



**WASSUP
PEOPLE**



I AM A BIRD

Aves

Eduardo S.A. Santos

eduardosantos-lab.weebly.com

20/09/2017

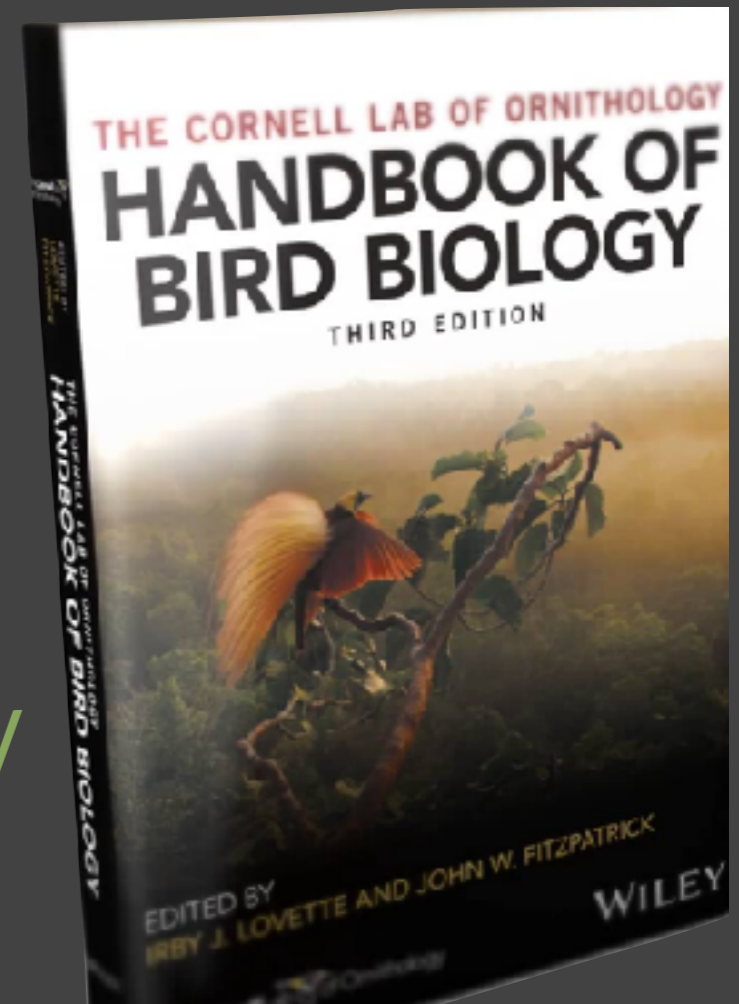
RECURSOS

HAND BOOK OF BIRD BIOLOGY

birdbiology.org

ORNITOLOGIA - MZC0017

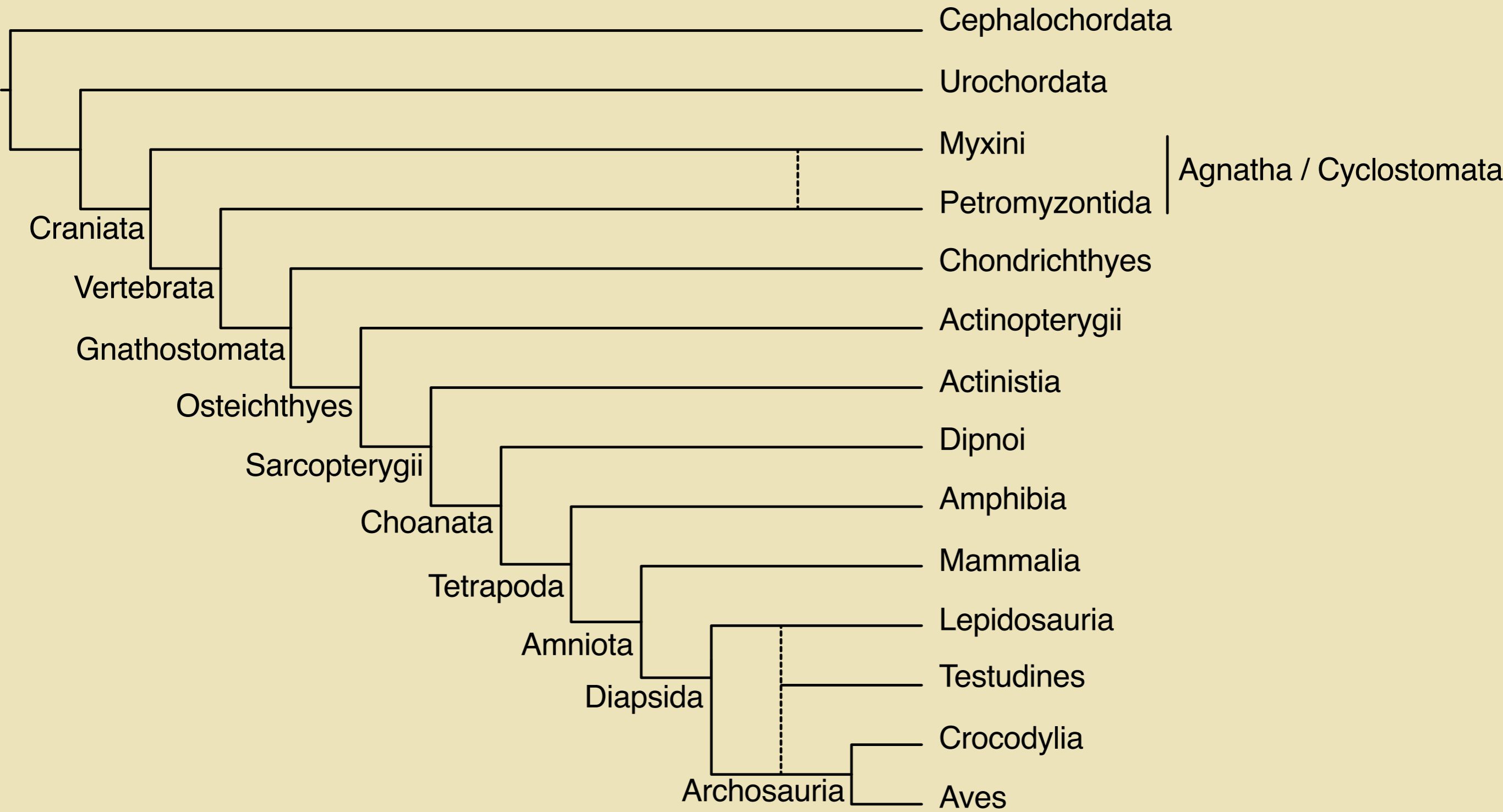
the life of birds



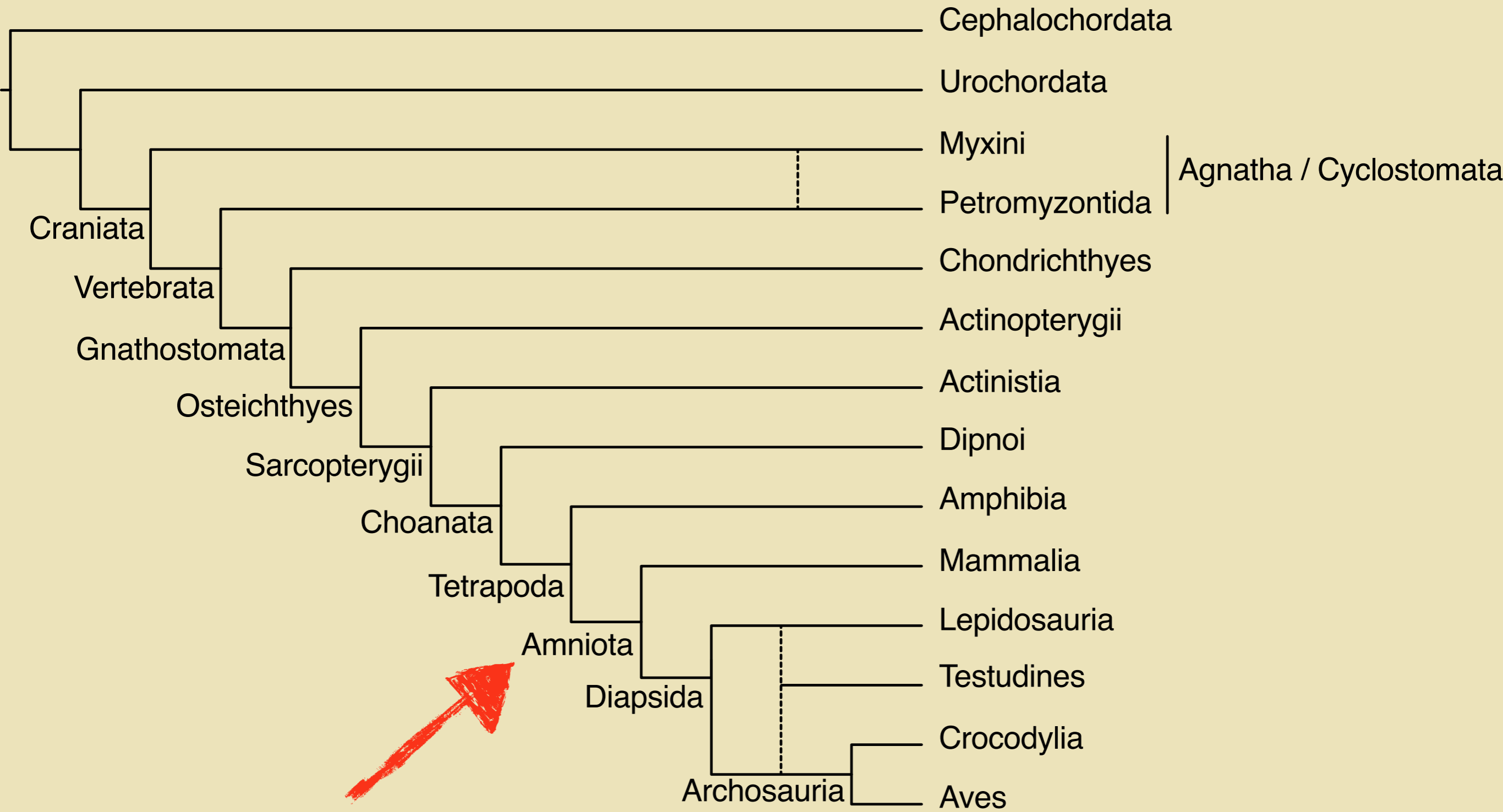




Filogenia de Chordata

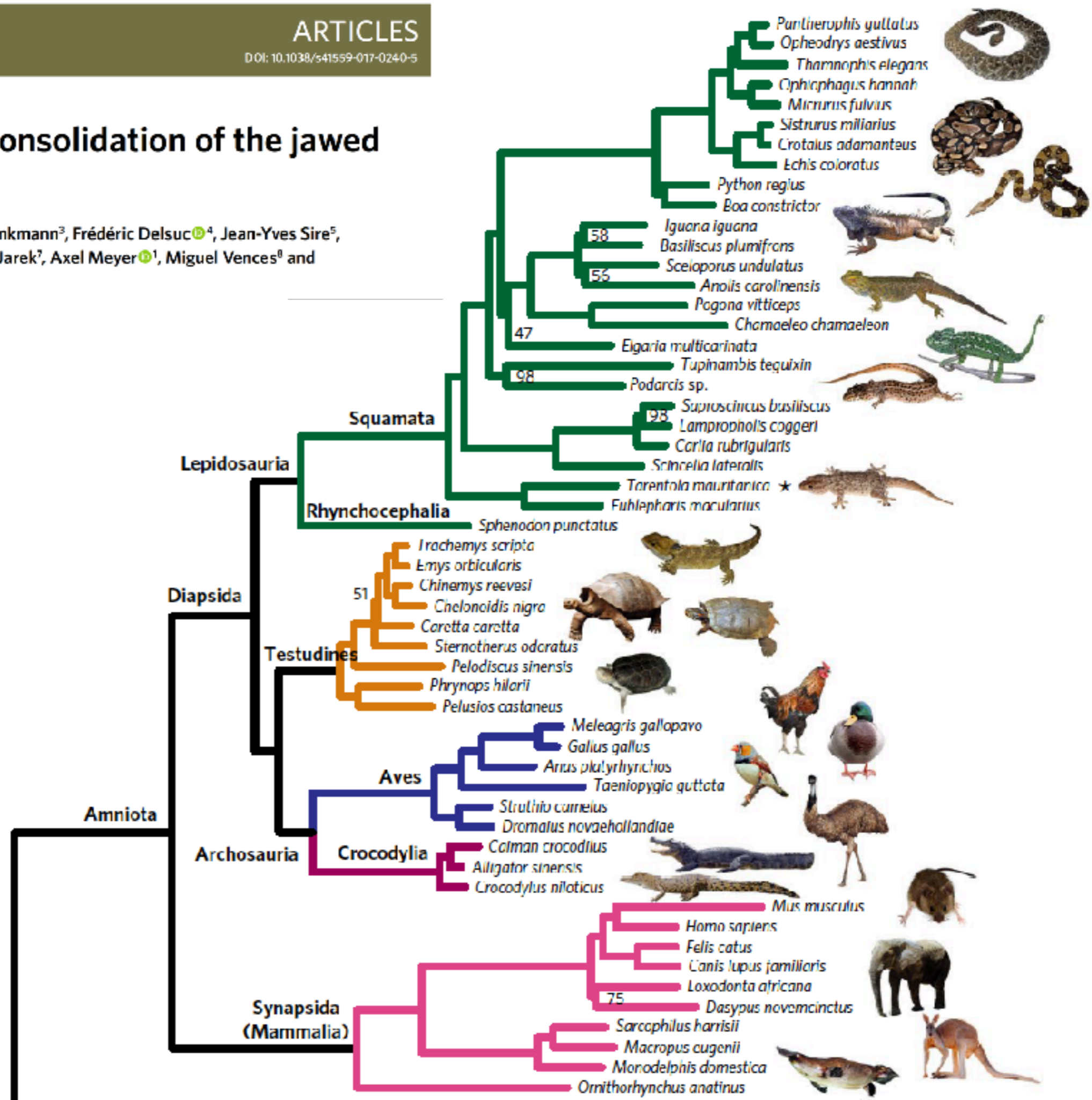


Filogenia de Chordata



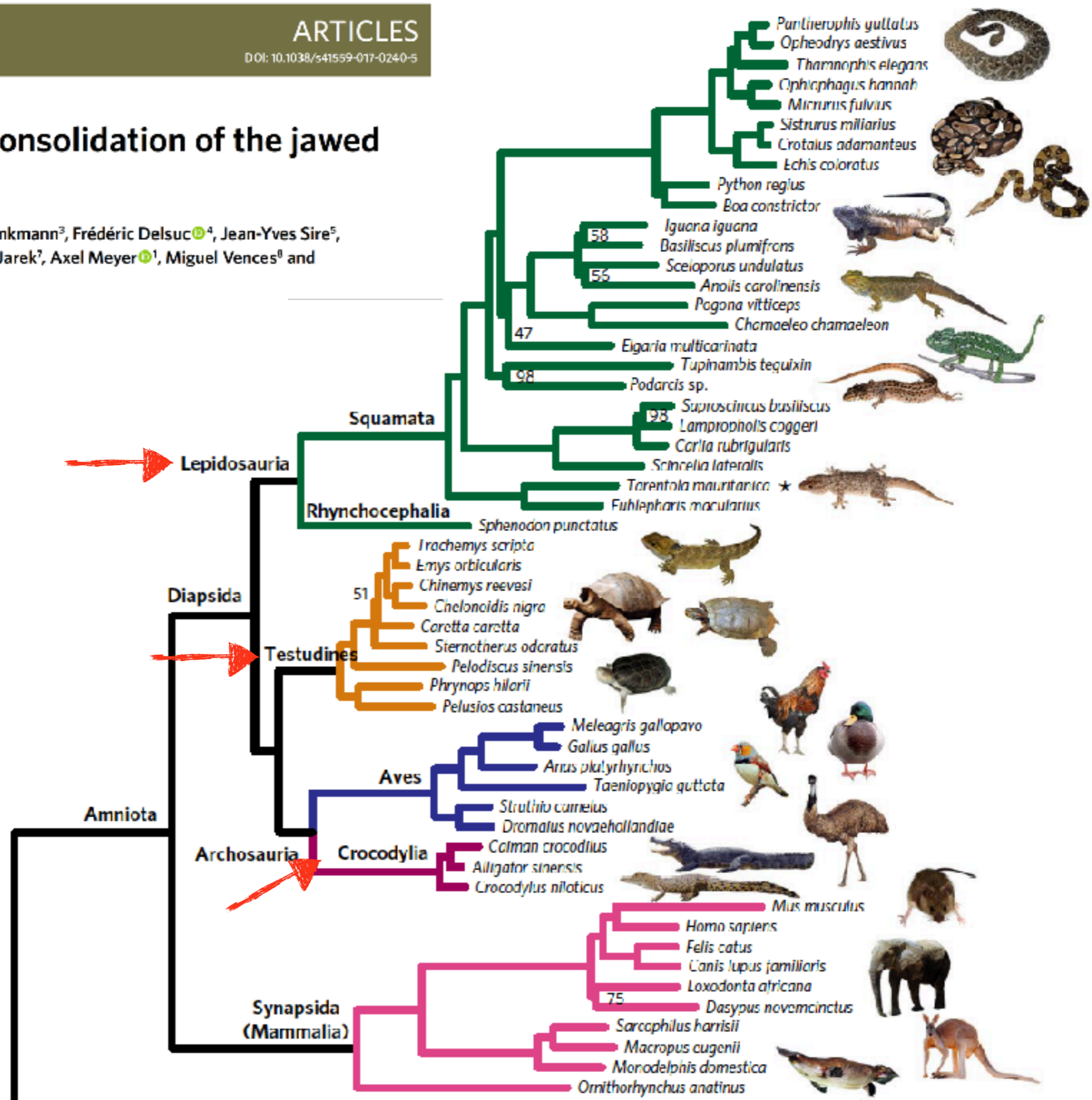
Phylotranscriptomic consolidation of the jawed vertebrate timetree

Iker Irisarri^{1,11*}, Denis Baurain², Henner Brinkmann³, Frédéric Delsuc⁴, Jean-Yves Sire⁵, Alexander Kupfer⁶, Jörn Petersen³, Michael Jarek⁷, Axel Meyer^{8,1}, Miguel Vences⁹ and Hervé Philippe^{3,10*}



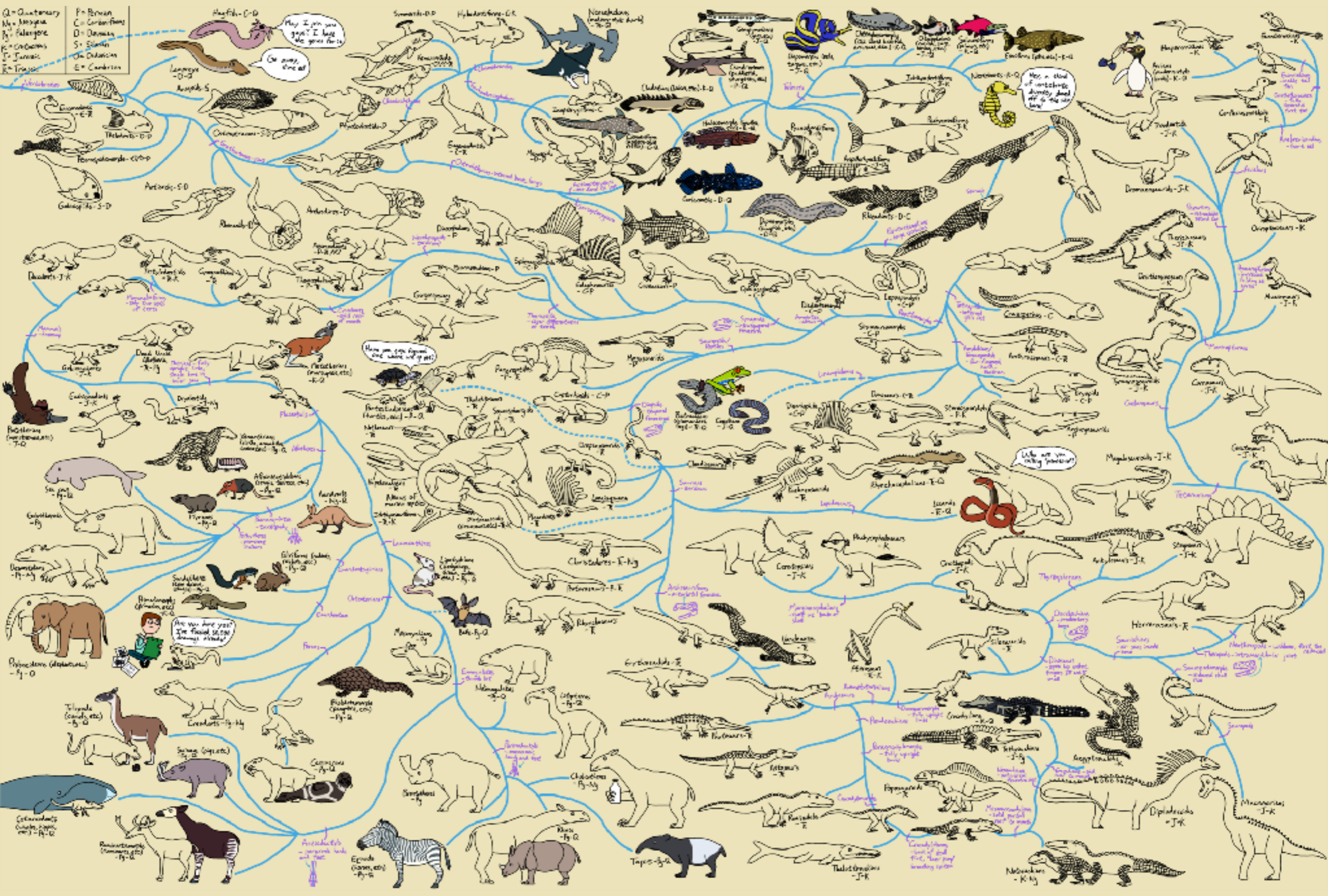
Phylotranscriptomic consolidation of the jawed vertebrate timetree

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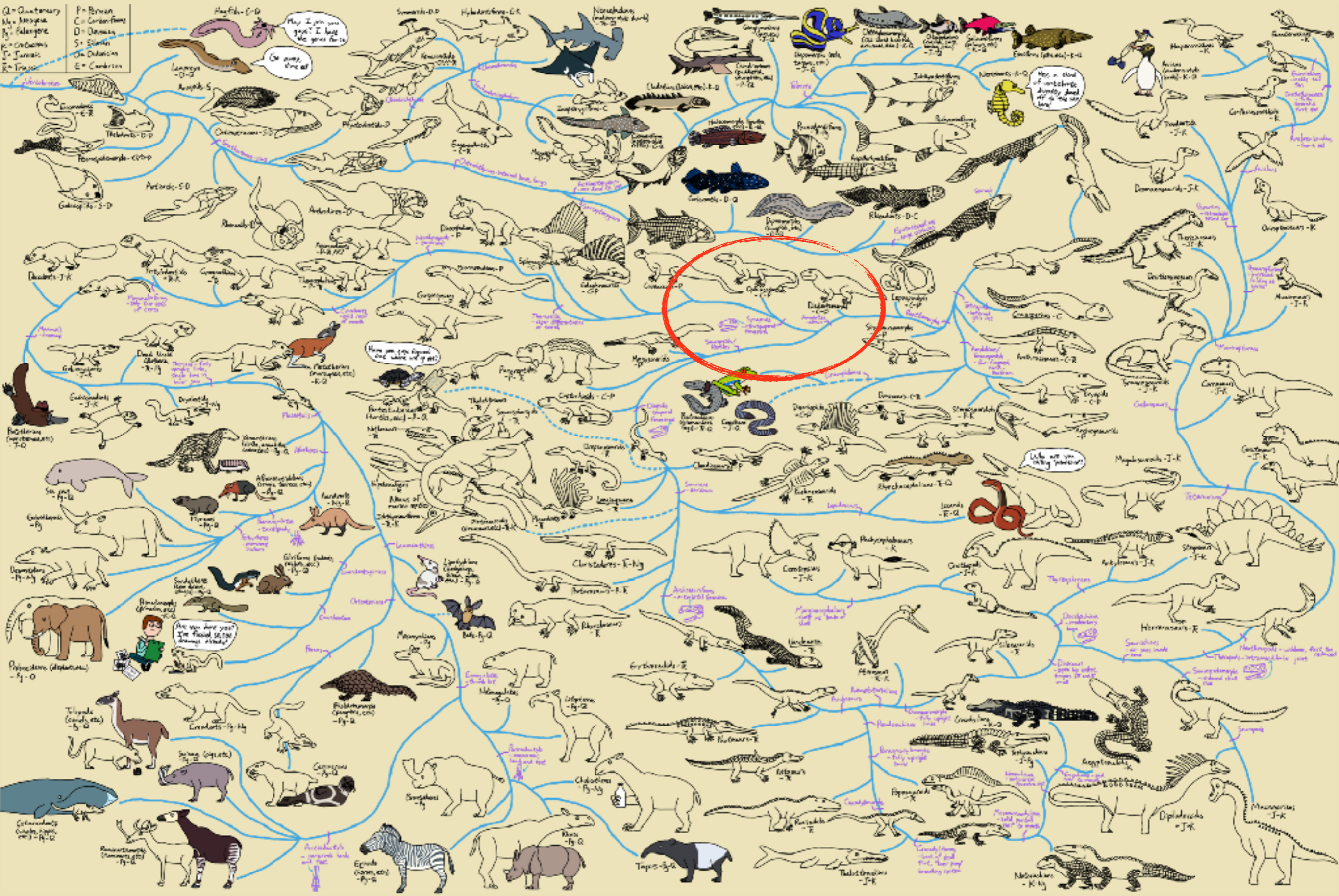


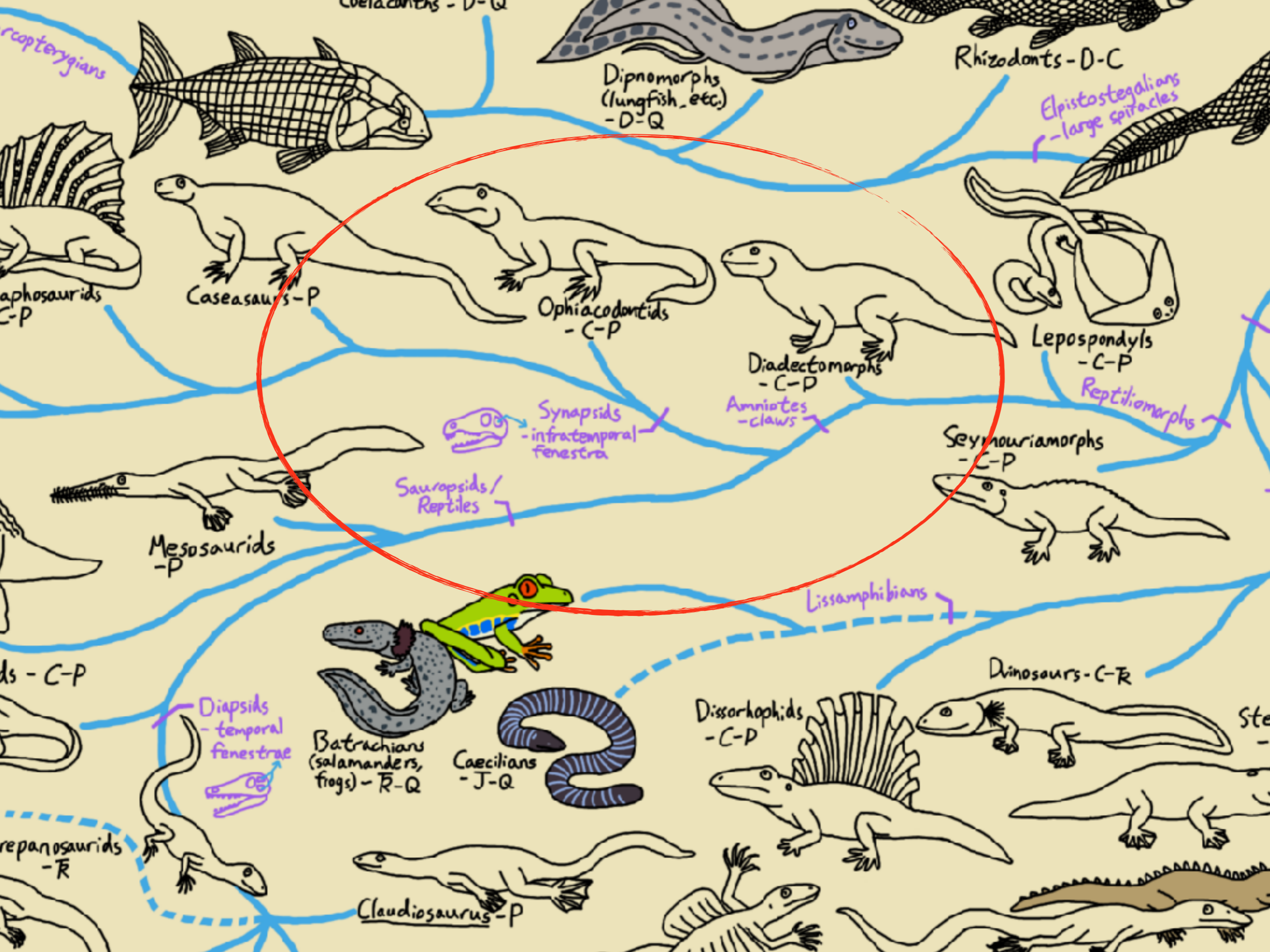
Q=Quaternary
 M=Miocene
 P=Paleogene
 K=Cretaceous
 J=Jurassic
 T=Triassic

