Aves II

Eduardo S.A. Santos

eduardosantos-lab.weebly.com

21/09/2017

FILO-GENIA

MACRO-EVOLU-ÇÃO

AMNIO-TA

ARCHOS-SAUROS

DINOS-SAUROS + AVES

DIVER-SIDADE

ORIGEM

AVES

ECOLO-GIA

ANATO-MIA

EVOLU-ÇÃO

REPRO-DUÇÃO

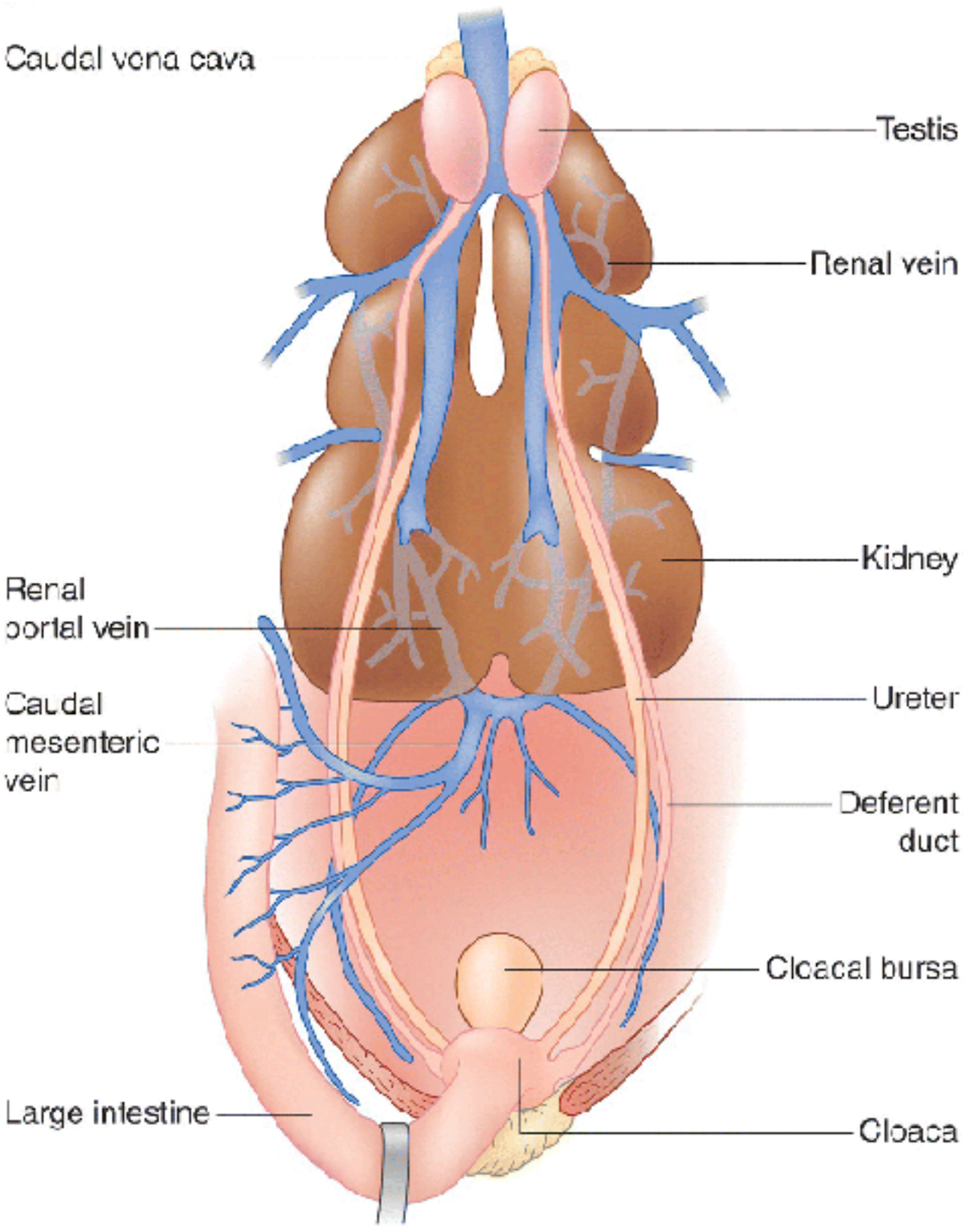
COMPOR-TAMENTO

VOO

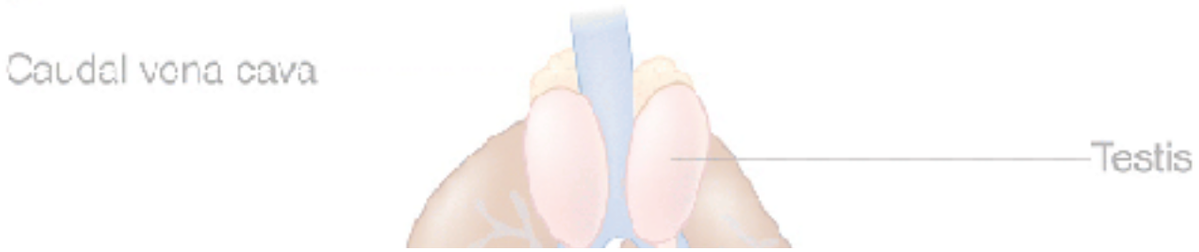
ALGUMA FISIO-LOGIA

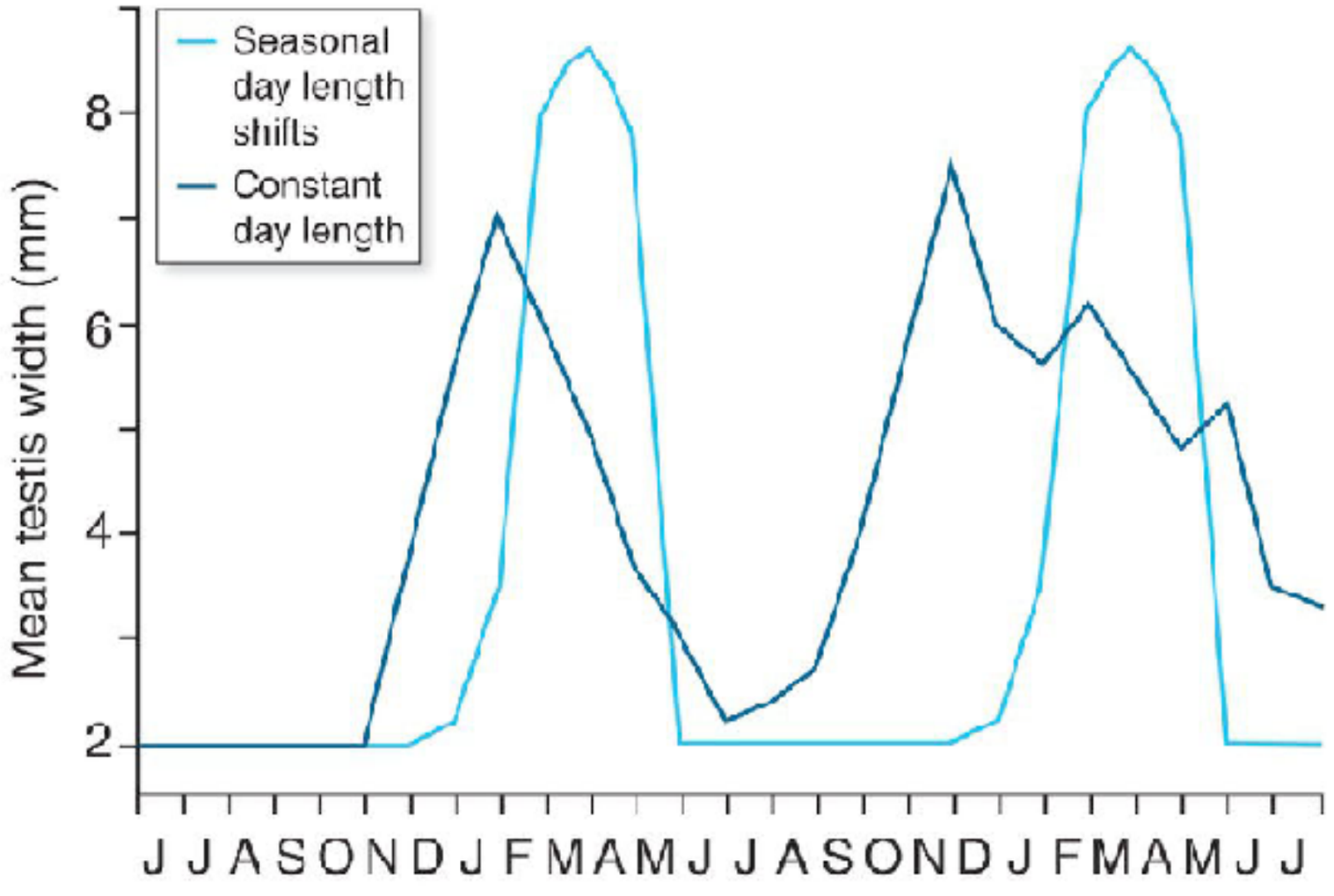
REPRODUÇÃO

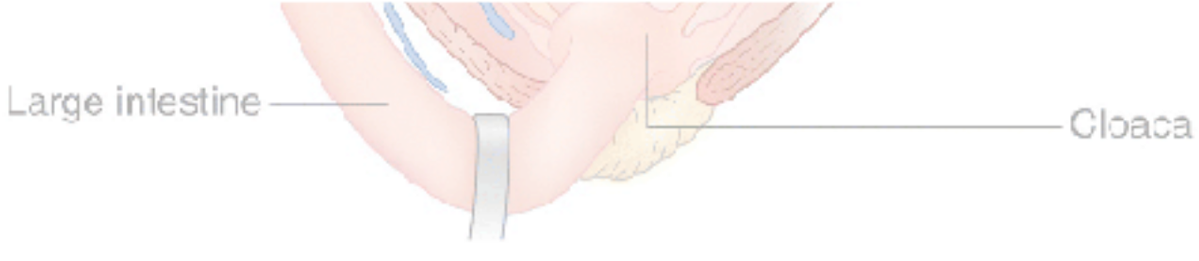
Sistema reprodutor: machos



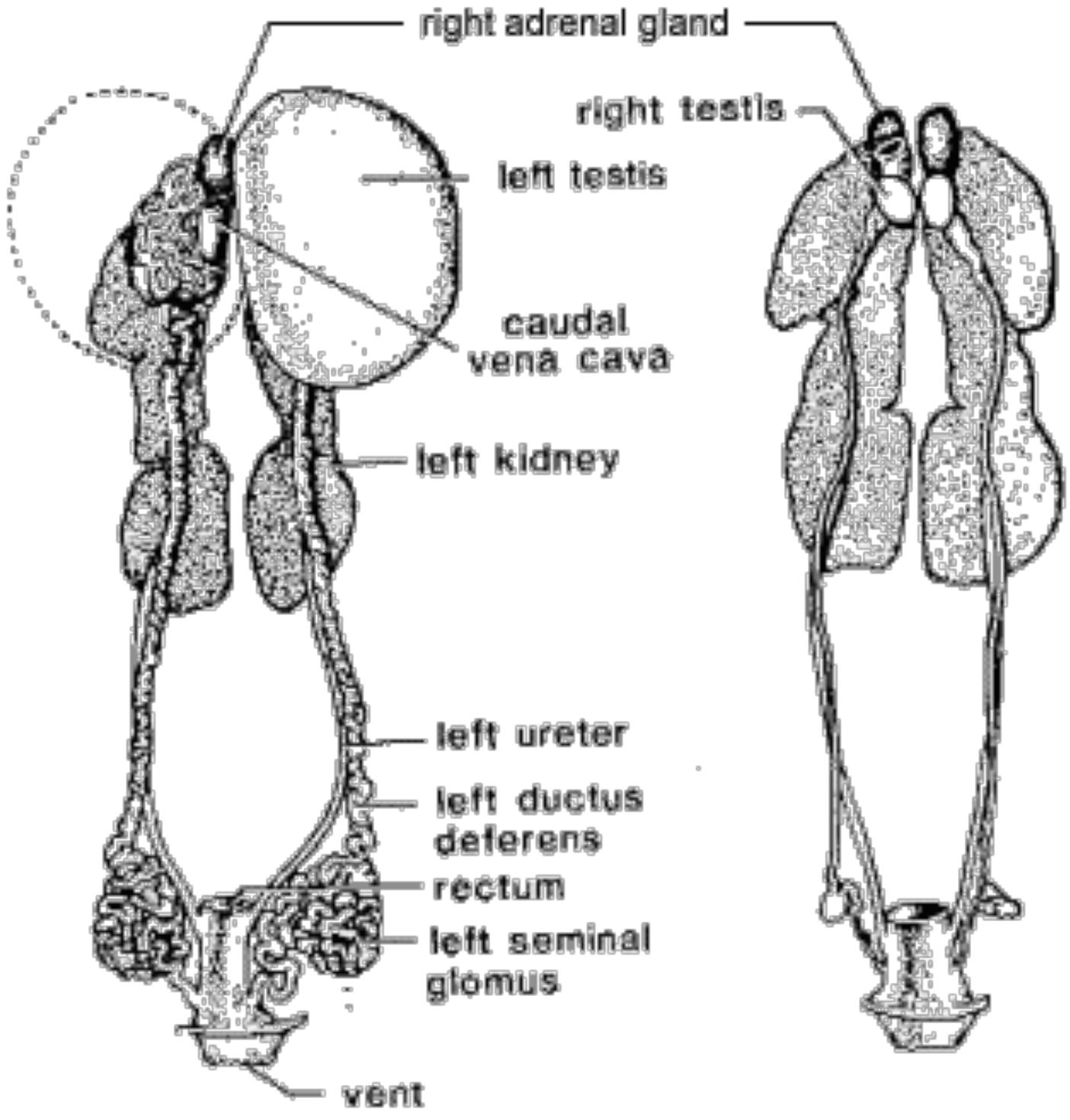
Sistema reprodutor: machos



