano. (fonte: http://naturlink.pt/article.aspx?menuid=55&cid=9801&bl=1&viewall=true#Go_1)

Be Persistent Like a Hedgehog - ouriço
For a fortunate few, meeting their partners means **love at first sight** -- but for countless other couplings, cupid's aim can be a little off the mark, and require a bit of persistence.
When male **hedgehogs** find their ideal mate playing hard-to-get, they'll casually pace around her, trying to get her attention -- which sometimes takes hours.
That stubborn persistence, while perhaps annoying at first, eventually endears the male hedgehog to his mate until she decides to give him a chance. In the world of human romances, too, sometimes just showing up is half the battle.
http://www.treehugger.com/slideshows/natural-sciences/10-animal-courtship-rituals-a-guy-could-learn-from/page/10/#slide-top

Courtship behaviour was identified based on the description by Reeve & Morris (1986), i.e.
“courtship involves the male circling closely around the female, with one or both sexes snorting loudly”. When courtship behavior was observed, the identification of individuals involved was recorded, in addition to their location, the length of time which they spent engaged in courtship behaviour and whether the behaviour concluded in a successful mating. (p. 44)

Courtship behaviour was usually first obvious by the loud hisses of the female. The hedgehogs faced each other, the male attempting to approach the female who would lunge forward, pushing her head underneath his body, while she forcefully pushed him away. The male would again edge forward and attempt to move behind the female, progressing in wide circles, and moving behind large clumps of grass. The female quickly circled around to avoid the male approaching behind her and again the hissing resumed. (p. 45)

Courtship always terminated with the male moving away and immediately starting to forage, while the female remained stationary until the male had moved away from the area. (p. 45)

Males were observed in courtship behaviour with up to three diff erent females during the breeding
season (mean 1.6 ± 0.31 occasions per male) (fi gure 2). (p. 45)

They spent up to 35% of their time engaged in courtship behaviour and 26% of their time foraging (Haigh 2011). (p.50)

In all cases courtship behaviour was characterized by the aggressive behaviour of the female, in the same manner previously described by Reeve & Morris (1986) and Jackson (2006). Cox & Le Boeuf (1977) indicated that this behaviour, of rejecting a suitor, allows the female to test the vigour, tenacity and speed (indicators of fi tness) of a potential suitor and select a union which results in
optimal genetic consequences. (p.50)

Reeve (1994) suggested that odour plays an important part in hedgehogs' pre-mating behaviour, with males attracted to females in oestrus and certainly in this study this appeared to be the case with a male seen running towards a lone female from the other side of the nine ha pasture in June 2010. (p.50)

Haigh, A. Butler, F. and O'Riordan, R. M. (2012) Courtship behavior of western hedgehogs (Erinaceus europaeus) in a rural landscape in Ireland and the first appearance of offspring', Lutra, 55(1), pp. 41-54.

European hedgehogs are solitary and non-territorial. They begin the mating process when a male encounters a female, at wich time the male encircles the female while she lowers her head and makes a variety snorts, grunts, and hisses.
http://animaldiversity.org/accounts/Erinaceus_europaeus/ - ultimo acesso em 19 agosto 2016

Reproduction

European hedgehogs are solitary and non-territorial. They begin the mating process when a male encounters a female, at which time the male encircles the female while she lowers her head and makes a variety snorts, grunts, and hisses. If the male is successful in courting the female, he attempts to mount her several times. After numerous copulations, the male leaves the female, and does not provide any parental care to his offspring. He continues to roam alone and attempts to mate with other females until he begins preparing for hibernation. Males and females have multiple mates each season. (Burton, 1969; Hof and Bright, 2010; Rondinini, 2007; Southern, 1964; Walker, 1968)

http://animaldiversity.org/accounts/Erinaceus_europaeus/ - ultimo acesso em 19 agosto 2016

When a male finds a mate, he circle for several hours, making several attempts to mount. If the female continually rejects the male, he eventually leaves to find a receptive female. If she accepts him, she flattens her spines and lowers herself to the ground, wich gives the male better access.

their home range during mating season to increase chances of finding a mate. When a male finds a mate, he circles her while she lowers her nose and becomes audibly defensive. The male may circle for several hours, making several attempts to mount. If the female continually rejects the male, he eventually leaves to find a receptive female. If she accepts him, she flattens her spines and lowers herself to the ground, which gives the male better access. To copulate, a male climbs onto a female's back and uses his teeth to hold onto her shoulder. Gestation last for about 35 days. Females give birth to four to six offspring per litter, and often have two litters per year. The second litter, which is born later in the year, has a reduced chance of surviving winter. New borns are about 3 inches long and weigh 0.3 to 0.9 oz. At birth, *E. europaeus* does not appear to have spines, which are concealed beneath their fluid filled skin. 24 hours after birth, the fluid is absorbed and the spines are revealed, and, 2 to 3 days later, the young's musculature is developed enough to allow it to hold the spines erect. These white adolescent spines are replaced by darker spines after about 1.5 days. Pigmented adult spines replace the first two coats after about 2 to 3 weeks, at which time young begin to open their eyes and learn how to roll into a ball. Young are weaned by 4 to 6 weeks old, after which they become independent of parental care, and are able to mate by about 1 year. (Bunnell, 2009; Burton, 1969; Johnston, 1903; Rondinini, 2007; Southern, 1964; de Magalhaes and Costa, 2009)

http://animaldiversity.org/accounts/Erinaceus_europaeus/ - ultimo acesso em 19 agosto 2016

Communication and Perception

European hedgehogs are not particularly noisy, and make mostly grunting, snorting, and hoarse squeaking sounds. Adults are vocal during mating, while feeding, and occasionally when captured. Young may squeak and whistle while in the nest. Due to its nocturnal behavior, European hedgehogs rely heavily on their senses of smell and hearing. In addition to having a well developed sense of smell, they, like many mammals, have a Jacobson's organ in their palate. The organ may have a role in social behavior as both male and female hedgehogs have a variety of scent glands. While the mechanisms of hearing in *E. europaeus* have not been well studied, research on a related species, the Long-eared hedgehog, has found it capable of processing high-frequency sounds up to 45kHz. (Burton, 1969; Forrest, 1899; Johnston, 1903; Rondinini, 2007; Southern, 1964; Step, 1921)

http://animaldiversity.org/accounts/Erinaceus_europaeus/ - ultimo acesso em 19 agosto 2016

OBSERVAÇÃO VISUAL (vídeo)

https://www.youtube.com/watch?v=btY-3ED__Vo - - ultimo acesso em 19 agosto 2016

https://www.youtube.com/watch?v=DDc74SgOHr8 - ultimo acesso em 19 agosto 2016

https://www.youtube.com/watch?v=tfLvzrdRyoc - ultimo acesso em 19 agosto 2016

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Haigh, A. Butler, F. and O'Riordan, R. M. (2012) Courtship behavior of western hedgehogs (Erinaceus europaeus) in a rural landscape in Ireland and the first appearance of offspring', Lutra, 55(1), pp. 41-54.

http://animaldiversity.org/accounts/Erinaceus_europaeus/ - ultimo acesso em 19 agosot 2016

PIRILAMPO

(Photinus pyralis)

TIPO DE AGENTE

Terrestre ou VOADOR?????

Physical Description

The common eastern firefly is, in fact, not a fly, but a type of beetle. The average adult

http://animaldiversity.org/accounts/Photinus_pyralis/ - UNIVERSITY OF MICHIGAN - acedido a 4 julho 2016

ZONAS GEOGRÁFICAS

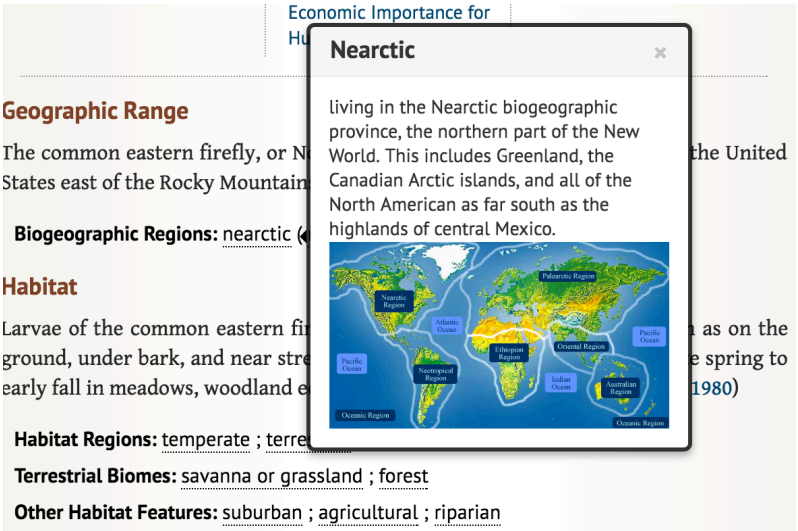
América do Norte –

The common eastern firefly, or North American firefly, ranges throughout the United States east of the Rocky Mountains. ("Firefly", 2001)

http://animaldiversity.org/accounts/Photinus_pyralis/#f7f9e02ea24a76e58fa9f5f3d1c15d61 - última consulta em 3 Julho de 2016

Biogeographic Regions

nearctic



América do Norte –

The common eastern firefly, or North American firefly, ranges throughout the United States east of the Rocky Mountains. ("Firefly", 2001)

http://animaldiversity.org/accounts/Photinus_pyralis/ - UNIVERSITY OF MICHIGAN - acedido a 4 julho 2016

The common eastern firefly, or North American firefly, ranges throughout the United States east of the Rocky Mountains.

Biogeographic Regions: nearctic (Native)

- 2001. Firefly. Pp. 134 in World Book. Chicago: World Book Incorporated.

http://eol.org/data_objects/31415407 (acedido a 4 de Julho)

QUEM TOMA INICIATIVA (M | F)

Masculino – Rhythmically flashing males fly individual patrols over low vegetation in witch females are perched. If a female answers the signal of a male the two fireflies may begin a courtship involving a series of alternating, timed flashes (McDermott 1910-1917, 1914; Mast 1912; Buck 1937[a]; Lloyd 1966, 1971).

TOWARD A FUNCTIONAL INTERPRETATION OF SYNCHRONOUS FLASHING BY FIREFLIES

JOHN BUCK AND ELISABETH BUCK

National Institutes of Health; Bethesda, Maryland 20014

In typical roving fireflies of the Western Hemisphere neither males nor females are gregarious. Rhythmically flashing males fly individual patrols over low vegetation in which females are perched. If a female answers the signal of a male the two fireflies may begin a courtship involving a series of alternating, timed flashes (McDermott 1910–1917, 1914; Mast 1912; Buck 1937*a*; Lloyd 1966, 1971).

In certain species of the tropical Far East the fireflies gather in trees by thousands, and the males flash in rhythmic synchrony. Since mating occurs in such trees it has been assumed that the communal display is some sort of sexual adaptation, but none of the published studies has provided an integrated explanation for the congregating, for the use of trees for assembly, and for the flash synchronization. In this paper we present such an explanation, based, insofar as possible, on strict selectionist considerations.

Buck, J. & Buck, E. (1978). Toward a Functional Interpretation of Synchronous Flashing by Fireflies.
The American Naturalist, Vol. 112, No. 985, pp. 471-492. Published by: The University of Chicago Press for The American Society of Naturalists. Pág. 471 – acedido online a 4 de julho em http://www.jstor.org/stable/2460117?seq=1#page_scan_tab_contents

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Rápido – até 10m - During courting, the solitary Photinus pyralis male flies along slowly, flashing about every 6 s (23°), and the sedentary female answers each of his signals after a 2-s delay (latency) (McDermott, 1911; Mast, 1912). The roving male responds to the female if, and only if, her answering flash occurs during the "early window;' 1.5 to 2.5 s after his flash (Buck, 1937b; Case, 1984). Responses involve orientation and approach, but not giving a flashed answer. In addition, when two males are less than a meter apart and A flashes during B's "late window;' 3.5 s or more after B's flash, B may flash immediately (0.4 s) (Buck, 1938; Case, 1984; Buck, Buck,

Case and Hanson, unpub.). Ns stimulus flash and B's response are thus closely clumped in time in comparison with the 6-s species interflash interval- i.e., A has caused B to synchronize with him. (p. 268)

Buck, J. (1988). Synchronous Rhythmic Flashing of Fireflies. II. The Quarterly Review of Biology, Vol. 63, No. 3 (Sep., 1988), pp. 265-289. Published by: The University of Chicago Press.

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Ritualizados - Synchronized flashing in firefly congregations implies that each participant is responding to visual input from others. There is a large literature demonstrating that single male and female fireflies of both synchronizing and nonsynchronizing species respond to flashes from other fireflies and to light signals from artificial sources, and that both spontaneous and responsive flashing are under nervous control. Pág. 268

Buck, J. (1988). Synchronous Rhythmic Flashing of Fireflies. II. The Quarterly Review of Biology, Vol. 63, No. 3 (Sep., 1988), pp. 265-289. Published by: The University of Chicago Press.

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)

Visão - Synchronized flashing in firefly congregations implies that each participant is responding to visual input from others. (pág. 268)

Buck, J. (1988). Synchronous Rhythmic Flashing of Fireflies. II. The Quarterly Review of Biology, Vol. 63, No. 3 (Sep., 1988), pp. 265-289. Published by: The University of Chicago Press.

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade, ritmada, etc.)

Ritmada e Reciprocidade - In practice, firefly "synchrony" refers to coordinated rhythmic group flashing, a definition covering serial responses to rhythmic photic driving (led or triggered synchrony), sequential individual-to-individual excitation (wave synchrony) and other types of mutual flashing discussed below. Rhythmic communal synchronization occurs in body movements and sound production of a few insects and other arthropods (see Buck, 1938; Buck and Buck, 1968, 1978). It is also typical of many human activities-e.g., dancing, the spontaneous rhythmic applause clapping by Russian opera, ballet and circus audiences and, notably, music. Even conducted orchestral music involves a large element of mutual cueing between performers. (pág. 267)
Buck, J. (1988). Synchronous Rhythmic Flashing of Fireflies. II. The Quarterly Review of Biology, Vol. 63, No. 3 (Sep., 1988), pp. 265-289. Published by: The University of Chicago Press.

Sincronização - Synchronized flashing in firefly congregations implies that each participant is responding to visual input from others. There is a large literature demonstrating that single male and female fireflies of both synchronizing and nonsynchronizing species respond to flashes from other fireflies and to light signals from artificial sources, and that both spontaneous and responsive flashing are under nervous control. (pág. 268)
Buck, J. (1988). Synchronous Rhythmic Flashing of Fireflies. II. The Quarterly

Review of Biology, Vol. 63, No. 3 (Sep., 1988), pp. 265-289. Published by: The University of Chicago Press.

Exibição e Reciprocidade - as femeas estão no chão a esperguiçar-se e a avaliar as suas opções. Têm muitos machos para escolher e são muito exigentes. Quando uma femea vê uma cintilação de um macho, aponta a sua lanterna na direcção dele e responde com outra cintilação. Voa para mais perto e ele cintila de novo.
https://www.ted.com/talks/sara_lewis_the_loves_and_lies_of_fireflies#t-439910(8m10s)

Rhythmically flashing males fly individual patrols over low vegetation in witch females are perched. If a female answers the signal of a male the two fireflies may begin a courtship involving a series of alternating, timed flashes (McDermott 1910-1917, 1914; Mast 1912; Buck 1937[a]; Lloyd 1966, 1971).

The most significant use of flashing is in courtship rituals. Male fireflies use their bioluminescence to signal to females that they are sexually mature and ready to mate while the female flashes a return signal to let the male(s) know the female is sexually receptive and where she can be found. Male fireflies use many variations of flash patterns, in which the variation of the pattern is due to timing changes. These variations allow the female firefly to distinguish between species and to choose the best mate for herself. Often, groups of competing males will employ synchronic flashes when in the presence of a female. Synchrony, in terms of fireflies, is the physical result of the sensory processing of relatively simple light signals. Recently, it has been discovered that many North American species of firefly in the genus Photinus not only use bioluminescent flashing to communicate during courtship behaviors, but they also use synchrony. There is a diversity of synchronies that exists in fireflies. Many researchers believe that the male firefly's response to a female might be critical in encouraging and increasing the formation of mating clusters in synchronic fireflies. This synchrony may be expressed in several different ways and it may have an affect on the mating success of male fireflies. It may also offer more choice of potential mates to females fireflies.
Tyler, C. (2003). Courtship and Synchronic Flashing Behavior in Fireflies in the Genus *Photinus*
Colorado State University April 9, 2003 E-mail: isis_tiet@yahoo.com

RESUMO DESCRITIVO

Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.
Pág. 27
Alguns insectos também usam os sinais visuais para encontra amantes. A luz produzida pelos pirilampos* ou vaga-lumes. As mais de 2000 espécies deste inseto conseguem produzir uma luz fria (não possui as frequências ultravioletas ou infravermelhas) a partir de reações químicas que têm lugar no seu abdómen (bioluminescência), sendo que uma merece o nome da nossa terra (*Luciola lusitanica*). Entre estes insetos não é só a luz que serve para atrair os parceiros, mas também o ritmo e a frequência com que se acende e apaga, parecendo que se está a comunicar por código morse. Tanto a luz como o ritmo são típicos de cada espécie evitando assim situações embaraçosas como entra na cama de uma prima. No entanto o oportunismo mais uma vez entra em cena – fêmeas dos pirilampos *Photuris* conseguem imitar os flashes de outras espécies para atrair os machos para um jantar que

de romântico não tem nada. Porque os machos enganados acabam comidos, as fêmeas *Photuris* recebem a designação da *femme fatale* dos pirilampos.
*O nome «pirilampo» tem a sua origem nas palavras gregas, *pyros*, que significa fogo e *lampis* que quer dizer luz.

São na verdade canções de amor silenciosas de pirilampos machos. Estão a voar e a cintilar os seus corações.
https://www.ted.com/talks/sara_lewis_the_loves_and_lies_of_fireflies#t-439910 (7m31s)

as femeas estão no chão a esperguiçar-se e a avaliar as suas opções. Têm muitos machos para escolher e são muito exigentes. Quando uma femea vê uma cintilação de um macho, aponta a sua lanterna na direcção dele e responde com outra cintilação. Voa para mais perto e ele cintila de novo (8m10s)

Estas criaturas demonstram o seu amor na linguagem da luz ((8m20s).

As femeas usam os sinais de luz dos machos como forma de tentar perceber qual dos macho será reprodutivamente melhor

In practice, firefly "synchrony" refers to coordinated rhythmic group flashing, a definition covering serial responses to rhythmic photic driving (led or triggered synchrony), sequential individual-to-individual excitation (wave synchrony) and other types of mutual flashing discussed below. Rhythmic communal synchronization occurs in body movements and sound production of a few insects and other arthropods (see Buck, 1938; Buck and Buck, 1968, 1978). It is also typical of many human activities-e.g., dancing, the spontaneous rhythmic applause clapping by Russian opera, ballet and circus audiences and, notably, music. Even conducted orchestral music involves a large element of mutual cueing between performers. (pág. 267)
Buck, J. (1988). Synchronous Rhythmic Flashing of Fireflies. II. The Quarterly Review of Biology, Vol. 63, No. 3 (Sep., 1988), pp. 265-289. Published by: The University of Chicago Press.

It is widely known that fireflies use bioluminescent “flashes” as a form of communication between individuals. These flashes are produced via a chemical reaction consisting of the combination of luciferin, luciferase, adenosine triphosphate (ATP) and oxygen. This form of communication is used during the evening and night and can lead to predation due to fact that they are easy to spot.
The most significant use of flashing is in courtship rituals. Male fireflies use their bioluminescence to signal to females that they are sexually mature and ready to mate while the female flashes a return signal to let the male(s) know the female is sexually receptive and where she can be found. Male fireflies use many variations of flash patterns, in which the variation of the pattern is due to timing changes. These variations allow the female firefly to distinguish between species and to choose the best mate for herself. Often, groups of competing males will employ synchronic flashes when in the presence of a female. Synchrony, in terms of fireflies, is the physical result of the sensory processing of relatively simple light signals. Recently, it has been discovered that many North American species of firefly in the genus Photinus not only use bioluminescent flashing to communicate during courtship behaviors, but they also use synchrony. There is a diversity of synchronies that exists in fireflies. Many researchers believe that the male firefly’s response to a female might be critical in encouraging and increasing the formation of mating clusters in synchronic fireflies. This synchrony may be expressed in several

different ways and it may have an affect on the mating success of male fireflies. It may also offer more choice of potential mates to females fireflies. These flashing and synchronic behaviors in courtship are ultimately affected by sexual selection. (pág 1)

Tyler, C. (2003). Courtship and Synchronic Flashing Behavior in Fireflies in the Genus *Photinus*
Colorado State University April 9, 2003 E-mail: isis_tiet@yahoo.com

OBSERVAÇÃO VISUAL (VÍDEO)

https://www.ted.com/talks/sara_lewis_the_loves_and_lies_of_fireflies#t-439910 (13m47s)

http://www.nytimes.com/interactive/projects/cp/summer-of-science-2015/latest/where-to-see-synchronous-fireflies

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The American Naturalist, Vol. 112, No. 985, pp. 471-492. Published by: The University of Chicago Press for The American Society of Naturalists
Stable URL: http://www.jstor.org/stable/2460117
Page Count: 22
acedido online a 4 de julho em
http://www.jstor.org/stable/2460117?seq=1#page_scan_tab_contents

Buck, J. (1988). Synchronous Rhythmic Flashing of Fireflies. II. The Quarterly Review of Biology, Vol. 63, No. 3 (Sep., 1988), pp. 265-289. Published by: The University of Chicago Press
Stable URL: http://www.jstor.org/stable/2830425
Accessed: 24/03/2010 06:39
acedido online a 4 de julho 2016

Tyler, C. (2003). Courtship and Synchronic Flashing Behavior in Fireflies in the Genus *Photinus*
Colorado State University April 9, 2003 E-mail: isis_tiet@yahoo.com

http://animaldiversity.org/accounts/Photinus_pyralis/ - UNIVERSITY OF MICHIGAN - acedido a 4 julho 2016

http://eol.org/data_objects/31415407 (acedido a 4 de Julho)

VOADORES

AVE-LIRA – BEIJA-FLOR

(Menura novaehollandiae)

TIPO DE AGENTE

Voador

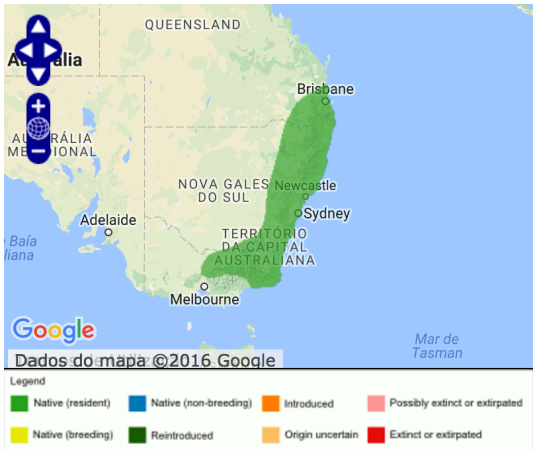
ZONAS GEOGRÁFICAS

Austrália

Geographic Range [top]

Countries occurrence:	**Native:** Australia
	♦ *Continuing decline in* Unknown

http://www.iucnredlist.org/details/22703605/0 - ultimo acesso no dia 26 de Agosto de 2016



http://www.birdlife.org/datazone/speciesfactsheet.php?id=5162 - ultimo acesso no dia 26 de Agosto de 2016

Quem toma iniciativa (M)

Masculino - To entice females into plumage-viewing range, the lyrebird sings the most elaborate and complex song he can muster, by copying the calls of all the other creatures in the forest and mixing them in with his own.
http://www.bbc.com/earth/story/20150504-the-ten-sexiest-male-birds - ultimo acesso a 25 de agosto de 2016

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Rápido – até 10m??????

ou

Prolongado >dia???

Devo considerar desde os primeiros cantos (vários dias) ou o ritual final (minutos)???? – conforme email em baixo

No dia 27/08/2016, às 00:50, Anastasia Helen Dalziell <anastasia.dalziell@cornell.edu> escreveu:
Dear Pedro,
Thank you for your interest in our work on lyrebirds.
Your question - what is the duration of courtship - is slightly complicated in lyrebirds because females probably listen to males singing for several days before she visits a male.
However, the final courtship display that occurs immediately (minuets) before copulation is a song and dance display. The most up-to-date information about that display is in our paper published in

Dalziell, A. H. et al. 2013. Dance choreography is coordinated with song repertoire in a complex avian display. *Curr. Biol*. 23, 1132-1135.(attached).

Further information (but more speculative) is in

Higgins, P. J., Peter, J. M. & Steele, W. K. 2001. *Tyrant-flycatchers to Chats. Handbook of Australian, New Zealand & Antarctic Birds* Vol 5. Melbourne: Oxford University Press (also attached).

We are going to published further information about courtship in the near future.

Best of luck for your PhD studies.
Anastasia

Anastasia H. Dalziell
Postdoctoral Associate
Macaulay Library and
Bioacoustics Research Program
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Cornell University

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Visiting Fellow
Hawkesbury Institute for the Environment
Western Sydney University, Australia

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Brandos - Breeding occurs in winter, when males prepare raised display mounds of scratched earth. To entice females into plumage-viewing range, the lyrebird sings the most elaborate and complex song he can muster, by copying the calls of all the other creatures in the forest and mixing them in with his own.
This grand master of mimicry can convincingly rattle off the calls of up to 20 other species in a five-minute window, and has even been known to steal more unnatural sounds for his show, including camera shutters, chain saws and car alarms. Ornithologists think that female lyrebirds judge potential mates on both mimetic accuracy and versatility.
http://www.bbc.com/earth/story/20150504-the-ten-sexiest-male-birds - ultimo acesso a 25 de agosto de 2016

Ritualizados - During the courtship display, the male emphasises his long extravagant tail by flipping it over his head and fanning it across his back. In 2013, researchers discovered the male lyrebird has one final trick up his sleeve: **coordinating choreographed dance steps** with specific songs.
http://www.bbc.com/earth/story/20150504-the-ten-sexiest-male-birds - ultimo acesso a 25 de agosto de 2016

Ritualizados - Australian biologists have found that male **superb lyrebirds (*Menura novaehollandiae*)** coordinate song with dance as part of an elaborate mating ritual.
FONTE: http://www.sci-news.com/biology/article01145-superb-lyrebird-dance.html - ultimo acesso a 25 de agosto de 2016

Ritualizados - Male lyrebirds sing four different song types (A – D), matching each with a unique set of movements and delivering song and dance types in a predictable sequence.
FONTE: http://www.sci-news.com/biology/article01145-superb-lyrebird-dance.html - ultimo acesso a 25 de agosto de 2016

Ritualizados - "These integrated song and dance routines had an additional layer of complexity: the birds performed their songs in a predictable order, always beginning with song A, then alternating between songs B and C, before finishing with song D."
http://www.sci-news.com/biology/article01145-superb-lyrebird-dance.html - ultimo acesso a 25 de agosto de 2016

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)
Audição - Breeding occurs in winter, when males prepare raised display mounds of scratched earth. To entice females into plumage-viewing range, the lyrebird sings the most elaborate and complex song he can muster, by copying the calls of all the other creatures in the forest and mixing them in with his own.
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Audição - Male lyrebirds sing four different song types (A – D), matching each with a unique set of movements and delivering song and dance types in a predictable sequence.
FONTE: http://www.sci-news.com/biology/article01145-superb-lyrebird-dance.html - ultimo acesso a 25 de agosto de 2016

Visão - During the courtship display, the male emphasises his long extravagant tail by flipping it over his head and fanning it across his back. In 2013, researchers discovered the male lyrebird has one final trick up his sleeve: **coordinating choreographed dance steps** with specific songs.
http://www.bbc.com/earth/story/20150504-the-ten-sexiest-male-birds - ultimo acesso a 25 de agosto de 2016

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade, imitação, aprendizagem, etc.)
Imitação - Breeding occurs in winter, when males prepare raised display mounds of scratched earth. To entice females into plumage-viewing range, the lyrebird sings the most elaborate and complex song he can muster, by

copying the calls of all the other creatures in the forest and mixing them in with his own.
This grand master of mimicry can convincingly rattle off the calls of up to 20 other species in a five-minute window, and has even been known to steal more unnatural sounds for his show, including camera shutters, chain saws and car alarms. Ornithologists think that female lyrebirds judge potential mates on both mimetic accuracy and versatility.
http://www.bbc.com/earth/story/20150504-the-ten-sexiest-male-birds - ultimo acesso a 25 de agosto de 2016

Imitação - The bird is most notable for its ability to mimic natural and artificial sounds from its environment. Male lyrebirds imitate about 20 to 25 species of birds during the breeding season.
http://www.sci-news.com/biology/article00409.html - ultimo acesso a 25 de agosto de 2016

Exibição - During the courtship display, the male emphasises his long extravagant tail by flipping it over his head and fanning it across his back. In 2013, researchers discovered the male lyrebird has one final trick up his sleeve: **coordinating choreographed dance steps** with specific songs.
http://www.bbc.com/earth/story/20150504-the-ten-sexiest-male-birds - ultimo acesso a 25 de agosto de 2016

Sincronização - Male lyrebirds sing four different song types (A – D), matching each with a unique set of movements and delivering song and dance types in a predictable sequence.
FONTE: http://www.sci-news.com/biology/article01145-superb-lyrebird-dance.html - ultimo acesso a 25 de agosto de 2016

Dinâmica - "While singing song A – which sounds like a 1980s video game – a male lyrebird typically steps sidewise with his tail spread over his head like a veil; but when he sings song C he narrows his tail so it resembles a mohawk, flaps his wings, and performs little jumps and bobs."

Aprendizagem - "Lyrebirds aren't born good mimics. Young male lyrebirds are really bad mimics and they are hopeless at imitating grey strike-thrush songs. They improve as they get older, but that takes years and years of practice."
http://www.sci-news.com/biology/article00409.html - ultimo acesso a 25 de agosto de 2016

Resumo descritivo

Com as asas batendo sem parar, o macho faz muitas curvas.
Para trás e para a frente, para um lado e para o outro, para cima e para baixo.
Vai aumentando a velocidade das curvas, vai chegando mais e mais alto.
De repente, sobe direto. Fica suspenso lá em cima um instante só. Aí mergulha, e no meio do caminho, freia. E pára bem na altura da cabeça da fêmea, que está sentadinha num galho, assistindo a tudo.
Essa manobra toda é apenas para dizer para a fêmea que ele voa muito bem, e consegue parar rapidamente quando for preciso. Está se aparecendo para arrumar namorada.
Normalmente as asas dos beija-flôres já batem umas cinquenta vezes por segundo.
Pois, nessas horas de acrobacias no ar, chegam a bater umas duzentas vezes por segundo.
É verdade que nem todos os beija-flôres batem as asas tão depressa. O beija-flor-gigante, por exemplo, bate muito mais devagar.

Mas qualquer beija-flor voa para trás (é a única ave que consegue fazer isso naturalmente).
E pode usar o voo reto, subindo ou descendo no ar. E voar para os lados.
E parar, voando, no mesmo ponto, o tempo que quiser.
Quando é preciso, voa setecentos quilômetros, ou mais, sem pousar nem uma vez. (http://www.ninha.bio.br/biologia/beija-flor.html)

During displays, male superb lyrebirds (Menura novaehollandiae) sing four different song types, matching each with a unique set of movements and delivering song and dance types in a predictable sequence. Crucially, display movements are both unnecessary for the production of sound and voluntary, because males sometimes sing without dancing. (p. 1132)

During displays, male superb lyrebirds (Menura novaehollandiae) sing four different song types, matching each with a unique set of movements and delivering song and dance types in a predictable sequence. Crucially, display movements are both unnecessary for the production of sound and voluntary, because males sometimes sing without dancing. (p. 1132)

We have obtained evidence that the superb lyrebird, Menura novaehollandiae, an oscine passerine, coordinates repertoires of song types with repertoires of independently produced dance movements. Like many birds, male lyrebirds display to females with both song and dance. Lyrebirds have a promiscuous, lek-like mating system lacking in paternal care [33]. Adult males advertise vocally with a large repertoire that can exceed 90 song types [34], comprising song types exclusive to lyrebirds
and extreme levels of accurate mimicry of the vocalizations of other species of bird [33–35]. Males also have a spectacular visual display involving the inversion of their tail over their heads, revealing the striking underside of their elaborate tail feathers (Figure 1). In addition, they perform a dance display on circular mounds that they have built on the forest floor [33]. This solo dance display is accompanied by song and is the prelude to mating [33] but has never been formally investigated. (p. 1132)

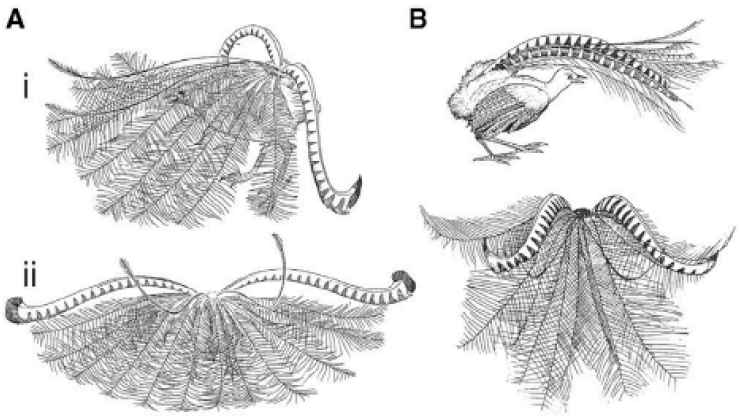

Figure 1. Inverted Tail Postures in Dance Displays by Males
Tail in (A) "Wide" and (B) "Narrow" position with (i) side view and (ii) front view (see also Movie S1). Drawings by Peter Marsack and reproduced with permission from [33].

(p. 1133)

Leg movement consisted of one of three mutually exclusive categories: (1) steps, ''S''; (2) jumps
or deep bobs, ''J''; or (3) none, ''N''. Steps within the dance were usually distinctive ''dance steps,'' with males stepping sideways. A male's wings

were either motionless (''No flaps'') or flapped (''Flaps''). The male's tail feathers were either fully fanned over his head, so that the outermost feathers, the striped lyrates, were at 180! to each other (''Wide'': Figure 1A), or closed, so the angle between the lyrates was less than 90! (''Narrow'': Figure 1B). Just as a song type is a set of acoustic characters, so dance is a set of movements and postures. (p. 1133)

Male lyrebirds ordered their songs and associated gestures into a predictable sequence. (p. 1133)

How males pair song types with dance gestures is a possible source of variation on which selection could act. These characteristics are consistent with a cognitively and physiologically demanding display that could be used by females to choose mates. (p. 1134)

Dalziell, A., Peters, R., Cockburn, A. et al. (2013). Dance Choreography Is Coordinated with Song Repertoire in a Complex Avian Display. Current Biology 23, 1132–1135, June 17, 2013 ª2013 Elsevier Ltd All rights reserved http://dx.doi.org/10.1016/j.cub.2013.05.018

Superb lyrebird (*Menura novaehollandiae*)
The songbird to end all songbirds, the superb lyrebird is a shy, ground-dwelling pheasant-sized bird that lives in the dense forests of southeastern Australia. The male carries a delicate tail of lacy white plumes bordered by a pair of elegantly curved feathers, which together resemble a lyre – an Ancient Grecian harp.

The Superb lyrebird (credit: Brian Ralphs/CC by 2.0)

But his *real* claim to fame is his virtuosic vocal repertoire.
Breeding occurs in winter, when males prepare raised display mounds of scratched earth. To entice females into plumage-viewing range, the lyrebird sings the most elaborate and complex song he can muster, by copying the calls of all the other creatures in the forest and mixing them in with his own. This grand master of mimicry can convincingly rattle off the calls of up to 20 other species in a five-minute window, and has even been known to steal more unnatural sounds for his show, including camera shutters, chain saws and car alarms. Ornithologists think that female lyrebirds judge potential mates on both mimetic accuracy and versatility.

A delicate tail of lacy white plumes (credit: John Cancalosi/Alamy)

During the courtship display, the male emphasises his long extravagant tail by flipping it over his head and fanning it across his back. In 2013, researchers discovered the male lyrebird has one final trick up his sleeve: **coordinating choreographed dance steps** with specific songs.

http://www.bbc.com/earth/story/20150504-the-ten-sexiest-male-birds - ultimo acesso a 25 de agosto de 2016

Dancing Superb Lyrebirds Surprise Ornithologists
Jun 10, 2013 by Natali Anderson

Australian biologists have found that male superb lyrebirds (*Menura novaehollandiae*) coordinate song with dance as part of an elaborate mating ritual.

Superb Lyrebird at Healesville Sanctuary, Victoria, Australia (Melburnian / CC BY-SA 3.0)

"Like humans, male superb lyrebirds have different dance movements to go with different songs," said Anastasia Dalziell of Australian National University, lead author of the study published in the journal *Current Biology*.

Male lyrebirds sing four different song types (A – D), matching each with a unique set of movements and delivering song and dance types in a predictable sequence.

"While singing song A – which sounds like a 1980s video game – a male lyrebird typically steps sidewise with his tail spread over his head like a veil; but when he sings song C he narrows his tail so it resembles a mohawk, flaps his wings, and performs little jumps and bobs."

"These integrated song and dance routines had an additional layer of complexity: the birds performed their songs in a predictable order, always beginning with song A, then alternating between songs B and C, before finishing with song D."

The lyrebirds' dance movements are a voluntary embellishment to their singing; in other words, they can and do sing without dancing. Sometimes they also make mistakes in their dancing, an observation that suggests that dancing is challenging for the birds, just as it is for us humans.

As much as people love to dance, the activity is even more crucial for the birds. Before they can mate, males must impress females with their dancing skills. They put a lot of work into their dances, with years of practice before they reach maturity.

In the breeding season, female lyrebirds will visit several different males to watch their song-and-dance routines. Exactly what those females are looking for is still anyone's guess.

"Sometimes after what seems to me to be a perfectly wonderful display by a male, I watch a female leave and check out his neighbor," Dr Dalziell said.

Referente ao texto em cima - Bibliographic information: Anastasia H. Dalziell et al. Dance Choreography Is Coordinated with Song Repertoire in a Complex Avian Display. *Current Biology*, published online June 06, 2013; doi: 10.1016/j.cub.2013.05.018

FONTE: http://www.sci-news.com/biology/article01145-superb-lyrebird-dance.html - ultimo acesso a 25 de agosto de 2016

Karaoke Star of Bird World: Lyrebird

Jun 21, 2012 by Natali Anderson

The lyrebird is the reigning king of karaoke in the bird world, Australian researchers have discovered.

The bird is most notable for its ability to mimic natural and artificial sounds from its environment. Male lyrebirds imitate about 20 to 25 species of birds during the breeding season.
"To test the accuracy of the lyrebird's mimicry, we performed an acoustic analysis comparing the real songs of the grey strike-thrush with the lyrebird's mimicked version. Grey shrike-thrushes sing a complex and beautiful song, but lyrebirds can accurately mimic them all the same," said Anastasia Dalziell, a PhD candidate at the Australian National University's College of Medicine, Biology and Environment and lead author of a paper published in the journal*Animal Behaviour*.
However, with so many impressions of other birds' songs, lyrebirds have found a way to save space in their musical repertoire.
"We found that the lyrebirds were accurately replicating the structure of shrike-thrush songs, but they sang an abridged version containing fewer repeated notes than songs sung by real shrike-thrushes. This meant that lyrebirds could demonstrate both the accuracy and versatility of their mimicry in a shorter period of time than if they mimicked the whole shrike-thrush song," Dalziell said.
"We also wanted to 'ask an expert' how accurate lyrebird mimicry was, so we played back recordings of lyrebird mimicry to the strike-thrushes themselves. Surprisingly, strike-thrushes approached the speaker broadcasting mimicked songs as well as the shrike-thrushes' own song."
Dalziell and her team further tested the accuracy of the mimicry by playing the imitation as part of a musical stream of mimicked songs of other birds. Since lyrebirds usually mimic lots of different species of bird in quick succession, this gave the strike-thrush a clue as to who the singer might be.
"When strike-thrushes were played a song embedded in a sequence containing mimicry of other birds, they were a bit better at telling the difference between the real thing and a mimic, and approaching a mimetic song less often than when songs were presented on their own," Dalziell said.
"The reason the male lyrebird has developed this impressively accurate repertoire is unclear. It might be difficult to be an accurate mimic, so female lyrebirds may get an idea of a male's quality by assessing how accurate he is.
"Lyrebirds aren't born good mimics. Young male lyrebirds are really bad mimics and they are hopeless at imitating grey strike-thrush songs. They improve as they get older, but that takes years and years of practice."

Bibliographic information: Dalziell A.H., Magrath R.D. 2012. Fooling the experts: accurate vocal mimicry in the song of the superb lyrebird, *Menura*

novaehollandiae. *Animal Behaviour* 83, issue 6, 1401–1410; doi: 10.1016/j.anbehav.2012.03.009
http://www.sci-news.com/biology/article00409.html - ultimo acesso a 25 de agosto de 2016

OBSERVAÇÃO VISUAL (vídeo)

https://vimeo.com/68049623 - ultimo acesso a 25 de agosto de 2016

REFERÊNCIAS BIBLIOGRÁFICAS

Dalziell, A., Peters, R., Cockburn, A. et al. (2013). Dance Choreography Is Coordinated with Song Repertoire in a Complex Avian Display. Current Biology 23, 1132–1135, June 17, 2013 ª2013 Elsevier Ltd All rights reserved http://dx.doi.org/10.1016/j.cub.2013.05.018

http://www.sci-news.com/biology/article00409.html - ultimo acesso a 25 de agosto de 2016

http://www.bbc.com/earth/story/20150504-the-ten-sexiest-male-birds - ultimo acesso a 25 de agosto de 2016

FONTE: http://www.sci-news.com/biology/article01145-superb-lyrebird-dance.html - ultimo acesso a 25 de agosto de 2016

http://www.iucnredlist.org/details/22703605/0 - ultimo acesso no dia 26 de Agosto de 2016

AVE-DO-PARAÍSO – DANCE BIRDS

(Parotia lawesii)
As fêmeas das aves do paraíso são geralmente "monótonas" cromaticamente (castanhas...), são os machos que teem diferentes tipos de plumagem e cores o que faz a diferença entre espécies, embora pertencendo todos às família das aves-do-paraiso.(minuto 10:29s a 10:45s)
Existem 39 especies de aves do paraíso (11:02s)

David Attenboroughs Paradise Birds | Season 1 Episode 1 | Full Episode - https://www.youtube.com/watch?v=LL30QtTSz9U
Publicado a 29/01/2015
Season 1, Episode 1
David Attenborough learns about the remarkable story of how 'birds from paradise' have captivated explorers, naturalists, artists, filmmakers and royalty throughout the years.

TIPO DE AGENTE

Voador

ZONAS GEOGRÁFICAS

Australasia
Central Range montane rain forests
Southeastern Papuan rain forests
http://eol.org/pages/1051882/overview - acedido em 30 julho 2016

QUEM TOMA INICIATIVA (M | F)

Masculino – Male advertisement calls were frequently heard during observation sessions and of those recorded, 24 were suitable for analysis. The most common call is a single loud raspy squawk that sounds like a nasal ''nyaack '' from a distance, especially when repeated multiple times. At close range, the sound is a more defined throaty ''yaack ''. (pág. 264)
...
In addition to advertisement calls, males give a diversity of softer sounds around display courts when
females are around, but sometimes also give them when alone. These sounds were variable and infrequent and therefore were not often recorded. One of these sounds was a soft clucking chatter comprised of a rolling twonote sequence (Fig. 2 c). (pág. 264)
Scholes, E. (2007). Structure and composition of the courtship phenotype in the bird of paradise *Parotia lawesii* (Aves: Paradisaeidae)

Masculino – Animal mating ritual of the exotic greater bird of paradise - David Attenborough - BBC wildlife - https://www.youtube.com/watch?v=DUDf599PQJ8 (minuto 1:06s)

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Rápido - Através de observação de vídeo - https://www.youtube.com/watch?v=2sn3wzN8sm4

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Ritualizados - Através de observação de vídeo - https://www.youtube.com/watch?v=2sn3wzN8sm4 (23s aos 1:18s)
Enganadores (pág. 265)
False court clearing (VIDEO_45936)
This behavior pattern is hypothesized to be displacement behavior (Fig. 3) because it appears similar in form to court clearing, but takes place in the presence of females prior to the courtship display sequence. The male lowers his head to the ground as if pecking to remove minute debris, but the bill usually does not touch the surface and nothing is actually moved or cleared from the court.
False preening (VIDEO_45937)
Like the previous behavior, this action is considered to be a displacement behavior (Fig. 3) because of the context in which it occurs (i.e., in the presence of a female). It involves a preen-like motion in which the male appears to be pecking at feathers along the breast, flanks, or under the wing but the bill does not touch the feathers.
Materiais (pág. 265)
Court object gathering (Fig. 4 a; VIDEO_45940)
This behavior is hypothesized to be a mate-sampling behavior (Fig. 3). Females pick up objects placed on the court floor by the male, hold them in the bill, and carry them away.
Scholes, E. (2007). Structure and composition of the courtship phenotype in the bird of paradise *Parotia lawesii* (Aves: Paradisaeidae)
"limpam" o chão, deitam bagas para embelezar e esfregam ramos com restos de pele de cobra - https://www.youtube.com/watch?v=iTmHtxJpEWE

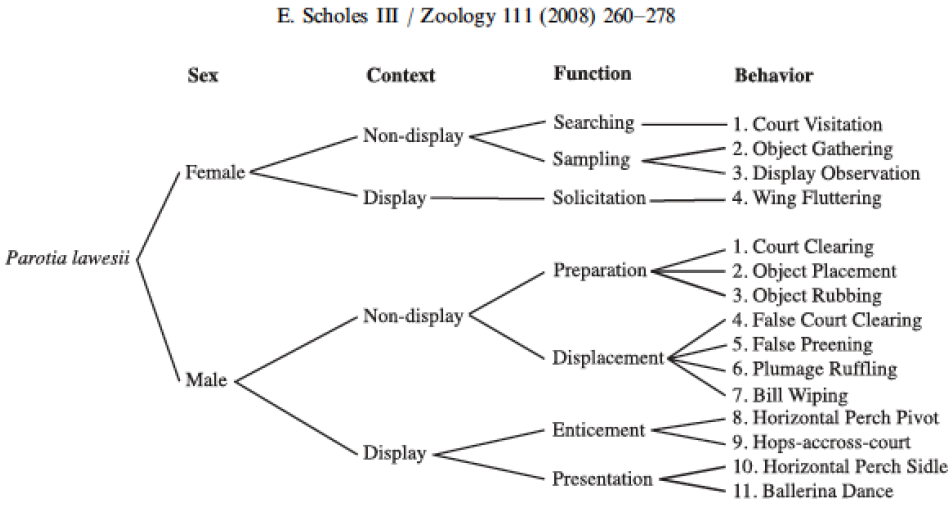

Fig. 3. Schematic diagram depicting the higher-level organizational structure for the courtship and mating behaviors described in this study. The 'tip' nodes on the right side of the diagram are specific examples of the nodes to the left to which they are connected by a line. At the far left is the 'root' node representing the most inclusive class, which is the species being described. Sub-class ''sex''
divides behaviors by those exhibited by males and females. Sub-class ''context'' designates whether a behavior is used as a display or not. Items in class ''function'' are simply putative hypotheses intended to clarify phenotype organization (see text for details). Subclass ''behavior'' describes the most inclusive named ethological units described in the study. The sequence of occurrence for behaviors reads from top to bottom. (P. 265)
Scholes, E. (2007). Structure and composition of the courtship phenotype in the bird of paradise *Parotia lawesii* (Aves: Paradisaeidae)

Dancing - dá saltinhos num galho – (minuto 1:23s)

Quando fica mais excitado começa a levantar uma espécie de "antenas/penas" - (minuto 1:44s)
Abana-se num galho com as antenas – (2:27s)
Animal mating ritual of the exotic greater bird of paradise - David Attenborough - BBC wildlife -
https://www.youtube.com/watch?v=DUDf599PQJ8

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tato | olfato)

Visão - Ballerina dance (Figs. 13–15; VIDEO_45931–45933)
The ballerina dance is considered to be a presentation display (Fig. 3) because it is directed toward females observing at close range from the main court perch and because of its complexity and focal emphasis on plumage ornamentation. During the display, the male erects the flank plumes around the body – resembling a ballerina's tutu – while performing an intricate dance. The display has one version (stationary waggle; Fig. 7 ; see additional comments below), five phases (stand, bow, walk, pause, and waggle; Fig. 7), and 24 elements. (pág. 267)
Scholes, E. (2007). Structure and composition of the courtship phenotype in the bird of paradise *Parotia lawesii* (Aves: Paradisaeidae)

Audição – Male advertisement calls were frequently heard during observation sessions and of those recorded, 24 were suitable for analysis. The most common call is a single loud raspy squawk that sounds like a nasal ''nyaack '' from a distance, especially when repeated multiple times. At close range, the sound is a more defined throaty ''yaack ''. (pág. 264)

Scholes, E. (2007). Structure and composition of the courtship phenotype in the bird of paradise *Parotia lawesii* (Aves: Paradisaeidae)

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Scholes, E. (2007). Structure and composition of the courtship phenotype in the bird of paradise *Parotia lawesii* (Aves: Paradisaeidae)

Tato - Court object gathering (Fig. 4 a; VIDEO_45940)
This behavior is hypothesized to be a mate-sampling behavior (Fig. 3). Females pick up objects placed on the court floor by the male, hold them in the bill, and carry them away.
Scholes, E. (2007). Structure and composition of the courtship phenotype in the bird of paradise *Parotia lawesii* (Aves: Paradisaeidae)

"limpam" o chão, deitam bagas para embelezar e esfregam ramos com restos de pele de cobra - https://www.youtube.com/watch?v=iTmHtxJpEWE

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade etc.)
Amabilidade + Cortesia – Limpa os galhos das árvores e o seu local - Bird Of Paradise Makes An Unforgettable First Impression - Animal Attraction – BBC - https://www.youtube.com/watch?v=iTmHtxJpEWE (23s)
Dinâmica - Ballerina dance (Figs. 13–15; VIDEO_45931–45933)
The ballerina dance is considered to be a presentation display (Fig. 3) because it is directed toward females observing at close range from the main court perch and because of its complexity and focal emphasis on plumage ornamentation. (pág. 267)
Exibição - During the display, the male erects the flank plumes around the body – resembling a ballerina's tutu – while performing an intricate dance. The display has one version (stationary waggle; Fig. 7 ; see additional comments below), five phases (stand, bow, walk, pause, and waggle; Fig. 7), and 24 elements. (pág. 267)
Scholes, E. (2007). Structure and composition of the courtship phenotype in the bird of paradise *Parotia lawesii* (Aves: Paradisaeidae)

RESUMO DESCRITIVO

É entre as asves e os peixes que encontramos os melhores dançarinos do Reino Animal. Como num espectaculo de bailado, a graciosidade dos mmovimentos e a eminência das cores estão muitas vezes associadas. A ave-do-paraíso é um candidato sério à eleição do melhor sedutor por via do espectaculo. Esta ave conjuga a melhor "vestimenta/roupagem/ com uma soberba coreografia - abrindo as caudas e asas coloridas esvoaçam continuamente entre árvores, rodam acrobaticamente sobre os ramos, e contorcionam a cabeça sobre o dorso. (p. 29)
Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.