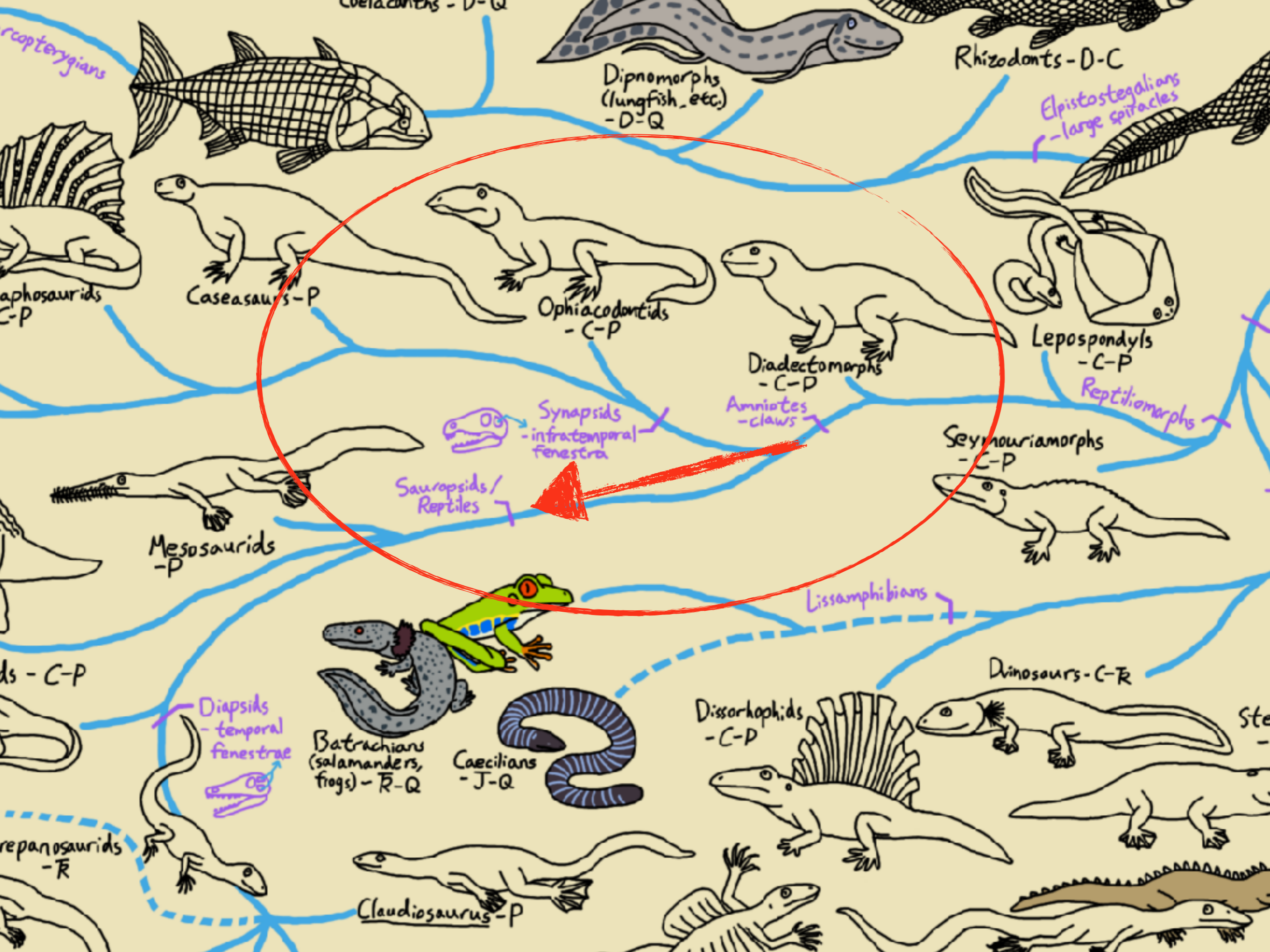
F=Forman
 C=Cambrian
 D=Devonian
 S=Silurian
 O=Ordovician
 E=Cambrian

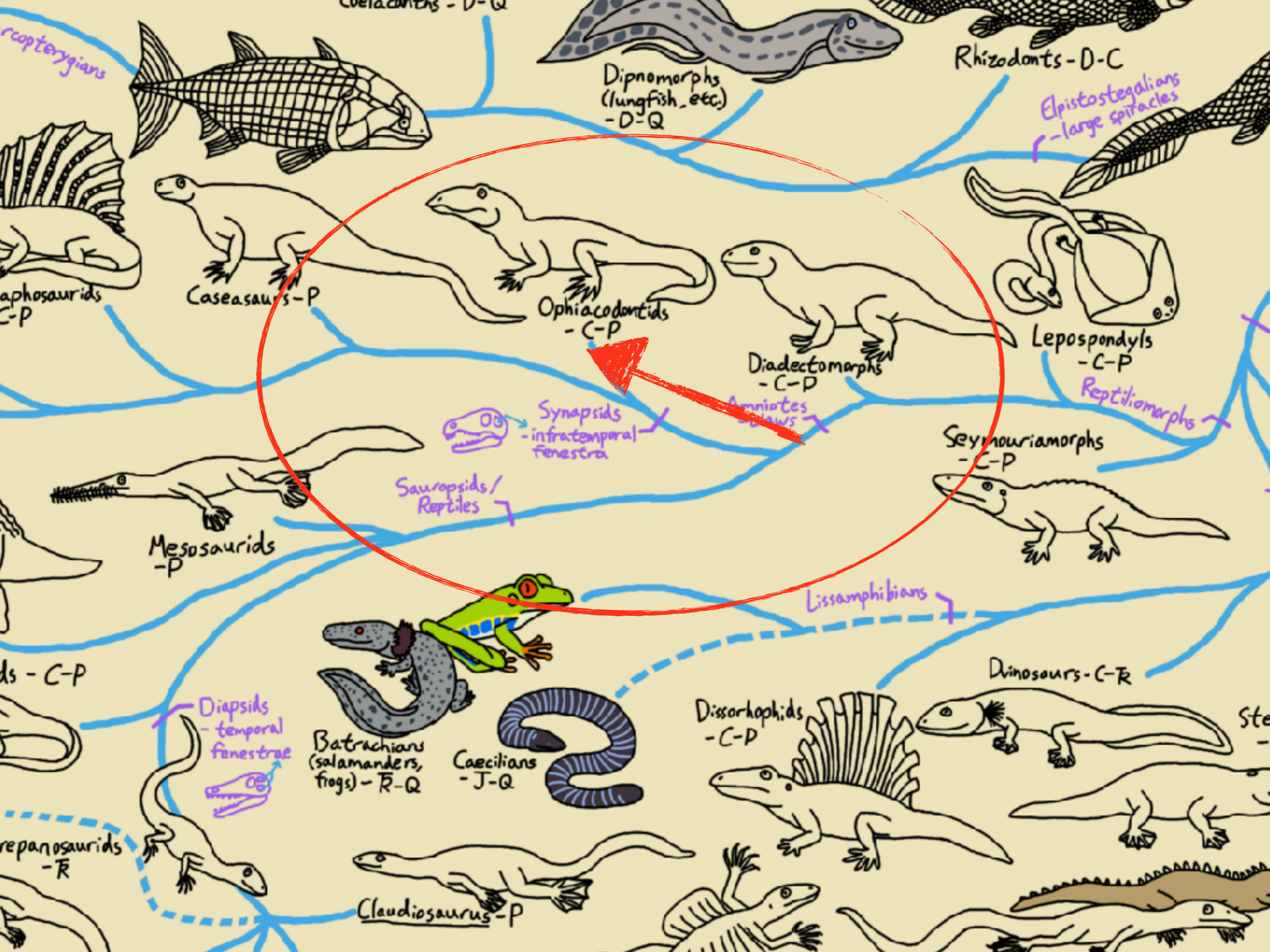


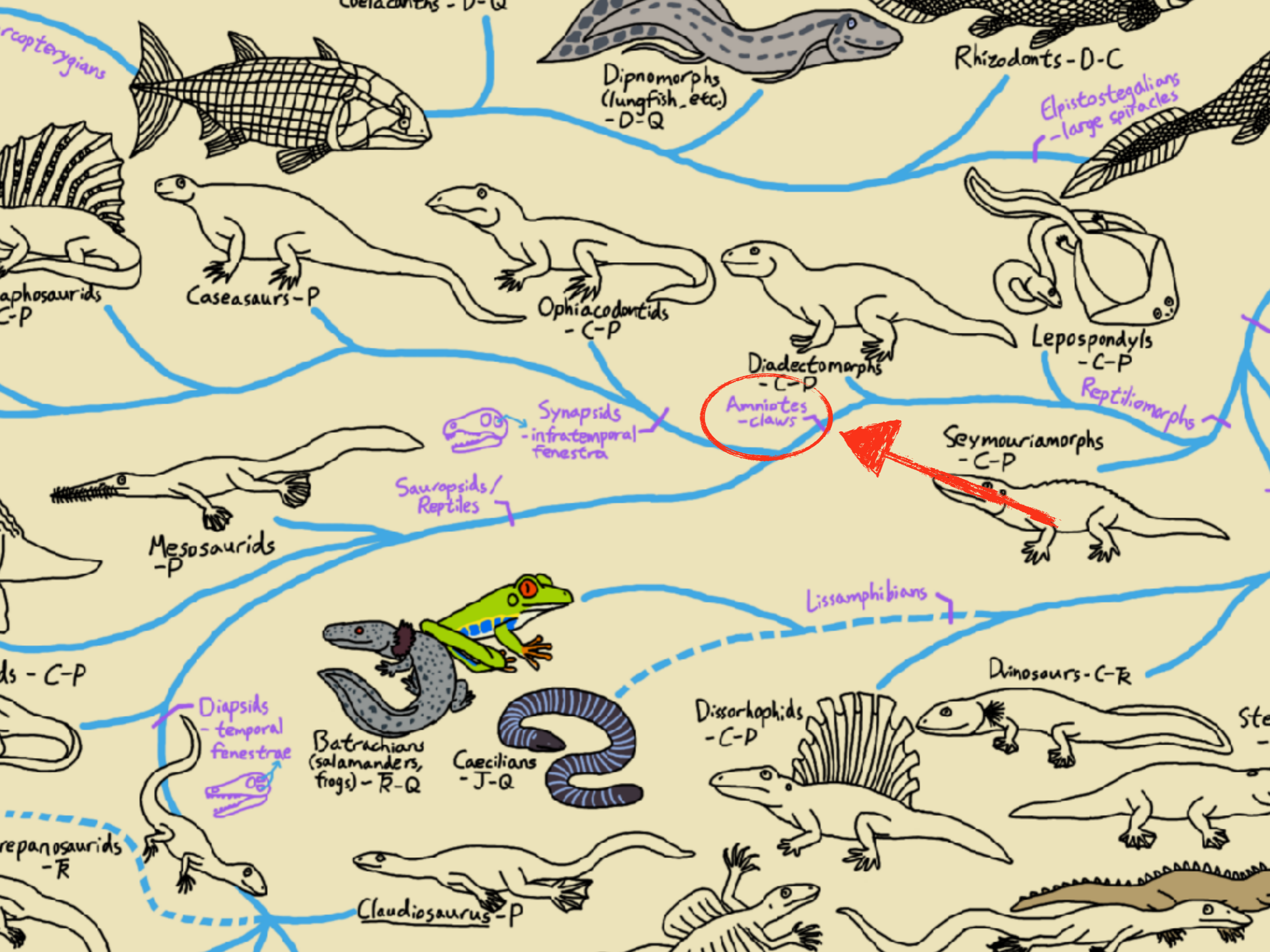
Q = Quaternary
 N = Neogene
 P = Paleogene
 C = Cretaceous
 J = Jurassic
 T = Triassic
 P = Permian
 C = Carboniferous
 D = Devonian
 S = Silurian
 O = Ordovician
 E = Cambrian











Q DIABO

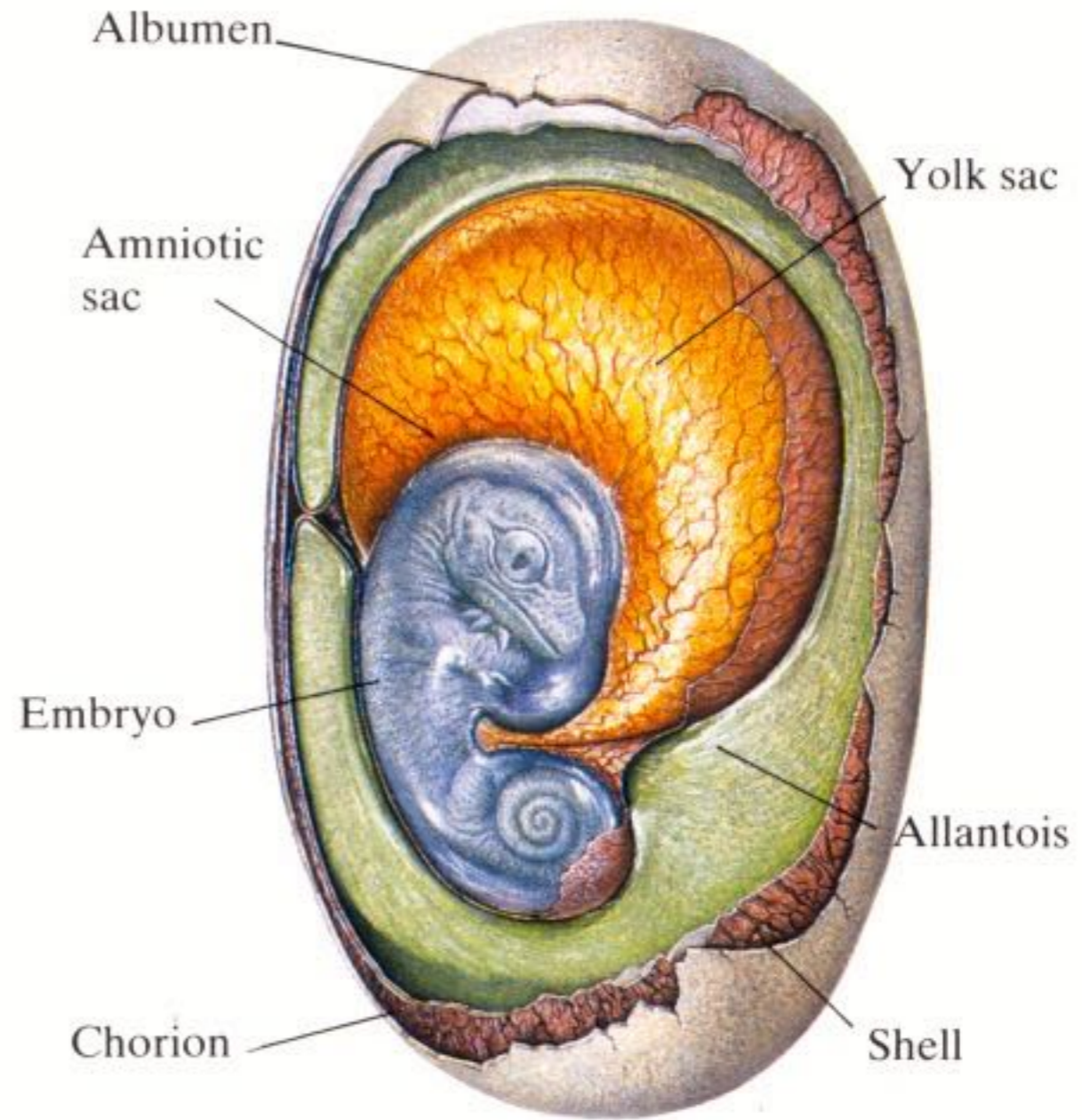
É UM...