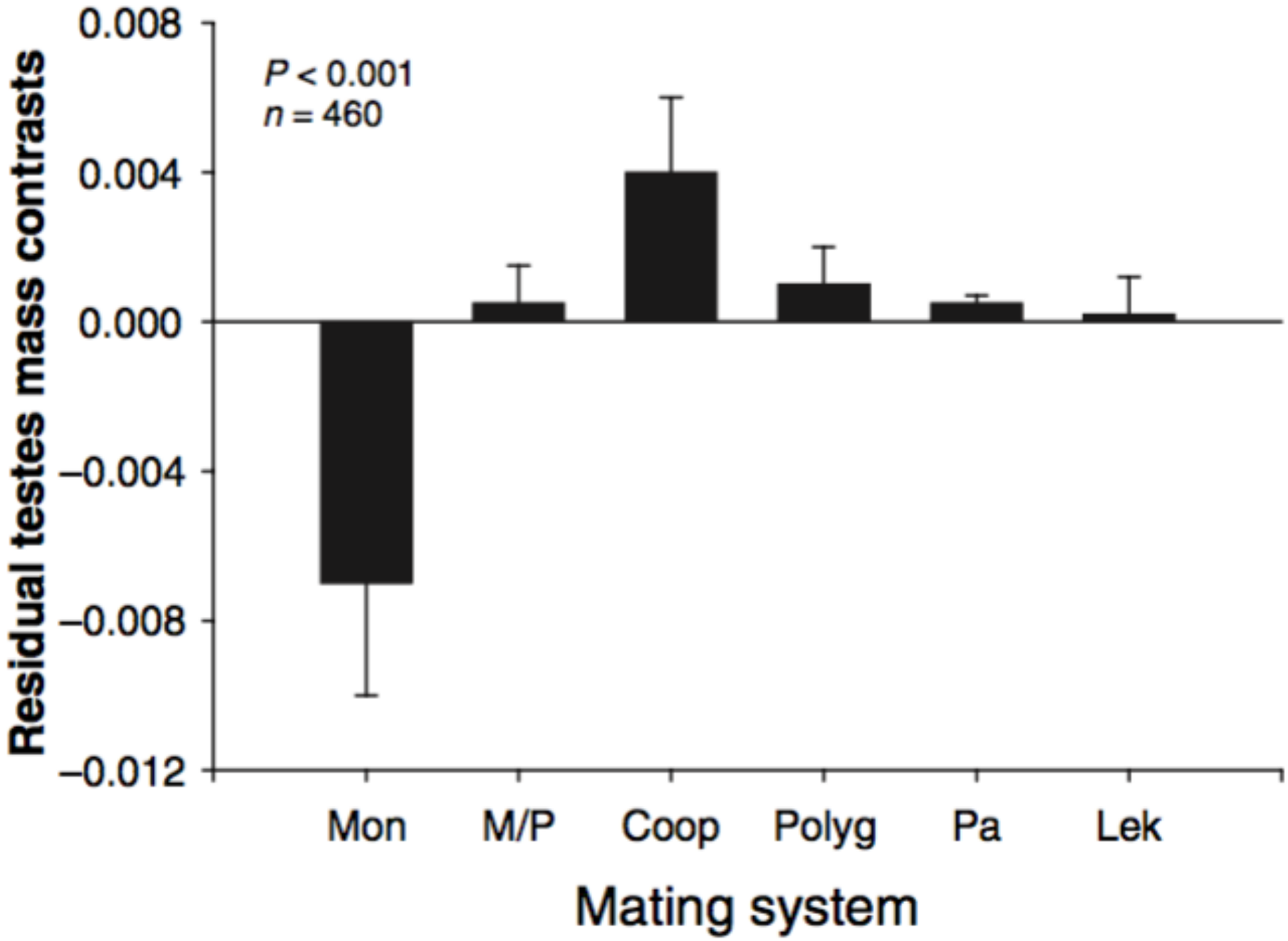




Sistema reprodutor: machos

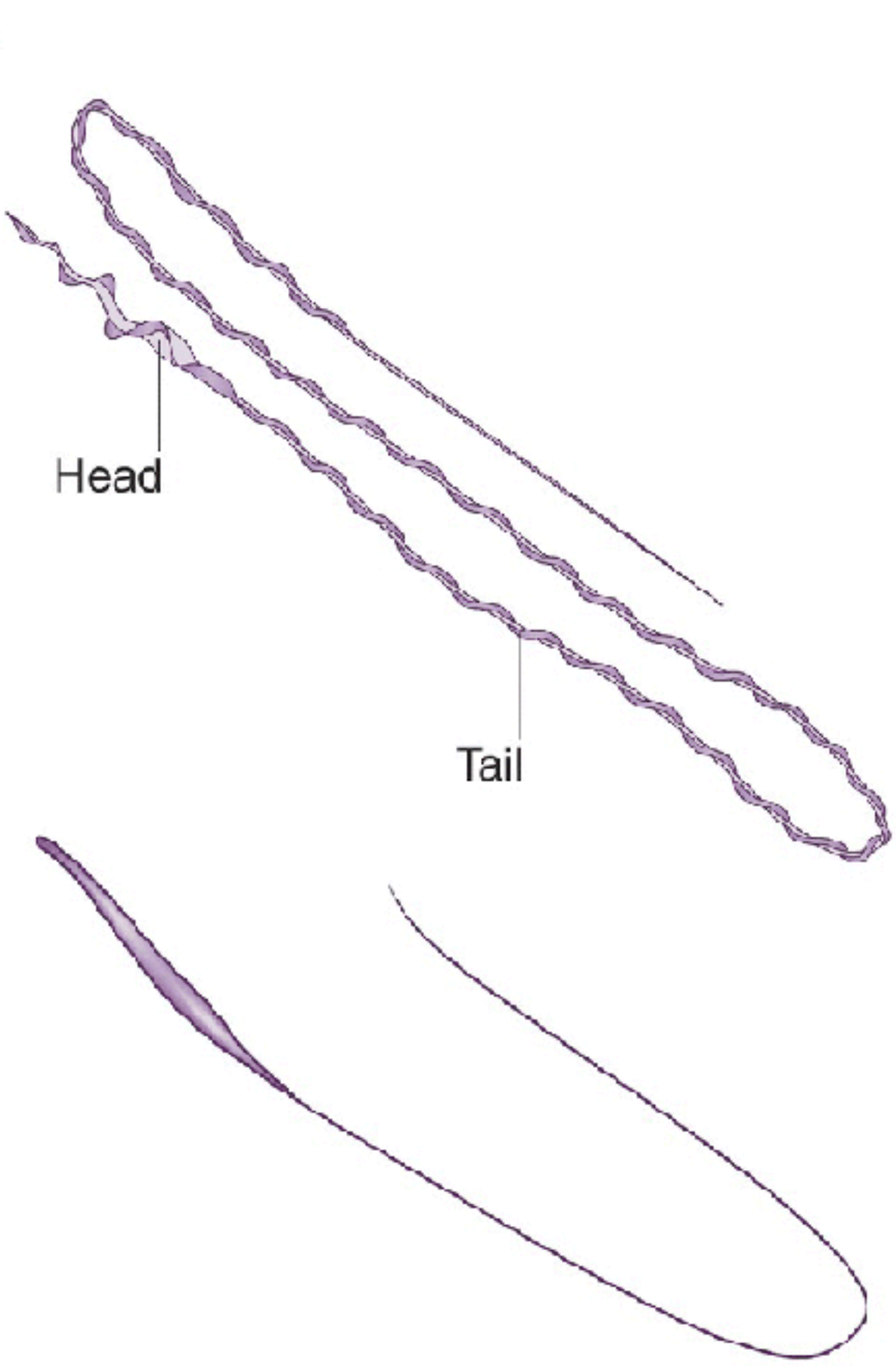


Sistema reprodutor: machos



Pitcher et al. (2005)

Sistema reprodutor: machos



Sistema reprodutor: machos

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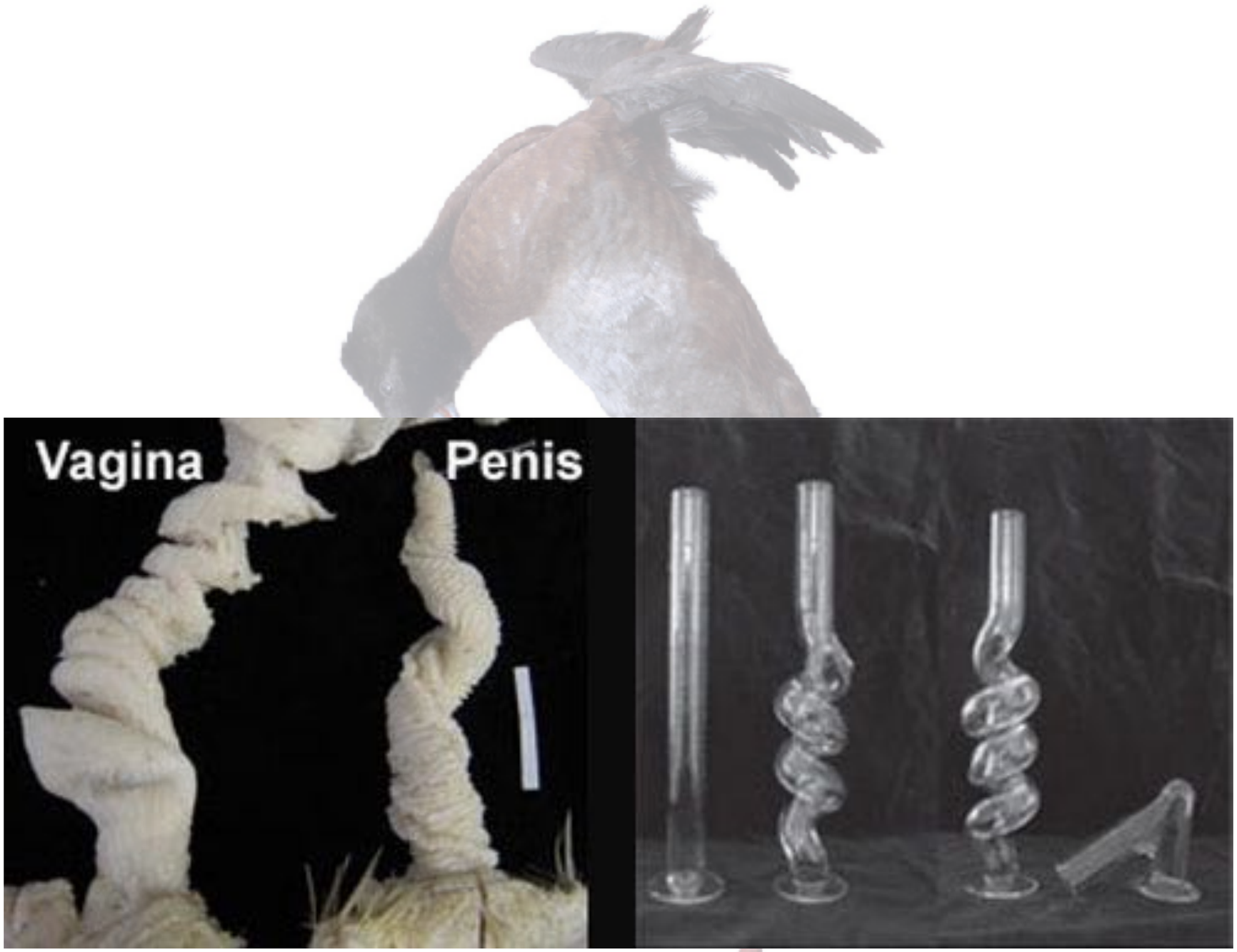

Sistema reprodutor: cópula

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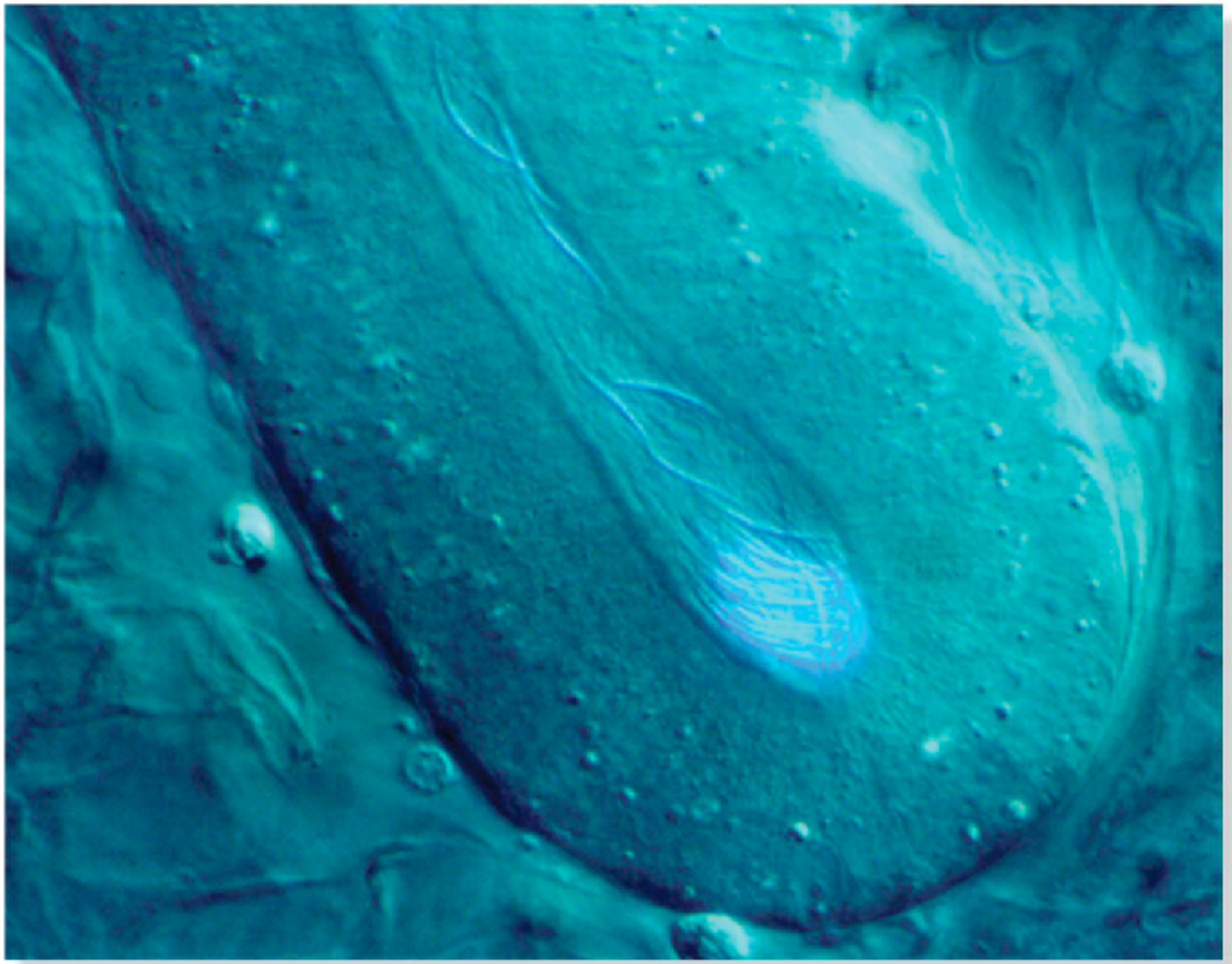
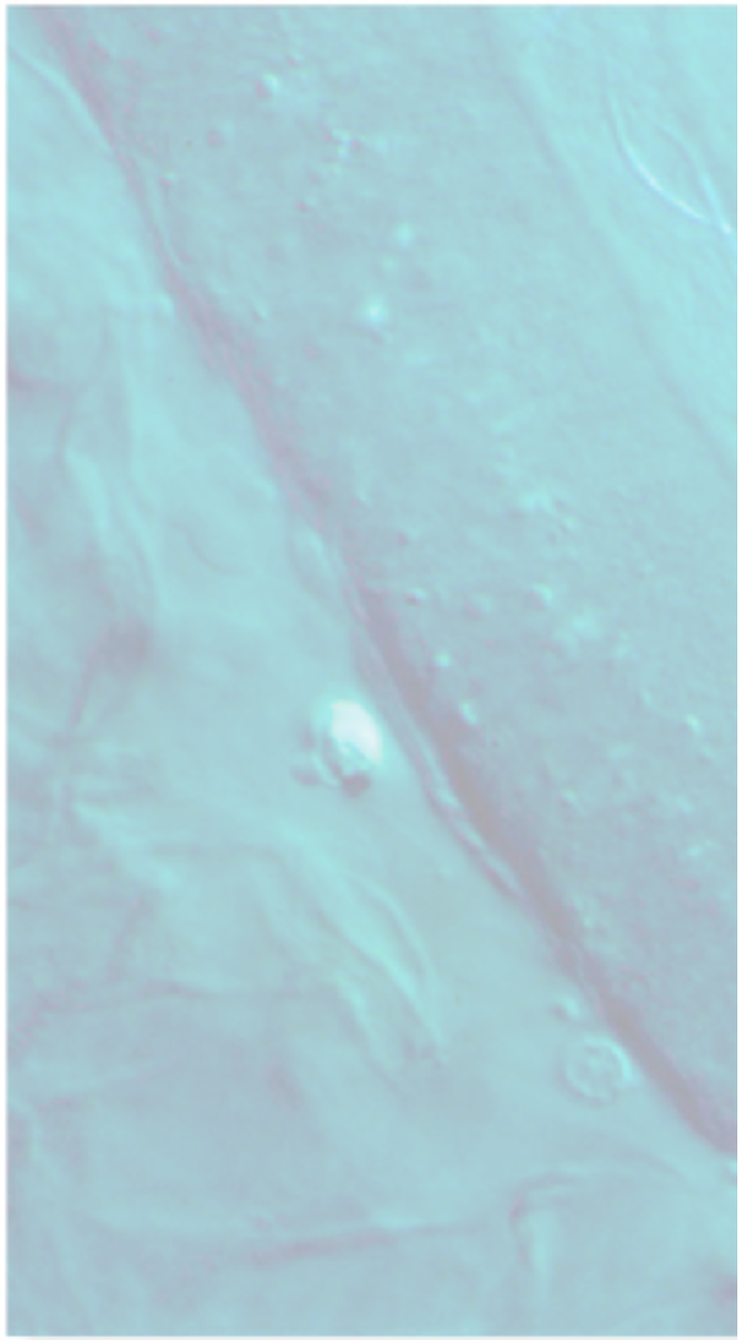
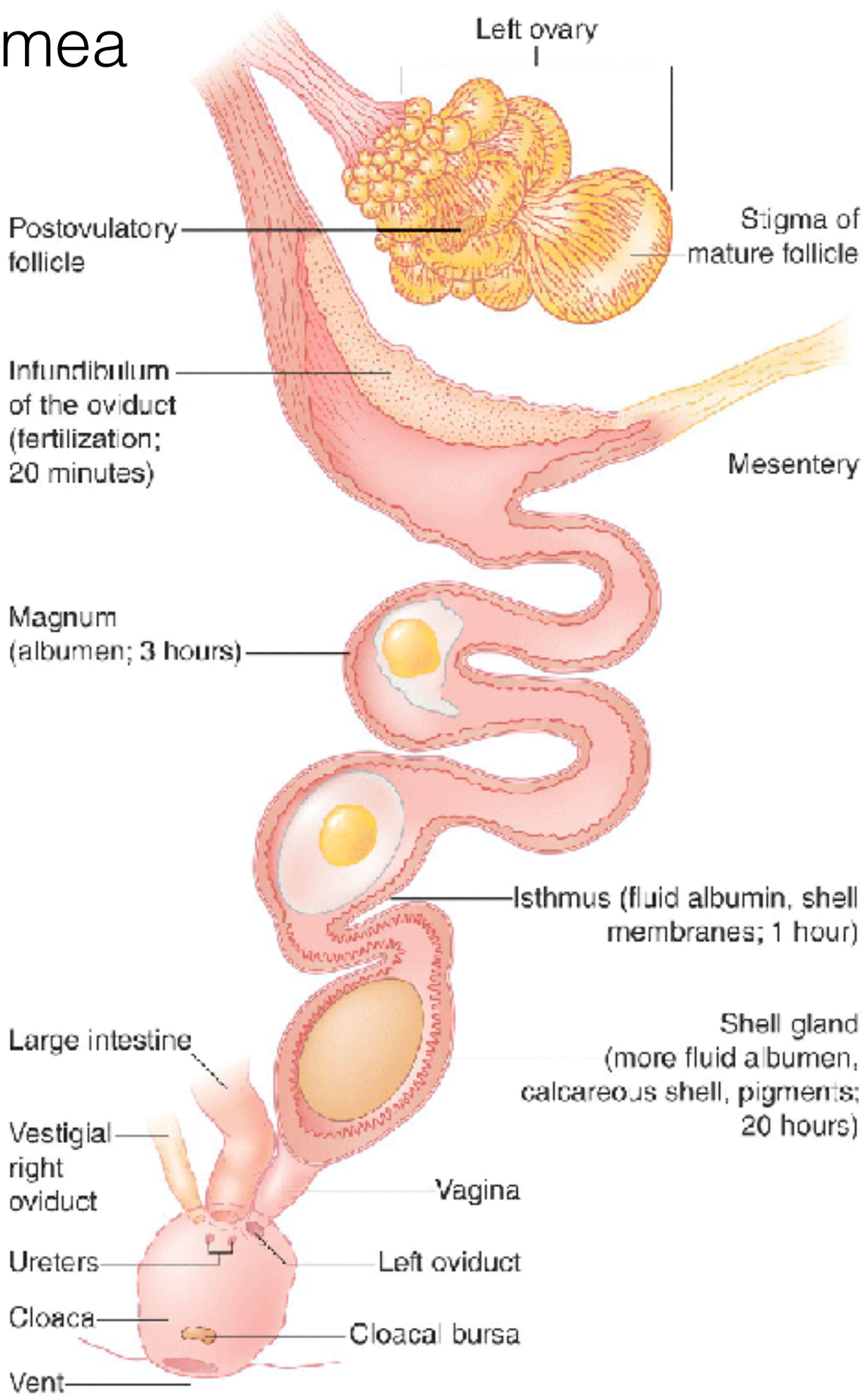
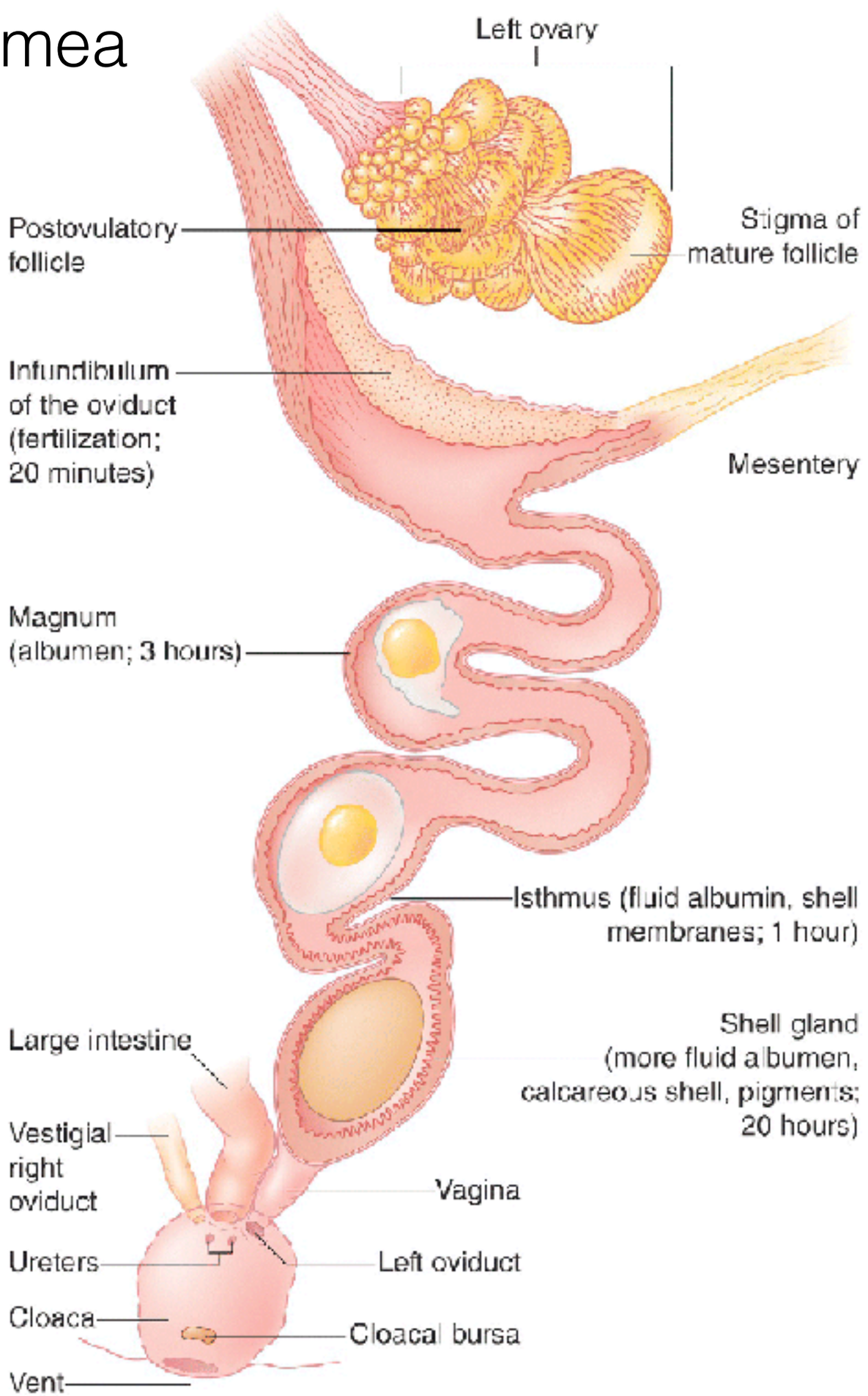