During courtship, they perform hula-like dances and spread out their "skirt" on a patch of forest floor they have meticulously cleaned of dead leaves and

other debris. The "hula dances" usually consist of the male hopping from foot and bobbing their heads from side to side!
https://www.beautyofbirds.com/parotia.html - ultimo acesso a 3 setembro de 2016

Court visitation (VIDEO_45938)
Court visitation includes several behavior patterns hypothesized to be associated with mate searching
(Fig. 3). Females move among perches above the court (including the main court perch) and seem to inspect the court. They also hop along on the court floor to search for court objects (see next). This behavior happens both in the presence of the male and when he is absent.
Court object gathering (Fig. 4 a; VIDEO_45940)
This behavior is hypothesized to be a mate-sampling behavior (Fig. 3). Females pick up objects placed on the court floor by the male, hold them in the bill, and carry them away.
Display observation (Fig. 4 b; VIDEO_45939)
This behavior pattern is hypothesized to be a mate sampling behavior (Fig. 3). Females move along a perchwhile intently observing the male displaying on the ground below. Place – horizontal perch. Posture – body horizontal (Fig. 4b). Action patterns – 1801 hop-turns to reverse direction (sometimes two consecutive ones for a 3601 total rotation); lean forward over perch; lower head and peer beneath perch; tilt head side-to-side; erect feathers behind eyes (Fig. 4b). Spatial movement – lateral movement back and forth along perch.
Wing fluttering (Fig. 4 c; VIDEO_45941)
Wing fluttering typically precedes male mounting and is considered to be a solicitation display used by females to signal intent to copulate (Fig. 3). During bouts of intense observation of a displaying male, females open their wings slightly and flutter the primaries. Place – horizontal perch above or adjacent to displaying male. Posture – body horizontal; wings partially open (Fig. 4c). Action patterns – wings fluttered (primaries expanded and shut); erect feathers behind eyes.
Male courtship and mating behavior
The relational structures of behaviors relative to each other and of their sub-components are depicted in Fig. 3 (lower-level organizational structure). A total of 11 behaviors are described. Of these, seven are non-display behaviors and four are displays.
Court clearing (VIDEO_45935)
This behavior pattern is a non-display preparation behavior (Fig. 3) that usually takes place when the male is alone on his court. It involves a range of actions in which leaves, leaf litter, and other forest debris are removed from the court floor. The most common action involves lowering the head to the court floor from an upright standing posture, picking up a leaf in the bill and throwing it off the court with a sudden toss of the head. Court clearing also includes the pruning or striping of leaves from overhanging branches and saplings. (pág. 264)
Object placement (Fig. 8 ; VIDEO_45948)
Like court clearing, this behavior pattern takes places when the male is alone on his court in preparation for courtship (Fig. 3). The male carries certain objects (e.g.,mammal fur, snakeskin, and mammal dung) to the court in the bill (Fig. 8a) and places them on the court floor (Fig. 8b). Large objects are often torn apart (Fig. 8c) and sometimes hung from the main court perch. After placement, these objects are not removed during subsequent bouts of court clearing.
Object rubbing (Fig. 8 ; VIDEO_45949)
This behavior pattern is a preparation activity (Fig. 3) that is closely associated with object placement (above). Males take bits of snake skin, mammal fur, or small clods of dung, hold them in the bill and rub them back and forth along a court perch (Fig. 8d).

False court clearing (VIDEO_45936)
This behavior pattern is hypothesized to be displacement behavior (Fig. 3) because it appears similar in form to court clearing, but takes place in the presence of females prior to the courtship display sequence. The male lowers his head to the ground as if pecking to remove minute debris, but the bill usually does not touch the surface and nothing is actually moved or cleared from the court.
False preening (VIDEO_45937)
Like the previous behavior, this action is considered to be a displacement behavior (Fig. 3) because of the context in which it occurs (i.e., in the presence of a female). It involves a preen-like motion in which the male appears to be pecking at feathers along the breast, flanks, or under the wing but the bill does not touch the feathers.
Plumage ruffling
This behavior pattern is considered to be a displacement behavior (Fig. 3) because it occurs in the presence of females. It involves ptilo-erection of the contour feathers of the torso. Feathers are puffed and lifted away from the skin with a conspicuous ruffling motion.
Bill wiping (VIDEO_45934)
Bill wiping is another displacement behavior (Fig. 3) because it occurs in the presence of a female in the context of display rather than after eating. The action consists of a stereotyped motion, in which the bill is wiped back and forth in rapid succession along the perch or against the stems of saplings growing within thecourt.
Horizontal perch pivot (Fig. 9 ; VIDEO_45944, 45945)
This behavior pattern is hypothesized to be an enticement display (Fig. 3) used to lure females down
onto the court from the canopy above. Males perform this display just prior to the arrival of a female. It involves a subtle side-to-side (i.e., left and right) movement of the upper body from a horizontal perch while wings are repeatedly flicked open to the sides and shut while the tail is simultaneously lowered and fanned (Fig. 9). There are a total of nine elements (Fig. 5 a). Place – from a horizontal perch (Fig. 9). Posture – body horizontal, wings closed, tail in line with body (Fig. 9 a and b). Action patterns – rapidly flick wings (Fig. 9 c), lower and fan tail with each wing-flick (Fig. 9 c), turn head and upper body from side-to-side (Fig. 9 a and b), hops to the side or 1801 hop-turn to face opposite
(Fig. 9 b–d), leap from perch (to ground or off court entirely). Spatial movement – lateral movement along perch. Other action patterns – wipe bill (arrow Fig. 9 e), ruffle plumage, false (wing) preen. The basic action pattern also takes place simultaneously by multiple males when they gather on one court for group displays (Fig. 9 e and f). (pág. 265)
Hops-across-court (Fig. 10; VIDEO_45942, 45943)
This behavior is hypothesized to be an enticement display (Fig. 3) since it takes place early in the display shut while the tail is simultaneously lowered and fanned (Fig. 9). There are a total of nine elements (Fig. 5 a). Place – from a horizontal perch (Fig. 9). Posture – body horizontal, wings closed, tail in line with body (Fig. 9 a and b). Action patterns – rapidly flick wings (Fig. 9 c), lower and fan tail with each wing-flick (Fig. 9 c), turn head and upper body from side-to-side (Fig. 9 a and b), hops to the side or 1801 hop-turn to face opposite (Fig. 9 b–d), leap from perch (to ground or off court entirely). Spatial movement – lateral movement along perch. Other action patterns – wipe bill (arrow Fig. 9 e),
ruffle plumage, false (wing) preen. The basic action pattern also takes place simultaneously by multiple males when they gather on one court for group displays (Fig. 9 e and f).
Hops-across-court (Fig. 10; VIDEO_45942, 45943)
This behavior is hypothesized to be an enticement display (Fig. 3) since it takes place early in the display sequence and appears to serve as a way for the male to get females to stay on the main court perch where the more

elaborate displays take place. The behavior involves repeated hops, or short flights, across the court and back (Fig. 10). There are two versions (hops and charges) with a total of 13 elements (Fig. 5 b). Place – onmthe court floor, begins from the edge of court whilemfacing main court perch (Fig. 10 a). Posture – bodynupright (Fig. 10 a). Action patterns – stand phasen(Fig. 10 a): stand in one place, false court clear, rufflen plumage, false wing preen, shake upper body; hop phase (Fig. 10 b–g): upright hops forward, slight wing-flicks, 1801 hop-turns to reverse direction, leap from the court to the main court perch or off the court; charge phase (charge version only): charging flight to a perch (usually to chase a female visitor). As with the horizontal perch pivot display, this display also takes place in groups with multiple males hopping back and forth simultaneously on one court (Fig. 10 h).

Horizontal perch sidle (Figs. 11 and 12; VIDEO_45946, 45947)

This behavior pattern is considered to be a presentation display (Fig. 3) because it is directed toward females observing at close range from the main court perch and because it precedes copulation. In the display, the male approaches and sidles up next to a perched female. The action pattern has 23 elements sub-divided into four phases (i.e., temporal stages): stand, lunge hop, billpoint sidle, and mate phases (Fig. 6). Place – stand and lunge-hop phases: court floor facing main court perch; bill-point sidle and mate phases: horizontal perch adjacent to female(s). Posture – stand phase: body upright (Fig. 11 a); hop phase: body horizontal (Fig. 11 b–f); sidle phase: upright and horizontal
(Fig. 12 a). Action patterns – stand phase: stand-in-place, turn head from side-to-side (Fig. 11 a), steps-in-place, false court clear, ruffle plumage and shake upper body; hop phase: lean forward, sleek plumage, bill-point lunge-hop forward (Fig. 11 b–f), leap to perch; sidle phase: turn to face female, wipe bill on perch, approach female, bill-point lunge, hop in place or slightly to side, flick wings over back and lower and fan tail, lean into female (Fig. 12 a–f), tilt head toward female; mate phase:
hop over/onto female, bite nape; copulate. Spatial movement – hop phase: movement across court in one direction until up on horizontal perch; sidle phase: lateral movement along perch to approach female. Other action patterns – false court clear; ruffle plumage; false preen; bill wipe. (pág. 266)

Ballerina dance (Figs. 13–15; VIDEO_45931–45933)

The ballerina dance is considered to be a presentation display (Fig. 3) because it is directed toward females observing at close range from the main court perch and because of its complexity and focal emphasis on plumage ornamentation. During the display, the male erects the flank plumes around the body – resembling a ballerina's tutu – while performing an intricate dance. The display has one version (stationary waggle; Fig. 7 ; see additional comments below), five phases (stand, bow, walk, pause, and waggle; Fig. 7), and 24 elements. Place – stand and bow phases: court floor facing main court perch (Fig. 13 a); walk, pause and waggle phases: beneath main court perch (Figs. 14 and 15). Posture – body upright all versions and phases. Action patterns – stand phase: stand-in-place, turn head from side-to-side (Fig. 13 a), step in place, false court clear, ruffle plumage,shake upper body, false (wing) preen; bow phase: lower head to ground (Fig. 13 b), move forehead tufts over bill
(Fig. 13 b), tuck head (Fig. 13 c), rise up (Fig. 13 d), move head wires in front of head (Fig. 13 e), form 'skirt' from flank plumes (Fig. 13 e and f); walk phase: shake head from side-to-side, walk forward (Fig. 14 a), change orientation (either 901 or 1801 turn (Fig. 14 b–d), walk forward and backward (Fig. 14 d and e); pause phase: stop/stand-in-place (Fig. 14 e), crouch slightly (Fig. 14 f), slowly lift body up (Fig. 14 g), move head wires to the sides and back; waggle phase: plunge head into body (Fig. 15 a and b), waggle head and neck (Fig. 15 c–f), squat and rise, relax flank plumes and leap from court. Spatial movement – walk phase: walk to beneath main

court perch, rotate 901 or 1801 to face origin. Other
action patterns – false court clear; ruffle plumage; plumage ornamentation. During the display, the male erects the flank plumes around the body – resembling a ballerina's tutu – while performing an intricate dance. The display has one version (stationary waggle; Fig. 7 ; see additional comments below), five phases (stand, bow, walk, pause, and waggle; Fig. 7), and 24 elements. Place – stand and bow phases: court floor facing main court perch (Fig. 13 a); walk, pause and waggle phases: beneath main court perch (Figs. 14 and 15). Posture – body upright all versions and phases. Action patterns –
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ballerina dance (Scholes 2006, 2008a). This could be due to sampling error, but videos of courtship displays from two additional populations show no evidence of versions (Stephen Pruett-Jones and Jeff Wilson of the BBC Natural History Unit, unpublished video). Observations of P. helenae , often treated as a subspecies of P. lawesii (Frith and Beehler 1998), also revealed no evidence of ballerina dance versions (Scholes, unpublished data). (pág. 267)
Scholes, E. (2007). Structure and composition of the courtship phenotype in the bird of paradise *Parotia lawesii* (Aves: Paradisaeidae)

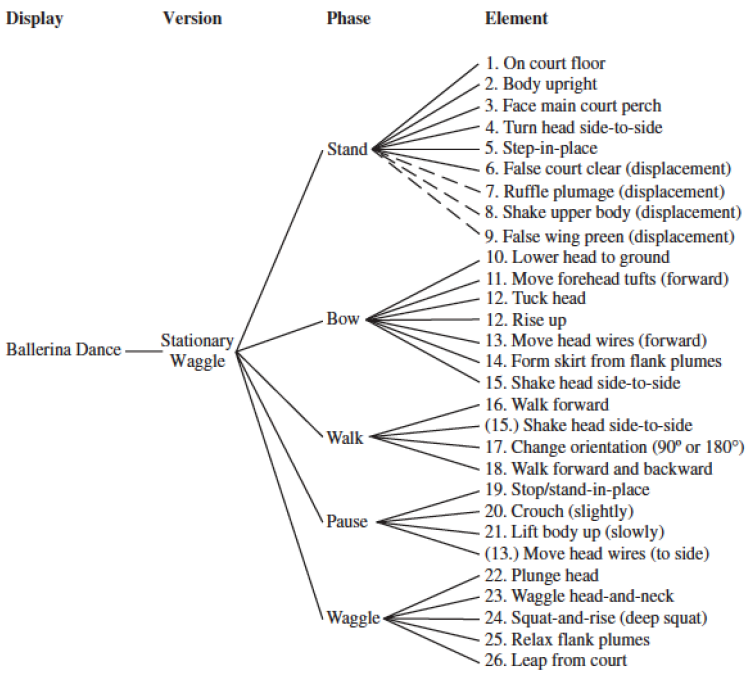

Fig. 7. Schematic diagram depicting the lower-level structure of the ballerina dance display. The 'root' node on the far left under the

sub-class heading ''behavior'' corresponds to the terminal 'tip' node of the same name in Fig. 3. The general sequence of events reads.
from top to bottom. Dashed lines indicate components with some irregularity.

OBSERVAÇÃO VISUAL (VÍDEO)

1 - David Attenboroughs Paradise Birds | Season 1 Episode 1 | Full Episode (56m22s)- https://www.youtube.com/watch?v=LL30QtTSz9U
Publicado a 29/01/2015
Season 1, Episode 1
David Attenborough learns about the remarkable story of how 'birds from paradise' have captivated explorers, naturalists, artists, filmmakers and royalty throughout the years.

2 - Animal mating ritual of the exotic greater bird of paradise - David Attenborough - BBC wildlife - https://www.youtube.com/watch?v=DUDf599PQJ8
Carregado a 09/02/2007
David Attenborough looks at the splendour of the King of Saxony greater bird of paradise. From the BBC.

3 - VIDEO QUE CORRESPONDE EXATAMENTE À ESPÉCIE ANALISADA NO ARTIGO - Bird Of Paradise Makes An Unforgettable First Impression - Animal Attraction – BBC - https://www.youtube.com/watch?v=iTmHtxJpEWE
Publicado a 30/12/2015
In the tropical forests of New Guinea, one male is dedicated to making an unforgettable first impression. Taken from Animal Attraction.

4 – O MELHOR!!!!! Onde se vê também pela perspetiva da fêmea - Através de observação de vídeo - https://www.youtube.com/watch?v=2sn3wzN8sm4
Publicado a 08/02/2013
Explore more at http://www.birdsofparadiseproject.org
At first, the parotias seem to do a different kind of shape shifting from other birds-of-paradise. They fan their feathers into a kind of skirt and then stutter-step around their court in a display called a "ballerina dance." But a new camera angle reveals that the display looks entirely different to the females who are judging from above.
Filmed and photographed by Tim Laman, Ed Scholes, Eric Liner and Rob Lyall.

REFERÊNCIAS BIBLIOGRÁFICAS

Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.
Scholes, E. (2007). Structure and composition of the courtship phenotype in the bird of paradise *Parotia lawesii* (Aves: Paradisaeidae)

http://www.birdsofparadiseproject.org/content.php?page=97 - último acesso a 3 de setembro de 2016

AVES DO PARAÍSO? – PÁSSARO JARDINEIRO | PÁSSARO-CETIM|SATIN-AZUL|SATIN-BOWERBIRD

(*Ptilonorhynchus violaceus*)
bowerbird em Inglês e em Português são conhecidos por pássaro-cetim ou satin-azul.

TIPO DE AGENTE

Voador

ZONAS GEOGRÁFICAS

Austrália - This spectacular courtship ritual during the November and December mating season has long attracted ornithologists to the species formally known as satin bowerbirds, native to Australia. (p.1)
Among Bowerbirds, Mimicry Wins Mates, Study Says
Bijal P. Trivedi
National Geographic Today
September 22, 2003
http://news.nationalgeographic.com/news/2003/09/0922_030922_bowerbirds.html - ACEDIDO EM 5 JULHO 2016

QUEM TOMA INICIATIVA (M | F)

Masculino - Male bowerbirds famously woo females by fashioning elaborate bowers —not nests but Ushaped showplaces with parallel walls of twigs. There the males prance and noisily serenade the females. (p.1)
Among Bowerbirds, Mimicry Wins Mates, Study Says
Bijal P. Trivedi
National Geographic Today
September 22, 2003
http://news.nationalgeographic.com/news/2003/09/0922_030922_bowerbirds.html - ACEDIDO EM 5 JULHO 2016

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Curto - <h -

Dear Pedro,
Apologies for my slow answer; I've been travelling this summer. Typically female mate searching involves 2 bouts of courtships (described in Uy et al 2001). First there are short courtships (~2+ minutes) with a few males, then females take a break during which they may build their nests, then there is a second round of courtships with the top-choice males, which are usually longer (~10 minutes). A later study by Coleman et al. (2004) found that females often visit briefly while males are absent and then preferentially return for courtship by males with nice bowers and nice decorations. So it's like a job search. Females start by checking the resume, then they do short interviews with the best applicants, then they call back the top few for extended interviews. It's pretty cool! My own PhD research addresses the details of how males and females interact during courtship. I used robotic females to show that successful males respond to subtle female behaviors by adjusting their courtship behaviors.
I have attached a bunch of papers that deal with satin bowerbird courtship.
Hope this helps!
-Gail
email de dia 25 de Agosto de 2016 do Professor Gail Patricelli (Departament of Evolution and Ecology – University of California)

No dia 25/08/2016, às 02:47, Gail L. Patricelli <GPatricelli@ucdavis.edu> escreveu:

Dear Pedro,
Apologies for my slow answer; I've been travelling this summer. Typically female mate searching involves 2 bouts of courtships (described in Uy et al 2001). First there are short courtships (~2+ minutes) with a few males, then females take a break during which they may build their nests, then there is a second round of courtships with the top-choice males, which are usually longer (~10 minutes). A later study by Coleman et al. (2004) found that females often visit briefly while males are absent and then preferentially return for courtship by males with nice bowers and nice decorations. So it's like a job search. Females start by checking the resume, then they do short interviews with the best applicants, then they call back the top few for extended interviews. It's pretty cool! My own PhD research addresses the details of how males and females interact during courtship. I used robotic females to show that successful males respond to subtle female behaviors by adjusting their courtship behaviors.
I have attached a bunch of papers that deal with satin bowerbird courtship.
Hope this helps!
-Gail

Gail L. Patricelli
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INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Materiais + Ritualizados - When a female enters a bower, the male ruffles his feathers, stretches his wings and makes loud buzzing sounds as he struts and runs about. Meanwhile the female also is apparently checking out his architectural talent—the bower's symmetry and decoration (females are partial to anything blue like a feather, a bottle cap or a shell).
Among Bowerbirds, Mimicry Wins Mates, Study Says
Bijal P. Trivedi
National Geographic Today
September 22, 2003
http://news.nationalgeographic.com/news/2003/09/0922_030922_bowerbirds.html - ACEDIDO EM 5 JULHO 2016

Materiais - Male bowerbirds are famous for their courtship rituals. They carefully decorate their bowers—Ushaped platforms built from twigs and grass—with strictly blue objects like berries and flowers, and even bottle caps and string, to attract prospective mates.
Bowerbirds Dance, Decorate to Suit Females' Changing Tastes
Bijal P. Trivedi
for National Geographic News
April 14, 2004
http://news.nationalgeographic.com/news/2004/04/0414_040414_bowerbirdsmating_2.html - ACEDIDO EM 5 JULHO 2016

Materiais - Blue objects are rare in the bowerbird environment, and a male whose bower is adorned with many is deemed superior, because it proves he is able to acquire and retain these items in the face of competition from other males.
Bowerbirds Dance, Decorate to Suit Females' Changing Tastes
Bijal P. Trivedi
for National Geographic News
April 14, 2004
http://news.nationalgeographic.com/news/2004/04/0414_040414_bowerbirdsmating_2.html - ACEDIDO EM 5 JULHO 2016

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)

Audição - male satin bowerbirds mimic the calls of other bird species to attract a mate. (p.1)
Once the males have built their bowers, they perch in them, squawk and whistle. (p. 1)
Among Bowerbirds, Mimicry Wins Mates, Study Says
Bijal P. Trivedi
National Geographic Today

September 22, 2003
http://news.nationalgeographic.com/news/2003/09/0922_030922_bowerbirds.html - ACEDIDO EM 5 JULHO 2016

Audição - After the male's raucous vocalizations, he makes a more intimate appeal, coming almost beak to beak with the female and softly mimicking five other Australian birds: the kookaburra, the Lewin's honeyeater, the sulfurcrested cockatoo, a Torresian crow and a yellow tailed black cockatoo. If the mimicry impresses the female, mating proceeds apace. Otherwise she flies to the next bower.
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Bijal P. Trivedi
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September 22, 2003
http://news.nationalgeographic.com/news/2003/09/0922_030922_bowerbirds.html - ACEDIDO EM 5 JULHO 2016

Visão - When a female enters a bower, the male ruffles his feathers, stretches his wings and makes loud buzzing sounds as he struts and runs about. Meanwhile the female also is apparently checking out his architectural talent—the bower's symmetry and decoration (females are partial to anything blue like a feather, a bottle cap or a shell).
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http://news.nationalgeographic.com/news/2003/09/0922_030922_bowerbirds.html - ACEDIDO EM 5 JULHO 2016

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção ou decoração?, dinâmica, cantar, dançar, persistência, sincronização, carinhos, exibição, vigilância, adaptação, reciprocidade, imitação, etc.)

Exibição - When a female enters a bower, the male ruffles his feathers, stretches his wings and makes loud buzzing sounds as he struts and runs about.
Among Bowerbirds, Mimicry Wins Mates, Study Says
Bijal P. Trivedi
National Geographic Today
September 22, 2003
http://news.nationalgeographic.com/news/2003/09/0922_030922_bowerbirds.html - ACEDIDO EM 5 JULHO 2016

Construção ou Decoração + Cortesia - Meanwhile the female also is apparently checking out his architectural talent—the bower's symmetry and decoration (females are partial to anything blue like a feather, a bottle cap or a shell).
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Bijal P. Trivedi
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September 22, 2003
http://news.nationalgeographic.com/news/2003/09/0922_030922_bowerbirds.html - ACEDIDO EM 5 JULHO 2016

Adaptação – Studies by a scientist at the University of Maryland show that male bowerbirds modify their courtship rituals based on the females body language.

Female Body Language No Enigma to Male Bowerbirds, Study Finds
Bijal P. Trivedi
National Geographic Today
January 16, 2002
http://news.nationalgeographic.com/news/2002/01/0116_020116bowerbirds2.html - ACEDIDO EM 5 JULHO 2016

Adaptação – But sometimes these macho displays are overly aggressive, resembling rough
Male-to-male encounters. This can frighten the females and abruptly end the courtship. So the males must interpret the females' body language to determine just how far to go.
Female Body Language No Enigma to Male Bowerbirds, Study Finds
Bijal P. Trivedi
National Geographic Today
January 16, 2002
http://news.nationalgeographic.com/news/2002/01/0116_020116bowerbirds2.html - ACEDIDO EM 5 JULHO 2016

Construção ou Decoração - The first step in the mate search involves visiting a bower while the male is absent. Males with poorly constructed or asymmetric bowers or a haphazard arrangement of blue
items are generally less successful at this stage.
Bowerbirds Dance, Decorate to Suit Females' Changing Tastes
Bijal P. Trivedi
for National Geographic News
April 14, 2004
http://news.nationalgeographic.com/news/2004/04/0414_040414_bowerbirdsmating_2.html - ACEDIDO EM 5 JULHO 2016

Exibição - When a female pays a visit, she crouches in the bower and lets the male strut his stuff. He embarks on a frenetic physical display dubbed the buzzwingflip—an elaborate dance during which he fluffs up his feathers, produces buzzing vocalizations, and runs back and forth. The male performs this maniacal dance four times. Once he's finished, the female is off to the next bower, reserving judgment until she's sampled more performances.
Bowerbirds Dance, Decorate to Suit Females' Changing Tastes
Bijal P. Trivedi
for National Geographic News
April 14, 2004
http://news.nationalgeographic.com/news/2004/04/0414_040414_bowerbirdsmating_2.html - ACEDIDO EM 5 JULHO 2016

Imitação – "This suggests that mimicry is pretty important in the final decision of
Mate choice¨ Coleman says. He described his results at the
Conference on Acoustic Communication by Animals¨ hosted by the
University of Maryland in July.
Among Bowerbirds, Mimicry Wins Mates, Study Says
Bijal P. Trivedi
National Geographic Today
September 22, 2003
http://news.nationalgeographic.com/news/2003/09/0922_030922_bowerbirds.html - ACEDIDO EM 5 JULHO 2016

Imitação – The research shows that the best mimics with the broadest

repertoire were most successful at wooing the females. The top males mimicked four or five species with accuracy and mated with 25 different females in one season, according to Coleman.
A poor mimic could only imitate the vocalizations of one or two species.
Among Bowerbirds, Mimicry Wins Mates, Study Says
Bijal P. Trivedi
National Geographic Today
September 22, 2003
http://news.nationalgeographic.com/news/2003/09/0922_030922_bowerbirds.html - ACEDIDO EM 5 JULHO 2016

RESUMO DESCRITIVO

Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.
Pág. 34
O grande campeão do uso de objetos para garantir a amizade dos elementos do sexo oposto é mais uma vez uma ave que pertence a uma família que vive lá para os lados da Oceânia e que ganhou o nome de bowerbird em Inglês e em Português são conhecidos por pássaro-cetim ou satin-azul (*Ptilonorhynchus violaceus*). … constroem autênticos monumentos às namoradas – pirâmides, paliçadas, avenidas, cabanas e mais uma serie de construções feitas com ramos, folhas e musgo unicamente destinadas a serem visitadas pela pretendente (não tem nada a ver com o ninho que será mais tarde construído pelas fêmeas). Mas há mais: pintam as suas criações com carvão ou frutos misturados com saliva, usando um pedaço de casca de árvore, dispõem à entrada e ao longo das suas obras os mais diversos objetos que apenas têm de cumprir uma regra: ser vistosos e coloridos. Antes da intromissão dos humanos os objetos usados restringiam-se a flores, conchas, insetos e pedras brilhantes, mas hoje em dia incluem plásticos, vidros, fios, caricas e tudo o que estiver à mão… ou, mais propriamente, ao bico. Autenticas joias aos olhos da senhora *Ptilonorhynchus*.
Quando a fêmea visita o monumento, o arquiteto segue-a exibindo os seus presentes e pavoneando-se orgulhoso. Alguns estudos indicam que as fêmeas mais novas deixam-se convencer pelos presentes, mas que as damas mais experientes preferem os machos com mais jeito para a dança e o canto… o que não quer dizer que recusem os presentes. Alguns estudos efetuados com satins-azuis mostram que há uma série de atributos que se ligam à capacidade de decorar o espaço e que se relacionam significativamente com a probabilidade de o macho ficar com uma boa fêmea. O primeiro é óbvio e tem a ver com a capacidade de encontrar os melhores itens na floresta. O atributo seguinte é que é menos recomendável – aparentemente os machos mais bem sucedidos, e, por isso, diríamos mais sedutores, são aqueles que conseguem roubar mais apetrechos das construções dos vizinhos ao mesmo tempo que são os melhores a proteger o seu próprio acervo. Provavelmente as fêmeas não procuram vilões que se especializam em cobiçar e recolher o que não é seu, mas sim os portadores dos genes que dão mais garantias de sobrevivência porque correspondem a uma maior capacidade de desenrascanço e de, sim, confesso que isto é um pouco antropomórfico, inteligência. Só que um outro estudo parece corroborar esta conclusão. Investigadores desde há muito sabem que os satins não gostam dos objetos encarnados, preferindo os azuis ou esverdeados. Numa tentativa de perceber aqueles que respondiam melhor a situações problemáticas introduziram-se peças encarnadas nas construções mas sob duas formas – tapadas por um jarro transparente ou pintadas em azulejos (estas ultimas impossíveis de remover). No fim do estudo concluiu-se que os machos que resolviam o dilema mais depressa – derrubando o jarro ou tapando o azulejo logo que percebiam que não o podiam retirar – eram os que ficavam com as melhores fêmeas. Como é que as fêmeas escolhiam?

Não se sabe, mas o que é certo é que têm olho para estas boas qualidades de chefe de família.

LEGENDA IMAGEM – O macho azul-satin prepara o arco-do-triunfo para a parada nupcial. No interior da construção uma coleção de objetos brilhantes ajuda a convencer as amadas mais relutantes.

<Construa e elas virão> decoram os ninhos... é a beleza que conquista o coração das fêmeas … a pilha de pedras exterior serve de palco para as actuações teatrais do macho quando ele atrai uma admiradora. O pássaro Jardineiro é um arquiteto da natureza por excelência! Constroi seus lares com o objetivo de seduzir as fêmeas. São verdadeiros artistas, interioristas, decoradores, excelentes nas suas construções e tudo por sexo! São capazes de burlar e roubar para conseguir o material mais surpreendente para as suas edificações e ter um momento de amor com sua parceira. Cada grupo tem o seu próprio estilo. Uns gostam de cores, outros decoram com esterco, outros com objetos de plástico, tampinhas de garrafas... um verdadeiro artista! Tudo faz parte do 'cortejar' sua parceira.
National Geographic - Julho 2010 - pág 34, 35, etc -
http://paulaconrado.blogspot.pt/2011/01/passaro-jardineiro.html -
http://www.youtube.com/watch?v=OJgfcOd1R7E&feature=related

successful males could interpret the females' body language and modify their courtship moves accordingly.
Among Bowerbirds, Mimicry Wins Mates, Study Says
Bijal P. Trivedi
National Geographic Today
September 22, 2003
http://news.nationalgeographic.com/news/2003/09/0922_030922_bowerbirds.html - ACEDIDO EM 5 JULHO 2016

A new study finds that a young, inexperienced, female bowerbird judges a male by the manner in which he decorates his bachelor pad. Once she's aged and mated a few times, this affinity for a swanky domicile fades, and she then relies on courtship routine—a vigorous song and dance—to select the most worthy suitor.
Bowerbirds Dance, Decorate to Suit Females' Changing Tastes
Bijal P. Trivedi
for National Geographic News
April 14, 2004
http://news.nationalgeographic.com/news/2004/04/0414_040414_bowerbirdsmating_2.html - ACEDIDO EM 5 JULHO 2016

The physical display is believed to be a more honest indicator of male quality. Blue ornaments can be stolen from another bower, but a buzzwingflip cannot be faked. "Only males in top physical condition are able to produce vigorous performances— something that sick or weak males can't do," Coleman said. Vigorous displays suggest a strong male with desirable genetic qualities.
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Bijal P. Trivedi
for National Geographic News
April 14, 2004
http://news.nationalgeographic.com/news/2004/04/0414_040414_bowerbirdsmating_2.html - ACEDIDO EM 5 JULHO 2016

Fortunately for the young female bowerbirds, good decorating skills correlate

with high energy—so both young and old females tend to mate with the same group of top males. For bowerbirds, males that can sing, dance, and decorate get the females. That's a combo that could work for humans as well.
Bowerbirds Dance, Decorate to Suit Females' Changing Tastes
Bijal P. Trivedi
for National Geographic News
April 14, 2004
http://news.nationalgeographic.com/news/2004/04/0414_040414_bowerbirdsmating_2.html - ACEDIDO EM 5 JULHO 2016

According to Gail Patricelli of the University of Maryland in College Park, male bowerbirds gauge the nature of their performance by studying the females' posture. Female bowerbirds indicate their level of interest in suitors by "crouching," or lowering their bodies and tilting forward toward a mating position. A fully crouched female also fluffs up her wings. A female that stands or barely crouches during a display signals alarm. This tells the male to tone down his antics. A female that begins to
crouch during a courting display signals some degree of tolerance—a sign that the male can intensify his display.
Female Body Language No Enigma to Male Bowerbirds, Study Finds
Bijal P. Trivedi
National Geographic Today
January 16, 2002
http://news.nationalgeographic.com/news/2002/01/0116_020116bowerbirds2.html - ACEDIDO EM 5 JULHO 2016

OBSERVAÇÃO VISUAL

Cornell LabofOrnithology -
https://www.youtube.com/watch?v=QkZQlaZUM38

BBC - https://www.youtube.com/watch?v=1XkPeN3AWIE

BBC – Attenborough - https://www.youtube.com/watch?v=GPbWJPsBPdA

http://video.nationalgeographic.com/video/bowerbirds-courtship
http://www.vidinfo.org/video/14454999/satin-bowerbird-part-1

https://www.youtube.com/watch?v=MZFzH3dWsbA

REFERÊNCIAS BIBLIOGRÁFICAS

Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.

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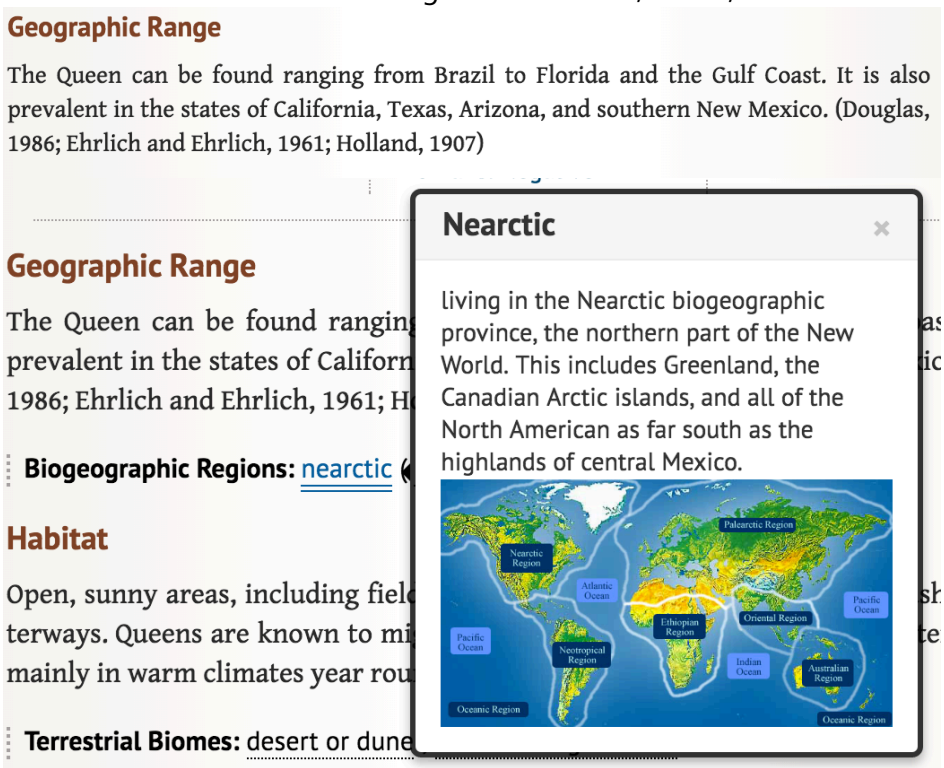
January 16, 2002
http://news.nationalgeographic.com/news/2002/01/0116_020116bowerbirds2.html - ACEDIDO EM 5 JULHO 2016

BORBOLETA
(*Danaus gilippus*)

TIPO DE AGENTE
Voador

ZONAS GEOGRÁFICAS
Do Brasil até florida e costa do golfo. California, Texas, Arizona e



http://animaldiversity.org/accounts/Danaus_gilippus/ - ultimo acesso a 24 de Agosto de 2016

HABITAT AND ACTIVITY. In the tropics, the queen uses open land, fields, meadows and occasional marshes. In the southern USA, it uses deserts (Moranz and Brower, 1998). Danaus gilippus is a diurnal species and flutters around dry and hot areas of low herbaceous vegetation. Low foliage areas are used as shelter by the queen during heavy showers but can be active again when the downpour subsides or during light rain showers. Females fly close to each other in search of oviposition sites which are usually located on short vegetation that they land on for brief periods (Myers, 1968).
https://sta.uwi.edu/fst/lifesciences/documents/Danaus_gilippus.pdf - ultimo acesso a 3 de setembro de 2016

QUEM TOMA INICIATIVA (M | F)

Masculino - To find females, males patrol all day. Females lay eggs singly on leaves, stems, and flower buds, which the larvae will eat. Adults roost communally. Males have pheromones, specific scents, which aid in mating and attract females. (Struttman 2000)
http://animaldiversity.org/accounts/Danaus_gilippus/ - ultimo acesso a 24 de Agosto de 2016

Masculino – Numa outra espécie de borboleta (*Danaus gilippus*) as feromonas dos machos cumprem uma outra missão – travar as fêmeas mais irrequietas. O galã, quando encontra uma femea disponível, persegue-a num voo nupcial complexo, …, a parceira vai adiando, e adiando, o consumar da relação. O galã impaciente liberta então uma substancia que imobiliza a noiva permitindo que a noite acabe bem.
Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.
Pág. 33

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Rápido – até 10m -
No dia 04/09/2016, às 17:23, Lincoln Brower <brower@sbc.edu> escreveu:
Dear Pedro,

You will find detailed answers to your questions in:

Brower, L. P., J. V. Z. Brower, and F. P. Cranston. 1965. Courtship behavior of the queen butterfly, Danaus gilippus berenice (Cramer). Zoologica **50**:1-39, 37 plates.

The short answer is less than 10 minutes.
Lincoln Brower

Research Professor – Sweet Briar College (Virginia, USA)

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Intimidatórios - The male chases the female and overtakes her from above. He brushes her antennae with his abdominal hairpencils, which disseminate scent, and induces the female to alight. The male continues to hover over the female, hairpencils still active, until the female becomes submissive. He alights alongside the female and copulation takes place.
http://animaldiversity.org/accounts/Danaus_gilippus/ - ultimo acesso a 24 de Agosto de 2016

Ritualizados - The queen can mate up to 15 times and as a result the males patrol in search for a female. When found, the courtship between the female and male must be followed rigidly. The female is chased by the male and he brushes her antennae with a scent to induce her to alight. Mating can last for more than an hour (New, 1991). The females will then fly close to the ground to find a host plant for egg deposition.
https://sta.uwi.edu/fst/lifesciences/documents/Danaus_gilippus.pdf - ultimo acesso a 3 de setembro de 2016

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)

Olfato - To find females, males patrol all day. Females lay eggs singly on leaves, stems, and flower buds, which the larvae will eat. Adults roost communally. Males have pheromones, specific scents, which aid in mating and attract females. (Struttman 2000)
http://animaldiversity.org/accounts/Danaus_gilippus/ - ultimo acesso a 24 de Agosto de 2016

Olfato - Numa outra espécie de borboleta (*Danaus gilippus*) as feromonas dos machos cumprem uma outra missão – travar as fêmeas mais irrequietas. O galã, quando encontra uma femea disponível, persegue-a num voo nupcial complexo, …, a parceira vai adiando, e adiando, o consumar da relação. O galã impaciente liberta então uma substancia que imobiliza a noiva permitindo que a noite acabe bem.
Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.
Pág. 33

Tacto - The queen can mate up to 15 times and as a result the males patrol in search for a female. When found, the courtship between the female and male must be followed rigidly. The female is chased by the male and he brushes her antennae with a scent to induce her to alight. Mating can last for more than an hour (New, 1991). The females will then fly close to the ground to find a host plant for egg deposition.
https://sta.uwi.edu/fst/lifesciences/documents/Danaus_gilippus.pdf - ultimo acesso a 3 de setembro de 2016

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade, perseguição, etc.)

Subserviência - The male chases the female and overtakes her from above. He brushes her antennae with his abdominal hairpencils, which disseminate scent, and induces the female to alight. The male continues to hover over the female, hairpencils still active, until the female becomes submissive. He alights alongside the female and copulation takes place.
http://animaldiversity.org/accounts/Danaus_gilippus/ - ultimo acesso a 24 de Agosto de 2016

Perseguição - O galã, quando encontra uma femea disponível, persegue-a num voo nupcial complexo, …, a parceira vai adiando, e adiando, o consumar da relação. O galã impaciente liberta então uma substancia que imobiliza a noiva permitindo que a noite acabe bem.
Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.
Pág. 33

Persistência - O galã, quando encontra uma femea disponível, persegue-a num voo nupcial complexo, …, a parceira vai adiando, e adiando, o consumar da relação. O galã impaciente liberta então uma substancia que imobiliza a noiva permitindo que a noite acabe bem.
Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.
Pág. 33

RESUMO DESCRITIVO

Quando a femea aparece no campo visual do macho, ele voa atrás dela numa perseguição aérea. Quando ele consegue colocar-se a pouco milimetros do seu dorso, o modo de voo muda rapidamente para um balancear de forma a disseminar o seu perfume sobre a femea.
Posteriormente o macho exibe movimentos de dança à sua frente. O bater das asas por parte da fêmea corresponde a uma reação positiva. (p. 14)
Brower, L., P., Brower, J., V., Z. & Cranston, F., P. (1950). Courtship behavior of the queen butterfly, Danaus gilippus berenice (Cramer). Zoologica, Scientific contributions of the New York Zoological Society, Vol. 50, Issue 1.

Reproduction
To find females, males patrol all day. Females lay eggs singly on leaves, stems, and flower buds, which the larvae will eat. Adults roost communally. Males have pheromones, specific scents, which aid in mating and attract females. (Struttman 2000)
Behavior
The Queen is known for its definite courtship display which must be rigidly followed by both sexes. The male chases the female and overtakes her from above. He brushes her antennae with his abdominal hairpencils, which disseminate scent, and induces the female to alight. The male continues to hover over the female, hairpencils still active, until the female becomes submissive. He alights alongside the female and copulation takes place. Post-nuptial flights occur with the male pulling the female backwards through the air. Laboratory experiments have shown that males from which the hairpencils have been removed, and females whose antennae have been made none receptive, are unacceptable, unable, or unwilling to mate. Male butterflies of this genus are known to get their sex schents from plants such as heliotrope (Heliotropium) and eupatorium (Eupatorium) which contain pyrrolizidine alkaloids. (New, 1991; Parenti, 1977; Pyle, 1999)
http://animaldiversity.org/accounts/Danaus_gilippus/ - ultimo acesso a 24 de Agosto de 2016

Uma pequena borboleta (*Eurema lisa*) tem um reportório de 8 passos que os machos tentam repetir sem falhas em frente das suas namoradas. Após filmagens passadas em camara lenta mostrou-se que a cópula só existia quando os 8 movimentos eram exibidos sem falhas ou trocas, favorecendo assim o melhor artista ou, pelo menos, aquele com melhor memória. No caso do mandarim (*Taeniopygia guttata*), uns suaves movimentos de vénia por parte da femea garantem ao macho que este se pode aproximar para consumar o casamento sem o perigo de ter de ir primeiro às compras ao shopping mais próximo. Nos chimpanzés as fêmeas adotam certas posições e atitudes que mostram recetividade, desde oferecer-se para catar piolhos até sentar-se de costas para o pretendente.
Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.
Pág. 28

Numa outra espécie de borboleta (*Danaus gilippus*) as feromonas dos machos cumprem uma outra missão – travar as fêmeas mais irrequietas. O galã, quando encontra uma femea disponível, persegue-a num voo nupcial complexo, …, a parceira vai adiando, e adiando, o consumar da relação. O

galã impaciente liberta então uma substancia que imobiliza a noiva permitindo que a noite acabe bem.
Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.
Pág. 33

Play It Cool Like a Butterfly
single guy meets a gal that really makes his heart patter, he runs the risk of coming across as anxious on the **first date** -- but in such instances, it's crucially important to keep your cool.
Biologists have noted that when female **Squinting Bush Brown butterflies** are exposed to cooler temperatures as caterpillars, they are more likely to aggressively court males -- effectively **reversing the roles observed under normal conditions**.
http://www.treehugger.com/slideshows/natural-sciences/10-animal-courtship-rituals-a-guy-could-learn-from/page/4/#slide-top - ultimo acesso em 24 de Agosto de 2016

OBSERVAÇÃO VISUAL (vídeo)

https://www.youtube.com/watch?v=uGbrzTJ75YY - ultimo acesso em 24 de Agosto de 2016

https://www.youtube.com/watch?v=qRMUlyaynn8 - ultimo acesso em 24 de Agosto de 2016

REFERÊNCIAS BIBLIOGRÁFICAS

http://animaldiversity.org/accounts/Danaus_gilippus/ - ultimo acesso a 24 de Agosto de 2016

Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.

http://www.treehugger.com/slideshows/natural-sciences/10-animal-courtship-rituals-a-guy-could-learn-from/page/4/#slide-top - ultimo acesso em 24 de Agosto de 2016

http://animaldiversity.org/accounts/Danaus_gilippus/ - ultimo acesso a 24 de Agosto de 2016

https://sta.uwi.edu/fst/lifesciences/documents/Danaus_gilippus.pdf - ultimo acesso a 3 de setembro de 2016

BLACK SWAN - CISNE PRETO
(Cygnus atratus)

TIPO DE AGENTE –

Voador

Class
Aves
birds

http://animaldiversity.org/accounts/Cygnus_atratus/ - ultimo acesso a 26 de Agosto de 2016

ZONAS GEOGRÁFICAS

Australia, Nova Zelândia, Europa e América do Norte

Geographic Range

Cygnus atratus, commonly known as black swans, are native to Australia (including Tasmania) and have been introduced to New Zealand, Europe, and North America. Black swans are found mainly in the wetlands of southern Australia and tend to avoid the northern tropics. They can also be found in across the rest of southern Australia, and in the southeast of Tasmania. After being introduced to Europe as pets, they can now be found there in the wild. (del Hoyo, et al., 1992; Delacour, 1954)

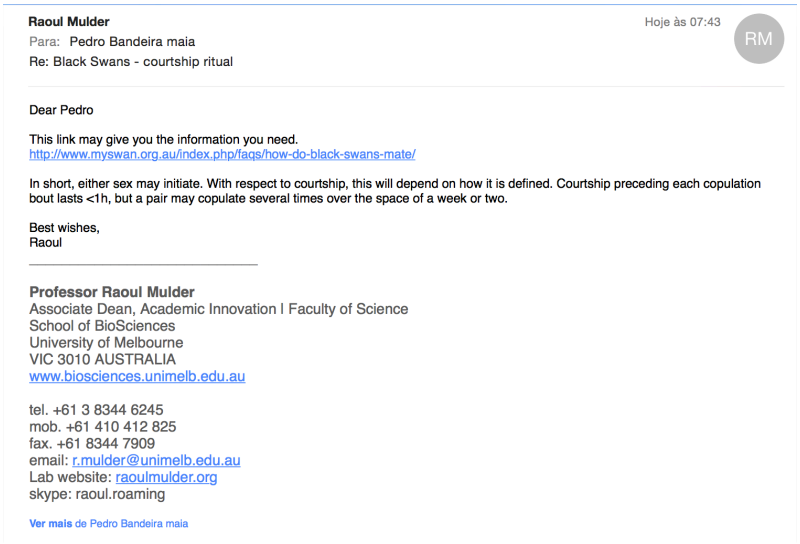
Biogeographic Regions: nearctic (introduced) ; palearctic (introduced) ; australian (native) ; oceanic islands (introduced)

http://animaldiversity.org/accounts/Cygnus_atratus/#geographic_range

QUEM TOMA INICIATIVA (m | f, ambos)

Ambos - An elaborate ritual precedes and follows mating. Either the male, or the female, may approach its mate with its neck stretched out low over the water, at times dipping it under the surface. This is a cue for its partner to respond with identical behaviour.
http://www.myswan.org.au/index.php/faqs/how-do-black-swans-mate/

Enviei email para University of Melbourne - r.mulder@unimelb.edu.au (http://www.myswan.org.au/index.php/black-swans/) no dia 27 de Julho 2016, com resposta no dia 28



Raoul Mulder Hoje às 07:43

Para: Pedro Bandeira maia

Re: Black Swans - courtship ritual

RM

Dear Pedro

This link may give you the information you need.
http://www.myswan.org.au/index.php/faqs/how-do-black-swans-mate/

In short, either sex may initiate. With respect to courtship, this will depend on how it is defined. Courtship preceding each copulation bout lasts <1h, but a pair may copulate several times over the space of a week or two.

Best wishes,
Raoul

Professor Raoul Mulder
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Lab website: raoulmulder.org
skype: raoul.roaming

Ver mais de Pedro Bandeira maia

DURATION - **Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)**

Curto - <h

In short, either sex may initiate. With respect to courtship, this will depend on how it is defined. Courtship preceding each copulation bout lasts <1h, but a pair may copulate several times over the space of a week or two. – Resposta Professor Raoul Mulder

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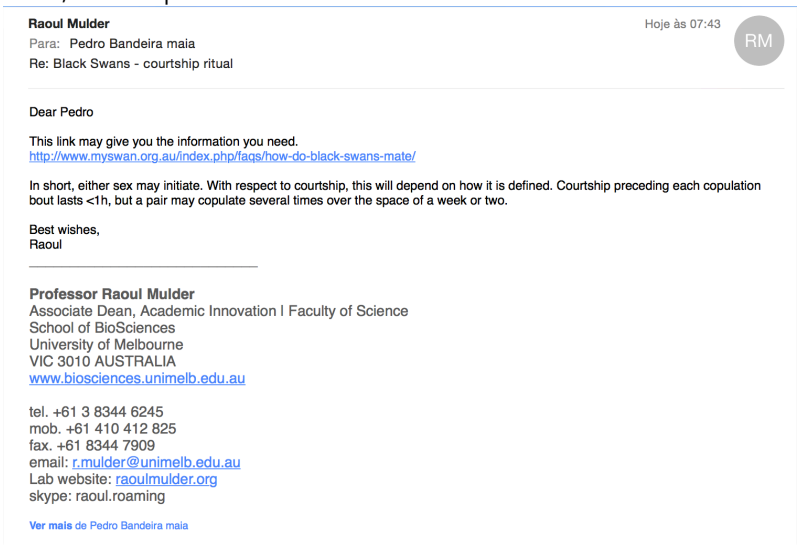

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Ver mais de Pedro Bandeira maia

INTERACTION - **Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)**

Brandos e Ritualizados - Mute swans form the classic image of devotion, with their curved necks entwined in a perfect love heart. It's part of a courtship ritual, in which pairs face each other and, with a ruffle of feathers and lifted wings, bow gracefully.
Trumpeter swans go in for synchronised swimming, head bobbing and "singing"

But despite their name, mute swans are anything but silent. Their courtship "dance" is accompanied by a range of hissing and grunting sounds. The idea that swans only sing when they are dying, the so-called **swan song**, is a myth.
http://www.bbc.com/earth/story/20141204-the-truth-about-swans

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)
Visão, Audição e Tato - Swan courtship is both beautiful, and noisy.
Mute swans form the classic image of devotion, with their curved necks entwined in a perfect love heart. It's part of a courtship ritual, in which pairs face each other and, with a ruffle of feathers and lifted wings, bow gracefully.
Trumpeter swans go in for synchronised swimming, head bobbing and "singing"
But despite their name, mute swans are anything but silent. Their courtship "dance" is accompanied by a range of hissing and grunting sounds. The idea that swans only sing when they are dying, the so-called **swan song**, is a myth.

All six swan species perform this sort of mating dance, albeit with some variations. **Australian black swans** have special feathers for attracting a mate. The
Eurasian**Bewick's**, **whooper** and **whistling** swans call softly to each other after they have mated.
Meanwhile, the North American **trumpeter swans**, as their name suggests, are much more boisterous. For one thing, thanks to a coiled, looping windpipe, **they can honk**. They also go in for synchronised swimming, head bobbing and "singing".
http://www.bbc.com/earth/story/20141204-the-truth-about-swans

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade, imitação, etc.)
Amabilidade, Cortesia, Sincronização e Carinhos - Swan courtship is both beautiful, and noisy.
Mute swans form the classic image of devotion, with their curved necks entwined in a perfect love heart. It's part of a courtship ritual, in which pairs face each other and, with a ruffle of feathers and lifted wings, bow gracefully.
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http://www.bbc.com/earth/story/20141204-the-truth-about-swans

Reciprocidade, Imitação - An elaborate ritual precedes and follows mating. Either the male, or the female, may approach its mate with its neck stretched out low over the water, at times dipping it under the surface. This is a cue for its partner to respond with identical behaviour. As the two birds come together, the aquatic ballet begins in earnest.
http://www.myswan.org.au/index.php/faqs/how-do-black-swans-mate/

OBSERVAÇÃO VISUAL (vídeo)

https://www.youtube.com/watch?v=EBqEkkFhWjU

https://www.youtube.com/watch?v=8oZu6PAfoG4

RESUMO DESCRITIVO

O ritual de acasalamento começa com um cortejo suave, estando lado a lado a mergulhar a cabeça e soprar bolhas na água. Ao chegarem à excitação máxima é possivel ouvi-los expressando o grande prazer por meio de assobios e bufando. Este ritual de acasalamento termina com eles a deslizarem na água fazendo movimentos síncronos, de rosto colado e a 'andar' na água.
http://www.youtube.com/watch?v=OJgfcOd1R7E&feature=related

The truth about swans
Swans often do mate for life but it's less romantic than you'd think. And they probably can't break your arm
By Louise Crane
4 December 2014

Reputation: *Swans' love for their partners is so deep they mate for life. They are creatures of myth that only sing when they are dying. Also, paradoxically for such paragons of elegance, they are vicious blighters that can break your arm with their wings.*
Reality: *Swans often do stay with their partners for life. But whatever feelings they may have for each other, this loyalty is a strategy for maximising the number of cygnets they can raise. They make plenty of noise, and yes, that does include mute swans. Finally, though they defend their young with extreme prejudice, they are probably too weak to break a human arm – although we don't recommend you try the experiment.*
Swan courtship is both beautiful, and noisy.
Mute swans form the classic image of devotion, with their curved necks entwined in a perfect love heart. It's part of a courtship ritual, in which pairs face each other and, with a ruffle of feathers and lifted wings, bow gracefully.
Trumpeter swans go in for synchronised swimming, head bobbing and "singing"
But despite their name, mute swans are anything but silent. Their courtship "dance" is accompanied by a range of hissing and grunting sounds. The idea that swans only sing when they are dying, the so-called **swan song**, is a myth.