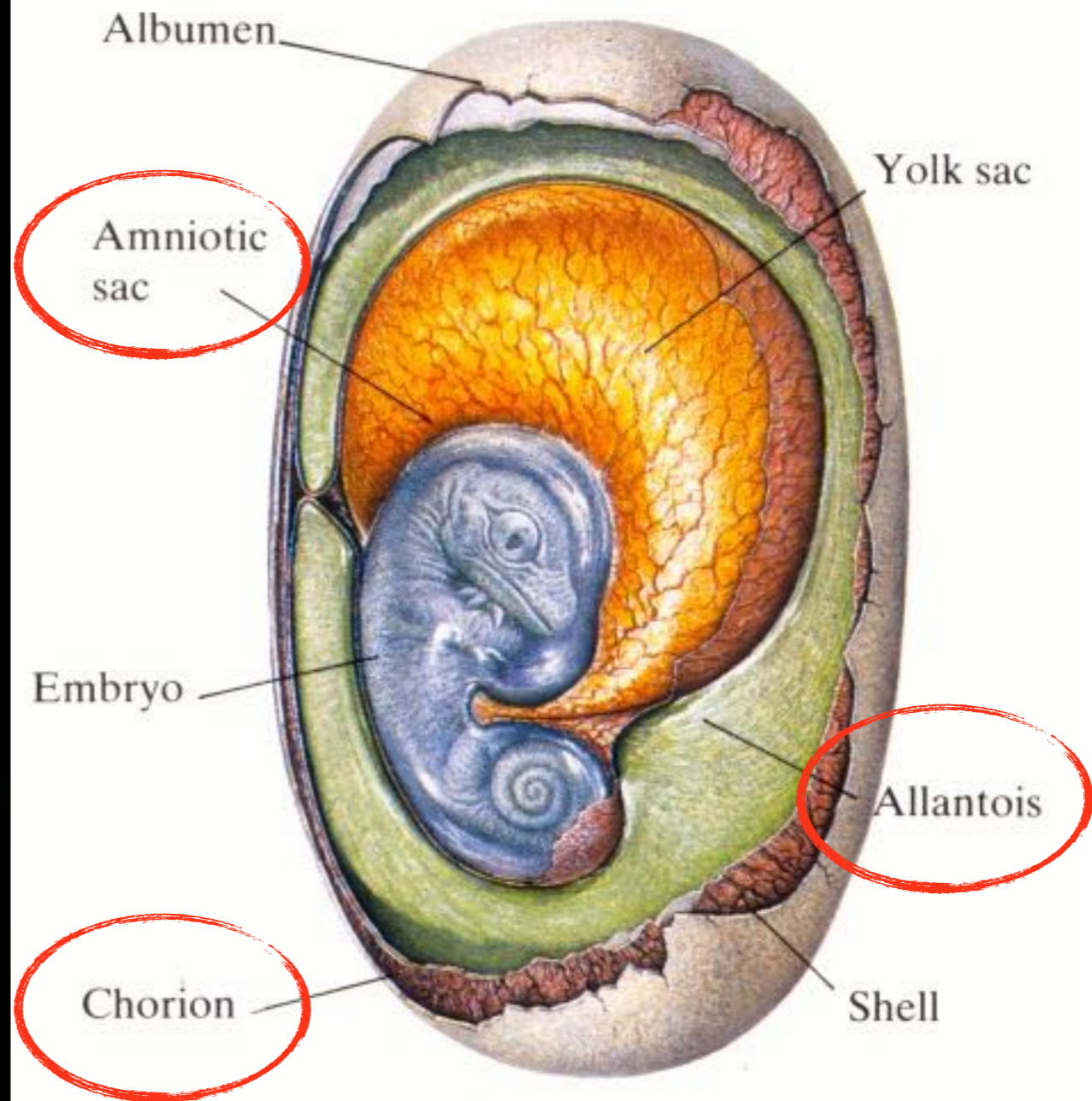
...AMNIOTA



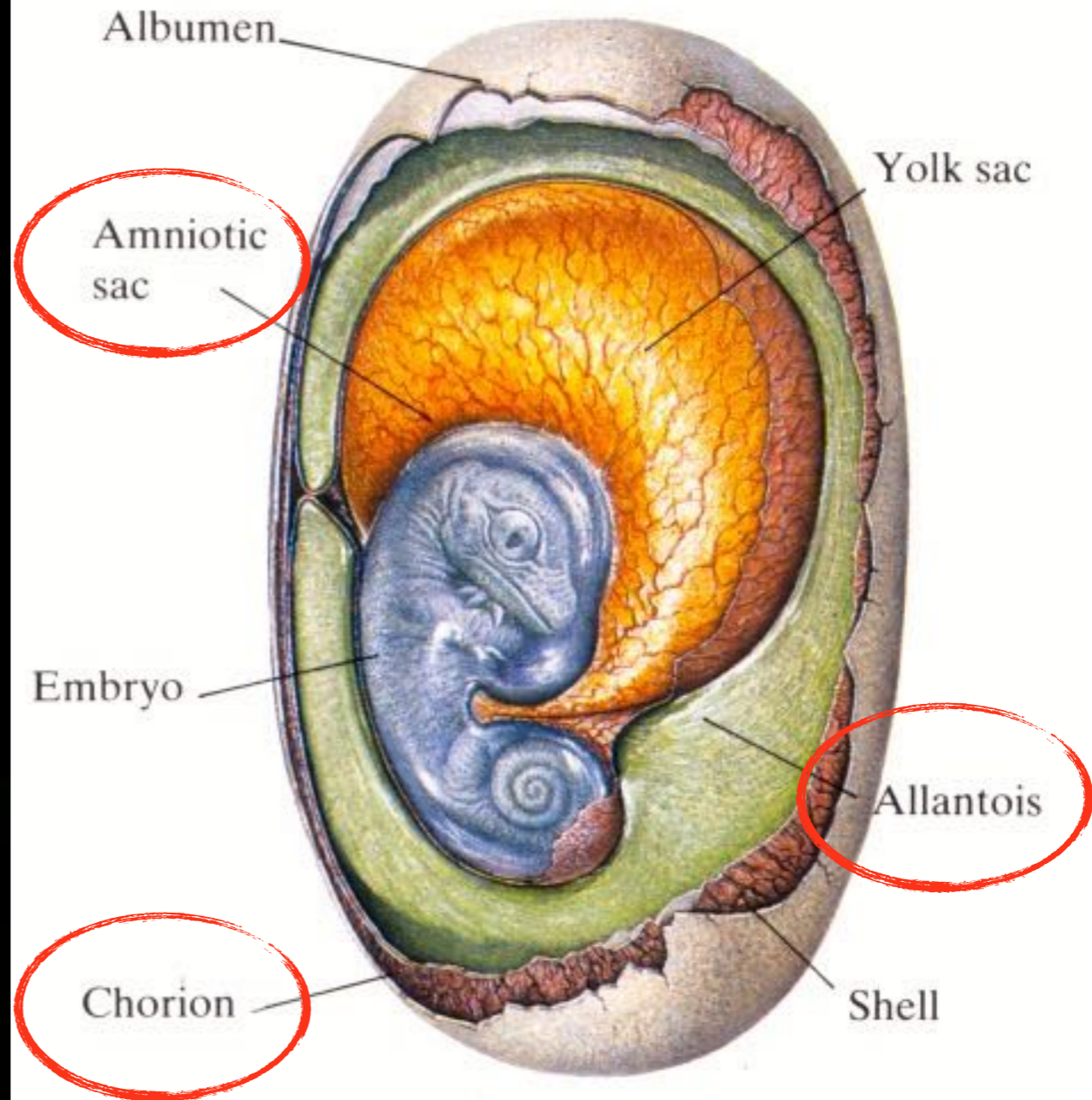
OVO AMNIÓTICO



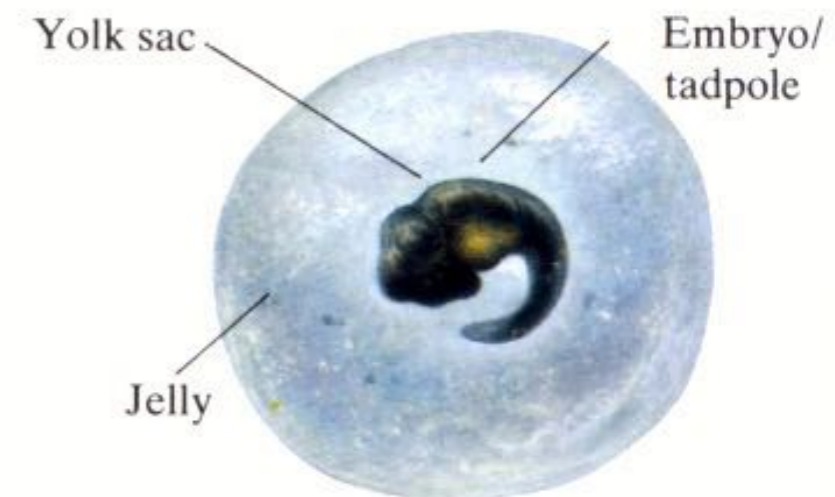
OVO AMNIÓTICO



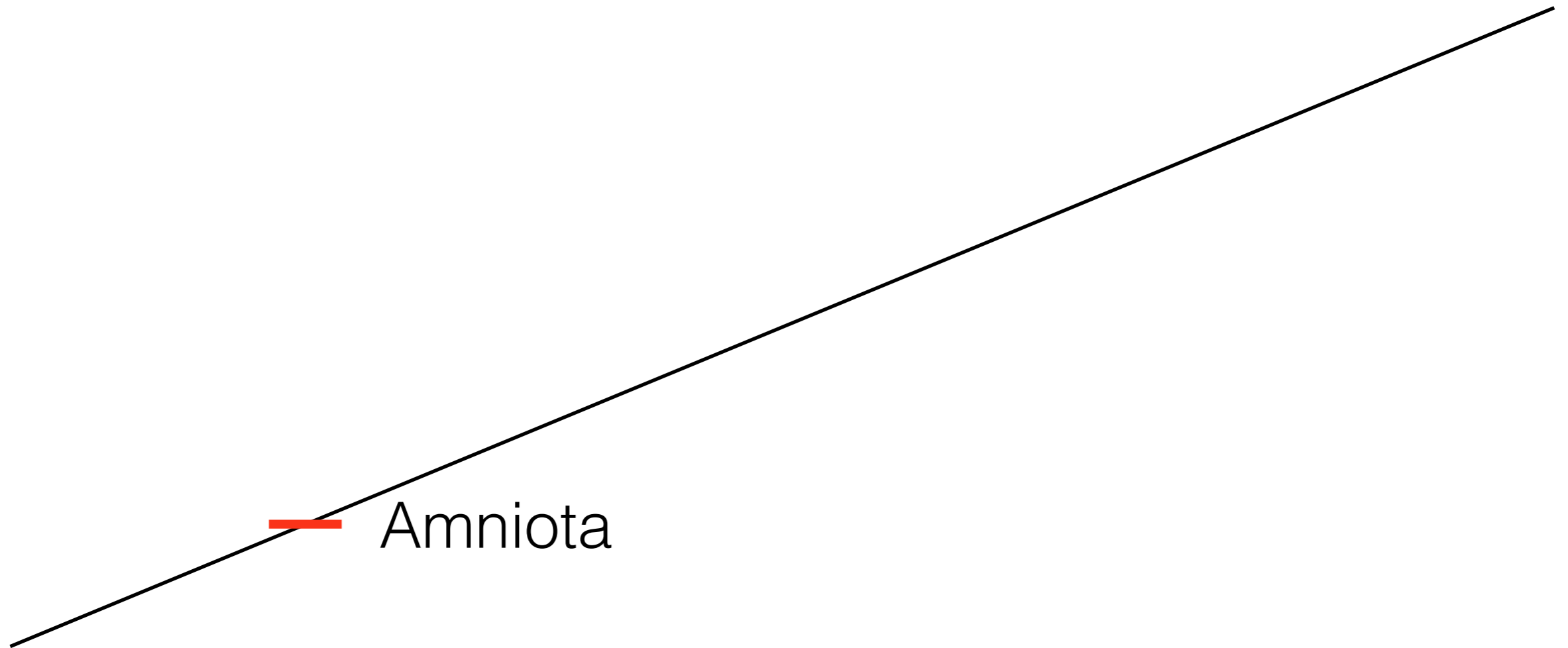
OVO AMNIÓTICO



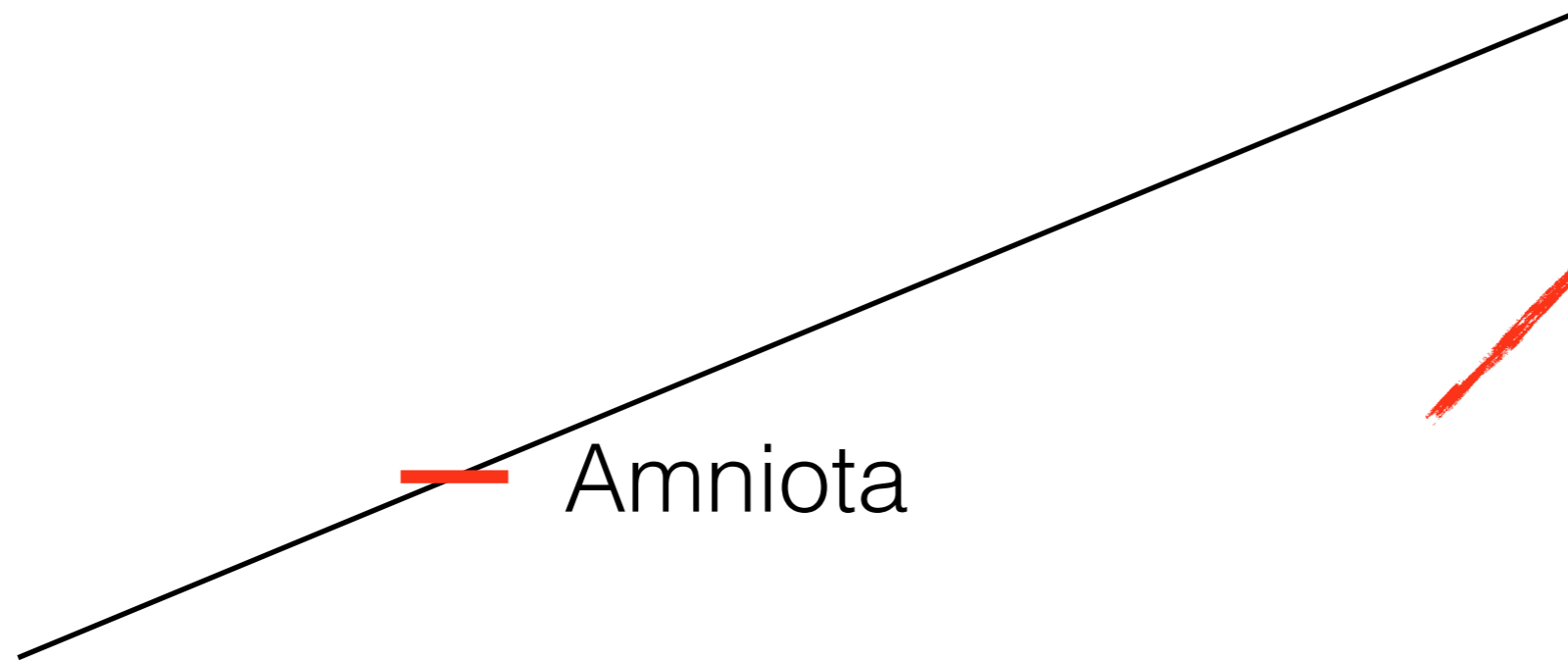
Amphibian egg



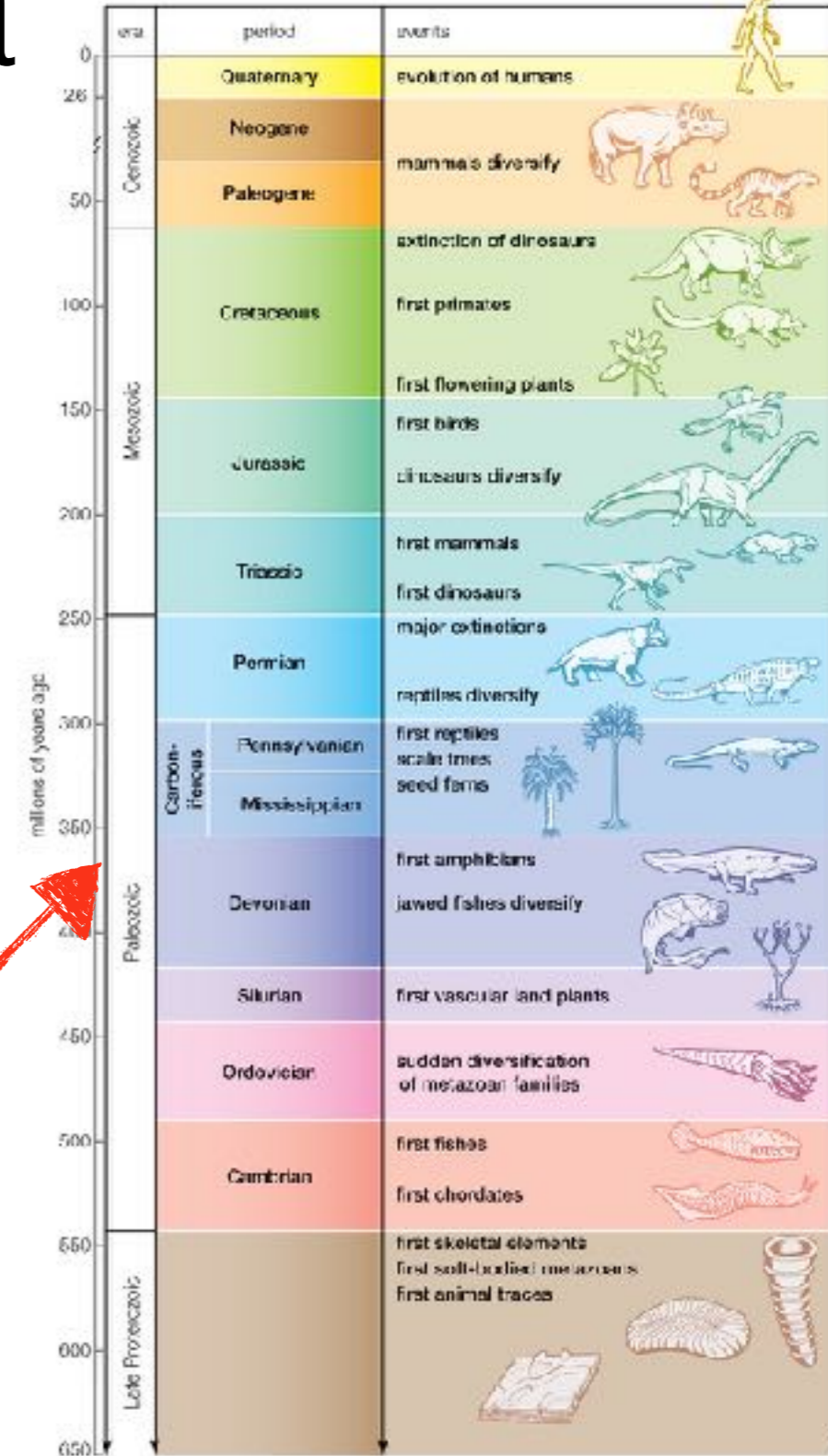
Amniota: origem de Sauropsida



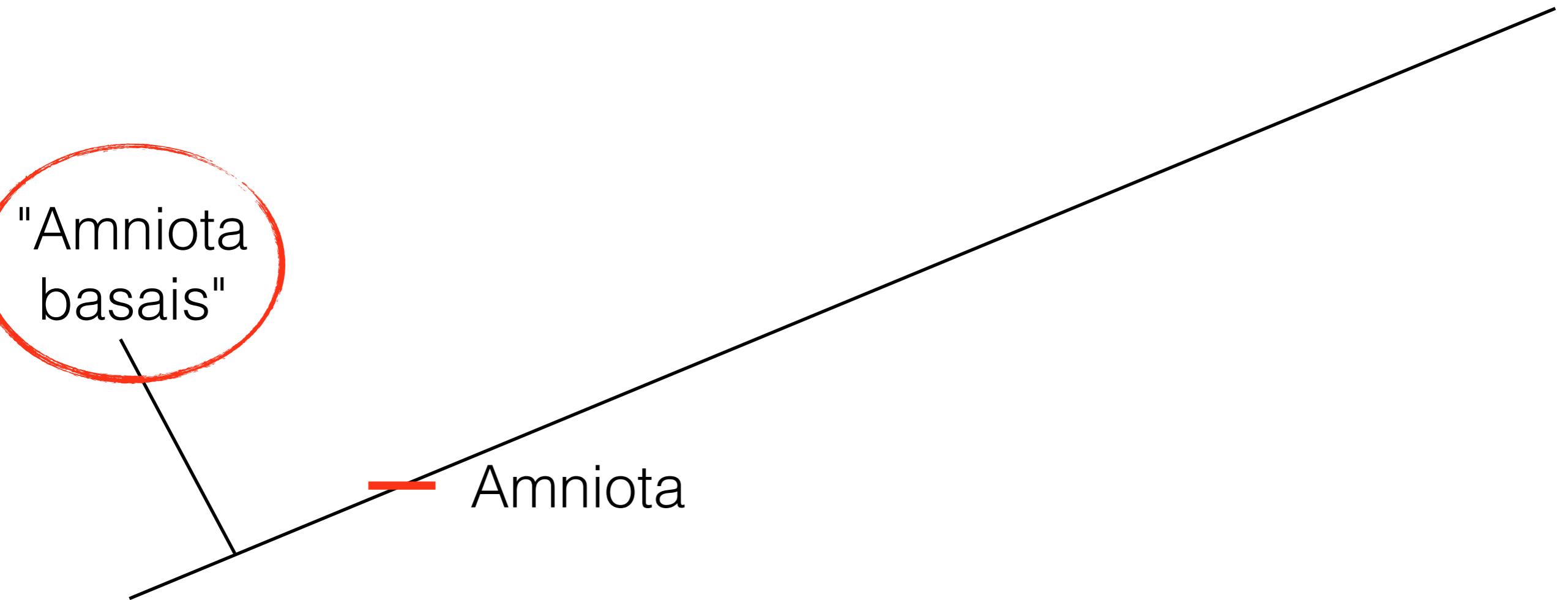
Amniota: origem de Sauropsida



Geologic time scale, 650 million years ago to the present



Amniota: origem de Sauropsida





© JleSTaT

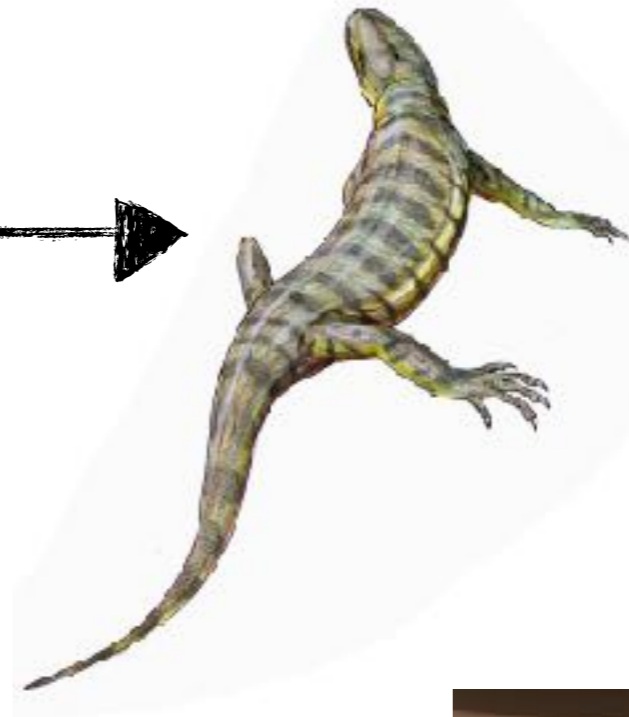
Período Carbonífero

360 - 300 mya

“Amniota basais”: candidatos



Casineria kiddi



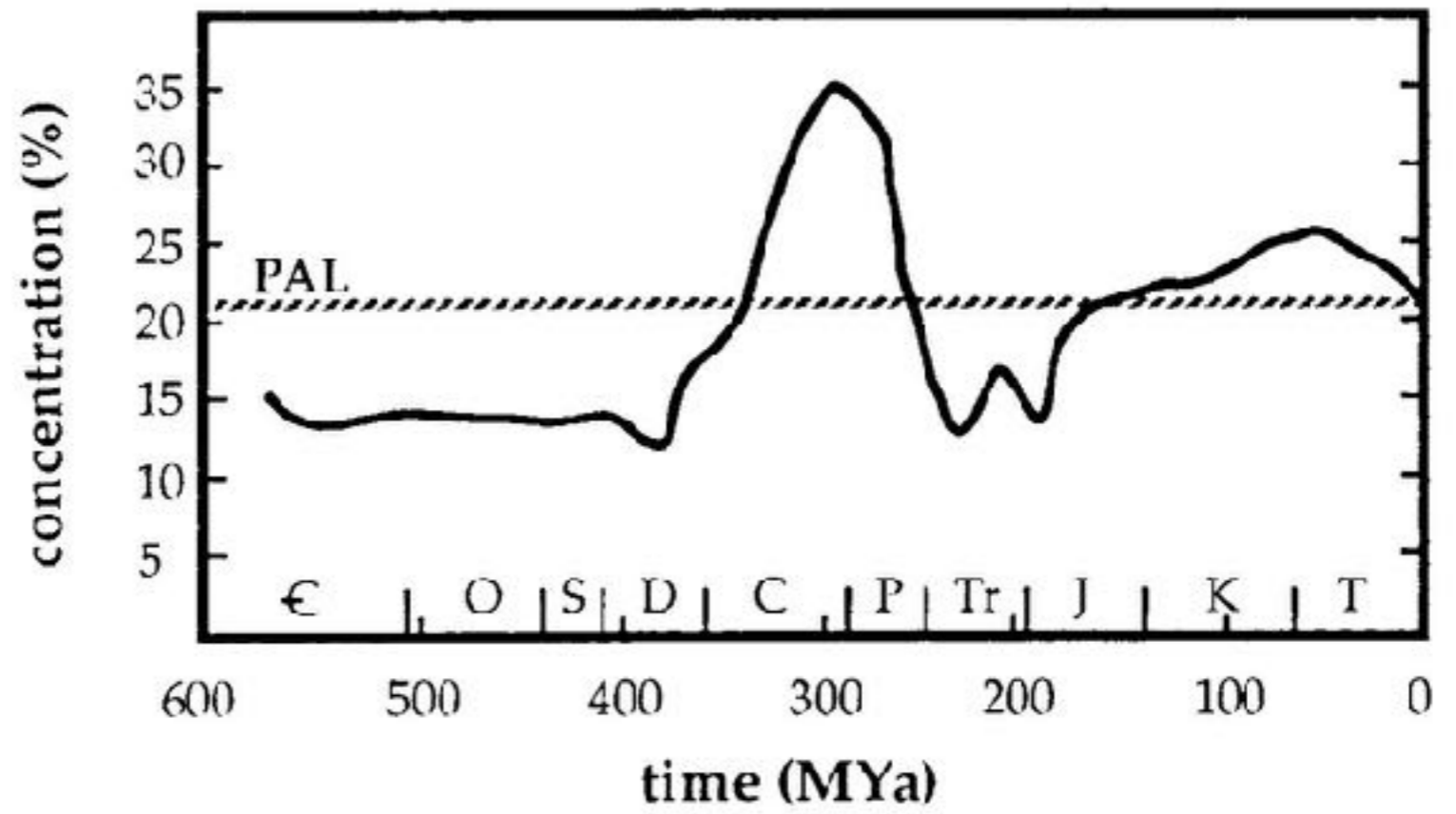
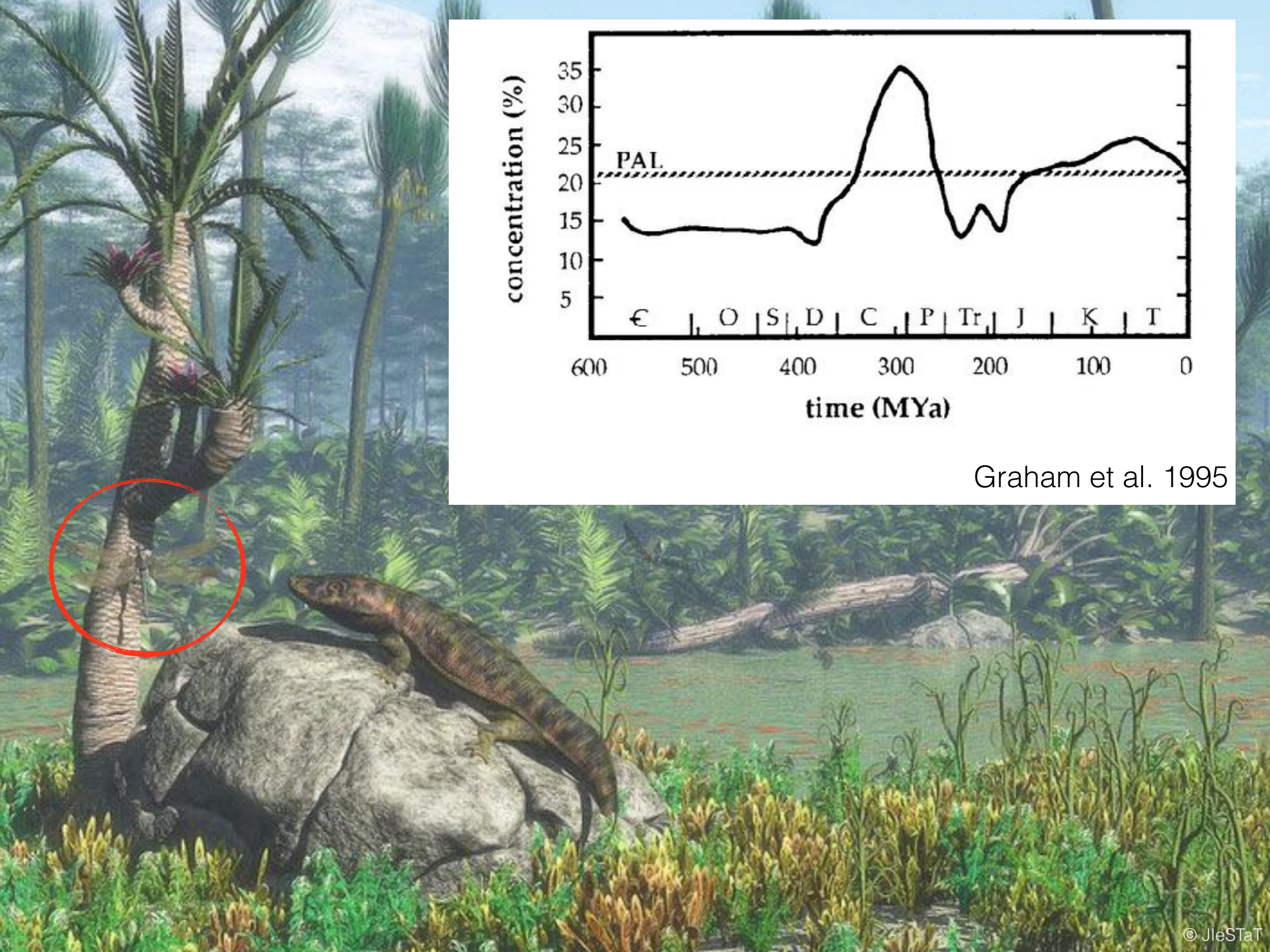
Westlothiana lizziae



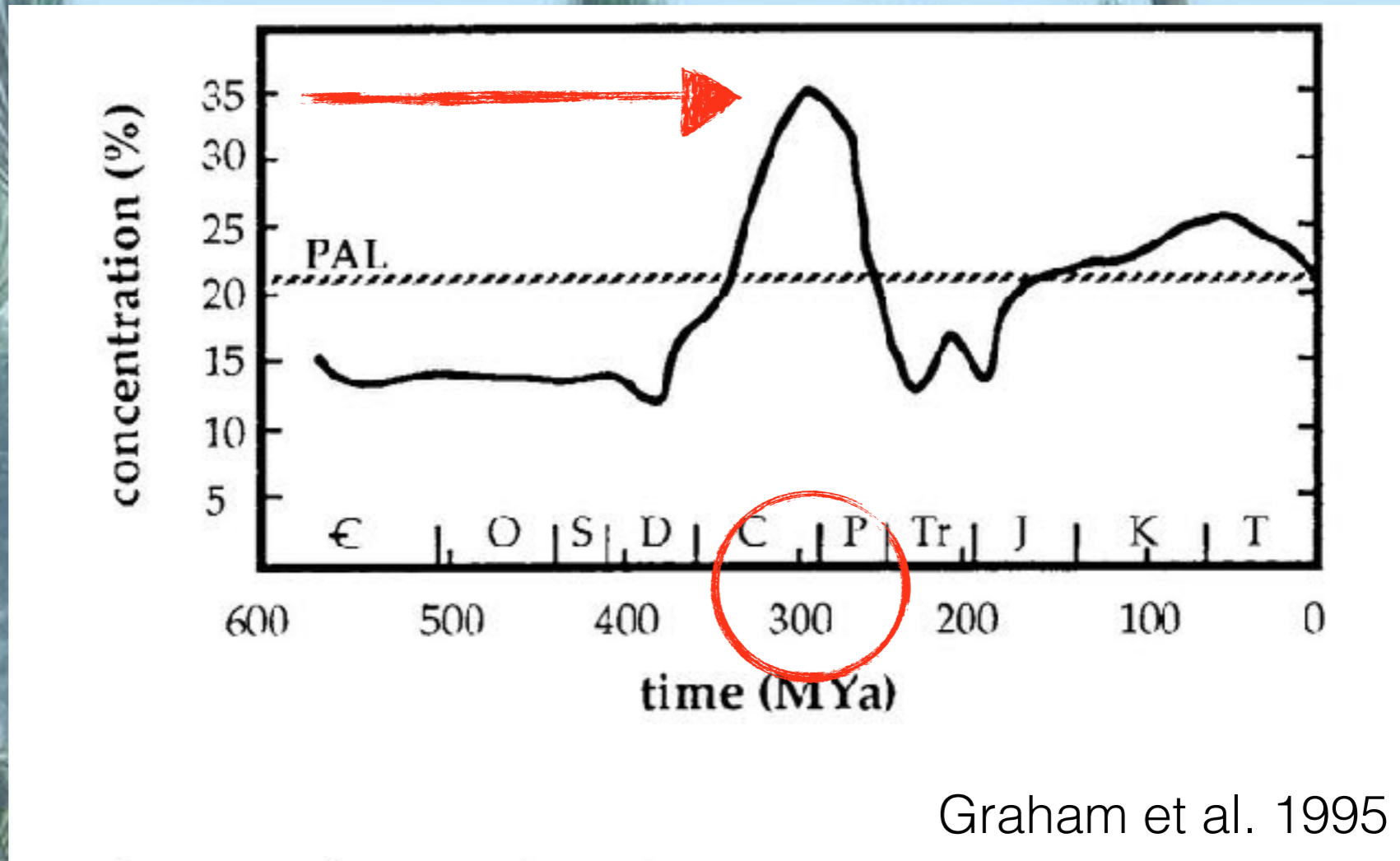
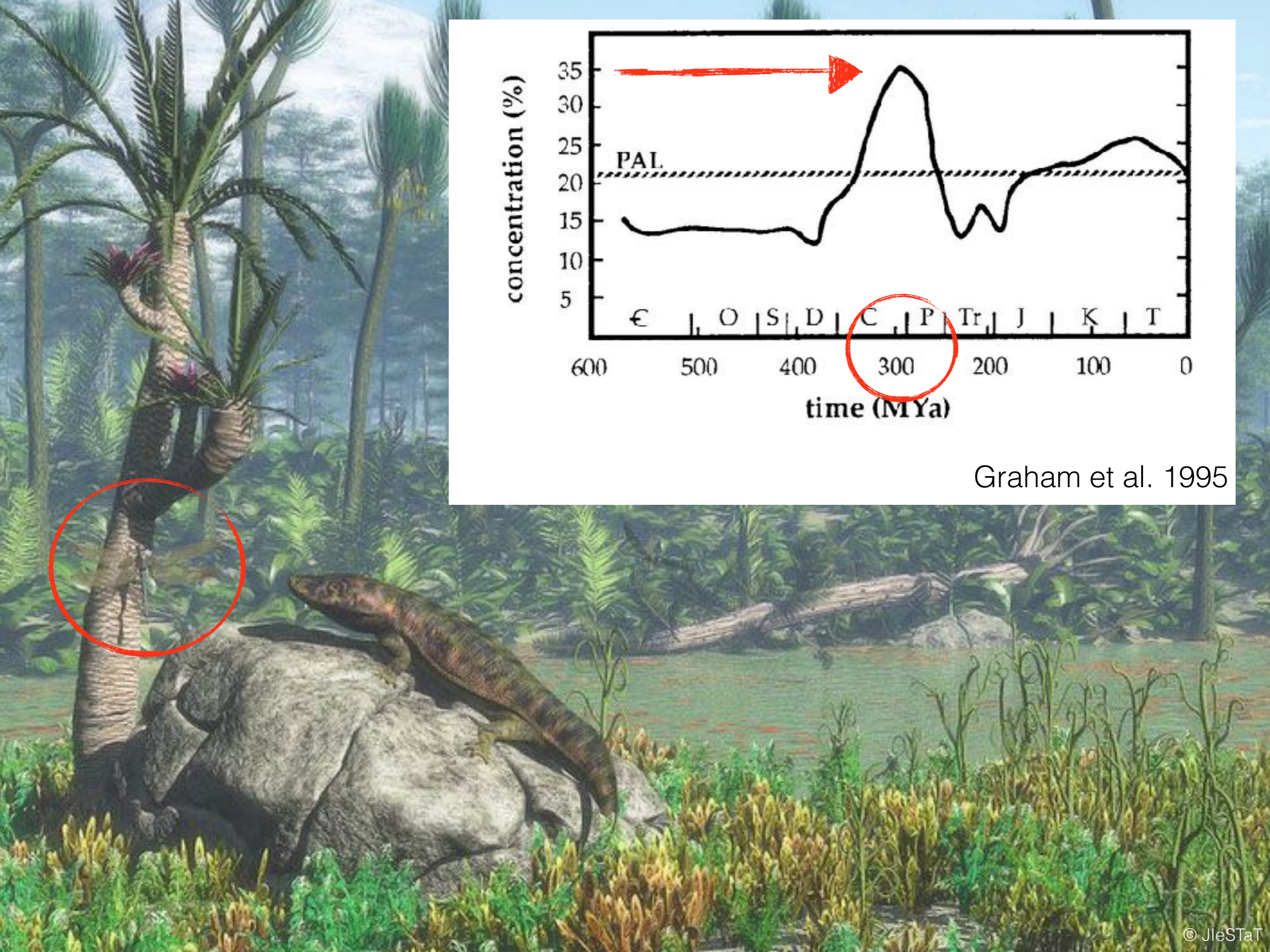
Qual foi o grande evento que permitiu a radiação destes amniota basais?



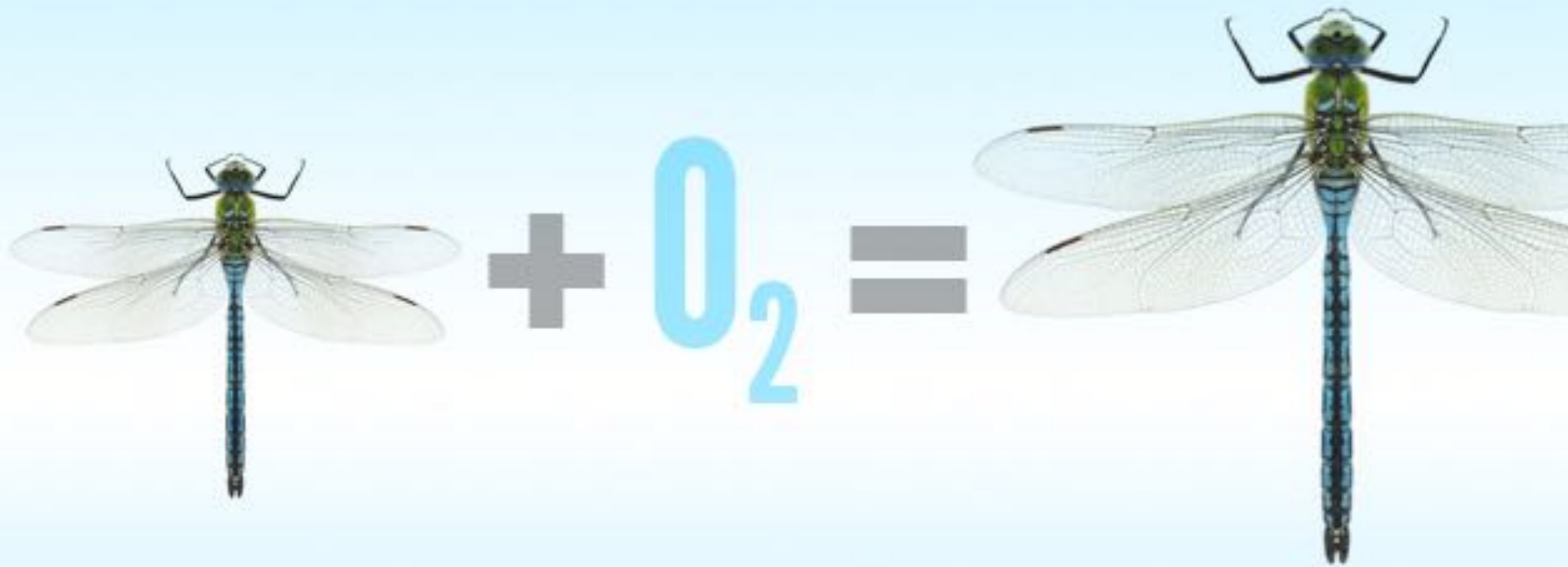




Graham et al. 1995



Graham et al. 1995



Super
artrópode

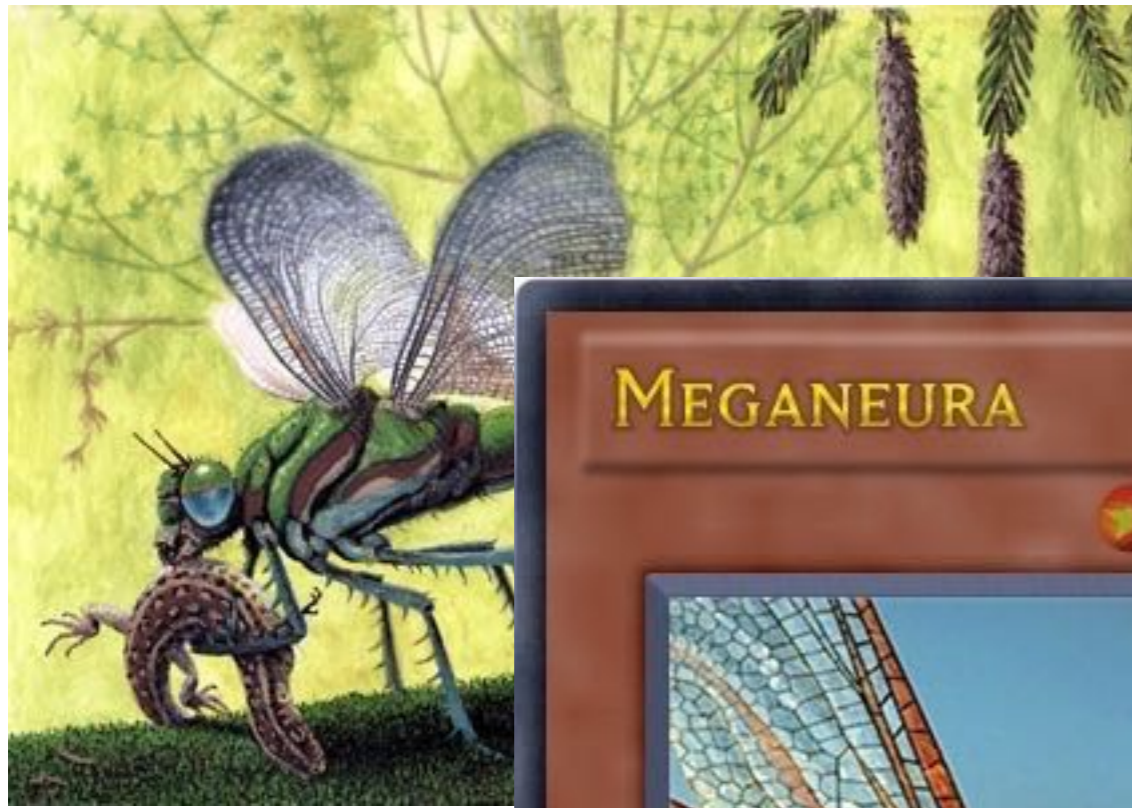


"Amniota
basais"



Casineria kiddi

Meganeura



Casineria kidd

Meganeura

MEGANEURA 





1st Editton DOI-001

[INSECT / EFFECT]

This card cannot be special summoned from your graveyard. When this card is summoned successfully you and your opponent must discard your entire hands then both of your draw up to the number of Insect type monster you control on your side of the field excluding Meganeura. When this card destroys one of your opponents monster in battle and sends it to the graveyard your opponent must discard one card from his or her hand. When this card is destroyed and sent to the graveyard you must discard cards up to the number of Insect type monsters on the field, if there are more Insect types monsters than cards in your hand when this activates discard the remain number of cards from the top of the deck for each Insect type monster.

ATK / 2200 DEF / 1400

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Casineria kidd

Meganeura

MEGANEURA

1st Editton DOI-

[INSECT / EFFECT]

This card cannot be special summoned from your graveyard. When this card is summoned successfully you and your opponent must discard your entire hands then both of your draw up to the number of Insect type monster you control on your side of the field excluding Meganeura. When this card destroys one of your opponents monster in battle and sends it to the graveyard your opponent must discard one card from his or her hand. When this card is destroyed and sent to the graveyard you must discard cards up to the number of Insect type monsters on the field, if there are more Insect types monsters than cards in your hand when this activates discard the remain number of cards from the top of the deck for each Insect type monster.

ATK / 2200 DEF / 1400

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AMODEL

MEGANEURA

EVEN WHEN IN THEIR LARVAL STAGES, MEGANEURA EAT THE FLESH OFF TO THE VERY BONE.