Sistema reprodutor: cópula/fêmea

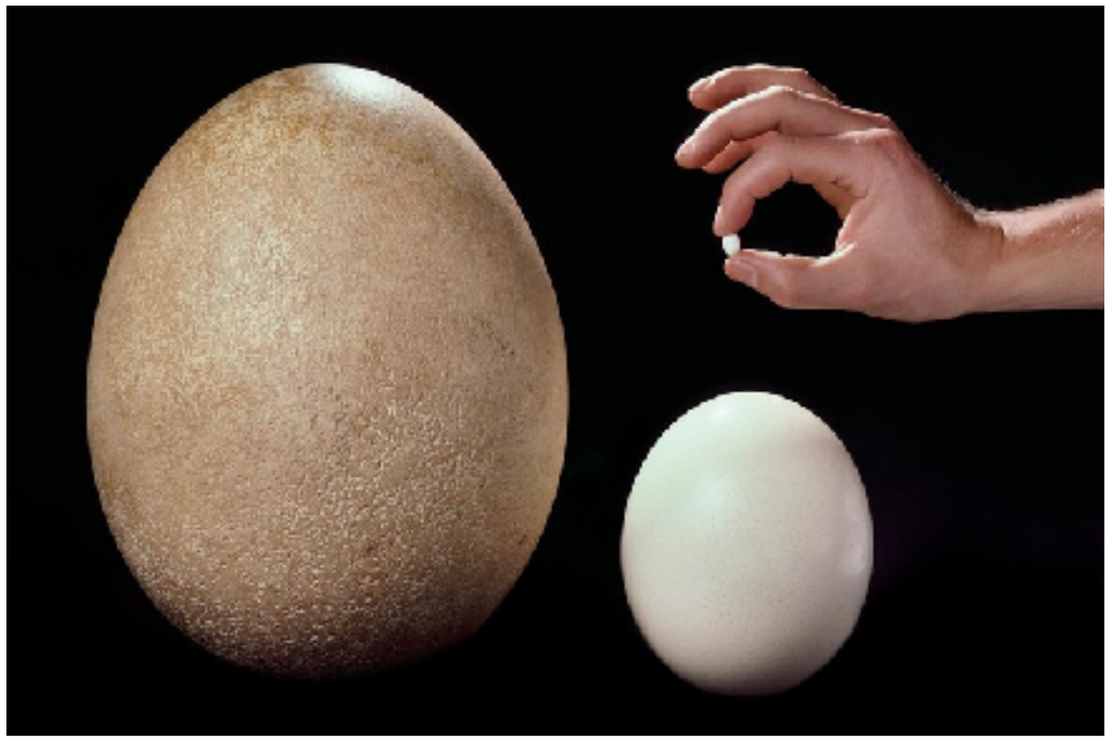




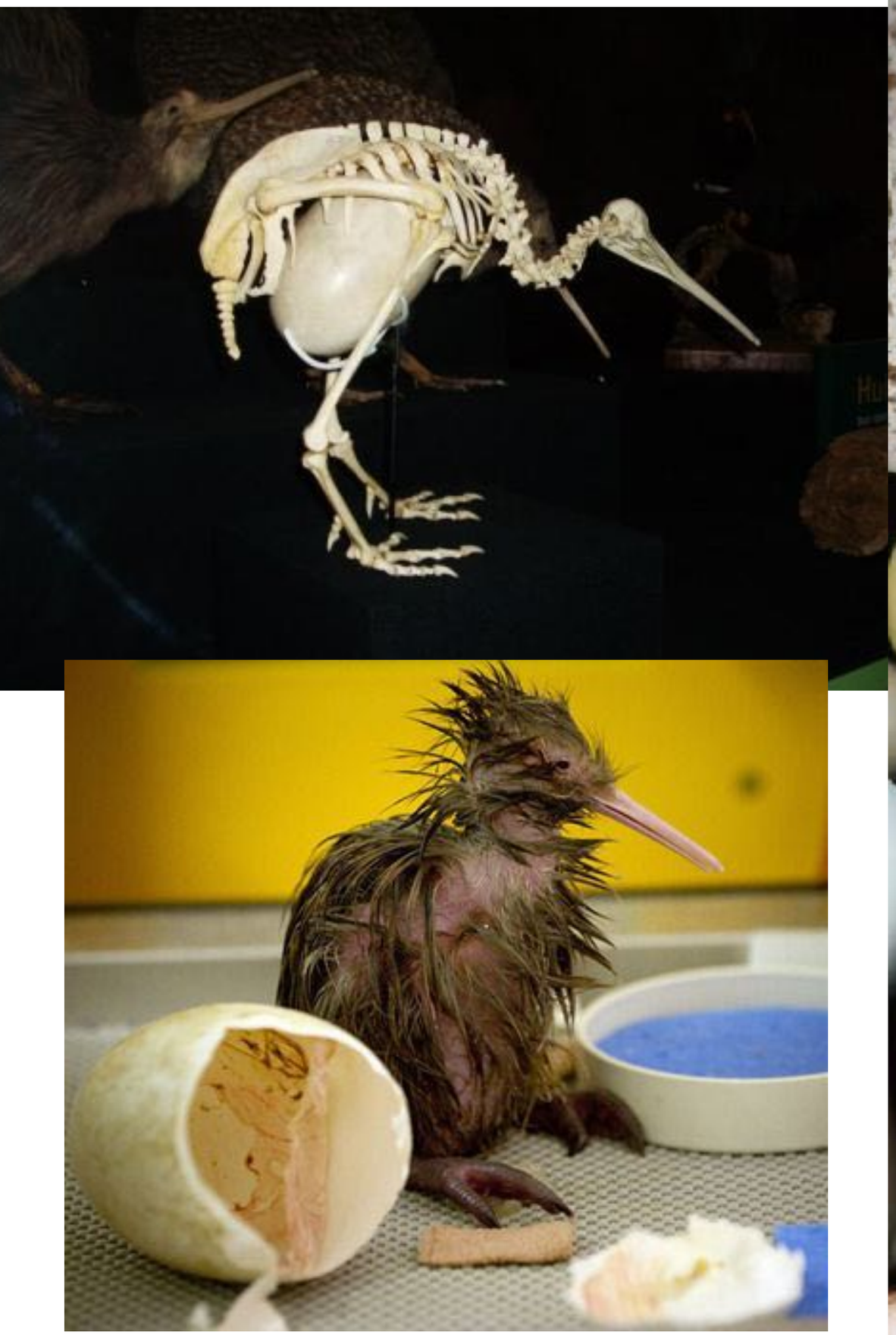
Sistema reprodutor: cópula/fêmea



Sistema reprodutor: ovos



Sistema reprodutor: ovos

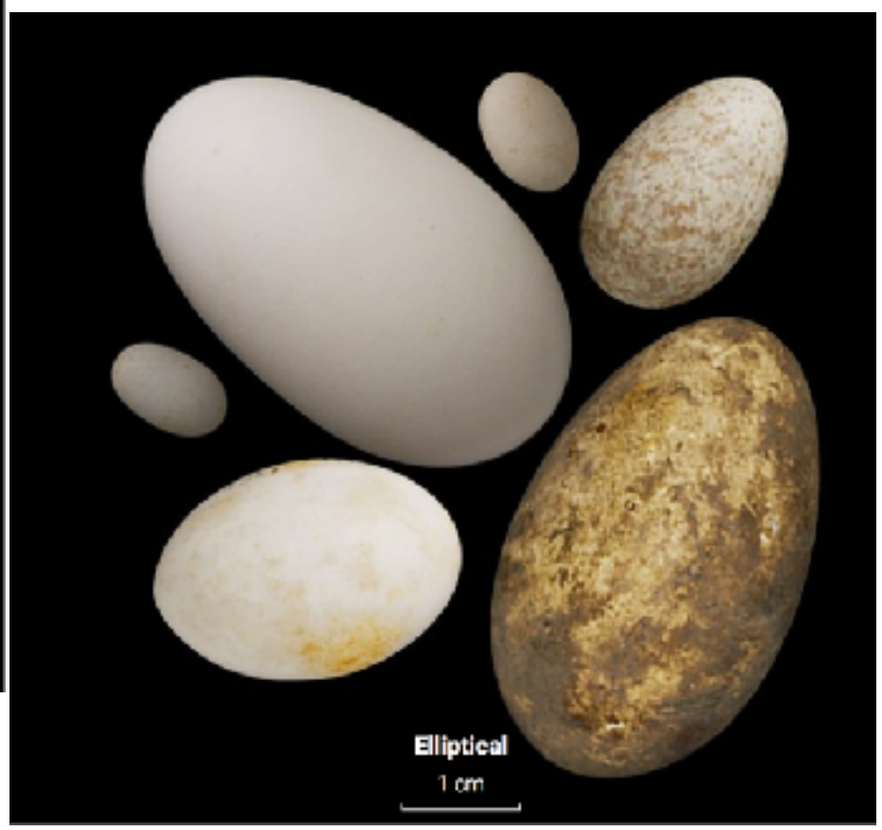


Sistema reprodutor: ovos

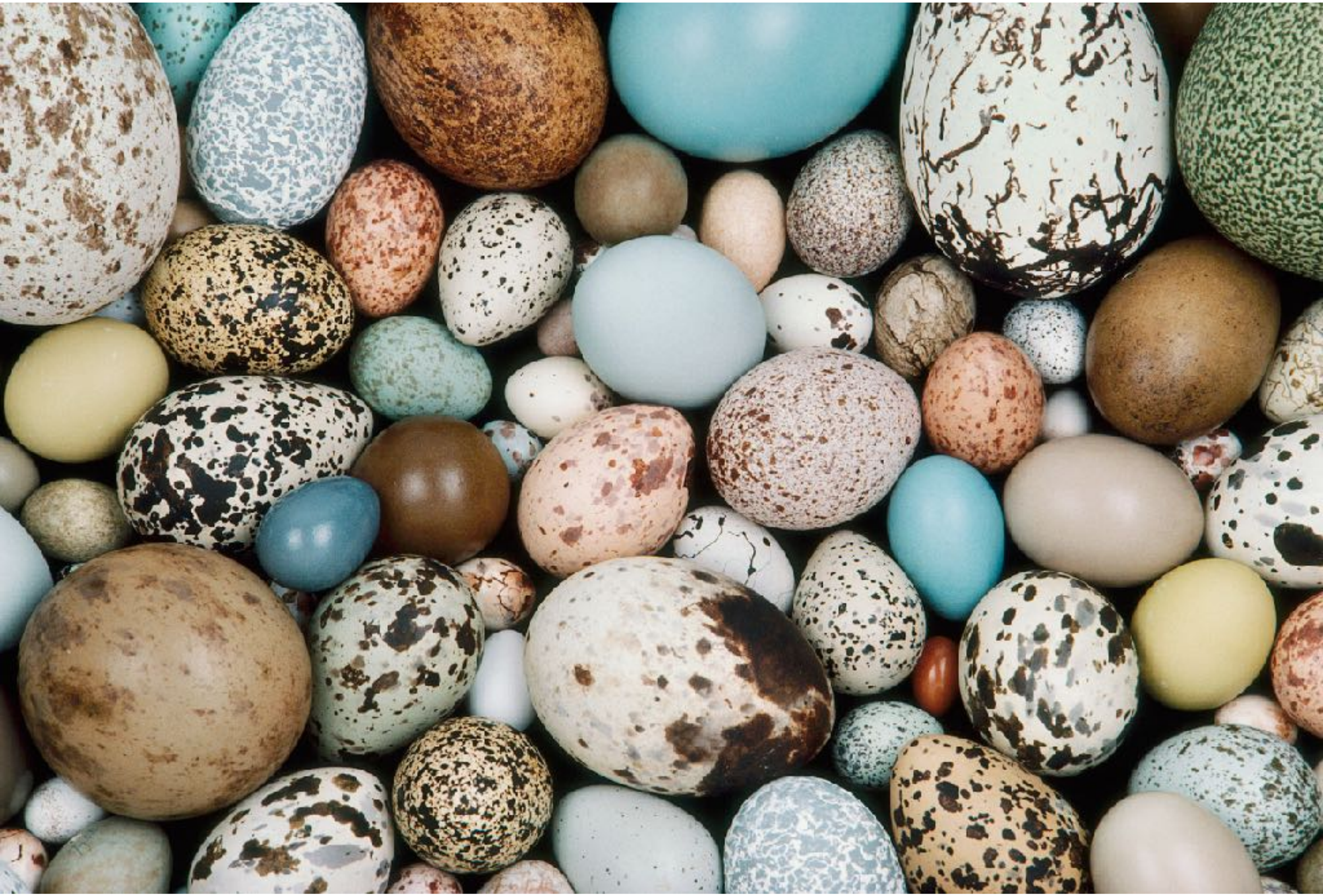
Spherical
Owl

Elliptical
Maleo

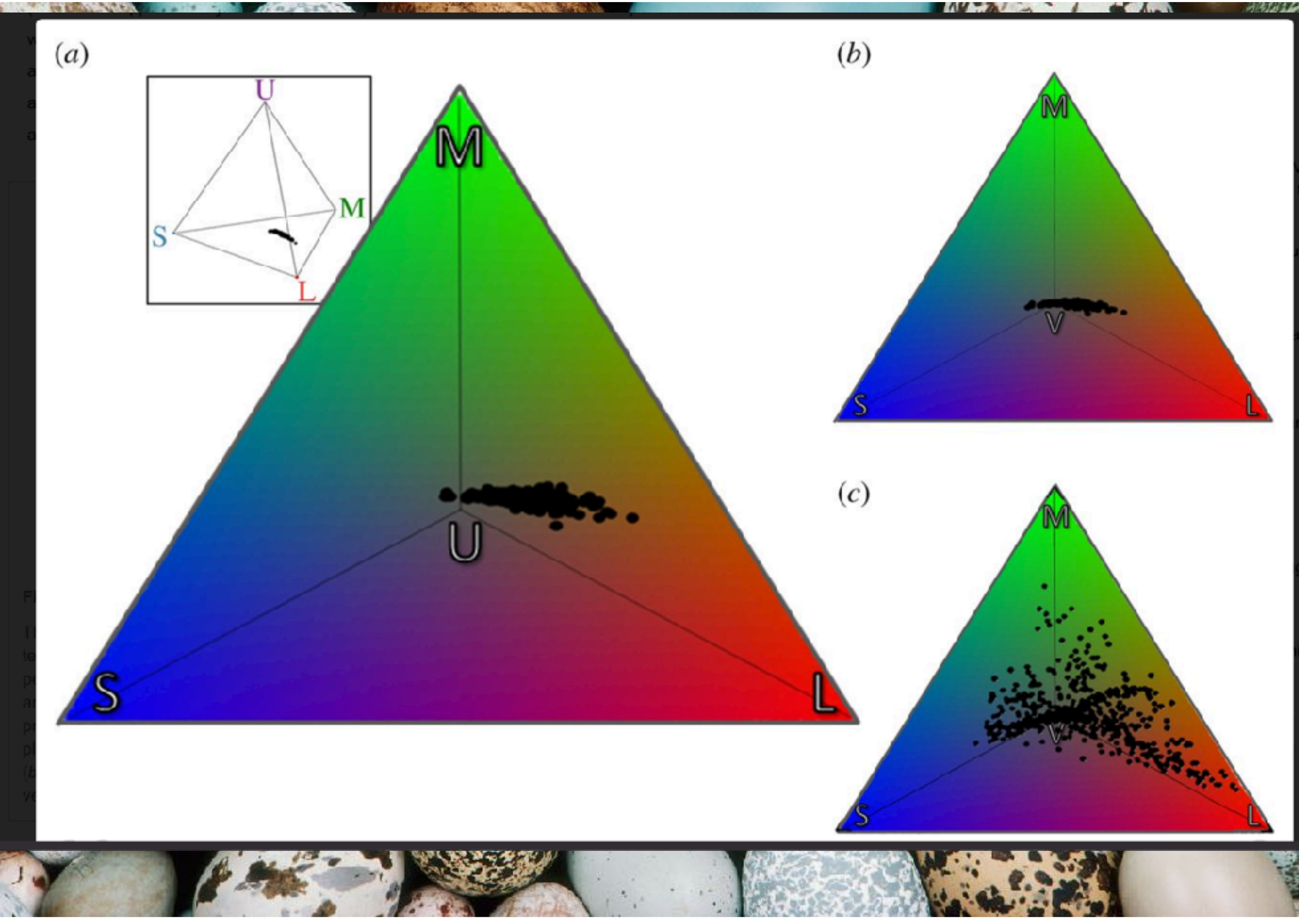
Conical
Murre



Sistema reprodutor: ovos



Sistema reprodutor: ovos



Ausência de cuidado parental

Cuidado parental

Figure 1 | Variation in parental provisioning. In every species of bird with parental care, chicks appear to have evolved signals designed to maximize their chance of being fed, such as vocalizations, begging postures and bright mouths. However, the way parents respond to information about their offspring differs markedly across species. Tree swallows *Tachycineta bicolor* feed the chick begging the most (**a**). Others sometimes neglect begging offspring, such as the blue-footed booby *Sula nebouxii* (**b**) and the hoopoe *Upupa epops* (**c**) which instead preferentially feed larger chicks. Gouldian finch *Erythrura gouldiae* parents (**d**) may preferentially feed offspring with elaborate structural ornaments around their mouths. (Photos courtesy of (**a**) M. Sodicoff. (**b**) This figure is not covered by the CC BY licence ©Damschen/ARCO/naturepl.com. All rights reserved, used with permission. (**c**) This figure is not covered by the CC BY licence © L.M.R. Gordón. All rights reserved, used with permission; and (**d**) This figure is not covered by the CC BY licence (**c**) G. Grall, National Aquarium, Baltimore. All rights reserved, used with permission.