All six swan species perform this sort of mating dance, albeit with some variations. **Australian black swans** have special feathers for attracting a mate. The Eurasian**Bewick's**, **whooper** and **whistling** swans call softly to each other after they have mated.

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Once courtship is complete, male and female swans really are bonded for life, with few exceptions. This is unusual. Most other birds will raise their young as a pair for one season, but move on to new mates the next. What's more, many species also engage in "extra-pair mating" – "adultery" to you and me. Ducks are particularly keen on such additional copulations. By finding extra mates in these ways, each bird can produce more offspring.
However, for swans the benefits of "together forever" are greater than anything they could gain by sowing their wild oats. The bonded pair will raise clutch after clutch of cygnets in their lifetimes, learning from their successes and failures each time. This opportunity to learn may be one reason they don't break up.
Swan couples are also highly effective fighting teams. If they are separated, swans of either sex get threatened more frequently, and come off less well in aggressive encounters. Females also eat less when separated from their mates. By sticking together, they protect themselves.
Staying together can also save time and energy. Every year, Bewick's swans fly a long, hard race from breeding grounds in northern Russia to their European winter quarters. They only make brief pit stops, to refuel. So they have little time for flirting.
"Most Bewick's swans form pair-bonds during their breeding season in Arctic Russia," says Eileen Rees of the **Wetlands and Wildfowl Trust** (WWT). "It seems that the 2,500 km long migration and the shortness of the Arctic summer limits their ability to find a new mate and breed within a year."
Bewick's swans migrate the furthest of all swan species, which may be why they are the least likely to "divorce". In 50 years there have only been three cases at WWT Slimbridge, where 10,000 Bewick's swans have spent their winters since studies began in 1963.
So why do swans ever leave their long-term mate, who has become the perfect parent? Rather like humans, they sometimes get out when things go badly.
"Swans change mates sometimes after a bad breeding season or nest failure," says **Radoslaw Włodarczyk** of University of Łódź in Poland. "It takes 1-2 seasons for birds to match each other precisely and start to breed again." The new pair often raises fewer cygnets in their first year, but improve in later years, particularly for the female from the original pair. In Poland, the divorce rate in mute swans is about 4%.
As well as divorcing, swans do occasionally "cheat". But it's really only female Australian black swans that are regularly unfaithful. **Around 1 in 7 eggs reared by a black swan male will not be his**, almost always because the female has copulated with a different male just in case she cannot have offspring with her partner.
For the other five swan species, the risks involved in seeking an extra mate, such as contracting a sexually-transmitted disease, or simply failing to find a second mate, are just too high. So they stay loyal - and male swans are thoroughly modern husbands. Unlike most ducks and geese, they help incubate the eggs, allowing the female to feed more and rebuild the fat reserves she used up in laying them.
Male black swans actually spend more time on their nests than females. That may seem strange, because black swan females are the least loyal. But unlike other swans, they can lay multiple clutches a year. The more time a female spends sitting on her nest, the longer it will be before she is ready to lay another clutch. By giving her time off, the male ensures the next clutch comes along quickly. This should mean he has more offspring - so long as the cygnets are his.

Once the cygnets hatch, swan parents live with their young for six to nine months. For comparison, a male duck will spend about a month on parenting duties before, well, swanning off.
Like many parents, swans respond with extreme prejudice if their family is threatened. But could they really break your arm with their wing?
Woe betide anyone who accidentally disturbs a family of swans. Male swans of all species will ferociously guard their nests. As well as protecting the offspring from predators, this also prevents the female from mating with another male.
When it perceives a threat, a swan will rear up with dramatically flared wings and hiss, grunt, snort and flap. This display is called "busking". But this naked aggression is only for show: **most of the time the swans are bluffing**.
It's unlikely a swan could break an adult's bones, says Włodarczyk, although a child or older person might be unlucky as their bones are weaker. "They can hit hard with their carpal wing joint," he concedes, but they can only muster so much force.
That's because of the way their bones are built. All flying birds have a honeycomb-like bone structure to make them as light as possible. Swans are among the heaviest flying birds, so they need all the help they can get. The trade-off is that their bones are weaker than those of other animals. As a result, a swan would be more likely to break their own wing if they struck an adult human's arm. Rees confirms there have been no swan-caused broken bones at WWT sites.

http://www.bbc.com/earth/story/20141204-the-truth-about-swans

How do black swans mate?
BY MYSWAN_ADM ON MAY 13, 2015 · LEAVE A COMMENT
An elaborate ritual precedes and follows mating. Either the male, or the female, may approach its mate with its neck stretched out low over the water, at times dipping it under the surface. This is a cue for its partner to respond with identical behaviour. As the two birds come together, the aquatic ballet begins in earnest. The swans now cross their necks and commence neck-dipping in synchrony for up to 20 minutes, each gracefully curved neck arched over the body of its partner. The copulation that follows this flawless choreographic routine is almost comically clumsy by comparison. The male grasps a tuft of feathers on the female's neck for purchase and heaves himself laboriously onto her back. Given that he is considerably heavier, his weight causes her to sink beneath the surface. After a few seconds (during which insemination presumably takes place under water) the female extends her neck, calls loudly and struggles to the surface, leaving the male to slide ingloriously back into the water. John Mewett has taken a remarkable sequence of photographs (see below) documenting this mating ritual.
http://www.myswan.org.au/index.php/faqs/how-do-black-swans-mate/

Reproduction

Black swans are monogamous and often have the same mate for life. They are territorial and stay in solitary pairs when mating but are known to occasionally mate in colonies. The threatening behavior of black swans is similar to mute swans; they both flap and wave their wings with two or three strokes followed by a call. However, the wings of black swans make a louder sound than mute swans. Also the standing stance is different; black swans hold their necks erect with a downward point of the bill and ruffled feathers. (Delacour, 1954; Forshaw, 1998; Johnsgard, 1965)

One particularly interesting thing about the courting behavior of black swans is the "Triumph Ceremony". It is used to strengthen pair-bonds between mates, between parents and cygnets (baby swans), and for threatening territorial displays. The male swan approaches the female swan with wings and chin lifted, calling repeatedly. Then the female returns the same call. They then dip their heads alternating with erect postures. After this the birds call with their necks outstretched and bills pointed upward; then they hold their necks at a forty five degree angle and point their bills downward and at a right angle, they proceed to swim in a circle. These ceremonies are primarily initated by the male and tend to increase in frequency when there are more swans around. (Johnsgard, 1965; Kraaijeveld and Mulder, 2002)

http://animaldiversity.org/accounts/Cygnus_atratus/

O ritual de acasalamento começa com um cortejo suave, estando lado a lado a mergulhar a cabeça e soprar bolhas na água. Ao chegarem à excitação máxima é possivel ouvi-los expressando o grande prazer por meio de assobios e bufando. Este ritual de acasalamento termina com eles a deslizarem na água fazendo movimentos síncronos, de rosto colado e a 'andar' na água. (sem fonte)

REFERÊNCIAS BIBLIOGRÁFICAS

http://www.bbc.com/earth/story/20141204-the-truth-about-swans

http://www.myswan.org.au/index.php/faqs/how-do-black-swans-mate/

http://animaldiversity.org/accounts/Cygnus_atratus/#geographic_range

COMBATENTES

(*Philomachus pugnax*)

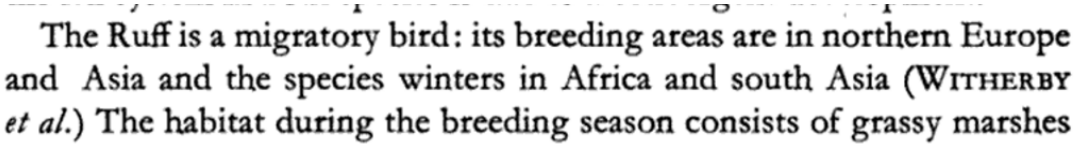
TIPO DE AGENTE

Voador

ZONAS GEOGRÁFICAS

Europa, Ásia e África – There is evidence to suggest that the European population (200,000-510,000 pairs, occupying 50-74% of the global breeding range) has declined by up to 30% over ten years (three generations), but this may reflect shifts in breeding populations, populations in Asia are not thought to be declining and wintering populations in Africa appear to be increasing.

http://www.iucnredlist.org/details/22693468/0 - ultimo acesso a 24 de Agosto de 2016


The Ruff is a migratory bird: its breeding areas are in northern Europe and Asia and the species winters in Africa and south Asia (WITHERBY *et al.*) The habitat during the breeding season consists of grassy marshes

Hogan-Wargurb, A. (1966). Social behavior of the Ruff, *Philomachus pugnax.* Brill Archive, *Volume 54;Volume 1966 de Ardea (Series)* – 121 pág. (recorte na pág. 113).

QUEM TOMA INICIATIVA (M | F)

Mascuino - We defined three spacing tactics that male ruffs use to position themselves to court females : "Following" - directly pursuing females, and two types of lekking behavior, "Intercepting"
- waiting for females at resource-rich sites, and "True Lekking" - waiting for females at places without any resources other than the males themselves. (p. 137)

Lank, D. & Smith, C. (1987). Conditional lekking in ruff (Philomachus pugnax)**.** Behavorial Ecology Sociobiology 20:137-145**.** Department of Biology, Queen's University, Kingston, Ontario, K7L 3N6, Canada.

We view Following, Intercepting, and True Lekking as conditional behavioral tactics that all male ruffs may use, in contrast to the different strategies attributed to independents and satellites
(Hogan-Warburg 1966; van Rhijn 1983).

Lank, D. & Smith, C. (1987). Conditional lekking in ruff (Philomachus pugnax)**.** Behavorial Ecology Sociobiology 20:137-145**.** Department of Biology, Queen's University, Kingston, Ontario, K7L 3N6, Canada. (p. 144)

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Prolongado >dia

No dia 26/08/2016, às 21:54, David B Lank <dlank@sfu.ca> escreveu:
Hello Pedro Bandeira Maia.

The answer depends on exactly what question you are asking.
Ruff males assemble in all-male groups (called 'leks) of e.g. 5 or so males, which then await visits from females.

Females circulate among several different leks for 3-4 days, and mate during that period.

On most visits they do not mate at all - they are sampling the population.

On visits where they do mate, they likely do so within 10 minutes.

So if you want a measure of search time, it is in days. If you want a measure of mating on a particular visit once they have made up their mind, it is 10 minutes.

The searching time (days) reference is:
Lank, D.B. and C.M. Smith. 1987. Conditional lekking in ruff (Philomachus pugnax). Behavioral Ecology and Sociobiology 20:137–145. (attached).
For detailed courtship descriptions: Hogan-Warburg 1966 and van Rhihn 1973 (attached).

D> Lank

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Ritualizados - We defined three spacing tactics that male ruffs use to position themselves to court females : "Following" - directly pursuing females, and two types of lekking behavior, "Intercepting"

- waiting for females at resource-rich sites, and "True Lekking" - waiting for females at places without any resources other than the males themselves. (p. 137)
Lank, D. & Smith, C. (1987). Conditional lekking in ruff (Philomachus pugnax). Behavorial Ecology Sociobiology 20:137-145. Department of Biology, Queen's University, Kingston, Ontario, K7L 3N6, Canada.

Intimidatórios - "Following" - directly pursuing females, and two types of lekking behavior, "Intercepting" - waiting for females at resource-rich sites, and "True Lekking" - waiting for females at places without any resources other than the males themselves. (p. 137)
Lank, D. & Smith, C. (1987). Conditional lekking in ruff (Philomachus pugnax). Behavorial Ecology Sociobiology 20:137-145. Department of Biology, Queen's University, Kingston, Ontario, K7L 3N6, Canada.

Enganadores - Known as a faeder, it does away with the fancy breeding plumage of the highly aggressive, territorial males and "satellite males" that lurk on the fringes.
Territorial males not only tolerate faeders, they even mate with them—either because they haven't figured out the imposters' disguise or, scientists suspect, to attract genuine females to their area. (Also see "7 Gender-Altering Animals.")
Either way, faeders get to mate without being chased or attacked.
http://voices.nationalgeographic.com/2014/09/18/animals-science-males-females-mating-sex-cichlids-sneaky/ - ultimo acesso a 3 de setembro de 2016

Enganadores – Travestismo. É muito comum encontrar fêmeas fingindo serem machos – e vice-versa – entre algumas espécies de peixes, répteis e insetos. Já entre as aves, esse comportamento é bastante raro.
É por isso que as duas únicas espécies de pássaros que gostam de se travestir pelo resto da vida são tão especiais.
O macho do combatente (*Philomachus pugnax*) foi o primeiro animal que se traveste de fêmea a ser documentado. Alguns deles adotam uma aparência de fêmea para se aproximarem mais das verdadeiras fêmeas e acasalarem.
Já o macho da águia-sapeira (*Circus aeruginosus*), quando está cuidando do ninho, também se "disfarça" de fêmea para evitar ser atacado por outros machos. Alguns desses machos também observam as verdadeiras fêmeas e se comportam como elas, algo que os cientistas ainda não conseguiram explicar.
http://www.bbc.com/portuguese/noticias/2015/03/150304_vert_earth_sexo_picante_animais_ml - ultimo acesso a 15 setembro de 2016

Ritualizados + Intimidatórios - Male ruffs use three behavioral tactics to position themselves to court females. "Following" involves direct pursuit and courtship of females, mostly when the latter are foraging. Displaying males along the shore and in the field are considered to be primarily Followers. Males may Follow as individuals or in mobile display groups. "Intercepting" is a form of lekking where males stand at sites such as the Pond, where females are likely to come for reasons other than mating. "True Lekking" occurs when males wait at places without other resources for females (Emlen and Oring 1977; Bradbury 1977).
Lank, D. & Smith, C. (1987). Conditional lekking in ruff (Philomachus pugnax). Behavorial Ecology Sociobiology 20:137-145. Department of Biology, Queen's University, Kingston, Ontario, K7L 3N6, Canada. (p. 143)

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)

Visão - In contrast to most other birds, male Ruffs are silent during their lek displays. The function of identifying themselves appears to have been transferred to a visual modality for which variation is transmitted genetically (Lank and Dale 2001, Auk 118:759-765), rather than by voice. -

http://www.sfu.ca/biology/wildberg/ruff.html - ultimo acesso a 2 de Setembro de 2016

Consistent with the model, we have shown that while certain aspects of a males breeding plumage phenotye change with a male's physiological condition, its coloration does not.
http://www.sfu.ca/biology/wildberg/ruff.html - ultimo acesso a 2 de Setembro de 2016

We defined three spacing tactics that male ruffs use to position themselves to court females : "Following" - directly pursuing females, and two types of lekking behavior, "Intercepting"
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INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade etc.)

Exibição - (…) Ou o caso dos combatentes (*Philomachus pugnax*), cujo nome se tornará claro mais abaixo, entre os quais existem cerca de 1% de machos com plumagem idêntica às fêmeas e que se ocupam de as cobrir* enquanto os outros 99%, com plumagem marcial, se ocupam de espalhafatosas exibições e batalhas para garantir o seu quinhão de sexo. São aquelas raras ocasiões em que o desígnio máxima da Natureza é deturpado e adulterado por uma outra personagem engraçada – o oportunismo. (P. 20)
*Alguns estudos indicam que as fêmeas preferem ser cobertas por estes machos disfarçados o que parece significar que dão mais valor à inteligência do que à beleza e força bruta.
Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.

Persistência + Vigilância - We defined three spacing tactics that male ruffs use to position themselves to court females : "Following" - directly pursuing females, and two types of lekking behavior, "Intercepting"
- waiting for females at resource-rich sites, and "True Lekking" - waiting for females at places without any resources other than the males themselves. (p. 137)
Lank, D. & Smith, C. (1987). Conditional lekking in ruff (Philomachus pugnax). Behavorial Ecology Sociobiology 20:137-145. Department of Biology, Queen's University, Kingston, Ontario, K7L 3N6, Canada.

Exibição - Males perform courtship ritual called lekking; they dance for the benefit of females, who pick one to pair with.
http://www.birddatabase.com/birds/ruff - ultimo acesso a 2 de Setembro de 2016

RESUMO DESCRITIVO

Travestismo

É muito comum encontrar fêmeas fingindo serem machos – e vice-versa – entre algumas espécies de peixes, répteis e insetos. Já entre as aves, esse comportamento é bastante raro.
É por isso que as duas únicas espécies de pássaros que gostam de se travestir pelo resto da vida são tão especiais.
O macho do combatente (*Philomachus pugnax*) foi o primeiro animal que se traveste de fêmea a ser documentado. Alguns deles adotam uma aparência de fêmea para se aproximarem mais das verdadeiras fêmeas e acasalarem.

Já o macho da águia-sapeira (*Circus aeruginosus*), quando está cuidando do ninho, também se "disfarça" de fêmea para evitar ser atacado por outros machos. Alguns desses machos também observam as verdadeiras fêmeas e se comportam como elas, algo que os cientistas ainda não conseguiram explicar.
http://www.bbc.com/portuguese/noticias/2015/03/150304_vert_earth_sexo_picante_animais_ml - ultimo acesso a 15 setembro de 2016

Cross-Dressing Birds
Male ruffs (*Philomachus pugnax*), found across Europe and Asia, have a cross-dresser among them—a bird that mimics females to get close enough to mate.
Known as a faeder, it does away with the fancy breeding plumage of the highly aggressive, territorial males and "satellite males" that lurk on the fringes.
Territorial males not only tolerate faeders, they even mate with them—either because they haven't figured out the imposters' disguise or, scientists suspect, to attract genuine females to their area. (Also see "7 Gender-Altering Animals.")
Either way, faeders get to mate without being chased or attacked.
As with the cichlid male dwarf, this sneaker morph is rare in ruffs—they make up about one percent of the male population.
David Lank, a behavioral ecologist at Simon Fraser University in British Columbia, explained that these sneakers need to be rare for their mating strategy to work.
"If there are too many 'sneakers,' they complete too strongly with each other for the 'sneaker niche,' and each one does less well, and there are fewer in the next generation," Lank, who wasn't involved in the new cichlid study, said in an email.
http://voices.nationalgeographic.com/2014/09/18/animals-science-males-females-mating-sex-cichlids-sneaky/ - ultimo acesso a 3 de setembro de 2016

Postures.
The U p r i g h t (upr - Fig. Ia) is shown predominantly by resident males and females. The body axis points upwards at an angle between 6o0° and 9go° with the horizontal. The neck is stretched vertically upwards. The legs are stretched, the tail is held low, and the wings are folded. In males ruff and head tufts are more or less flattened.
T i p t o e (tip - Fig. ib) is only shown by satellite males. The body axis points upwards at an angle between 45° and 75° with the horizontal. Head and bill point obliquely downwards. Ruff and head tufts are raised in a specific way. The other characters are similar to those of the "upright".
The 0 b l i q u e (obl - Fig. ic) is shown by resident males, satellite males and females. There are slight differences between these categories. The body axis is obliquely upwards at about a 45° angle with the horizontal. The head extends above the body, the neck is more or less bent, the tail is held in line with the body axis, and covered by folded wings. In males ruff and head tufts are raised in a specific way.
S t r u t t i n g (str - Fig. id) is only shown by satellite males. The body axis points obliquely upwards at an angle between 30° and 45° with the horizontal. The neck is held in line with the body axis, the head is turned downwards, and the bill points towards the ground. The legs are bent, the tail is fully spread and held in line with the body axis, the wings are unfolded and held along the sides of the body. Ruff and head tufts are fully expanded.
The Half Squat (hsq - Fig. ie) is only shown by males. The body axis is horizontal. The neck is held in line with the body axis, and head and bill point vertically downwards. The male is more or less raised from the ground, the

legs are bent, the tail is held in line with the body axis, and the wings may be unfolded to some extent. Ruff and head tufts are raised.
The S q u a t (squ - Fig. if) is also only shown by males. The male lies with his belly and breast on the ground, the wings are folded. I59 This content downloaded from 142.58.26.229 on Thu, 09 Apr 2015 17:16:49 UTC All use subject to JSTOR Terms and Conditions60o J. G. VAN RHIJN Ruff and head tufts are fully expanded. The other characters are equal to those of the "half squat".
C ro u ch in g (cro - Fig. Ig) is only shown by females. The body axis point downwards. The neck is bent, and head and bill point obliquely downwards. The legs are bent, the tail is held in line with the body axis, and the wings are folded.
The Fo r w a r d (fow - Fig. Ih) is predominantly shown by resi-dent males; females do not show this posture. The body axis is horizontal or pointed downwards. The head is lowered to the same level as the front of the body, the bill points forwards or slightly downwards. The legs are more or less bent, the tail may be spread, and the wings may be unfolded to some extent. The ruff is fully expanded, and the head tufts are bent forwards. (p. 159)

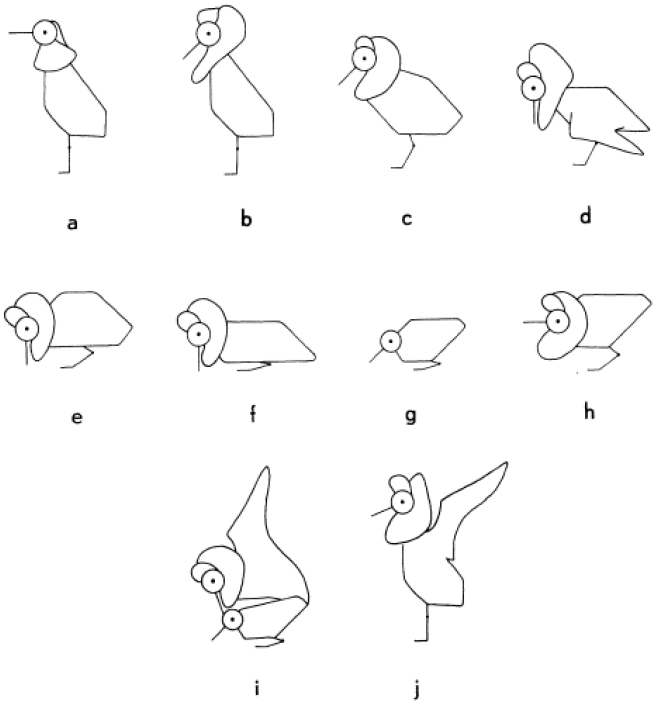

Fig. 1a, Upright; b, Tiptoe; c, Oblique; d, Strutting; e, Half squat; f, Squat; g, Crouching; h, Forward; i, Copulation; j, Wing fluttering.

OBSERVAÇÃO VISUAL (VÍDEO)

https://player.vimeo.com/video/144333522 - ultimo acesso a 24 de Agosto de 2016

https://www.youtube.com/watch?v=pSfw6C2aCy0 - ultimo acesso a 2 de Setembro de 2016

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Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.

http://www.iucnredlist.org/details/22693468/0 - ultimo acesso a 24 de Agosto de 2016

http://www.sfu.ca/biology/wildberg/ruff.html - ultimo acesso a 2 de Setembro de 2016

http://voices.nationalgeographic.com/2014/09/18/animals-science-males-females-mating-sex-cichlids-sneaky/ - ultimo acesso a 3 de setembro de 2016

FRAGATA

(*Fregata magnificens*)

TIPO DE AGENTE

Voador

ZONAS GEOGRÁFICAS

Gronelândia, Arquipélago Ártico Canadiano e toda a América do Norte até o sul de terras altas do centro do México - Magnificent frigatebirds live along American, tropival coastlines. They bred as far north as 25 degrees north latitute in Mexico and Florida and as far south 27 degrees south latitude in Brazil. They are especially common in Southern Florida, the Gulf Coast, The Caribbean islands and the West coast of mexico. (Diamond and Schreiber, 2002, Stefferud, 1966)
http://animaldiversity.org/accounts/Fregata_magnificens/ - último acesso a 8 agosto 2016

Geographic Range

Magnificent frigatebirds live alo reed as far north as 25 degrees north latitud 27 degrees south latitude in Brazil. They ar a, the Gulf Coast, the Caribbean islands and Schreiber, 2002; Stefferud, 1966)

Biogeographic Regions: nearctic (

Nearctic

living in the Nearctic biogeographic province, the northern part of the New World. This includes Greenland, the Canadian Arctic islands, and all of the North American as far south as the highlands of central Mexico.

Habitat

Magnificent frigatebirds usually b l low-lying vegetation. Males gather twigs an les remain at the males' display site and bui structed at ground level, but sometimes in tr with a diameter of 25 - 35 cm. They are us s' sunning

http://animaldiversity.org/accounts/Fregata_magnificens/ - último acesso a 8 agosto 2016

QUEM TOMA INICIATIVA (M | F)

Male – During the breeding season, male magnificent frigatebirds congregate at male display sites. They inflate their large, red, gular sacs. These sacs, while inflated, can get so large that they obscure the bird´s head. Males rapidly vibrate their wings and sit back on their tails. They stretch their wings out and throw theis heads back for maximum display of the gular sac. Females then inspect the males. As females attempt to find a preferred mate, males twist and bend to make their gular sac look as large a possible, theu also make loud, drumming noise during display. Magnificent frigatebirds form monogomous pairs each breeding season once females have selected mates. However, they rarely maintain the same partner from season to season. (Diamond and Schreiber, 2002; Diamond, 1973; Madsen, et al, 2004)
http://animaldiversity.org/accounts/Fregata_magnificens/ - último acesso a 8 agosto 2016

Reproduction

During the breeding season, male magnificent frigatebirds congregate at male display sites. They inflate their large, red, gular sacs. These sacs, while inflated, can get so large that they obscure the bird's head. Males rapidly vibrate their wings and sit back on their tails. They stretch their wings out and throw their heads back for maximum display of the gular sac. Females then inspect the males. As females attempt to find a preferred mate, males twist and bend to make their gular sac look as large a possible, they also make a loud, drumming noise during this display. Magnificent frigatebirds form monogamous pairs each breeding season once females have selected mates. However, they rarely maintain the same partner from season to season. (Diamond and Schreiber, 2002; Diamond, 1973; Madsen, et al., 2004)

http://animaldiversity.org/accounts/Fregata_magnificens/ - último acesso a 8 agosto 2016

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Curto - ...alguns pássaros enviam não só sinais através de sons mas também através de imagem. (1m43s) Têm uma espécie de insuflável no peito de cor vermelha, que demora +/- 20 minutos a insuflar totalmente para em conjunto

com os sons atrair as parceiras.(2m4s) O tamanho do balão dá indicações às fêmeas das condições de saúde do macho. (2m29s) As fêmeas não têm o insuflável.
Attenborough, D. (1998). The life of birds, época 1, episódio 7. BBCWorldwide: 49:18. Último acesso a 11 de Agosto de 2016 - http://www.youtube.com/watch?v=OJgfcOd1R7E&feature=related

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

Ritualizados - During the breeding season, male magnificent frigatebirds congregate at male display sites. They inflate their large, red, gular sacs. These sacs, while inflated, can get so large that they obscure the bird´s head. Males rapidly vibrate their wings and sit back on their tails. They stretch their wings out and throw theis heads back for maximum display of the gular sac. Females then inspect the males. As females attempt to find a preferred mate, males twist and bend to make their gular sac look as large a possible, theu also make loud, drumming noise during display. Magnificent frigatebirds form monogomous pairs each breeding season once females have selected mates. However, they rarely maintain the same partner from season to season. (Diamond and Schreiber, 2002; Diamond, 1973; Madsen, et al, 2004)
http://animaldiversity.org/accounts/Fregata_magnificens/ - último acesso a 8 agosto 2016

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)

Visãos + Audição - During the breeding season, male magnificent frigatebirds congregate at male display sites. They inflate their large, red, gular sacs. These sacs, while inflated, can get so large that they obscure the bird´s head. Males rapidly vibrate their wings and sit back on their tails. They stretch their wings out and throw theis heads back for maximum display of the gular sac. Females then inspect the males. As females attempt to find a preferred mate, males twist and bend to make their gular sac look as large a possible, theu also make loud, drumming noise during display. Magnificent frigatebirds form monogomous pairs each breeding season once females have selected mates. However, they rarely maintain the same partner from season to season. (Diamond and Schreiber, 2002; Diamond, 1973; Madsen, et al, 2004)
http://animaldiversity.org/accounts/Fregata_magnificens/ - último acesso a 8 agosto 2016

INTENSITY - Características/ações (amabilidade, cortesia, "transformação física" ou "metamoforse", proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade etc.)

"Transformação física" ou "metamoforse", - They inflate their large, red, gular sacs. These sacs, while inflated, can get so large that they obscure the bird´s head.

Dinâmica + exibição - Males rapidly vibrate their wings and sit back on their tails. They stretch their wings out and throw theis heads back for maximum display of the gular sac. Females then inspect the males. As females attempt to find a preferred mate, males twist and bend to make their gular sac look as large a possible, theu also make loud, drumming noise during display. Magnificent frigatebirds form monogomous pairs each breeding season once females have selected mates. However, they rarely maintain the same partner from season to season. (Diamond and Schreiber, 2002; Diamond, 1973; Madsen, et al, 2004)

http://animaldiversity.org/accounts/Fregata_magnificens/ - último acesso a 8 agosto 2016

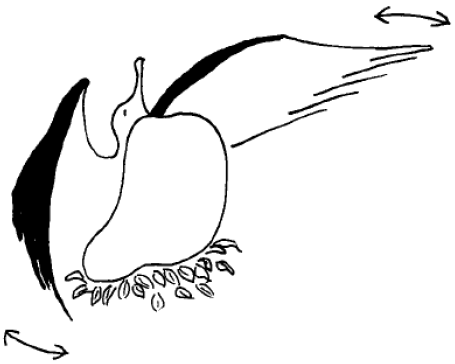


FIGURE 7. Diagram of ♂ – to – ♀ display. Arrows show direction of movement of wing tips in wing-fanning.

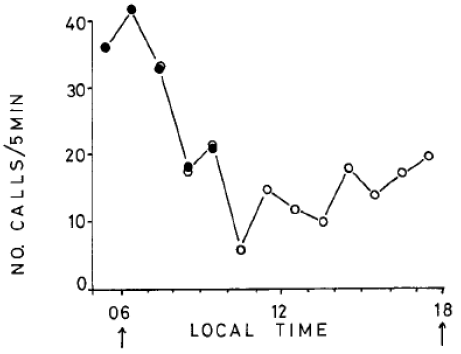


FIGURE 8. Diel periodicity of display calls given by males. Open circles: 15 September. Solid circles: 16 September 1971.

Diamond, A. (1972). Notes on the breeding biology and behavior of the magnificent frigatebird. Zoology Department, Edward Grey Institute of Field Ornithology
South Parks Road. Oxford OX1 3PS, England. (pág. 217)

RESUMO DESCRITIVO

seduzem através de sons e imagem. Têm uma espécie de insuflável no peito de cor vermelha, que demora +/- 20 minutos a insuflar totalmente para em conjunto com os sons atrair as parceiras. tal como no pavão o tamanho do balão dá indicações às fêmeas das condições de saúde do macho. As fêmeas não têm o insuflável.
http://www.youtube.com/watch?v=OJgfcOd1R7E&feature=related

Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.
Pág. 24
Nas ilhas tropicais existe uma ave marinha chamada fragata (*Fregata magnificens*) que resolveu colorir uma outra parte do corpo, provavelmente porque as aves da floresta já tinham esgotado as vestimentas espampanantes. Depois de muito pensar as fragatas resolveram mandar instalar um saco de cor vermelha escarlate na zona do pescoço que conseguem inchar até ofuscar o resto do desinteressante (para as fêmeas, claro) corpo preto.

Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.
Pág. 45

A fragata, também apresenta um comportamento estranho durante a cópula. O macho, enquanto em cima da femea, gentilmente cobre a cabeça da parceira com as asas. A razão para tal comportamento só poderá ser para evitar que ela se distraia com os papos escalartes e insuflados dos restantes machos da colónia e não sobrevenha algum sentimento de arrependimento com a escolha.

Reproduction

During the breeding season, male magnificent frigatebirds congregate at male display sites. They inflate their large, red, gular sacs. These sacs, while inflated, can get so large that they obscure the bird's head. Males rapidly vibrate their wings and sit back on their tails. They stretch their wings out and throw their heads back for maximum display of the gular sac. Females then inspect the males. As females attempt to find a preferred mate, males twist and bend to make their gular sac look as large a possible, they also make a loud, drumming noise during this display. Magnificent frigatebirds form monogamous pairs each breeding season once females have selected mates. However, they rarely maintain the same partner from season to season. (Diamond and Schreiber, 2002; Diamond, 1973; Madsen, et al., 2004)

http://animaldiversity.org/accounts/Fregata_magnificens/ - último acesso a 8 agosto 2016

...alguns pássaros enviam não só sinais através de sons mas também através de imagem. (1m43s) Têm uma espécie de insuflável no peito de cor vermelha, que demora +/- 20 minutos a insuflar totalmente para em conjunto com os sons atrair as parceiras.(2m4s) O tamanho do balão dá indicações às fêmeas das condições de saúde do macho. (2m29s) As fêmeas não têm o insuflável. Attenborough, D. (1998). The life of birds, época 1, episódio 7. BBCWorldwide: 49:18. Último acesso a 11 de Agosto de 2016 - http://www.youtube.com/watch?v=OJgfcOd1R7E&feature=related

DISPLAY
The general features of the courtship display are similar to those described by Nelson (1968) for F. minor. Males display in groups, commonly of four to eight, to birds flying overhead. The full display, with outstretched wings rapidly vibrated, head thrown back, and pouch fully blown out, is reserved for females, but what is probably a low-intensity version of this display is given to incoming males as well. (P. 206)
This version differs from the full male-to-female display in the following respects: (1) the wings are not fully outstretched and are flopped or waved halfheartedly; in full display they are extended sideways, raised well above the substrate, and vibrated rapidly back and forth (fig. 7). I suggest the term "wing-fanning" be used for the full-display wing movements and "wingwaving" for the actions used in a male-to-male context. (2) The displaying male does not throw back his head and raise the scapulars to nearly the same extent as when displaying to a female. (3) When a female pauses overhead to inspect a group of males (females flying directly over are often ignored), every male in the group at once goes into full display. When a male flies over, and particularly when one attempts to land in or next to the group, usually only the nearest one or two males react with the low-intensity version of the display; the others pay no visible attention (4) When a male does land, the nearest male in the group lunges at him with billsnapping and frequently drives him off. Thus although there is no ritualized site-ownership display, the male certainly defends the area immediately around his display site (cf.Nelson 1968, 1970).
Male-to-male display has hitherto been recorded in Pelecaniformes only in the Masked or Blue-faced Booby (Sula dactz~latru) in the Pacific (Kepler 1969). Once a female has landed by a male, he continues the full display intermittently, often accompanied by one or two, but rarely all, members of the group, and alternates display with bouts of head-shaking with the female. She responds with the twittering already described, bending her neck

around to nibble the male's flanks or stretching across to rub her head along his pouch, and passing her head across his in mutual head-snaking. Contrary to the description of frigatebird display given by van Tets (1965), the female does not have a display similar to the male.
A female flying over a group of displaying males would, if attracted by the display, hover above the group before flying on or descending. This hovering was apparently identical with that used to maintain position in other situations, e.g.. before landing by a chick or on the nest; there are no ritualized wing or neck actions characteristic of females answering a male's display such as are found in F. ariel (Diamond, unpubl.) .
A measure of the diurnal variation in display activity is given by the number of "reeling" and "drumming" sounds heard in a given time interval. This is shown, for parts of 2 days in September, in figure 8. There is an early morning peak and a late morning trough, followed by a steady rise to about half the dawn value at dusk. Some display was heard after dark. (P. 207)

Diamond, A. (1972). Notes on the breeding biology and behavior
of the magnificent frigatebird. Zoology Department, Edward Grey Institute of Field Ornithology
South Parks Road. Oxford OX1 3PS, England. (pag. 200 A 209)

OBSERVAÇÃO VISUAL (VÍDEO)

http://www.youtube.com/watch?v=OJgfcOd1R7E&feature=related

REFERÊNCIAS BIBLIOGRÁFICAS

Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.

Diamond, A. (1972). Notes on the breeding biology and behavior
of the magnificent frigatebird. Zoology Department, Edward Grey Institute of Field Ornithology
South Parks Road. Oxford OX1 3PS, England. (pag. 200 A 209)

http://animaldiversity.org/accounts/Fregata_magnificens/ - último acesso a 8 agosto 2016

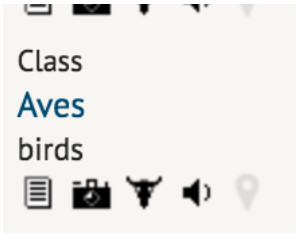
Attenborough, D. (1998). The life of birds, época 1, episódio 7. BBCWorldwide: 49:18. Último acesso a 11 de Agosto de 2016 - http://www.youtube.com/watch?v=OJgfcOd1R7E&feature=related

Carregado a 09/04/2009
David Attenborough reveals how male birds use both extraordinary displays and bizarre rituals in order to turn a females head, and how for many species its girl power that rules the dating game. Curassows and guans have bizarre calls that sound just like dropping bombs and electric drills. On the Galapagos Islands, frigate birds pump up their vivid red throat pouches. While the tiny fairy wren of southern Australia is revealed as the most promiscuous bird in the world.

Programa	The Life of Birds
Época	1
Episódio	7
Data de lançamento	02/12/98
Duração	49:18
Ator/Atriz	David Attenborough
Realizadores(as)	Peter Bassett, Nigel Marven
Produtor(a)	Peter Bassett
Escritor(a)	David Attenborough
Categoria	Documentário, Natureza
Licença	Licença padrão do YouTube

GROU JAPONÊS – FALTA!!!!!
(*Grus japonensis*)

TIPO DE AGENTE
Voador



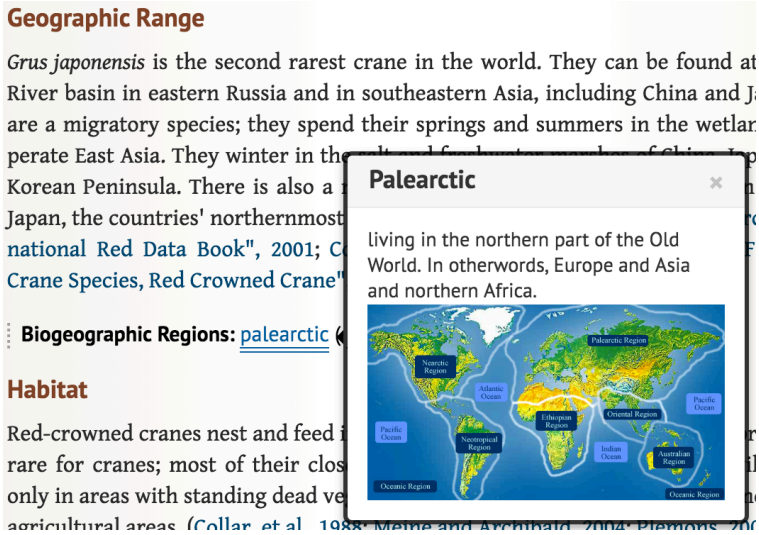
http://animaldiversity.org/accounts/Grus_japonensis/#f8087fc57457a19b6598aa02f3bc0664 - ultimo acesso a 26 de agosto de 2016

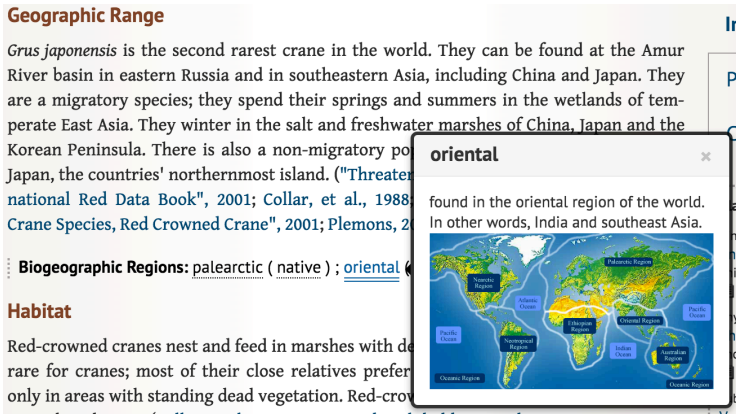
ZONAS GEOGRÁFICAS
Russia, Sudueste Asiático incluindo a China e o japão

Geographic Range

Grus japonensis is the second rarest crane in the world. They can be found at the Amur River basin in eastern Russia and in southeastern Asia, including China and Japan. They are a migratory species; they spend their springs and summers in the wetlands of temperate East Asia. They winter in the salt and freshwater marshes of China, Japan and the Korean Peninsula. There is also a non-migratory population that remains in Hokkaido, Japan, the countries' northernmost island. ("Threatened Birds of Asia: The BirdLife International Red Data Book", 2001; Collar, et al., 1988; "International Crane Foundation, Crane Species, Red Crowned Crane", 2001; Plemons, 2001; Smirenski, 2000)

Biogeographic Regions: palearctic (native) ; oriental (native)





http://animaldiversity.org/accounts/Grus_japonensis/ - ultimo acesso a 26 de agosto de 2016

Red-crowned Cranes breed in large wetlands in temperate East Asia and winter along rivers and in coastal and freshwater marshes in Japan, China, and the Korean Peninsula. There are two main breeding populations: a migratory population on the East Asia mainland (northeastern China and Russia) of perhaps 1,200 birds, and a resident population on the island of Hokkaido in northern Japan of about 900 birds. In the winter, the mainland population divides into two or three wintering subpopulations. The total population has fluctuated over the last century, probably reaching its lowest point in the years following World War II. Although the species has recovered in some areas, a substantial amount of habitat has been lost to agricultural development and other human activities.

Range, Migration and Nesting Map
https://www.savingcranes.org/species-field-guide/red-crowned-crane/ - ultimo acesso a 26 de agosto de 2016

QUEM TOMA INICIATIVA (M | F)

Male Red-crowned Cranes initiate the display and the female utters two calls for each male call.
https://www.savingcranes.org/species-field-guide/red-crowned-crane/ - ultimo acesso a 26 de Agosto de 2016

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)

Rápido – até 10m
No dia 12/09/2016, às 22:08, CEDIntern <CEDIntern@savingcranes.org> escreveu:
Hello Mr. Bandeira Maia,

Thank you for writing to the International Crane Foundation with your question about Red-crowned Crane courtship behaviors. While we couldn't find any papers that describe the length of a crane mating dance, we know from our staff observations on site that the dancing ritual takes less than ten minutes. Copulation itself is very quick (seconds) but the dancing and shadowing behaviors can take place for minutes before. Not all dancing rituals lead to copulation however – cranes dance for exercise, to strengthen pair bonds, and to teach chicks the sequence. We're sorry we can't cite a

published scientific paper that describes the time budget of the courtship ritual of Red-crowned cranes but encourage you to visit our species field guide at:https://www.savingcranes.org/species-field-guide/ and to email us back with any additional questions or comments!

Thank you again for contacting the International Crane Foundation and best of luck with your research!

Sincerely,
Emma Shelly
Interpretive Naturalist

INTERNATIONAL CRANE FOUNDATION
E11376 Shady Lane Road, P.O. Box 447
Baraboo, WI 53913 USA
(p) 608.356.9462 ext.127 (f) 608.356.9465
www.savingcranes.org

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)

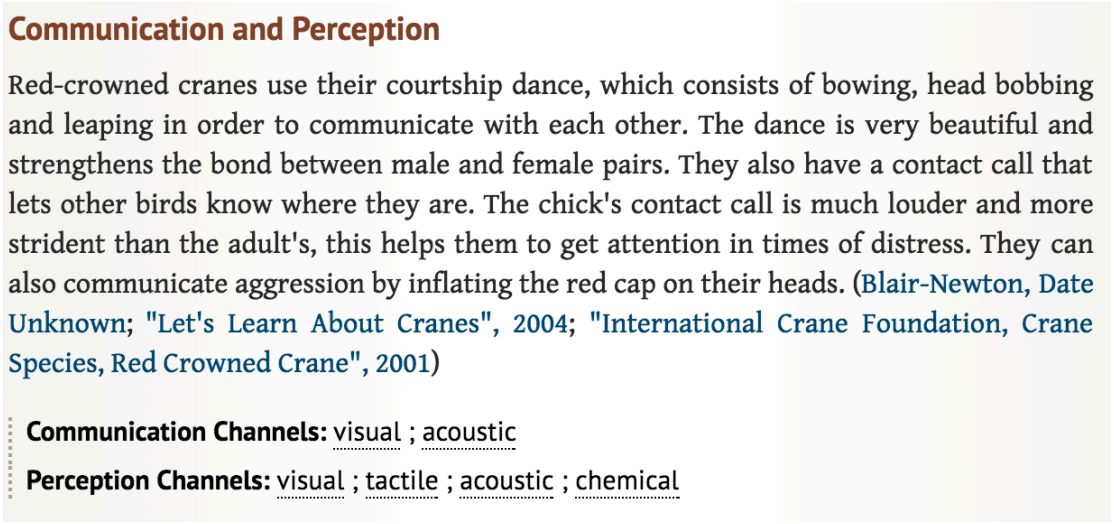
Brandos – The birds stand in a specific posture, usually with their heads thrown back and beaks skyward during the display. The male always lifts up his wings over his back during the unison call while the female keeps her wings folded at her sides. Male Red-crowned Cranes initiate the display and the female utters two calls for each male call. All cranes engage in dancing, which includes various behaviors such as bowing, jumping, running, stick or grass tossing, and wing flapping. Dancing can occur at any age and is commonly associated with courtship;
https://www.savingcranes.org/species-field-guide/red-crowned-crane/ - ultimo acesso a 26 de Agosto de 2016

Ritualizados - The birds stand in a specific posture, usually with their heads thrown back and beaks skyward during the display. The male always lifts up his wings over his back during the unison call while the female keeps her wings folded at her sides. Male Red-crowned Cranes initiate the display and the female utters two calls for each male call. All cranes engage in dancing, which includes various behaviors such as bowing, jumping, running, stick or grass tossing, and wing flapping. Dancing can occur at any age and is commonly associated with courtship;
https://www.savingcranes.org/species-field-guide/red-crowned-crane/ - ultimo acesso a 26 de Agosto de 2016

Materiais - that begin with a courtship consisting of bowing, posing, bobbing, pirouetting and leaping excitedly in the air. When they really get worked up, they can be seen tossing sticks, leaves and grass high into the air and pecking at the debris as it falls to the ground. Taking the top spot in our countdown, this bird is an elegant performer and a symbol of good luck and happiness throughout its range.
http://www.animalplanet.com/wild-animals/no-1-red-crowned-crane-the-dance-of-love/ - ultimo acesso a 26 de Agosto de 2016

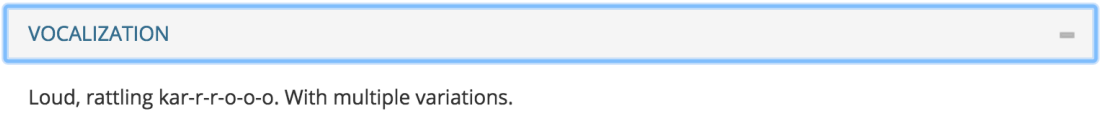
TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)

Visão –



http://animaldiversity.org/accounts/Grus_japonensis/ - ultimo acesso a 26 de agosto de 2016

Audição -



https://www.savingcranes.org/species-field-guide/red-crowned-crane/ - ultimo acesso a 26 de Agosto de 2016

Audição -

VOICE:

Red-crowned Crane utters penetrating vocalizations. It has wide repertoire from low-pitched purrs to loud calls given by both mates during the courtship displays. Unison calls are given by both sexes before the dances.

http://www.oiseaux-birds.com/card-red-crowned-crane.html - ultimo acesso a 26 de Agosto de 2016

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade, etc.)

Amabilidade – that begin with a courtship consisting of bowing, posing, bobbing, pirouetting and leaping excitedly in the air. http://www.animalplanet.com/wild-animals/no-1-red-crowned-crane-the-dance-of-love/ - ultimo acesso a 26 de Agosto de 2016

Cortesia – Also known as the Japanese and the Manchurian crane, these animals form lifelong romantic partnerships that begin with a courtship consisting of bowing, posing, bobbing, pirouetting and leaping excitedly in the air. When they really get worked up, they can be seen tossing sticks, leaves and grass high into the air and pecking at the debris as it falls to the ground. Taking the top spot in our countdown, this bird is an elegant performer and a symbol of good luck and happiness throughout its range. http://www.animalplanet.com/wild-animals/no-1-red-crowned-crane-the-dance-of-love/ - ultimo acesso a 26 de Agosto de 2016

Dinâmica – Also known as the Japanese and the Manchurian crane, these animals form lifelong romantic partnerships that begin with a courtship consisting of bowing, posing, bobbing, pirouetting and leaping excitedly in

the air. When they really get worked up, they can be seen tossing sticks, leaves and grass high into the air and pecking at the debris as it falls to the ground. Taking the top spot in our countdown, this bird is an elegant performer and a symbol of good luck and happiness throughout its range. http://www.animalplanet.com/wild-animals/no-1-red-crowned-crane-the-dance-of-love/ - ultimo acesso a 26 de Agosto de 2016
Sincronização – Mated pairs of cranes, including Red-crowned Cranes, engage in unison calling, which is a complex and extended series of coordinated calls.
https://www.savingcranes.org/species-field-guide/red-crowned-crane/ - ultimo acesso a 26 de Agosto de 2016
Exibição – Also known as the Japanese and the Manchurian crane, these animals form lifelong romantic partnerships that begin with a courtship consisting of bowing, posing, bobbing, pirouetting and leaping excitedly in the air. When they really get worked up, they can be seen tossing sticks, leaves and grass high into the air and pecking at the debris as it falls to the ground. Taking the top spot in our countdown, this bird is an elegant performer and a symbol of good luck and happiness throughout its range. http://www.animalplanet.com/wild-animals/no-1-red-crowned-crane-the-dance-of-love/ - ultimo acesso a 26 de Agosto de 2016
Reciprocidade - Male Red-crowned Cranes initiate the display and the female utters two calls for each male call. All cranes engage in dancing, which includes various behaviors such as bowing, jumping, running, stick or grass tossing, and wing flapping.
https://www.savingcranes.org/species-field-guide/red-crowned-crane/ - ultimo acesso a 26 de Agosto de 2016

RESUMO DESCRITIVO

No dia 12/09/2016, às 22:08, CEDIntern <CEDIntern@savingcranes.org> escreveu:
Hello Mr. Bandeira Maia,

Thank you for writing to the International Crane Foundation with your question about Red-crowned Crane courtship behaviors. While we couldn't find any papers that describe the length of a crane mating dance, we know from our staff observations on site that the dancing ritual takes less than ten minutes. Copulation itself is very quick (seconds) but the dancing and shadowing behaviors can take place for minutes before. Not all dancing rituals lead to copulation however – cranes dance for exercise, to strengthen pair bonds, and to teach chicks the sequence. We're sorry we can't cite a published scientific paper that describes the time budget of the courtship ritual of Red-crowned cranes but encourage you to visit our species field guide at:https://www.savingcranes.org/species-field-guide/ and to email us back with any additional questions or comments!

Thank you again for contacting the International Crane Foundation and best of luck with your research!