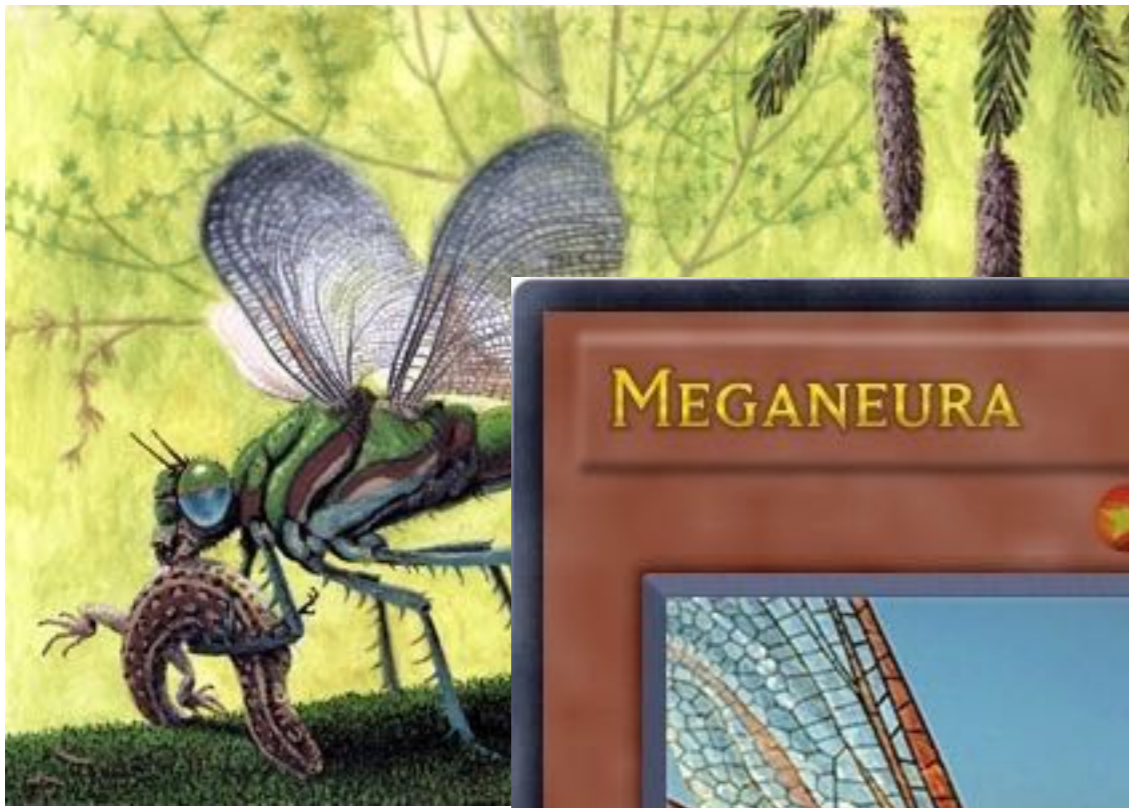
ANYTHING SMALLER THAN A COCK HATCH OUT, THESE MEGANEURA LIE ON SMALL FRY.

MOB TYPE: NEUTRAL

DAMAGE:

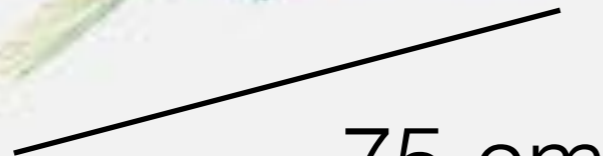
DROPS: (?)

FAELDSPR



Meganeura

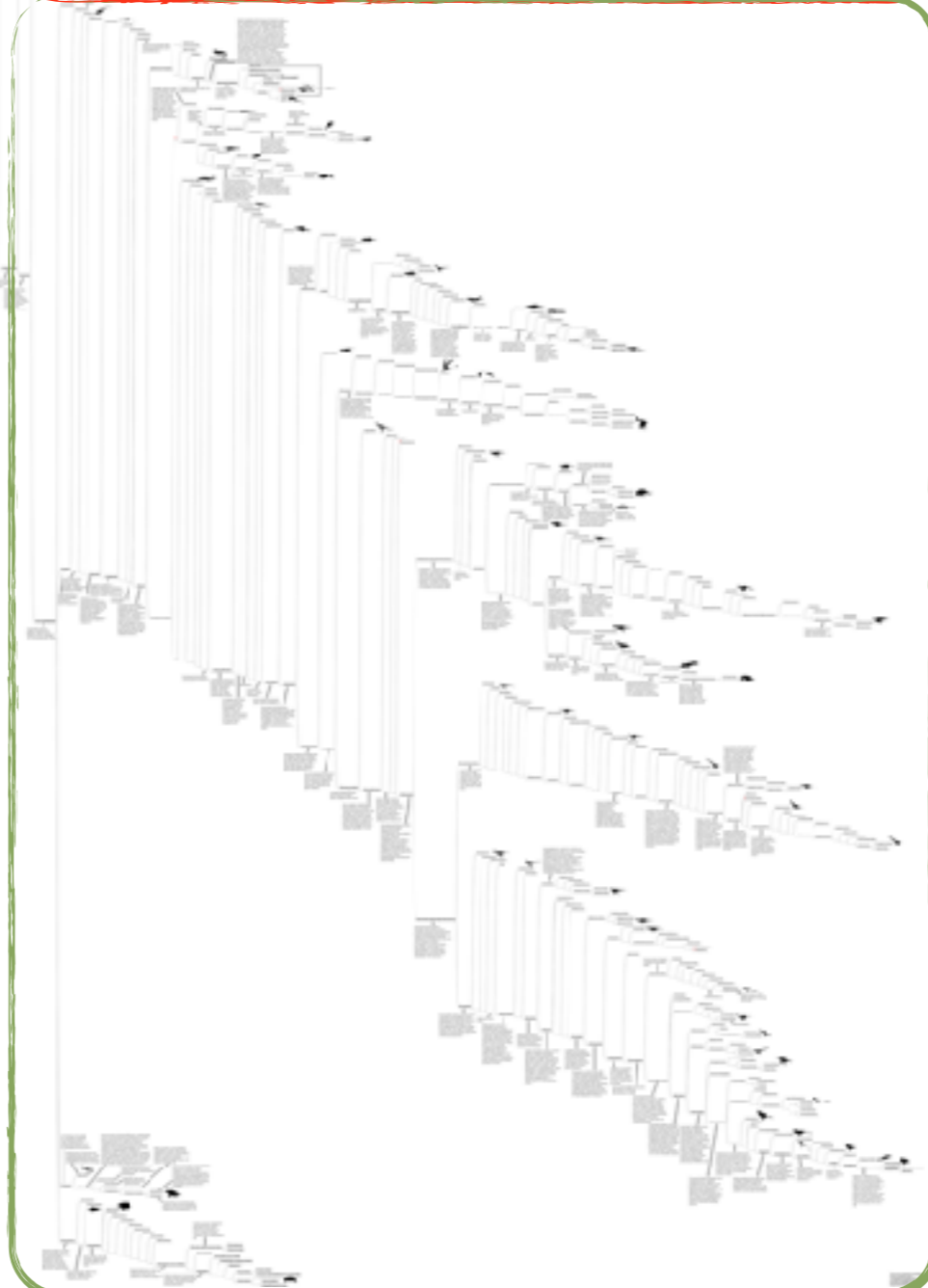
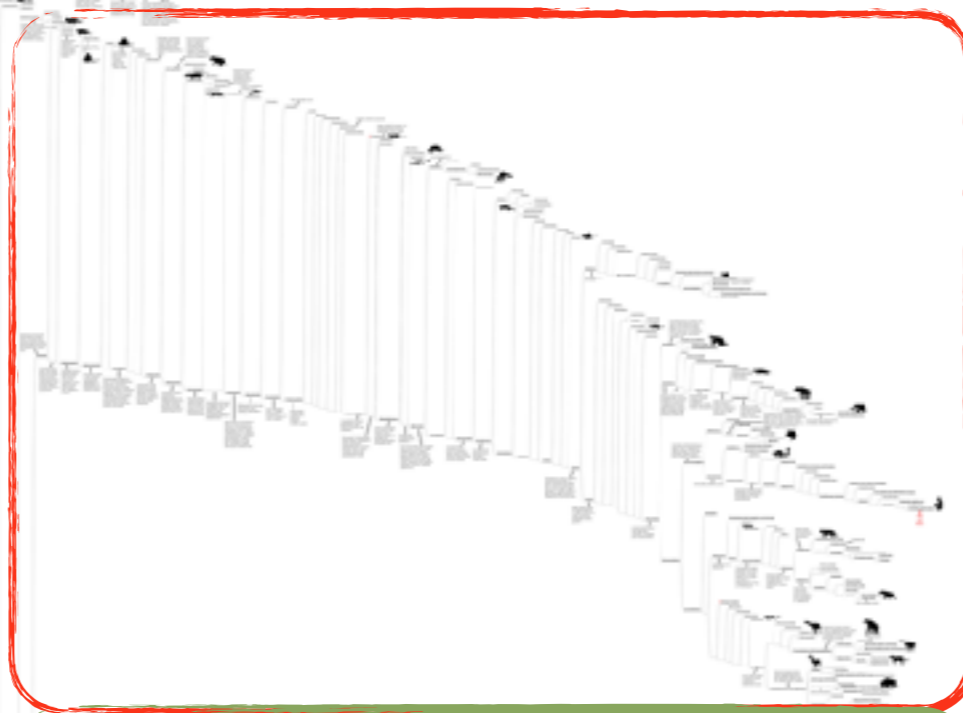
Casineria kidd