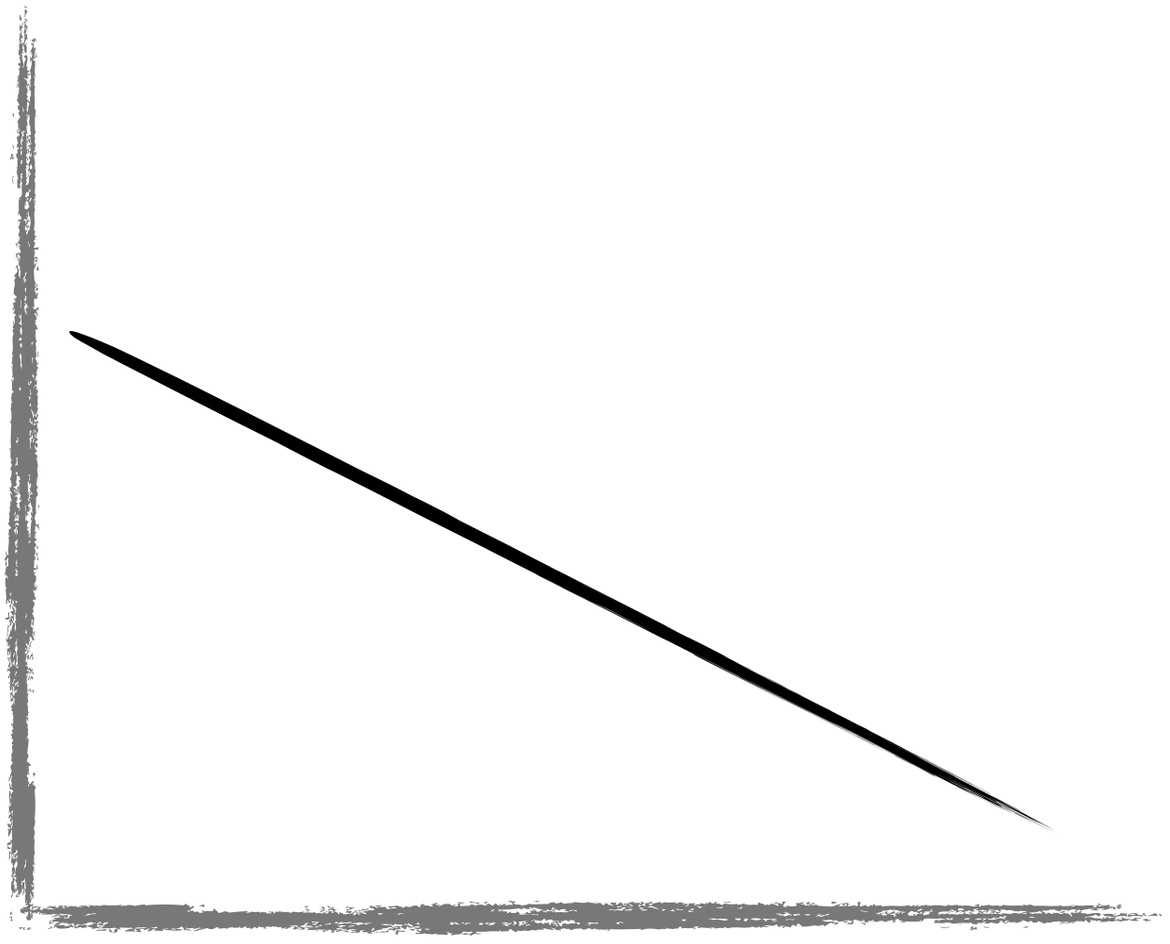
cuidado parental é

exigente

Peterson et al. 1990 PNAS

hipótese da certeza da paternidade

esforço paternal



perda de paternidade

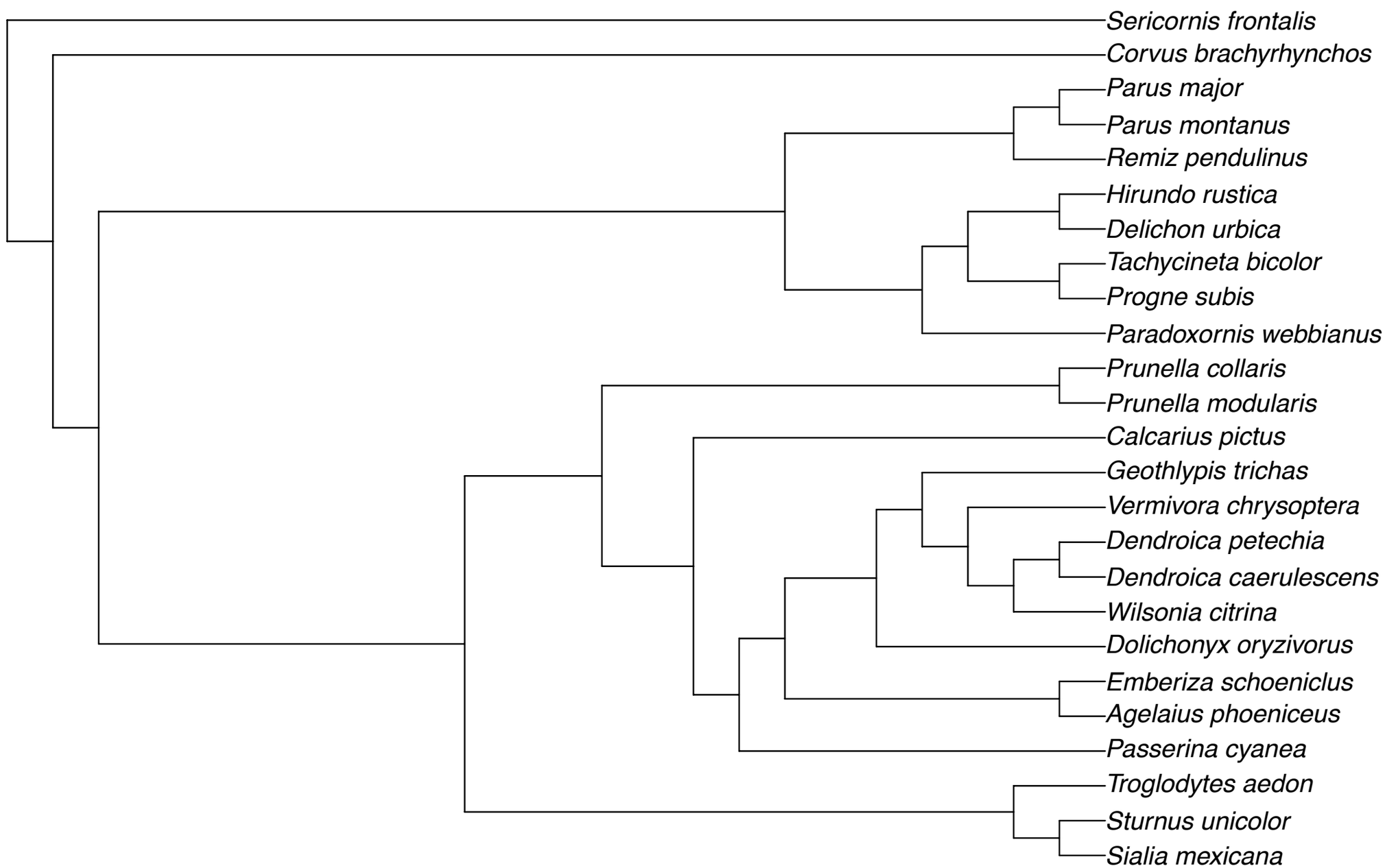
ou

incerteza de paternidade

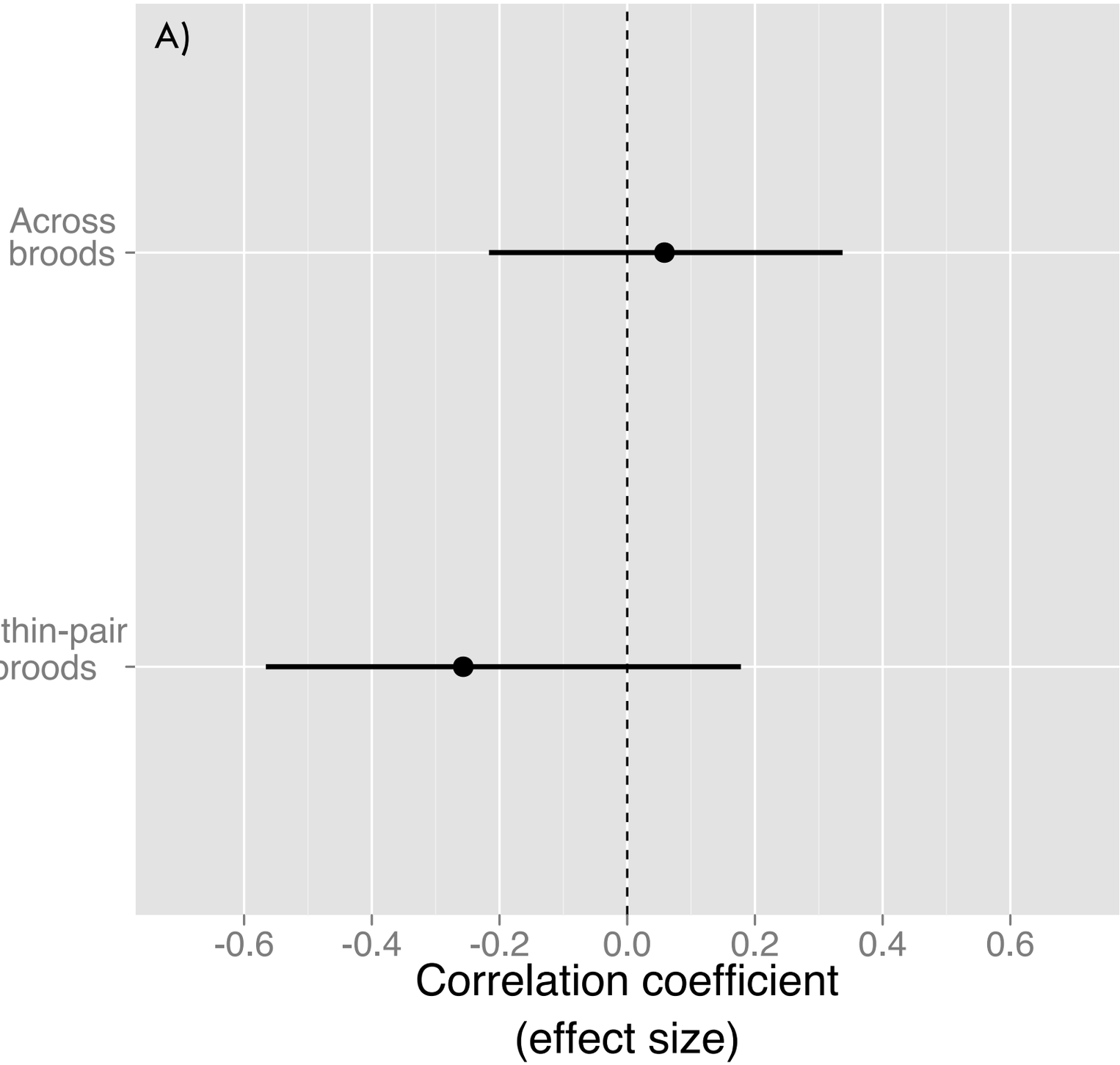
pergunta:

machos ajustam seu cuidado paternal de acordo com paternidade?

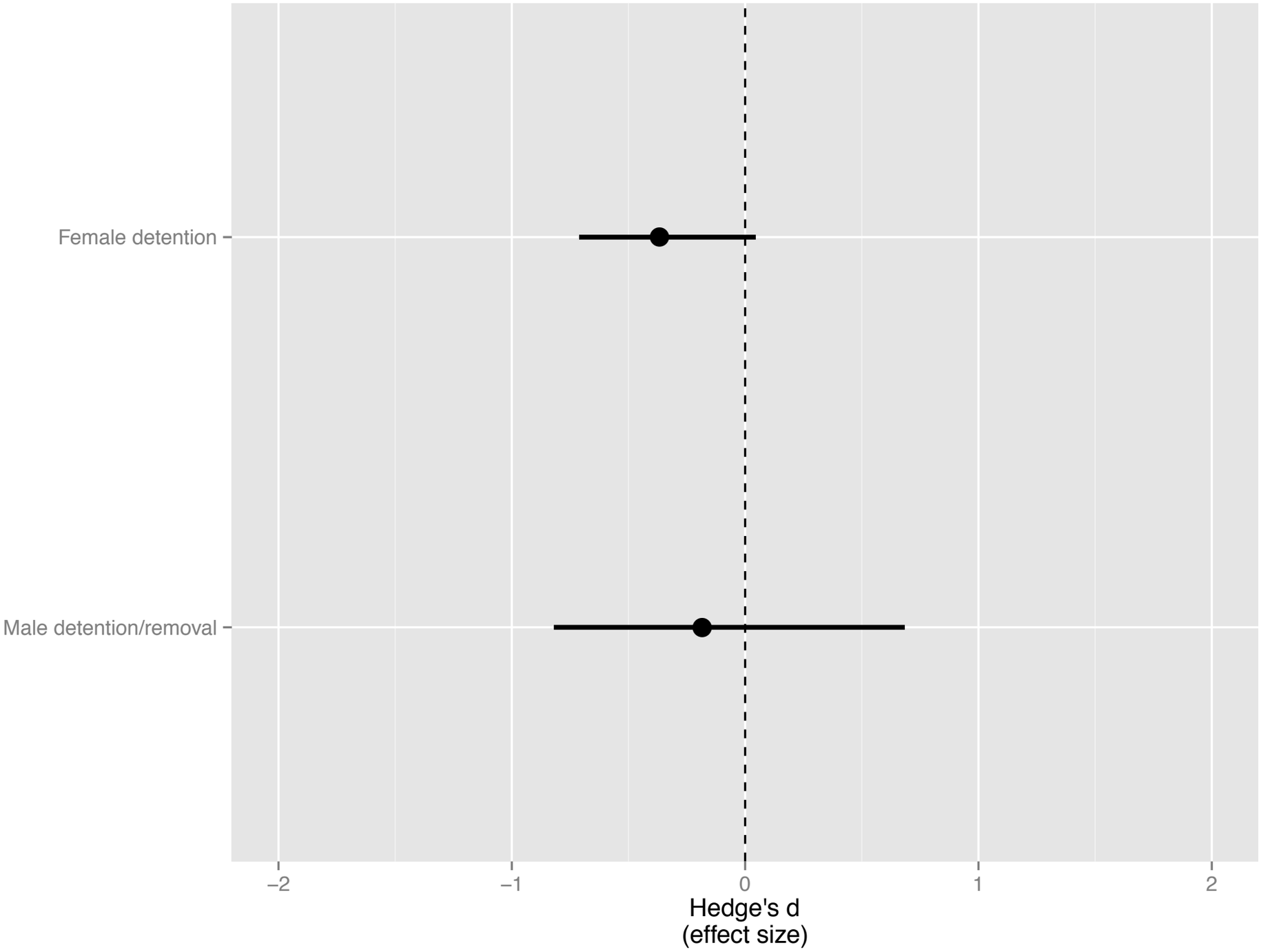
uma abordagem meta-analítica

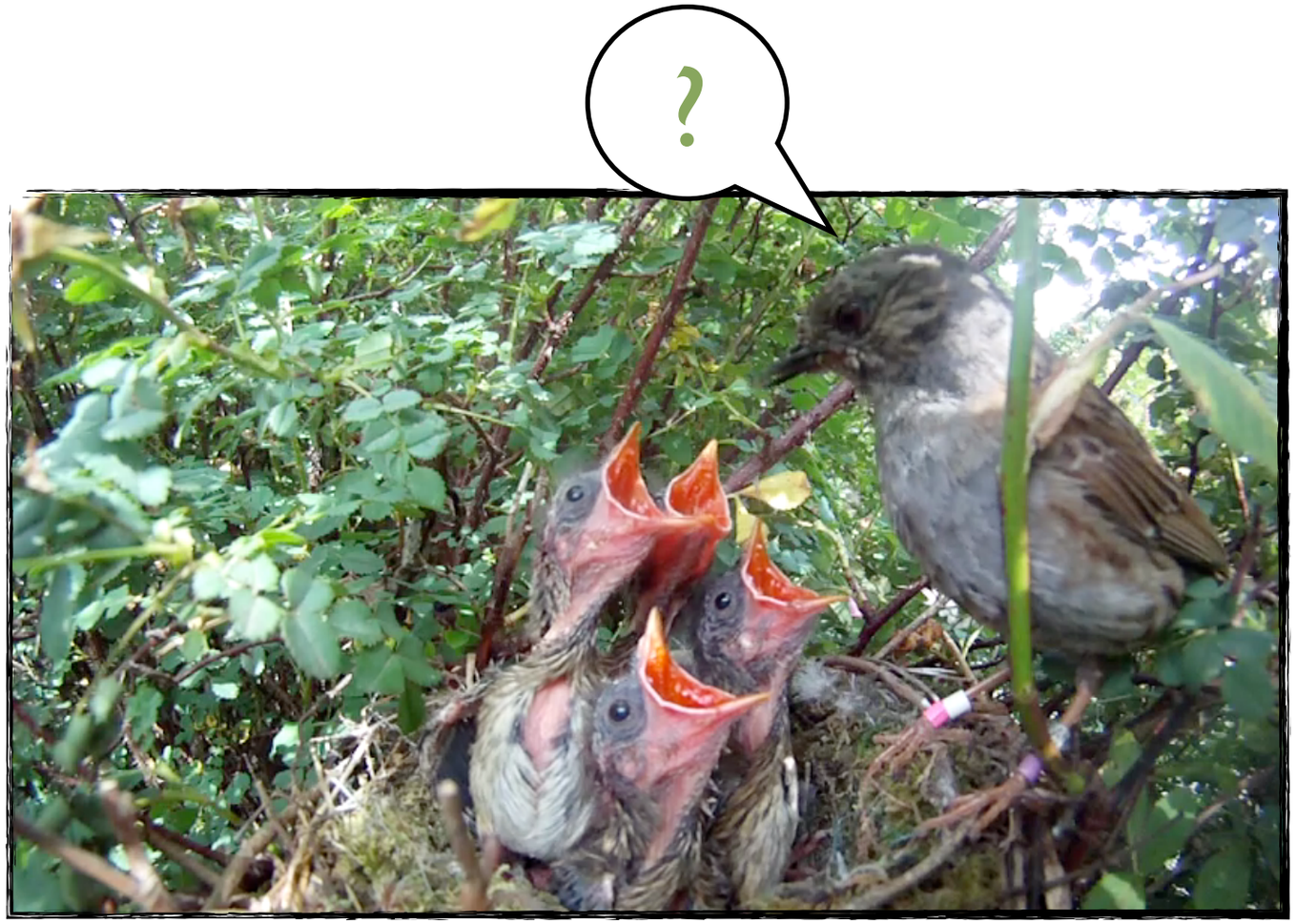

Sericornis frontalis
Corvus brachyrhynchos
Parus major
Parus montanus
Remiz pendulinus
Hirundo rustica
Delichon urbica
Tachycineta bicolor
Progne subis
Paradoxornis webbianus
Prunella collaris
Prunella modularis
Calcarius pictus
Geothlypis trichas
Vermivora chrysoptera
Dendroica petechia
Dendroica caerulescens
Wilsonia citrina
Dolichonyx oryzivorus
Emberiza schoeniclus
Agelaius phoeniceus
Passerina cyanea
Troglodytes aedon
Sturnus unicolor
Sialia mexicana