Sincerely,
Emma Shelly
Interpretive Naturalist

INTERNATIONAL CRANE FOUNDATION
E11376 Shady Lane Road, P.O. Box 447
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(p) 608.356.9462 ext.127 (f) 608.356.9465

www.savingcranes.org

Cranes are well known for their wonderful mating dances. These dances include jerky bouncing, graceful leaping up in the air and wild running with outstretched wings. The birds bow with bent legs and raised wings, and jump. They may take a stick or some vegetation, and toss it up in the air. These dances are amazing to see. They are used for pair-bond maintenance, but they have several goals according to the age of the bird.
Even the chicks may dance and for them, these displays are associated to play, whereas in adults, they are a real communication accompanied by calls. Vocal displays occur, with head tossed backwards, bill upwards and raised wings.
http://www.oiseaux-birds.com/card-red-crowned-crane.html - ultimo acesso a 26 de Agosto de 2016

Is there anything more beautiful than a pair of red-crowned cranes in love? Perhaps, but when these birds come together, they put on a performance more spectacular than anything you'll see on Broadway. Also known as the Japanese and the Manchurian crane, these animals form lifelong romantic partnerships that begin with a courtship consisting of bowing, posing, bobbing, pirouetting and leaping excitedly in the air. When they really get worked up, they can be seen tossing sticks, leaves and grass high into the air and pecking at the debris as it falls to the ground. Taking the top spot in our countdown, this bird is an elegant performer and a symbol of good luck and happiness throughout its range.
http://www.animalplanet.com/wild-animals/no-1-red-crowned-crane-the-dance-of-love/ - ultimo acesso a 26 de Agosto de 2016

Mated pairs of cranes, including Red-crowned Cranes, engage in unison calling, which is a complex and extended series of coordinated calls. The birds stand in a specific posture, usually with their heads thrown back and beaks skyward during the display. The male always lifts up his wings over his back during the unison call while the female keeps her wings folded at her sides. Male Red-crowned Cranes initiate the display and the female utters two calls for each male call. All cranes engage in dancing, which includes various behaviors such as bowing, jumping, running, stick or grass tossing, and wing flapping. Dancing can occur at any age and is commonly associated with courtship; however, it is generally believed to be a normal part of motor development for cranes and can serve to thwart aggression, relieve tension, and strengthen the pair bond. Red-crowned Cranes seem to dance more than other species of cranes.
https://www.savingcranes.org/species-field-guide/red-crowned-crane/ - ultimo acesso a 26 de Agosto de 2016

Reproduction

Red-crowned cranes have a dancing display used in courtship and to communicate between the other members of its species. The dance is a series of bows, head bobbing, leaps, and various other gestures. There is also a unison call given by the male and female before they start other dance elements. These cranes are monogamous and stay together throughout the year, they often remain together for many years or until one of them dies. ("International Crane Foundation, Crane Species, Red Crowned Crane", 2001; Smirenski, 2000)

http://animaldiversity.org/accounts/Grus_japonensis/ - ultimo acesso a 26 de agosto de 2016

Communication and Perception

Red-crowned cranes use their courtship dance, which consists of bowing, head bobbing and leaping in order to communicate with each other. The dance is very beautiful and strengthens the bond between male and female pairs. They also have a contact call that lets other birds know where they are. The chick's contact call is much louder and more strident than the adult's, this helps them to get attention in times of distress. They can also communicate aggression by inflating the red cap on their heads. (Blair-Newton, Date Unknown; "Let's Learn About Cranes", 2004; "International Crane Foundation, Crane Species, Red Crowned Crane", 2001)

Communication Channels: visual ; acoustic

Perception Channels: visual ; tactile ; acoustic ; chemical

http://animaldiversity.org/accounts/Grus_japonensis/ - ultimo acesso a 26 de agosto de 2016

OBSERVAÇÃO VISUAL (VÍDEO)

https://www.youtube.com/watch?v=M8qprOG2LxY - ultimo acesso a 26 de Agosto de 2016

http://www.discovery.com/tv-shows/winged-planet/videos/japanese-crane-courtship-dance/ - ultimo acesso a 26 de Agosto de 2016

REFERÊNCIAS BIBLIOGRÁFICAS

http://animaldiversity.org/accounts/Grus_japonensis/ - ultimo acesso a 26 de agosto de 2016

http://www.animalplanet.com/wild-animals/no-1-red-crowned-crane-the-dance-of-love/ - ultimo acesso a 26 de Agosto de 2016

https://www.savingcranes.org/species-field-guide/red-crowned-crane/ - ultimo acesso a 26 de agosto de 2016

PATOLA-DE-PÉS-AZUIS

(*Sula nebouxii*)

TIPO DE AGENTE

Voador

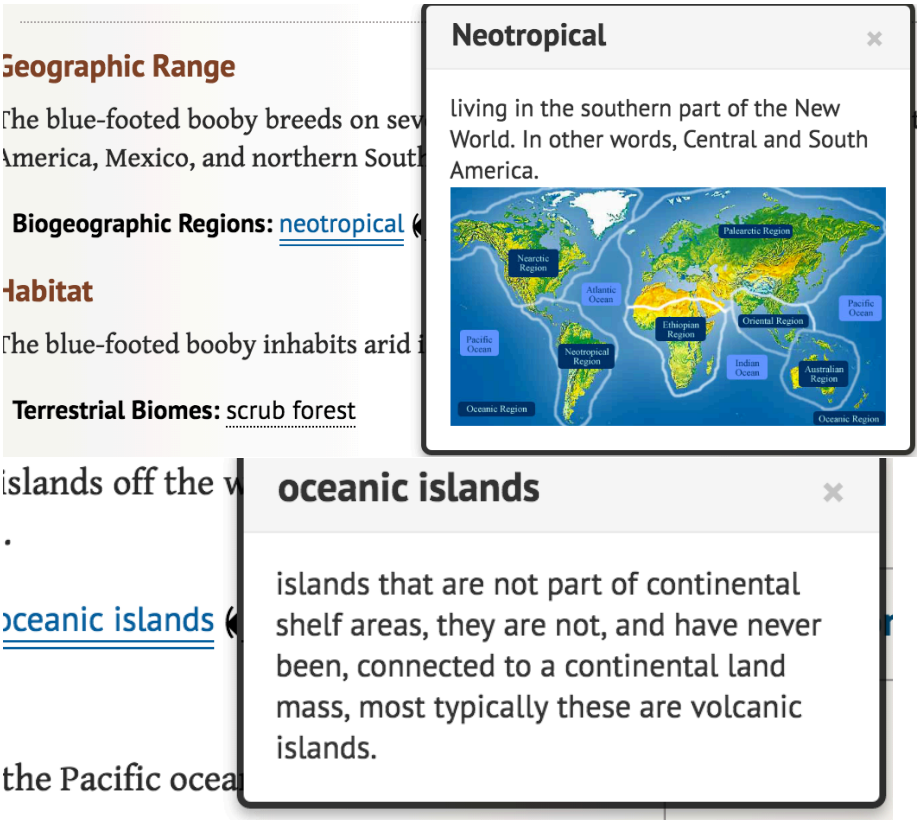
ZONAS GEOGRÁFICAS

Costa ocidental da América tropical, México e norte da América do Sul -

Geographic Range

The blue-footed booby breeds on several arid islands off the western coasts of tropical America, Mexico, and northern South America.

Biogeographic Regions: neotropical (native) ; oceanic islands (native)



http://animaldiversity.org/accounts/Sula_nebouxii/ - ultimo acesso em 19 de Agosto de 2016

These boobies live off the western coasts of Central and South America. The Galápagos Islands population includes about half of all breeding pairs of blue-footed boobies.
http://animals.nationalgeographic.com/animals/birds/blue-footed-booby/ - ultimo acesso a 20 de Agosto de 2016

Quem toma iniciativa (M | F)

Masculino - Mating is preceded by an elaborate courtship ritual, which begins with the male presenting the female with a small stick or stone.
http://galapagosconservation.org.uk/wildlife/blue-footed-booby/ - ultimo acesso a 19 de Agosto de 2016

Masculino - When it's mating season, the birds need to attract a mate. So, as Oxford says, they need to "put on a sexy dress." This requirement falls to the males, who are charged with attracting the female boobies.
http://www.treehugger.com/natural-sciences/the-strange-sexy-dance-of-the-blue-footed-boobies.html - ultimo acesso a 19 de Agosto de 2016

DURATION - Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia) – CONFIRMAR!!!!!

Rápido – até 10m

Email Professor hugh Drummond – 22 Agosto 2016 às 21h21m
If you search on the internet you will probably find videos of courtship. A bout of courtship in a bonded pair can last as little as a few seconds or as long as a few minutes, and often there is a sequence of several bouts.
Good luck!
Hugh
No dia 22/08/2016, às 20:02, Lynna kiere <lynnamariekiere@gmail.com> escreveu:

Hi Pedro,
From the time of first encounter to copulation, especially in the formation of social pairs ("married" couples) this courtship almost always goes on for more than one day before the *first* copulation occurs, but for subsequent copulations can be less then 10 min.

Within-pair courtship was frequent throughout the times when both mates were together: the mean proportion of 15-min intervals with some courtship varied from 67.7% to 89.2% over the eight 5-day blocks before laying (mean à 75.5%, 13 pairs). (p. 309)
Osorio-Beristain, M. & Drummond, H. (1998). Non-aggressive mate guarding by the blue-footed booby: a balance of female and male control. Behav Ecol Sociobiol (1998) 43: 307±315
Furthermore, courtship continued at roughly typical levels in these postcopulation periods: pairs showed some courtship in 63.7 ã 17.4% of 15-min intervals (n à 12 pair means). (p. 310)
Osorio-Beristain, M. & Drummond, H. (1998). Non-aggressive mate guarding by the blue-footed booby: a balance of female and male control. Behav Ecol Sociobiol (1998) 43: 307±315

INTERACTION - Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)
Brando – The courtship displays recorded were sky-pointing (when the bird's neck was lengthening with the bill pointing skywards, accompanied by elevation of the tail and lateral spreading of the wings), parading (when the bird performed an exaggerated footraising, flaunting the webs upwards and outwards), … (p. 61)
Torres, R. & Velando, A. (2004). Male preference for female foot colour in the socially monogamous blue-footed booby, Sula nebouxii. Animal Behaviour, 69, 59–65

Ritualizado – … and ritualized nest material presentation (when the bird picked up a fragment of any type of material and with an upward movement of the head in a smooth high arc deposited it near the feet of the courting bird; Nelson 1978). (p. 61)
Torres, R. & Velando, A. (2004). Male preference for female foot colour in the socially monogamous blue-footed booby, Sula nebouxii. Animal Behaviour, 69, 59–65

Materiais – … and ritualized nest material presentation (when the bird picked up a fragment of any type of material and with an upward movement of the head in a smooth high arc deposited it near the feet of the courting bird; Nelson 1978). (p. 61)
Torres, R. & Velando, A. (2004). Male preference for female foot colour in the socially monogamous blue-footed booby, Sula nebouxii. Animal Behaviour, 69, 59–65

Ritualizado – Mating is preceded by an elaborate courtship ritual, which begins with the male presenting the female with a small stick or stone. He then tips his beak, tail, and wing tips to the sky, whistles, and marches around the female with a high-stepping motion, showing off his feet.
http://galapagosconservation.org.uk/wildlife/blue-footed-booby/ - ultimo acesso a 19 de Agosto de 2016

Ritualizado – she needs to make sure he can groove. The male will initiate this supremely bizarre dance, wobbling back and forth, raising one leg after

another, and continuing to make high-pitched calls. If she's into it, she'll join him on the dance floor.
Brando – The males then wait on the ground for a female to fly overhead. When he sees one that's to his liking, he'll point everything he's got—beak, wings, chest—up to the sky and whistle obnoxiously to get her attention. Sound familiar, ladies?
Materiais - When he finally attracts a suitably buxom boobie, he'll try to gain her trust, and signal that he's in it for the long term. Boobies don't nest, so he'll pick up a stone or a twig with his beak as an offering—sort of like presenting a wedding ring, or signing a mortgage. He says, "Well I don't have my own place *yet*, but things are looking pretty good . . ."
http://www.treehugger.com/natural-sciences/the-strange-sexy-dance-of-the-blue-footed-boobies.html - ultimo acesso a 19 de Agosto de 2016

TRIGGERS - Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)

Visão – During mating rituals, male birds show off their feet to prospective mates with a high-stepping strut. The bluer the feet, the more attractive the mate.
http://animals.nationalgeographic.com/animals/birds/blue-footed-booby/ - ultimo acesso a 20 de Agosto de 2016
Visão – During courtship, the female booby honks and the male whistles. They perform a dance which includes showing off their feet and "sky-pointing."
The male, eager to impress the female, flashes his brightly colored feet, and struts around her.
https://biology.cornell.edu/people/christina-mendoza - ultimo acesso a 19 de Agosto de 2016
Visão – For example, while the male is busy showing off his feet to the female, she's not judging it based on shape or size; she's judging it based on color. The brightness of male blue-footed boobies' feet is dependent on their age and health. Younger males have brighter feet, and healthy birds have dietary carotenoids which make their feet more aquamarine, thus making the color of feet indicative of successful genes; genes that the female would like to pass on to its offspring.
https://biology.cornell.edu/people/christina-mendoza - ultimo acesso a 19 de Agosto de 2016

Visão - So, as Oxford says, they need to "put on a sexy dress." This requirement falls to the males, who are charged with attracting the female boobies. They preen themselves, and make sure they look slick enough to turn heads.
Visão + Audição - The males then wait on the ground for a female to fly overhead. When he sees one that's to his liking, he'll point everything he's got—beak, wings, chest—up to the sky and **Audição -** whistle obnoxiously to get her attention.
Visão – The male will initiate this supremely bizarre dance, wobbling back and forth, raising one leg after another, and continuing to make high-pitched calls. If she's into it, she'll join him on the dance floor.
Tacto – She'll allow him to preen her with his beak, which is a big sign of trust. The beak is the boobies' most dangerous weapon, and to let him use it in such intimate context is much when we human touch tooth-filled mouths in our own weird ritual.
http://www.treehugger.com/natural-sciences/the-strange-sexy-dance-of-the-blue-footed-boobies.html - ultimo acesso a 19 de Agosto de 2016

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade, etc.)

Sincronização – frente a frente imitam os movimentos um do outro - https://www.youtube.com/watch?v=z922by9_6Fw – 36 segundos - (ultimo acesso a 21 de Agosto de 2016

Exibição – The courtship displays recorded were sky-pointing (when the bird's neck was lengthening with the bill pointing skywards, accompanied by elevation of the tail and lateral spreading of the wings), parading (when the bird performed an exaggerated footraising, flaunting the webs upwards and outwards), … (p. 61)
Torres, R. & Velando, A. (2004). Male preference for female foot colour in the socially monogamous blue-footed booby, Sula nebouxii. Animal Behaviour, 69, 59–65

Amabilidade – Boobies don't nest, so he'll pick up a stone or a twig with his beak as an offering—sort of like presenting a wedding ring, or signing a mortgage. He says, "Well I don't have my own place *yet*, but things are looking pretty good . . ."
http://www.treehugger.com/natural-sciences/the-strange-sexy-dance-of-the-blue-footed-boobies.html - ultimo acesso a 19 de Agosto de 2016

Cortesia – Boobies don't nest, so he'll pick up a stone or a twig with his beak as an offering—sort of like presenting a wedding ring, or signing a mortgage. He says, "Well I don't have my own place *yet*, but things are looking pretty good . . ."
http://www.treehugger.com/natural-sciences/the-strange-sexy-dance-of-the-blue-footed-boobies.html - ultimo acesso a 19 de Agosto de 2016

Carinhos – She'll allow him to preen her with his beak, which is a big sign of trust. The beak is the boobies' most dangerous weapon, and to let him use it in such intimate context is much when we human touch tooth-filled mouths in our own weird ritual.
http://www.treehugger.com/natural-sciences/the-strange-sexy-dance-of-the-blue-footed-boobies.html - ultimo acesso a 19 de Agosto de 2016

Carinhos – Tocam bico coom bico de forma carinhosa - https://www.youtube.com/watch?v=z922by9_6Fw – 22 segundos - (ultimo acesso a 21 de Agosto de 2016

Exibição - During mating rituals, male birds show off their feet to prospective mates with a high-stepping strut. The bluer the feet, the more attractive the mate.
http://animals.nationalgeographic.com/animals/birds/blue-footed-booby/ - ultimo acesso a 20 de Agosto de 2016

Exibição – The courtship ritual continues with the male showing off potential nest building materials. Then, since female blue-footed boobies are essentially podophilists because of their intense sexual interest in feet, the male continues to show off his bright blue feet. However, this heated encounter also features a male displaying its wings and sky-pointing. As the

name suggests, in sky-pointing, the male booby points its head to the sky, and as it spreads out its wings, he whistles to the female.
https://biology.cornell.edu/people/christina-mendoza - ultimo acesso a 19 de Agosto de 2016

Exibição – They preen themselves, and make sure they look slick enough to turn heads.
2. The males then wait on the ground for a female to fly overhead. When he sees one that's to his liking, he'll point everything he's got—beak, wings, chest—up to the sky and whistle obnoxiously to get her attention.
http://www.treehugger.com/natural-sciences/the-strange-sexy-dance-of-the-blue-footed-boobies.html - ultimo acesso a 19 de Agosto de 2016

Reciprocidade – The male will initiate this supremely bizarre dance, wobbling back and forth, raising one leg after another, and continuing to make high-pitched calls. If she's into it, she'll join him on the dance floor.
http://www.treehugger.com/natural-sciences/the-strange-sexy-dance-of-the-blue-footed-boobies.html - ultimo acesso a 19 de Agosto de 2016

Resumo descritivo

Email Professor hugh Drummond – 22 Agosto 2016 às 21h21m
Pedro:
These might help a little bit, and give you an entry into the literature, but what you probably need is JB Nelson´s 1975 book The Sulidae: Gannets and Boobies, which will probably be very hard to find now.
If you search on the internet you will probably find videos of courtship. A bout of courtship in a bonded pair can last as little as a few seconds or as long as a few minutes, and often there is a sequence of several bouts.
Good luck!
Hugh
No dia 22/08/2016, às 20:02, Lynna kiere <lynnamariekiere@gmail.com> escreveu:
Hi Pedro,
From the time of first encounter to copulation, especially in the formation of social pairs ("married" couples) this courtship almost always goes on for more than one day before the *first* copulation occurs, but for subsequent copulations can be less then 10 min. This time can be less though in extra-pair interactions ("affairs" with individuals other than the social mate), when the time between first encounter and the first copulation can be less than a day (though usually more than 10 minutes). By the way, in this species both males and females court, and both sexes are choosy about their partners.
Hope that helps!
Saludos,
Lynna Kiere
No dia 22/08/2016, às 18:24, Lynna kiere <lynnamariekiere@gmail.com> escreveu:
Hi Pedro,
What an interesting way to use animal behavior! Boobies have a very long courtship period before actually laying their eggs, during which they establish a social partnership (kind of equivalent to dating before getting married in humans, I suppose) which can last up to a month or even two. During that time they carry out courtship behaviors-their famous "dance"-which actually includes three main courtship displays: "parading", "skypointing", and "twig-lifting". Over this period there are several copulations, and the rate of copulations increases as the female gets closer to laying. The male and

female also defend a territory together and preen each other during this time.

From your question it's not completely clear to me if this is the "duration of courtship" you are referring to. If so, I would definitely say more than a day. However, my work was on extra-pair behavior, where the female courts and may copulate with a male that is *not* her social partner. Extra-pair interactions can be much shorter- perhaps less than an hour of courtship before a copulation occurs, though there is a *lot* of variation and about half of the time that females courted with an extra-pair male no copulation occured at all. I noticed you read one of my papers on research gate, but the description of courtship in that paper is very brief. There is a more detailed description in the methods section of my first paper on boobies (2014 "Extrapair behaviour reveals flexible female choosiness and mixed support for classic good genes in blue-footed boobies"). Also, I'd recommend either the book by J. Bryan Nelson (2005) "Pelicans, Cormorants, and their relatives: The Pelecaniformes" which has a very nice general description of booby courtship, as well as papers by Marcela Osorio (e.g. 1998 "Non-aggressive mate guarding by the blue-footed booby: A balance of female and male control") which are a bit more detailed. I hope that answers some questions for you, but let me know if you need more information!

Best of luck,

Lynna Kiere

Dra. en Ciencias Biológicas
Lab. de Conducta Animal
Instituto de Ecología, UNAM

Courtship occurred when two interacting birds both performed any of the following displays: skypointing, parading, symbolic nestbuilding or bill-up-and-face-away (Nelson 1978). (p. 308)

Within-pair courtship was frequent throughout the times when both mates were together: the mean proportion of 15-min intervals with some courtship varied from 67.7% to 89.2% over the eight 5-day blocks before laying (mean à 75.5%, 13 pairs). (p. 309)

Osorio-Beristain, M. & Drummond, H. (1998). Non-aggressive mate guarding by the blue-footed booby: a balance of female and male control. Behav Ecol Sociobiol (1998) 43: 307±315

Males and females have colourful feet that are displayed ostentatiously during courtship, both before and after pairing, and extrapair copulations are frequent. (p. 59)

In the blue-footed booby, both females and males have conspicuous and variably coloured feet that are exhibited prominently during pair courtship (Nelson 1978). (p. 60)

In this species, males provide a large amount of parental care (Anderson & Ricklefs 1992; Guerra & Drummond 1995), and their contribution influences the female's investment (Velando & Alonso-Alvarez 2003). (p. 60)

The courtship displays recorded were sky-pointing (when the bird's neck was lengthening with the bill pointing skywards, accompanied by elevation of the tail and lateral spreading of the wings), parading (when the bird performed

an exaggerated footraising, flaunting the webs upwards and outwards), and ritualized nest material presentation (when the bird picked up a fragment of any type of material and with an upward movement of the head in a smooth high arc deposited it near the feet of the courting bird; Nelson 1978). (p. 61)

suggesting that male foot colour is important in the courting motivation of females (Torres & Velando 2003). (p.63)
Torres, R. & Velando, A. (2004). Male preference for female foot colour in the socially monogamous blue-footed booby, Sula nebouxii. Animal Behaviour, 69, 59–65

Christina Mendoza – Cornell University
Blue-footed Booby Expert
Setting the Stage for Evolution: The Blue-footed Booby Mating Dance
6:00AM, somewhere in the Pacific Ocean
não transcrevi tudo...
For blue-footed boobies, breeding is opportunistic, so they "take the stage" and mate whenever their environment is favorable (3). During courtship, the female booby honks and the male whistles. They perform a dance which includes showing off their feet and "sky-pointing."
The male, eager to impress the female, flashes his brightly colored feet, and struts around her. Most people think the tango is the most passionate form of dance, but I'd say it comes second to the mating dance of the blue-footed boobies. The courtship ritual continues with the male showing off potential nest building materials. Then, since female blue-footed boobies are essentially podophilists because of their intense sexual interest in feet, the male continues to show off his bright blue feet. However, this heated encounter also features a male displaying its wings and sky-pointing. As the name suggests, in sky-pointing, the male booby points its head to the sky, and as it spreads out its wings, he whistles to the female.
On the seventh day of our trip to the Galapagos, we went to Punta Cormorant Island. We had come to see flamingos but got a glimpse of an even cooler show. The sand was a dark greenish color, and on the edge of a nearby cliff, I observed two males attempting to display to a female bird. The males, trying to out-do the other, each did a few rounds of sky-pointing and showing off their feet, but ultimately, the female was unimpressed with their dance battle. Perhaps sensing the feeling of disgust and disinterest, one of the males flew towards the ocean while the other slowly waddled away. Elizabeth Cady Stanton, a proud women's right advocate, would be proud.
But in all seriousness, it makes sense that females are very "choosy" since they invest a lot of energy in reproduction, given that she actually finds a suitable male to fertilize her egg. A lot of thought goes into choosing a mate. For example, while the male is busy showing off his feet to the female, she's not judging it based on shape or size; she's judging it based on color. The brightness of male blue-footed boobies' feet is dependent on their age and health. Younger males have brighter feet, and healthy birds have dietary carotenoids which make their feet more aquamarine, thus making the color of feet indicative of successful genes; genes that the female would like to pass on to its offspring (2). It's important for a female to choose a healthy male mate, because both the male and female will raise their chicks (2). This is known as bi-parental care and it leads to males choosing as well. Studies show have also shown that females with brighter feet were more likely to have males display to them, demonstrating that males also invest in this relationship as well (5). However, displaying is only beneficial if both participants are committed.
Female boobies will display back to the male to show their interest. This behavior of blue-footed boobies displaying and engaging in courtship is part of sexual selection. Sexual selection is a form of natural selection, where organisms choose to mate with other members of its species based on

favorable characteristics, for example foot color in blue-footed boobies. This "choosing" behavior leads to successful mating, and is passed down to subsequent generations. Foot color is such a favorable trait that even related species, such as the Peruvian booby, can sometimes cue in on the foot color. Normally, Peruvian boobies have dull grayish feet, but a female Peruvian booby may choose a blue-footed booby male to mate with because of its color signaling. On the other hand, a male blue-footed booby will never display to a female Peruvian booby since it will not be attracted to the female's gray feet.
https://biology.cornell.edu/people/christina-mendoza - ultimo acesso a 19 de Agosto de 2016

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1. "Blue-Footed Boobies, Blue-Footed Booby-Sula Nebouxii." National Geographic. National Geographic Society. Web. 25 Apr. 2016. <http://animals.nationalgeographic.com/animals/birds/blue-footed-booby/>.

2. Dentressangle, F., Boeck, L., & Torres, R. (2008). Maternal investment in eggs is affected by male feet colour and breeding conditions in the blue-footed booby, Sula nebouxii. Behavioral Ecology and Sociobiology Behav Ecol Sociobiol, 62(12), 1899-1908. doi:10.1007/s00265-008-0620-6

3. Fitter, Julian, Daniel Fitter, and David Hosking. Wildlife of the Galapagos. London: Collins, 2007. Print.

4. Torres, Roxanna, and Alberto Velando. "Male Preference for Female Foot Colour in the Socially Monogamous Blue-Footed Booby, Sula Nebouxii." Animal Behaviour. Web. 25 Apr. 2016. <http://www.sciencedirect.com/science/article/pii/S0003347204003094>.

5. Velando, A., Beamonte-Barrientos, R., & Torres, R. (2006). Pigment-based skin colour in the blue-footed booby: An honest signal of current condition used by females to adjust reproductive investment. Oecologia, 149(3), 535-542. doi:10.1007/s00442-006-0457-5

6. "You've Gotta Dance like There's Nobody Watching... - NaturalNews.com." NaturalNews. Natural News Network. Web. 25 Apr. 2016. <http://www.naturalnews.com/Quote-Dance-Love-Sing-Live-William-Purkey.html>.

The Strange, Sexy Dance of the Blue-Footed Boobies
Brian Merchant (**@bcmerchant)**
Science / Natural Sciences
November 29, 2008
Today, on the coast of the **Galapagos Island** Espanola, I saw two birds with blue feet puff themselves up, awkwardly cuddle, and then proceed to dance around with all the grace of teenagers at a junior high dance. I had never planned on devoting an article to the mating rituals of rare, weird-looking birds. I was going to make it a point to focus solely on hot-button issues with **global resonance**. But then I saw the blue-footed boobies getting down and dirty, and my world was turned upside down.The spectacle was so bizarre, and so intriguing that I've decided to dedicate a post to it—with the help of naturalist/photographer Pete Oxford, who's an expert on **the Galapagos**. I was lucky enough to snap photos of the raunchy ritual, and Oxford took me through the boobies' dance step by step. So, I'll explain each step along with the pictures I took of the seductive salsa. Oxford also notes that we should pay attention to how their ritual seems somehow oddly familiar—in many ways, it's a simplified, accelerated version of our own.
A Complete Guide to the Blue-Footed Boobies' Dirty Dance
1. When it's mating season, the birds need to attract a mate. So, as Oxford says, they need to "put on a sexy dress." This requirement falls to the males, who are charged with attracting the female boobies. They preen themselves, and make sure they look slick enough to turn heads.

2. The males then wait on the ground for a female to fly overhead. When he sees one that's to his liking, he'll point everything he's got—beak, wings, chest—up to the sky and whistle obnoxiously to get her attention. Sound familiar, ladies?
3. When he finally attracts a suitably buxom boobie, he'll try to gain her trust, and signal that he's in it for the long term. Boobies don't nest, so he'll pick up a stone or a twig with his beak as an offering—sort of like presenting a wedding ring, or signing a mortgage. He says, "Well I don't have my own place *yet*, but things are looking pretty good . . ."
4. If the female is still interested, she'll stick around. And now, satisfied that he's the real deal, ready for commitment and so forth—she needs to make sure he can groove. The male will initiate this supremely bizarre dance, wobbling back and forth, raising one leg after another, and continuing to make high-pitched calls. If she's into it, she'll join him on the dance floor.
5. Finally, if he's got the right moves, she'll let him get intimate—but they take things slow at first, of course. She'll allow him to preen her with his beak, which is a big sign of trust. The beak is the boobies' most dangerous weapon, and to let him use it in such intimate context is much when we human touch tooth-filled mouths in our own weird ritual.
6. When she's satisfied, the male celebrates and they get it on to a mix tape of Marvin Gaye and Barry White. Okay, not that last part. But the rest is all true.
*30 of the top teachers in the US are making a trek from the Florida Everglades to the Galapagos Islands in order to engage a series of global conservation issues in the**Toyota International Teacher Program**. I'm traveling alongside the educators to report on what we discover about the threats and wonders on **modern day Galapagos**.*
http://www.treehugger.com/natural-sciences/the-strange-sexy-dance-of-the-blue-footed-boobies.html - ultimo acesso a 19 de Agosto de 2016

Mating is preceded by an elaborate courtship ritual, which begins with the male presenting the female with a small stick or stone. He then tips his beak, tail, and wing tips to the sky, whistles, and marches around the female with a high-stepping motion, showing off his feet. Once a match is made, the pair will often remain together for life. The female lays 2 to 3 eggs, which both parents take turns to incubate whilst the other keeps watch for predators. Boobies lack a brood patch, instead using their large feet to keep the eggs warm. Eggs hatch after approximately 45 days, and the chicks are fed on regurgitated fish by both parents. Young Boobies will stay with their parents for about 2 months.
http://galapagosconservation.org.uk/wildlife/blue-footed-booby/ - ultimo acesso a 19 de Agosto de 2016

Reproduction

The blue-footed booby breeds year round. Breeding begins with elaborate courtship displays by the male. He flies around his territory, flaunting his blue feet in an exaggerated high-stepping walk, and presents pieces of nest material to the female. After making a courtship flight, the male flashes his feet at the female as he lands. Then each bird tilts its bill up towards the sky and the male gives a piercing whistle. The female responds with groaning calls, and mating follows shortly afterwards.

http://animaldiversity.org/accounts/Sula_nebouxii/ - ultimo acesso em 19 de Agosto de 2016

Blue-footed boobies are aptly named, and males take great pride in their fabulous feet. During mating rituals, male birds show off their feet to

prospective mates with a high-stepping strut. The bluer the feet, the more attractive the mate.
http://animals.nationalgeographic.com/animals/birds/blue-footed-booby/ - ultimo acesso a 20 de Agosto de 2016

Observação Visual (vídeo)

http://video.nationalgeographic.com/video/boobies_bluefooted - ultimo acesso a 19 de Agosto de 2016
https://www.youtube.com/watch?v=z922by9_6Fw - ultimo acesso a 19 de Agosto de 2016
http://www.pri.org/stories/2014-02-13/12-animal-mating-rituals-prove-love-about-good-dance-moves - ultimo acesso a 19 de Agosto de 2016
http://galapagosconservation.org.uk/wildlife/blue-footed-booby/ - ultimo acesso a 19 de Agosto de 2016
O MELHOR - https://www.youtube.com/watch?v=z922by9_6Fw - ultimo acesso a 21 de Agosto de 2016

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monogamous blue-footed booby, Sula nebouxii. Animal Behaviour, 69, 59–65

Osorio-Beristain, M. & Drummond, H. (1998). Non-aggressive mate guarding by the blue-footed booby: a balance of female and male control. Behav Ecol Sociobiol (1998) 43: 307±315

http://www.treehugger.com/natural-sciences/the-strange-sexy-dance-of-the-blue-footed-boobies.html - ultimo acesso a 19 de Agosto de 2016

Blue-footed boobies hop from side to side to show off their spectacular blue feet
http://www.pri.org/stories/2014-02-13/12-animal-mating-rituals-prove-love-about-good-dance-moves

http://animaldiversity.org/accounts/Sula_nebouxii/ - ultimo acesso em 19 de Agosto de 2016

http://galapagosconservation.org.uk/wildlife/blue-footed-booby/ - ultimo acesso a 19 de Agosto de 2016

https://biology.cornell.edu/people/christina-mendoza - ultimo acesso a 19 de Agosto de 2016

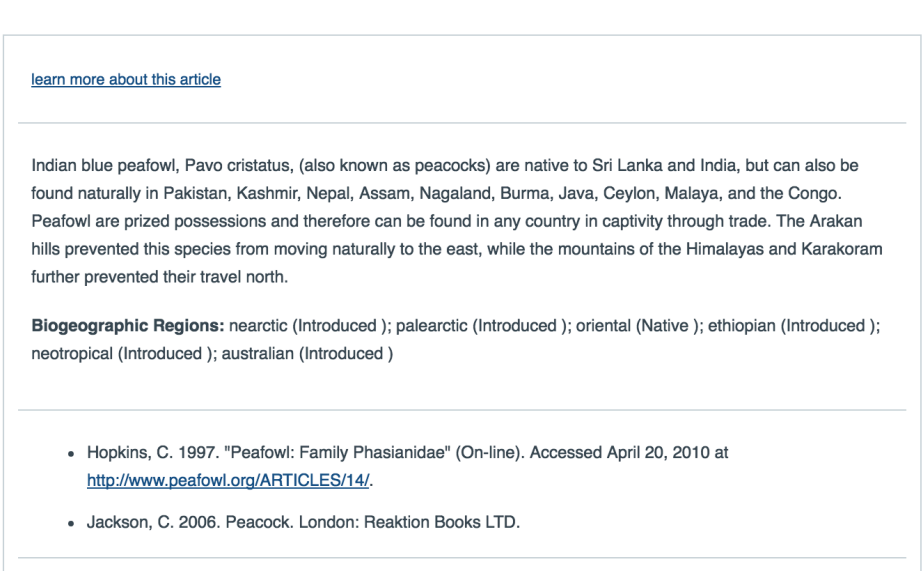
http://animals.nationalgeographic.com/animals/birds/blue-footed-booby/ - ultimo acesso a 20 de Agosto de 2016

https://biology.cornell.edu/people/christina-mendoza - ultimo acesso a 19 de Agosto de 2016

PAVÃO
(Pavo cristatus)

Tipo de agente
Voador

Zonas geográficas
Indian blue peafowl, Pavo cristatus, (also known as peacocks) are native to **Sri Lanka and India**, but can also be found naturally in **Pakistan, Kashmir, Nepal, Assam, Nagaland, Burma, Java, Ceylon, Malaya, and the Congo**.
http://eol.org/pages/1049264/details



http://eol.org/pages/1049264/details

Quem toma iniciativa **(M | F)**
Macho - It was found that male peafowl spent their maximum time in walking, calling and displaying in open areas to attract females…
Dookia, S., Singh, R. & Anoop KR. Ecology and Behaviour of Indian Peafowl (Pavo
cristatus) in Keoladeo National Park, Bharatpur, Rajasthan, India. International Journal of Fauna and Biological Studies 2015; 2(4): p. 97

O macho é que toma as despesas destes encontros. É ele que tem de impressionar, porque as suas hipóteses são tao boas como a sua cauda. (58s)

http://channel.nationalgeographic.com/wild/worlds-weirdest/videos/peacock-courtship/ - (acedido a 19 Julho 2016)

DURATION **- Duração (rápido – até 10m | curto - <h | médio - <dia | prolongado >dia)**

Rápido (384.85s = 6,41m) - The mean display duration for the adult male Indian peafowl recorded from 32 displays was 430.03 ± 34.29 seconds with a maximum of 1060.00 seconds, and a minimum of 28.50 seconds. The median display duration was 384.85 seconds. The display duration was not influenced by mean number of females per scan during the breeding season ($r = -0.04$, $P > 0.05$, $N = 32$). We observed five copulations performed by four

different adult males, and all of them occurred in the second half of the study period. (pág 15)
Harikrishnan, S., Vasudevan, K. & Sivakumar, K. (2010). Behavior of Indian Peafowl Pavo cristatus Linn. 1758 During the Mating Period in a Natural Population. The Open Ornithology Journal, 3, 13-19.

INTERACTION - **Categoria de comportamento (intimidatórios | brandos | enganadores | ritualizados | materiais)**

Ritualizados - Mating commenced when the male lunged forward after displaying, to mount the female once it crouched. (pág 17)
Harikrishnan, S., Vasudevan, K. & Sivakumar, K. (2010). Behavior of Indian Peafowl Pavo cristatus Linn. 1758 During the Mating Period in a Natural Population. The Open Ornithology Journal, 3, 13-19.

TRIGGERS - **Sentido/s utilizado/s (visão | audição | paladar | tacto | olfato)**

Visão - Nevertheless, several lines of observational and experimental evidence indicate that eyespot number is an important cue for mate choice by peahens: (1) the number of eyespots visible in the train is correlated with the number of copulations a male achieves during a breeding season (Petrie et al. 1991; Loyau et al. 2005a); (2) male copulation success declined precipitously when 20 of the outermost eyespots were removed experimentally (Petrie & Halliday 1994); (3) peahens biased the sex ratio of their offspring towards females when they were mated, experimentally, with males from
which 20 eyespots were removed (Pike & Petrie 2005); and (4) female investment of resources into eggs increased with the number of eyespots visible on the train of her experimentally chosen mate (Loyau et al. 2007a). p.21
Dakin, R. & Montgomerie, R. (2011). Peahens prefer peacocks displaying more eyespots, but rarely. Animal Behaviour 82, 21-28.

Os pássaro teem uma muito melhor percepçãoo da cor do que nós. (42s – Drª. Olivia Judson – evolutionary biologista)

O macho é que toma as despesas destes encontros. É ele que tem de impressionar, porque as suas hipóteses são tao boas como a sua cauda. (58s)

As fêmeas pensam que quanto maior e melhor for a cauda melhores serão os genes (1m13s)

http://channel.nationalgeographic.com/wild/worlds-weirdest/videos/peacock-courtship/ - (acedido a 19 Julho 2016)

Audição - The calls of Indian blue peafowl are extremely loud and are often described as unpleasant, harsh shrieking. These calls are extremely varied, with up to six alarm calls issued by both sexes and seven additional calls that males emit during territorial disputes. Three of the calls the males produce are only associated with reproduction, and are typically only used during breeding season. These calls are only created by sexually-mature males, and can affect mating success. The calls mostly differ in pitch and the number of

notes. These calls could be more important than the actual visual display of the males trains in which even the most elaborate can have varying rates of mating success. Vocal calls with more than five notes are generally more successful and it is believed that these types of calls are sexually selected by the females. Also, when predators, humans, or any other type of disturbance agitates a peafowl, they can issue an alarm call. The type of alarm call emitted depends on the threat. However, no matter how great the level of alarm, peafowls of any age and gender call back to increase awareness among the group. If the call indicates great danger, the peafowls will relocate to a safer position.

The elaborate ornamentation of male plumage is an important visual cue that communicates fitness to potential mates. Indian blue peafowl perceive their environment through visual, auditory, tactile, and chemical stimuli.

Communication Channels: visual ; acoustic

Perception Channels: visual ; tactile ; acoustic ; chemical

http://eol.org/data_objects/31413548 - ultimo acesso a 30 julho 2016

Behavior

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The calls of Indian blue peafowl are extremely loud and are often described as unpleasant, harsh shrieking. These calls are extremely varied, with up to six alarm calls issued by both sexes and seven additional calls that males emit during territorial disputes. Three of the calls the males produce are only associated with reproduction, and are typically only used during breeding season. These calls are only created by sexually-mature males, and can affect mating success. The calls mostly differ in pitch and the number of notes. These calls could be more important than the actual visual display of the males trains in which even the most elaborate can have varying rates of mating success. Vocal calls with more than five notes are generally more successful and it is believed that these types of calls are sexually selected by the females. Also, when predators, humans, or any other type of disturbance agitates a peafowl, they can issue an alarm call. The type of alarm call emitted depends on the threat. However, no matter how great the level of alarm, peafowls of any age and gender call back to increase awareness among the group. If the call indicates great danger, the peafowls will relocate to a safer position.

The elaborate ornamentation of male plumage is an important visual cue that communicates fitness to potential mates. Indian blue peafowl perceive their environment through visual, auditory, tactile, and chemical stimuli.

Communication Channels: visual ; acoustic

Perception Channels: visual ; tactile ; acoustic ; chemical

- Takahashi, M., T. Hasegawa. 2008. Seasonal and dinural use of eight different call types by Indian peafowl (Pavo cristatus). Journal of Ethology, 26/3: 375-381.

http://eol.org/data_objects/31413548 - ultimo acesso a 30 julho 2016

INTENSITY - Características/ações (amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, persistência, sincronização, carinhos, exibição, vigilância, reciprocidade etc.)

Exibição - The iridescent train of the lek-breeding peacock is an obvious visual display, long thought to be the result of sexual selection for increased ornament size and complexity (Darwin 1871). P.21
Dakin, R. & Montgomerie, R. (2011). Peahens prefer peacocks displaying more eyespots, but rarely. Animal Behaviour 82, 21-28.

females prefer to mate with males that display a greater number of eyespots in their trains during courtship (Petrie et al. 1991; Petrie & Halliday 1994; Loyau et al. 2005a), lending support to Darwin's (1871) idea that elaboration of the train is the result of selection mediated by female mate preferences. P.21
Dakin, R. & Montgomerie, R. (2011). Peahens prefer peacocks displaying more eyespots, but rarely. Animal Behaviour 82, 21-28.

Eles viram-se de costas para a femea, mostram e abanam o rabo e depois viram-se e "arrasam" ao abrir a sua enorme cauda. (35s)

http://channel.nationalgeographic.com/wild/worlds-weirdest/videos/peacock-courtship/ - (acedido a 19 Julho 2016)

Resumo descritivo

os machos exibem-se, permitindo deste modo as escolha por parte das fêmeas. Estas tendem a escolher os machos de dimensões maiores e que apresentam mantos nupciais mais vistosos. Quando chega época de acasalamento, o pavão apresenta um espectáculo para atrair a pavoa. O pavão levanta as longas penascoloridas da cauda para o ar e sacode-os. A agitação de suas penas da cauda soa como folhas farfalhando ao vento. O pavão enfrenta a pavoa, com as suas penas da cauda farfalhantes e segue-a em torno de fazer chamadas de acasalamento altos. Se a pavoa tem interesse, ela vai permitir que o pavão acasale com ela.
Comportamento Animal - Enciclopédia da ciencia, pág. 86/9 +
http://www.ehow.com/how-does_4565678_peacocks-mate.html

Dentro das classes das Aves temos alguns exemplos mais perfeitos da arte de se fazer ver e ficar a ganhar com isso. O caso do pavão (*Pavo cristatus*) é o mais notório e um dos melhores e um dos melhores exemplos daqueles que optaram por arriscar um pouco mais o pescoço em troca de uns segundos de fama. Para o macho adulto, com uma cauda de metro e meio que ultrapassa o comprimento do corpo, não é nada fácil arrumar a trouxa e sair a voar quando se aproxima um faminto caçador. Por outro lado nenhuma fêmea se pode queixar de não dar com um amante – quando a época de reprodução se inicia, os machos juntam-se em clareiras pavoneando-se com a cauda aberta em leque fazendo um alarido indescritível. Na verdade, estudos recentes mostram que os pavões aos quais são retiradas penas que comportam os olhos* têm menos sucesso em conquistar amadas, não sendo no entanto o único sinal que as fêmeas procuram. Após o espetáculo, os mais coloridos, com mais olhos e, provavelmente, com mais autoconfiança, acabam por conquistar um harém de fêmeas que lhes irão proporcionar uma catrefada de crias.
*Os olhos na cauda do pavão são aqueles desenhos bem redondos, esverdeados ou azulados que se encontram na extremidade de cada pena da cauda. O número de olhos pode ultrapassar os 170 nos pavões mais sofisticados.
Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.
Pág. 23

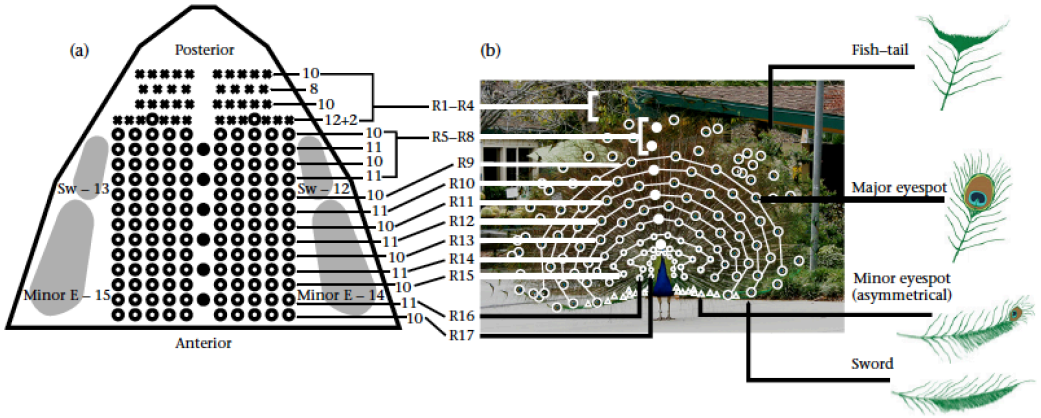

Figure 1. The peacock's train is composed of four specialized types of upper-tail coverts, shown to the right. (a) Diagram of feather insertion in the caudal feather tract of male PC72. The fish-tail and major eyespot feathers were arranged in a regular pattern of rows (R1–R17). Fish-tail feathers are marked with an 'x' and major eyespots with an 'o' (filled for feathers on the midline of the uropygium). Numbers on this diagram give the total number of feathers in each row. The sword ('Sw') and minor eyespot ('Minor E') feathers were grouped to the left and right sides of the rows of major eyespots, and are also labelled with the number of feathers removed. (b) Photograph of male PC72 with his train erect, with major eyespots marked with white circles corresponding to the size of each eyespot. Major eyespots in rows R9–R17 are joined together with white lines. For the remaining rows, major eyespots visible in the photograph are circled but could not be identified to row. Minor eyespots visible in the photograph are marked with white triangles.

Dakin, R. & Montgomerie, R. (2011). Peahens prefer peacocks displaying more eyespots, but rarely. Animal Behaviour 82, p.22

Eles viram-se de costas para a femea, mostram e abanam o rabo e depois viram-se e "arrasam" ao abrir a sua enorme cauda. (35s)

Os pássaro teem uma muito melhor percepçãoo da cor do que nós. (42s – Drª. Olivia Judson – evolutionary biologista)

O macho é que toma as despesas destes encontros. É ele que tem de impressionar, porque as suas hipóteses são tao boas como a sua cauda. (58s)

As fêmeas pensam que quanto maior e melhor for a cauda melhores serão os genes (1m13s)

http://channel.nationalgeographic.com/wild/worlds-weirdest/videos/peacock-courtship/ - (acedido a 19 Julho 2016)

Peacocks are large, colorful pheasants (typically blue and green) known for their iridescent tails. These tail feathers, or coverts, spread out in a distinctive train that is more than 60 percent of the bird's total body length and boast colorful "eye" markings of blue, gold, red, and other hues. The large train is used in mating rituals and courtship displays. It can be arched into a magnificent fan that reaches across the bird's back and touches the ground on either side. Females are believed to choose their mates according to the size, color, and quality of these outrageous feather trains.

Male vs. Female

The term "peacock" is commonly used to refer to birds of both sexes. Technically, only males are peacocks. Females are peahens, and together, they are called peafowl.

Suitable males may gather harems of several females, each of which will lay three to five eggs. In fact, wild peafowl often roost in forest trees and gather in groups called parties.

Population

Peacocks are ground-feeders that eat insects, plants, and small creatures. There are two familiar peacock species. The blue peacock lives in India and Sri Lanka, while the green peacock is found in Java and Myanmar (Burma). A more distinct and little-known species, the Congo peacock, inhabits African rain forests.

Peafowl such as the blue peacock have been admired by humans and kept as pets for thousands of years. Selective breeding has created some unusual color combinations, but wild birds are themselves bursting with vibrant hues. They can be testy and do not mix well with other domestic birds.

http://animals.nationalgeographic.com/animals/birds/peacock/ (acedido a 30 julho)

Mating commenced when the male lunged forward after displaying, to mount the female once it crouched. The male dropped the train during copulation and held the crest plumes of the female with its beak. In this position, the male made a highpitched whistling call as reported by Galusha and Hill [15]. After copulation, which lasted a few seconds, adult males remained in their courts displaying to other females and never attempted to follow the female they mated.

Harikrishnan, S., Vasudevan, K. & Sivakumar, K. (2010). Behavior of Indian Peafowl Pavo cristatus Linn. 1758 During the Mating Period in a Natural Population. The Open Ornithology Journal, 3, 13-19. – pág 17

Adult males spent significantly more time in preening than sub-adult males and females suggesting they incurred a 'high maintenancehandicap' because of the elaborate ornamentation [8].

Harikrishnan, S., Vasudevan, K. & Sivakumar, K. (2010). Behavior of Indian Peafowl Pavo cristatus Linn. 1758 During the Mating Period in a Natural Population. The Open Ornithology Journal, 3, 13-19. – pág 17

Standing is an important behavioral state for a predominantly ground living bird like Indian peafowl, as it enables the bird to invigilate and locate threats from a distance [15]. This posture probably enabled the adult males to locate groups of females from a distance. This posture in adult males was associated with calling, which made them conspicuous, and probably signaled their location.

Harikrishnan, S., Vasudevan, K. & Sivakumar, K. (2010). Behavior of Indian Peafowl Pavo cristatus Linn. 1758 During the Mating Period in a Natural Population. The Open Ornithology Journal, 3, 13-19. – pág 17

Observação Visual **(vídeo)**

http://channel.nationalgeographic.com/wild/worlds-weirdest/videos/peacock-courtship/ - (acedido a 19 Julho 2016)

https://www.youtube.com/watch?v=R9tGMxM9fds

https://www.youtube.com/watch?v=xq3XpwZCPr4

Referências bibliográficas

Stilwell, G. (2012). Quando os macacos se apaixonam. Lisboa: A Esfera dos Livros.

Dakin, R. & Montgomerie, R. (2011). Peahens prefer peacocks displaying more eyespots, but rarely. Animal Behaviour 82, 21-28.

Dookia, S., Singh, R. & Anoop KR. Ecology and Behaviour of Indian Peafowl (Pavo
cristatus) in Keoladeo National Park, Bharatpur, Rajasthan, India. International Journal of Fauna and Biological Studies 2015; 2(4): 97-103

Harikrishnan, S., Vasudevan, K. & Sivakumar, K. (2010). Behavior of Indian Peafowl Pavo cristatus Linn. 1758 During the Mating Period in a Natural Population. The Open Ornithology Journal, 3, 13-19.

Correspondência trocada com autores de artigos científicos

De: **Raoul Mulder** r.mulder@unimelb.edu.au
Assunto: Re: Black Swans - courtship ritual
Data: 28 de Julho de 2016 às 07:43
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

RM

Dear Pedro

This link may give you the information you need.
http://www.myswan.org.au/index.php/faqs/how-do-black-swans-mate/

In short, either sex may initiate. With respect to courtship, this will depend on how it is defined. Courtship preceding each copulation bout lasts <1h, but a pair may copulate several times over the space of a week or two.

Best wishes,
Raoul

_____

Professor Raoul Mulder
Associate Dean, Academic Innovation I Faculty of Science
School of BioSciences
University of Melbourne
VIC 3010 AUSTRALIA
www.biosciences.unimelb.edu.au

tel. +61 3 8344 6245
mob. +61 410 412 825
fax. +61 8344 7909
email: r.mulder@unimelb.edu.au
Lab website: raoulmulder.org
skype: raoul.roaming

> On 28 Jul 2016, at 01:21, Pedro Bandeira maia <pedrobandeiramaia@amadesign.net> wrote:
>
> Good afternoon,
>
> I´m a Portuguese PHD student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.
> I´m designing a courtship taxonomy that try to answer to some questions that could help me to inspiring and designing new products.
> The Black Swans are one of my selected animals to integrate the taxonomy, but I couldn´t find scientific information and evidences that answer to my questions:
> Who start the courting? male, female, both?
> What´s the duration of the courtship? less then 10m, less a hour, less a day or more than one day.
>
> Could you help me? it´s possible to indicate me one paper that answer to this questions?
>
> Thank you for helping me.
>
> Best regards,
>
> Pedro Bandeira Maia

De: **hugh** hugh@unam.mx
Assunto: Re: PhD student in interaction design - Blue-footed Booby (Sula nebouxii) ritual
Data: 22 de Agosto de 2016 às 21:21
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

Pedro:

These might help a little bit, and give you an entry into the literature, but what you probably need is JB Nelson´s 1975 book The Sulidae: Gannets and Boobies, which will probably be very hard to find now.