75 cm



Synapsida



Sauropsida

Amniota e suas radiações



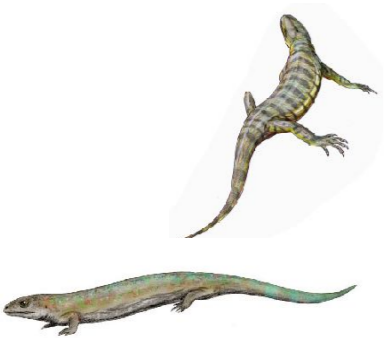
Synapsida



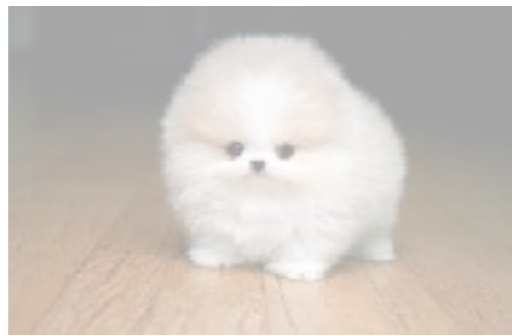
Sauropsida

Beta-queratina
Excreção ácido úrico

Amniota



Amniota e suas radiações



Synapsida



Sauropsida

Beta-queratina
Excreção ácido úrico

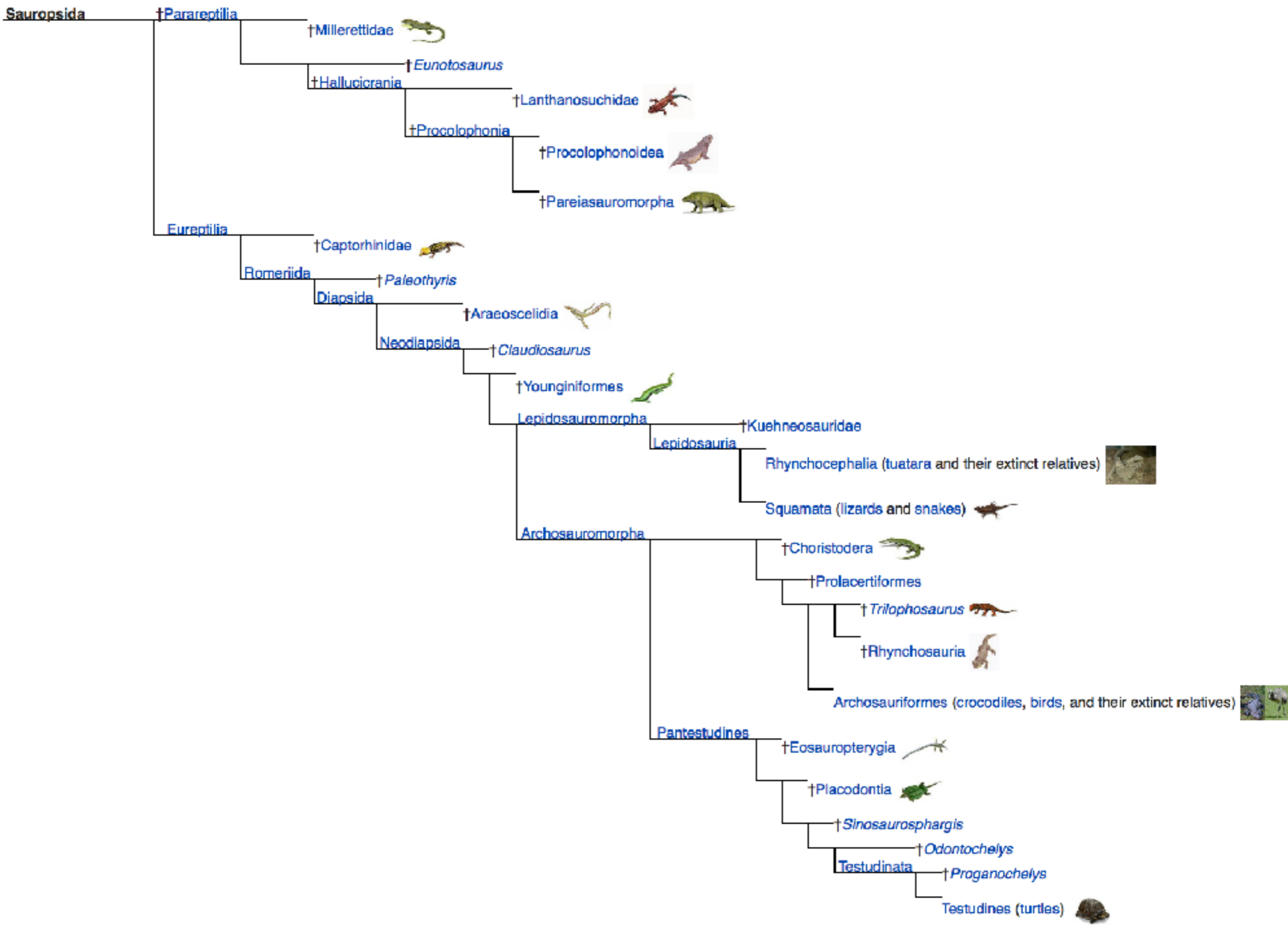
Amniota

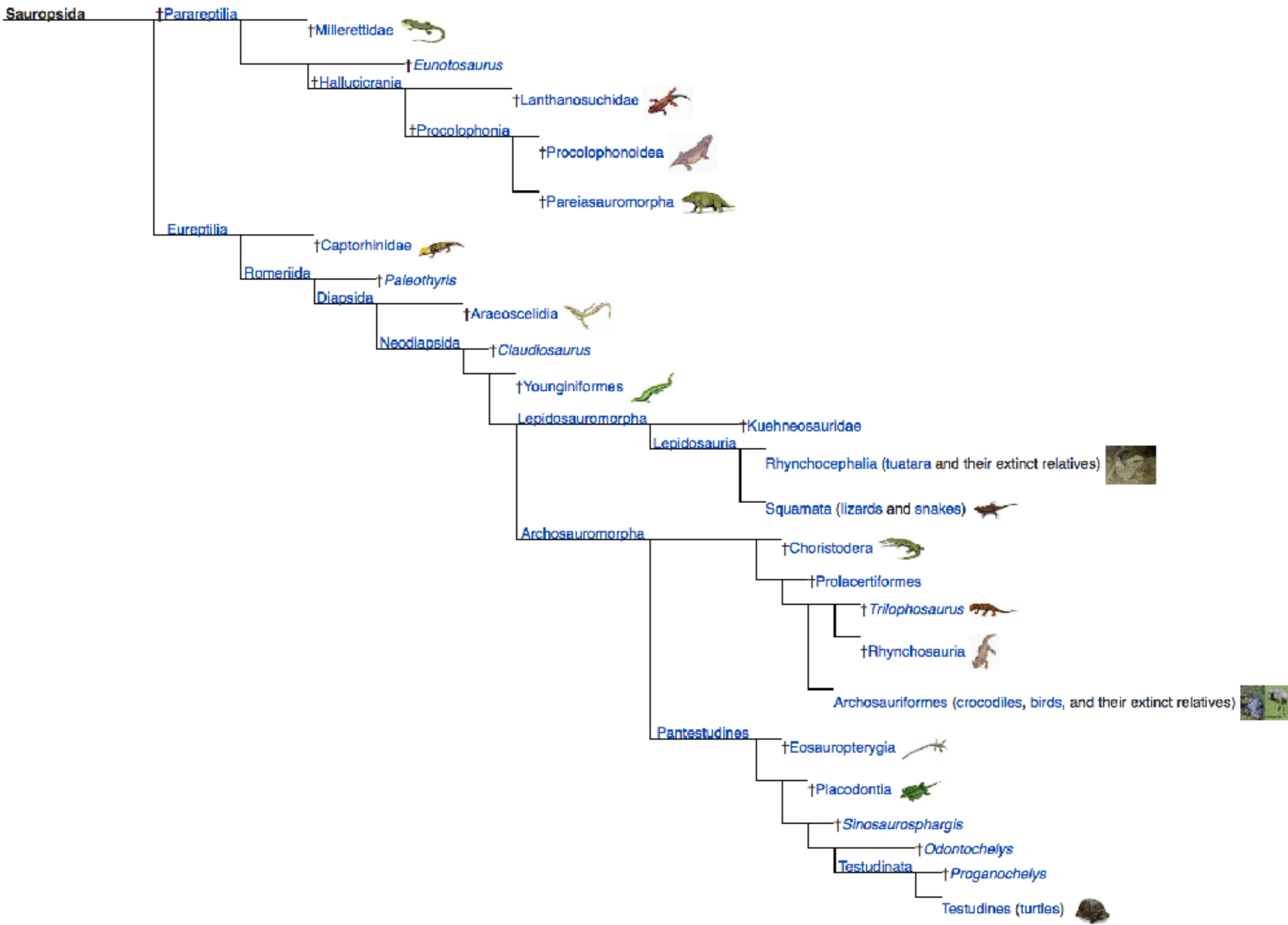


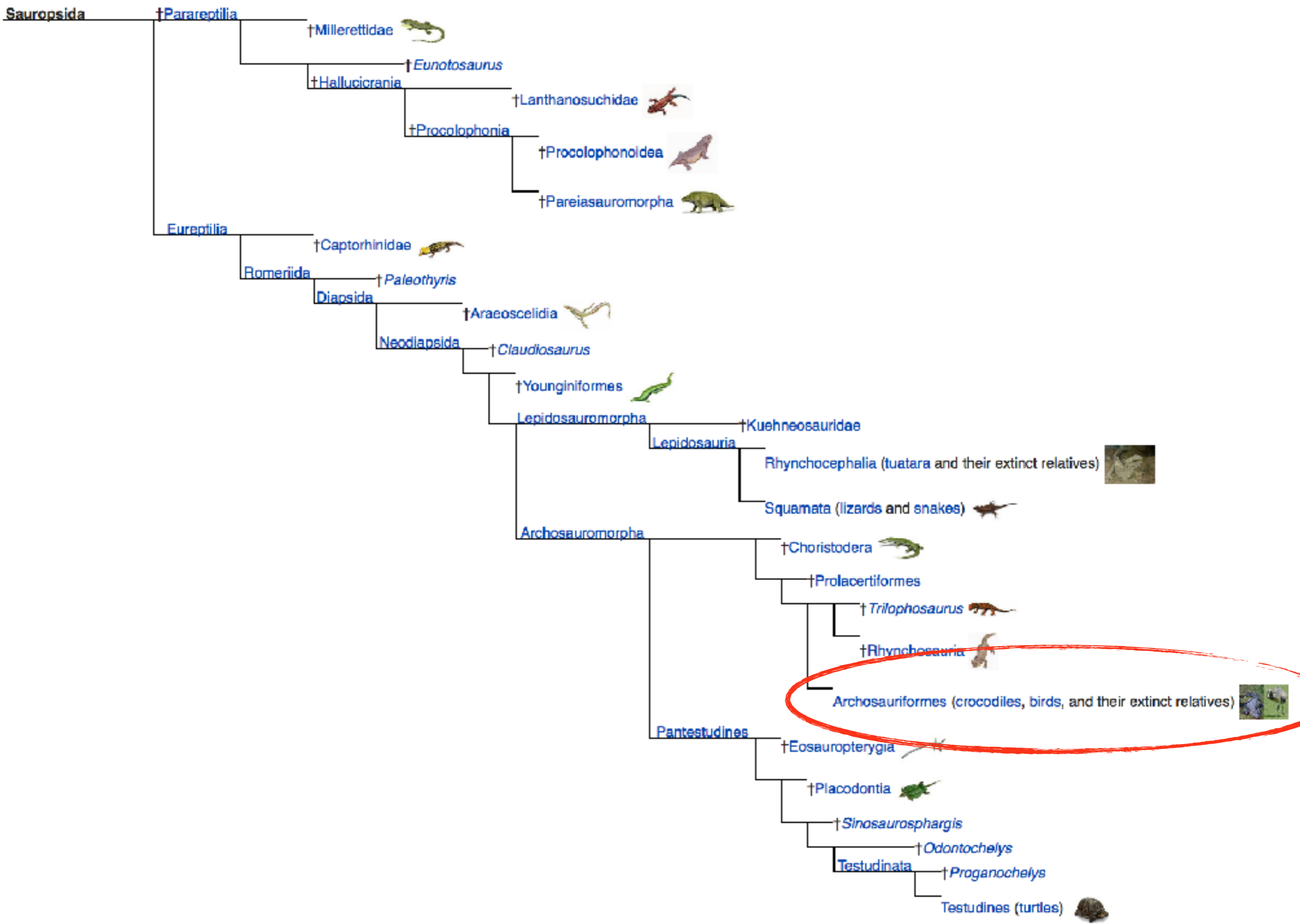


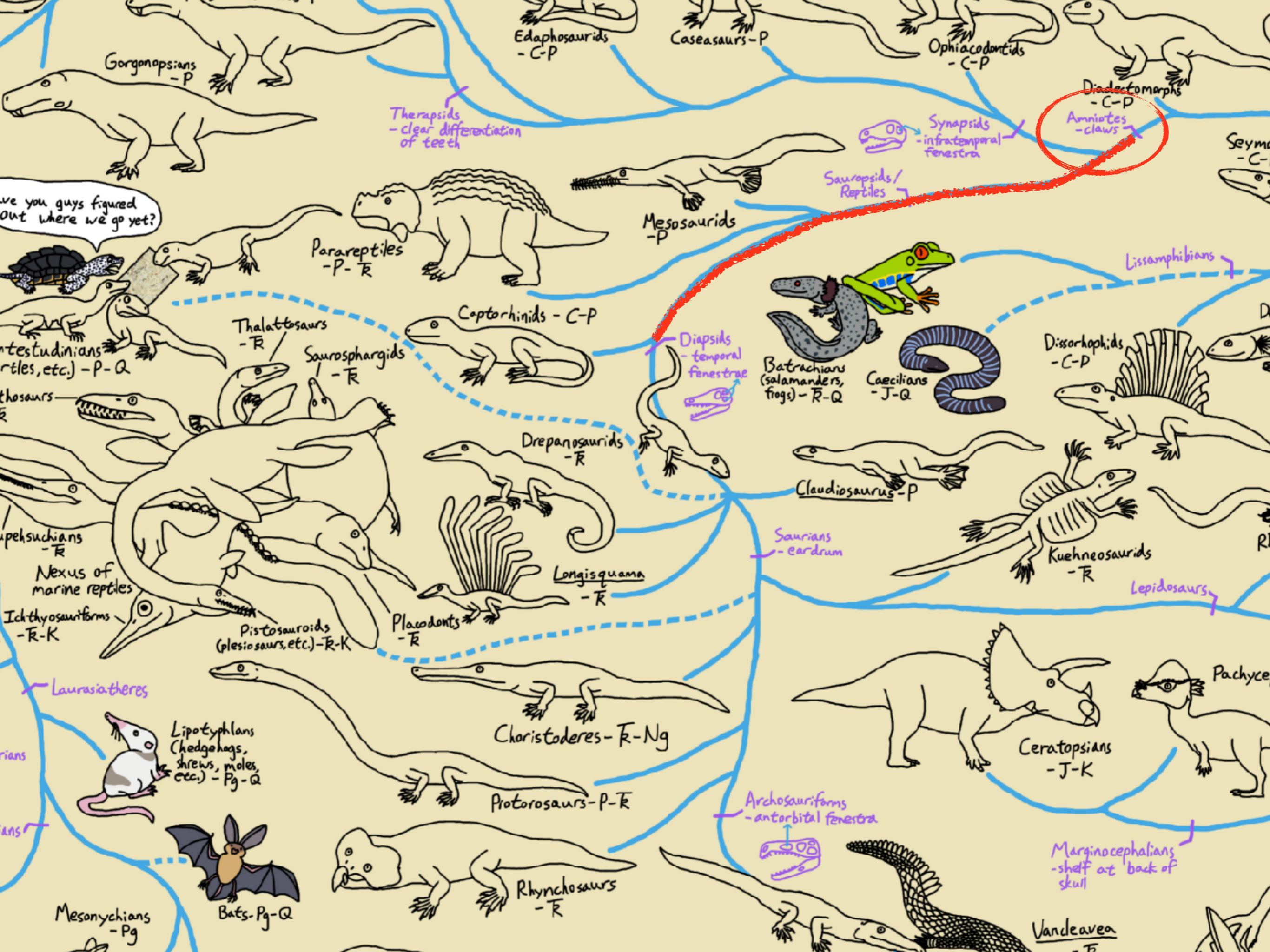
Sauropsida



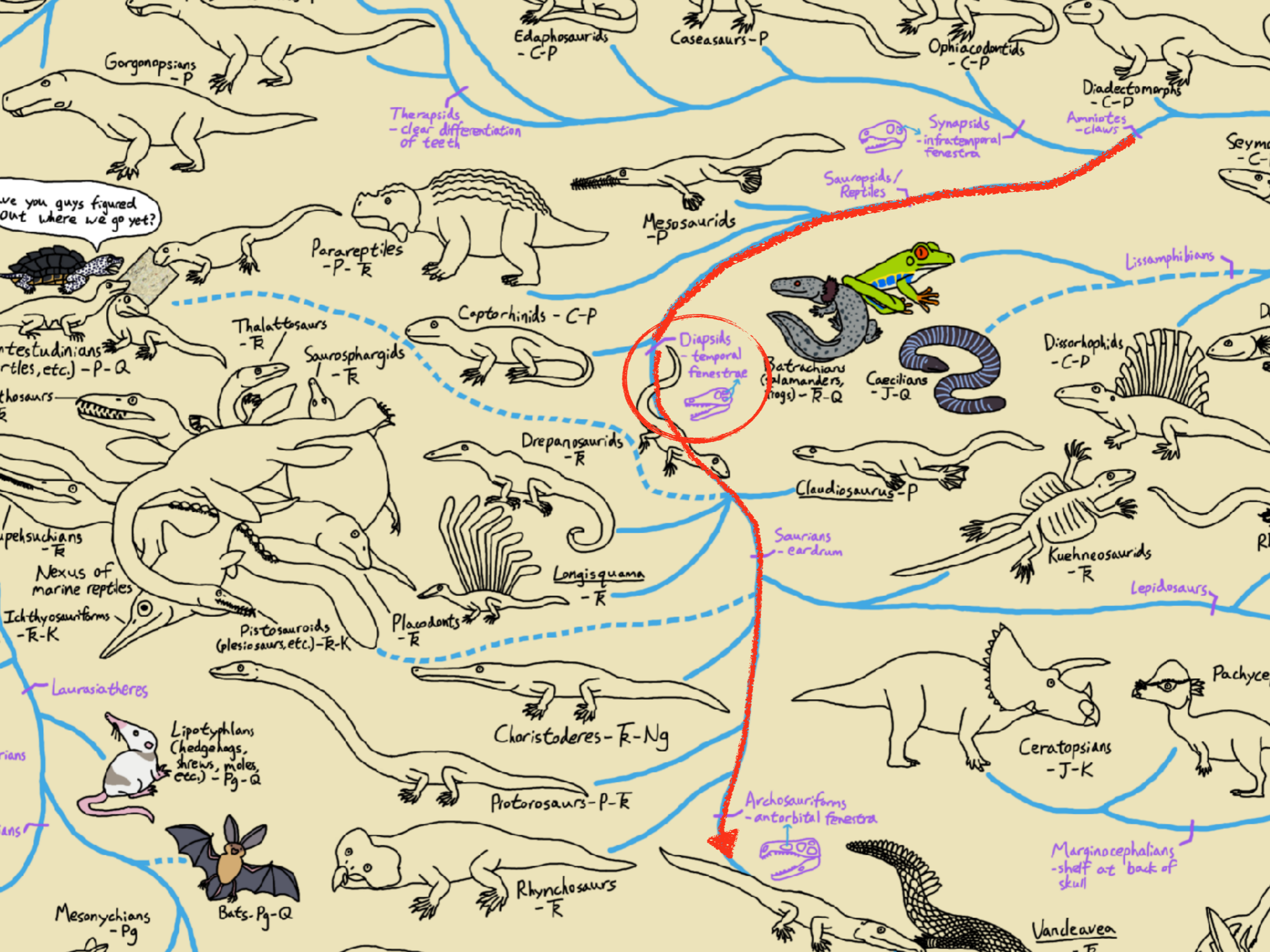






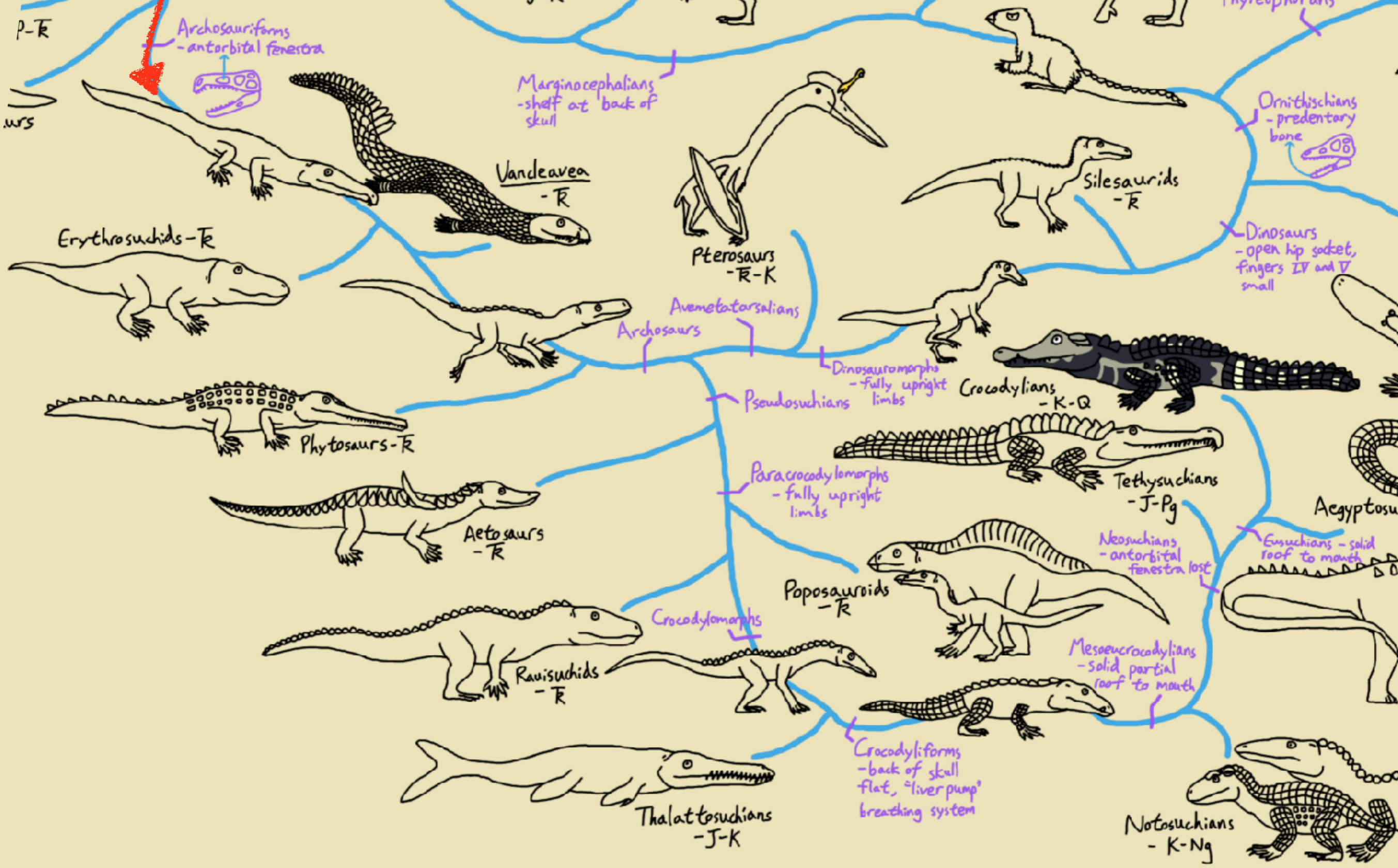




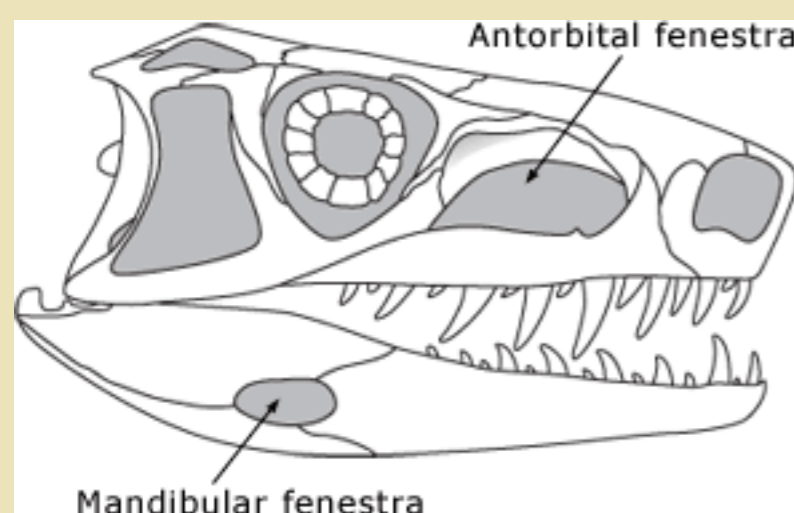
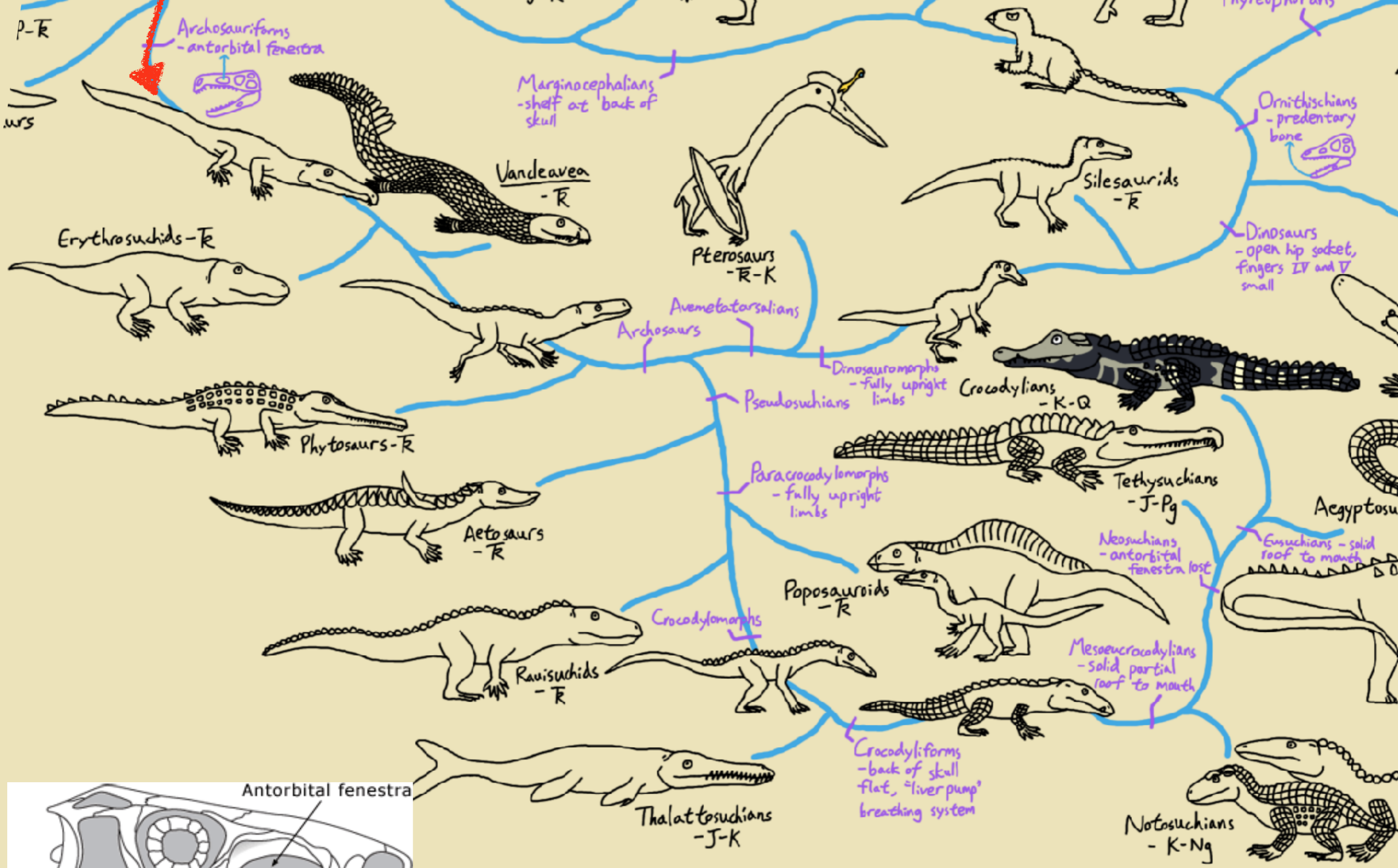




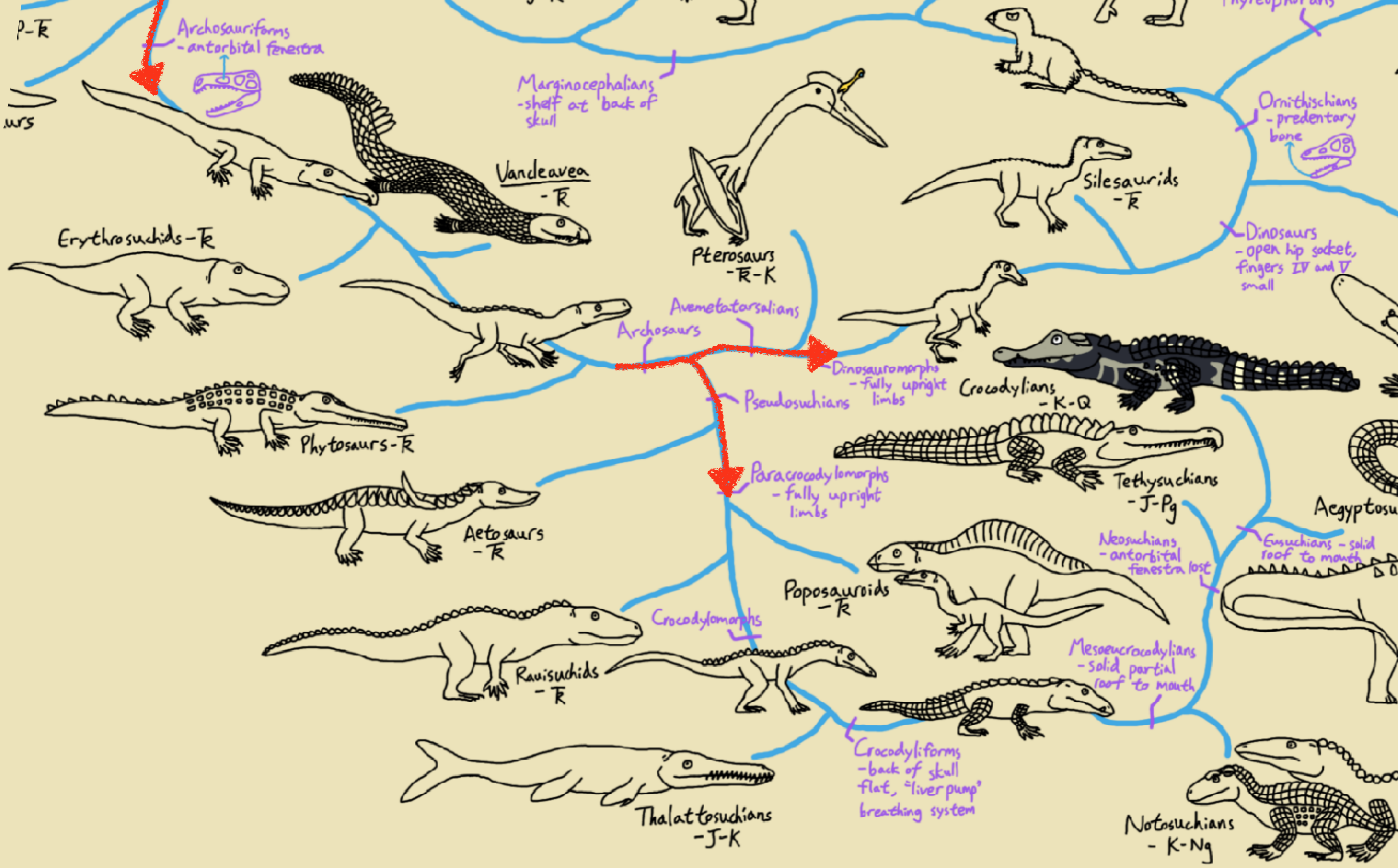




Permiano/Triássico (260 mya)



Permiano/Triássico (260 mya)



Avemetatarsalia

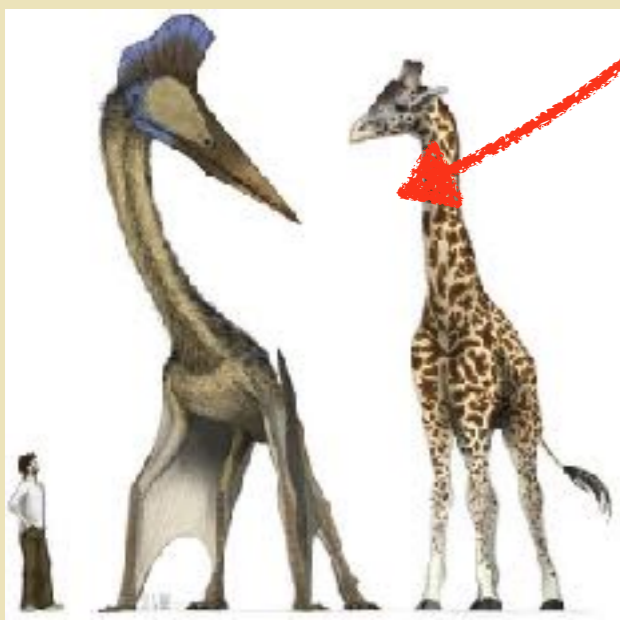


Triássico (245 mya)

Avemetatarsalia



Quetzalcoatlus



Triássico (245 mya)



FILO-
GENIA

MACRO-
EVOLU-
ÇÃO

AMNIO-
TA

ARCHOS-
SAUROS

DINOS-
SAUROS
+
AVES

DIVER-
SIDADE

ORIGEM

ECOLO-
GIA

AVES

ANATO-
MIA

EVOLU-
ÇÃO

REPRO-
DUÇÃO

COMPOR-
TAMENTO

VOO

ALGUMA
FISIO-
LOGIA

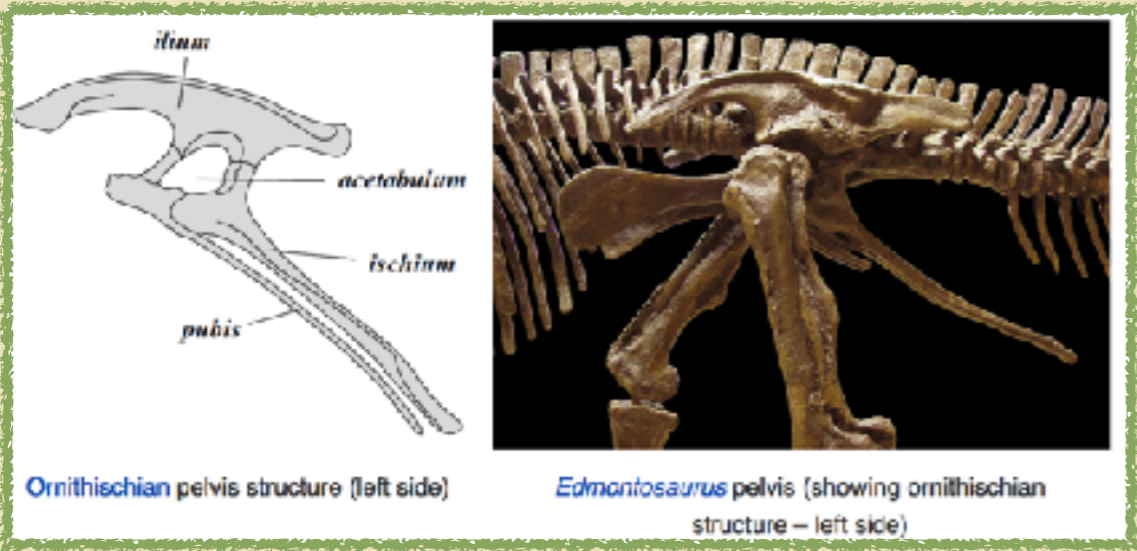
Dinosauria



Triássico (245 mya)

Dinosauria

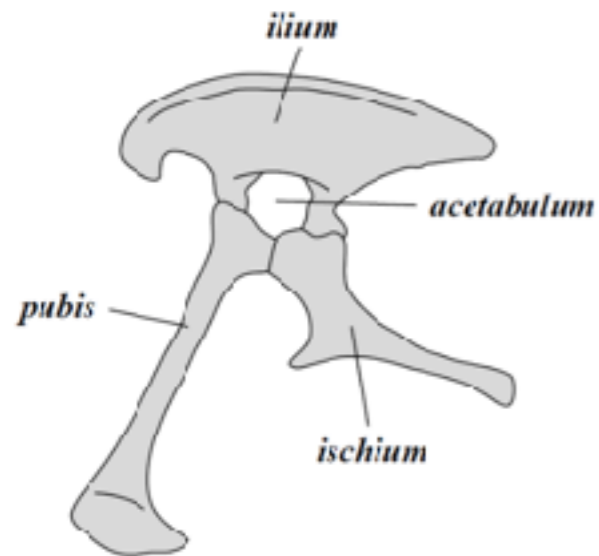
- Ornithischia



Triássico (245 mya)

Dinosauria

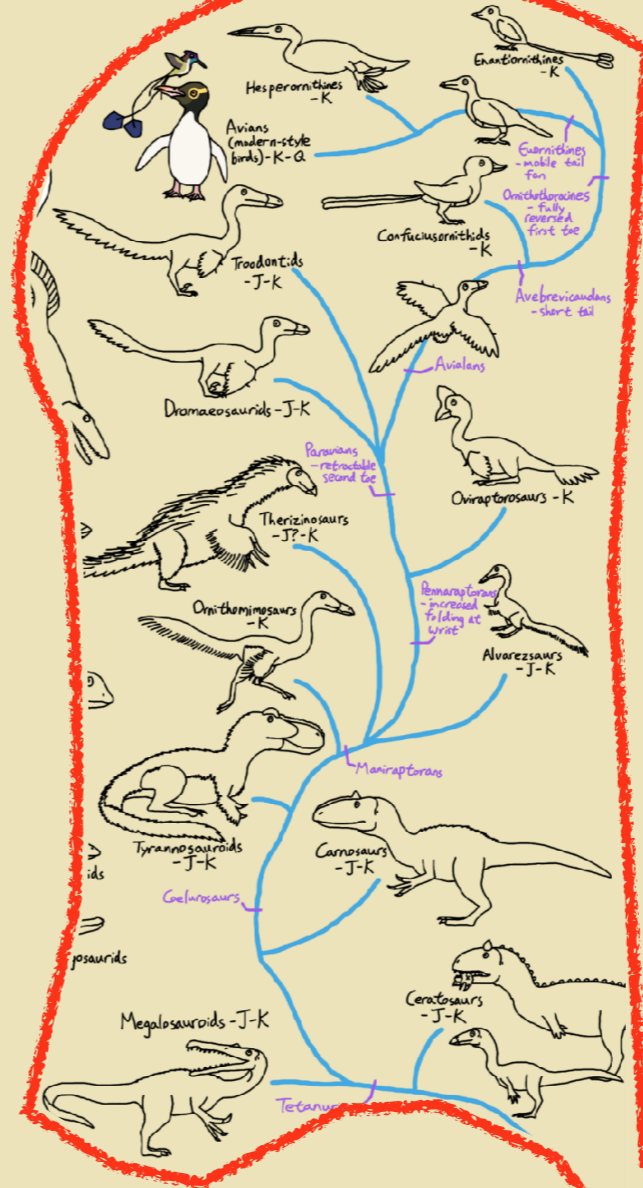
- Ornithischia
- Saurischia



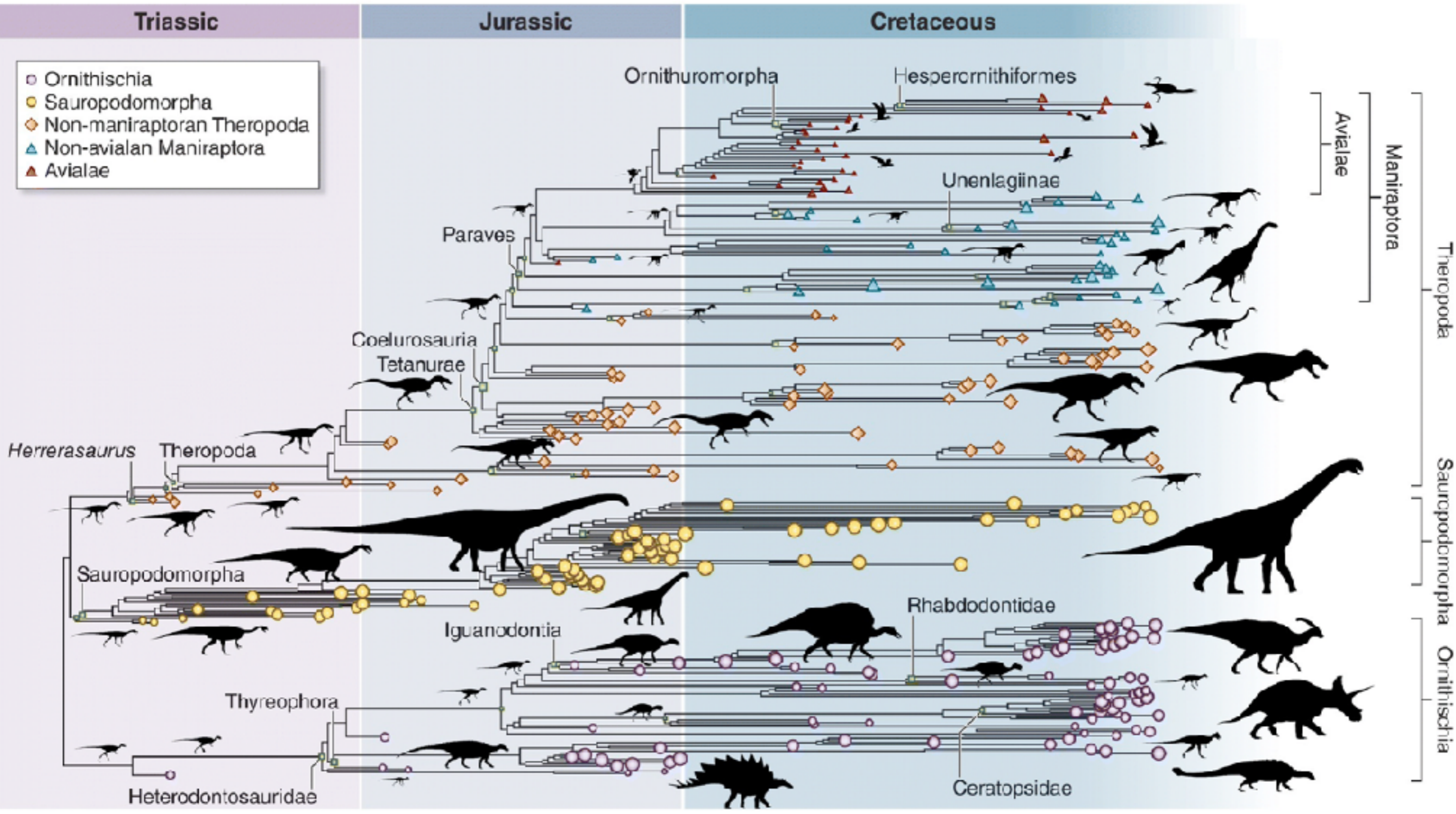
Saurischian pelvis structure (left side)



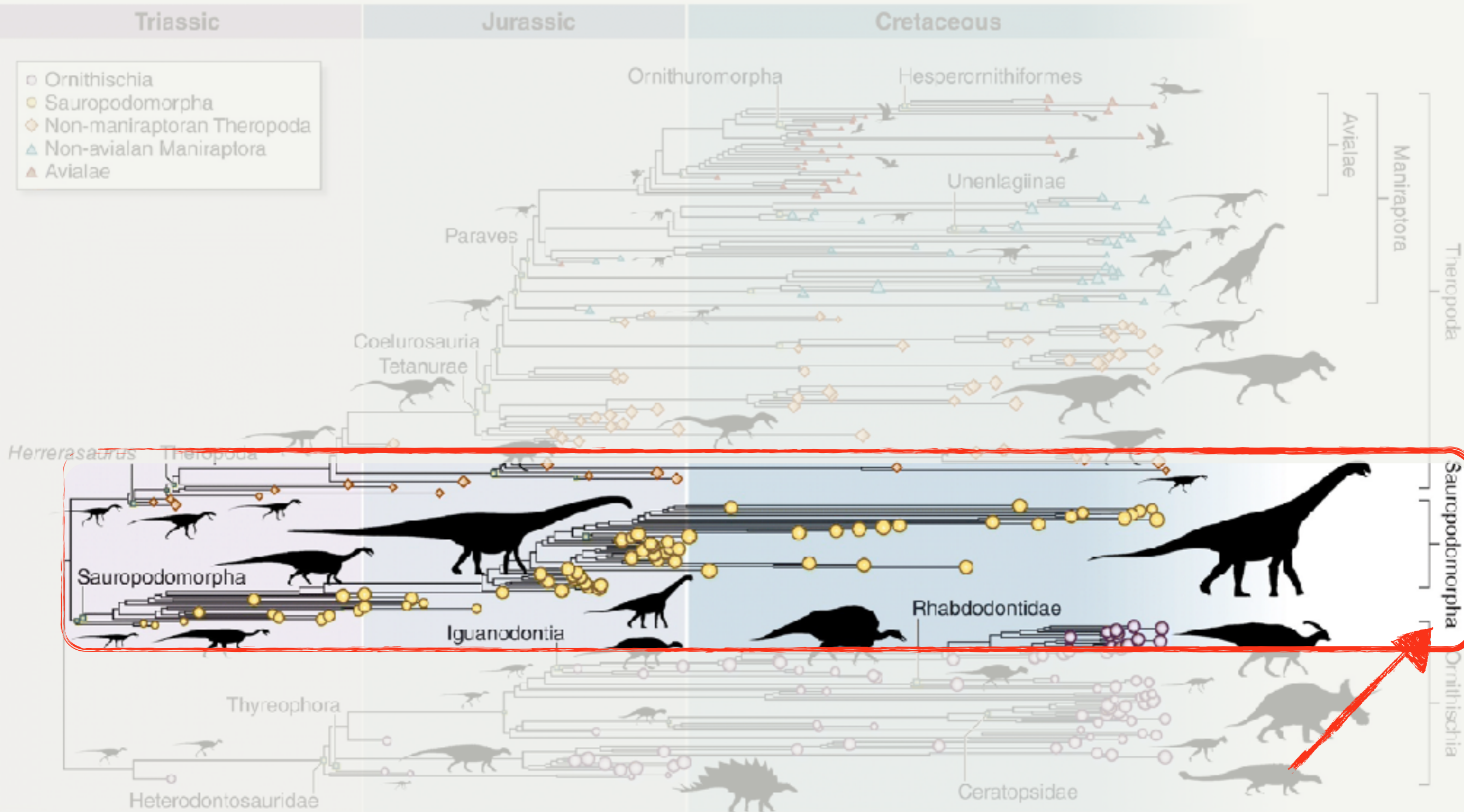
Tyrannosaurus pelvis (showing saurischian structure - left side)

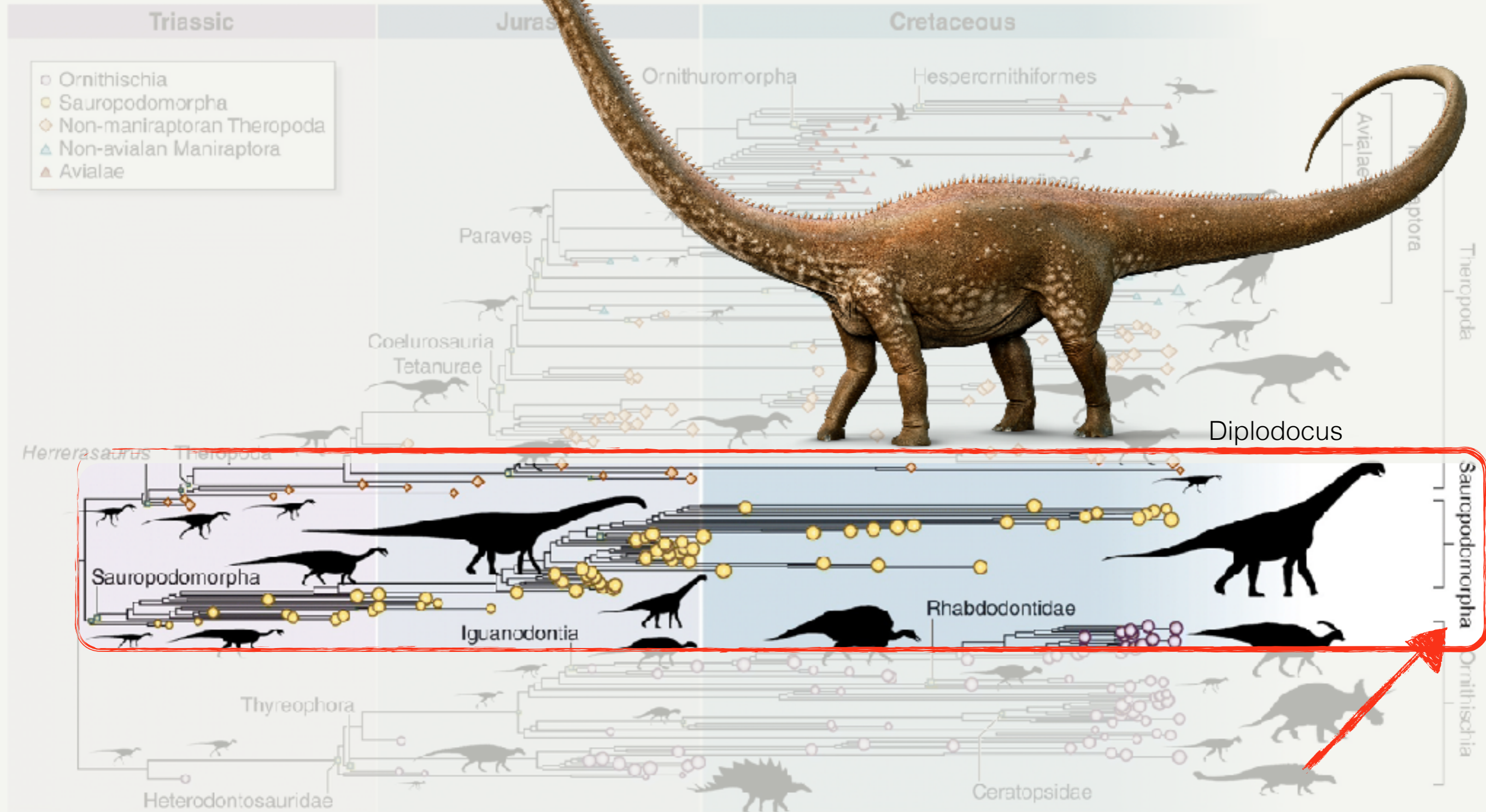


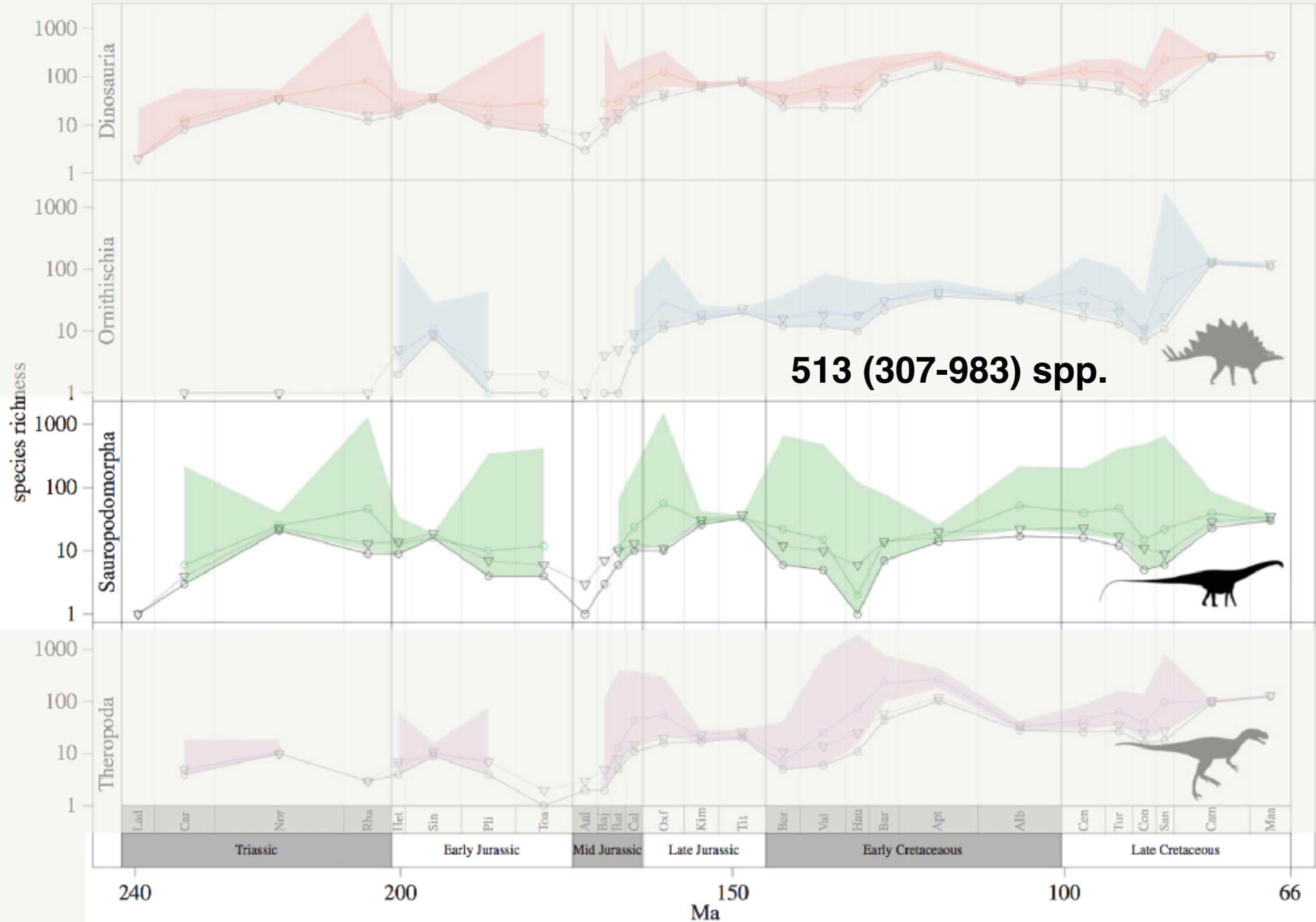
Triássico (245 mya)