pouca evidência de que machos reduzem cuidado (estudos observacionais)



pouca evidência de que machos reduzem cuidado (estudos experimentais)





erros são muito caros

erros são muito caros

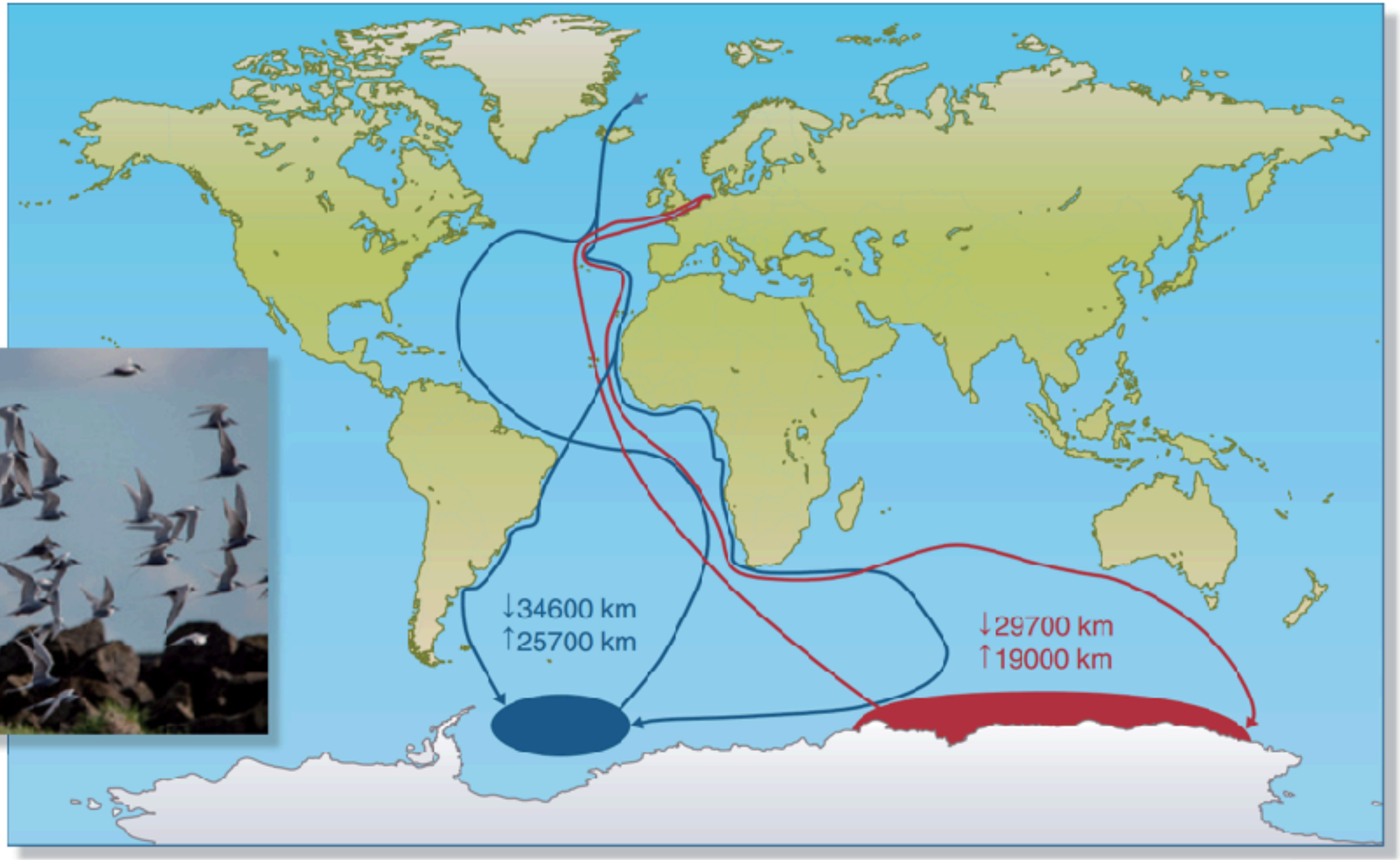
não tem boa informação

Filhotes altriciais

Filhotes precoces

Filhotes altriciais & precoces

Migração



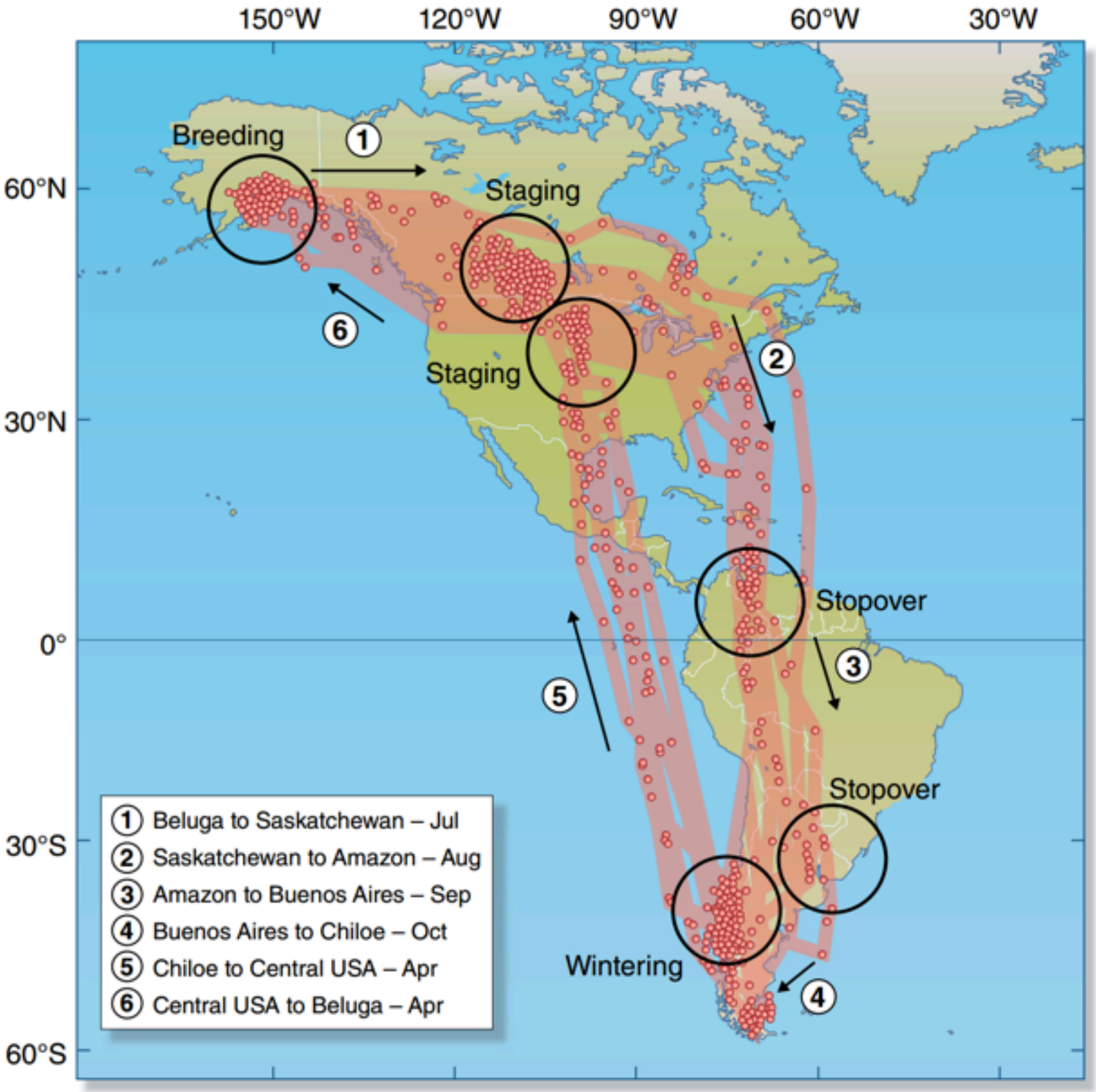
Migração

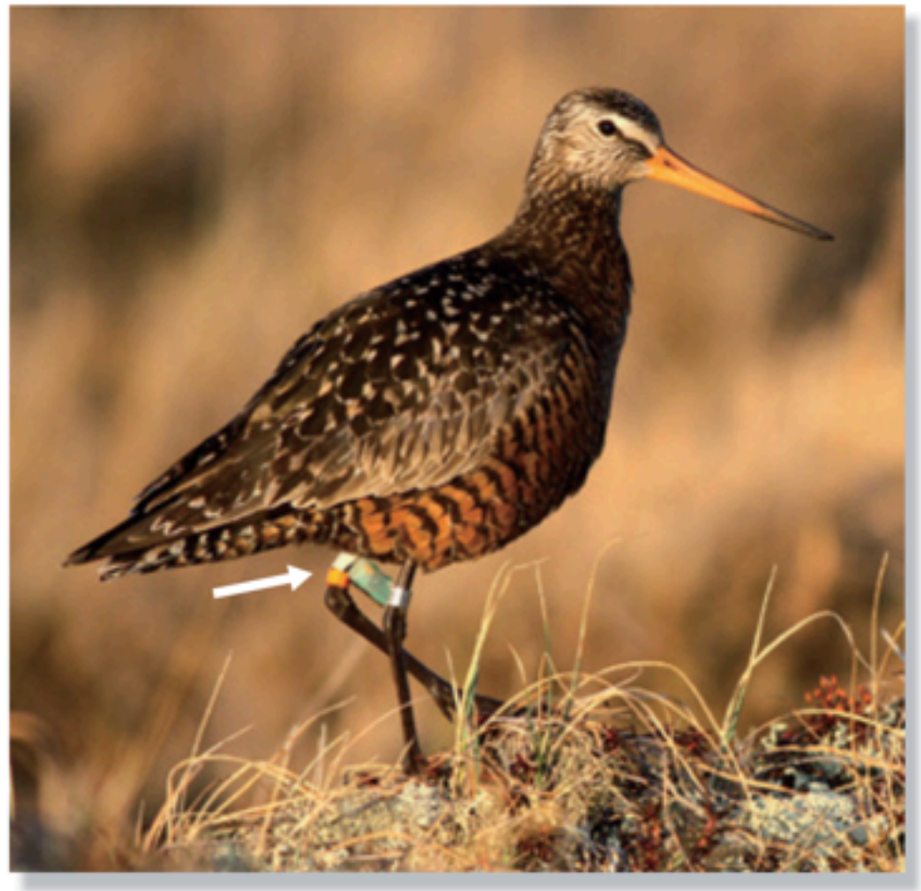

OCEANO ATLÂNTICO
Equador
FLORESTA AMAZÔNICA
MANGUES LITORÂNEOS
MATA DE COCAIS
CAATINGA
CERRADO
PANTANAL
MATA ATLÂNTICA
Trópico de Capricórnio
MATA DE ARAUCÁRIA
CAMPOS GERAIS
ESCALA
0
590 km
65°
45°

Migração


Greenland
Iceland
Finland
Norway
Sweden
Russia
Estonia
Latvia
Lithuania
Denmark
Belarus
Nether-
lands
Ireland
United
Kingcom
Belgium
Germany
Poland
Czech
Rep.
Slovakia
Ukraine
Kazakhstan
France
Switz.
Austria
Hungary
Italy
Croatia
Romania
Serbia
Bulgaria
Georgia
Uzbekh.
Kyrgyz.
Azer.
Turkmenistan
Tajik.
Spain
Portugal
Alb.
Mac.
Greece
Turkey
China
Tunisia
Cyprus
Syria
Leb.
Isr.
Jor.
Iraq
Iran
Afghanistan
Morocco
Algeria
Libya
Egypt
Saudi Arabia
UAE
Pakistan
Nep.
India
Resident
Breeding
Non-breeding

Migração


150°W
120°W
90°W
60°W
30°W
60°N
30°N
0°
30°S
60°S
Breeding
1
Staging
Staging
2
6
Stopover
3
5
Stopover
Wintering
4
1 Beluga to Saskatchewan – Jul
2 Saskatchewan to Amazon – Aug
3 Amazon to Buenos Aires – Sep
4 Buenos Aires to Chiloe – Oct
5 Chiloe to Central USA – Apr
6 Central USA to Beluga – Apr