If you search on the internet you will probably find videos of courtship. A bout of courtship in a bonded pair can last as little as a few seconds or as long as a few minutes, and often there is a sequence of several bouts.

Good luck!

Hugh

De: Pedro Bandeira maia <pedrobandeiramaia@amadesign.net>
Enviado: lunes, 22 de agosto de 2016 12:08:22 p.m.
Para: hugh
Cc: Pedro Bandeira maia
Asunto: PhD student in interaction design - Blue-footed Booby (Sula nebouxii) ritual

Dear Professor Hugh Drummond,

I´m a Portuguese PHD student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.
I´m designing a courtship taxonomy that try to answer to some questions that could help designers to be inspired and designing new products.
The Blue-footed Booby (Sula nebouxii) are one of my selected animals to integrate the taxonomy, but I couldn´t find scientific information and evidences that answer to that question:
What´s the duration of the courtship? less then 10m, less a hour, less a day or more than one day.

Could you help me? it´s possible to indicate me one scientific paper that answer to this questions and describe the courtship ritual (before copulation)?

Thank you for helping me.

Best regards,

Pedro Bandeira Maia

Foot ColorPrefer…005AB.pdf

Marce Non-aggressive mate guarding.pdf

De: **Cornell Lab Help** support@cornelllab.desk-mail.com
Assunto: Re: Cornell Lab of Ornithology Website: PhD student in interaction design - BowerBird Courting ritual
Data: 12 de Agosto de 2016 às 16:16
Para: pedrobandeiramaia@amadesign.net

CL

Type your response ABOVE THIS LINE to reply

pedro bandeira maia
Subject: Cornell Lab of Ornithology Website: PhD student in interaction design - BowerBird Courting ritual

AUG 12, 2016 | 11:16AM EDT
Cornell Lab of Ornithology replied:

Hi Pedro,

Unfortunately the paper I think might have this information is unavailable to me as it is held here: http://trove.nla.gov.au/work/18405852?selectedversion=NBD2559913

As we don't have anyone here who has done work on bowerbirds, I can't be sure if this will be the paper you will eed, and I don;t ave anyone here to ask. Google Scholar shows many dozens of papers on Satin Bowerbirds. I would start looking through all of those and possibly contacting some of the authors.

Best of luck,
Marc

Marc Devokaitis
Public Information Specialist

Have we helped you today? Your support makes our work possible. If you're not yet a member, please visit http://tiny.cc/jointheCornellLab to support our cause and receive our beautiful quarterly magazine, Living Bird.

Learn something new about birds every month! Sign up for our eNewsletter at birds.cornell.edu/enews

AUG 06, 2016 | 08:35AM EDT
Original message
pedro wrote:

Cornell Lab of Ornithology Website Contact Us Form:
==========

Not a Lab Member
==========

PhD student in interaction design - BowerBird Courting ritual
Good afternoon,

I´m a Portuguese PHD student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.
I´m designing a courtship taxonomy that try to answer to some questions that could help me to inspiring and designing new products.
The Satin Bowerbird are one of my selected animals to integrate the taxonomy, but I couldn´t find scientific information and evidences that answer to that question:
What´s the duration of the courtship? less then 10m, less a hour, less a day or more than one day.

Could you help me? it´s possible to indicate me one paper that answer to this questions?

Thank you for helping me.

Best regards,

Pedro Bandeira Maia

De: **Owens, David William** OwensD@cofc.edu
Assunto: Re: PhD student in interaction design - Green sea turtles (Chelonia mydas) courtship ritual
Data: 6 de Setembro de 2016 às 16:58
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

OD

Hi Pedro,
I am only guessing but I would think quick would be less than an hour but not less than 10 minutes.

Dave

From: Pedro Bandeira maia <pedrobandeiramaia@amadesign.net>
Sent: Tuesday, September 6, 2016 5:22:57 PM
To: Owens, David William
Cc: Pedro Bandeira maia
Subject: Re: PhD student in interaction design - Green sea turtles (Chelonia mydas) courtship ritual

Dear Professor,

When you say rather quick, is less then 10 minutes?

Thank you for your help.

best regards,
pedro bandeira maia

> No dia 06/09/2016, às 03:48, Owens, David William <OwensD@cofc.edu> escreveu:
>
> Dear Pedro,
> The two key papers of which I am aware are :
>
> Booth, Julie. and A. Peters. 1972. Behavioral studies on the green sea turtle (Chelonia mydas) in sea. Animal Behavior, 20:808-812. .
>
> Comuzzie, D.C. and D. W. Owens. 1990. A quantitative analysis of courtship behavior in captive green sea turtles (Chelonia mydas). Herpetologica. 46:195-202.
>
> The Booth paper is the classic in this poorly studied field and the Comuzzie is the only more quantitative paper I have seen. Sorry I do not have PDFs available for these papers.
>
> Courtship may take several hours or be rather quick. This depends on the level of receptivity of the female. Mating on the other hand often lasts for several hours (even days apparently, but I can not confirm this old belief), and usually includes multiple mounted males on the same female.
>
> Hope this helps,
> Best regards,
> Dave Owens
> Fulbright Senior Scholar, Burma 2016
>
> ---
>
> **From:** Pedro Bandeira maia <pedrobandeiramaia@amadesign.net>

De: **Godfrey, Matthew H** matt.godfrey@ncwildlife.org
Assunto: RE: PhD student in interaction design - Green sea turtles (Chelonia mydas) courtship ritual
Data: 5 de Setembro de 2016 às 20:01
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

GM

Hi Pedro,
There is relatively little known about courtship behavior in green turtles, and most of the publications are several decades old. But they do have interesting information in them. Also, you can also look at the paper by Godley et al. about numbers of male green turtles at Ascension Island around the time of the start of the nesting season.
Best wishes,
Matthew

Matthew H Godfrey, Phd
Sea Turtle Biologist

NC Wildlife Resources Commission
Mailing Address: 1507 Ann St.
Beaufort, North Carolina 28516
office: 252-728-1528 // turtle hotline: 252-241-7367

ncwildlife.org

From: Pedro Bandeira maia [mailto:pedrobandeiramaia@amadesign.net]
Sent: Monday, September 05, 2016 2:25 PM
To: Godfrey, Matthew H <matt.godfrey@ncwildlife.org>
Cc: Pedro Bandeira maia <pedrobandeiramaia@amadesign.net>
Subject: PhD student in interaction design - Green sea turtles (Chelonia mydas) courtship ritual

Good afternoon,

I´m a Portuguese Phd student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.
I´m designing a courtship taxonomy that try to answer to some questions that could help designers to be inspired and designing new products.
The Green sea turtles (Chelonia mydas) are one of my selected animals to integrate the taxonomy, but I couldn´t find scientific information and evidences that answer to that question:
What´s the duration of the courtship (before copulation)? less then 10m, less a hour, less a day or more than one day.

Could you help me?
It´s possible to indicate one scientific paper that answer to this questions and describe the courtship ritual (before copulation)?

Thank you for helping me.

De: **Jane Williamson** jane.williamson@mq.edu.au
Assunto: Re: I´m sorry for being so insistent - PhD student in interaction design - cuttlefish (Sepia plangon) ritual
Data: 21 de Março de 2017 às 11:11
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

JW

Less than an hour.
J

From: Pedro Bandeira maia <pedrobandeiramaia@amadesign.net>
Date: Tuesday, 21 March 2017 at 10:08 pm
To: Jane Williamson <jane.williamson@mq.edu.au>
Subject: Re: I´m sorry for being so insistent - PhD student in interaction design - cuttlefish (Sepia plangon) ritual

Dear Jane,

Thank you very much. I´m sorry for being insistent…

By your experience and imagination, if you have to select one of this answers about courtship duration,

less then 10m, less a hour, less a day or more than one day.

Witch one you select?

Best regards,
pedro

> No dia 18/03/2017, às 05:57, Jane Williamson <jane.williamson@mq.edu.au> escreveu:
>
> Hi Pedro,
>
> We don't know the duration of the courtship with Sepia plangon.
> I had asked my colleagues if they knew but no.
>
> I have been hoping to find someone who could answer this question better.
>
> Sorry for this bad news.
>
> Regards,
> Jane
>
> ---
>
> **From:** Pedro Bandeira maia <pedrobandeiramaia@amadesign.net>
> **Date:** Saturday, 18 March 2017 at 1:31 am
> **To:** Jane Williamson <jane.williamson@mq.edu.au>
> **Cc:** Pedro Bandeira maia <pedrobandeiramaia@amadesign.net>
> **Subject:** I´m sorry for being so insistent - PhD student in interaction design - cuttlefish (Sepia plangon) ritual
>
> Dear Jane,
>
> I´m sorry for being so insistent, but you are may last chance to finish my taxonomy.
> At this moment it is only the information about the Sepia Plangon that is missing in order to have the taxonomy

De: **Manjula Tiwari** manjula.tiwari@noaa.gov
Assunto: Re: PhD student in interaction design - Green sea turtles (Chelonia mydas) courtship ritual
Data: 7 de Setembro de 2016 às 20:47
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

MT

Dear Pedro,
The best place to search for information on sea turtles is the Sea Turtle Bibliography: http://st.cits.fcla.edu/st.jsp

All the best with your research,
Manjula

Manjula Tiwari, PhD
NOAA-National Marine Fisheries Service
Marine Turtle Ecology & Assessment Program
Southwest Fisheries Science Center
8901 La Jolla Shores Dr.
La Jolla, California 92037, USA

Email: Manjula.Tiwari@noaa.gov
Tel: (858) 546-5658
Fax: (858) 546-7003

On Sep 5, 2016, at 11:22 AM, Pedro Bandeira maia wrote:

> Good afternoon,
>
> I´m a Portuguese Phd student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.
> I´m designing a courtship taxonomy that try to answer to some questions that could help designers to be inspired and designing new products.
> The Green sea turtles (Chelonia mydas) are one of my selected animals to integrate the taxonomy, but I couldn´t find scientific information and evidences that answer to that question:
> What´s the duration of the courtship (before copulation)? less then 10m, less a hour, less a day or more than one day.
>
> Could you help me?
> It´s possible to indicate one scientific paper that answer to this questions and describe the courtship ritual (before copulation)?
>
> Thank you for helping me.
>
> Best regards,
>
> Pedro Bandeira Maia

De: **Lynna kiere** lynnamariekiere@gmail.com
Assunto: Re: PhD student in interaction design - Blue-footed Booby (Sula nebouxii) ritual
Data: 22 de Agosto de 2016 às 20:02
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

LK

Hi Pedro,
From the time of first encounter to copulation, especially in the formation of social pairs ("married" couples) this courtship almost always goes on for more than one day before the *first* copulation occurs, but for subsequent copulations can be less then 10 min. This time can be less though in extra-pair interactions ("affairs" with individuals other than the social mate), when the time between first encounter and the first copulation can be less than a day (though usually more than 10 minutes). By the way, in this species both males and females court, and both sexes are choosy about their partners.
Hope that helps!
Saludos,
Lynna Kiere

On Mon, Aug 22, 2016 at 1:54 PM, Pedro Bandeira maia <pedrobandeiramaia@amadesign.net> wrote:

> Dear Lynna,
>
> Thank you for your brief answer to my email. You help me a lot!
> The courtship that I´m interested are the “seductive” behavior that happens before the copulation ("parading", "skypointing", and "twig-lifting").
> I think male perform this ritual, interacting with females, one or more times before the females agree or not to copulate, is that ritual before copulation that I need to know the duration (less then 10m, less a hour, less a day or more than one day).
> Do you still think that the duration of this seduction performance is more than a day?
>
> Thank you very much for your help.
>
> Kind regards,
> pedro bandeira maia
>
> > No dia 22/08/2016, às 18:24, Lynna kiere <lynnamariekiere@gmail.com> escreveu:
> >
> > Hi Pedro,
> >
> > What an interesting way to use animal behavior! Boobies have a very long courtship period before actually laying their eggs, during which they establish a social partnership (kind of equivalent to dating before getting married in humans, I suppose) which can last up to a month or even two. During that time they carry out courtship behaviors-their famous "dance"-which actually includes three main courtship displays: "parading", "skypointing", and "twig-lifting". Over this period there are several copulations, and the rate of copulations increases as the female gets closer to laying. The male and female also defend a territory together and preen each other during this time.
> >
> > From your question it's not completely clear to me if this is the "duration of courtship" you are referring to. If so, I would definitely say more than a day. However, my work was on extra-pair behavior, where the female courts and may copulate with a male that is *not* her social partner. Extra-pair interactions can be much shorter- perhaps less than an hour of courtship before a copulation occurs, though there is a *lot* of variation and about half of the time that females courted with an extra-pair male no copulation occured at all. I noticed you read one of my papers on research gate, but the description of courtship in that paper is very brief. There is a more detailed description in the methods section of my first paper on boobies (2014 "Extrapair behaviour reveals flexible female choosiness and mixed support for classic good genes in blue-footed boobies"). Also, I'd recommend either the book by J. Bryan Nelson (2005) "Pelicans, Cormorants, and their relatives: The Pelecaniformes" which has a very nice general description of booby courtship, as well as papers by Marcela Osorio (e.g. 1998 "Non-aggressive mate guarding by the blue-footed booby: A balance of female and male control") which are a bit more detailed. I hope that answers some questions for you, but let me know if you need more information!
> >
> > Best of luck,
> >
> > Lynna Kiere
> >
> > Dra. en Ciencias Biológicas
> > Lab. de Conducta Animal
> > Instituto de Ecología, UNAM
> >
> > On Mon, Aug 22, 2016 at 11:59 AM, Pedro Bandeira maia <pedrobandeiramaia@amadesign.net> wrote:
> >
> > > Good afternoon,
> > >
> > > I´m a Portuguese PHD student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.
> > > I´m designing a courtship taxonomy that try to answer to some questions that could help designers to be inspired and designing new products.
> > > The Blue-footed Booby (Sula nebouxii) are one of my selected animals to integrate the taxonomy, but I couldn´t find scientific information and evidences that answer to that question:
> > > What´s the duration of the courtship? less then 10m, less a hour, less a day or more than one day.

De: **Gail L. Patricelli** GPatricelli@ucdavis.edu
Assunto: RE: PhD student in interaction design - BowerBird Courting ritual
Data: 25 de Agosto de 2016 às 02:47
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

GL

Dear Pedro,
Apologies for my slow answer; I've been travelling this summer. Typically female mate searching involves 2 bouts of courtships (described in Uy et al 2001). First there are short courtships (~2+ minutes) with a few males, then females take a break during which they may build their nests, then there is a second round of courtships with the top-choice males, which are usually longer (~10 minutes). A later study by Coleman et al. (2004) found that females often visit briefly while males are absent and then preferentially return for courtship by males with nice bowers and nice decorations. So it's like a job search. Females start by checking the resume, then they do short interviews with the best applicants, then they call back the top few for extended interviews. It's pretty cool! My own PhD research addresses the details of how males and females interact during courtship. I used robotic females to show that successful males respond to subtle female behaviors by adjusting their courtship behaviors.
I have attached a bunch of papers that deal with satin bowerbird courtship.
Hope this helps!
-Gail

Gail L. Patricelli
Professor & Chancellor's Fellow
Department of Evolution and Ecology
University of California
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2320 Storer Hall
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Office: 530-754-8310
Fax: 530-752-1449
e-mail: GPatricelli@ucdavis.edu
website: http://patricellilab.faculty.ucdavis.edu/

From: Pedro Bandeira maia [mailto:pedrobandeiramaia@amadesign.net]
Sent: Saturday, August 06, 2016 5:57 AM
To: GPatricelli@ucdavis.edu
Cc: Pedro Bandeira maia
Subject: PhD student in interaction design - BowerBird Courting ritual

Good afternoon,

I´m a Portuguese PHD student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.
I´m designing a courtship taxonomy that try to answer to some questions that could help me to be inspired and designing new products.
The Satin Bowerbird (*Ptilonorhynchus violaceus*) are one of my selected animals to integrate the taxonomy, but I couldn´t find scientific information and evidences that answer to that question:
What´s the duration of the courtship? less then 10m, less a hour, less a day or more than one day.

Could you help me? it´s possible to indicate me one paper that answer to this questions?

De: 竹下文雄 takeshitaf@gmail.com
Assunto: Re: PhD student in interaction design - Crab (UCA LACTEA) Courting ritual
Data: 14 de Agosto de 2016 às 06:30
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

Dear Pedro,

Thank you for your interesting in our paper.
I briefly describe their courtship behaviours. There are 3 stages in their courtship behaviours as the follows.

1) Broadcasting: males show display behaviour with their large claw for unspecified females (and males). This behaviour is found during 3-4 hour.
2) Waving: males show ritualized courtship behaviour, is called as “waving” a specified female when the female approach to the male burrow (the duration is about 10 sec - 5 min, i.e., until females come into the male burrow).
3) Vibration: After females came into burrows by waving, males emit vibrational signals (please see our paper). the duration is from several seconds to several minutes.

If you have any question else, please contact me again.
Best wishes,

Fumio Takeshita

> 2016/08/13 2:41、Pedro Bandeira maia <pedrobandeiramaia@amadesign.net> のメール:
>
> Good afternoon,
>
> I´m a Portuguese PHD student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.
> I´m designing a courtship taxonomy that try to answer to some questions that could help me to be inspired and designing new products.
> The Crab (UCA LACTEA) are one of my selected animals to integrate the taxonomy, but I couldn´t find scientific information and evidences that answer to that question:
> What´s the duration of the courtship? less then 10m, less a hour, less a day or more than one day.
>
> I´ve read your paper: The vibrational signals that male fiddler crabs (Uca lactea) use to attract females into their burrows, but I could´t understand the courtship time.
> Could you help me?
>
> Thank you for helping me.
>
> Best regards,
>
> Pedro Bandeira Maia

De: **Culum Brown** culumbrown@yahoo.com
Assunto: Re: PhD student in interaction design - cuttlefish (Sepia plangon) ritual
Data: 24 de Agosto de 2016 às 12:50
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

CB

Hi Pedro,

Contact Jane Williamson. One of her PhD students (Candace) worked on the reproductive behaviour of this species.

A/Prof. Culum Brown
Assistant Editor Journal of Fish Biology
Dpt Biological Sciences, Macquarie University
+61 2 98506292

On Thursday, 18 August 2016, 14:47, Pedro Bandeira maia <pedrobandeiramaia@amadesign.net> wrote:

Good afternoon,

I´m a Portuguese PHD student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.
I´m designing a courtship taxonomy that try to answer to some questions that could help designers to be inspired and designing new products.
The cuttlefish (*Sepia plangon)* are one of my selected animals to integrate the taxonomy, but I couldn´t find scientific information and evidences that answer to that question:
What´s the duration of the courtship? less then 10m, less a hour, less a day or more than one day.

Could you help me? it´s possible to indicate me one scientific paper that answer to this questions and describe the courtship ritual (before copulation)?

Thank you for helping me.

Best regards,

Pedro Bandeira Maia

De: **Tony Williams** tdwillia@sfu.ca
Assunto: Re: PhD student in interaction design - Emperor Pinguin (Aptenodytes forsteri) courtship ritual
Data: 6 de Setembro de 2016 às 18:55
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

TW

Hi Pedro

Some information, and then some references (many quite old):

Emperors return to breeding colonies March-early April and egg-laying occurs May-early June. So on average the "courtship period" is quite long. However, this is for the population - not sure about individuals (but I suspect easily > 1 day).

These sources have more information:

Stonehouse B. 1953. The emperor penguin I Breeding behaviour. Falkland Islands Dependencies Survey Scientific Report 6: 1-33

Prevost J. 1961. Ecologie du manchot empereur. Hermann, Paris.

Jouventin, P. Comportment et structure sociale chex le Manchot empereur. La Terre et vie 25: 510-586

I'm afraid most of these are old and may be hard to get. I found one more recent paper that I have attached.

Best wishes

Tony

From: "Pedro Bandeira maia" <pedrobandeiramaia@amadesign.net>
To: tdwillia@sfu.ca
Cc: "Pedro Bandeira maia" <pedrobandeiramaia@amadesign.net>
Sent: Monday, 5 September, 2016 10:16:45
Subject: PhD student in interaction design - Emperor Pinguin (Aptenodytes forsteri) courtship ritual

Good afternoon,

I´m a Portuguese Phd student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.
I´m designing a courtship taxonomy that try to answer to some questions that could help designers to be inspired and designing new products.
The Emperor Pinguin (Aptenodytes forsteri) are one of my selected animals to integrate the taxonomy, but I couldn´t find scientific information and evidences that answer to that question:
What´s the duration of the courtship (before copulation)? less then 10m, less a hour, less a day or more than one day.

De: **Roldán Valverde** roldan@conserveturtles.org
Assunto: Re: PhD student in interaction design - Green sea turtles (Chelonia mydas) courtship ritual
Data: 29 de Agosto de 2016 às 15:19
Para: pedrobandeiramaia@amadesign.net
Cc: Daniel Evans drevans@conserveturtles.org

RV

Dear Pedro,

Thank you for your e-mail. Your question is interesting; however, I must say that this is one of the areas where our knowledge of sea turtle biology is rather weak. Very little has been done to understand this part of the life history of these animals. I recommend that you read the following paper as it might help you with your quest for information:

http://www.jstor.org/stable/3892904?seq=1#page_scan_tab_contents

If you need more information, please consult Google Scholar. Best,

Roldán

Roldán A. Valverde, PhD
Scientific Director
Sea Turtle Conservancy
Apartado Postal 246-2050
San Pedro
Costa Rica
Tel in CR: +506-8642-6312
Phone in USA: 985-549-3029
Skype: roldan.valverde
www.conserveturtles.org

From: Daniel Evans
Sent: Monday, August 29, 2016 8:20:15 AM
To: Roldán Valverde
Subject: FW: PhD student in interaction design - Green sea turtles (Chelonia mydas) courtship ritual

~~~~~~

Daniel R. Evans
Technology & Research Specialist
Sea Turtle Grants Program Administrator
Sea Turtle Conservancy
4424 NW 13th St, Ste B-11, Gainesville, FL 32609
Phone: 352-373-6441 | Fax: 352-375-2449
drevans@conserveturtles.org
http://www.conserveturtles.org | http://www.helpingseaturtles.org

"And the turtles of course...all the turtles are free.
As turtles and, maybe, all creatures should be." - Dr. Seuss

From: Pedro Bandeira maia [mailto:pedrobandeiramaia@amadesign.net]
Sent: Friday, August 26, 2016 2:10 PM
To: Daniel Evans
Cc: Pedro Bandeira maia
Subject: PhD student in interaction design - Green sea turtles (Chelonia mydas) courtship ritual
~~~~~~

De: **Anastasia Helen Dalziell** anastasia.dalziell@cornell.edu
Assunto: Re: PhD student in interaction design - Lyrebird (Menura novaehollandiae) courtship ritual
Data: 27 de Agosto de 2016 às 00:50
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

AH

Dear Pedro,

Thank you for your interest in our work on lyrebirds.

Your question - what is the duration of courtship - is slightly complicated in lyrebirds because females probably listen to males singing for several days before she visits a male.

However, the final courtship display that occurs immediately (minuets) before copulation is a song and dance display. The most up-to-date information about that display is in our paper published in

Dalziell, A. H. et al. 2013. Dance choreography is coordinated with song repertoire in a complex avian display. *Curr. Biol*. 23, 1132-1135.(attached).

Further information (but more speculative) is in

Higgins, P. J., Peter, J. M. & Steele, W. K. 2001. *Tyrant-flycatchers to Chats. Handbook of Australian, New Zealand & Antarctic Birds* Vol 5. Melbourne: Oxford University Press (also attached).

We are going to published further information about courtship in the near future.

Best of luck for your PhD studies.

Anastasia

Anastasia H. Dalziell
Postdoctoral Associate
Macaulay Library and
Bioacoustics Research Program
Cornell Lab of Ornithology
Cornell University

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Mobile: (Australia) + 61 466 602 004
Email: anastasia.dalziell@cornell.edu
http://anastasiadalziell.weebly.com

Visiting Fellow
Hawkesbury Institute for the Environment
Western Sydney University, Australia

De: **Lincoln Brower** brower@sbc.edu
Assunto: Re: PhD student in interaction design - Queen Butterfly (Danaus gilippus) courtship ritual
Data: 4 de Setembro de 2016 às 17:23
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

LB

Dear Pedro,

You will find detailed answers to your questions in:

Brower, L. P., J. V. Z. Brower, and F. P. Cranston. 1965. Courtship behavior of the queen butterfly, Danaus gilippus berenice (Cramer). Zoologica **50**:1-39, 37 plates.

The short answer is less than 10 minutes.

Lincoln Brower

> On Sep 4, 2016, at 8:58 AM, Pedro Bandeira maia <pedrobandeiramaia@amadesign.net> wrote:
>
> Dear Professor,
>
> I´m a Portuguese Phd student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.
> I´m designing a courtship taxonomy that try to answer to some questions that could help designers to be inspired and designing new products.
> The Queen Butterfly (Danaus gilippus) are one of my selected animals to integrate the taxonomy, but I couldn´t find scientific information and evidences that answer to that question:
> What´s the duration of the courtship (before copulation)? less then 10m, less a hour, less a day or more than one day.
>
> Could you help me?
> It´s possible to indicate one scientific paper that answer to this questions and describe the courtship ritual (before copulation)?
>
> Thank you for helping me.
>
> Best regards,
>
> Pedro Bandeira Maia

Professor Lincoln P. Brower
Research Professor of Biology
Sweet Briar College
Sweet Briar, VA 24595
(and Distinguished Service Professor of Zoology Emeritus, University of Florida)
Telephone: 434-277-5065
Fax: 434-381-6488
e-mail: brower@sbc.edu

De: **David B Lank** dlank@sfu.ca
Assunto: Re: PhD student in interaction design - Ruff (Philomachus pugnax) courtship ritual
Data: 26 de Agosto de 2016 às 21:54
Para: Pedro Bandeira maia pedrobandeiramaia@amadesign.net

DB

Hello Pedro Bandeira Maia.

The answer depends on exactly what question you are asking.

Ruff males assemble in all-male groups (called 'leks) of e.g. 5 or so males, which then await visits from females.

Females circulate among several different leks for 3-4 days, and mate during that period.

On most visits they do not mate at all - they are sampling the population.

On visits where they do mate, they likely do so within 10 minutes.

So if you want a measure of search time, it is in days. If you want a measure of mating on a particular visit once they have made up their mind, it is 10 minutes.

The searching time (days) reference is:
Lank, D.B. and C.M. Smith. 1987. Conditional lekking in ruff (Philomachus pugnax). Behavioral Ecology and Sociobiology 20:137–145. (attached).
For detailed courtship descriptions: Hogan-Warburg 1966 and van Rhihn 1973 (attached).

D> Lank

****
David B. Lank www.sfu.ca/biology/wildberg/lank.html
Dept. of Biological Sciences Simon Fraser University
Burnaby BC V5A 1S6 Canada
phone: 778-782-3010; FAX: 778-782-3496 Attn: D. Lank
****

----- Original Message -----
From: "Pedro Bandeira maia" <pedrobandeiramaia@amadesign.net>
To: dlank@sfu.ca
Cc: "Pedro Bandeira maia" <pedrobandeiramaia@amadesign.net>
Sent: Thursday, 25 August, 2016 11:33:23 AM
Subject: PhD student in interaction design - Ruff (Philomachus pugnax) courtship ritual

Dear Professor,

I´m a Portuguese Phd student in interaction design, and I´m trying to study animals courtship rituals in order to design new interactions between humans and technological artifacts.
I´m designing a courtship taxonomy that try to answer to some questions that could help designers to be inspired and designing new products.
The Ruff (Philomachus pugnax) are one of my selected animals to integrate the taxonomy, but I couldn´t find scientific information and evidences that answer to that question:
What´s the duration of the courtship (before copulation)? less then 10m, less a hour, less a day or more than one day.

Could you help me?
It´s possible to indicate one scientific paper that answer to this questions and describe the courtship ritual (before copulation)?

Thank you for helping me.

Best regards,

Pedro Bandeira Maia

van.Rhijn.1973.Behaviour.pdf

Hogan-Warburg1966.pdf

LankSmith1987BESCondLekking.pdf

De: **CEDIntern** CEDIntern@savingcranes.org
Assunto: Red-crowned Crane Courtship Ritual
Data: 12 de Setembro de 2016 às 22:08
Para: pedrobandeiramaia@amadesign.net
Cc: Andy Bingle abingle@savingcranes.org

Hello Mr. Bandeira Maia,

Thank you for writing to the International Crane Foundation with your question about Red-crowned Crane courtship behaviors. While we couldn't find any papers that describe the length of a crane mating dance, we know from our staff observations on site that the dancing ritual takes less than ten minutes. Copulation itself is very quick (seconds) but the dancing and shadowing behaviors can take place for minutes before. Not all dancing rituals lead to copulation however – cranes dance for exercise, to strengthen pair bonds, and to teach chicks the sequence. We're sorry we can't cite a published scientific paper that describes the time budget of the courtship ritual of Red-crowned cranes but encourage you to visit our species field guide at: https://www.savingcranes.org/species-field-guide/ and to email us back with any additional questions or comments!

Thank you again for contacting the International Crane Foundation and best of luck with your research!

Sincerely,
Emma Shelly
Interpretive Naturalist

INTERNATIONAL CRANE FOUNDATION
E11376 Shady Lane Road, P.O. Box 447
Baraboo, WI 53913 USA
(p) 608.356.9462 ext.127 (f) 608.356.9465
www.savingcranes.org

Join Our Email List

Workshops

Sinopse

Workshop – 29 Set, 6 ou 13 de Out?

Comportamentos biológicos aplicados ao design de interação, experiência e comportamentos

Enquadramento

A banalização de artefactos tecnológicos que vai povoando o nosso quotidiano, torna importante o desenvolvimento de novos significados no relacionamento humano com a tecnologia ou nas relações humanas que ocorrem através dessa mesma tecnologia. Atualmente, projetar tendo em forte consideração os comportamentos, apela a uma reflexão sobre os fatores semânticos e subjetivos que podem estar associados aos produtos, para além da sua função ou estética visual.

A importância, cada vez mais evidente, do estudo do comportamento, enquanto gerador de novas metáforas com interesse para o desenvolvimento da relação entre homem e objeto tecnológico, suscita a possível importância de introduzir a dimensão imaterial/comportamental nas metodologias de inspiração biológica (biomimética), para além da forma e da técnica que atualmente prevalecem.

Os rituais de sedução e namoro encontrados na natureza, através da sua riqueza visual, sonora, táctil, olfativa e de paladar, apresentam-se como potencialmente geradores de uma nova linguagem da poética da interação. Esta dimensão poética, propiciadora de um novo imaginário humano, parece-nos apresentar potencial para aplicação no design de interação, experiência e comportamentos.

Foi desenvolvida uma taxonomia de comportamentos biológicos de sedução e namoro, analisados e classificados segundo a perspetiva do design, recorrendo ao estudo da dimensão da experiência, identificada por Nathan Shedroff (2001), que distingue as seis dimensões que concorrem na estrutura dinâmica da experiência: Tempo/Duração [Time/Duration]; Interatividade [Interactivity]; Intensidade [Intensity]; Amplitude/Consistência [Breadth/Consistency]; Gatilhos Sensoriais e Cognitivos [Sensorial and Cognitive Triggers] e Significância/Significado [Significance/Meaning].

A nossa expectativa é, de que, através da utilização desta taxonomia, seja possível oferecer ao designer uma nova heurística de inspiração biológica, que privilegie uma abordagem menos tangível e evidente, propiciadora da criação de inéditos conceitos com aplicação no projeto de novos produtos ou serviços no âmbito do design de interação, experiência e comportamentos.

Sinopse

Este workshop propõe dois exercícios complementares. O primeiro, realizado em aula, tenta encontrar solução para um problema de interação previamente definido (que inclua tecnologia associada), recorrendo à inspiração nos comportamentos existentes na natureza (taxonomia dos rituais de sedução). O segundo exercício, realizado fora da aula, propõe que seja selecionado um comportamento biológico e posteriormente encontradas potenciais aplicações no âmbito do design de interação, experiência e comportamento, sempre com tecnologia associada.

Em ambos os exercícios solicita-se que, depois de analisados, interpretados e compreendidos os comportamentos, sejam desenvolvidas ideias de projeto (fase conceptual/ideia até primeiras formulações projetuais) que apliquem e relacionem a taxonomia dos comportamentos biológicos com um determinado problema de design de interação, experiência ou comportamento.

Trata-se de exercícios eminentemente conceptuais, exploradores de novas formas de abordar problemas existentes ou de prever necessidades futuras, tentado promover o pensamento divergente.

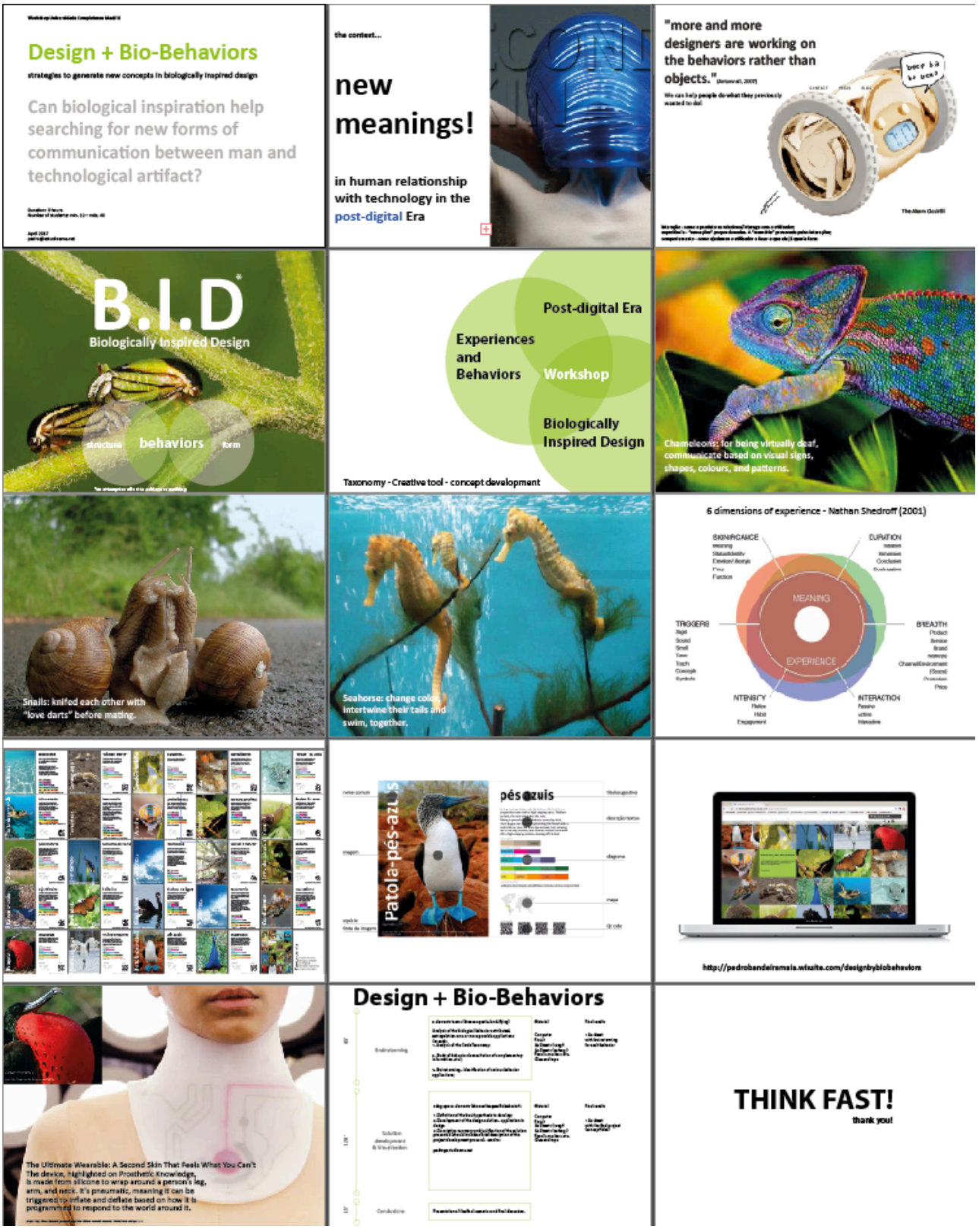
Enfatizamos esta dimensão da concetualidade, da poética e estimulo do imaginário humano ou das recordações passadas como forma de projetar em design. Procuramos resultados inéditos quer na forma como os comportamentos naturais possam originar novas necessidades ou como possam ser eles próprios a solução para problemas existentes.

Objetivos:

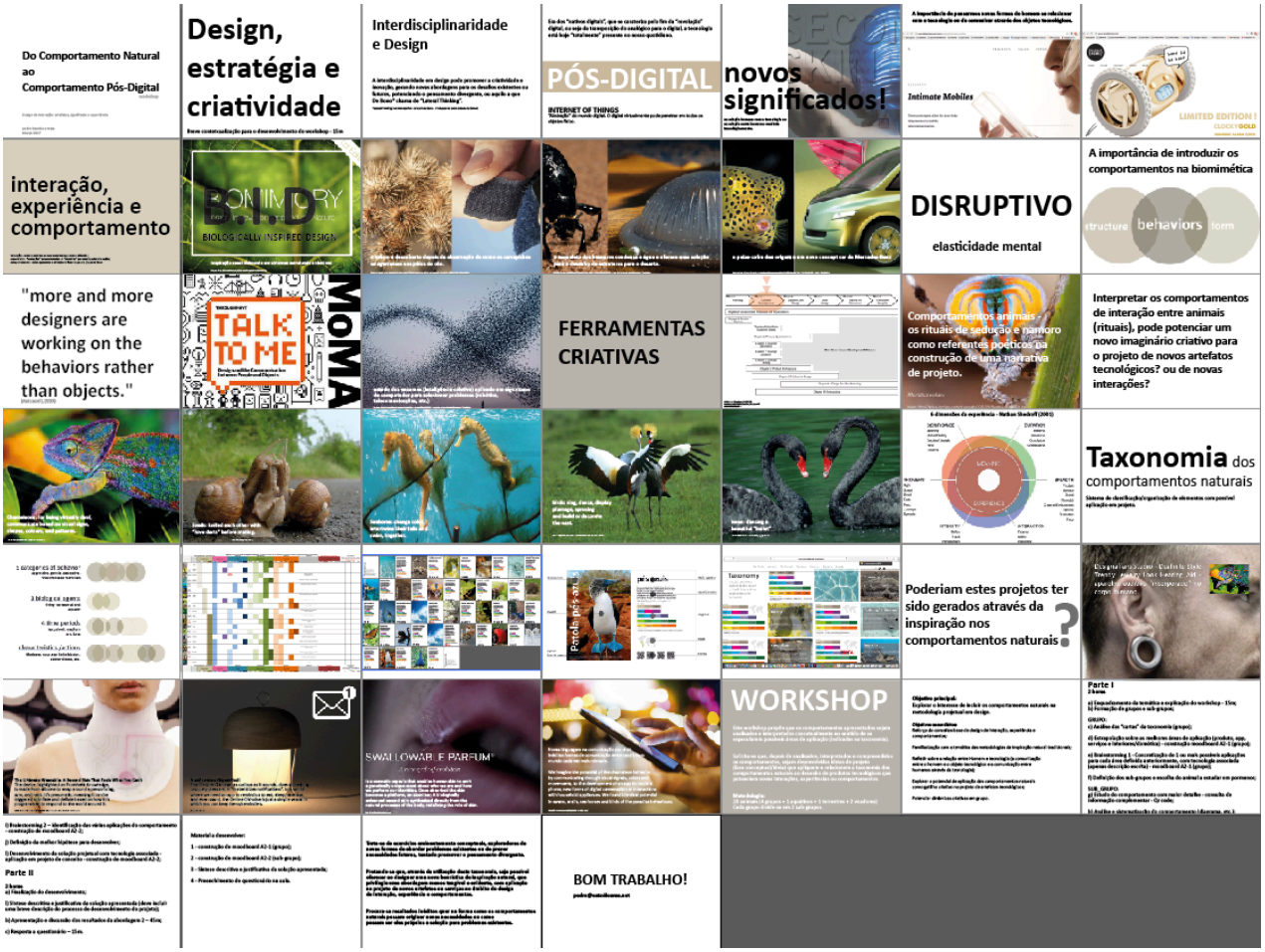
Reforço do conceitos base de design de interação e experiência;
Contato com o design de comportamentos e o seu potencial;
Familiarização com a temática da biomimética tradicional;

Apresentações

Workshop Universidade Complutense de Madrid



Workshop IPC, IPCA e U.A



Questionários e respostas

Universidade Complutense de Madrid

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
Please rate the following questions according to your opinion / Classifique segundo a sua opinião as seguintes questões.

1 - Do you consider that this workshop was a good methodology to generate new concepts?
1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

I disagree/discordo — I agree/ concordo — excelent/excelente

0	1	2	3	4	5	6	7	8	9	10

2 - How do you classifies the interest of including the animal behaviors in the design methodology of technological products biologically inspired.
2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 - Can the proposed taxonomy generate new ways for humans to communicate with technology or to communicate with others humans through technology?
3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

Anything/nada — Moderately/moderadamente — entirely/totalmente

0	1	2	3	4	5	6	7	8	9	10

4 - From the four dimensions of the experience that were the basis of the analysis of each behavior, number in descending order (from the most important to the least important) the importance assigned to each one, in order to be able to relate the behavior and the potential application in projects.
4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

☐ Duration/Duração (rápido, curto, médio e prolongado)
☐ Interaction/Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
☐ Triggers/Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
☐ Intensity/Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Which of the dimensions was most important for the development of your final project (sub-team)?

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

☐ Duration/Duração (rápido, curto, médio e prolongado)
☐ Interaction/Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
☐ Triggers/Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
☐ Intensity/Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – What was the importance of the auxiliary resources (articles, videos, etc.) to the development of the final project (sub-team)?

6 – De que forma os meios auxiliares disponibilizados (artigos, vídeos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	4	5	6	7	8	9	10

Questionário - 1/37

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
Please rate the following questions according to your opinion / Classifique segundo a sua opinião as seguintes questões.

1 - Do you consider that this workshop was a good methodology to generate new concepts?
1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

I disagree/discordo — I agree/ concordo — excelent/excelente

0	1	2	3	4	5	6	7	8	9	10

2 - How do you classifies the interest of including the animal behaviors in the design methodology of technological products biologically inspired.
2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 - Can the proposed taxonomy generate new ways for humans to communicate with technology or to communicate with others humans through technology?
3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

Anything/nada — Moderately/moderadamente — entirely/totalmente

0	1	2	3	4	5	6	7	8	9	10

4 - From the four dimensions of the experience that were the basis of the analysis of each behavior, number in descending order (from the most important to the least important) the importance assigned to each one, in order to be able to relate the behavior and the potential application in projects.
4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[2] Duration/Duração (rápido, curto, médio e prolongado)
[4] Interaction/Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
[3] Triggers/Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
[1] Intensity/Intensidade (caraterisitcas/ações atribuídas – exibição, sincronização, reciprocidade, etc.)

5 - Which of the dimensions was most important for the development of your final project (sub-team)?

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

[2] Duration/Duração (rápido, curto, médio e prolongado)
[4] Interaction/Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
[3] Triggers/Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
[1] Intensity/Intensidade (caraterisitcas/ações atribuídas – exibição, sincronização, reciprocidade, etc.)

6 – What was the importance of the auxiliary resources (articles, videos, etc.) to the development of the final project (sub-team)?

6 – De que forma os meios auxiliares disponibilizados (artigos, vídeos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	4	5	6	7	8	9	10

2

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
Please rate the following questions according to your opinion / Classifique segundo a sua opinião as seguintes questões.

1 - Do you consider that this workshop was a good methodology to generate new concepts?
1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

I disagree/discordo — I agree/ concordo — excelent/excelente

0	1	2	3	4	5	6	7	(8)	9	10

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No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	8	(9)	10

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Anything/nada — Moderately/moderadamente — entirely/totalmente

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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	4	5	6	(7)	8	9	10

3

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

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Madrid, April 2017 - Workshop – Design + Bio-Behaviors

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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	X	4	5	6	7	8	9	10

11

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
Please rate the following questions according to your opinion / Classifique segundo a sua opinião as seguintes questões.

1 - Do you consider that this workshop was a good methodology to generate new concepts?
1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

I disagree/discordo — I agree/ concordo — excelent/excelente

0	1	2	3	4	5	6	(7)	8	9	10

2 - How do you classifies the interest of including the animal behaviors in the design methodology of technological products biologically inspired.
2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	(6)	7	8	9	10

3 - Can the proposed taxonomy generate new ways for humans to communicate with technology or to communicate with others humans through technology?
3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

Anything/nada — Moderately/moderadamente — entirely/totalmente

0	1	2	3	4	5	6	7	(8)	9	10

4 - From the four dimensions of the experience that were the basis of the analysis of each behavior, number in descending order (from the most important to the least important) the importance assigned to each one, in order to be able to relate the behavior and the potential application in projects.
4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	(4)	5	6	7	8	9	10

12

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
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I disagree/discordo — I agree/ concordo — excelent/excelente

0	1	2	3	4	5	6	7	8	9	10

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No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	8	9	10

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Anything/nada — Moderately/moderadamente — entirely/totalmente

0	1	2	3	4	5	6	7	8	9	10

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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

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13

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

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I disagree/discordo — I agree/ concordo — excelent/excelente

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No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 - Can the proposed taxonomy generate new ways for humans to communicate with technology or to communicate with others humans through technology?
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Anything/nada — Moderately/moderadamente — entirely/totalmente

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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	4	5	6	7	8	9	10

14

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
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I disagree/discordo — I agree/ concordo — excelent/excelente

0	1	2	3	4	5	6	7	8	9	10
										(10)

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No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	8	9	10
								(8)		

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Anything/nada — Moderately/moderadamente — entirely/totalmente

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										(10)

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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	4	5	6	7	8	9	10
			(3)							

15

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

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I disagree/discordo — I agree/ concordo — excelent/excelente

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No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	8	9	10
								(8)		

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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	4	5	6	7	8	9	10
							(7)			

16

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
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No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	8	9	10

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Anything/nada — Moderately/moderadamente — entirely/totalmente

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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	4	5	6	7	8	9	10

17

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
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										(10)

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No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

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										(10)

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18

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

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19

Madrid, April 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
Please rate the following questions according to your opinion / Classifique segundo a sua opinião as seguintes questões.

1 - Do you consider that this workshop was a good methodology to generate new concepts?
1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

I disagree/discordo — I agree/ concordo — excelent/excelente

0	1	2	3	4	5	6	7	8	(9)	10

2 - How do you classifies the interest of including the animal behaviors in the design methodology of technological products biologically inspired.
2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	(8)	9	10

3 - Can the proposed taxonomy generate new ways for humans to communicate with technology or to communicate with others humans through technology?
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Anything/nada — Moderately/moderadamente — entirely/totalmente

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4 - From the four dimensions of the experience that were the basis of the analysis of each behavior, number in descending order (from the most important to the least important) the importance assigned to each one, in order to be able to relate the behavior and the potential application in projects.
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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

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20

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No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

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21

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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

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I loved the workshop, thank you very much for your time!
Good luck on your Phd.

J2

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Instituto Politécnico de Coimbra - ESEC

Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	10

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Questionário - 1/37

ESEC — Inscritos

1

Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

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Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

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ESEC Nov.2016

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discordo					concordo					excelente
0	1	2	3	4	5	6	7	X 8	9	10

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Sem interesse					Interessante					muito interessante
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Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	(8)	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	(9)	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	(10)

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[1] Duração (rápido, curto, médio e prolongado)

[4] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[3] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[2] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

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6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	(7)	8	9	10

Workshop - Do comportamento natural ao comportamento pós-digital
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Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10

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nada — moderadamente — totalmente

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Workshop - Do comportamento natural ao comportamento pós-digital
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[3] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[2] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

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6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	(9)	10

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Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	(9)	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	(10)

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	(9)	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

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nada — moderadamente — determinantes

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Workshop - Do comportamento natural ao comportamento pós-digital
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Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10

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nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	10

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3 Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

4 Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

2 Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

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2 Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

1 Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

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nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	9	10

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Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

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0	1	2	3	4	5	6	7	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10

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nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	9	10

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Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	X	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	X	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	X	8	9	10

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nada — moderadamente — determinantes

0	1	2	X	4	5	6	7	8	9	10

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Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

Questionário individual e anónimo.

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1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8 X	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7 X	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9 X	10

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nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8 X	9	10

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discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	(9)	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	(8)	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	(7)	8	9	10

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nada — moderadamente — determinantes

0	1	2	3	4	5	(6)	7	8	9	10

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Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo					concordo					excelente
0	1	2	3	4	5	6	7	(8)	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse					Interessante					muito interessante
0	1	2	3	4	5	6	7	8	(9)	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada					moderadamente					totalmente
0	1	2	3	4	5	6	7	(8)	9	10

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nada					moderadamente					determinantes
0	1	2	3	4	(5)	6	7	8	9	10

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Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

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1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	X 8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	X 9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	X 8	9	10

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Sem interesse — Interessante — muito interessante

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Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

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Classifique segundo a sua opinião as seguintes questões.

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discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	9	(10)

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	(8)	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	(8)	9	10

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1 [4] Duração (rápido, curto, médio e prolongado)

2 [2] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

3 [3] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

4 [1] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

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nada — moderadamente — determinantes

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discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	9	10
										X

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10
						X				

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	10
							X			

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

1 [ ] Duração (rápido, curto, médio e prolongado)

4 [ ] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

2 [ ] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

3 [ ] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

[ ] Duração (rápido, curto, médio e prolongado)

[X] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[ ] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[ ] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	9	10
									X	

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Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	(8)	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	(5)	6	7	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	(7)	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[1] Duração (rápido, curto, médio e prolongado)

[4] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[3] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[2] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

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6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	(5)	6	7	8	9	10

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Workshop - Do comportamento natural ao comportamento pós-digital
ESEC Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	9	10
									X	

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10
								X		

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	10
								X		

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

1 [X] Duração (rápido, curto, médio e prolongado)

3 [X] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

4 [X] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

2 [X] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

1 [X] Duração (rápido, curto, médio e prolongado)

2 [X] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

4 [X] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

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6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	9	10
							X			

Instituto politécnico do Cávado e do Ave

Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

☐ Duração (rápido, curto, médio e prolongado)

☐ Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

☐ Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

☐ Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

☐ Duração (rápido, curto, médio e prolongado)

☐ Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

☐ Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

☐ Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	9	10

Questionário - 1/20

Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo					concordo					excelente
0	1	2	3	4	5	6	7	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse					Interessante				muito interessante	
0	1	2	3	4	5	6	7	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada					moderadamente					totalmente
0	1	2	3	4	5	6	7	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

3 Duração (rápido, curto, médio e prolongado)

4 Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

1 Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

2 Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

4 Duração (rápido, curto, médio e prolongado)

3 Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

2 Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

1 Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada					moderadamente					determinantes
0	1	2	3	4	5	6	7	8	9	10

2

Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

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nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	9	10

3

Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	(8)	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	(7)	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	(9)	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

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[2] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[1] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

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nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	(8)	9	10

4

Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	(8)	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	(8)	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	(7)	8	9	10

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[2] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[1] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

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nada — moderadamente — determinantes

0	1	2	3	4	5	6	(7)	8	9	10

5

Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[4] Duração (rápido, curto, médio e prolongado)

[3] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[1] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[2] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

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[ ] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[X] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[ ] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

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nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	9	10

Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

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discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

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nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	9	10

7

Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[1] Duração (rápido, curto, médio e prolongado)

[3] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[2] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[4] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

[ ] Duração (rápido, curto, médio e prolongado)

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[ ] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[X] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	9	10

Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7 ✓	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6 ✗	7	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7 ✗	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[1] Duração (rápido, curto, médio e prolongado)

[3] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[4] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[2] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

[2] Duração (rápido, curto, médio e prolongado)

[1] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[3] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[4] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8 ✗	9	10

Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7 ✓	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8 ✓	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8 ✓	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[2] Duração (rápido, curto, médio e prolongado)

[1] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[3] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[4] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

[2] Duração (rápido, curto, médio e prolongado)

[3] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[1] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[4] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	7 ✓	8	9	10

10

Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[3] Duração (rápido, curto, médio e prolongado)

[2] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[4] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[1] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

[4] Duração (rápido, curto, médio e prolongado)

[1] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[3] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[2] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	9	10

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Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	9	10
							X			

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10
								X		

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	10
							X			

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[4] Duração (rápido, curto, médio e prolongado)

[1] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[2] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[3] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

[ ] Duração (rápido, curto, médio e prolongado)

[X] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[ ] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[ ] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	9	10
								X		

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Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8 X	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8 X	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8 X	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[4] Duração (rápido, curto, médio e prolongado)

[1] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[3] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[2] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

[ ] Duração (rápido, curto, médio e prolongado)

[X] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[ ] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[ ] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	7 X	8	9	10

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Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8 ✓	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9 ✓	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7 ✓	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[3] Duração (rápido, curto, médio e prolongado)

[1] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[2] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[4] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

[3] Duração (rápido, curto, médio e prolongado)

[2] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[1] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[4] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	7 ✓	8	9	10

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Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo — concordo — excelente

0	1	2	3	4	(5)	6	7	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	(5)	6	7	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	(4)	5	6	7	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[4] Duração (rápido, curto, médio e prolongado)

[3] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[1] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[2] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

[ ] Duração (rápido, curto, médio e prolongado)

[x] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)

[ ] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)

[ ] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	(4)	5	6	7	8	9	10

15

Workshop - Do comportamento natural ao comportamento pós-digital
IPCA Nov.2016

Questionário individual e anónimo.

Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

discordo					concordo				excelente
0	1	2	3	4	5	6	☒	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse					Interessante					muito interessante
0	1	2	3	4	5	6	7	☒	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada					moderadamente					totalmente
0	1	2	☒	4	5	6	7	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

- [ ] Duração (rápido, curto, médio e prolongado)
- [ ] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
- [x] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
- [ ] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

- [ ] Duração (rápido, curto, médio e prolongado)
- [x] Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
- [ ] Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
- [ ] Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada					moderadamente					determinantes
0	1	2	3	4	☒	6	7	8	9	10

Universidade de Aveiro
Workshop - Do comportamento natural ao comportamento pós-digital
U. AVEIRO – MESTRADO EM DESIGN - Março 2017

Questionário individual e anónimo.
Classifique segundo a sua opinião as seguintes questões.

1 – Considera que este workshop foi uma metodologia eficaz para gerar novas interações, experiências ou comportamentos?

discordo — concordo — excelente

0	1	2	3	4	5	6	7	8	9	10

2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

Sem interesse — Interessante — muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

nada — moderadamente — totalmente

0	1	2	3	4	5	6	7	8	9	10

4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (4- importante a 1- menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

☐ Duração (rápido, curto, médio e prolongado)
☐ Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
☐ Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
☐ Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

☐ Duração (rápido, curto, médio e prolongado)
☐ Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
☐ Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
☐ Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – De que forma os meios auxiliaries disponibilizados (artigos, videos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

nada — moderadamente — determinantes

0	1	2	3	4	5	6	7	8	9	10

Questionário - 1/20

UA - inscrição

U. Aveiro, May 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
Please rate the following questions according to your opinion / Classifique segundo a sua opinião as seguintes questões.

1 - Do you consider that this workshop was a good methodology to generate new concepts?
1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

I disagree/discordo — I agree/ concordo — excelent/excelente

0	1	2	3	4	5	6	7	8	9	10

2 - How do you classifies the interest of including the animal behaviors in the design methodology of technological products biologically inspired.
2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 - Can the proposed taxonomy generate new ways for humans to communicate with technology or to communicate with others humans through technology?
3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

Anything/nada — Moderately/moderadamente — entirely/totalmente

0	1	2	3	4	5	6	7	8	9	10

4 - From the four dimensions of the experience that were the basis of the analysis of each behavior, number in descending order (from the most important to the least important) the importance assigned to each one, in order to be able to relate the behavior and the potential application in projects.
4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[2] Duration/Duração (rápido, curto, médio e prolongado)
[4] Interaction/Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
[3] Triggers/Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
[1] Intensity/Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Which of the dimensions was most important for the development of your final project (sub-team)?

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

[ ] Duration/Duração (rápido, curto, médio e prolongado)
[X] Interaction/Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
[ ] Triggers/Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
[ ] Intensity/Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – What was the importance of the auxiliary resources (articles, videos, etc.) to the development of the final project (sub-team)?

6 – De que forma os meios auxiliares disponibilizados (artigos, vídeos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	4	5	6	7	8	9	10

U. Aveiro, May 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
Please rate the following questions according to your opinion / Classifique segundo a sua opinião as seguintes questões.

1 - Do you consider that this workshop was a good methodology to generate new concepts?
1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

I disagree/discordo — I agree/ concordo — excelent/excelente

0	1	2	3	4	5	6	7	8	9	~~10~~

2 - How do you classifies the interest of including the animal behaviors in the design methodology of technological products biologically inspired.
2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	~~8~~	9	10

3 - Can the proposed taxonomy generate new ways for humans to communicate with technology or to communicate with others humans through technology?
3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

Anything/nada — Moderately/moderadamente — entirely/totalmente

0	1	2	3	4	5	6	7	8	9	~~10~~

4 - From the four dimensions of the experience that were the basis of the analysis of each behavior, number in descending order (from the most important to the least important) the importance assigned to each one, in order to be able to relate the behavior and the potential application in projects.
4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

[2] Duration/Duração (rápido, curto, médio e prolongado)
[4] Interaction/Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
[1] Triggers/Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
[3] Intensity/Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Which of the dimensions was most important for the development of your final project (sub-team)?

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

[ ] Duration/Duração (rápido, curto, médio e prolongado)
[ ] Interaction/Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
[X] Triggers/Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
[ ] Intensity/Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

6 – What was the importance of the auxiliary resources (articles, videos, etc.) to the development of the final project (sub-team)?

6 – De que forma os meios auxiliares disponibilizados (artigos, vídeos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	4	5	6	7	8	9	~~10~~

U. Aveiro, May 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
Please rate the following questions according to your opinion / Classifique segundo a sua opinião as seguintes questões.

1 - Do you consider that this workshop was a good methodology to generate new concepts?
1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

I disagree/discordo — I agree/ concordo — excelent/excelente

0	1	2	3	4	5	6	7	8	9	10

2 - How do you classifies the interest of including the animal behaviors in the design methodology of technological products biologically inspired.
2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	8	9	10

3 - Can the proposed taxonomy generate new ways for humans to communicate with technology or to communicate with others humans through technology?
3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

Anything/nada — Moderately/moderadamente — entirely/totalmente

0	1	2	3	4	5	6	7	8	9	10

4 - From the four dimensions of the experience that were the basis of the analysis of each behavior, number in descending order (from the most important to the least important) the importance assigned to each one, in order to be able to relate the behavior and the potential application in projects.
4 - Das 4 dimensões da experiência que estiveram na base da análise de cada comportamento, numere por ordem decrescente (da mais importante para a menos importante) a importância que atribui a cada uma, para conseguir relacionar os comportamento e o potencial de aplicação em projeto.

- [4] Duration/Duração (rápido, curto, médio e prolongado)
- [3] Interaction/Interação (categorias - intimidatórios, brandos, enganadores, ritualizados e materiais)
- [1] Triggers/Gatilhos (5 sentidos – visão, audição, paladar, tato e olfato)
- [2] Intensity/Intensidade (caraterisitcas/ações atribuidas – exibição, sincronização, reciprocidade, etc.)

5 - Which of the dimensions was most important for the development of your final project (sub-team)?

5 - Qual das dimensões foi mais determinante para o desenvolvimento do seu projeto final (sub-equipa)?

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6 – De que forma os meios auxiliares disponibilizados (artigos, vídeos, etc.) foram importantes no desenvolvimento do seu projeto final (sub-equipa)?

Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	4	5	6	7	8	9	10

4

U. Aveiro, May 2017 - Workshop – Design + Bio-Behaviors

Questionário individual e anónimo / Individual and anonymous questionnaire.
Please rate the following questions according to your opinion / Classifique segundo a sua opinião as seguintes questões.

1 - Do you consider that this workshop was a good methodology to generate new concepts?
1 – Considera que este workshop foi uma metodologia eficaz para gerar novos conceitos?

I disagree/discordo — I agree/ concordo — excelent/excelente

0	1	2	3	4	5	6	7	8	X	10

2 - How do you classifies the interest of including the animal behaviors in the design methodology of technological products biologically inspired.
2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

No interest/Sem interesse — Interesting/Interessante — very interesting/muito interessante

0	1	2	3	4	5	6	7	8	X	10

3 - Can the proposed taxonomy generate new ways for humans to communicate with technology or to communicate with others humans through technology?
3 – A taxonomia proposta pode gerar novas formas do homem comunicar com a tecnologia ou de comunicar entre si através de tecnologia?

Anything/nada — Moderately/moderadamente — entirely/totalmente

0	1	2	3	4	5	6	7	X	9	10

4 - From the four dimensions of the experience that were the basis of the analysis of each behavior, number in descending order (from the most important to the least important) the importance assigned to each one, in order to be able to relate the behavior and the potential application in projects.
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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	4	5	6	7	8	X	10

5

U. Aveiro, May 2017 - Workshop – Design + Bio-Behaviors

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I disagree/discordo — I agree/ concordo — excelent/excelente

0	1	2	3	4	5	6	7	8	(9)	10

2 - How do you classifies the interest of including the animal behaviors in the design methodology of technological products biologically inspired.
2 – Como classifica o interesse de incluir os comportamentos animais na metodologia projetual de produtos tecnológicos de inspiração natural.

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Nothing/ nada — moderately/ moderadamente — determinant/ determinantes

0	1	2	3	4	5	6	7	(8)	9	10

Artigos publicados

DESIGNA2016

Maia, P., Dias, N., Stilwell, G. (2016). Comportamento biológico e ausência de erro – uma taxonomia inspiradora de inéditas interações, experiências e comportamentos com artefactos tecnológicos. Designa2016 - Erro(r) - International Conference on Design Research. Universidade da Beira Interior. Covilhã.

DESIGNA2016 ERRO(R)- Conferência Internacional de Investigação em Design – 6ª edição
Universidade da Beira Interior

ID432

Biological behavior and absence of error - an inspiring taxonomy promoter of inedit interactions, experiences and behaviors with technological artifacts.

Panel:
Product / Produto
Theory / Teoria

Abstract
The banalization of technological artifacts that crowd our daily lives, shows that the development of new meanings in the human relationship with technology or in relations between humans that occur through this same technology is of great importance.
Currently design, taking into account a emotional dimension, based on the need to think about new experiences, behaviors or interactions, calls for a reflection on the semantic and subjective factors that may be associated with the products, in addition to their function or visual aesthetics.
The seduction rituals found in nature, through the richness of its visual, auditional, tactile, olfactory and gustative, present themselves as potentially generators of a unique poetic language of interaction, suggest a new human imagination, with potential for application in interaction design, experience and behavior.

A taxonomy of biological behaviors of seduction (not rational animals) was developed, analyzed and classified according to the perspective of design, where the six dimensions that compete in the dynamic structure of experience (Nathan Shedroff, 2001), framing the parameters of interpretation of each behavior.

The error in seduction biological behavior cannot exist, since this is the ritual which depends on the development of species. The error, or lack thereof, appears as a decisive element in seduction of a sexual partner that will lead to copulation and thus the genetic offspring, since most of the females does depend on execution without error of the seduction rituals, your choice of the partner for mating.

We think that the importance of the absence of manifest error in the performance of rituals may become an interesting field of study with application in interaction design.

Our expectation is that by using this taxonomy, you can offer the designer a new heuristic of biological inspiration, which favors less tangible and obvious approach, pledge of a divergent thinking that results in the creation of new concepts with application within interaction design, experience and behavior.

Keywords: biomimetic, interaction, experience, behavior, technology

Contextualização

Adoptar uma estratégia exploratória que potencie o pensamento divergente, ou aquilo a que Edward De Bono (2014) chama de "Lateral Thinking", com o intuito de investigar e cruzar áreas que tradicionalmente não se relacionam de uma forma direta pode, na nossa perspetiva, constituir uma interessante abordagem ao pensamento e ao projeto em design.

A premissa de construção da taxonomia proposta, centra-se na capacidade de olhar para a natureza, na sua forma menos evidente, interpretá-la e aproximá-la das metodologias de projeto em design. ***Pretende-se, reforçar e enquadrar o interesse da inclusão dos comportamentos naturais nas atuais metodologias projetuais,*** dinamizando a construção de um novo paradigma na utilização da biomimética tradicional, que atualmente privilegia os sistemas estruturais e formais da natureza.

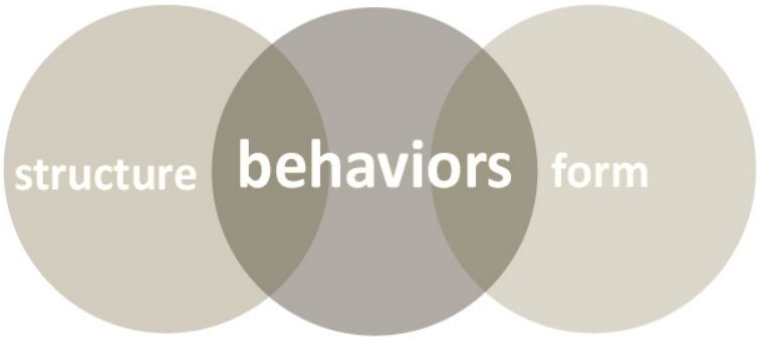

Figura 1 – Estrutura, comportamentos e forma.

O design para a experiência e comportamentos e o estudo dos exemplos de inspiração natural, sendo áreas estudadas individualmente carecem de uma associação entre si, com o objetivo de sistematizar processos e metodologias que permitam traduzi-las em artefatos promotores de novas experiências e comportamentos.

A vivência na sociedade atual, complexa e tecnológica, onde as inter(rel)ações humanas tendem para uma profunda transformação e evolução, bem como a forma como comunicamos com a tecnologia, torna evidente a necessidade de estabelecer novas relações com os artefactos tecnológicos, como refere Donald Norman, "os objetos na nossa vida são mais do que meras posses materiais. Temos orgulho neles, não necessariamente porque estamos a mostrar a nossa riqueza ou status, mas por causa do significado que trazem às nossas vidas." (Norman, 2004, p.6; nossa tradução).

Os produtos devem ter em atenção as necessidades emocionais. Paola Antonelli (2007), na conferência *TedTalks: Treat Design as Art*, refere que "cada vez mais designers estão a trabalhar sobre os comportamentos em vez de objetos." Com efeito, o design parece-nos um veículo privilegiado para propor inéditas experiências e comportamentos entre o homem e o artefato tecnológico, onde a emoção pode desempenhar um papel decisivo.

António Damásio (2000) afirma que, *"mais do que ditar uma resposta individual para cada acção, a evolução força directamente a mente para tomar decisões através de um sistema bastante singular utilizando percursos de prazer e emoção para conduzir o comportamento humano. Muitas das determinações que a consciência humana toma, são em parte directamente influenciadas por mecanismos subconscientes".* Torna-se necessario estudar e compreender a forma como o ser humano responde ao estímulo. Os designers criam conjuntos de condições para solicitarem acção e reacção,

encontramos este tipo de estratégia nos rituais de sedução e namoro dos animais.

É possível sugerir que a relação entre homem e artefato tecnológico, depende em parte da capacidade de gerar fluxos interativos que evitem frustrar o utilizador. Segundo Norman (2013),

"As pessoas estão frustradas com as coisas dia-a-dia. Da complexidade crescente do painel do automóvel, à crescente automação em casa com suas redes internas, música complexa, sistemas de vídeo e jogos para entretenimento e comunicação, e a automação crescente na cozinha, o quotidiano, às vezes, parece uma luta interminável contra a confusão, erros de continuidade, frustração e um ciclo contínuo de atualização e manutenção dos nossos pertences". (Donald Norman, 2013, p.9; nossa tradução). Desta forma, a diminuição ou ausência do erro e a sistematização de processos ou rituais, podem contribuir para uma definição de estratégias utilizadas no desenho para a experiência ou para o comportamento, promotoras de relação emocional que se pretende fluida.

Partindo desta premissa, entendemos que a natureza pode inspirar o desenho de inéditas interações, pois o erro nos comportamentos naturais de sedução não pode existir, uma vez que é deste ritual que depende o que Darwin chamou de seleção sexual, *"Esta depende não de uma luta pela existência, mas de uma luta entre os machos pela posse das fêmeas; o resultado não é a morte do adversário derrotado, mas uma prole menos numerosa ou inexistente. A selecção sexual é, portanto, menos rígida do que a selecção natural. Geralmente, os machos mais vigorosos, os que estão mais bem adaptados aos seus papéis da natureza, deixarão uma progénie mais vasta."* (Darwin, 2003, p.92).

Através dos diversos rituais de sedução existentes na natureza, o macho protagoniza um incansável momento, onde anuncia a sua força, saúde geral e o desejo de acasalar. Estas exibições, onde a ausência de erro é determinante, tendem a transmitir mensagens fidedignas, uma vez que são energicamente dispendiosas e arriscadas, levando ao esgotamento de importantes recursos e ao risco de serem capturados pelos seus predadores. A ausência de erro, aparece como elemento decisivo na sedução do parceiro sexual que levará à cópula e consequentemente à descendência genética, uma vez que, grande parte das fêmeas faz depender da execução sem erros dos rituais, a sua escolha do parceiro para acasalamento.

A taxonomia

Na génese da construção dos parâmetros da taxonomia, tentámos estabelecer uma estreita relação com a dimensão da experiência, identificada por Nathan Shedroff (2001), que distingue as seis dimensões que concorrem na estrutura dinâmica da experiência: Tempo/Duração [Time/Duration]; Interatividade [Interactivity]; Intensidade [Intensity]; Amplitude/Consistência [Breadth/Consistency]; Gatilhos Sensoriais e Cognitivos [Sensorial and Cognitive Triggers] e Significância/Significado [Significance/Meaning].

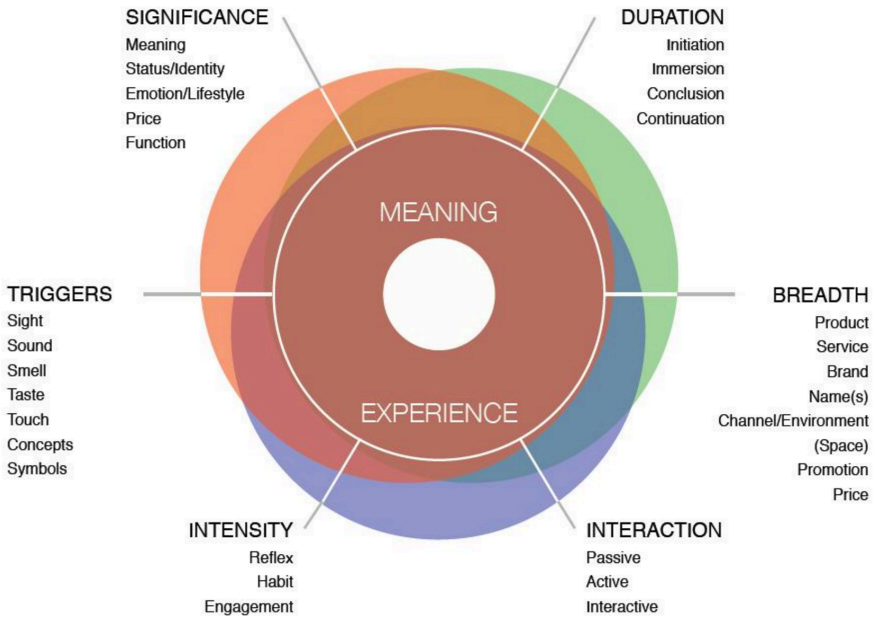

Figura 2: Diagrama das 6 dimensões da experiência – Nathan Shedroff (2001).

Shedroff (2001), acentua a importância e grande variedade de tipologias de experiências, propondo uma fórmula para pensar a experiência sem ser contagiada à cabeça pela tecnologia, considerando que, *"O conceito mais importante a reter é o de que todas as experiências são importantes e que podemos aprender com elas quer sejam tradicionais, físicas, offline, digitais, online, ou outras experiências tecnológicas. Na verdade, sabemos muito sobre as experiências e sua criação através destas outras disciplinas estabelecidas que podem e devem ser usadas para desenvolver novas soluções. A maioria das experiências tecnológicas, incluindo as digitais e, especialmente, as experiências online, tem pouco significado em comparação com experiências do mundo real e têm sido relativamente mal sucedidas enquanto resultado. O que essas soluções requerem é que quem desenvolve o processo entenda o que em primeiro lugar faz uma boa*

experiência e, depois de, tão bem como possível, traduzir esses princípios para os media desejado, sem ser a tecnologia a ditar a forma da experiência." (p. 2-3; nossa tradução*)*

A estratégia de construção da taxonomia começou pelo levantamento dos exemplos de rituais de sedução existentes em animais não racionais que, numa primeira análise, entendemos terem capacidade visual, poética, rítmica e conceptual para posterior aplicação em projetos de design. Decrevemos de seguida, alguns rituais selecionados.

Os cavalos-marinhos, mudam de cor entrelaçam as suas caudas e nadam juntos em conjunto, acariciando-se com os seus tentáculos, tentando descobrir se são o par ideal um para o outro. Os camaleões, por serem praticamente surdos, comunicam com base em sinais visuais, formas, cores e padrões, estratégias que usam para reconhecer a sua parceira. Os Caracóis, esfaqueiam-se uns aos outros com "dardos do amor". O dardo, com a forma de agulha hipodérmica, injeta uma hormona, causando uma alteração de comportamento. Por último, os pássaros, *"os grandes criativos nas estratégias de atração", segundo Stilwell, nos quais " a mudança de guarda-roupa, as exibições divinais de canto, os deslumbrantes passos de dança, o voo acrobático, a construção de apartamentos de luxo, a proteção da companheira… e mais uma infinidade de truques para conseguir alguns segundos de glória."* (Stilwell, G. 2012, p.22)

Para a construção desta taxonomia foram identificadas 3 categorias de agentes naturais; aquáticos, terrestres e voadores e o género que toma a iniciativa; masculino, feminino ou ambos.

Na tentativa de aproximar os parâmetros de análise da taxonomia às 6 dimensões da experiência de Nathan Shedroff, foi considerado que seria importante enquadrar temporalmente cada ritual (duration); rápido (alguns minutos), curto (menos de uma hora), médio (menos de um dia), e prolongado (mais do que um dia).

Complementarmente foram classificados 5 tipos de interatividade (interactivity): agressivos (configuram atos violentos), brandos (utilização de ações suaves e/ou carinhosas), enganadores (são utilizadas estratégias que não estão de acordo com a real capacidade do seu emissor), ritualizados (que obedecem a um conjunto de práticas previamente "definidas"), e os materiais (implicam a utilização de outros recursos que não apenas os meios físicos do seu emissor).

Nathan Shedroff inclui no seu diagrama a importância dos "gatilhos" que despoletam a ação (triggers), definimos os 5 sentidos; visão, audição, olfato, tato e paladar, como possiveis gatilhos.
O parâmetro seguinte é a intensidade (intensity) das ações ocorridas que podem enriquecer a descrição; amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, entre outros.

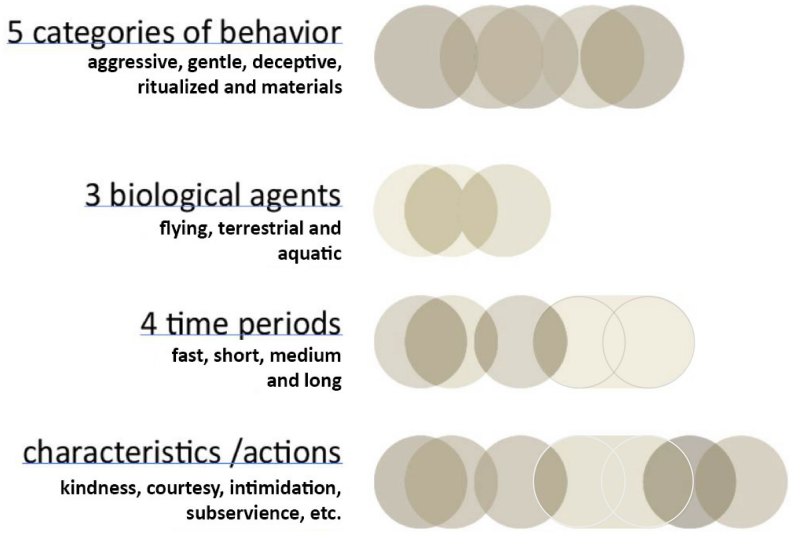

Figura 3 – Parâmetros de construção da taxonomia.

Aos campos atrás descritos acrescentámos dois novos campos, não relacionados diretamente com o comportamento observado nos animais, mas que incorporam as 6 dimensões da experiência e, do nosso ponto de vista, se tornam essenciais para uma extrapolação sobre a possível aplicabilidade em design. Espetro de aplicação (breath) e o seu significado (significance), um conceito extremamente importante no design para a experiência. Pareceu-nos importante e decisivo a inclusão destes dois novos campos, pois assim será possivel objetivar com mais detalhe as possiveis relações entre os comportamentos naturais e o desenho de novas interações, experiências e comportamentos.

A informação recolhida, foi tratada e representada visualmente, com o intuito de transmitir com objetividade e clareza as respostas encontradas.
Numa primeira fase procedeu-se à construção de um conjunto de "cartas" que apresentassem visualmente a taxonomia. Sendo uma ferramenta física, possível de manusear, misturar, hierarquizar, etc., estas cartas apresentam-se como um valioso recurso na percepção global da taxonomia, despoletando o

entusiasmo dos utilizadores, o que contribuirá para a dinamização dos workshops realizados.

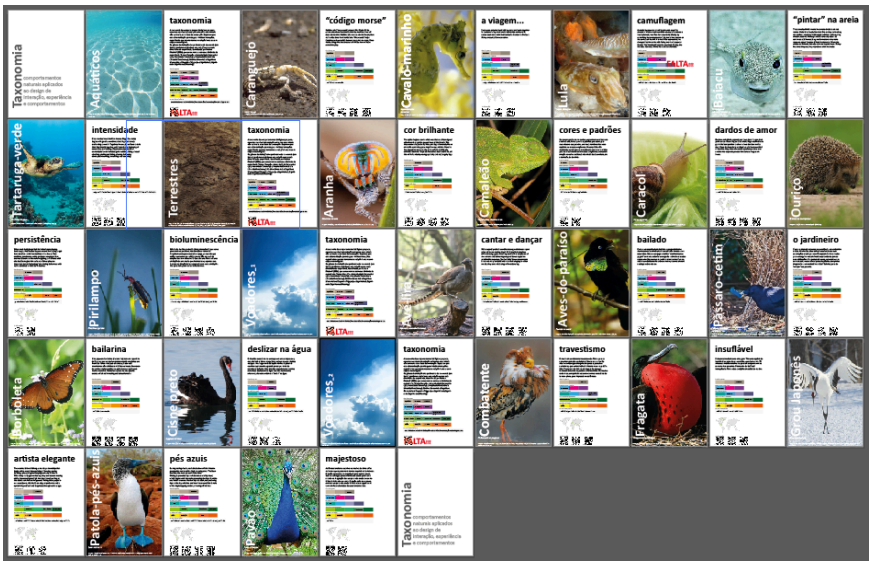

Figura 4: Visão de conjunto das fichas da taxonomia.

Cada carta obedeceu a uma grelha previamente definida, conforme imagem.

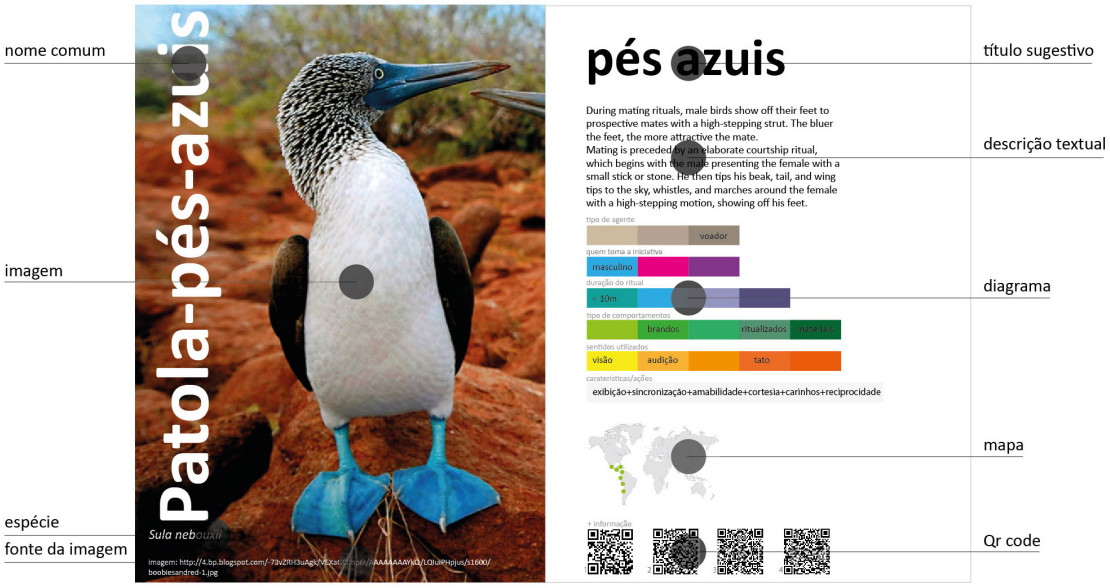

Figura 5: Esquema explicativo das cartas da taxonomia.

Entendemos que, a transmissão rápida da informação ao designer, permitirá fazer uma triagem inicial tendo em atenção as características que devem ser valorizadas na procura da resposta a um determinado problema. Se é procurada uma interação rápida, mas simultaneamente branda, através das cartas será possível encontrar os comportamentos que se aproximam destas carateristicas e, posteriormente, iniciar o seu estudo pormenorizado,

recorrendo aos Qrcode existente nas cartas, que remetem para o endereço web da investigação, onde é possível ler artigos descritivos dos rituais e observar vídeos ou conjuntos de imagens.

Foi construído um quadro geral, que permite uma visão global dos animais estudados e oferece uma análise comparativa entre todos.

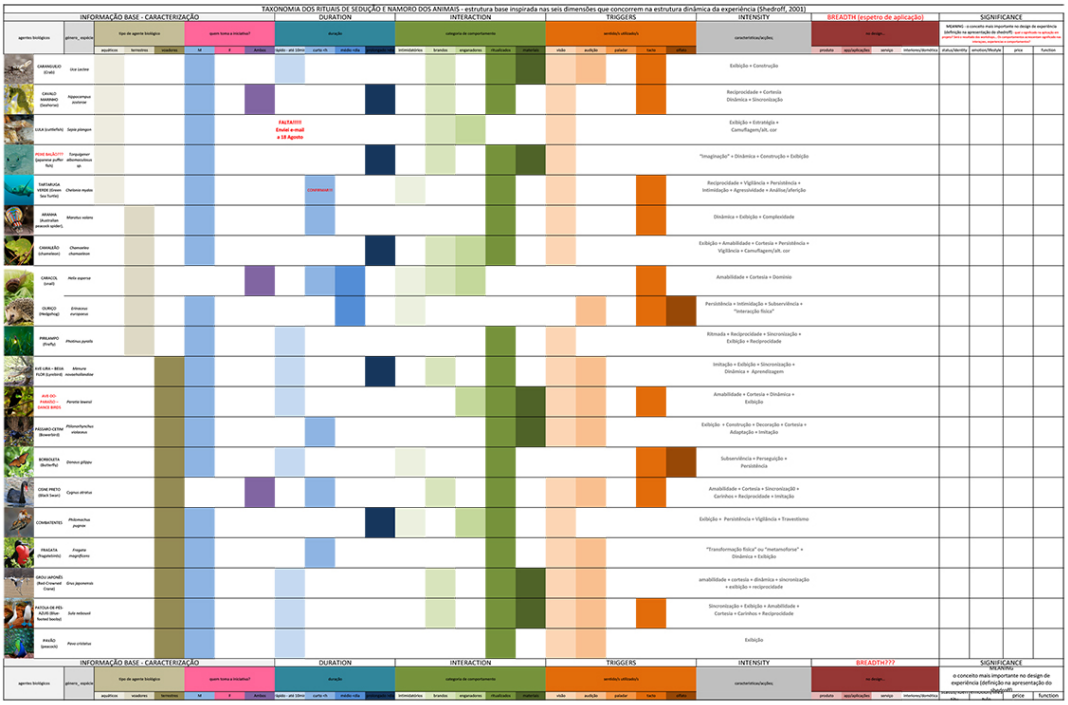

Figura 6: Quadro comparativo dos comportamentos.

A página Web - http://pedrobandeiramaia.wixsite.com/designbybiobehaviors - permite a divulgação da investigação produzida no âmbito do doutoramento em design. Pretende ainda ser, um instrumento de apoio aos workshops dinamizados e uma plataforma de troca de informação relativa ao design inspirado na natureza, onde seja possível qualquer interessado acrescentar um novo comportamento e interpretá-lo conforme os parâmetros da taxonomia definida.

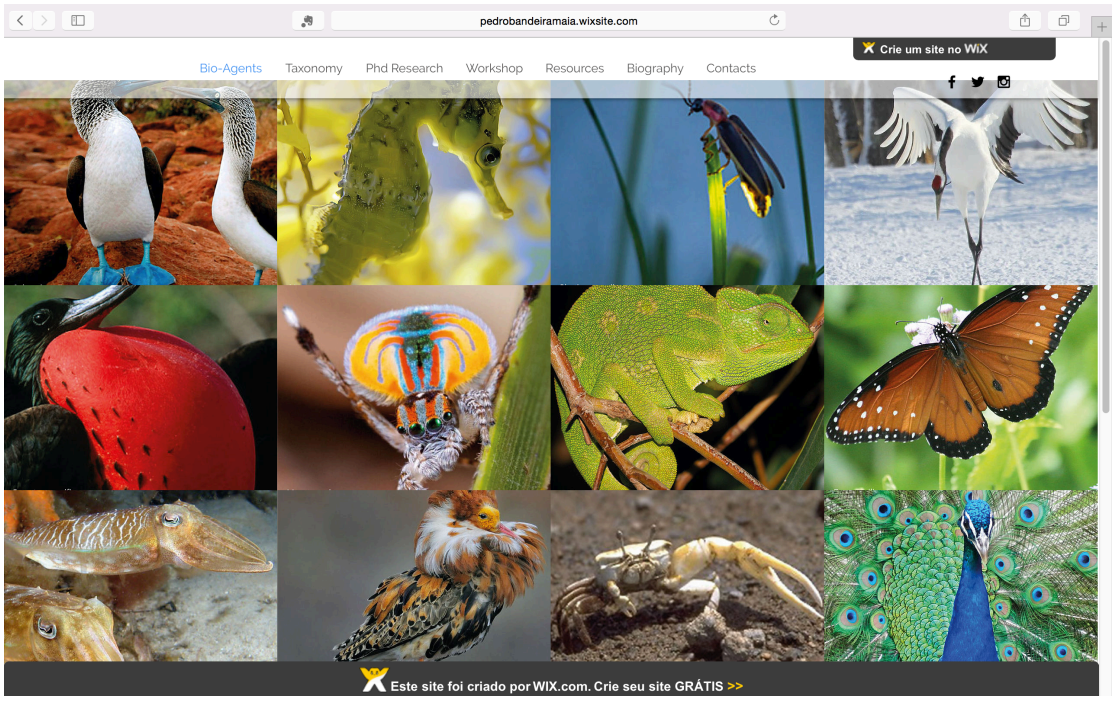

Figura 7: Separador de entrada.

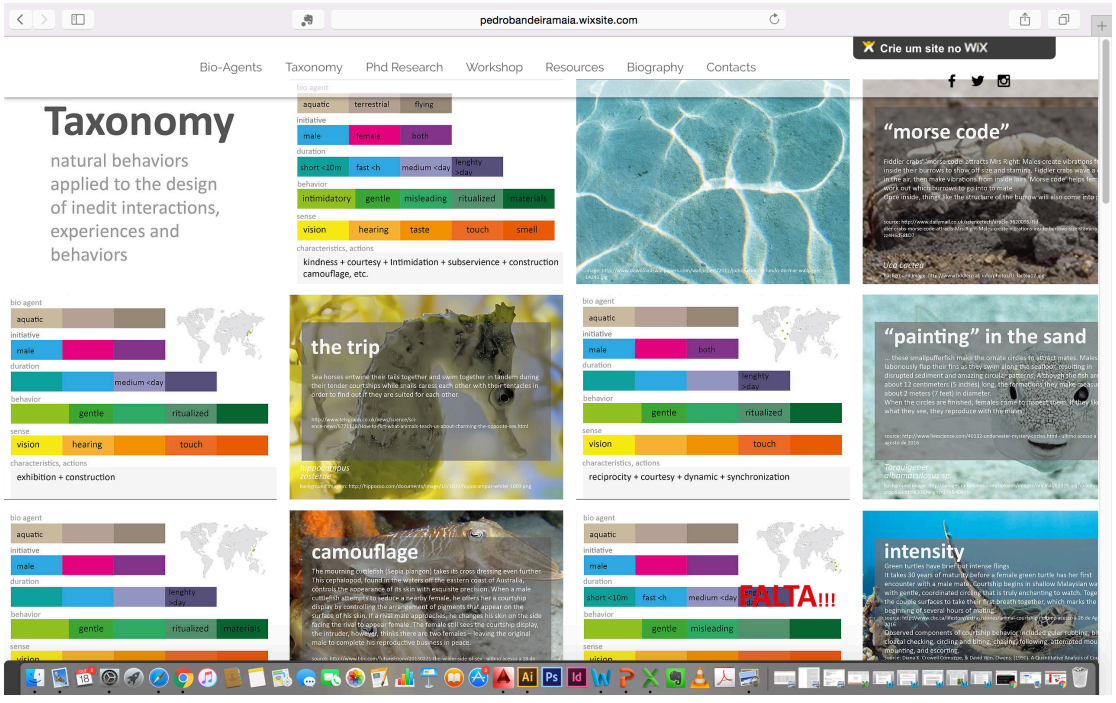

Figura 8: Separador com a interpretação de cada comportamento segundo os parâmetros definidos.

CONCLUSÕES

Procura-se demonstrar nesta investigação que o estudo dos comportamentos encontrados na natureza, designadamente os rituais de sedução e namoro, podem contribuir para a formação de uma heurística de inspiração e apoio

no desenho de novas interações, experiências e comportamentos entre o homem e os artefactos tecnológicos, assim como, das relações estabelecidas através destes.

Sonho e imaginação são talvez as características mais importantes dos seres humanos. O ser humano seduz para falar, enganar, conquistar, partilhar ou sobreviver. Seduz e é seduzido através de gestos, rituais, palavras, comportamentos, produtos ou através de seu próprio corpo. Mas, o que realmente cativa o ser humano é a emoção, o sentimento, a magia, proporcionada em grande parte pela capacidade de seduzir. Sendo, estes comportamentos, de alguma forma antemporais, integrados na imaginação humana e, portanto, potenciais veículos poéticos e simbólicos, eles são assumidos como elementos ideais para re-imaginar o nosso mundo tecnológico.

Através desta pesquisa, pretende-se demonstrar a viabilidade do desenvolvimento de uma metodologia que complementa a abordagem biomimética tradicional e potencializa a concetualização de novas formas de relacionamento entre pessoas, sistemas técnicos e relações interpessoais, tecnicamente mediadas.

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Designing with biological behaviors in post-digital Era

Links between animals' seduction behavior and inedited interactions with technological artefacts.

Abstract

Biomimetic is used in specific design projects, mainly as a methodology focused on the study of technical and mechanical aspects. Our research aims to expand the biomimetic taxonomy, continuing the study of nature in a broader design perspective, not just on their mechanic and formal aspects, but in the study of animal behaviour in its aesthetic and symbolic dimension. We believe this approach could be an inspiration for new artefact/human interaction paradigms.

In order to establish analogies, we developed a taxonomy of behaviours based on animals' seduction and mating rituals with the goal of building a conceptual framework that relate these behaviors with the design of inedited interactions and contribute to the construction of new metaphors.

Cognitive, emotional and behavioural features are increasingly valued in contemporary design, thus it seems pertinent to look for relations with some behaviours observed in nature. Because these are two areas of research that are seldom associated, we have strived to develop an interdisciplinary approach, based on a careful systematization and posterior application of the developed hypothesis into a set of artefacts – *tools for communication* - that promote new behaviours in interaction design.

This research aims to demonstrate the feasibility of developing a new human scenario that generates experiences, behaviors and seduction, found in timeless biological archetypes.

Keywords: Biomimetic, behavior, experience, emotion, interaction design, rituals, post-digital.

Research area

Interaction Design: artefacts, meaning and experience.

Key research questions

a) The animals rituals of seduction and dating applied to artefacts, are able to contribute for the development of an emerging generation of technological artefacts that can influence our behavior?

b) Is it possible to build a taxonomy of animal behavior with application to the design of technological artefacts?

c) How can the biological behaviors influence unique interactions in man's relationship with the technological artefact or to the relationship with othe men, but mediated by technological artefacts?

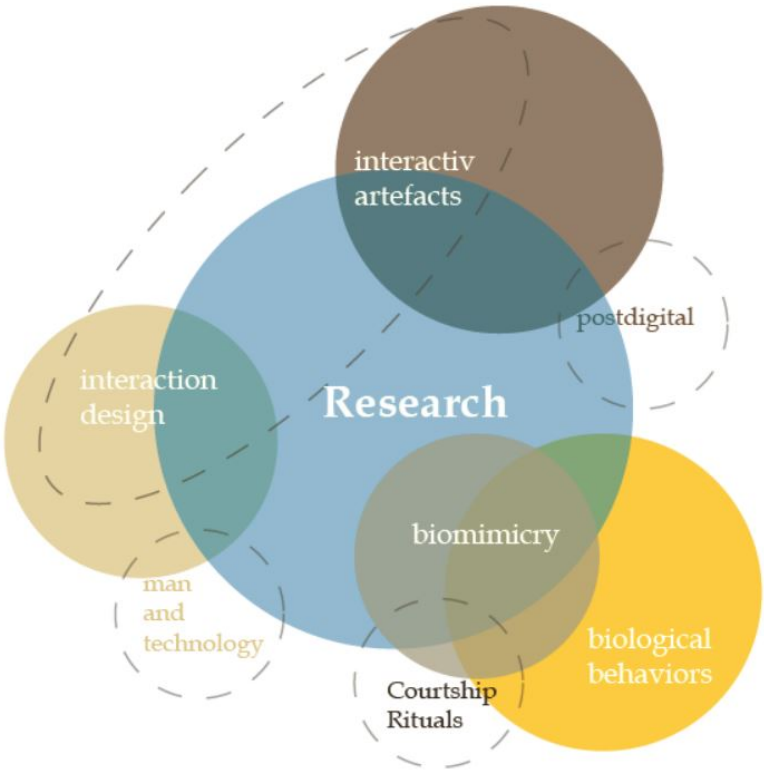

Figure 1 – Research diagram

Design, Technology and Behaviors

In recent years, the sustainability of human inter(rel)ations has acquired an increasingly important impact on the field of expertise of designers. Antonelli

(2007), in her lecture *TEDTalks: Treat Design as Art*, states that "*"more and more designers are working on the behaviors rather than objects."*

In fact, design seems to us as an excellent vehicle, for the creation of unique behaviors between people and technological artefacts that populate their everyday life. As Norman (2004) states, *"the objects in our lives are more than mere material possessions. We take pride in them, not necessarily because we are showing our wealth or status, but because of the meaning they bring to our lives."* "(p. 6).

The development of new meanings in the human relationship with technology, presents itself as a major challenge in a post-digital society, this idea presupposes an abstraction of the digital media for a better understanding of the people's physical world, where the massification of technology and the digital omnipresence, objectified in the concept of *Internet of Things*, inclines this to be a reality.

As Del-Claro (2004) states, *"the science of Animal Behavior may well be defined as an exercise of human curiosity in trying to understand its own animal nature (…)."* (p. 12). To develop bionic natural seductions we believe that it´s necessary to design a taxonomy of behaviors that enhances the imagination of designers through the systematization of seduction rituals and the relationship found in nature, which enhances the conceptualization of interactions closer to human nature.

The "design behaviors" and the study of examples inspired biologically, in spite of being areas studied individually, have a lack of intertwining in order to systematize and define processes and methodologies in order to translate them into artefacts which enhance new behaviors. It seems to us that to apply the behavioral inspiration existing in nature, could be a promising path to be explored in contemporary design and can, thus, generate a new project methodology that allows an innovative approach, namely in the field of interaction design.

This taxonomy should enable and support the design of new interfaces with technologically rich artifacts, technologically rich, as well as new forms of human social interaction through technological mediation, inspired by seduction rituals of animals.

Form, Technic and Behaviors

Throughout time, the biological inspiration has always been present in the relationship that the human being developed with the artefact. As a conceptual support tool for design, it has been used widely in the past years, presenting itself as a possible model in the search for solutions in specific design problems.

For Parra (2007), there can be identified two possible approaches with inspiration in nature: "*one of a more structural and functional character, such as Bionics and Structural Morphology (…)"*; and "one *of a more formal nature, as in the case of the Streamlining and Bionics (…)".* Formal and technical vectors are presented as well as the vectors of force in the application of biological inspiration in design culture. However, we found in these vectors a deficit of interpretation of what may be the new technological artefacts and the relationship of humans with them. In this sense, it seems to us interesting and potentially motivating to introduce a third vector in this equation; the behaviors.

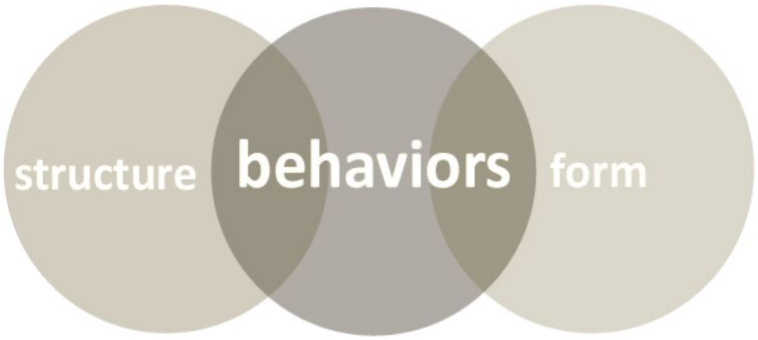

Figure 2 – structure, behaviors and form

The behavior holds within itself a catalyst role of meanings and signifier or, as Merleau-Ponti (1972) claims, "*(...) the behavior is not a thing but it's not also an idea, is not a shell of a pure conscience. That is precisely what we meant by saying that it is a way".* (p. 138). Our understanding of the importance of behavior in the human imaginary - and consequently in design culture - is reinforced in the following words of Merleau-Ponty (1972):

> *"With the symbolic forms emerge one conduct that expresses the stimulus for itself, which opens to the truth and value of things, which intend to adjust the adequacy of significant to meaning, the intention and to what it seeks to appear. Here the behavior has no longer a meaning, itself is the meaning."* (p. 133).

The study of behavior and its expressions found in nature seem to be conducive to the development of a new research line, biologically inspired, that, interpreted according to the paradigm of design, may suggest uncommon inter(rel)ations between humans and the current material and technological culture, a theme where the design can play an important role.

Post-digital Interactions

The (re)qualification of human experience, technologically mediated, presents itself as the aim of this research, where the notion that "technological (im)mediate experience" can be synthesise in a *"human action that is simultaneously mediated (from the technical point of view) and direct or immediate (from the perception point of view) between the being and its action in the world."* (Dias, 2011).

Aesthetic and emotional issues assumed currently a leading role in design. This challenge should not force the choice of a single path between the preponderance of the function, embodied in the interaction itself, or the aesthetics and emotion. On the contrary, we think that the aesthetics of interaction, supported by cognitive challenges, may constitute in itself an approach. Overbeeke et al (2000) reinforces this idea as follows:

> *"Do not think beauty of appearance, think beauty in interaction. Usability is usually treated separately from the aesthetic. The aesthetic in products design seems to be restricted to the production of products with beauty in appearance. As their strategies of easy handling does not seem to solve the problem, we come to this strange situation where we have attractive products at first look, but frustrating as we started to interact with them. Thus, we reiterate that the emphasis should change the appearance of beauty for beauty's interaction, context in which the beauty of appearance is only one party."* (Overbeeke, Djajadiningrat, Hummels, & Wensveen, 2000).

To think holistically in interaction, combining usability and aesthetics of experience, it will generate new inter(rel)ations between technological artifact and the human being. More or less intuitively, designers have traditionally conceptual tools that strategically aim at modeling emotions in interaction design. We have witnessed a growing interest in the emotional dimension of the experience, produced by the interaction between people and artefacts and by the possible relationships established through artifacts. In recent years, authors such as Norman (2004), Krippendorff (2006), Sudjic (2008), among others, or exhibition as Design and the Elastic Mind (*MOMA*, 2008) and Talk to Me: Design and the Communication between People and Objects (*MOMA*, 2011), rather than just thinking in product functions, they reflected on the semantic and subjective factors that they may be associated with.

The dimension of "designed experiences" emphasizes the dematerialization and intangible character that can be assumed in interaction provided between technological artefact and the human being. This dynamic, which

will lead to one appropriation, not only formal but also emotional, will largely depend on the type of the designed interaction. This appropriation depends on the level of expertise provided and how it is considered. As Buxton (2005) regards,

> *"Despite the technocratic and materialistic root of our culture are, ultimately, experiences and not things that we draw. (...) Obviously, aesthetics and functionality play an important role since they attract and convey the ability to that experience. But the experience is the last - too often neglected - goal of the exercise."*

We believe it is important to define a strong and a conceptual body of inspiration, in order to establish analogies with possible application in design, whose aim will be the experience (re) qualification that artifacts and technical devices convoke, as well as the appropriation and bond that the person establishes with them - the emotion, the imagination, and poetry are assumed as paths to explore a greater sense of ownership of the artifacts by humans.

Emotional and behavior aspects are increasingly valued in the methodological and conceptual design equations. Thus, it is consider being appropriate to establish a methodology that is based on the inspiration of behaviors observed in nature in order to think the design of behavior of technical mediation.

We seek to complement and relate to existing studies, aiming at the development of its interdisciplinarity, with a further systematization and application of the developed hypotheses. Our objective is to translate them into artefacts, promoters of new applicable behaviors, especially, in the design of technological artefacts.

The practical development of this research will apply to technological artefacts. With the entry in the designated post-digital Era (or era of "digital natives"), which is characterized by the end of the digital "revolution", that is, the translation from analog to digital technology is now "fully" present in our daily lives. Indeed, today we are witnessing the fact that digital can virtually penetrate all physical objects.

> *"(...) with the advent of the post-digital Era; Era of physical and ubiquitous computing, and of an increased and immersive reality; Era of computer abstraction and the abolition of the interface that has already begun, but probably will soon have, through the sophistication of technological mediation, an exponential growth."* (Dias, 2011, p. 140)

In this scenario, we consider the design hypothesis benefit from the study of biological behaviors as inspiration for the construction of new human

inter(rel)ations, technologically mediated, which are to be smoother and closer to a "natural processes".

The relationship between humans and technology and the diverse possible inter(rel)ations of building around this binomial is an action field where design can be presented as a key interlocutor. Some projects can be found that address this issue as the *Attenborough Design Group projects*, which investigate the use of animal behavior as a way to promote emerging technologies, or the duo *Dunne & Raby*, with the *Technological Dreams Series project*, where the robots are used as study objects, reflecting on the new types of interdependencies that may emerge in the interaction between human beings and technological object.

Research process/methods - Metaphors to construct a narrative in interaction design

"Humanity has always observed nature to extract images, metaphors and analogies that could be transfered to culture." (Manzini, 1994, p.1)

The study of techniques of rituals of seduction and dating found in the non-rational animals seeks to establish contact bridges between intangible concepts and timeless archetypes, and the possible relations generated between man and artifact. We believe that would be possible to build and develop the human imagination that enhances experiences, behaviors and seductions grounded in biological and timeless archetypes that promote new relationships with technological objects.

The interest in animal behavior (and not in the rituals of seduction and dating existing in human culture), arises in an attempt to clearly distance the design of new interactions of human mimicry. Thus we believe that distancing the focus from men and setting the angle of approach only on the non-rational animals, it´s possible to build a human imaginary, based on analogies, which lead to new ways of understanding the human relationship with the technological artifacts.