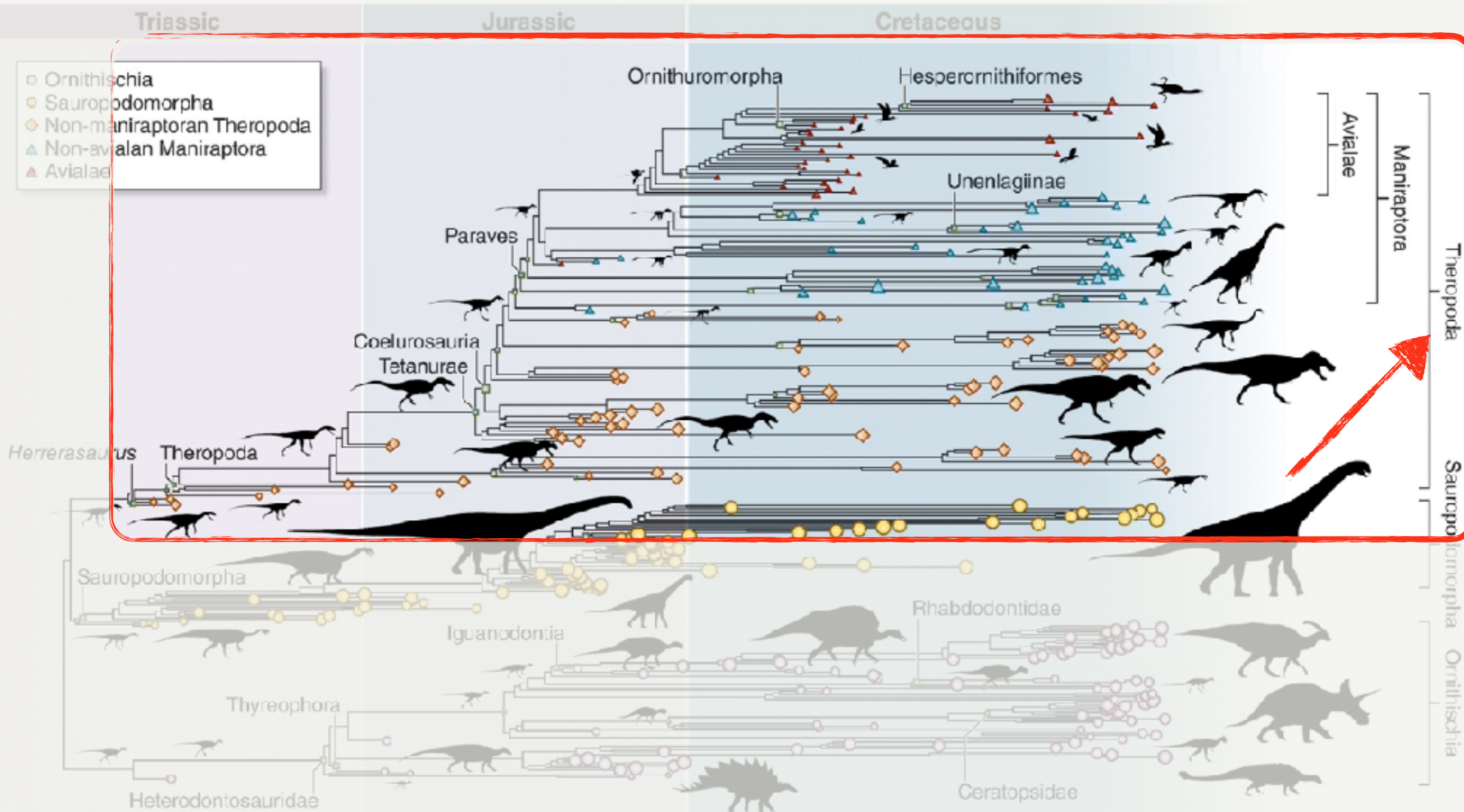


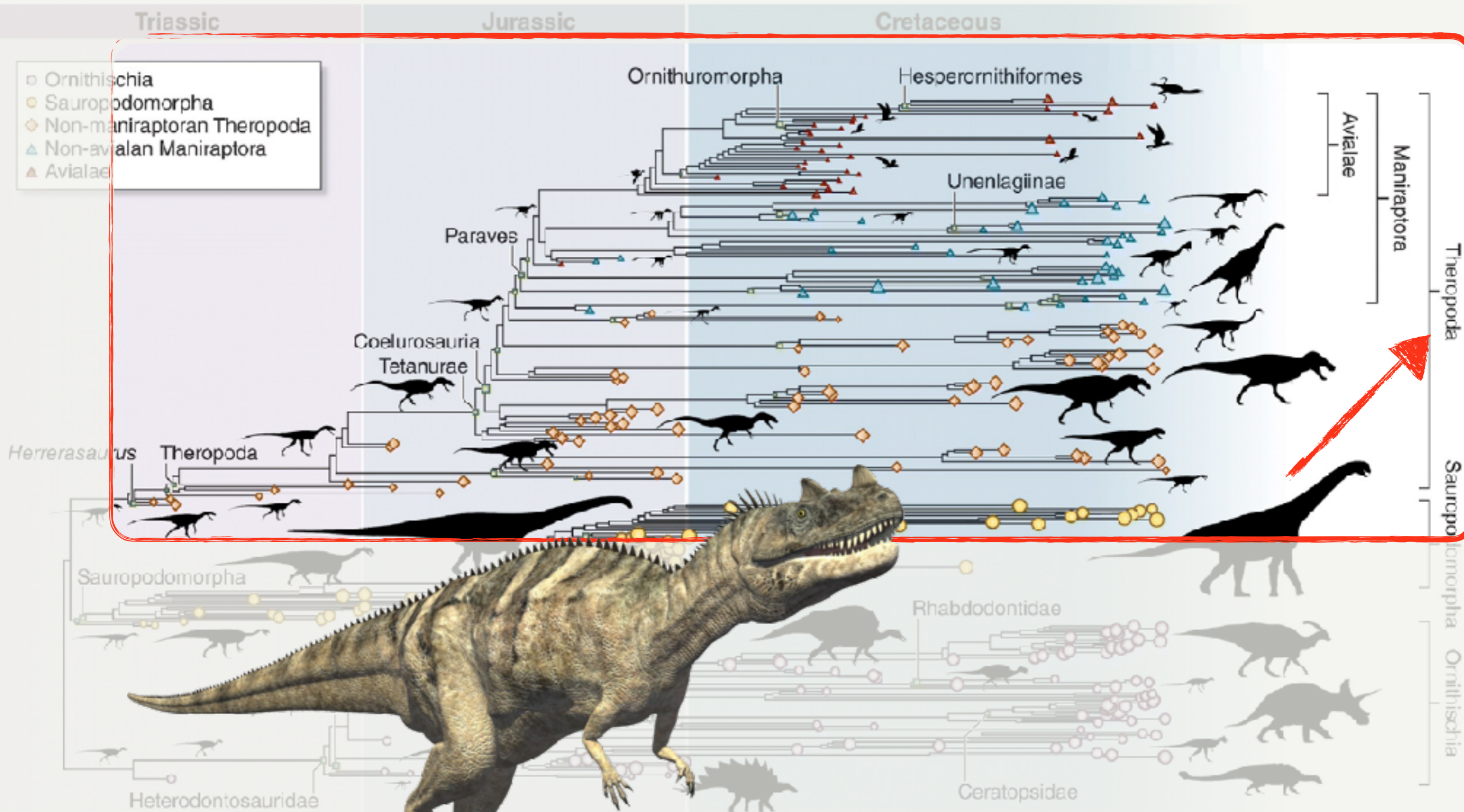
Benson et al. 2014

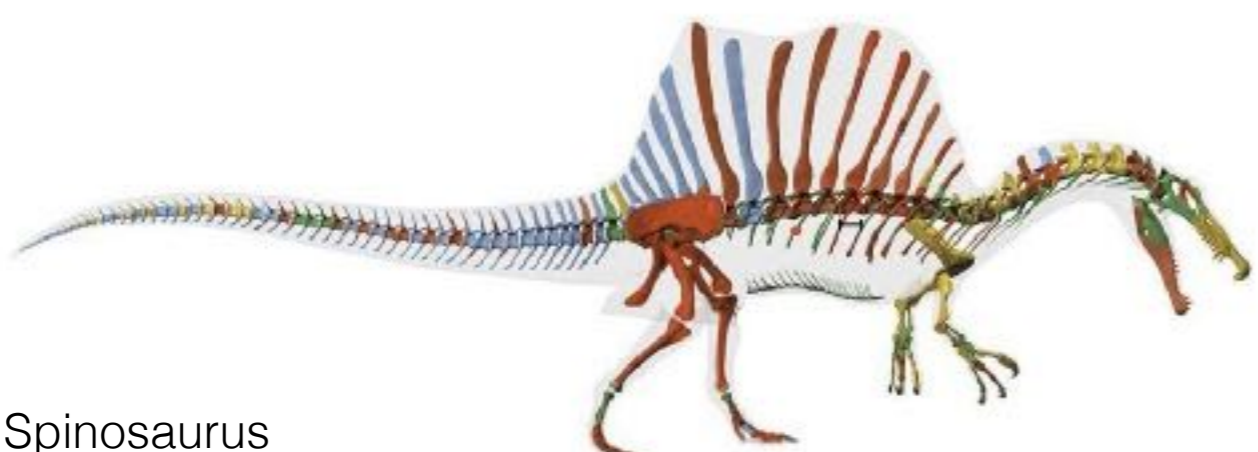
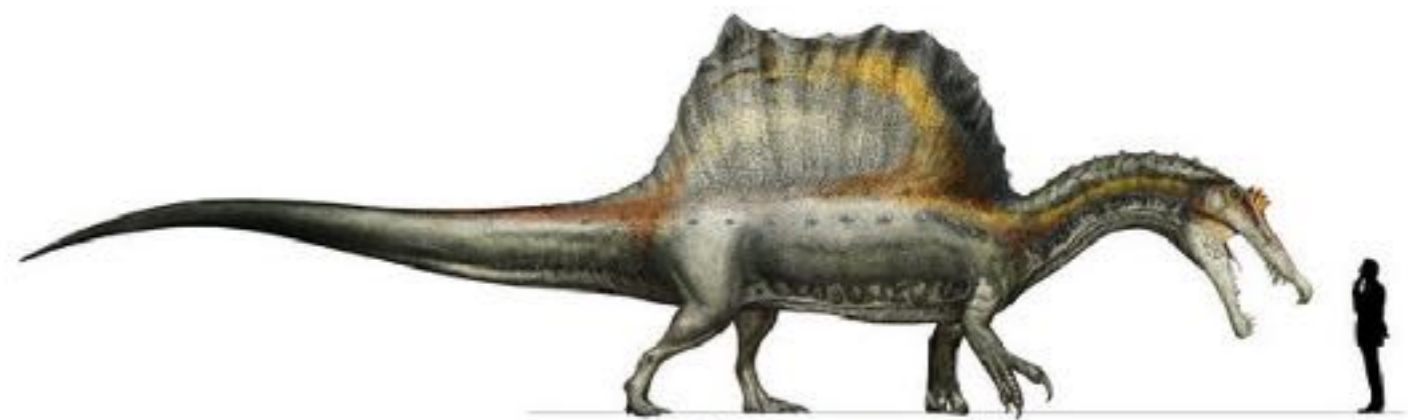
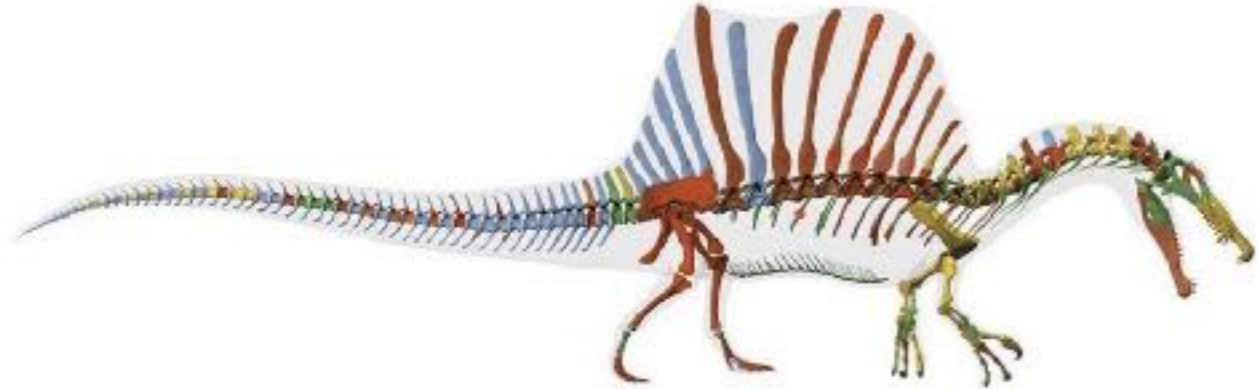




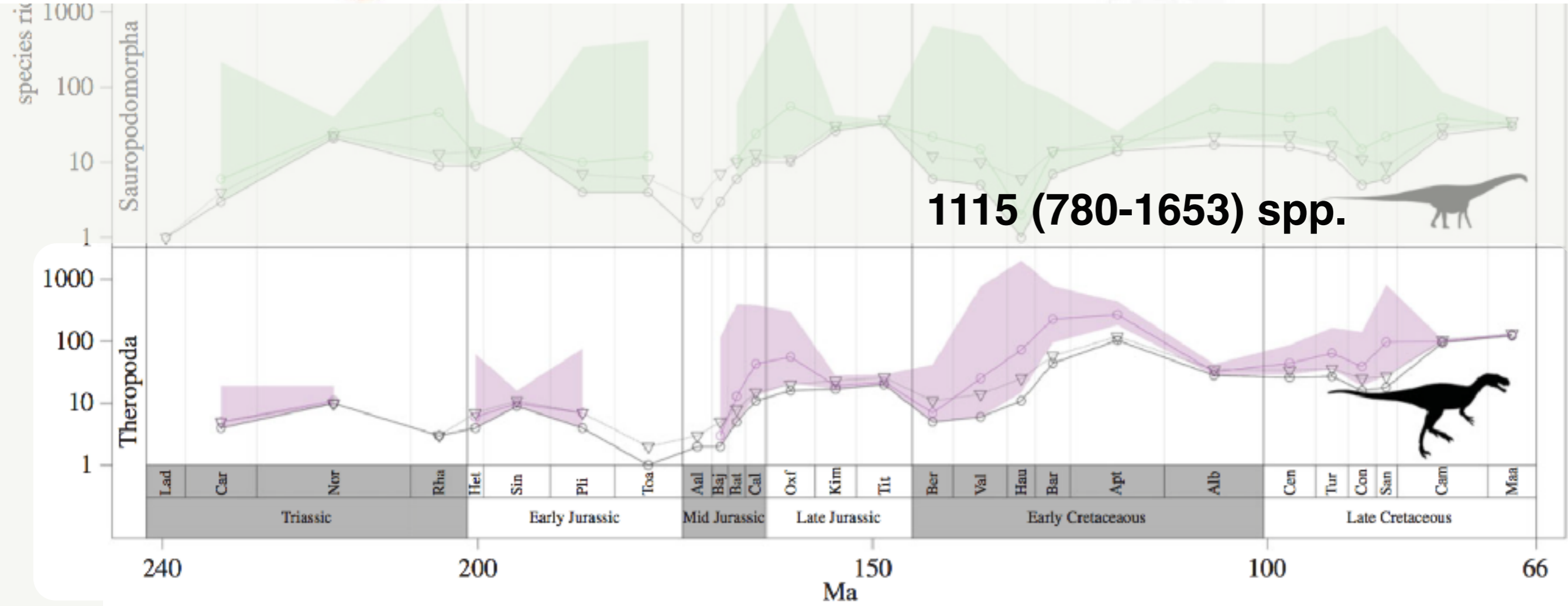






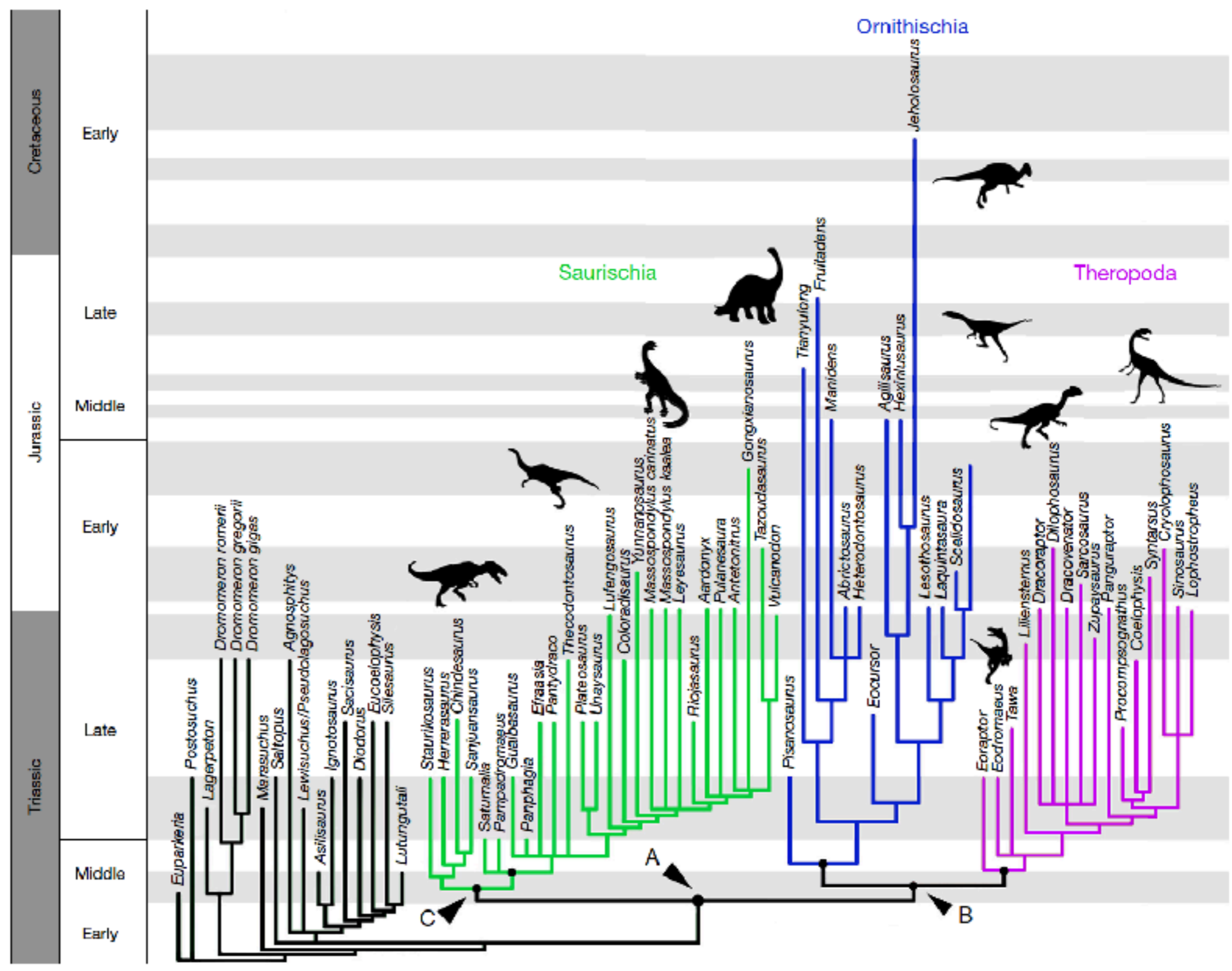


Spinosaurus

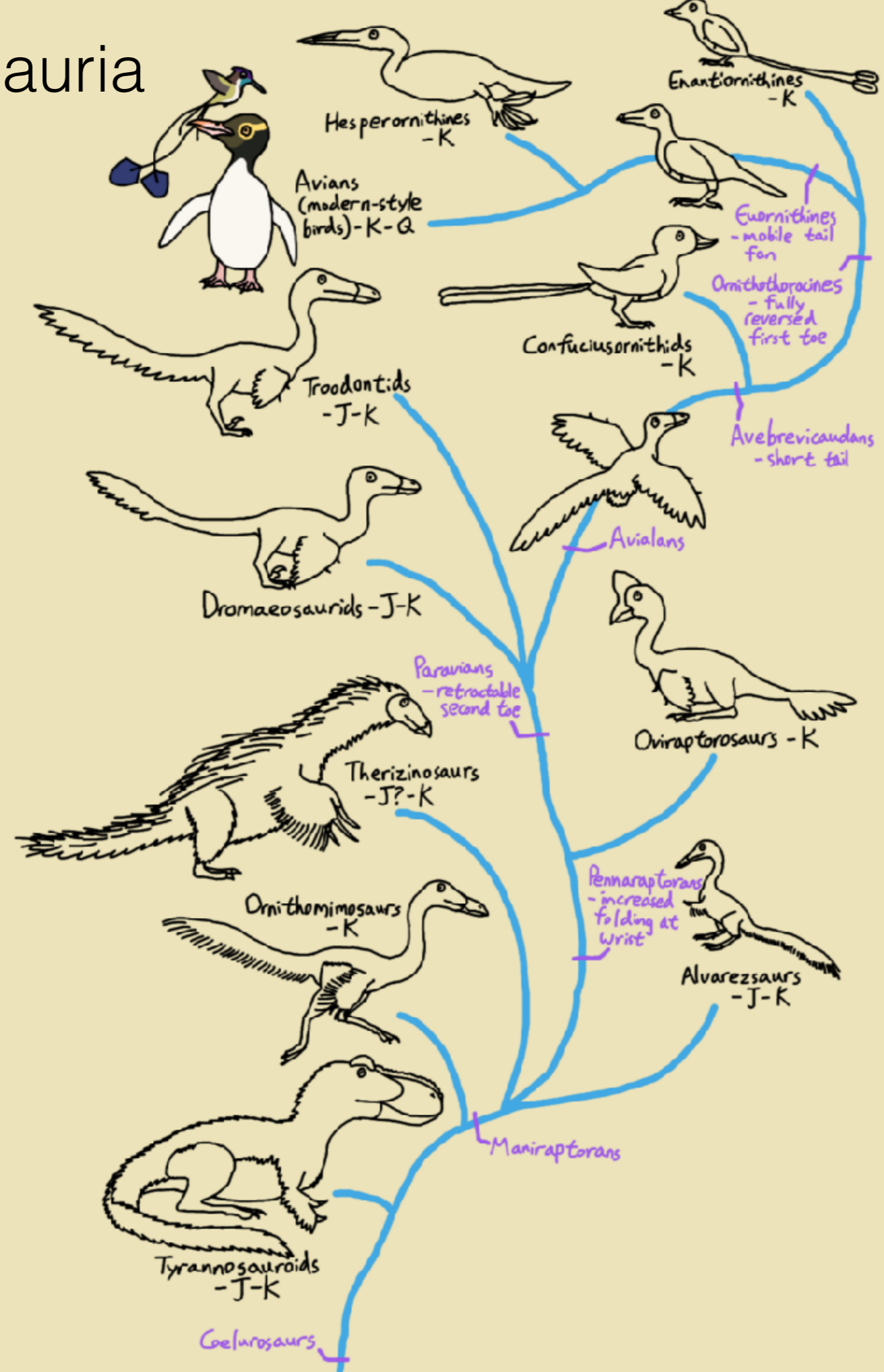


A new hypothesis of dinosaur relationships and early dinosaur evolution

Matthew G. Baron^{1,2}, David B. Norman¹ & Paul M. Barrett²

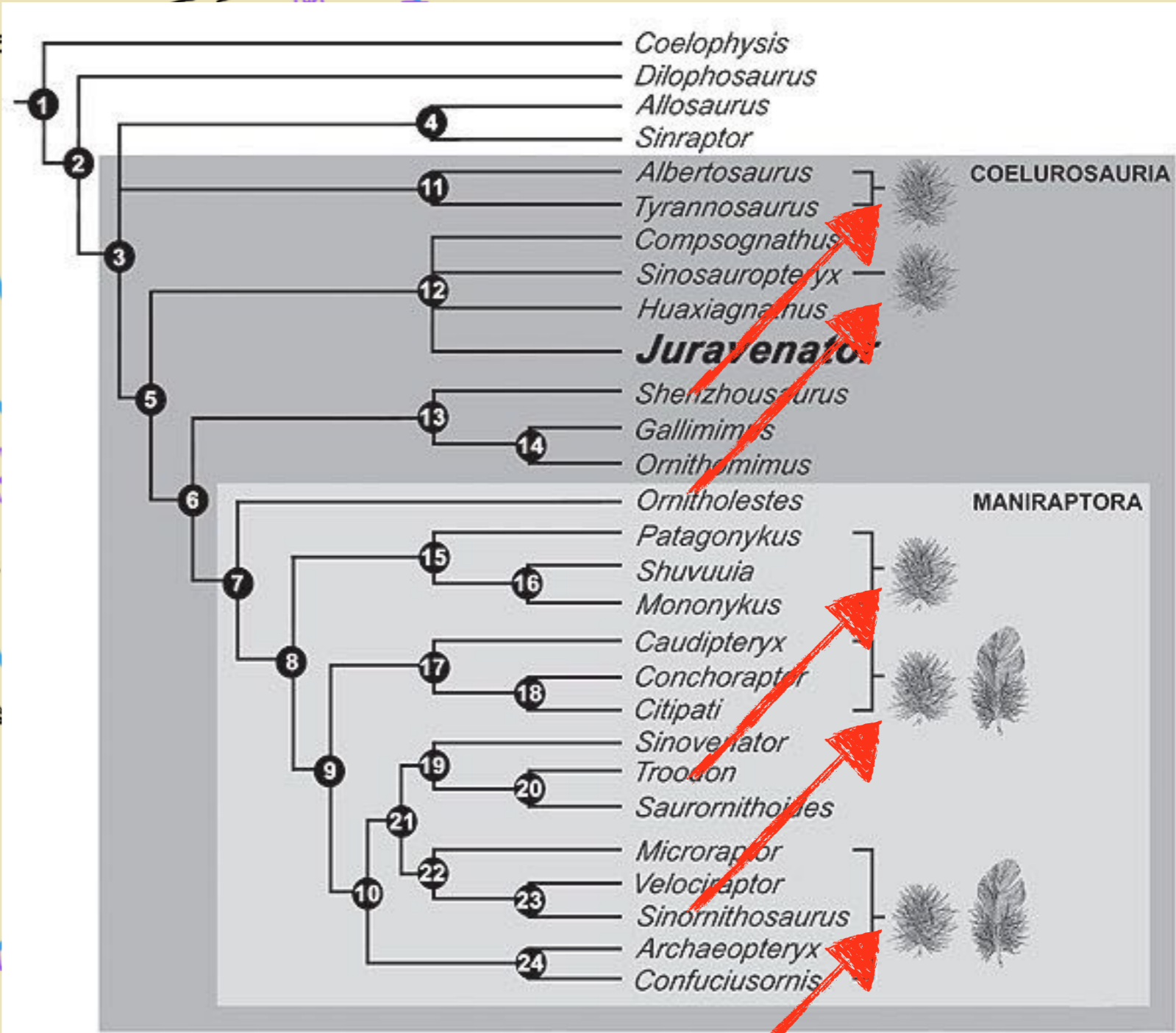
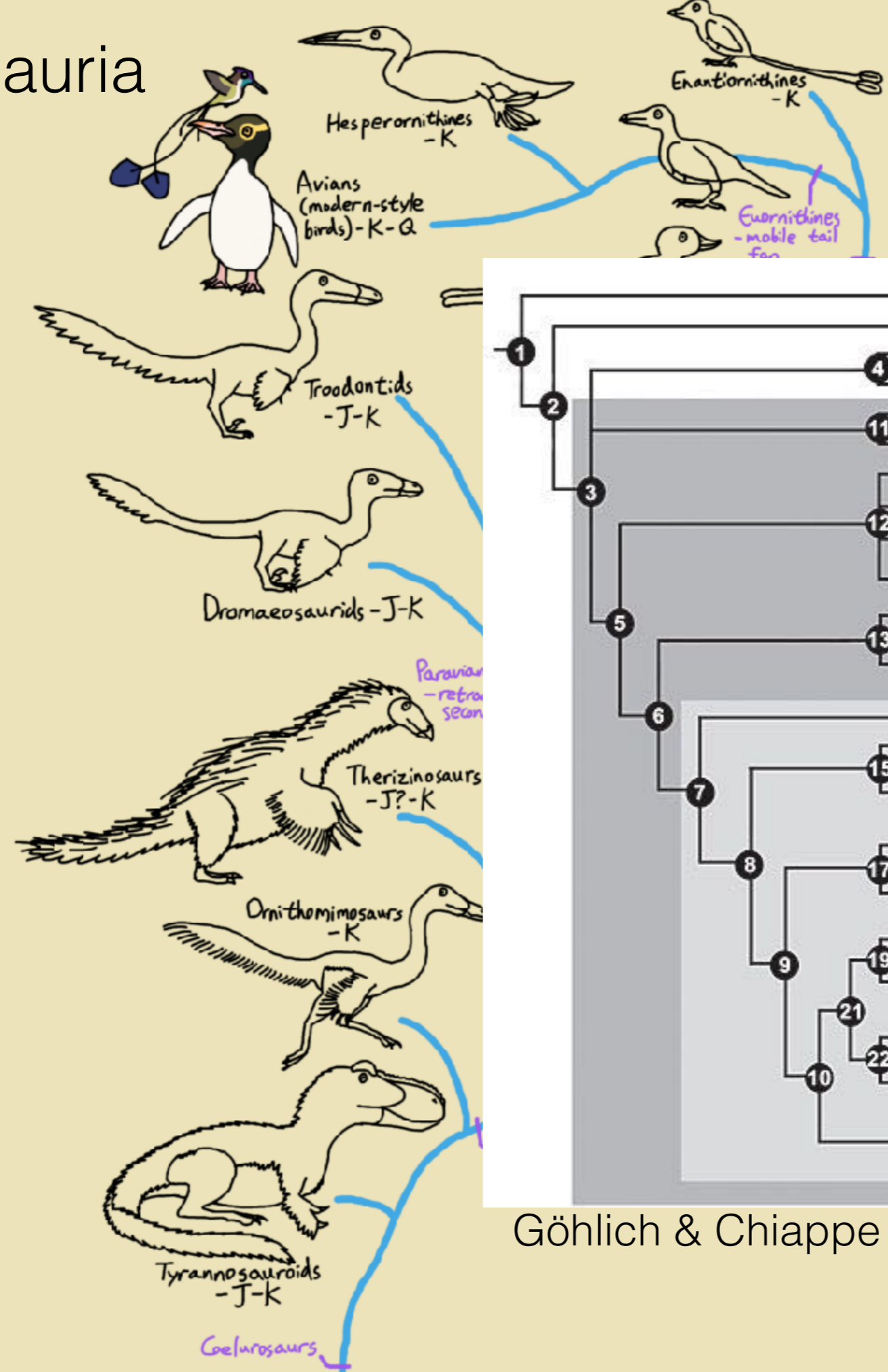