Alaska

2-8 May
6,500 km

China

Pacific
Ocean

Hawaii

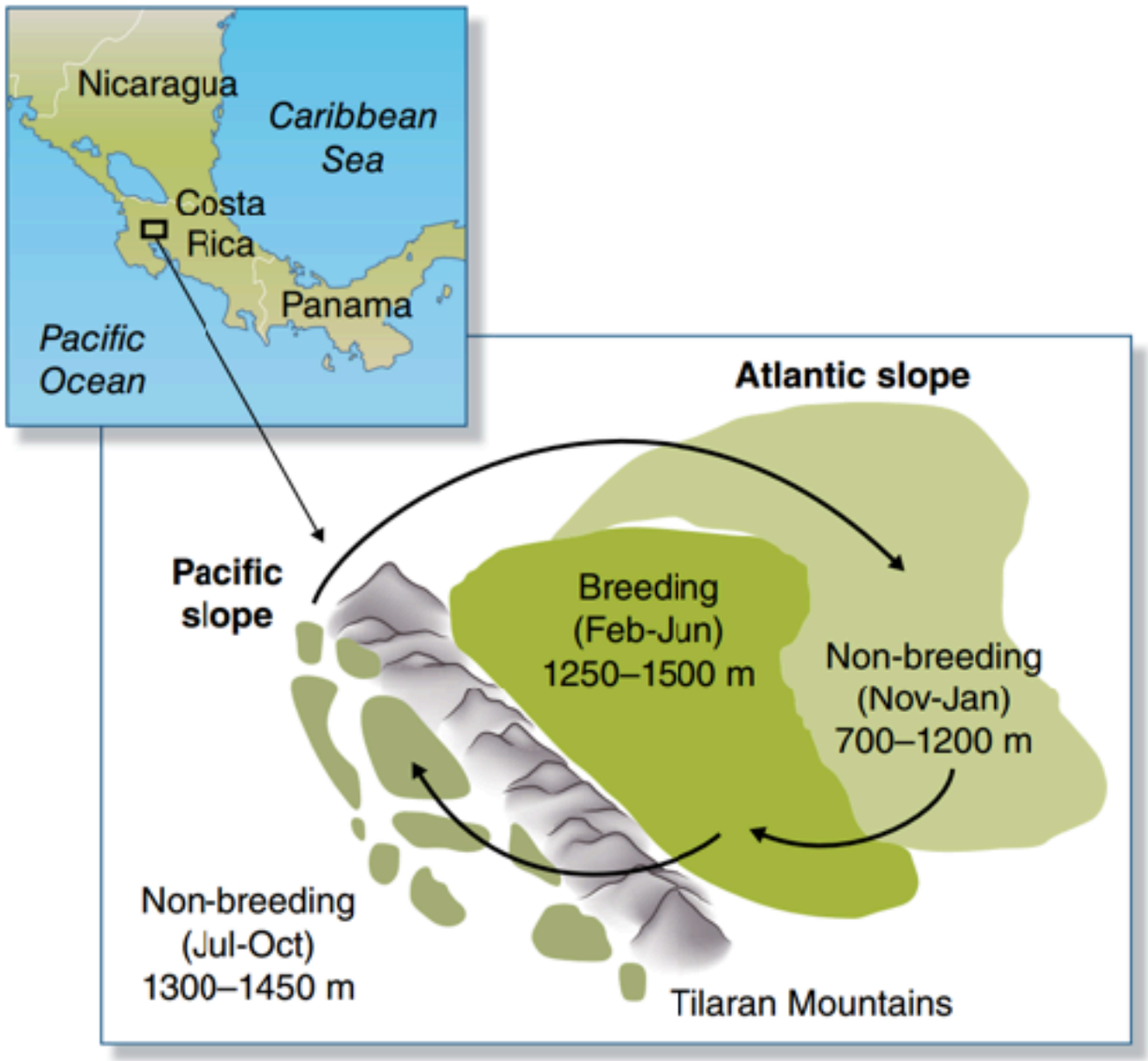
17-24 March
10,300 km

30 August-
7 September
11,700 km

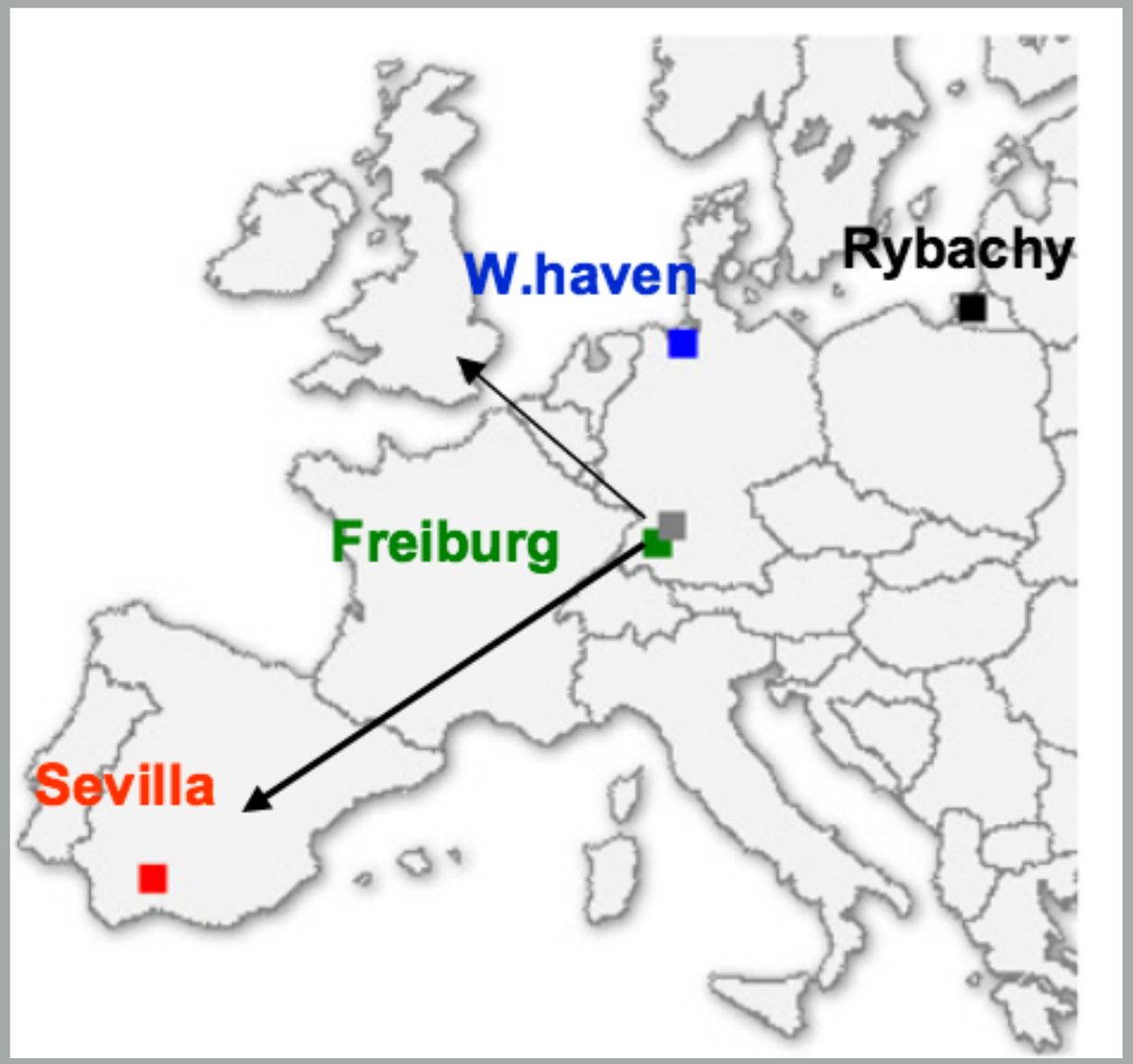
Australia

New Zealand

RBO Conservation Science
GS Alaska Science Center


Nicaragua
Caribbean Sea
Costa Rica
Panama
Pacific Ocean
Atlantic slope
Pacific slope
Breeding (Feb-Jun) 1250–1500 m
Non-breeding (Nov-Jan) 700–1200 m
Non-breeding (Jul-Oct) 1300–1450 m
Tilaran Mountains

Influência antropológica muda trajetória migratória



Rolshausen et al. (2009)

Como surge a migração?

Alaska
2-8 May
6,500 km
China
Hawaii
17-24 March
10,300 km
30 August-
7 September
11,700 km
Australia
New Zealand
RBO Conservation Science
GS Alaska Science Center

Present-day breeding and non-breeding distributions of a hypothetical long-distance migrant bird species

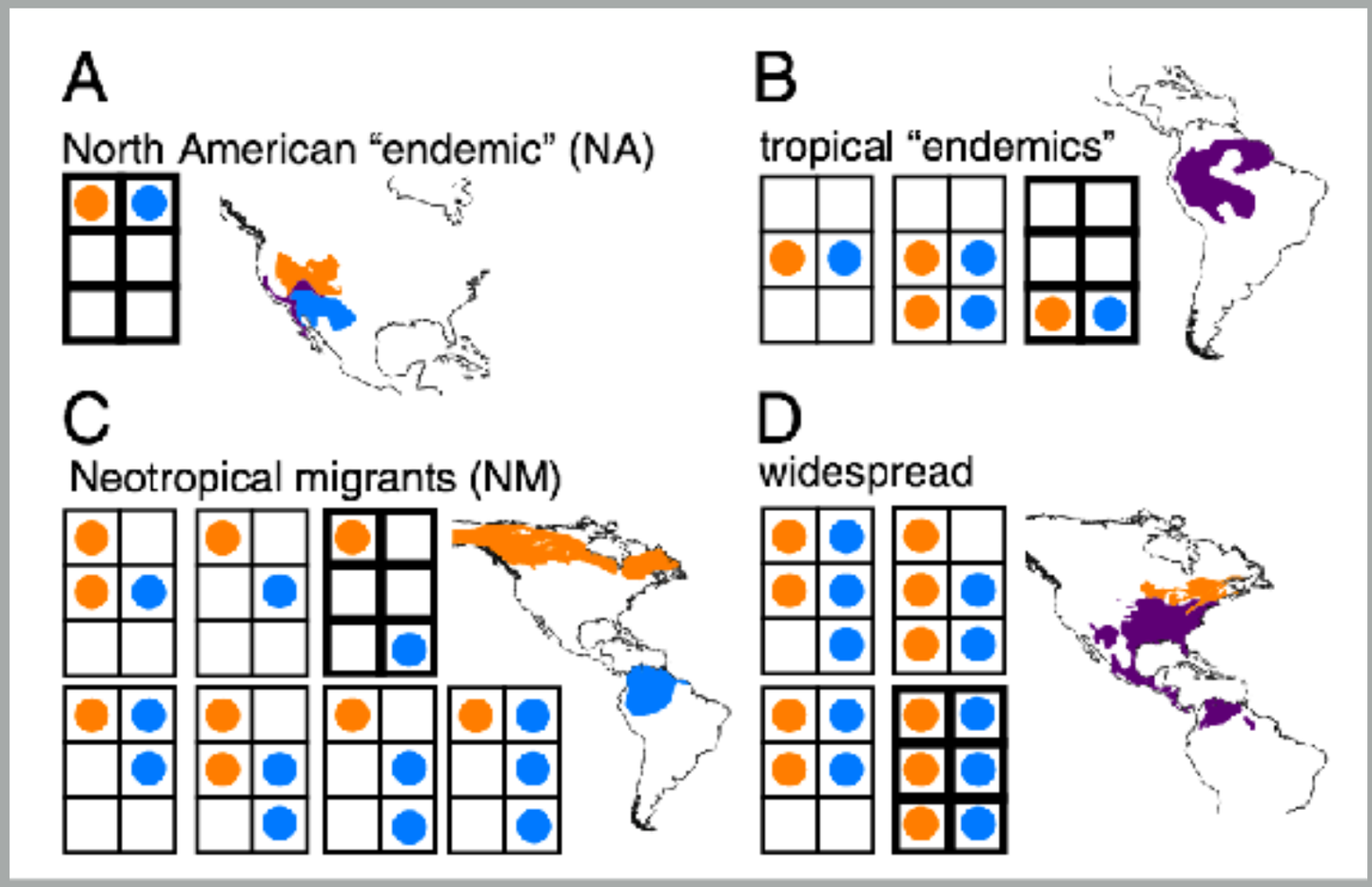
Shift of non-breeding range to tropics (northern home hypothesis)

Shift of breeding range to temperate region (southern home hypothesis)

Modelo filogenético para inferir história biogeográfica

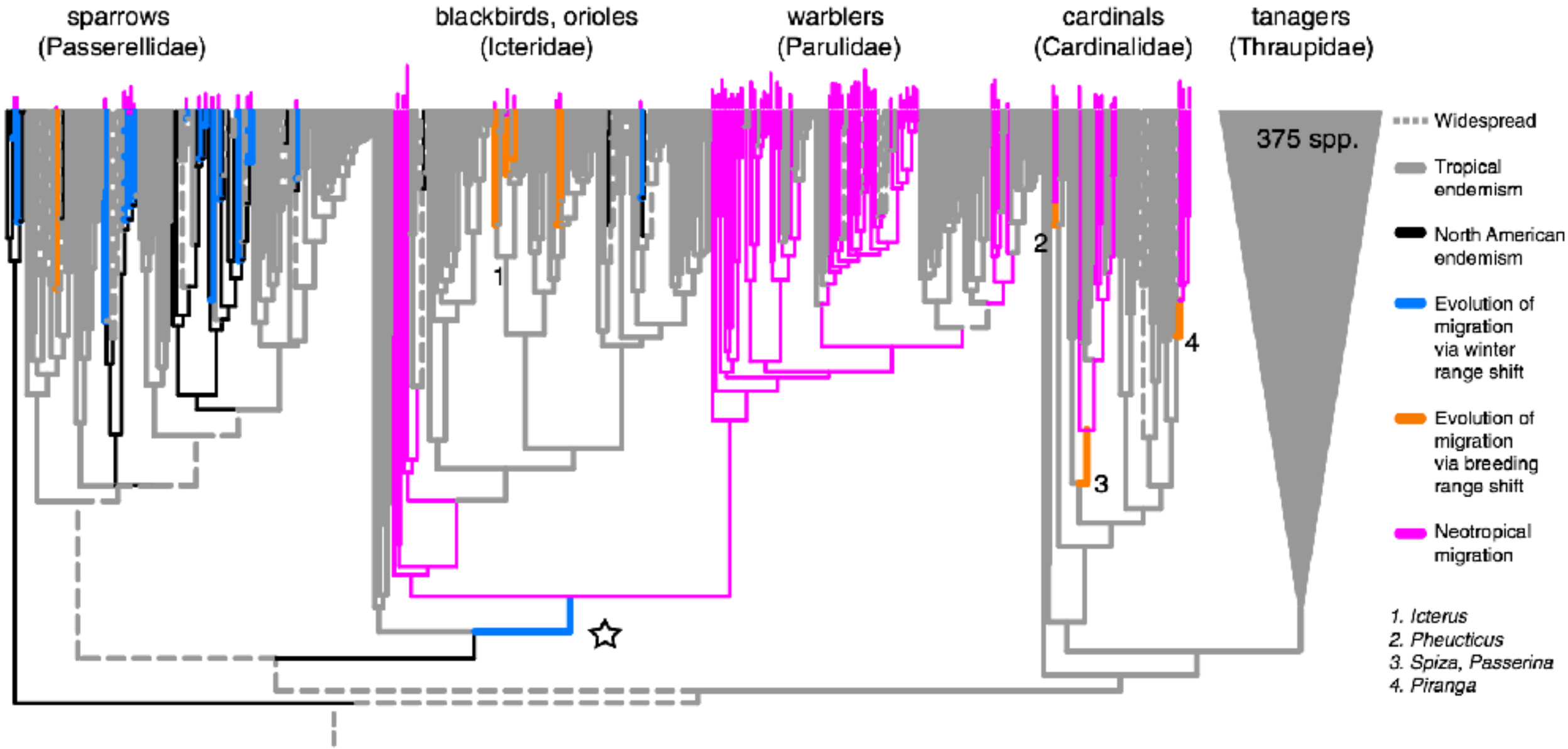
~830 spp

120 migrantes Neotropicais



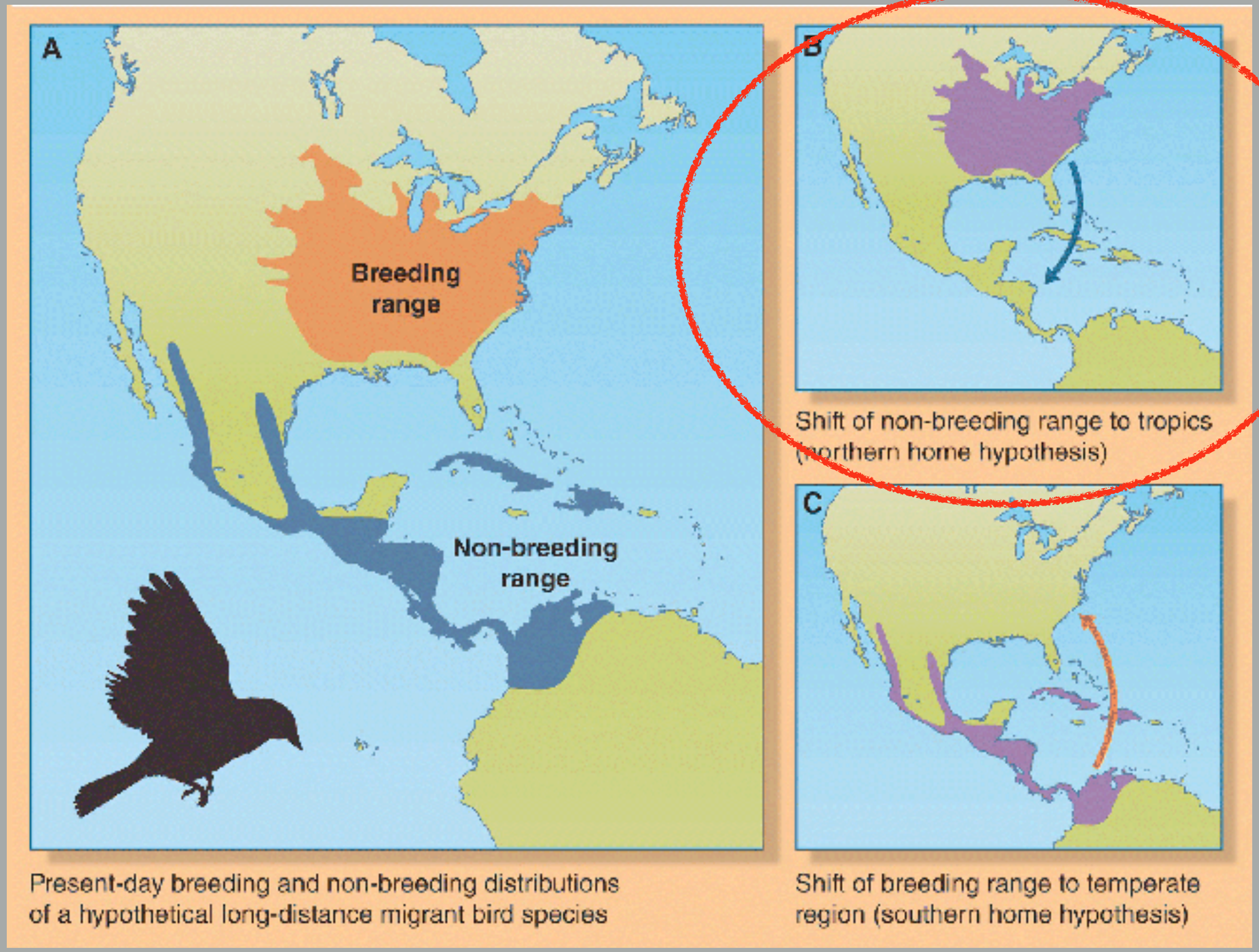
Winger et al. (2014)

Modelo filogenético para inferir história biogeográfica



Winger et al. (2014)

Modelo filogenético para inferir história biogeográfica



Winger et al. (2014)