We are developing a taxonomy of behaviors, based on rituals of seduction found in nature, with the goal of building a conceptual framework that relate these behaviors with the design of new interactions. It's believed that these interactions could inspire the interface between people and technological artefacts and also the technological mediated communication between humans.

This research does not intend to study animal behavior but to take advantage of what is already known and adapt it to artefacts, promoting an association between two distinct areas - Design and Biology.

It is expected that this approach, summarized in a taxonomy of seduction behaviors found in nature, after translated and interpreted according to the vision of design, can lead to a new model for thinking and recreate the human relationship with technology and simplify communication between people.

To design the taxonomy, we tried to establish a close relationship with the dimension of experience, identified by Shedroff (2001), which distinguishes six dimensions that compete in the dynamic structure of experience: Time / Duration [Time / Duration]; Interactivity [Interactivity]; Intensity [Intensity]; Amplitude / Consistency [Breadth / Consistency]; Triggers Sensory and Cognitive [Sensory and Cognitive Triggers] and significance / meaning [Significance / Meaning].

The strategy of building the taxonomy began by raising examples of rituals of seduction that, in a first analysis, we understand that they have visual, poetic, rhythmic, and conceptual capacity for subsequent use in design projects. Then we define five categories of behavior (aggressive, gentle, deceptive, ritualized and materials), three biological agents (flying, terrestrial and aquatic) and four time periods (fast, short, medium and long). It was also defined characteristics /actions present in the process, such as kindness, courtesy, intimidation, subservience, etc. Based on this collection and classification, we developed a framework of rituals with potential application in design, where we added a new area related to the extrapolation about its possible applicability in design.

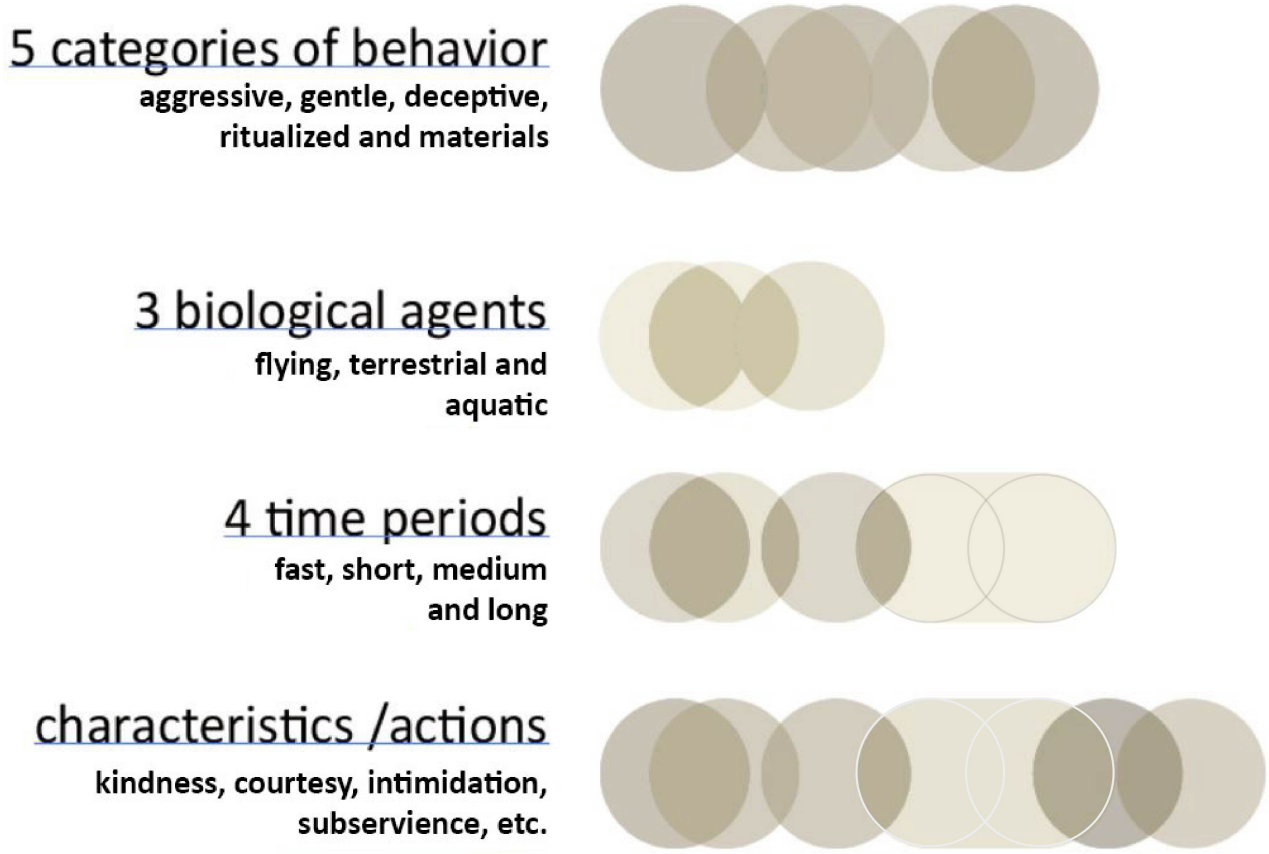

Figure 3 – Taxonomy strategy

It´s possible to identify a panoply of behaviors, practically inexhaustible, that may be of interest for this study. Some examples are presented below.

Seahorses, which change color in their ritual, intertwine the tails and swim together during their courtship caressing each other with their tentacles.

Chameleons, for being virtually deaf, communicate based on visual signs, shapes, colors, and patterns. They use these strategies to recognize the partner.

Snails stab each other with "love darts" before mating. The dart, which is shaped like hypodermic needle, injects a hormone in another snail, causing a change in their behavior.

Finally the birds, *"the major creators of strategies of attraction"*, said Stilwell (2012), in which *"a change of wardrobe are divine exhibitions of singing, are the dazzling dance steps, is the aerobatic flight, is the construction of luxury apartments, is the protection of the companion ... and a infinity of tricks to get a few seconds of glory."* (p. 22).

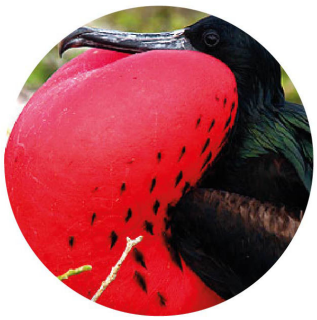

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9

Figure 4 - Frigate birds: Have a kind of a red inflatable in breast, which takes +/- 20minutes to fully inflate to together with the the sounds attract partner;
Figure 5 - Seahorse: change color, intertwine their tails and swim,together;
Figure 6 - Chameleons: for being virtually deaf, communicate based on visual signs, shapes, colours, and patterns;
Figure 7 - Birds: sing, dance, display, plumage, sprucing and build or decorate the nest.;
Figure 8 - Fireflies: “morse code"bioluminescence;
Figure 9 - Snails: knifed each other with “love darts” before mating.

The selection criteria of behaviors, which integrate the proposed taxonomy, is directly related to the symbolic, poetic, and seductive meaning, found in each example, and to the potential that demonstrate, for one future application in projects of technological artifacts, that they will validate the application of the proposed taxonomy. Through the developed taxonomy was able to start the application study of these rituals in products, services or strategies.
In this stage, we are working with people who find it difficult to relate to others, either for psychological or behavioral issues or have some kind of disability. We started the development of a collection of objects of adornment, which by their shape, color, odour or movements, inspired by seduction rituals, and by incorporating technology, they are able to promote

communication between people with some kind of behavioral or sensory handicap.

Expected outcomes

This research aims to demonstrate the feasibility of developing a new human scenario that generates experiences, behaviors and seduction, found in timeless biological archetypes. Through the theoretical frame, it is intended to demonstrate the feasibility and interest in incorporating and emphasizing the behavioral dimension biologically inspired, in projectual valence of interactive products.

Thus, it will be designed a set of technological artifacts – *tools for communication* - with the objective of testing in "real" context the relevance of the behaviors generated by the proposals or through them.

We imagine the potential of the chameleon behavior, by communicating through visual signals, colors and movements, to the development of an app for mobile phone, new forms of digital conversation or interactions with household appliances.

For the artefacts design, there are already defined the different action areas. They are: the digital interfaces (GUI-graphical user interface) that promote or develop human relations, with potential application in chats, games, etc.; the development of technological furniture for domestic environment and the inclusive design through the project of a new technological artifacts interaction / communication and sharing of information.

We believe that by applying the taxonomy developed in three very different areas, it is possible to demonstrate their interest in a more rigorous manner, enabling to valid the use in project, hoping to enhance the interest of designers in their practical usage.

In this context, the planning of a methodology will be elaborated that enables the examination and evaluation of developed artefact(s), in accordance with the assumptions of the research.

Conclusions

In a post-digital society where technology prevails, it´s important to establish new interaction practices with the technologic materiality that surrounds us.

Dream and imagination is perhaps the most important characteristics of human beings.

Design inspired by animals' seduction behaviors could be a valuable strategy to design methodologies.

The human being *seduces* to talk, cheat, conquer, share or survive. Seduces and is seduced through gestures, rituals, words, behaviors, products or

through his own body. But what really captivates the human being is the emotion, the feeling, the magic, provided largely by the capacity of seduction.

Being somehow these timeless behaviors integrated in human imagination, and, thus, being potential poetic and symbolic vehicles, they are assumed as ideal elements to reimagine our technological world.

We sought to demonstrate that the biological inspiration and particularly the seduction behaviors and dating rituals of biological inspiration can provide the key elements in the formation of a model to support the design of new relationships between humans and artefacts of technological mediation, as well as the established relations between humans by technological mediation. Considering that certain animals have not developed all the senses, it seems that may be inspiring when we design for people with these reduced or absent sensory capabilities. Through this research, it is intended to demonstrate the viability of development of a methodology that complements the traditional biomimetic approach and potentiates the conceptualization of new ways of relationships between people and technicians systems and interpersonal relationships, technically mediated.

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Submission ID: 236

Rituals of seduction for a biomimetic of animal behavior in the post-digital Era

Design of inedited interactions with technological artefacts.

Topic(s): - Product - Theory

ABSTRACT This research aims to establish a biomimetic approach to animal behavior in design, particularly in interaction design. We are developing a taxonomy of behaviors and rituals of seduction found in nature, with the goal of building a conceptual framework that relate these behaviors with the design of new interactions. It's believed that these interactions could inspire the interface between people and technological artifacts and also the technological mediated communication between humans. It is intended to demonstrate the relevance of including biological behaviors in design methodologies inspired by nature, in addition to the formal and technical direction that currently prevail in Biomimetic. We believe that we are entering in what we call the post-digital Era, a place where the digital medium, visible or invisible, is taken for guaranteed and it's omnipresent in the fabric of our lives. In this scenario, we consider the opportunity to value biological behaviors as a way to oppose the traditional ideas and designs of the digital medium. This new technologically, mediated interactions are intended to be more fluid and close to "natural processes". This research aims to demonstrate the feasibility of developing a new human scenario that generates experiences, behaviors and seduction, found in timeless biological archetypes.

Keywords: Biomimetic, behavior, experience, interaction design, rituals, post-digital.

For a bionic natural seduction

In recent years, the sustainability of human inter(rel)ations has acquired an

increasingly important impact on the field of expertise of the designers. Paola Antonelli (2007), in his lecture TEDTalks: Treat Design as Art, states that "more and more designers are working on the behaviors rather than objects."

In fact, the design seems to us an excellent vehicle, or even the means par excellence to propose inedited behaviors between people and technological artefacts that populate their everyday life. As Donald Norman states, "the objects in our lives are more than mere material possessions. We take pride in them, not necessarily because we are showing our wealth or status, but because of the meaning they bring to our lives "(Norman, D. 2004, p. 6).

The development of new meanings in the human relationship with technology, presents itself as a major challenge in the post-digital society, an idea that presupposes an abstraction of digital media in the perception and the physical world of people, where the technological widespread and the digital omnipresence, materialised in the concept of Internet of Things, inclines to be a reality.

As Del-Claro (2004) states, "the science of Animal Behavior may well be defined as an exercise of human curiosity in trying to understand its own animal nature" (Del-Claro, 2004, p. 12). To develop one bionic natural seduction we believe to be necessary to design a taxonomy of behaviors that enhances the imagination of designers through the systematization of seduction rituals and the relationship found in nature, which enhances to draw interactions closer to human nature.

The "design behaviors" and the study of examples, inspired biologically, in spite of being areas studied individually, have a lack of an association and mixture between them in order to systematise and define processes and methodologies to translate them into artifacts which generate behaviors. It seems to us that to apply for the behavior inspiration existing in nature, it is like a promising path to be explored in contemporary design and can, thus, generate a new project model that allows an innovative approach, namely in the field of interaction design.

This taxonomy should enable support the design of new interfaces for artifacts, technologically rich, as well as new forms of human social interaction through technological mediation, inspired by seduction rituals of animals.

Biological Inspiration and Behaviors

Throughout time, the biological inspiration has always been present in the relationship that the human being developed with artefacts. While conceptual design support tool, has been, in recent years, widely used, assuming as a possible model in the search for solutions to specific design problems.

For Paulo Parra (2007), it can be identified two possible approaches with inspiration in nature: "one of a more structural and functional character, such as Bionics and Structural Morphology"; and "one of a more formal nature, as in the case of the Streamlining and Bionics". Formal and technical vectors are presented as well as the lines of force in the application of biological inspiration in projetual culture in design. However, we found in these vectors a deficit of interpretation of what may be new technological artefacts and the relationship of humans with them. In this sense, it seems to us interesting and potentially motivating to introduce a third vector in this equation; the behaviors.

The behavior holds within itself a catalyst role of meanings and significant or, as Merleau-Ponti claims, "(...) the behavior is not a thing but it's not also an idea, is not a shell of a pure conscience. That is precisely what we meant by saying that it is a way" (Merleau-Ponty, 1972, p. 138). Our understanding of the importance of behavior in the human imaginary - and consequently in the project culture in design - it is reinforced in the following words of Merleau-Ponty:

“With the symbolic forms emerge one conduct that expresses the stimulus for itself, which opens to the truth and value of things, which intend to adjust the adequacy of significant to meaning, the intention and to what it seeks to appear. Here the behavior has no longer a meaning, itself is the meaning” (Merleau-Ponty, 1972, p. 133).

The study of behavior and its expressions found in nature seem to be conducive to the development of a new research line, biologically inspired, that, interpreted according to the paradigm of design, may suggest uncommon inter(rel)ations between humans and the current material and technological culture, a theme where the design can play an important role.

Human experience in the Post-Digital Era

The (re) qualification of human experience, technologically mediated,

presents itself as a aim of this research, where the notion of "technological (im)mediate experience" can be synthesise in a "human action that is simultaneously mediated (from the technical point of view) and direct or immediate (from the perception point of view) between the being and its action in the world" (Dias, 2011).

Aesthetic and emotional issues assumed currently a leading role in the design. This challenge should not force the choice of a single path between the preponderance of the function, embodied in the interaction itself, or the aesthetics and emotion. On the contrary, we think that the aesthetics of interaction, supported by cognitive challenges, may constitute in itself an approach. Overbeeke reinforces this idea as follows:

"Do not think beauty of appearance, think beauty in interaction. Usability is usually treated separately from the aesthetic. The aesthetic in products design seems to be restricted to the production of products with beauty in appearance. As their strategies of easy handling does not seem to solve the problem, we come to this strange situation where we have attractive products at first look, but frustrating as we started to interact with them. Thus, we reiterate that the emphasis should change the appearance of beauty for beauty's interaction, context in which the beauty of appearance is only one party" (Overbeeke, Djajadiningrat, Hummels, & Wensveen, 2000).

To think holistically in the mode of interaction, combining usability and aesthetics of experience, it will generate new inter(rel)ations between technological artifact and the human being. More or less intuitively, the designers have traditionally conceptual tools that strategically aim at modeling emotions in interaction design. We have witnessed a growing interest in the emotional dimension of the experience, produced by the interaction of artefacts with people and by the possible relationships established through artifacts. In recent years, authors such as Donald Norman (2004), Klaus Krippendorff (2006), Deyan Sudjic (2008), among others, or exhibition as Design and the Elastic Mind (MOMA, 2008) and Talk to Me: Design and the Communication between People and Objects (MOMA, 2011), rather than just thinking in product functions, they reflected on the semantic and subjective factors that they may be associated.

The dimension of "designed experience" emphasizes the dematerialization and intangible character that can be assumed in interaction provided between technological artifact and the

human being. This dynamic, which will lead to one appropriation, not only

formal but also emotional, will largely depend on the type of designed interaction. This appropriation depends on the level of expertise provided and how it is considered. As Bill Buxton regards,

"Despite the technocratic and materialistic root of our culture are, ultimately, experiences and not things that we draw. (...) Obviously, aesthetics and functionality play an important role since they attract and convey the ability to that experience. But the experience is the last - too often neglected - goal of the exercise." BILL BUXTON, Experience Design vs. Interface Design.

We believe it is important to define a strong and a conceptual body of inspiration, in order to establish analogies with possible application in design, whose aim will be the experience (re) qualification that artifacts and technical devices convoke, as well as the appropriation and bond that the person establishes with them - the emotion, the imagination, and poetry are assumed as paths to explore to greater ownership of the artifacts by humans.

The emotional and behavior aspects are increasingly valued in the methodological and conceptual design equations. Thus, it is consider being appropriate to establish a methodology that is based on the inspiration of behavior observed in nature in order to think the design of behavior of technical mediation.

We seek to complement and relate to existing studies, aiming at the development of its interdisciplinarity, with a further systematization and application of the developed hypotheses. Our objective is to translate them into artefacts, promoters of new behaviors applied, especially, in design of technological artefacts.

The practical development of this research will apply to technological artefacts. With the entry in the designated post-digital Era (or era of "digital natives"), which is characterised by the end of the digital "revolution", that is, the translation from analog to digital technology is now "fully" present in our daily lives. Indeed, today we are witnessing the fact that digital can virtually penetrate all physical objects.

"(...) with the advent of the post-digital Era; Era of physical and ubiquitous computing, and of an increased and immersive reality; Era of computer abstraction and the abolition of the interface that has already begun, but probably will soon have, through

the sophistication of technological mediation, an exponential growth." (Dias,

N., 2011, p. 140)

In this scenario, we consider the design hypothesis benefit from the study of biological behaviors as inspiration for the construction of new human inter(rel)ations, technologically mediated, which are to be smoother and closer to "natural processes".

The relationship between humans and technology and the diverse possible inter(rel)ations of building around this binomial is an action field where the design can be presented as a key interlocutor. It can be found some projects that address this issue as the Attenborough Design Group projects, which investigate the use of animal behavior as a way to promote emerging technologies, or the duo Dunne & Raby, with the Technological Dreams Series project, where the robots are used as a study object, reflecting on the new types of interdependencies that may emerge in the interaction between human beings and technological object.

For a taxonomy of biological behaviors

This research does not intend to study animal behavior but to take advantage of what is already known and adapt it to artefacts, promoting an association between two distinct areas - Design and Biology. It is hoped that this approach, summarized in a taxonomy of seduction behaviors found in nature, after translated and interpreted according to the vision of design, can lead to a new model for thinking and recreate the human relationship with technology and simplify communication between people.

An investigation into behaviors, in the generic sense of the term, includes too many items to consider, we believe in setting a single type of behavior: The seduction and courtship rituals existing in nature. Being somehow these timeless behaviors integrated in human imagination, and, thus, being potential poetic and symbolic vehicles, they are assumed as ideal elements for building this taxonomy.

The human being seduces to talk, cheat, conquer, sell, share, survive, etc. He seduces and is seduced through gestures, rituals, words, behaviors, products or through his own body. But what really captivates the human being is the emotion, the feeling, the magic, factual experiences - provided largely by the action of seduction of others and of oneself before others.

The strategy of building the taxonomy began by raising examples of rituals of seduction that, in a first analysis, we understand that they have visual, poetic,

rhythmic, and conceptual capacity for subsequent use in design projects. Then we define five categories of behavior (aggressive, gentle, deceptive, ritualised and materials), three biological agents (flying, terrestrial and aquatic) and four time periods (fast, short, medium and long). It was also defined characteristics /actions present in the process, such as kindness, courtesy, intimidation, subservience, etc. Based on this collection and classification, we developed a framework of rituals with potential application in design, where we added a new area related to the extrapolation about its possible applicability in design.

It´s possible to identify a panoply of behaviors, practically inexhaustible, that may be of interest for this study. Some examples are presented below. Seahorses, which change colour in their ritual, intertwine the tails and swim together during their courtship caressing each other with their tentacles.

Chameleons, for being virtually deaf, communicate based on visual signs, shapes, colours, and patterns. They use these strategies to recognise the partner. Snails knifed each other with "love darts" before mating. The dart, which is shaped like hypodermic needle, injects a hormone in another snail, causing a change in their behavior. Finally the birds, "the major creators of strategies of attraction", said Stilwell, in which "a change of wardrobe are divine exhibitions of singing, are the dazzling dance steps, is the aerobatic flight, is the construction of luxury apartments, is the protection of the companion ... and a infinity of tricks to get a few seconds of glory." (Stilwell, G. 2012, p. 22).

The selection criteria of behaviors, which integrate the proposed taxonomy, is directly related to the symbolic, poetic, and seductive meaning, found in each example, and to the potential that demonstrate, for one future application in projects of technological artifacts, that they will validate the application of the proposed taxonomy. Through the developed taxonomy was able to start the application study of these rituals in products, services or strategies.

In this stage, we are working with people who find difficult to relate to others, either for psychological or behavioral issues or have some kind of disability. We started the development of a collection of adornment objects, which by their shape, colour, odour or movements, inspired by seduction rituals, and by incorporating technology, they are able to promote communication between people with some kind of behavioral or sensory handicap.

Conclusions

We sought to demonstrate that the biological inspiration and particularly the seduction behaviors and dating rituals of biological inspiration can provide the key elements in the formation of a model to support the design of new relationships between humans and artefacts of technological mediation, as well as the established relations between humans by technological mediation.

Considering that certain animals have not developed all the senses, it seems that may be inspiring when we design for people with these reduced or absent sensory capabilities. Through this research, it is intended to demonstrate the viability of development of a methodology that complements the traditional biomimetic approach and potentiates the conceptualization of new ways of relationships between people and technicians systems and interpersonal relationships, technically mediated.

Future Work

For each behavior should be prepared a descriptive sheet (textual and infographic). Subsequently, it will be develop one infographic, a set of identified behaviors.

As a way to get contributions and understand the interest of the research community regarding this issue, it will be placed online a site about taxonomy of behaviors that will consent to present, continuously, the evolution of its construction. This site will also have a place where you can ask questions or send suggestions, and thus, contributing to a greater interactivity between research and its potential users.

Through the theoretical corpus built, it is intended to demonstrate the feasibility and interest in incorporating and emphasizing the behavioral dimension, biologically inspired, in projetual valence of interactive products. Thus, it will be designed a set of technological artifacts, with the objective of testing in "real" context the relevance of the behaviors generated by the proposals or through them.

For the artifacts design, there are already defined the different action areas. They are: the digital interfaces (GUI-graphical user interface) that promote or develop human relations, with potential application in chats, games, etc.; the development of technological furniture for domestic environment and the inclusive design through the project of a new technological artifacts interaction / communication and sharing of information.

We believe that by applying the taxonomy developed in three very different and disparate areas, you can demonstrate your interest in a more rigorous manner, enabling to valid the use in project, hoping to captivate the interest of designers in their practical usage. In this context, it will be elaborate the planning of a methodology that enables the examination and evaluation of developed artefact(s), in accordance with the assumptions of the research.

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OS RITUAIS DE SEDUÇÃO E NAMORO APLICADOS NO DESENHO DE NOVAS INTERAÇÕES

Comportamentos biológicos como facilitadores da comunicação entre pessoas e artefatos tecnológicos

RESUMO

A presente investigação na área do design de interação estabelece analogias entre os rituais de sedução e namoro encontrados na natureza e novos modelos do homem se relacionar com artefactos tecnológicos. Tem como objetivo principal o desenho de um inédito conjunto de interações promotoras de novas formas de relacionamento na comunicação entre pessoas e artefactos.

O estudo de técnicas e rituais de sedução e namoro encontrados nos animais não racionais procura, estabelecer pontos de contacto entre conceitos intangíveis e intemporais e as possíveis inter(rel)ações geradas entre homem e artefacto. Acreditamos que desta forma será possível construir e desenvolver um imaginário humano que potencie experiências, comportamentos e seduções alicerçadas em arquétipos biológicos e intemporais que permitam promover novas relações com os objetos ou a mediação humana através destes.

De forma a conseguir estabelecer as analogias, desenvolvemos uma taxonomia de comportamentos biológicos baseados nestes rituais, no sentido de definir um sistema que permita mapear uma perceção global de exemplos encontrados na natureza, inspiradores para as relações humanas. Foram identificados uma panóplia de rituais com enorme potencial para aplicações no design. Todos os comportamentos identificados têm sido analisados, classificados e representados tendo sido estabelecida uma ligação conceptual e poética ao campo do design, perspetivando a sua aplicação futura. A sistematização proposta visa estudar estes fenómenos naturais, esperando-se

que permita gerar novos modos de interação, que posteriormente serão aplicados e testados numa família de artefactos tecnológicos, com o objetivo de validar em contexto real a taxonomia proposta.

Esta linha de investigação pretende demonstrar a pertinência de incluir os comportamentos biológicos nas metodologias projetuais inspiradas na natureza, para além da forma e técnica que atualmente imperam.
Acredita-se que estes novos modos de inter(rel)acção com o artefacto tecnológico podem constituir um caminho a explorar no percurso contemporâneo da cultura material emergente da sociedade pós-digital.

PALAVRAS-CHAVE
design, sedução, rituais, comportamento, interação, pós-digital, tecnologia, artefato, natureza, emoção, experiência, sentidos, taxonomia, biológico.

A presente investigação na área do design de interação tem como objetivo principal o desenho de um conjunto de interações promotoras de novas formas de mediação entre humanos ou de comunicação entre pessoas e artefactos. Visa estabelecer analogias entre os rituais de sedução e namoro encontrados na natureza e novos modelos do homem se relacionar com artefactos tecnológicos.

A IMPORTÂNCIA DA EXPERIÊNCIA MEDIADA NA ERA PÓS-DIGITAL

Podemos considerar que vivemos num mundo tecnologicamente complexo, onde a mediação entre homem e tecnologia se assume como um dos desafios decisivos na atual cultura material. A esta problemática, acrescentamos ainda a necessidade de se encontrar novas estratégias na mediação entre humanos recorrendo a tecnologia.
Segundo Norman (2013),

"As pessoas estão frustradas com as coisas dia-a-dia. Da complexidade crescente do painel do automóvel, à crescente automação em casa com suas redes internas, música complexa, sistemas de vídeo e jogos para entretenimento e comunicação, e a automação crescente na cozinha, o quotidiano, às vezes, parece uma luta interminável contra a confusão, erros de continuidade, frustração e um ciclo contínuo de atualização e manutenção dos nossos pertences". (Donald Norman, 2013, p.9; nossa tradução)

Neste contexto, pretende-se dar resposta às seguintes questões: de que forma poderemos encontrar na inspiração biológica um caminho na procura de novas formas de inter(rel)ações entre humanos ou na comunicação entre homem e artefactos tecnológicos? Na procura de novas hipóteses, será possível incorporarmos os comportamentos biológicos como analogias no design de interação? Poderão os comportamentos biológicos constituir-se como um terceiro vetor na metodologia da biomimética, para além da forma e da técnica?

Com a entrada na Era pós-digital, que pressupõe uma abstração do meio digital na perceção e no mundo físico das pessoas, deparamo-nos com uma proliferação de artefactos tecnológicos que vai abraçando o quotidiano e que torna essencial o desenvolvimento de novos significados no relacionamento humano com a tecnologia.

Segundo Pepperel & Punt (2000),

"O termo «Pósdigital» pretende enfatizar o atual estado da tecnologia ao mesmo tempo que rejeita a mudança conceptual implicada na 'revolução digital' – uma mudança aparentemente tão abrupta como a lógica «ligado/desligado», «zero/um» das mecânicas prevalecentes nas vidas quotidianas. Dessa forma, são requeridos novos modelos conceptuais para descrever a continuidade entre arte, computação, filosofia e a ciência que evitem o binarismo, o determinismo e o reducionismo. A própria imprevisibilidade e ambiguidade da experiência humana – as suas capacidades mais valiosas – estão a ser conformadas aos códigos binários do processamento digital e às prescrições lógicas de muitos cientistas. Estas descrições amputadas expõem a necessidade de metáforas nas quais possamos descrever a estável e, ainda assim, dinâmica realidade da era pós-digital." (Pepperell & Punt, 2000, p. 2; nossa tradução)

É neste contexto povoado de produtos, artefactos e desafios tecnológicos, ávidos de novas interpretações e analogias, que o estudo do comportamento e as suas expressões encontradas na natureza, nos parece ser propiciador para a proposta de uma nova linha de investigação de inspiração biológica, que interpretada segundo o paradigma do design poderá sugestionar inéditas inter(rel)ações entre o ser humano e a atual cultura material, que é eminentemente tecnológica.

Pensamos que esta abordagem, através da construção de novas narrativas geradoras de ferramentas concetuais, permitirá ser encarada como metodologia na resposta às constantes experimentações e mutações conducentes ao aparecimento das tendências que vão modelando o futuro da sociedade e, por conseguinte, a relação humana com os artefactos tecnológicos. O relatório de tendências da Philips com o título – BiologicalAge (2011) reforça a questão da imprevisibilidade do futuro, quando afirma que existem,

"indicações precoces de novos comportamentos sociais, rituais, modas, hábitos, mudanças políticas, tendências económicas, evolução tecnológica e similares, que podem ou não se manifestar como tendências dominantes no futuro, mas que não são em si mesmas uma evidência clara de uma tendência já definida." (Philips, 2011, p. 5; nossa tradução)

Devido às novas exigências concetuais que a evolução da sociedade provoca, as questões estéticas, poéticas e emocionais assumem um papel preponderante. Este desafio não deverá obrigar à escolha de um único caminho entre a preponderância da função, materializada na interação em si própria, ou da estética e da emoção. Pelo contrário, pensamos que a própria estética da interação, pode constituir em si própria uma abordagem na procura da concetualidade que o entendimento do metadesign exige. A Philips (2011), reforça esta questão, quando refere que o desafio do futuro estará relacionado tanto com tecnologia como com filosofia e que será necessário re-examinar o que pensamos sobre a invenção e exploração tanto quanto, o modo como agimos.

Pensamos ser essencial desenvolver a construção de metodologias em design capazes de inspirar a experiencia e a técnica desenhada.

Na procura desta "abstração" técnica da mediação, o design e o designer assumem-se como interlocutores privilegiados na procura de novos modos de ação perante os desafios atuais. O designer, ao pensar holisticamente a interação, conjugando a usabilidade e a estética da experiência, deverá ser capaz de imaginar novas inter(rel)ações entre artefacto tecnológico e o ser humano. De forma mais ou menos intuitiva, os designers já modelam emoções no design de Interação. (Dias, 2011)

Por outro lado Koskinen & Battarbee afirmam que,

" (…) é compreensível que traduzir experiências e emoções em produtos se tenha tornado numa constante no panorama do design. Por exemplo, pede-

se aos designers que traduzam emoções em produtos – que deem uma forma tangível a experiências indescritíveis."
(Koskinen & Battarbee, 2003, p.39; nossa tradução)

O crescente interesse pela dimensão emocional da experiência gerada na interação dos artefactos com as pessoas e as relações possíveis de estabelecer através dos artefactos, apelam a uma reflexão sobre os fatores semânticos e subjetivos que podem estar associados aos produtos, para além da sua função ou estética visual. Encontramos esta abordagem nos trabalhos de autores como Donald Norman (2004), Klaus Krippendorff (2006), Deyan Sudjic (2008), ou em exposições como *Design and the Elastic Mind* (*MOMA,* 2008) ou *Talk to Me: Design and the Communication between People and Objects* (*MOMA,* 2011).
McLellan (2000) diz que,

"O Design da Experiência é uma prática antiga, remontando aos primeiros impulso humano para desenvolver rituais, cerimônias, drama, e até mesmo arquitetura. Mas o design de experiências tornou-se muito mais pervasivo durante o século XX. Os media, incluindo televisão, rádio, multimédia e realidade virtual, têm desempenhado um papel central. Mas o design de experiência também é informado por ideias novas na economia, especialmente a noção de Pine e Gilmore sobre a emergente economia da experiência. Para além disso, baseia-se em ideias da inteligência artificial, a psicologia da experiência ótima, a sociologia e outras áreas, incluindo o comércio eletrónico, persuasivo, design de interface humano-computador, teatro e as narrativas digitais." (McLellan, 2000, p. 59; nossa tradução)

Também na divulgação do "Design da Experiência" entendido enquanto disciplina, destaca-se o designer Nathan Shedroff, que assume um importante papel na fundação do Design da Experiência enquanto disciplina, propondo a substituição das noções clássicas de Design de Interação e, sobretudo, do Design de Interface. Shedroff (2001, p.2) define o Design da Experiência como uma abordagem orientada para experiência da pessoa e não da mediação ou do meio. Assim, quando falamos em Design da Experiência podemos falar «em qualquer meio», assim como «em qualquer modalidade percetiva» (sentidos do corpo). Refere ainda que, a disciplina do Design da experiência é tão nova que sua própria definição se encontra em fluxo. Sendo entendida por muitos, apenas como um campo para os media digitais, enquanto outros consideram-no um termo genérico que engloba disciplinas tradicionais e estabelecidas tão diversas como, o teatro, o design gráfico,

storytelling, design de exposições, design de parques temáticos, design online, design de jogos, design de interiores, arquitetura, etc. Realça também que o design de experiências não é mais recente que o próprio reconhecimento das experiências, uma vez que simultaneamente, não tem história (já que é uma disciplina recém-definida), mas paradoxalmente tem a mais longa das histórias (já que é o culminar de muitas e antigas disciplinas), o Design da Experiência tornou-se recentemente reconhecido e denominado. No entanto, é realmente a combinação de muitas disciplinas anteriores; mas dificilmente antes estas disciplinas estiveram tão inter-relacionadas, nem tiveram tantas possibilidades de integração em soluções globais.

"O design de experiência é uma abordagem que visa a criação de experiências de sucesso para pessoas, em qualquer meio. Esta abordagem inclui a análise e o design nas três dimensões espaciais sobre o tempo, todos os cinco sentidos comuns e a interatividade, bem como valor de cliente, significado pessoal, e o contexto emocional. Design da experiência não é apenas o design de páginas Web ou de outras media interativos, ou das telas de conteúdos digitais. As experiências podem ser projetadas em qualquer meio, incluindo instalações espaciais / ambientais, produtos de impressão, produtos rígidos, serviços, emissão de imagens e sons, performances ao vivo e eventos, media digital e online, etc." (Shedroff, s/d, Experience Design)

É através da dimensão da "experiência projetada", enfatizada pelo carácter desmaterializador e intangível que pode ser assumido na interação gerada entre o artefacto tecnológico e o ser humano, que acontecerá uma apropriação não só formal, mas também emocional. Esta apropriação depende do nível da experiência proporcionada e na forma como ela é percecionada e absorvida.

Importa ainda referir que Donald Norman considera que a

"Experiência é fundamental, pois determina quão carinhosamente as pessoas lembram as suas interações. A experiência foi globalmente positiva, ou foi frustrante e confusa? Quando a nossa tecnologia em casa se comporta de uma maneira impossível de interpretar, podemos tornar-nos confusos, frustrados e zangados —emoções negativas fortes. Quando há a compreensão de que pode levar a um sentimento de controle, de domínio e de satisfação ou orgulho mesmo —emoções positivas fortes. Cognição e emoção estão fortemente interligadas, o que significa que os designers

devem projetar com ambas na mente." (Donald Norman, 2013, p.10; nossa tradução)

A TAXONOMIA

metáforas para construir uma narrativa em design de interação

"A Humanidade tem sempre observado a natureza para extrair imagens, metáforas e analogias que podem ser transferidas para a cultura." (Manzini, 1994, p.1; nossa tradução)

O estudo de técnicas e rituais de sedução e namoro encontrados nos animais não racionais procura, estabelecer pontos de contacto entre conceitos intangíveis e intemporais e as possíveis inter(rel)ações geradas entre homem e artefacto. Acreditamos que desta forma será possível construir e desenvolver um imaginário humano que potencie experiências, comportamentos e seduções alicerçadas em arquétipos biológicos e intemporais que permitam promover novas relações com os objetos ou a mediação humana através destes.

O interesse nos comportamentos animais (e não nos rituais de sedução e namoro existentes na cultura humana), surge numa tentativa de distanciar claramente o desenho das novas interações da mimetização humana. Desta forma entendemos, que distanciando o foco do homem e definindo o ângulo de abordagem apenas nos animais não racionais, será possível construir um imaginário humano, povoado de analogias, propiciadoras de novas formas de entender o relacionamento humano com os artefactos tecnológicos.

É uma premissa desta investigação tentar colocar o artefacto sempre no domínio técnico, enfatizando ao máximo a noção de experiência, enquanto verdadeira forma de interação "invisível" entre homem e artefacto tecnológico, não querendo que os objetos se aproximem de uma "humanização" técnica ou da ideia de objeto sujeito, premissas que no entender de Francisco Providência afastam o alcance da verdadeira experiência, quando refere na seguinte afirmação;

"Os objetos que valorizam a experiência contrariam a tendência de uma humanização técnica, operada por objetos quase sujeitos (Branco e Providência, 2000), recuperando uma tecnologia humanizada, estes são remetidos para o seu lugar de coisas técnicas, distantes e auxiliares, contribuindo para a habitação do mundo na sua limitada qualidade de

artefactos. Objetos assim valorizam a exuberância da experiencia genuína em vez de a contaminarem demagogicamente." (Providencia, 2014, p.64)

Uma investigação sobre comportamentos, no sentido genérico do termo, comporta demasiados itens a analisar, apostamos na definição de uma tipologia única de comportamentos: A *sedução* e *rituais de namoro* existentes na natureza.
Estando de alguma forma estes comportamentos intemporais integrados no imaginário humano, e sendo assim potenciais veículos poéticos e simbólicos, assumem-se como elementos ideais para a construção desta taxonomia.
De forma a conseguir estabelecer analogias, desenvolvemos uma taxonomia de comportamentos biológicos baseados nestes rituais, no sentido de definir um sistema que permita mapear uma perceção global de exemplos encontrados na natureza, inspiradores para as relações humanas. Foram identificados uma panóplia de rituais com enorme potencial para aplicações no design. Todos os comportamentos identificados têm sido analisados, classificados e representados tendo sido estabelecida uma ligação conceptual e poética ao campo do design, perspetivando a sua aplicação futura. A sistematização proposta visa estudar estes fenómenos naturais, esperando-se que permita gerar novos modos de interação, que posteriormente serão aplicados e testados numa família de artefactos tecnológicos, com o objetivo de validar em contexto real a taxonomia proposta.

Na génese da construção dos parâmetros da taxonomia, tentámos estabelecer uma estreita relação com a dimensão da experiência, identificada por Nathan Shedroff (2001), que distingue as seis dimensões que concorrem na estrutura dinâmica da experiência: Tempo/Duração [Time/Duration]; Interatividade [Interactivity]; Intensidade [Intensity]; Amplitude/Consistência [Breadth/Consistency]; Gatilhos Sensoriais e Cognitivos [Sensorial and Cognitive Triggers] e Significância/Significado [Significance/Meaning].
Shedroff acentua a importância e grande variedade de tipologias de experiências, propondo uma fórmula para pensar a experiência sem ser contagiada à cabeça pela tecnologia, uma vez que considera que,

"O conceito mais importante a reter é o de que todas as experiências são importantes e que podemos aprender com elas quer sejam tradicionais, físicas, offline, digitais, online, ou outras experiências tecnológicas. Na verdade, sabemos muito sobre as experiências e sua criação através destas outras disciplinas estabelecidas que podem e devem ser usadas para desenvolver novas soluções. A maioria das experiências tecnológicas,

incluindo as digitais e, especialmente, as experiências online, tem pouco significado em comparação com experiências do mundo real e têm sido relativamente mal sucedidas enquanto resultado. O que essas soluções requerem é que quem desenvolve o processo entenda o que em primeiro lugar faz uma boa experiência e, depois de, tão bem como possível, traduzir esses princípios para os media desejado, sem ser a tecnologia a ditar a forma da experiência." (Shedroff, 2001, pp. 2-3; nossa tradução)

A estratégia de construção da taxonomia começou pelo levantamento dos exemplos de rituais de sedução que, numa primeira análise, entendemos terem capacidade visual, poética, rítmica e conceptual para posterior aplicação em projetos de design. Seguidamente definimos 5 categorias de comportamentos (agressivos, brandos, enganadores, ritualizados e materiais), 3 de agentes biológicos (voadores, terrestres e aquáticos) e 4 períodos temporais (rápido, curto, médio e prolongado). Foram ainda definidas características/ações presentes no processo, como a amabilidade, cortesia, intimidação, subserviência, etc. Com base nesta recolha e classificação, elaborámos um quadro de rituais com potencial de aplicação em design, onde acrescentamos um novo campo referente à extrapolação sobre a sua possível aplicabilidade em design.

É possível identificar uma panóplia praticamente inesgotável de comportamentos que podem apresentar interesse para este estudo. Apresentam-se de seguida, alguns exemplos.

Os cavalos-marinhos que no seu ritual mudam de cor entrelaçam os seus rabos e nadam juntos em conjunto durante o seu namoro acariciando-se com os seus tentáculos.

Os camaleões por serem praticamente surdos, comunicam com base em sinais visuais, formas, cores e padrões, estratégias que usam para reconhecer a sua parceira.

Os Caracóis esfaqueiam-se uns aos outros com "dardos do amor" antes de copular. O dardo, que tem a forma de agulha hipodérmica, injeta uma hormona no outro caracol, causando no seu comportamento uma alteração.

Por último, os pássaros, "os grandes criativos nas estratégias de atração", segundo Stilwell, nos quais " a mudança de guarda-roupa, são as exibições divinais de canto, são os deslumbrantes passos de dança, é o voo acrobático, é a construção de apartamentos de luxo, é a proteção da companheira… e mais uma infinidade de truques para conseguir alguns segundos de glória." (Stilwell, G. 2012, p.22)

O critério de seleção dos comportamentos que integram a taxonomia proposta, está diretamente relacionado com a carga simbólica, poética e

sedutora que encontramos em cada exemplo e com o potencial que demonstre, para uma aplicação futura nos projetos dos artefactos tecnológicos que permitirão validar a aplicação da taxonomia proposta.
Através da taxonomia desenvolvida foi possível iniciar o estudo de aplicação destes rituais em produtos, estratégias ou serviços. Nesta fase estamos a trabalhar com pessoas que têm dificuldade em se relacionar com outras, quer por questões psicológicas/comportamentais ou por terem algum género de deficiência.

CONCLUSÃO

Esta linha de investigação pretende demonstrar a pertinência de incluir os comportamentos biológicos nas metodologias projetuais inspiradas na natureza, para além dos vetores formais e técnicos que atualmente imperam.
Procurou-se realçar que a inspiração biológica, designadamente os comportamentos de sedução e os rituais de namoro, podem concorrer para a construção de metáforas que auxiliem a importância do desenho da experiencia. Podem ainda constituir-se como elementos fundamentais para a formação de um modelo de apoio no desenho/design de novas relações entre o ser humano e os artefactos de mediação tecnológica, assim como, das relações estabelecidas entre humanos pela mediação tecnológica, contextualizadas na cultura material e tecnológica emergente da sociedade pós-digital.
Tendo em consideração que certos animais não têm desenvolvidos todos os sentidos, parece-nos que poderão ser inspiradores quando projetamos para pessoas com capacidades sensoriais reduzidas ou inexistentes.

Através desta investigação pretende-se demonstrar viabilidade de desenvolvimento de uma ferramenta que complemente a abordagem da biomimética tradicional, e potencie a inspiração de novos modos de relacionamentos entre pessoas e os sistemas técnicos e relacionamentos interpessoais mediados tecnicamente.

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A INSPIRAÇÃO BIOLÓGICA NO DESIGN DE NOVOS MODELOS DE INTERACÇÃO

Os Rituais de Sedução e Namoro aplicados no desenho de novas interacções que facilitem a comunicação entre pessoas e artefactos tecnológicos

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***Resumo**: A presente investigação no âmbito do design procura estudar os rituais de sedução e namoro encontrados intemporalmente na natureza para que, através da elaboração de um modelo taxonómico, seja criada uma ferramenta que facilite a inspiração conceptual e poética, a partir de analogias que potenciem a imaginação sobre novos modos de interacção. O principal objectivo será aplicar este estudo na concepção de comportamentos inéditos em artefactos tecnológicos que se relacionam diretamente com o ser humano, ou permitam a mediação entre seres humanos. Será proposta uma taxonomia de comportamentos biológicos baseados nos rituais de sedução e namoro encontrados na natureza, no sentido de definir um sistema que permita mapear uma percepção global de exemplos encontrados na natureza, que se revelem inspiradores para as relações humanas. Esta sistematização visa definir fenómenos naturais, com o objectivo de organizar e caracterizar os comportamentos identificados e estabelecer analogias que permitirão traduzir-se em novos modos comportamentais por parte dos artefactos interativos.*

A linha de investigação apresentada neste artigo pretende demonstrar a pertinência de incluir os comportamentos biológicos nas metodologias projectuais inspiradas na natureza e aplicadas ao design de produto, passando, desta forma, a constituírem-se como mais uma área de influência para além da inspiração biológica na forma e na técnica que actualmente

impera nesta abordagem. Parece-nos que, através deste tipo de analogias encontradas na natureza, será possível gerar novas experiências, comportamentos e seduções alicerçadas em arquétipos biológicos e intemporais que promovam a comunicação entre pessoas e objectos. Acredita-se que estes novos modos de inter(rel)acção com o artefacto tecnológico podem constituir-se como um caminho a ser explorado no percurso contemporâneo da cultura material emergente da sociedade pós-digital.

A materialização final deste estudo será o desenho de um conjunto diferenciado de artefactos tecnológicos, que pretende testar a taxonomia proposta, esperando-se dessa forma criar uma ferramenta conceptual que permita gerar novos modos de interacção.

Palavras-Chave: *comportamento, interacção, pós-digital, experiência, biológico, taxonomia*

Abstract: *This research in design seeks to study, the rituals of seduction and dating timelessly found in nature so that, in its conceptual and poetic inspiration, could be established analogies that foster new modes of interaction. The main objective of this study is to design original behaviors applied to technological artifacts that relate directly to human beings, or that allow a mediation between human beings. We propose a taxonomy of biological behavior based on the rituals of seduction and dating, to define a system that mapping a global perception of examples found in nature, which may be inspiring for human relationships. This systematization want to define these natural phenomenas, in order to organize and categorize the identified behaviors and establish analogies that will be translated into new behaviors of technological artifacts.*

The research intended to demonstrate the usefulness of the biological behaviors to be included in projectual methodologies inspired in nature, thus being able to establish itself as an additional area of influence beyond the inspiration in form and structure that currently prevails in the methodologies associated with nature. We think that through this kind of analogies found in nature, is possible to generate and enhance new experiences, behaviors and enticements based in biological and timeless archetypes that promote communication between people and technological artifacts. It is believed that these new methods of interaction with technological objects can generate new kinds of emotions, experiences, behaviors, and seductions that improve the communication between person and object and may constitute

itself as a new possibility to be explored in the emergent necessities of contemporary material culture found in the post- digital society.

The materialization of this study will be the design of a diverse set of technological artifacts, which aims to apply and test the proposed taxonomy, it is expected that will generate new modes of interaction.

Key-words: *behavior, interaction, post-digital, experience, biologic, taxonomy*

Interdisciplinaridade e Design

O design de comportamentos e o estudo dos exemplos de inspiração biológica, embora sendo áreas estudadas individualmente carecem de uma associação e cruzamento entre elas com o objectivo de sistematizar e definir processos e metodologias que permitam traduzi-las em artefactos geradores de comportamentos. Parece-nos que recorrer à inspiração de comportamentos existentes na natureza com o intuito de desenhar novos modos de inter(rel)acção com artefactos e sistemas tecnológicos se apresenta como um caminho promissor para ser explorado no design contemporâneo, podendo desta forma gerar um novo paradigma de investigação cujo objectivo será estabelecer uma relação consistente e inovadora no campo do design de interacção e a inspiração nos comportamentos existentes na natureza.

É pretendido através, do estudo dos comportamentos biológicos inspirados no conceito de sedução e rituais de namoro, investigar e definir uma taxonomia que permita, de forma sistematizada, apoiar o desenho de novas formas dos artefactos interagirem com o homem, assim como novas formas do homem interagir socialmente através desses mesmos artefactos;

É nesta lacuna que reside o interesse da presente investigação, que procurará complementar os estudos existentes nestas áreas, relacionando-os; tendo como objectivo permitir um aprofundamento e desenvolvimento da sua interdisciplinaridade, com posterior sistematização e aplicação das hipóteses desenvolvidas; e, por fim, tentando traduzi-las em artefactos promotores de novos comportamentos no contexto da sociedade pós-digital (conceito que pressupõe a abstracção do meio digital no mundo físico e na percepção das pessoas).

Pretende-se demonstrar ainda que a sociedade pós- digital, sendo "digitalmente nativa", poderá beneficiar de uma maior aproximação aos comportamentos biológicos no desenho e estudo de novas inter(rel)acções humanas que se pretendem mais fluidas.

Natureza, comportamentos e tecnologia

A inspiração biológica esteve sempre presente na relação que o homem desenvolveu com os artefactos ao longo do tempo. Enquanto ferramenta conceptual de apoio ao design, tem sido, nos últimos anos, amplamente utilizada tendo como objectivo uma abordagem sistematizada da natureza, assumindo-se como um possível modelo na procura de solução para problemas específicos do design.

Segundo Paulo Parra (2007), é possível identificar duas aproximações possíveis à inspiração na natureza: "uma aproximação de carácter mais estrutural e funcional, como a Biónica e a Morfologia Estrutural", e, " uma aproximação de carácter mais formal, como são os casos do Streamlining e o Biodesign". É possível concluir que têm sido os vectores formais e técnicos as linhas de força de aplicação da inspiração biológica na cultura projectual no design.

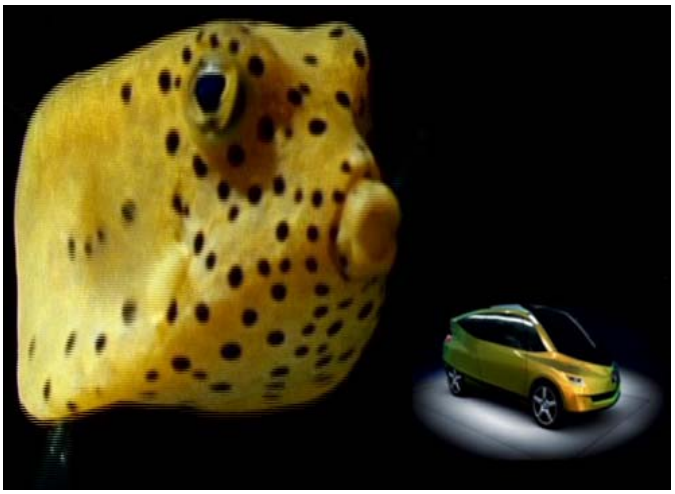

Figura 1: Exemplo clássico de abordagem biomimética. Projecto de carro inspirado no peixe-cofre (arquivo do autor).

Analisando os últimos desenvolvimentos na reflexão sobre design de interacção, é possível encontrar nos vectores atrás descritos um défice na interpretação do que poderão ser os novos artefactos e a relação do homem com os mesmos. Assistimos actualmente a um crescente interesse pela dimensão emocional da experiência gerada na interacção dos artefactos com o homem e das possíveis relações de estabelecer através dos artefactos. Nos últimos anos, vários autores como Donald Norman (*Emotional design: why we love |or hate| everyday things*, 2004), Klaus Krippendorff (*The Semantizc Turn*, 2006), Deyan Sudjic (*The Language of Things - Design, Luxury, Fashion, Art: how we are seduced by the objects around us,* 2008*)*, entre outros, e também exposições como, *Design and the Elastic Mind* (*MOMA,* 2008) ou *Talk to Me: Design and the Communication between People and Objects*

(*MOMA,* 2011), mais do que pensarem apenas nas funções dos produtos, reflectem também sobre os factores subjectivos que a eles podem estar associados. Paola Antonneli, reforça o exposto atrás, quando afirma na sua conferência no TedTalks, que "*cada vez mais designers estão a trabalhar sobre comportamentos em vez de objectos" (Antonneli, 2007).*

A relação entre homem e tecnologia e as diversas inter(rel)ações possíveis de construir em torno deste binómio é um campo de acção onde o design se pode apresentar como um interlocutor decisivo. É possível encontrar alguns projectos que abordam esta temática como os projectos do Attenborough Design Group que adoptam uma abordagem que investiga o uso de comportamentos animais como forma de promover as tecnologias emergentes. Apresentam projectos como o radio Gesundheit (figura 2), que "espirra" periodicamente de forma a expelir o pó que poderá vir a danificar os componentes do rádio, ou o leitor de CD´s Floppy Legs (figura 3), que quando detecta o derrame de liquido no seu perímetro de segurança, eleva-se seguindo os princípios dos animais de quatro patas, como forma de se preservar intacto.