Coelurosauria



Jurássico (165 mya)

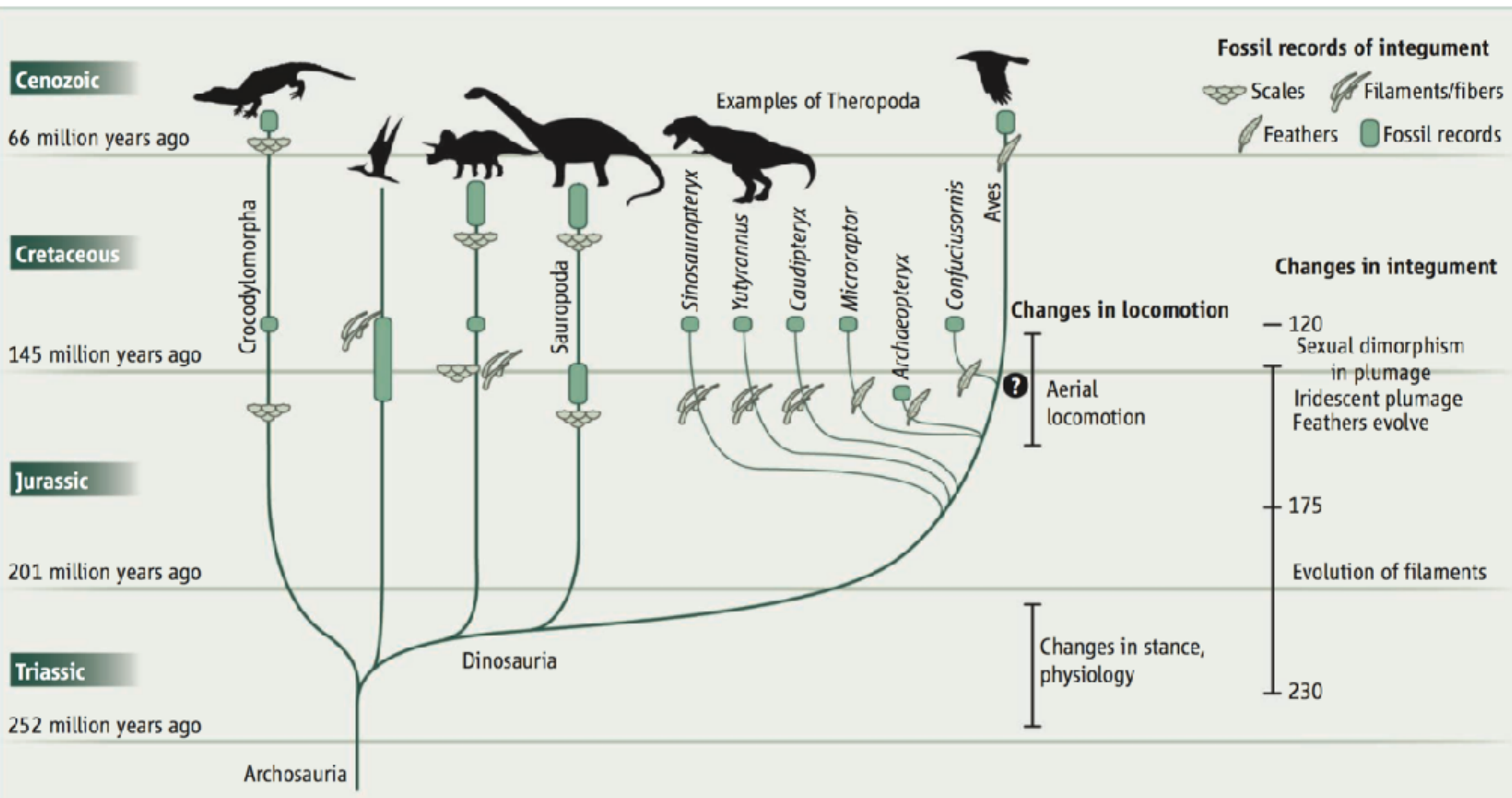
Coelurosauria



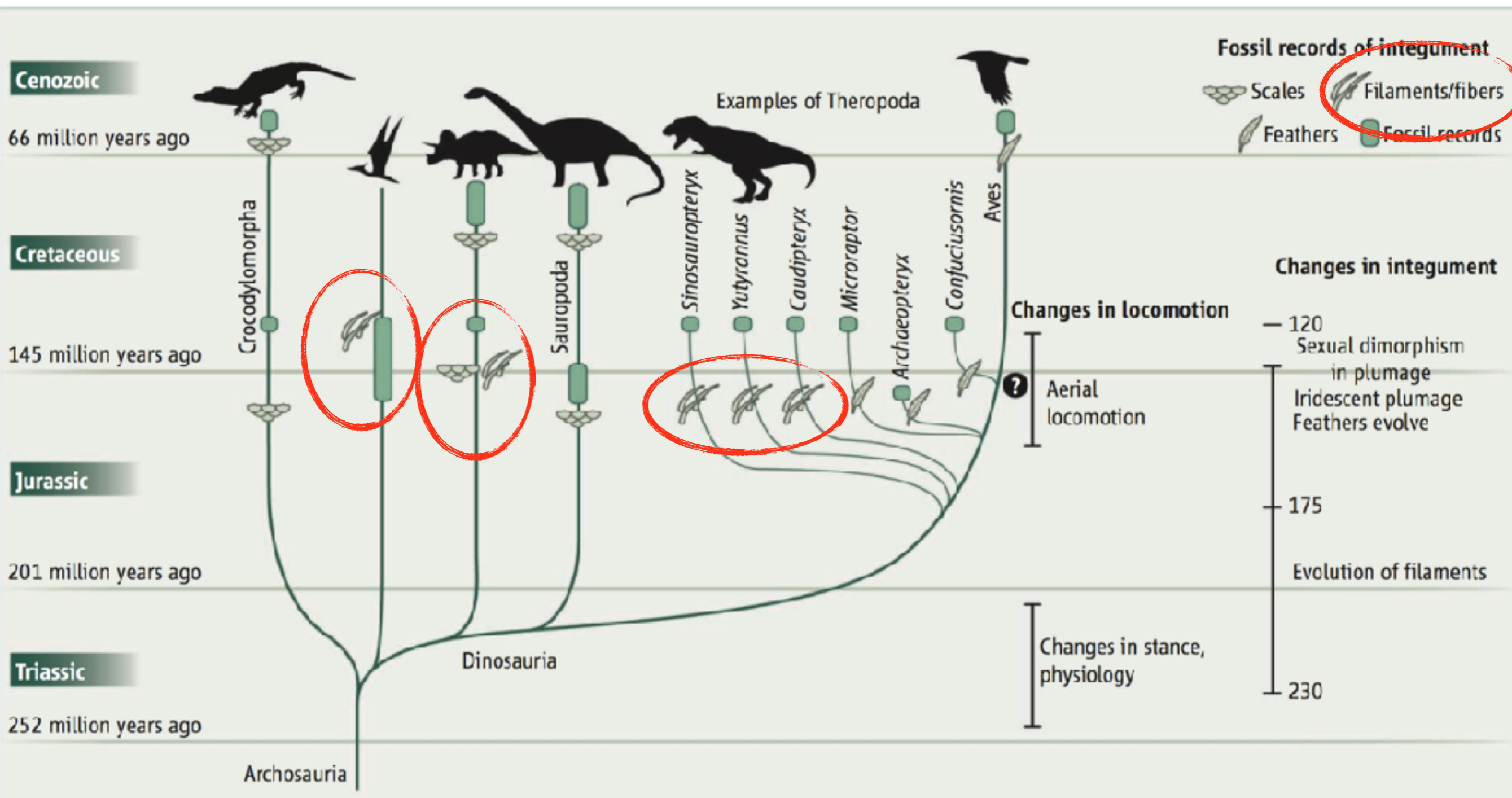
Göhlich & Chiappe 2006

Jurássico (165 mya)

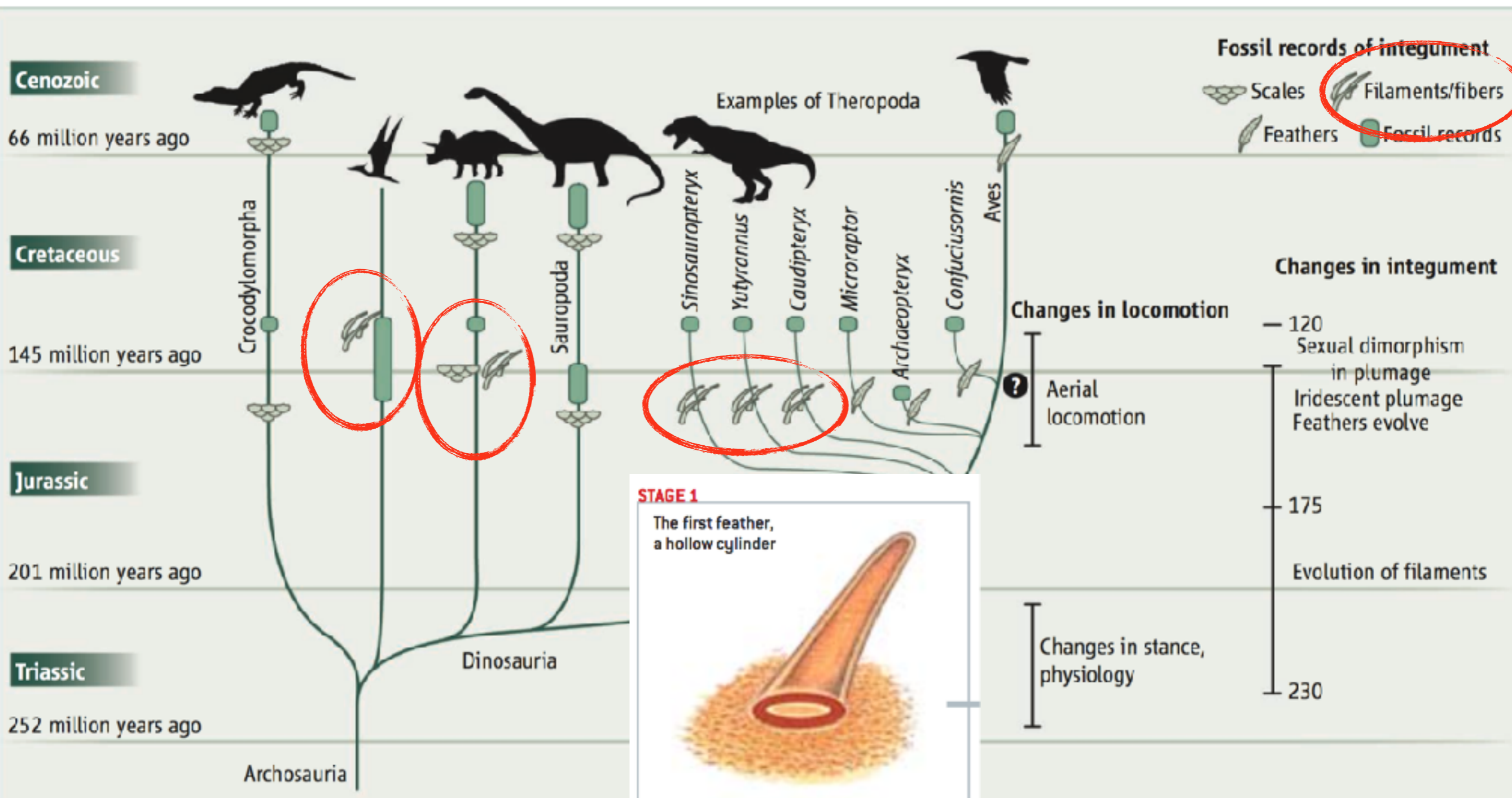
Coelurosauria



Coelurosauria



Coelurosauria



STAGE 1

The first feather, a hollow cylinder

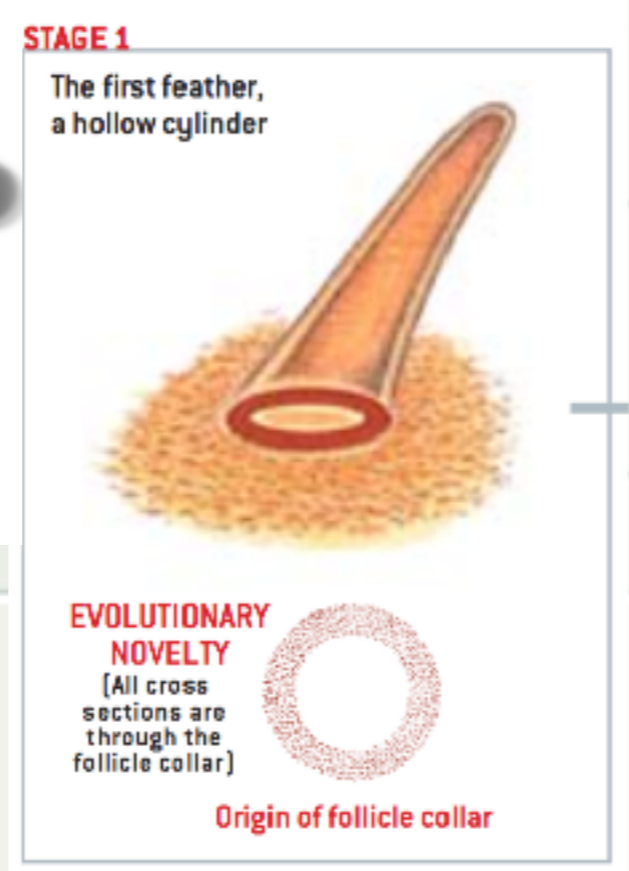
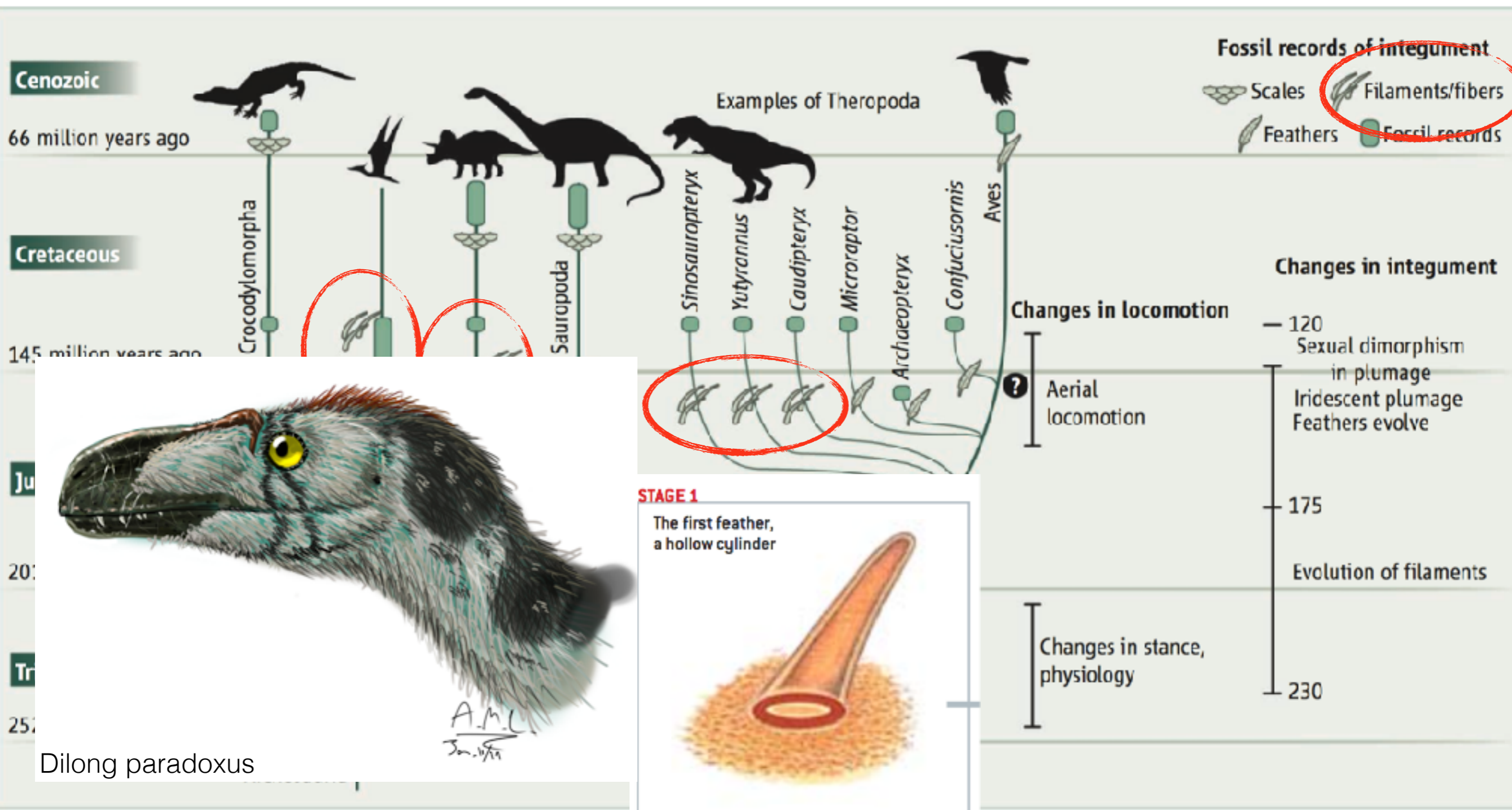
EVOLUTIONARY NOVELTY
[All cross sections are through the follicle collar]

Origin of follicle collar

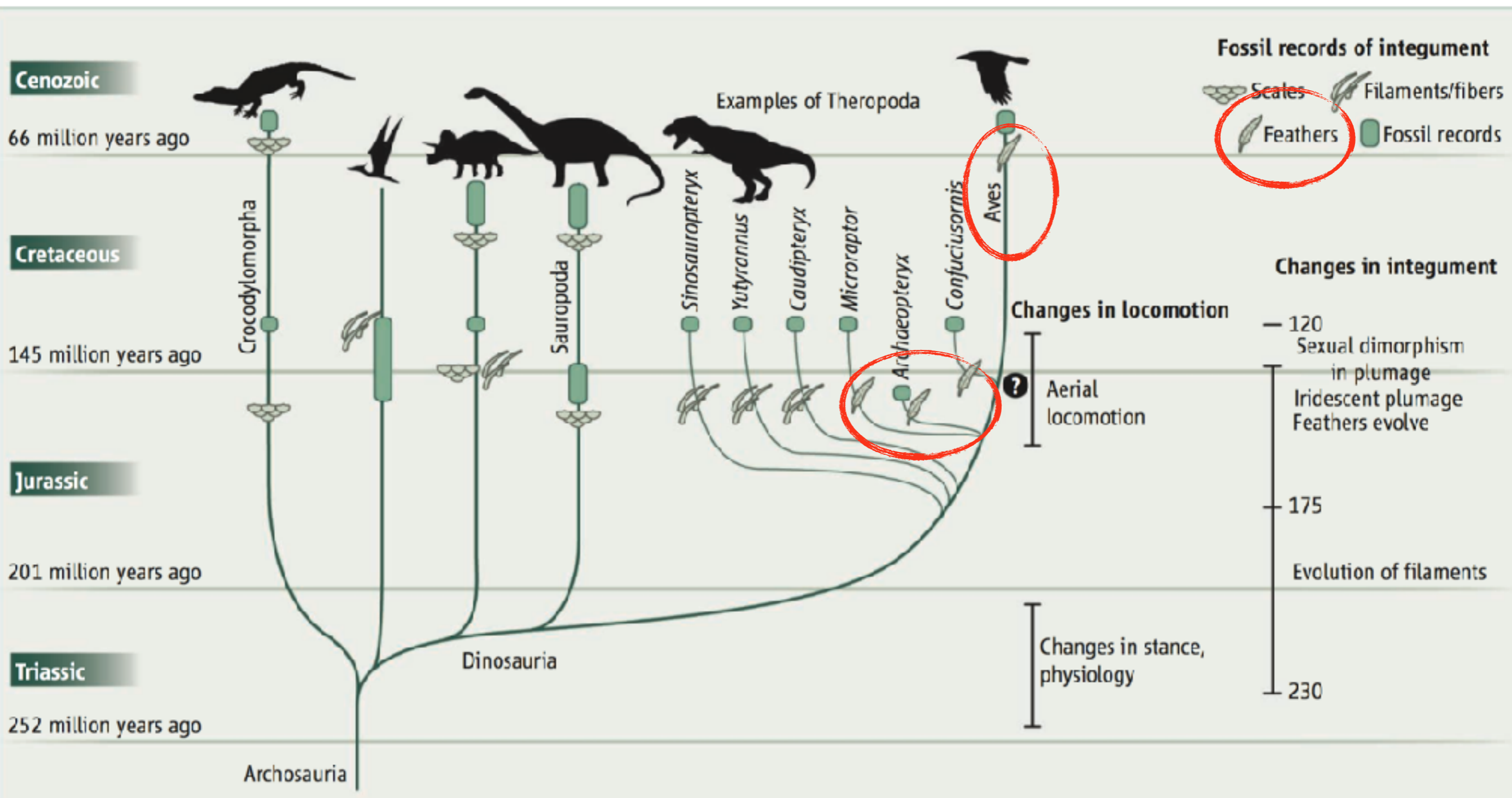
Prum & Brush 2003

Clarke 2013

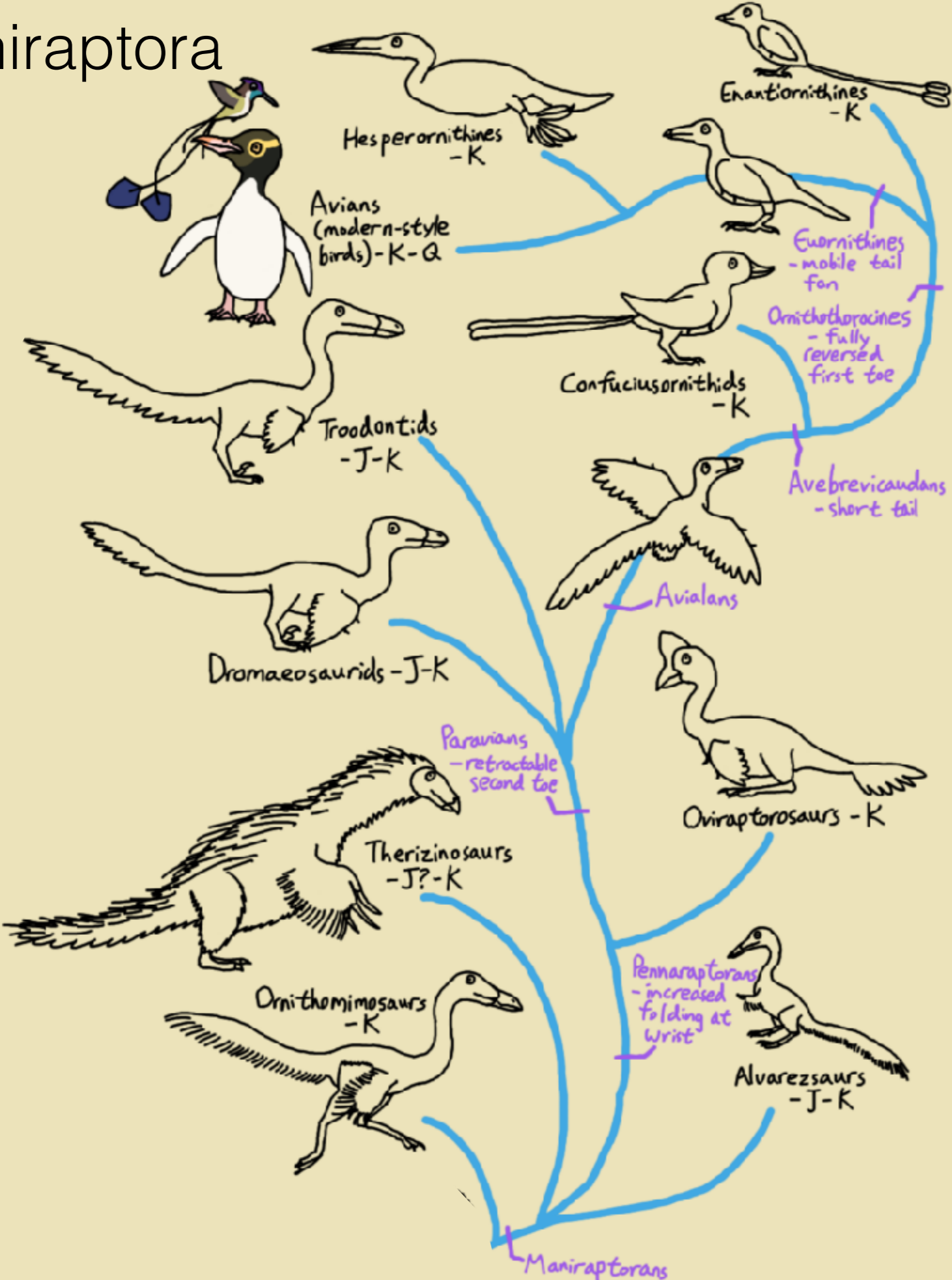
Coelurosauria



Coelurosauria



Maniraptora



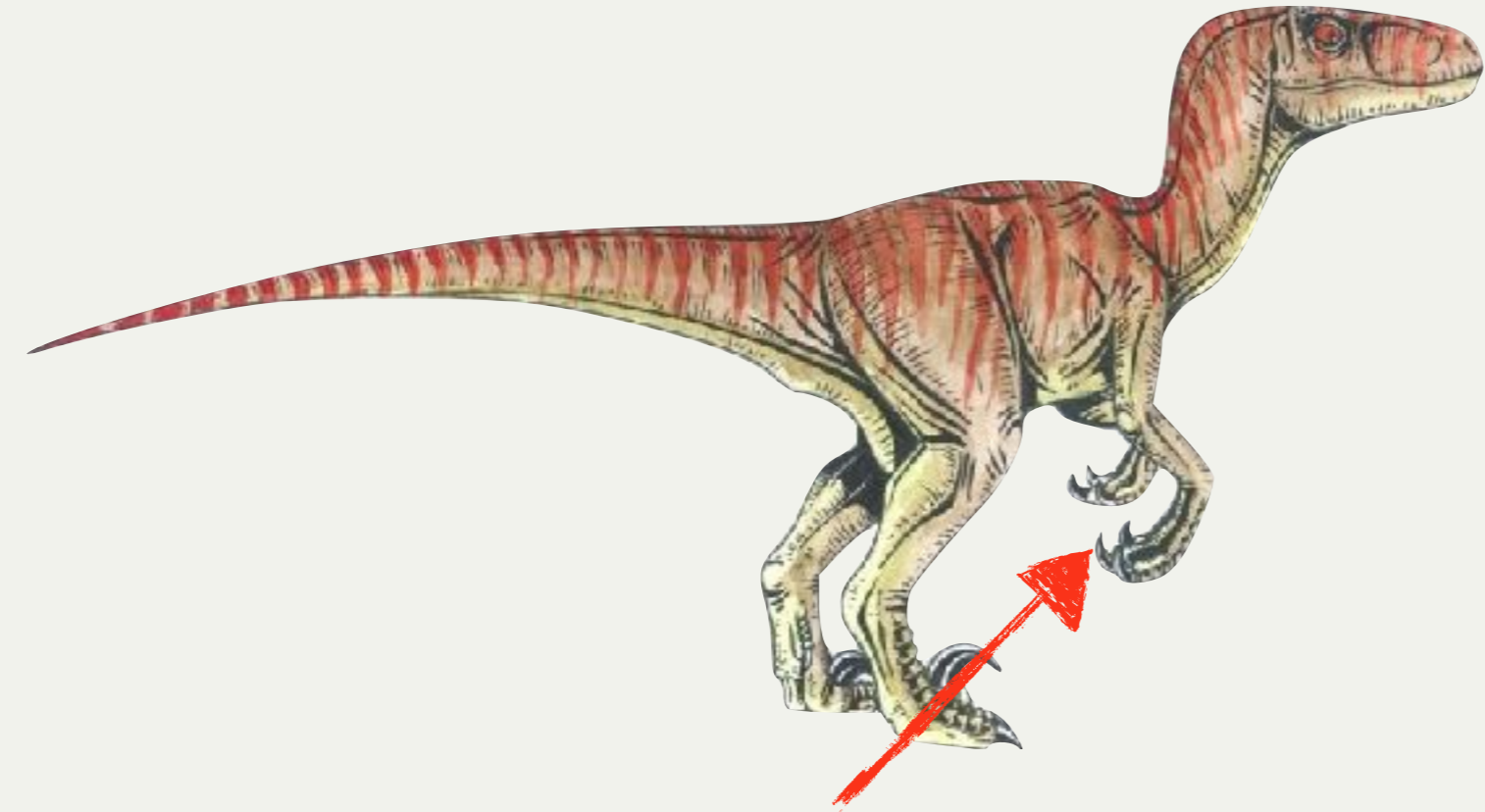
Jurássico (160 mya)