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ECOLO-GIA

ANATO-MIA

EVOLU-ÇÃO

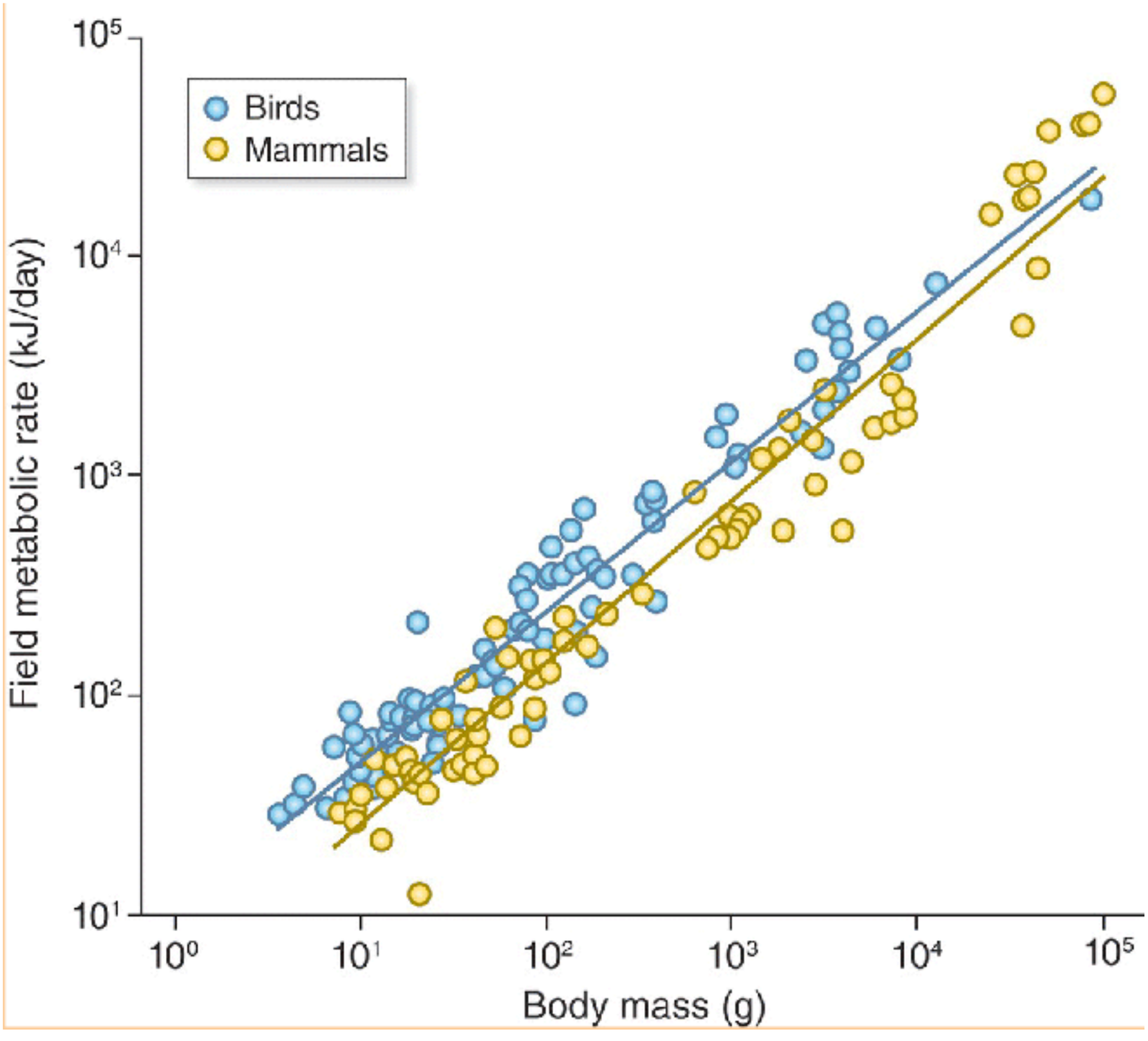
REPRO-DUÇÃO

COMPOR-TAMENTO

VOO

ALGUMA FISIO-LOGIA

Metabolismo



Metabolismo

Taxa metabólica basal = $73,5(\text{massa em kg})^{0,734}$

Metabolismo

Taxa metabólica basal = $73,5(\text{massa em kg})^{0,734}$

~122 kcal/dia

Metabolismo

Taxa metabólica basal
= 57,2(massa em kg)^{0,716}

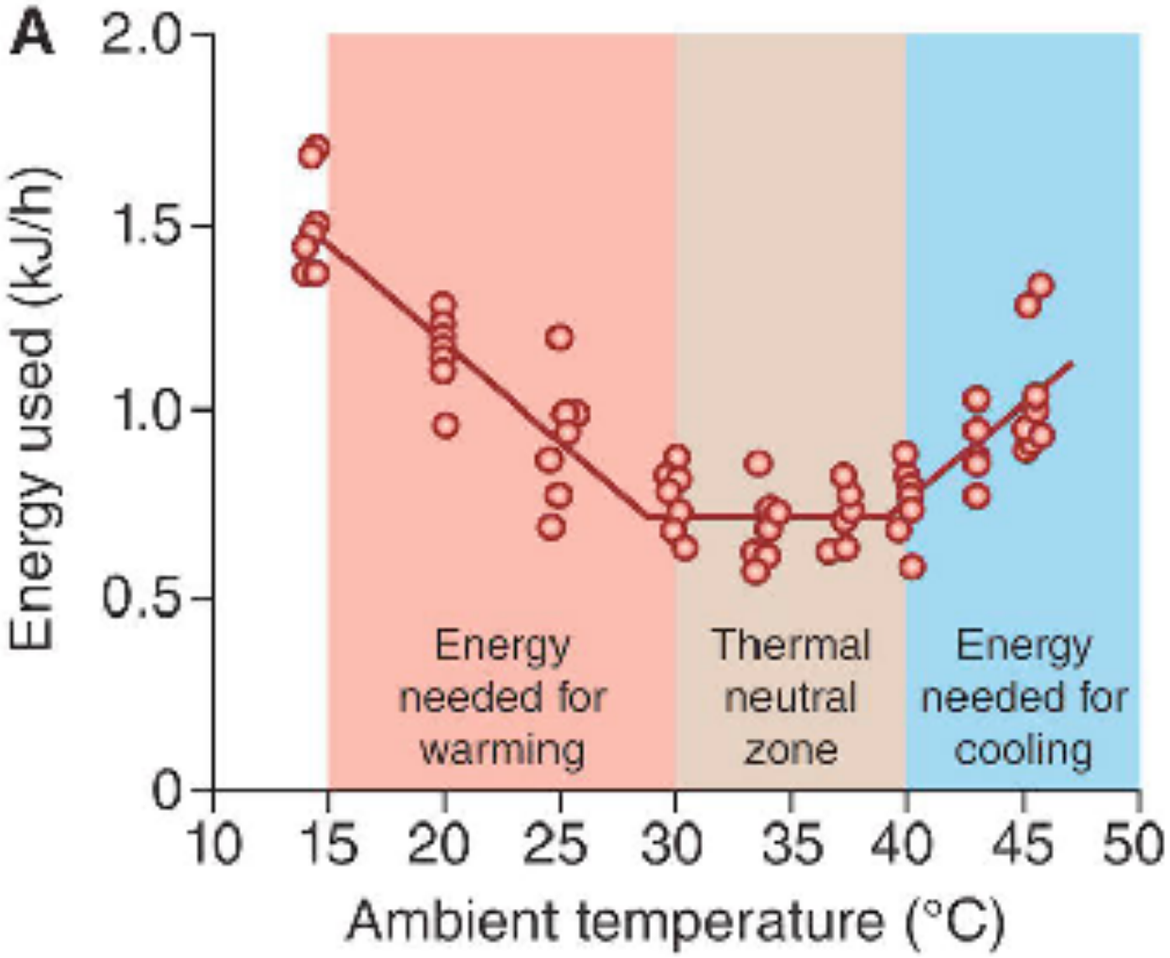
Metabolismo

Taxa metabólica basal
= 57,2(massa em kg)^{0,716}

~94 kcal/dia

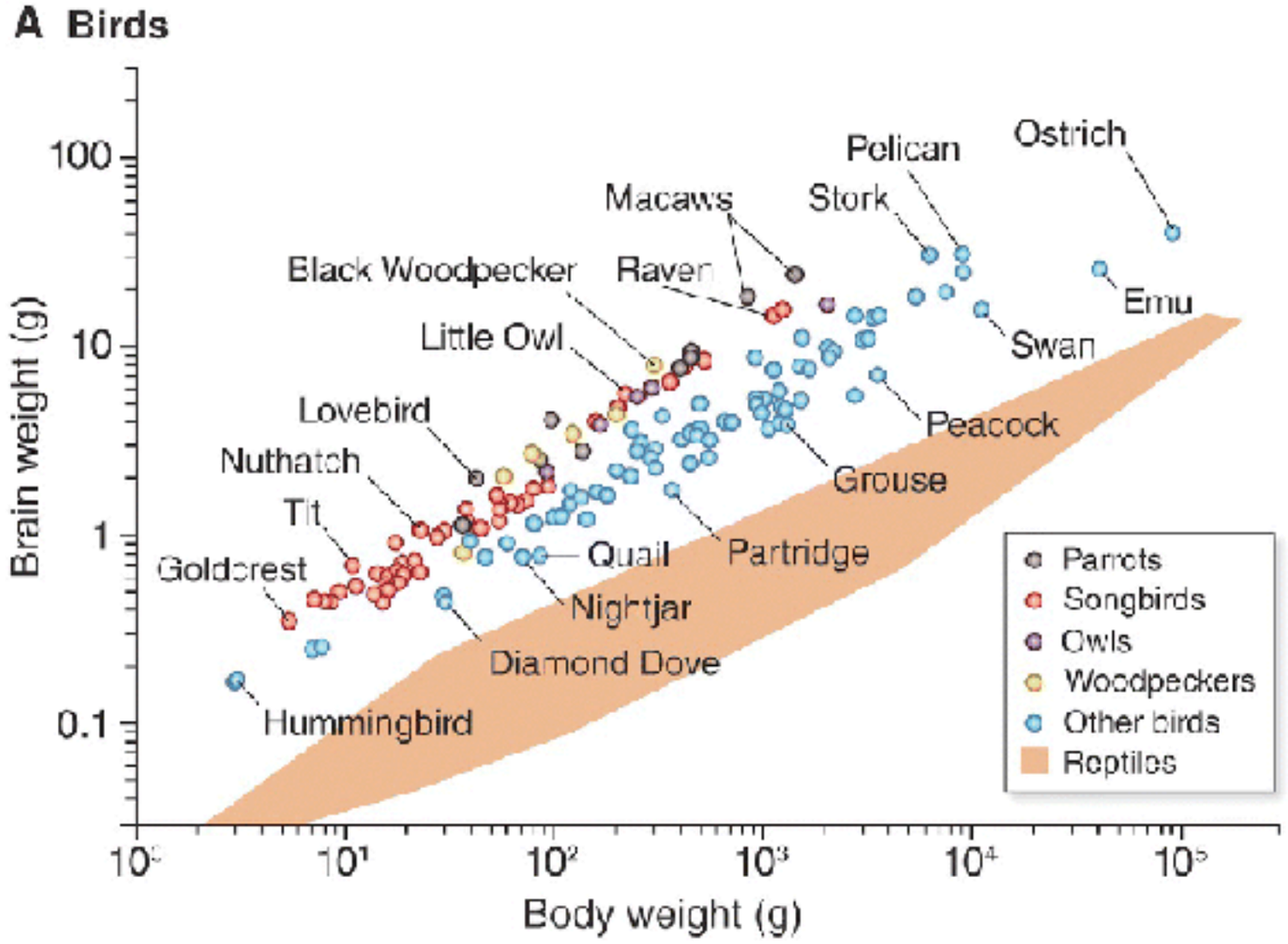
~ Δ25%

Temperatura/ termorregulação

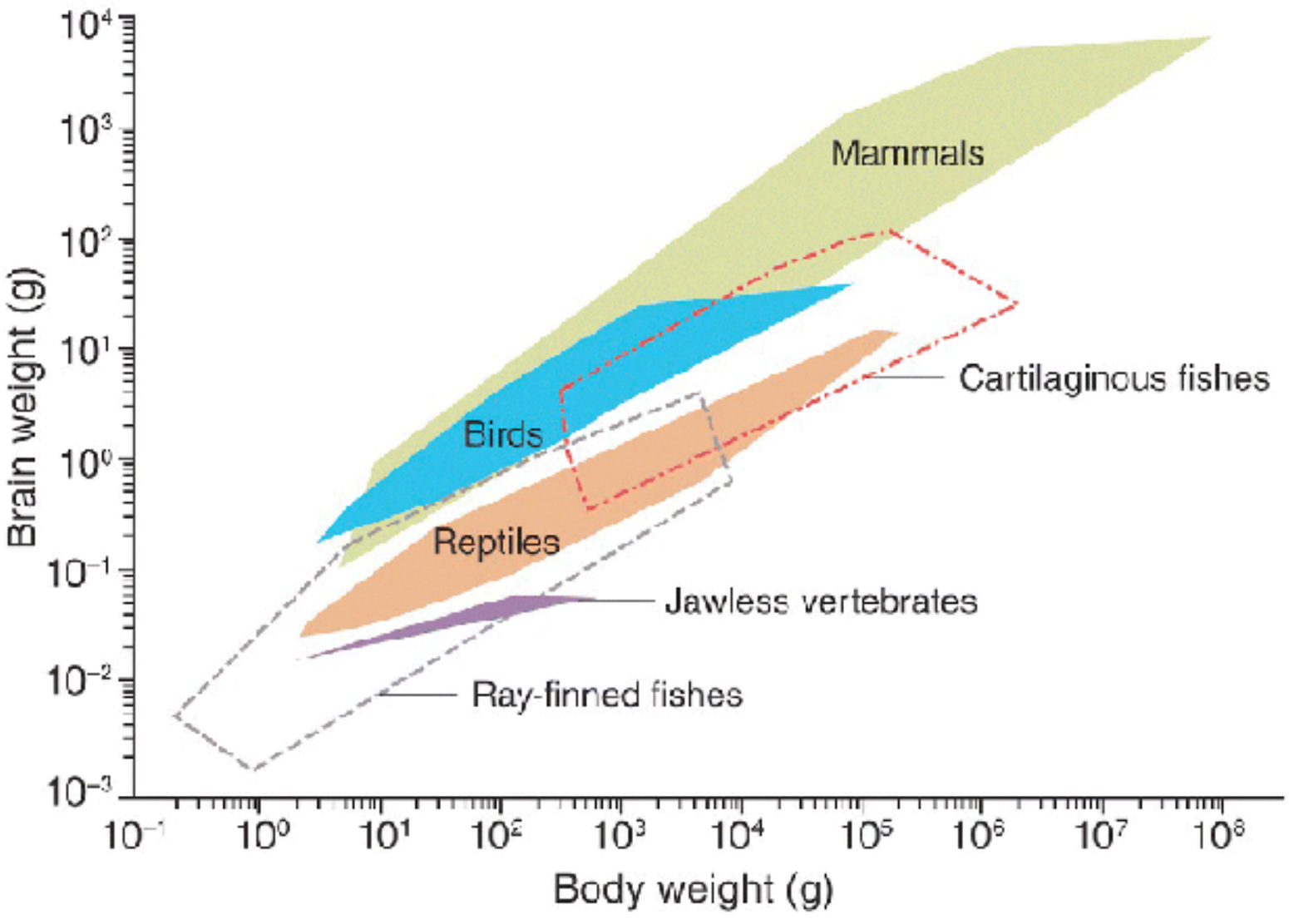


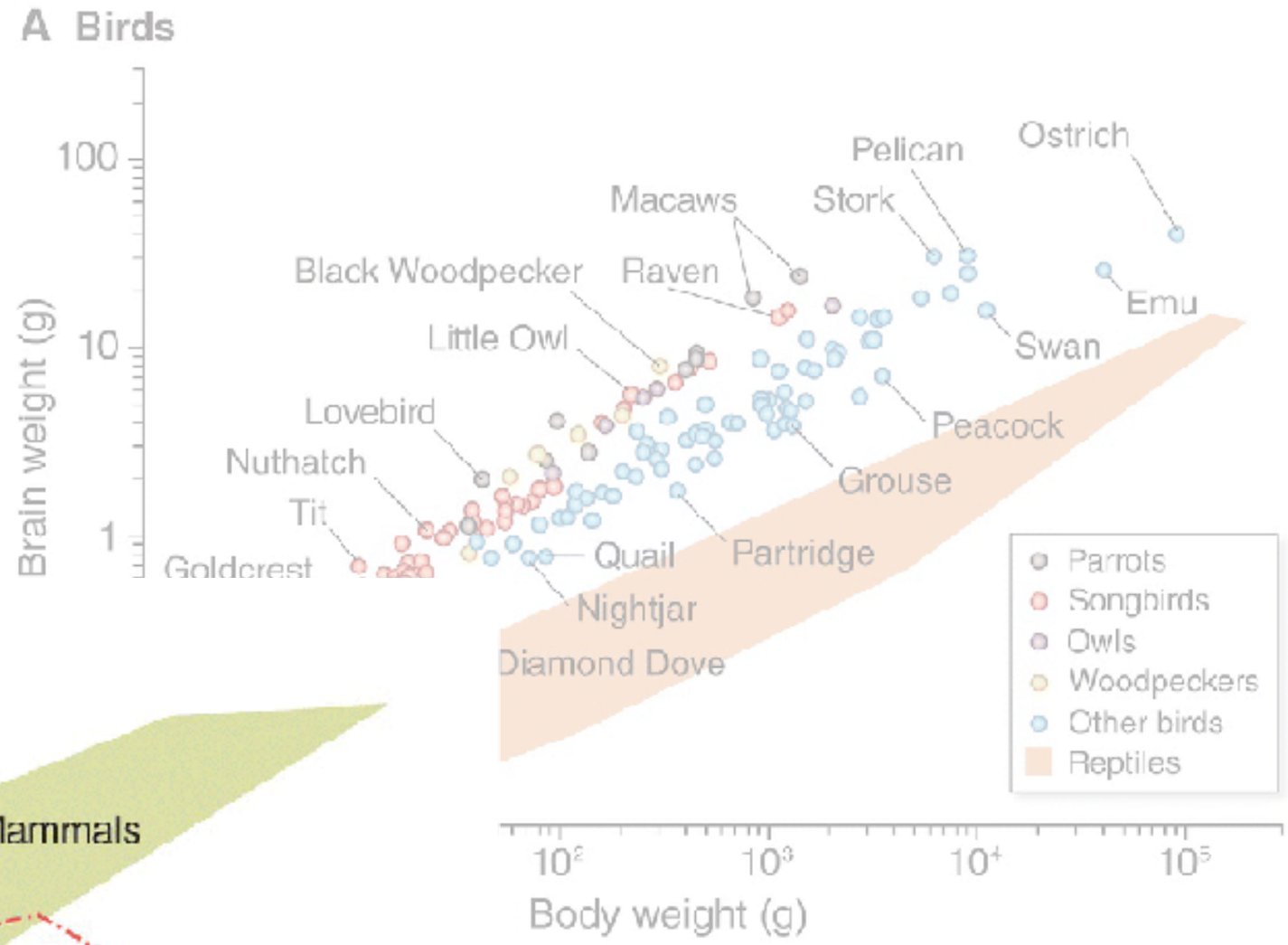
~39–43°C

Cérebro


A Birds
Brain weight (g)
100
10
1
0.1
Ostrich
Pelican
Stork
Macaws
Emu
Raven
Black Woodpecker
Swan
Little Owl
Lovebird
Peacock
Nuthatch
Grouse
Tit
Quail
Partridge
Goldcrest
Nightjar
Diamond Dove
Hummingbird
Parrots
Songbirds
Owls
Woodpeckers
Other birds
Reptiles
10⁰
10¹
10²
10³
10⁴
10⁵
Body weight (g)

Cérebro


B Minimum convex polygons
Brain weight (g)
Body weight (g)
Mammals
Birds
Reptiles
Cartilaginous fishes
Jawless vertebrates
Ray-finned fishes


A Birds
Brain weight (g)
Body weight (g)
Ostrich
Pelican
Macaws
Stork
Black Woodpecker
Raven
Emu
Little Owl
Swan
Lovebird
Peacock
Nuthatch
Grouse
Tit
Quail
Partridge
Goldcrest
Nightjar
Diamond Dove
Parrots
Songbirds
Owls
Woodpeckers
Other birds
Reptiles

Cérebro

PNAS

Birds have primate-like numbers of neurons in the forebrain

Seweryn Olkowicz[a], Martin Kocourek[a], Radek K. Lučan[a], Michal Porteš[a], W. Tecumseh Fitch[b], Suzana Herculano-Houzel[c,d,1], and Pavel Němec[a,2]

[a]Department of Zoology, Faculty of Science, Charles University in Prague, CZ-12844 Prague, Czech Republic; [b]Department of Cognitive Biology, University of Vienna, 1090 Vienna, Austria; [c]Instituto de Ciências Biomédicas, Universidade Federal do Rio de Janeiro, CEP 21941-902, Rio de Janeiro, Brazil; and [d]Instituto Nacional de Neurociência Translacional, Ministério da Ciência e Tecnologia/Conselho Nacional de Pesquisas, CEP 04023-900, São Paulo, Brazil