Figura 2: Radio Gesundheit (URL - http://www.di10.rca.ac.uk/jameschambers/).

Figura 3: Leitor de Cd´s Floppy Legs (URL - http://www.di10.rca.ac.uk/jameschambers/).

Com o seu projecto Technological Dreams Series (figura 4) a dupla Dunne & Raby apresenta outro tipo de abordagem na relação entre homem e objecto/tecnologia. Utilizando os robots como objecto de estudo, reflectem sobre os novos tipos de interdepências e de relações que, poderão emergir na interacção entre homem e objecto tecnológico.

Figura 4: Technological Dreams Series (URL - http://www.dunneandraby.co.uk/content/projects/10/0).

Através da interligação do conjunto de áreas ou conceitos, referidos anteriormente, esta investigação tem por objectivo construir artefactos que promovam novos comportamentos na relação do homem com o artefacto ou das relações estabelecidas através dos artefactos. A importância dos comportamentos associados aos artefactos, tendo a inspiração biológica enquanto "reguladora", a afirmação do corpo humano como interface privilegiado, as emergentes necessidades da sociedade pós-digital e finalmente o conceito de sedução enquanto aglutinador conceptual, formam os vectores centrais e estruturantes deste estudo.

Para uma Taxonomia dos Comportamentos Biológicos

O estudo da área comportamental, com base no desenho de experiências e interacção com as emoções, sendo uma temática relativamente recente no design apresenta-se como o principal campo de aplicação deste estudo, no que se refere à sua concretização.

Numa época em que os aspectos cognitivos, emocionais e comportamentais são, cada vez mais valorizados e introduzidos na equação do design, pensou-se que poderia fazer sentido estabelecer uma relação entre os comportamentos observados na natureza e o desenho de novos comportamentos possíveis de estabelecer na relação do homem com o artefacto.

Desta forma, foi definido como primeiro objectivo a construção de uma taxonomia de comportamentos naturais que, posteriormente traduzida e interpretada segundo a visão do design, possa ser aplicada no desenho de artefactos e sistemas tecnológicos que pretendem tornar-se promotores de novos modos de interacção.

Uma taxonomia é um sistema de classificação, normalmente utilizada em organismos, que permite compreender como é que os organismos se relacionam com os diferentes desafios.

Como uma pesquisa em comportamentos, no sentido genérico do termo, comporta demasiados itens a analisar, entendeu-se ser necessário focarmos a construção da taxonomia numa tipologia de comportamentos bem delimitada, de forma a ser possível uma maior objectividade. Foi identificada uma primeira área de interesse que posteriormente passou a ser entendida como a ideal para o estudo em questão; A *sedução* e *rituais de namoro* existentes na natureza.

Sendo estes comportamentos parte integrante do imaginário humano, intemporais, carregados de poesia e simbolismo, conseguem ainda reunir os conceitos de comunicação, acção/reacção, emissão/recepção de sinais e interacção, características essenciais no relacionamento entre duas partes e

que se apresentam com muito interesse na relação do homem com o artefacto tecnológico. A sedução e os rituais de namoro, sendo conceitos intangíveis, biologicamente enraizados, presentes em muitos momentos do dia-a-dia da humanidade assumem-se como elementos ideais para a construção desta taxonomia. Pensamos que trabalhar sobre conceitos e não sobre "peças" físicas e tangíveis poderá reforçar o interesse no comportamento e na própria mensagem em forma de comportamento.

A construção desta taxonomia centra-se em três modelos:

1)- No trabalho de Nathan Seedorf uma referência na construção de taxonomias relacionadas com conceitos intangíveis, como os sentidos ou as experiências.

Taxonomy of Experiences:

Category	Experience	Issues	Others Needed?	Scope
Producing/Processing	Brainstorming		Desirable	Personal
Producing/Processing	Planning/Arranging/Organizing/ Reorganizing	Organizational Abilities, Available Data	Not Necessary	Personal
Producing/Processing	Processing/Transforming	Media Literacy/Skills, Available Data	Not Necessary	Personal
Producing/Processing	Making/Building/Preparing/Cooking			
Producing/Processing	Reflecting/Contemplating			
Producing/Processing	Classifying			
Producing/Processing	Learning			
Producing/Processing	Asking			
Storage	Storing	Space, Compression, Quality, Longevity	Not Necessary	Personal
Storage	Indexing			
Transmitting	Transmitting/Sending/Receiving	Medium, Quality, Bandwidth	Not Necessary	Personal
Advising	Facilitating	Quantity	One to Few?	Broad/Narrow/Personal
Advising	Analyzing	Quantity	One to Few?	Broad/Narrow/Personal
Advising	Teaching		One to Few?	Broad/Narrow/Personal
Helping (Process-oriented)				
Performing	Simulations/Re-enactments/Pretending	Suspension of Disbelief	Possibly	Personal
Performing	Speaking/Telling/Showing	Ability, Fear, Anxiety, Quality (see Performing)	Few to Many	Broad/Narrow
Performing	Performing/Acting/Demonstrating...	Ability, Audience	Few to Many	Broad/Narrow
Performing	Testing/Quizzes/Exams	Ability, Time, Quality, Depth, Fear, Anxiety	Not Necessary	Personal
Performing	Playing/Sports/Games...	Ability, Interest, Equipment	Not Necessary	Personal
Performing	Practicing?		Not Necessary	Personal
Consuming	Listening/Watching	Time, Context, Level of Complexity	Two Minimum	Broad/Narrow
Consuming	Conversations	Interest, Ability	Few	Personal
Consuming	Indulging/Eating/Drinking...	Nutrition? Texture? Quantity?	Not Necessary	Personal
Waiting		Time, Space, Available activities	Possibly	Personal

Figura 5: Esta imagem apresenta apenas uma parte do quadro da Taxonomia das experiências de Nathan Seedrof (URL - http://www.nathan.com/projects/current/communications.html).

2)- No Biomimicry Institute e na sua construção de uma taxonomia onde são apresentadas e classificadas mais de 1500 estratégias inspiradas na natureza, com o propósito de virem a ser utilizadas em projectos futuros.

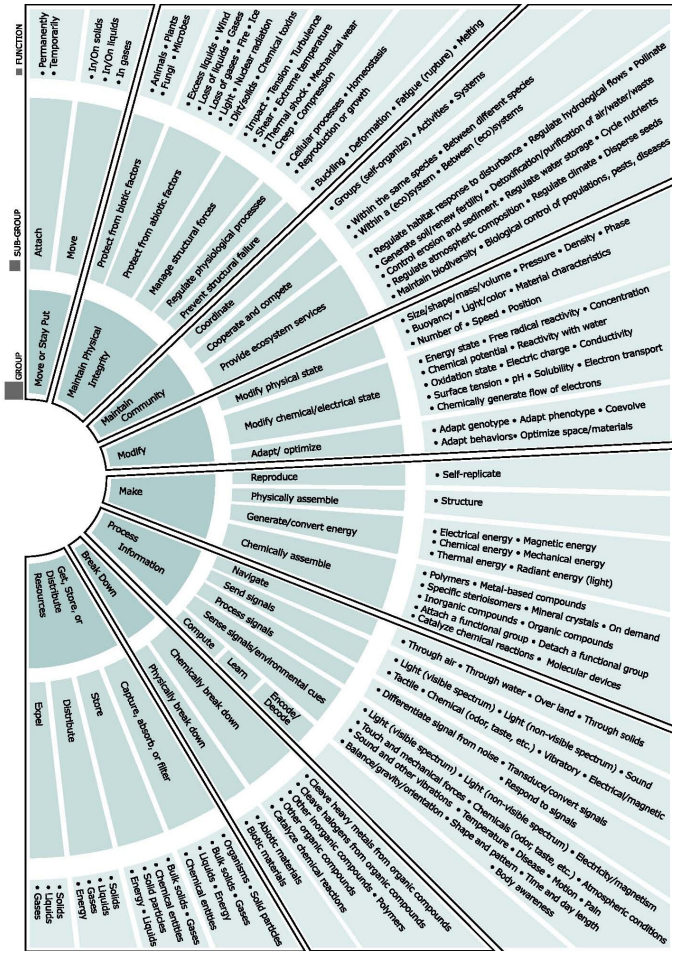

Figura 6: Taxonomia desenvolvida pelo Biomimicry Institute (URL - http://www.biomimicryinstitute.org/images//biomimicry_taxonomy.pdf).

3)- Na Etologia, enquanto metodologia científica para observação e classificação de comportamentos (de animais e humanos).

Através do estudo destes exemplos, encontrámos informação relevante e variada que nos ajudou a desenhar uma primeira estratégia para "catalogar" e ordenar as várias camadas de análise atribuídas a cada comportamento identificado como interessante de integrar este estudo.

Nesta construção o conceito de sedução implica uma serie de acções com vista a um fim pré-definido. A desconstrução deste termo conduz-nos à percepção de que, o homem *Seduz* para conversar, enganar, amar, vender, partilhar, sobreviver, etc. Seduz e é seduzido através de gestos, rituais, palavras, sentidos, tecnologia, comportamentos, produtos, ambiências, ou do próprio corpo. Mas o que verdadeiramente seduz o homem é a emoção, a sensação, a magia, a experiencia fática, a memória ou o comportamento.

Na construção desta taxonomia foram, definidas 5 categorias de comportamentos: os agressivos (configuram actos violentos), brandos (utilização de acções suaves e/ou carinhosas), enganadores (são utilizadas

estratégias que não estão de acordo com a real capacidade do seu emissor), ritualizados (que obedecem a um conjunto de práticas previamente "definidas"), e os materiais (implicam a utilização de outros recursos que não apenas os meios físicos do seu emissor).

Por outro lado, foram identificados 4 categorias de agentes biológicos que interpretam a sedução e os rituais de namoro de diferentes formas; os voadores (insectos, pássaros, etc.), as plantas (reino plantae e protistas), os terrestres (mamíferos, rastejantes, etc.) e o homem.

Foi também considerado que seria importante enquadrar temporalmente cada processo. Neste sentido foram definidos 4 períodos diferentes; o rápido (alguns minutos), curto (menos de uma hora), médio (menos de um dia), e prolongado (mais do que um dia).

Como forma de descrever os processos foram definidas características/acções possíveis de atribuir aos diversos modos de sedução e rituais de namoro; amabilidade, cortesia, proibição, intimidação, subserviência, timidez, imaginação, construção, dinâmica, som, cheiro, toque, visão, sabor, entre outros.

É através das categorias definidas; comportamentos, agentes biológicos, duração temporal e características identificadas que está a ser desenhado o esqueleto base da taxonomia de comportamentos biológicos.

Nesta fase é já possível identificar na natureza uma panóplia praticamente inesgotável de comportamentos que podem apresentar interesse para este estudo. Apresentam-se de seguida alguns exemplos encontrados na natureza que permitem compreender melhor o âmbito deste estudo e o seu possível interesse.

Encontramos nas orquídeas uma estratégia de «amor e mentira» onde através de ardis visuais, aromáticos ou tácteis são encenadas promessas de sexo exótico aos abelhões-macho, tendo como posterior consequência o logro sexual, base da estratégia reprodutiva desta planta.

Os cisnes interpretam um elegante ritual de acasalamento que começa com um cortejo suave, estando lado a lado a mergulhar a cabeça e soprar bolhas na água, terminando a deslizarem na água fazendo movimentos síncronos, de rosto colado.

Figura 7: Ritual de sedução dos cisnes (URL - http://www.kboing.com.br).

Os cavalos-marinhos que no seu ritual mudam de cor, entrelaçam os seus rabos e nadam juntos em conjunto durante os seu namoro acariciando-se com os seus tentáculos, tentando descobrir se eles são adequados um para o outro.

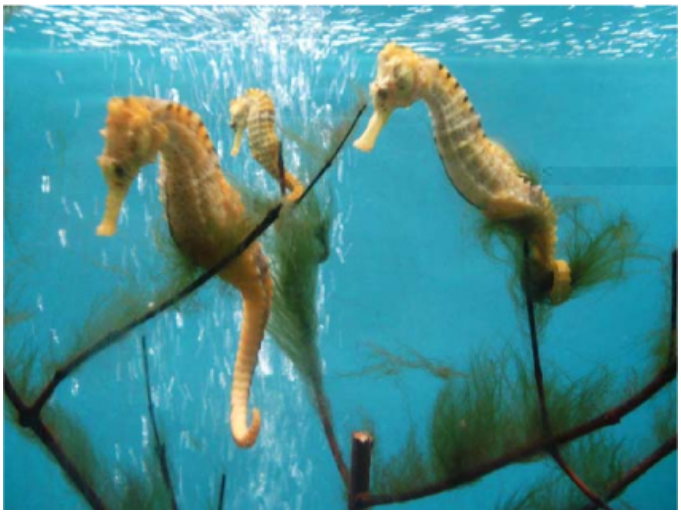

Figura 8: Ritual de sedução dos cavalos marinhos (URL - http://www.ninha.bio.br/biologia/cavalos_marinhos.html).

Nos Pinguins imperador a corte é feita com uma troca de carinhos e mensagens visuais (vénias e movimentos de bico).

Os machos Pavões exibem-se, permitindo deste modo a escolha por parte das fêmeas. Quando chega a época de acasalamento, o pavão apresenta um espectáculo para atrair a pavoa. Levanta as longas penas coloridas da cauda para o ar e sacode-as. A agitação de suas penas da cauda soa como folhas farfalhando ao vento.

Os camaleões que por serem praticamente surdos, comunicam com base em sinais visuais, formas, cores e padrões, estratégias que usam para reconhecer

a sua parceira. Estes não mudam de cor só para se camuflarem, fazem-no também para se relacionarem com os seus congéneres, exercendo atracção sexual ou evidenciando actividade de combate, de submissão e de domínio ou permitindo que casais "estabelecidos" possam reconhecer-se entre si. As fêmeas também podem utilizar cores e padrões específicos para avisar que estão grávidas.

Os Caracóis esfaqueiam-se uns aos outros com "dardos do amor" antes de copular. O dardo, que tem a forma de agulha hipodérmica, injecta uma hormona no outro caracol, causando no seu comportamento uma alteração. Esta substância também é importante para aumentar a probabilidade de fertilização, quando os caracóis finalmente decidem acasalar.

Por último os pássaros que procuram de diversas maneiras atraírem um parceiro; cantando, dançando, exibindo plumagem, enfeitando-se e até construindo ou enfeitando o seu ninho. Como por exemplo o pássaro-jardineiro que é um designer da natureza por excelência! Constrói o seu lar com o objectivo de seduzir as fêmeas. São verdadeiros designers, arquitectos, artistas, decoradores, excelentes nas suas construções. E tudo por sexo! São capazes de enganar e roubar para conseguir o material mais surpreendente para as suas construções com o objectivo de ter um momento de amor com sua parceira. Cada grupo tem o seu próprio estilo. Uns gostam de cores, outros ornamentam com excrementos, outros com objectos de plástico, tampinhas de garrafas, etc. Um verdadeiro artista! Tudo faz parte do 'cortejar' sua parceira.

Figura 9: Ninho do Pássaro-Jardineiro(URL - http://www.duskyswondersite.com/animals/bower-birds/).

Apresentaram-se atrás alguns dos exemplos já identificados na natureza que depois de devidamente estudados e interpretados, poderão apontar novas

direcções no que diz respeito ao desenho de inéditas interacções entre homem e artefacto.

O critério de selecção dos comportamentos que integram a taxonomia proposta, está directamente relacionado com o potencial e a carga simbólica, poética e sedutora que encontramos em cada exemplo e com o interesse e potencial que demonstre para uma aplicação futura nos projectos dos artefactos tecnológicos que constituem a fase final desta investigação e que permitirão validar a aplicação da taxonomia proposta.

Trabalho futuro

Para cada comportamento deverá ser elaborada uma ficha descritiva (textual e infográfica). Posteriormente será elaborada uma infografia de conjunto dos comportamentos identificados. Como forma de obter contribuições e compreender o interesse da comunidade de investigação relacionada com esta temática será colocado online um site da taxonomia de comportamentos que permitirá ir apresentando a evolução da sua construção. Este site terá ainda um local onde será possivel colocar questões ou sugestões contribuindo assim para uma maior interactividade entre a investigação e os seus potenciais utilizadores.

Através do corpo teórico construído, mas também das propostas concretas de diferentes tipologias de produtos, pretende-se demonstrar a viabilidade e interesse em incorporar e enfatizar a dimensão comportamental biologicamente inspirada na valência projectual de produtos interactivos. Desta forma será projectada um conjunto de três artefactos tecnológicos, com o objectivo de testar em contexto "real" a pertinência dos comportamentos gerados pelas propostas ou através das mesmas.

O artefactos que se pretende projectar devem procurar reforçar o envolvimento do Ser humano com o artefacto tecnológico no contexto das necessidades emergentes da sociedade pós-digital no que diz respeito às inter(rel)acções humanas, reflectindo-se num aumento das hipóteses da interacção humana com a tecnologia se diluir ainda mais nos modos e costumes de vida diários;

Para o desenho dos três artefactos estão já definidas as diferentes áreas de actuação. Estas são; os interfaces digitais (GUI- ***graphical user interface***) que promovam ou desenvolvam as relações humanas, com possível aplicação em chats, jogos, etc., o desenvolvimento de mobiliário tecnológico para ambiente doméstico e o design inclusivo através do projecto de um novo artefacto tecnológico de interacção/comunicação e partilha de informação.

Acreditamos que ao aplicar a taxonomia desenvolvida em três áreas tão diferentes e díspares, será possível demonstrar o seu interesse de uma forma

mais rigorosa, que permita validar a utilização em projecto, esperando cativar o interesse de designers ou de outros projectistas na sua utilização prática.
Neste contexto será elaborado o planeamento de uma metodologia que possibilite o teste e avaliação do/s artefacto/s desenvolvidos, de acordo com os pressupostos da investigação.

Figura 10: Ritual de sedução dos caracóis
(URL - https://fbcdn-profile-a.akamaihd.net/hprofile-ak-snc4/261146_431991490145481_129905784_n.jpg).

Conclusões

Procura-se demonstrar nesta investigação que o estudo de comportamentos de inspiração biológica e designadamente os comportamentos de sedução e os rituais de namoro de inspiração biológica revestem-se de especial interesse na formação de uma metodologia para a inspiração e o apoio no desenho/design de novas relações entre o homem e os artefactos de mediação tecnológica, assim como, das relações estabelecidas na mediação tecnológica. A emoção e a experiência estabelecidas em torno do conceito de sedução e rituais de namoro procuram apresentar-se como geradores de novos paradigmas de relacionamento com os artefactos tecnológicos.

Pretende-se demonstrar ainda que, a sociedade pós-digital sendo por definição "tecnologicamente nativa", poderá beneficiar de uma maior aproximação aos comportamentos biológicos no desenho e estudo de novas inter(rel)acções humanas que se pretendem mais naturais. Por fim é pretendido enfatizar, a afirmação do corpo enquanto derradeira interface na mediação do homem com os artefactos tecnológicos, mas também enquanto plataforma de comunicação na relação "tecnologicamente" humanizada com os outros.

Figura 11: Postal de apresentação da Investigação (arquivo do autor).

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Posters

Imagination Lancaster

Maia, P., Dias, N., Stilwell, G. (2015). Biological behaviors as a strategic methodology in biomimicry approach. Imagination Lancaster. Lancaster, Reino Unido.

Links between animals' seduction behavior and inedited interactions with technological artefacts in post-digital Era.

RESEARCH AREA
Interaction Design: artefacts, meaning and experience.

KEY RESEARCH QUESTIONS
a) The animals rituals of seduction and dating applied in artefacts, are able to contribute to the development of an emerging generation of technological artefacts that can influence our behavior?

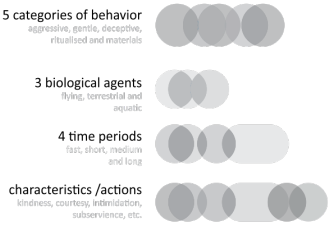
b) Is it possible to build a taxonomy of animal behavior with application to the design of technological artefacts?

c) How can the biological behaviors influence inedited interactions in man's relationship with the technological artefact or to the relationship between men, but mediated by technological artefacts?

CONTEXTUALIZATION
Biomimetic is used in specific design projects, mainly as a methodology focused on the study of technical and mechanical aspects. Our research aims to expand the biomimetic taxonomy, continuing the study of nature in a broader design perspective, not just on their mechanic and formal aspects, but in the study of animal behaviour in its aesthetic and symbolic dimension. We believe this approach could be an inspiration for new artefact/human interaction paradigms.

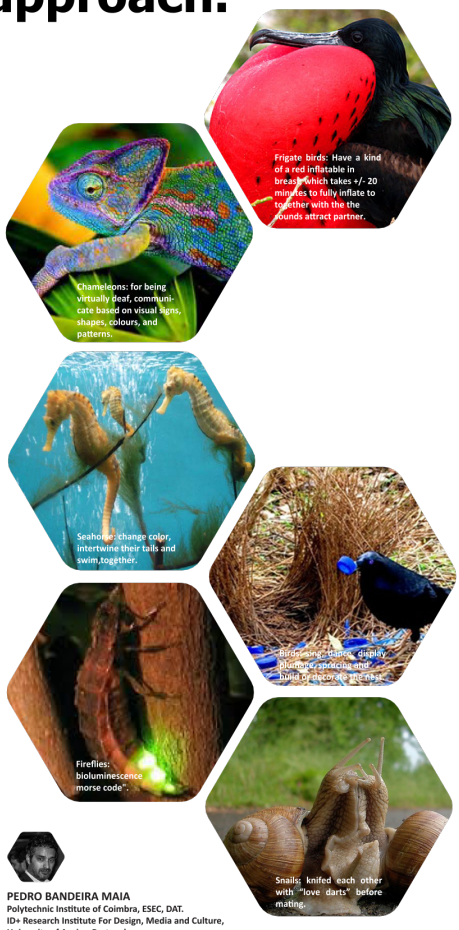
In a post-digital society where technology reigns, is important to establish new interaction practices with the technologic materiality that surrounds us. Dream and imagination is perhaps the most important characteristics of human beings that lead to innovation, that´s why design inspired by animals' seduction behaviors could be a valuable strategy to design methodologies.
Being somehow these timeless behaviors integrated in human imagination, and, thus, being potential poetic and symbolic vehicles, they are assumed as ideal elements to reimagine our technological world.

RESEARCH PROCESS/METHODS
We are developing a taxonomy of behaviors, based in rituals of seduction found in nature, with the goal of building a conceptual framework that relate these behaviors with the design of new interactions. It's believed that these interactions could inspire the interface between people and technological artefacts and also the technological mediated communication between humans.



EXPECTED OUTCOMES
This research aims to demonstrate the feasibility of developing a new human scenario that generates experiences, behaviors and seduction, found in timeless biological archetypes. Through the theoretical frame, it is intended to demonstrate the feasibility and interest in incorporating and emphasizing the behavioral dimension biologically inspired, in projetual valence of interactive products.
We imagine the potential of the chameleon behavior, by communicating through visual signals, colors and movements, to the development of an app for mobile phone, new forms of digital conversation or interactions with household appliances. We found identical potential in swans, snails, sea horses and birds of the paradise behaviours.
Thus, it will be designed a set of technological artifacts, with the objective of testing in "real" context the relevance of the behaviors generated by the proposals or through them.

Biological behaviors as a strategic methodology in biomimicry approach.



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ISAE2014

Maia, P., Dias, N., Stilwell, G. (2014). Links between animal´s seduction behaviour and technological artifacts. ISAE2014 – 48th Congress of the International Society for Applied Ethology. Vitoria-Gasteiz. Espanha.

UD 14

Maia, P., Dias, N., Stilwell, G. (2014). Rituais de sedução para uma biomimética do comportamento animal na era pós-digital. UD 14 – 1º Encontro Ibérico de Doutoramentos em design. 3º Encontro Nacional de Doutoramentos em Design Universidade de Aveiro, Portugal.

Rituais de sedução para uma biomimética do comportamento animal na Era pós-digital

Contributo dos comportamentos biológicos para o desenho de inéditas interações com artefatos tecnológicos.

A presente investigação na área do design de interação estabelece analogias entre comportamentos de sedução e namoro encontrados nos animais não racionais e o desenho de novas formas de comunicação entre homem e o artefato tecnológico.

Podemos considerar que vivemos num mundo tecnologicamente complexo, onde a mediação entre homem e tecnologia se assume como um dos desafios decisivos na atual cultura material. A esta problemática, acrescentamos ainda a necessidade de encontrar novas estratégias na mediação entre humanos recorrendo a tecnologia.

Neste sentido de que forma poderemos encontrar na inspiração biológica um caminho na procura de novas formas de inter(rel)ações entre humanos ou na comunicação entre homem e artefatos tecnológicos? Na procura de novas hipóteses, será possível incorporarmos os comportamentos biológicos como analogias no design de interação? Poderão os comportamentos biológicos constituir-se como um terceiro vetor na metodologia da biomimética, para além da forma e da técnica?

Inéditas inter(rel)ações na Era pós-digital

Com a entrada na Era pós-digital, que pressupõe uma abstração do meio digital na perceção e no mundo físico das pessoas, deparamo-nos com uma proliferação de artefatos tecnológicos que vai abraçando o quotidiano e que torna essencial o desenvolvimento de novos significados no relacionamento humano com a tecnologia.
É neste contexto povoado de produtos, artefatos e desafios tecnológicos, ávidos de novas interpretações e analogias que, o estudo do comportamento e as suas expressões encontradas na natureza, nos parece ser relevante na proposta de construção de uma nova linha de investigação de inspiração biológica, que interpretada segundo o paradigma do design poderá sugestionar inéditas inter(rel)ações entre o ser humano e a atual cultura material, que é eminentemente tecnológica.
Esta investigação pretende demonstrar a pertinência de incluir os comportamentos biológicos nas metodologias do design inspiradas na natureza, para além dos vetores formais e técnicos que atualmente imperam. Pensamos que a sociedade pós-digital, sendo "digitalmente nativa", poderá beneficiar de uma maior aproximação aos comportamentos biológicos no desenho de novas inter(rel)acções humanas que se pretendem mais fluidas e próximas dos processos naturais.

A taxonomia

De forma a estabelecer analogias, desenvolvemos uma taxonomia de comportamentos baseados nos rituais de sedução e namoro entre animais, definindo um sistema que permita mapear os exemplos encontrados na natureza, inspiradores para as relações humanas. Os comportamentos identificados têm sido analisados, classificados e representados, estabelecendo uma ligação conceptual no campo do design, perspetivando a sua aplicação futura.
A estratégia de construção da taxonomia começou pelo levantamento dos exemplos de rituais de sedução que, numa primeira análise, entendemos terem capacidade visual, poética, rítmica e conceptual para posterior aplicação em projetos de design; seguidamente definimos 5 categorias de comportamentos (agressivos, brandos, enganadores, ritualizados e materiais), 3 categorias de agentes biológicos (voadores, terrestres e aquáticos) e 4 períodos temporais (rápido, curto, médio e prolongado). Por fim foram definidas características/ações presentes no processo, como a amabilidade, cortesia, intimidação, subserviência, etc. Com base nesta recolha e classificação, elaborámos um quadro de rituais com potencial de aplicação em design. Desta forma foi obtido um panorama geral dos rituais e que nos permitiu acrescentar um novo campo que, diz respeito à extrapolação sobre os variados problemas onde poderá ter interesse aplicar este estudo e a sua aplicabilidade em design.

Possíveis aplicações em desenvolvimento

Através da taxonomia desenvolvida foi possível iniciar o estudo de aplicação destes rituais em produtos, estratégias ou serviços. Nesta fase estamos a trabalhar com pessoas que têm dificuldade em se relacionar com outras, quer por questões psicológicas/comportamentais ou por terem algum género de deficiência. Iniciámos o desenvolvimento de uma coleção de objetos de adorno que pela sua forma, cor, cheiro ou movimento inspirados nos rituais de sedução e ao incorporarem tecnologia consigam promover a comunicação entre pessoas com algum género de handicap sensorial ou comportamental. Imaginamos o potencial do ritual do camaleão, que comunica através de sinais visuais, cores e padrões, no desenvolvimento de aplicações para telemóveis, novas formas de conversação digital ou inéditas interações com eletrodomésticos.

Acreditamos ser possível desenvolver um novo imaginário humano que potencie experiências, comportamentos e seduções alicerçadas em arquétipos biológicos intemporais com aplicação em artefatos tecnológicos.

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Orientador: Professor Doutor Nuno Dias, Universidade de Aveiro, ID+
Co-orientador: Professor Doutor George Stilwell, Fac. Medicina Veterinária. Univ. de Lisboa

1° Encontro Ibérico de **Doutoramentos em Design**
29 novembro 2014

3° Encontro Nacional de **Doutoramentos em Design**
Universidade de Aveiro

Traduções

Traduções realizadas pelo autor.

p.7

"O Design atravessa as fronteiras das disciplinas, coordenando e transformando atividades na tentativa de sincronizar múltiplas compreensões de um projeto. Deste ponto de vista, design é precisamente oposto à lógica tradicional académica que define a disciplina. Ao contrário de precisar saber tudo o que há para saber num campo discreto, o design precisa de saber o suficiente das múltiplas perspetivas que enquadram e dão forma a qualquer projeto.". (Erlhoff & Marshall, 2008, p. 108)

p.10

"Literalmente, um artefacto é um objeto que é o produto do engenho e habilidade humana. O termo deriva do latinas ars (arte ou habilidade) e de factum (feito ou feito) sendo, portanto, um termo fundamental para descrever quase qualquer entidade projetada. Todos os produtos de design são artefatos de um tipo ou outro, e uma definição comum de design é a organização da interface entre humanos e o "mundo feito", ou seja, a interação entre as pessoas e nossos artefatos. (...).". *(Erlholf, M. & Marshall, T., 2008, p.27)*

p.10

"Eu gostaria de terminar com as três categorias (que derivam de Herbert Read) com as quais eu comecei, a fazer algumas sugestões práticas sobre os tipos de investigação que se podem ajustar, que na verdade surgiram, através do que realmente fazemos:

-Investigação em arte e design

-Investigação através da arte e design

-Investigação para a arte e design "

(Frayling, C., 1993–94, pp4-5)

p.11

"O conceito de pesquisa em design é vago, e esta indefinição tem correspondência em diversas áreas: entre teoria, prática e esboço; entre artefatos e os seus contextos; entre o mundo visível e o mundo das ideias de académicas tradicionais. Esta falta de especificidade nem sempre é uma desvantagem; pelo contrário, a possibilidade de introduzir o conceito de investigação mais fluido representa uma oportunidade para distinguir o design de outras formas de estudo.".
(Erlholf, M. & Marshall, T., 2008, p.333)

p.12

"O conceito de "investigação" apresenta duas formas diferentes no design. Uma perspetiva vê a investigação como exploração e experimentação que conduz ao avanço do conhecimento, ao desenvolvimento de teorias e à sua aplicação. (...) A outra perspetiva analisa a investigação como qualquer atividade de recolha e análise de dados para uma melhor compreensão de um assunto (...).". (Norman & Verganti, 2012, p. 5)

p.15

"Eu mantenho seis princípios honestos (ensinaram-me tudo que eu sabia); os seus nomes são o quê e porquê e quando e como e onde e quem.".
(Rudyard Kipling em nobre e Bestley, 2005, p.55)

p.23

"A grande imprevisibilidade e a ambiguidade da experiência humana — seus recursos mais valiosos — estão sendo reconciliado no código binário de processamento digital e as prescrições lógicas de muitos cientistas. Essas descrições amputadas exponham a necessidade de metáforas mais flexíveis com o qual descrever a realidade estável ainda dinâmica da idade postdigital.". (Pepperel & Punt, 2000, p. 2)

p.23

"A revolução digital acabou". (Negroponte, 1998)

p.25

"Para usar uma comparação terrivelmente inadequada e mais pesada estou a usar o Post Digital da mesma forma com que as pessoas podem ter usado o pós-guerra em 1913 ou 1938. Eles especulavam, tendo esperança, e não descreviam algo real. É uma ideia e não uma realidade. Não tivemos ainda a guerra. ". (Davies, 2010)

p.40

"*IoT* refere-se à interligação em rede dos objetos do quotidiano, que muitas vezes são equipados com uma inteligência onipresente. *IoT* aumentará a omnipresença da Internet através da integração de cada objeto para a interação através de sistemas integrados, o que leva a uma rede altamente distribuída de dispositivos que comunicam com os seres humanos, bem como com outros dispositivos.".
(Xia, Yang, Wang & Vinel, 2012, pp. 1101-1102).

p.42

"Em contraste com o triunfo do século XX da semiótica, que olhou para baixo para a comunicação como nada além de uma transmissão mecânica do significado codificado, o século vinte e um começou como um dos "*pancommunication-everything"* e todos transmitiram o conteúdo e o significado em todas as combinações possíveis, de um para tudo para toda a gente.". (Antonelli, 2011, p. 7)

p.42

"Talk to Me: o design e a Comunicação entre pessoas e objetos prospera como um importante desenvolvimento do final do século XX na cultura do design, que pode ser descrito como uma mudança da centralidade da função para o de significado, sendo que no século XXI se concentra na necessidade de se comunicar para existir.". (Antonelli, 2011, p.7)

p.44

"A maioria dos objetos deste livro tentam encontrar a linguagem do design que melhor encarnará o novo equilíbrio entre tecnologia e as pessoas.". (Antonelli, 2011, p.18)

p.45

"Alguns dos conceitos e protótipos apresentados aqui são produtos por excelência do nosso tempo, misturando o sarcasmo e o mal-estar sobre comunicação interpessoal com a curiosidade e o entusiasmo para superar criativamente esses obstáculos. Alguns alarmistas temem que a nossa confiança na comunicação digital tenha criado uma sociedade que, apesar da troca de informações e pensamentos ininterruptamente em blogs e em redes sociais, podem já não articular ideias e emoções; várias das hipóteses de design que se seguem foram criadas para compensar essa impossibilidade, seja física ou psicológica". (Antonelli, 2011, p.56)

p.47

"A questão do significado da vida é tão enorme e profundo – e a própria vida é tão difícil de perceber, movendo-se rapidamente de verões intermináveis da juventude à maturidade – que temos de confiar na síntese e na descrição, qualidades características do *visualization design* , a fim de capturar o seu alcance incrível. Os cientistas e os estatísticos têm utilizado muito o visualization *design* para dar sentido a comportamentos complexos, na recolha de grandes conjuntos de dados; aqui, os designers empregam-no para nos ajudar a entender o mistério final.". (Paola Antonelli, 2011, p.74)

p.49

"Os designers têm um papel importante nisso. Com suas invenções - de todos os tipos, em todas as escalas – eles podem melhorar clareza, civismo e envolvimento, incluindo os cidadãos na manutenção dos códigos que mantêm a cidade viva. Os designers também podem estimular o fluxo de comunicação que é a linfa vital do organismo urbano. (...) de criadores de formas e função para capacitadores, inspiradores e facilitadores". (Antonelli, 2011, p.98)

p.51

"O que a maioria destas tecnologias têm em comum é o fato de que são baseadas em sistemas e assentam em ligações em rede, tal como o mundo natural, e compreender o seu design deve ser, e é muitas vezes, uma exigência para aqueles elementos que vêm em conjunto e que constituem estes mundos físicos e virtuais, de designers e arquitetos, engenheiros e executivos de televisão. Para aqueles que não estão dispostos, ou capazes, de compreender sistemas mas ainda precisam lhes aceder, existem interfaces que funcionam como zonas de conexão e troca.". (Antonelli, 2011, p.132)

p.53

É por isso que os designers, cujo foco é sempre centralizado na melhoria das condições dos seres humanos, já se envolveram em projetos que exigem não só os elementos clássicos de conceção da educação, mas também os princípios básicos da ciência cognitiva.". (Paola Antonelli, 2011, p.174)

p.61

"(...) a história do design é também a história das sociedades: qualquer mudança deve repousar sobre a compreensão de como o design afeta, e é afetado, pelos processos das economias modernas.". (Forty, 1992, p.8)

p.63

"O Status é uma característica importante a considerar no contexto do design de produto. Qualquer produto que é visto pelos outros pode ser visto um símbolo de status.".
(Van Musli Adams, 2012, p.106)

p.64

"O design de produtos manufaturados é determinado não por alguma estrutura genética interna, mas pelas pessoas e pelas indústrias que os fazem, e pelas relações entre estas pessoas e as indústrias para a sociedade em que os produtos são para serem vendidos.". (Quarenta, 1992, p. 8)

p.65

"A forma, natureza e uso de todos os artefatos são tão influenciados pela política, costumes e preferências pessoais, como por essa entidade nebulosa, a tecnologia. E a evolução dos artefatos, por sua vez, tem profundas influências na educação e as relações sociais." (Petrosky, 1994, p.20)

p.68

"os objetos, nas nossas vidas, são mais do que meras posses materiais. Temos orgulho neles, não necessariamente porque estamos a mostrar a nossa riqueza ou status, mas por causa do significado que eles trazem às nossas vidas.".
(Norman, 2004, p. 6)

p.69

"Os objetos tornaram-se interlocutores tão complexos e exigentes, como as pessoas, (...)". (Antonelli, 2011, p.8)

p.72

"A Emoção não é um luxo: é uma expressão de mecanismos básicos da regulação da vida desenvolvida em evolução e é indispensável para a sobrevivência. Desempenha um papel crítico em praticamente todos os aspectos da aprendizagem, raciocínio e criatividade. Surpreendentemente, ele pode desempenhar um papel na construção da consciência.". (Damásio, 2004, in Anderson, 2011, p.25)

p.74

"Invés de meros instrumentos, os produtos devem ser descritos como objetos vivos com que as pessoas têm relações".
(Jordan, 2000, p.7)

p.75

"Há 2300 anos atrás Aristóteles concluiu que, mais do que qualquer outra coisa, os homens e as mulheres procuram a felicidade". (Csikszentmihalyi, 1990, p.1)

p.82

"Acho que eu diria que design de interação é tornar a tecnologia apropriada às pessoas.".
(David kelley *in* Moodrigde, 2007, p.293)

p.84

"Interfaces representam uma nova dimensão da nossa existência, (...)". (Antonelli, 2011, p. 11)

p.85

"Design de interação, uma parte significativa do design de interface, é responsável por projetar o desempenho destes processos em relação ao usuário, ao longo do tempo. Interação entre humanos e artefatos é o tema de investigação na interação Homem-máquina (IHM) e na interação humano-computador (HCI). ". (Erlhoff e Marshall, 2008, p.225)

p.85

"Para mim, design de interface é a combinação de três disciplinas: design de informação, design de interação e design sensorial. Não é possível separar esta relação nem ignorar as suas preocupações. O objetivo de todos estes processos é uma comunicação clara no formato adequado. Isso é feito criando experiências atrativas e noções básicas sobre o componente da experiência.". (Shedorff, 1998)

p.88

"Estética é o ramo da filosofia que lida com juízos sensoriais de beleza e de bom gosto.".
(Zangwill, 2007, *In* Van Gorp & Adams, 2012, p.86)

p.90

"Os nossos corpos não nos permitem "fugir" da mediação tecnológica - eles próprios são mediadores das máquinas/equipamentos, sem os quais não pode haver nenhum conhecimento do mundo ". (Jones, 2006, p. 2)

p.91

"Ainda assim, o corpo deve ser entendido como o local de desejo por novas tecnologias e o seu limite necessário.".
(Jones, 2006, p. 5)

p.92

"Para os designers neste livro, a arquitetura do corpo não é simplesmente algo para se contemplar, mas antes algo para analisar e explorar a partir de dentro para fora.". (Schwartzman, 2011, p. 6)

p.93

"(...) com as próteses, a robótica, a computação wearable, a cibernética, a biomimética, a realidade virtual, a engenharia, a nanotecnologia e a neurociência acionando a evolução contínua do modo como percebemos e experimentamos o espaço, o corpo re-emergiu como um importante site arquitectónico.". (Schwartzman, 2011, p. 6)

p.95

"A mediação pode ser instrutiva, esclarecedora, hipnótica, lúdica, mágica, viciante, social ou isoladora. Mas isso nos tornará mais humanos ou menos?". (Schwartzman, 2011, p.134)

p.101

"Design de interface e de interação, que às vezes é trazido sob uma rubrica genérica e mais funcional de design de experiência do utilizador, delineia o comportamento de produtos e sistemas, bem como a experiência que as pessoas vão ter com eles.". (Antonelli, 2011, pág. 9)

p.101

"Apesar das tecnocracias e do preconceito materialista da nossa cultura, são, em última análise, experiências que estamos projetando, não coisas. Sim, os objetos físicos são muitas vezes os resultados mais tangíveis e visíveis do design, mas sua principal função é envolver-nos numa experiência. Uma experiência que é moldada em grande parte por affordances (Gibson, 1979) e incorporada no produto em si (Norman, 1988;

Danyella Gonçalves, 1991). Obviamente, a estética e a funcionalidade desempenham um papel importante em tudo isso.". (Buxton, 2005, 127)

p.103

"(...) os designers são convidados a traduzir as emoções em produtos — para dar formas tangíveis de experiências indescritíveis.". (Koskinen, Mattelmaki & Battarbee, 2003, p.39)

p.110

"Todo o design é o processo de evocar o significado".
(Shedroff, 2010, 27m29s)

p.115

"O Design de produto tradicional é sobre a construção de bons produtos – produtos que funcionam bem e as pessoas gostam de usar. Projetando para mudança de comportamento é sobre a construção de produtos que são bons e comportamentalmente eficazes – produtos que ajudam as pessoas a mudra o seu comportamento. O objetivo é ajudar as pessoas a fazer coisas que querem fazer mas têm lutado com o passado.".
(Wendel, 2014, p.XV)

p.117

"Usando o meu *Behavior Model (FBM) (modelo de comportamento)* como um guia, os designers podem identificar o que impede as pessoas de executar os comportamentos que designers procuram. Por exemplo, se os utilizadores não estão a executar um comportamento alvo, tal como a classificação de hotéis num site de viagens, a FBM ajuda os designers qual o elemento psicológico que falta. A FBM também ajuda os académicos a entender melhor de mudança de comportamento. O que antes era uma massa difusa de teorias psicológicas, torna-se agora organizada e específica quando vista através do meu modelo de comportamento.".
(Fogg, 2016)

p.128

"a criatividade é ligar as coisas, como Steve Jobs gostava de dizer". (Woolley-Barker, T., 2017, p.155)

p.129

"IDEO Method Cards são uma ferramenta para demonstrar métodos que usamos para inspirar grandes projetos e manter as pessoas no centro do nosso processo de design".

(IDEO em https://www.ideo.com/post/method-cards)

p.132

"Design com Intenção visa dar aos praticantes uma abordagem mais sutil para o design e para o comportamento, trabalhando com pessoas, com o entendimento destas e com a complexidade da experiência humana quotidiana.".

(Dan Lockton em http://designwithintent.co.uk/)

p.135

"A ludicidade pode ser observada em todas as áreas da atividade humana. É uma atitude de tornar as atividades mais agradável. Projetando para ludicidade envolve a criação de objetos que provocam uma abordagem lúdica e proporcionam experiências agradáveis.".

(Andrés Lucero *in* http://www.funkydesignspaces.com/plex/)

p.151

"Embora sendo ainda controverso, a similaridade entre a esquerda e o lado direito da face, das suas asas, dos seus pelos ou das suas orbitas oculares pode ser ligada à sua condição de saúde. Enquanto nós olhamos para uma cara, pensando, wow, ela/ele é realmente linda/lindo. Que lindo, altamente simétrica e os genes que construiram aquele corpo são muito bons. E perfeita simetria não é fácil para a natureza para se reproduzir.". (Verdolin, 2014, p.35)

p.229

"(...), em alguns casos, as analogias eram tão próximas que os produtos de engenharia e da natureza parecem surgir de forma inseparavel.". (Kemp, 2006, p.104)

p.161

"Foi a natureza nos seus aspectos inesperados, que apelou ao artista de Arte Nova.".

(Peter Selz & Mildred Constantino, 1960, p. 16)

p.164

"A linha é muito importante. Deixe o designer, portanto, na adaptação da sua arte, debruçar-se sobre a linha — a linha determinante, a linha enfática, a linha delicada, a linha expressiva, a linha que controla e une.".
(Walter Crane, 1989 em Selz & Constantino, 1960, p. 10)

p.170

"A Biónica é um campo que analisa os princípios biológicos e os sistemas com o objetivo de aplicar esse conhecimento na criação de sistemas de engenharia".
(Erlhoff e Marshall, 2008, p.45)

p.172

"A natureza tem sempre servido como um modelo para imitar e inspirar o ser humano no seu desejo de melhorar a sua vida. Ao adaptar os mecanismos e recursos da natureza, as abordagens científicas têm ajudado os humanos a compreender fenómenos relacionados e princípios associados, com o intuito de desenvolver novos dispositivos e melhorar a sua capacidade.". (Bar-Cohen, 2006, p. 1)

p.173

"O design inspirado biologicamente (também conhecido como biomimetismo, biomimética e biónica) é um movimento crescente no design moderno que defende o uso da natureza como análogo na conceção de sistemas tecnológicos e como um padrão para avaliar projetos tecnológicos (French 1994; Gleich et. al. 2010; Turner 2007; Vincent & Mann 2002; Vogel 2000).". (Ashok Goel, 2015, p.49)

p.175

"(...) as lições da natureza não podem ser interpretadas apenas como uma evolução mecânica, ou seja, segundo um princípio apenas técnico, não podem ser apreendidas apenas de um ponto de vista matemático-geométrico, de acordo com uma conceção abstrata e puramente sintética do sistema de regras, não podem, também, ser devidamente entendidas, por imitar as suas formas, emulando a forma do crescimento orgânico recorrendo às linhas curvas e fluidas".
(Bosoni & Picchi, 1999, p.54)

p.178

"(...) as suas criações lêm um poema que diz apenas o que significa. Estudando estes poemas dia a dia, a biomimética desenvolve um alto grau de encantamento , na fronteira com reverência.". (Benyus, 2002, p.7)

p.179

"A biomimética é uma nova ciência revolucionária que analisa as melhores ideias da natureza (...)".
(Benyus?, 2002 - CONTRA-CAPA)

p.179

"Biomimética é a consciente emulação do génio da natureza. É uma abordagem interdisciplinar que reúne dois mundos, muitas vezes desconectados: a natureza e a tecnologia, a biologia e a inovação, a vida e o design. A prática da biomimética pretende trazer a sabedoria testada pelo tempo de vida para a o context do design para informar soluções humanas que criam condições favoráveis à vida. Na sua forma mais prática, a biomiméticaé uma forma de procurar soluções sustentáveis através do empréstimo da vida de "blueprints", receitas químicas e estratégias do conecta-nos de formas que se encaixam, alinham e integram espécie humana nos processos naturais da terra.". (*in* Biomimicry 3.8 Design Lens)

p.182

"Apesar dos enormes progressos feitos no domínio da biomimética, a natureza ainda é muito superior ao que somos capazes de fazer ou de adaptar.". (Bar-Cohen, 2006, p.3)

p.186

"O nosso conhecimento fragmentado sobre a biologia está duplicando a cada cinco anos, crescendo como uma pintura de Pontilhismo para um todo reconhecível. Igualmente, sem precedents, é a intensidade do nosso olhar: novos "scopes" e satélites permitem-nos testemunhar os padrões da natureza, da intercelular à interestrelar. Podemos sondar uma pequena flor com os olhos de um ácaro, viajar através dos eletrões da fotossíntese, sentir o arrepio de um neurónio em pensamento, ou assistir a cores ao nascimento de uma estrela. Podemos ver, mais claramente do que nunca, como a natureza cria os seus milagres.". *(*Benyus, 2002, p.6)

p.191

"Para ele as curvas suaves têm pouca importância. O que é mais importante é

o seu conhecimento e investigação na relação interativa entre a humanidade, natureza e tecnologia. Qualquer fator possível de existir e as suas inevitabilidades são cuidadosamente tidas em conta e refletidas nos seus projectos".
(Tokujin Yoshioka, 2004, p.26 in Supernatural – The Work of Ross Lovegrove)

p.192

"Sou suspeito sobre o minimalismo porque ele realmente não existe na natureza. É um conceito alianigena - ele sugere linhas direitas, superfícies lineares, uma falta de resposta emocional. Eu penso que a vida não é minimalista, na sua generalidade é bastante complicada e detalhada. O essencialismo é outra coisa, que se relaciona mais com a parte física dos objetos. Significa pôr menos ênfase no peso, densidade e espessura. É a ideia de que as coisas podem ser construídas no futuro mais organicamente, serem menos construtivas fisicamente, crescer mais do que construir. Este conceito de crescer mais do que construir é muito importante".
(Peter M. Fiell, entrevista a Ross Lovegrove, sept. 1999, revista Domus 818, pág. 73.)

p.192

"Eu considero uma virtude, encontrar um significado para a existência das coisas, dotando as peças que eu desenho de propriedades silenciosas que tocam as pessoas sem palavras de uma maneira emocional". (Lovegrove, 2004, p. 151)

p.193

"Ross é um pensador visual … ele desenha objetos com beleza, mas estes também têm significado e tornam-se em símbolos de ideias mais abstratas, que contribuem para o desenvolvimento da cultura da sociedade".
(Alberto Meda, livro Supernatural – The Work of Ross Lovegrove) (Alberto Meda in Lovegrove, 2004, p.143)

p.193

"A essência do design orgânico contemporâneo é talvez a procura, para lá dos limites tradicionais de uma disciplina, de maneira a aprender como contribuir para o futuro do mundo". (Paolla Antonelli *in* Lovegrove, 2004, p.9)

p.194

"A consciência e as experiências acumuladas ajudam-me a abrir novos caminhos que podem nunca ter sido tomados antes, com base no meu próprio entendimento pessoal e especulação, assim como alguma coisa tem, deveria ou poderia existir por qualquer motivo – a utilidade, a beleza estética, ou idealmente a coexistência inerente de ambos". (Lovegrove, 2004, p.15).

p.194

"O desafio de um determinado problema de design é apresentado pela complexidade onde temos de lidar com inúmeros fatores, não só os físicos mas os sociais, humanos, e depois os aspetos ligados ao material. Neste momento eu acho o mundo do mobiliário terrivelmente limitado devido à natureza da baixa tecnologia e aos seus objetivos. O design de produto, por outro lado, está a experimentar um período de invenção técnica, física e emocional – qualidades que estão a criar uma nova esfera de influência nas nossas ferramentas para viver, desde telemóveis, aos computadores e aos carros. O processo pelo qual estas estruturas 3D são concebidas, comunicadas e manufaturadas na atualidade, num avançado estado de liberdade possível através do software do computador, que está a possibilitar a fluidez de criatividade mais orgânica.". (Ross Lovegrove no livro Supernatural – The Work of Ross Lovegrove)

p.196

"Ela é muito rigorosa, observando longamente onde o design tem que estar mas, ao mesmo tempo, tem também um talento incrivel e um sentido estético como um artista. Qualquer coisa que ela faça tem, não só, base e credibilidade na ciência, mas também um apelo universal para todos, porque o seu trabalho é muito belo.". (Paola Antonelli, *in* Dvir, 2016)

p.197

"Neri é uma pessoa à frente do seu tempo, não do seu tempo, (…)". (Antonelli, *In* Dvir, 2016)

p.197

"Desde a Revolução Industrial, o design tem sido dominado pelos rigores da fabricação e produção em massa (...). As linhas de montagem ditaram um mundo onde os designers foram ensinados a pensar o seu produto como um conjuntos de peças, cada um feito de um material diferente e cumprindo uma função predeterminada. Estamos agora a mover-nos de um mundo de partes, de sistemas separados, para uma arquitetura que combina e integra a estrutura e pele ". (Oxman em Dvir, 2016)