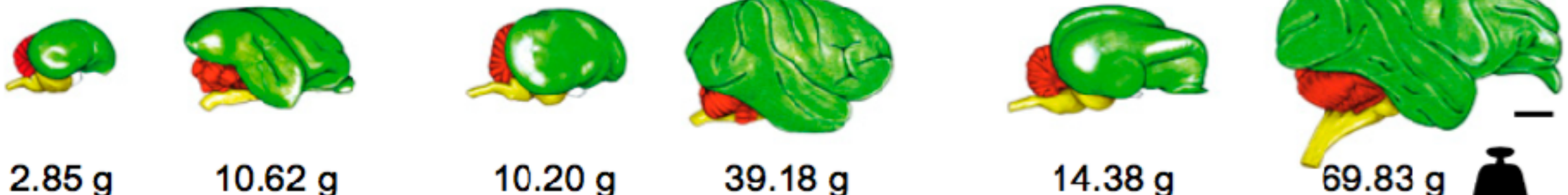
Edited by Dale Purves, Duke University, Durham, NC, and approved May 6, 2016 (received for review August 27, 2015)

Cérebro

Birds have primate-like numbers of neurons in the forebrain

G

Eurasian Jay | Owl Monkey | Raven | Capuchin Monkey | Blue-and-yellow Macaw | Macaque monkey

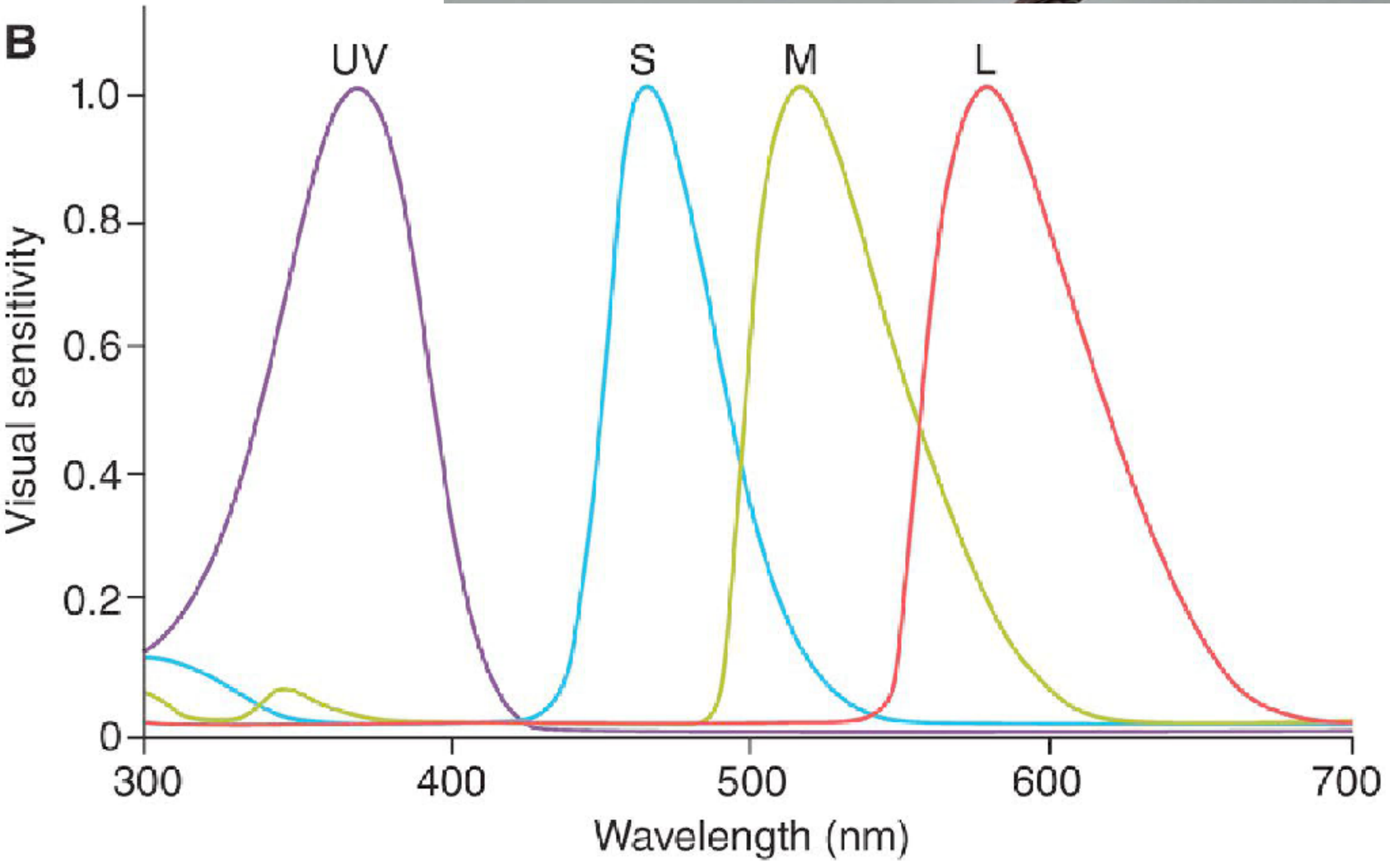


2.85 g | 10.62 g | 10.20 g | 39.18 g | 14.38 g | 69.83 g

# of neurons: 529 | 442 | 1,204 | 1,140 | 1,917 | 1,710 x10⁶

Visão

Visão


B
UV
S
M
L
1.0
0.8
0.6
0.4
0.2
0
Visual sensitivity
300
400
500
600
700
Wavelength (nm)

Parasitismo de ninho

Parasitismo de ninho

Great Reed Warbler

Redstart

Fig. 14.21 Parasitic cuckoo versus host eggshell variation. Female Common Cuckoos (*Cuculus canorus*) produce eggs that look strikingly similar to their host species (arrows point to the cuckoo eggs in each host nest). Spot pattern and background color are the most important characteristics to mimic.

Parasitismo de ninho

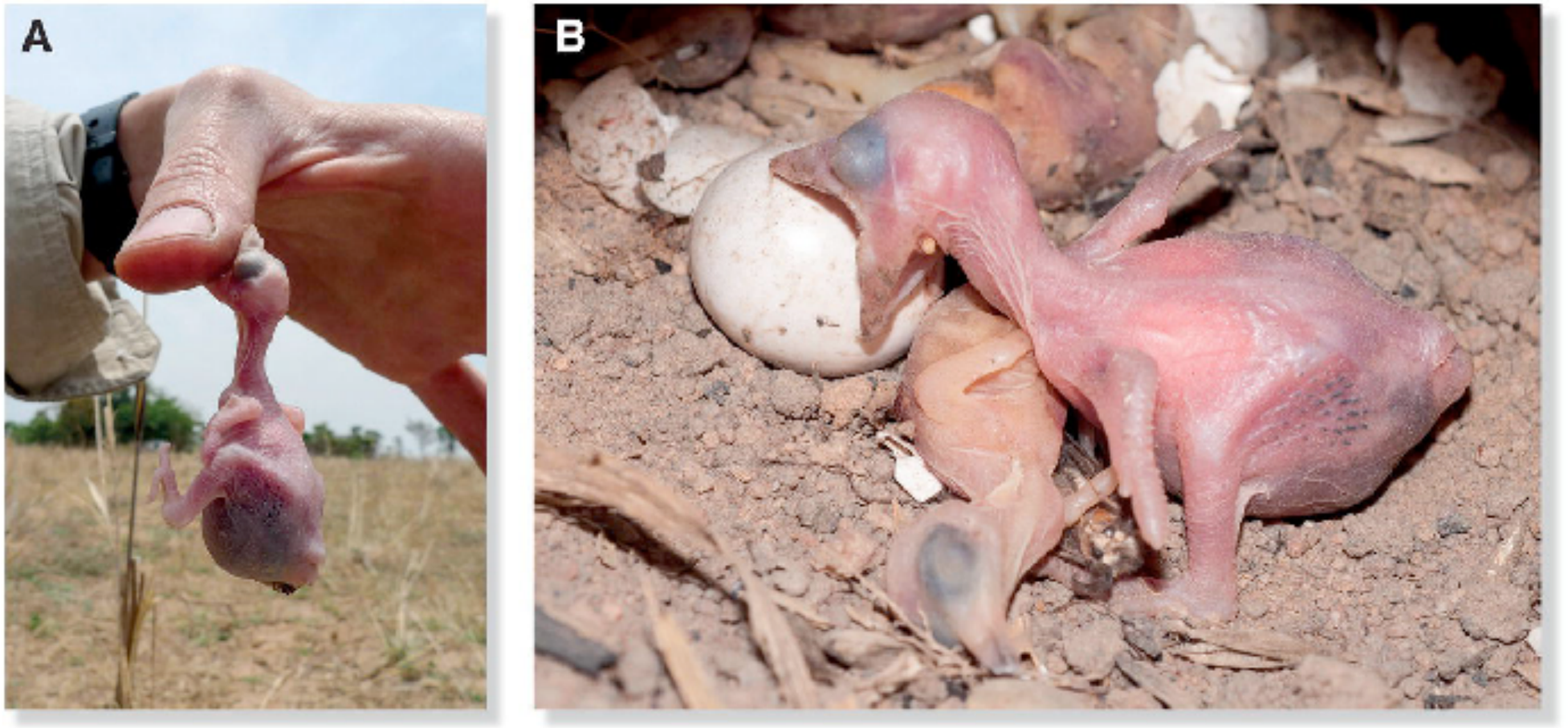


Fig. 14.23 Adaptations for killing host nestlings. (A) Greater Honeyguide (*Indicator indicator*) nestlings hatch with razor-sharp "bill-teeth," giving them amazing grip strength. (B) As brood parasites, Greater Honeyguide nestlings use these bill-teeth as weapons, puncturing host eggs and killing host nestlings to gain maximum resources for themselves.

Indicator indicator

Parasitismo de ninho

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Fig. 14.24 Brood parasite chick eliminating competition. Hours after hatching, a parasitic African Cuckoo (*Cuculus gularis*) nestling pushes the last of its host species' eggs out of the nest.

(Photograph by Claire Spottiswoode.)

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Mutualismo

Mutualismo

Indicator indicator

Mutualismo

Indicator indicator

Mutualismo

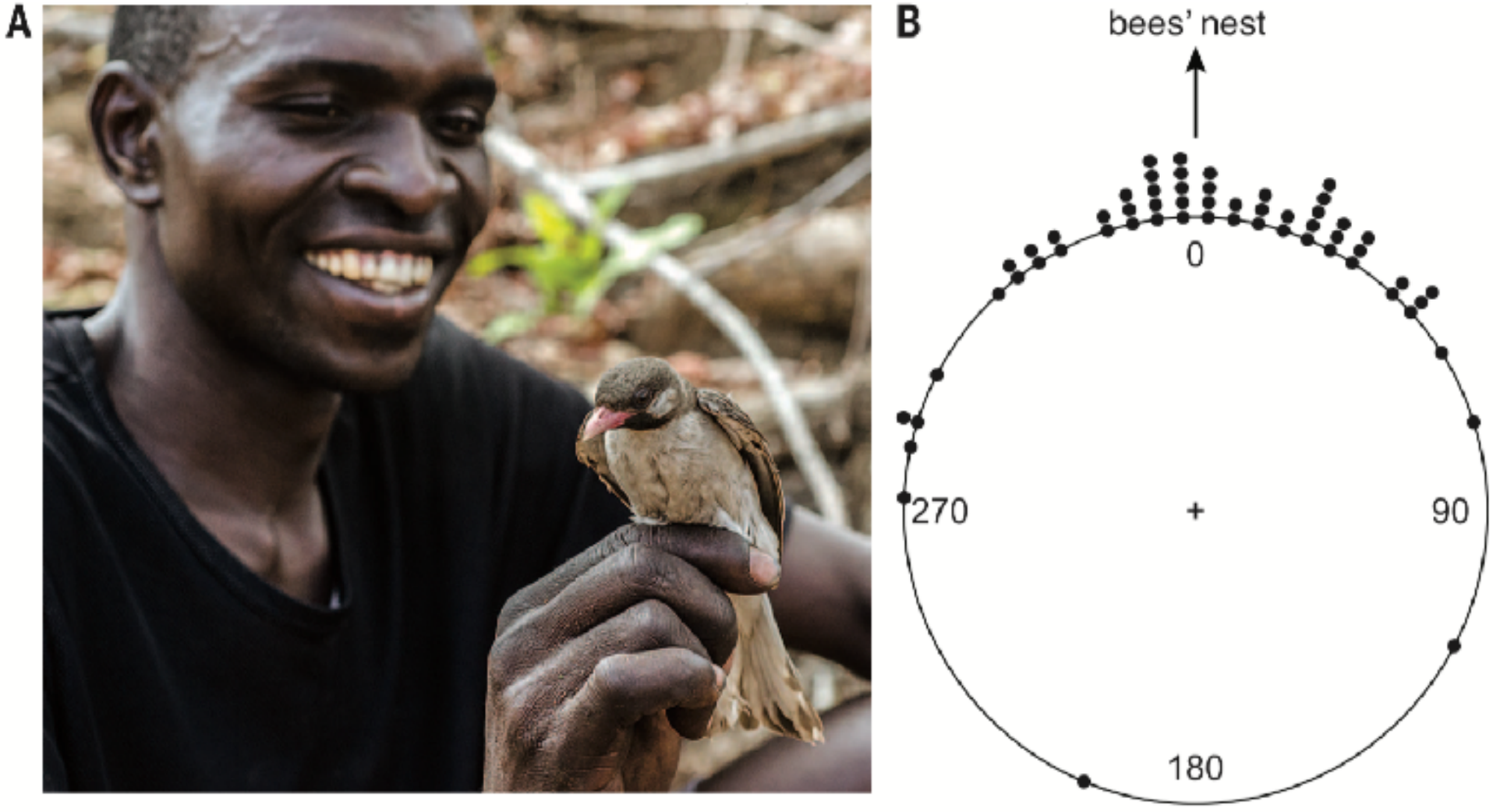

Fig. 1. Greater honeyguides accurately lead humans to bees' nests. (**A**) A Yao honey-hunter and a wild, free-living honeyguide. (This bird was captured using a researcher's mist-net and is neither tame nor habitually captive.) (**B**) Accuracy of honeyguide initial guiding behavior in relation to direction of successfully located bees' nests. Points represent the difference in bearing between initial guiding trajectory over the first 40 m of travel and the ultimate direction of the bees' nest (here set at 0) and are binned into 5° intervals. Each point represents a journey (n = 58 journeys) to a separate bees' nest that was at least 80 m away from the point where guiding began. Sometimes a honeyguide led humans to more than one nest consecutively (n = 50 guiding events). The circular distribution is unimodal (Rayleigh test, $P < 0.001$) with a mean of 1.7° (95% confidence interval includes zero: 352.3° to 11.1°), showing that honeyguide behavior offers reliable directional information to humans.

Spottiswoode et al. (2016)

Mutualismo

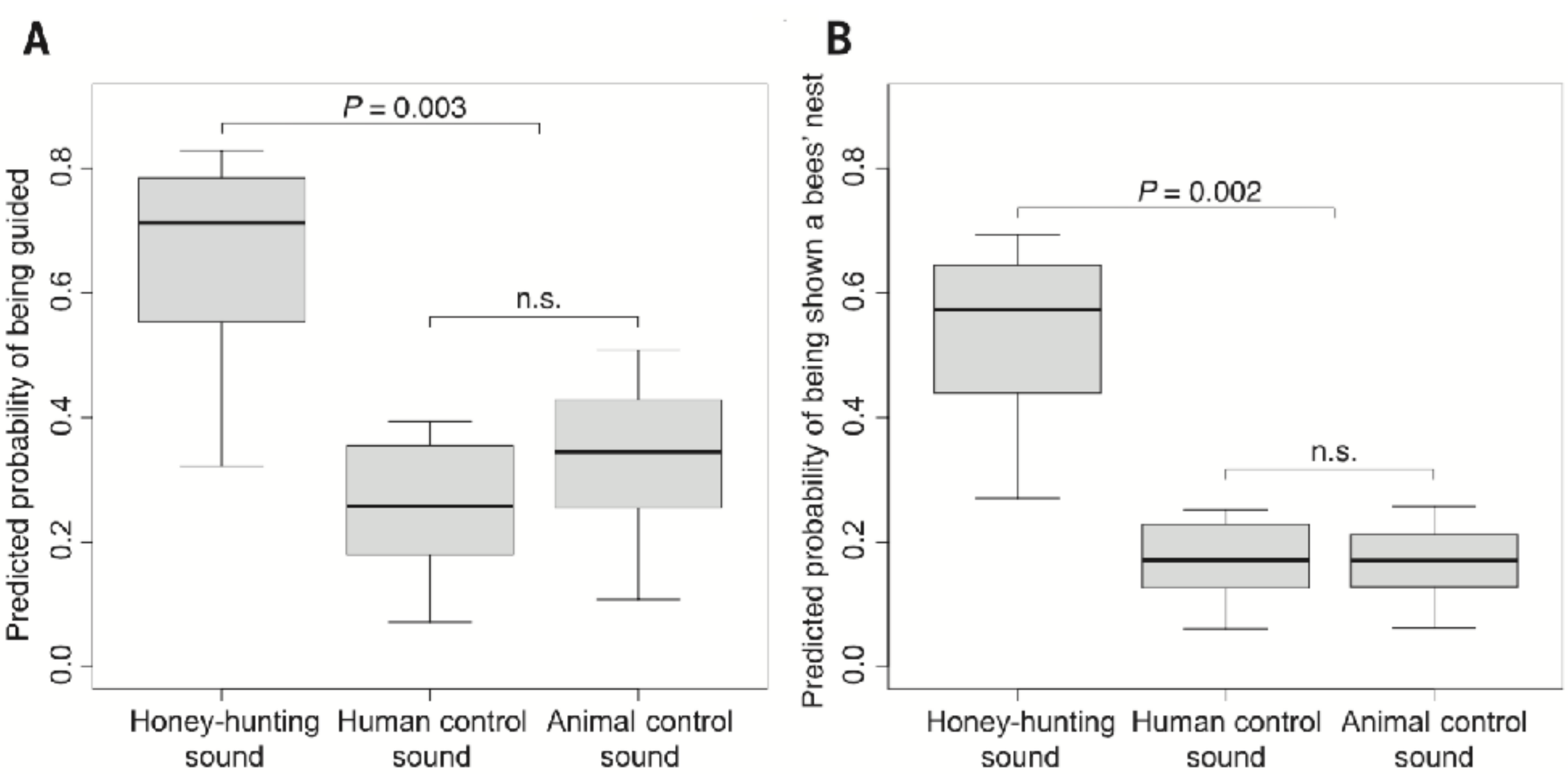

Fig. 2. Probability of a successful mutualistic interaction, in relation to experimentally given acoustic cues. Values are predicted probabilities of (**A**) being guided by a honeyguide and (**B**) being shown a bees' nest on a 15-min search, derived from a logistic model of data from experimental transects and accounting for time of day (minutes from sunrise to sunset). Boxes show medians and quartiles; whiskers show ranges (n = 24 trials per treatment group; P values show planned comparisons; n.s., not significant).

Spottiswoode et al. (2016)


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