Maniraptora



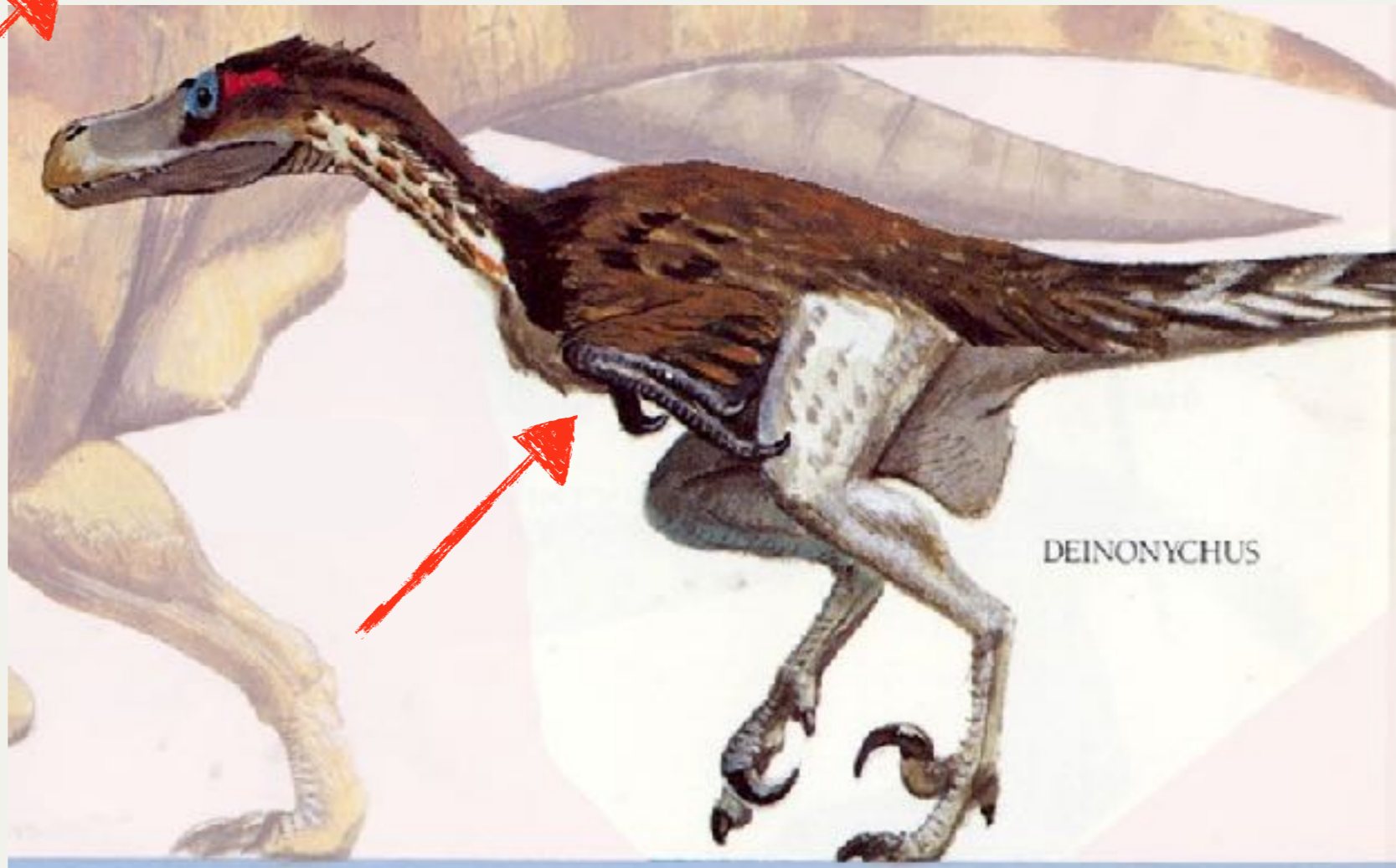
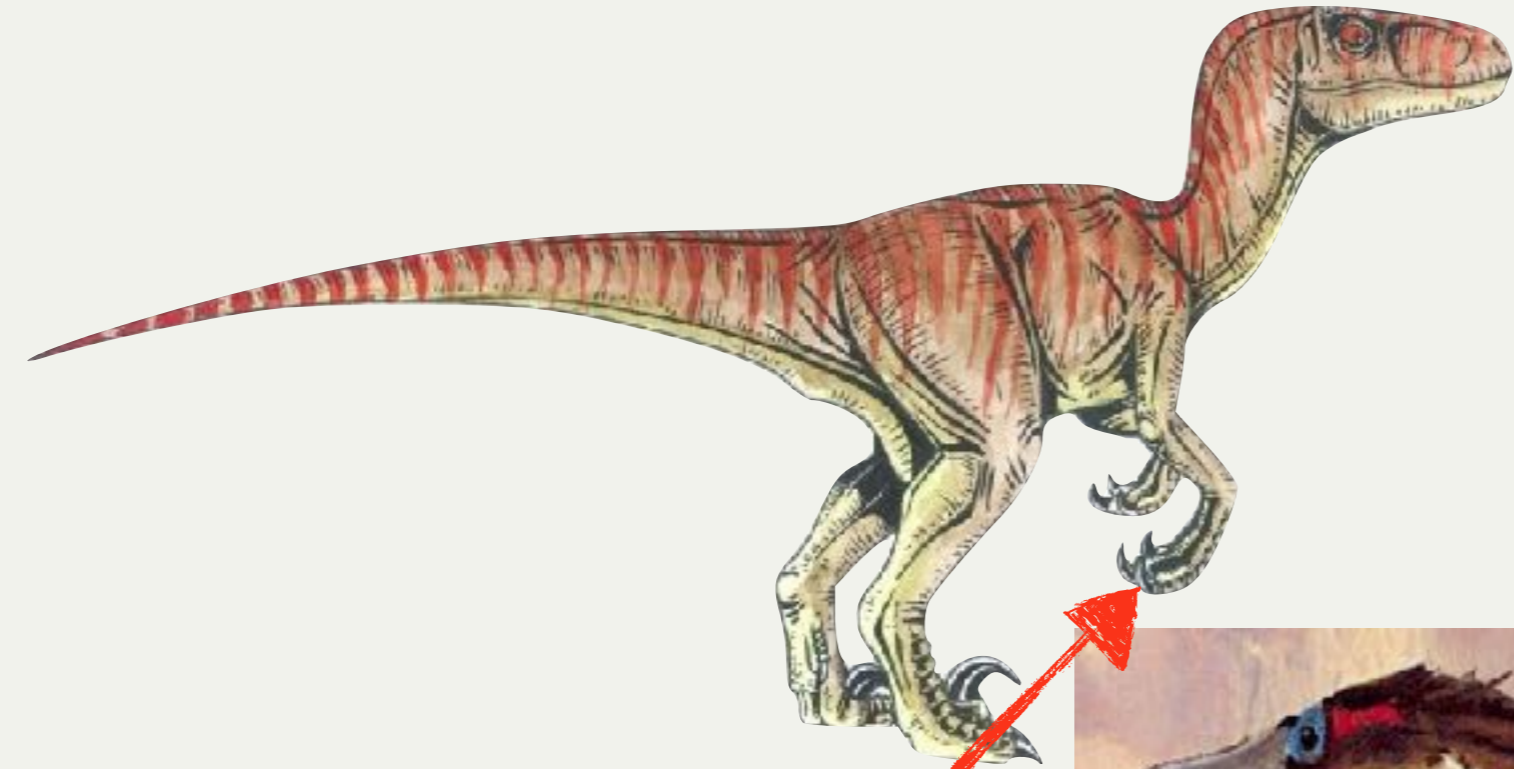
Deinonychus antirrhopus

Maniraptora



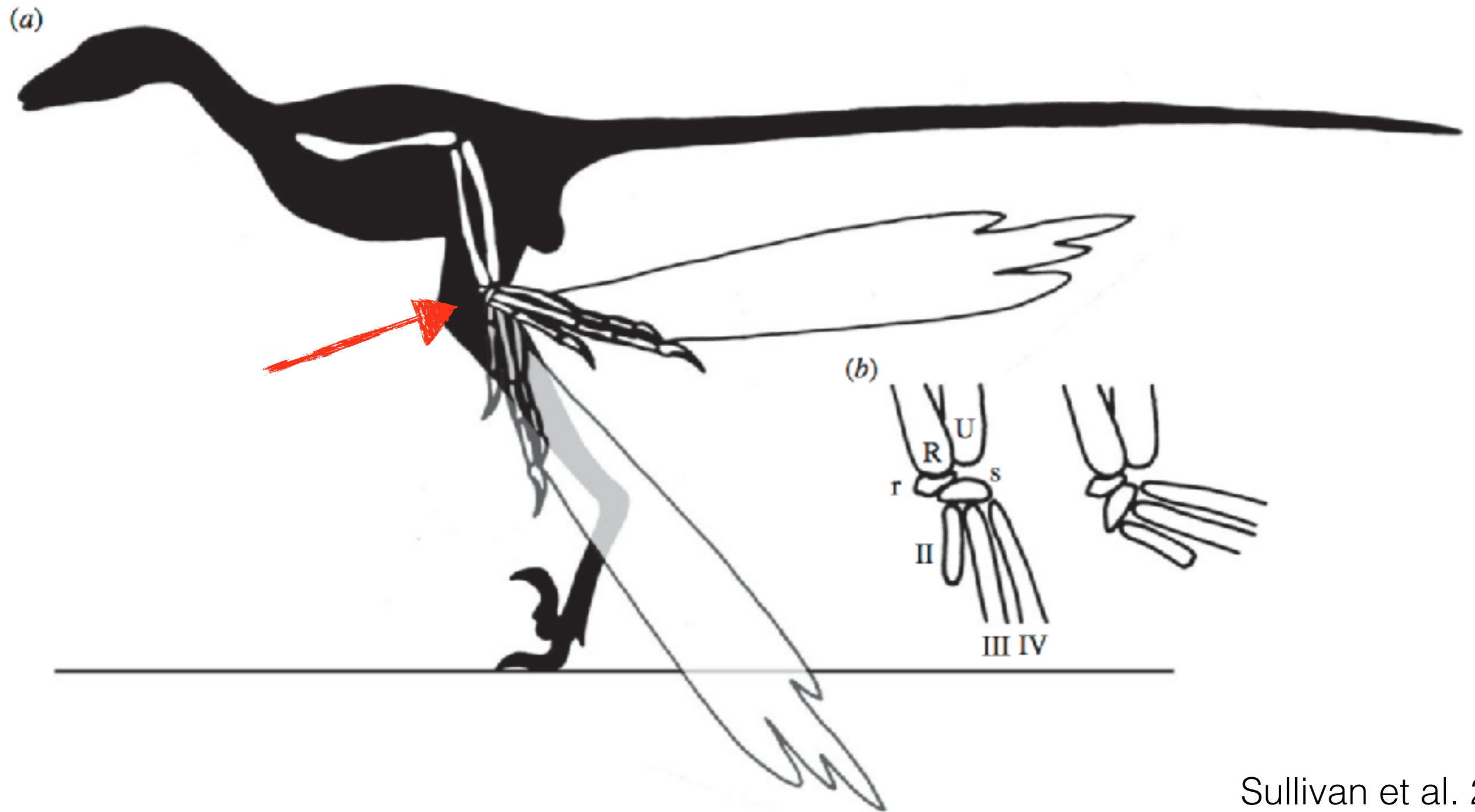
Deinonychus antirrhopus

Maniraptora



Deinonychus antirrhopus

Maniraptora





Deinonychus antirrhopus



Deinonychus antirrhopus (Ostrom, 1969)

Life reconstruction based on the skeleton reconstruction made by Scott Hartman

LUCCIONI - LORIS KATZ

Deinonychus antirrhopus



Deinonychus antirrhopus (Ostrom, 1969)

Life reconstruction based on the skeleton reconstruction by Scott Hartman

LUCCIONE - ARTIST

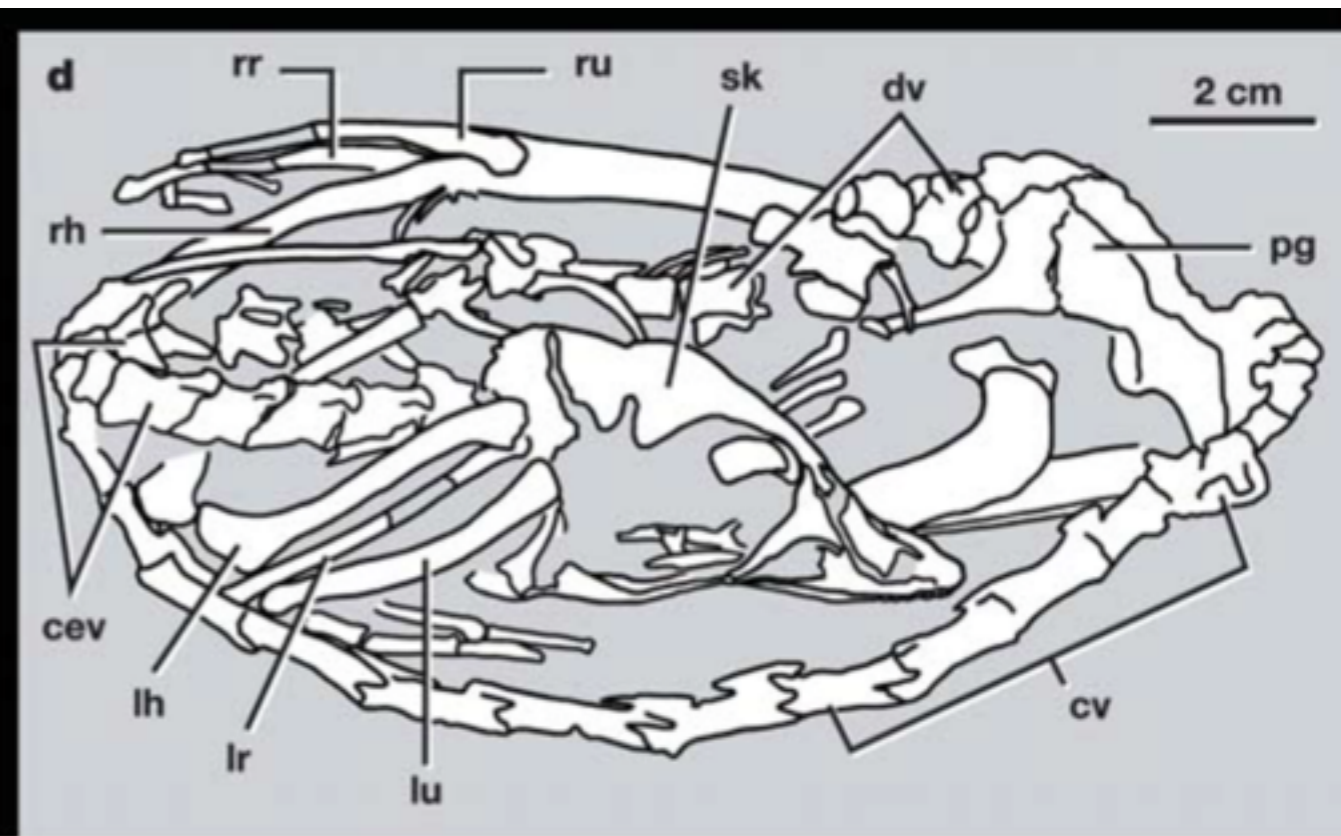
Deinonychus antirrhopus



Tyrannosaurus rex

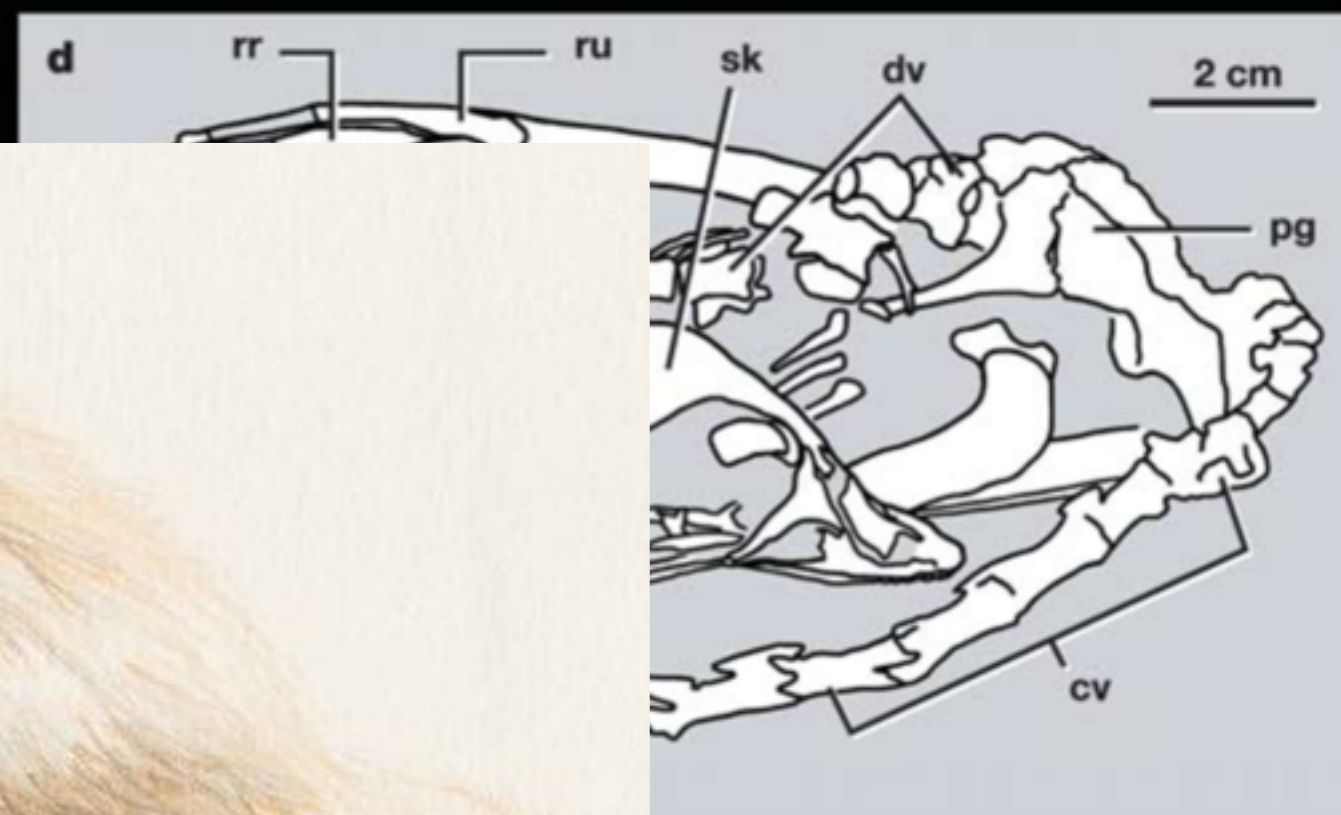
A new troodontid dinosaur from China with avian-like sleeping posture

Xing Xu^{1,2} & Mark A. Norell²

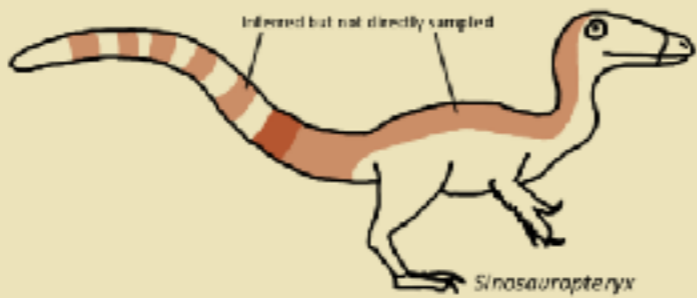
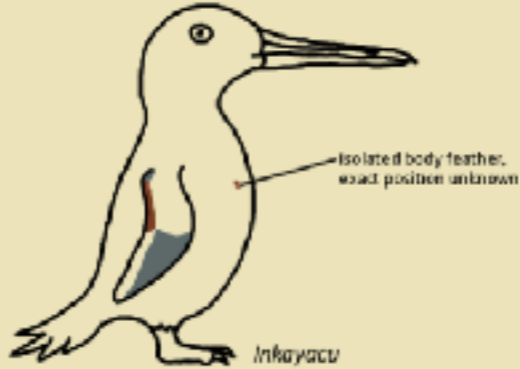


A new troodontid dinosaur from China with avian-like sleeping posture

Xing Xu^{1,2} & Mark A. Norell²



Cores!

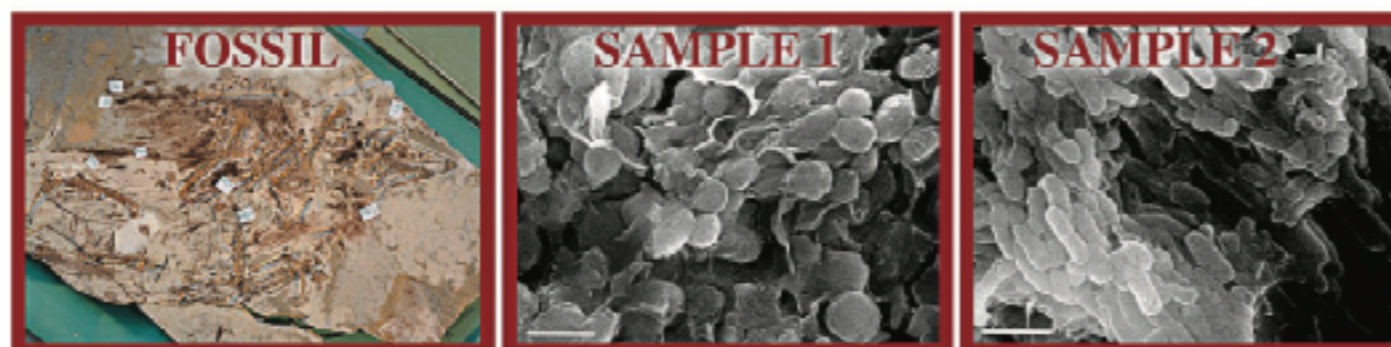
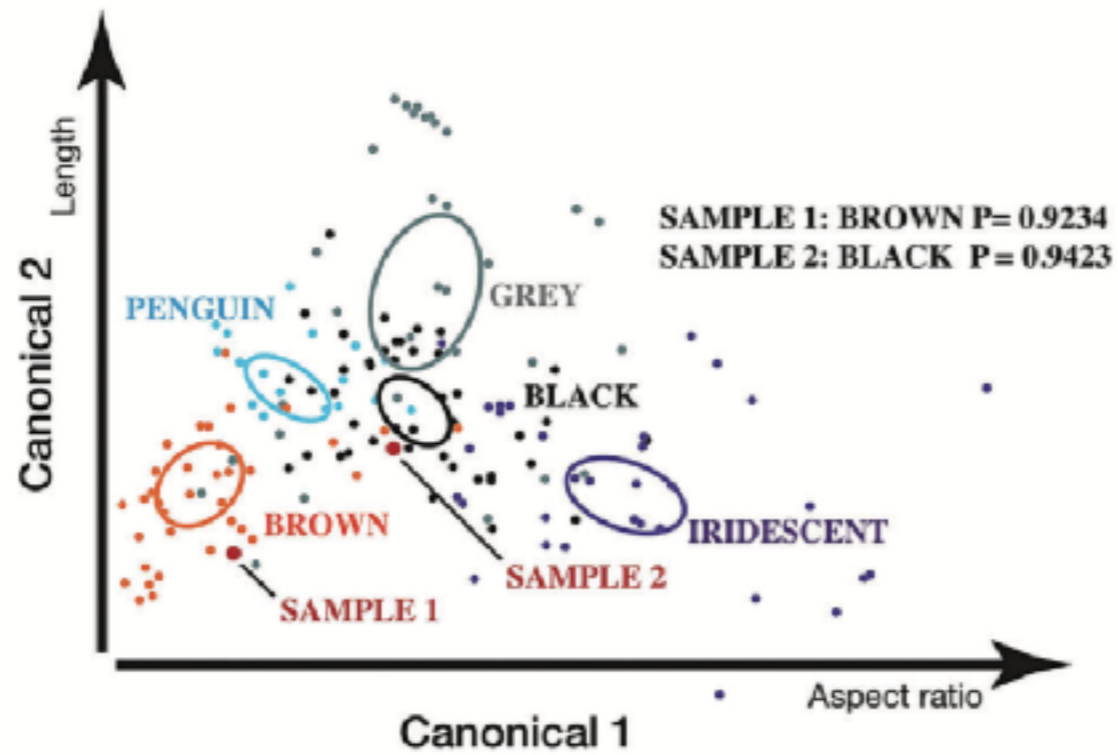


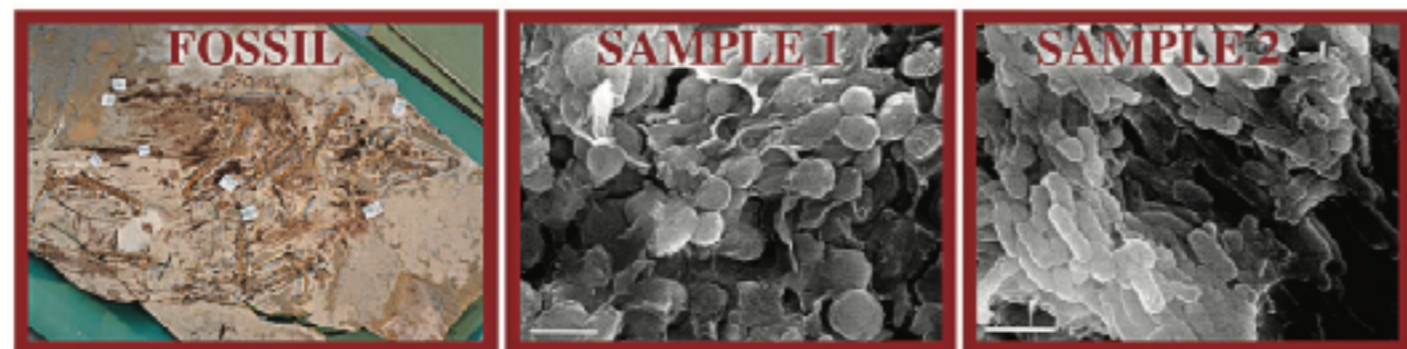
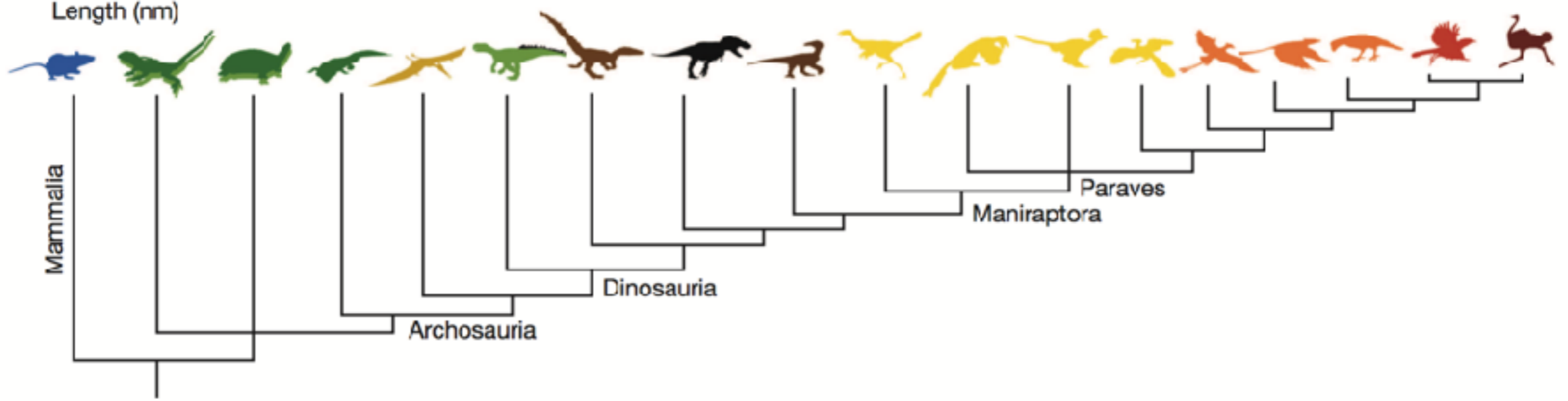
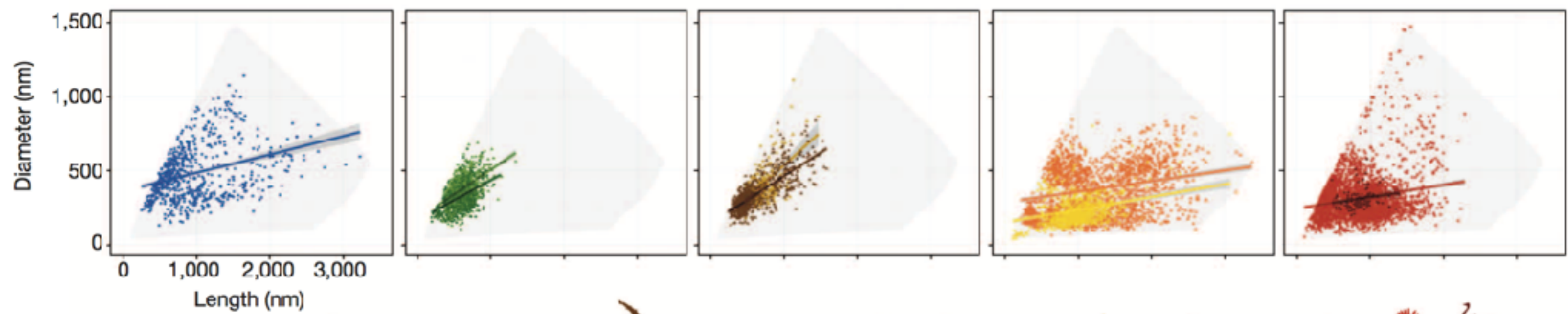
© MAGIA
NEGRA...



...É ESSA



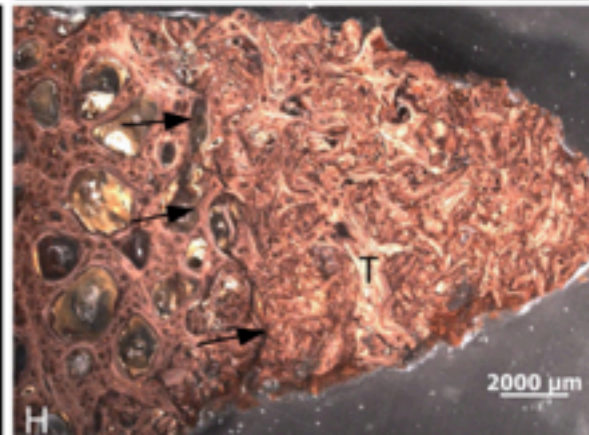
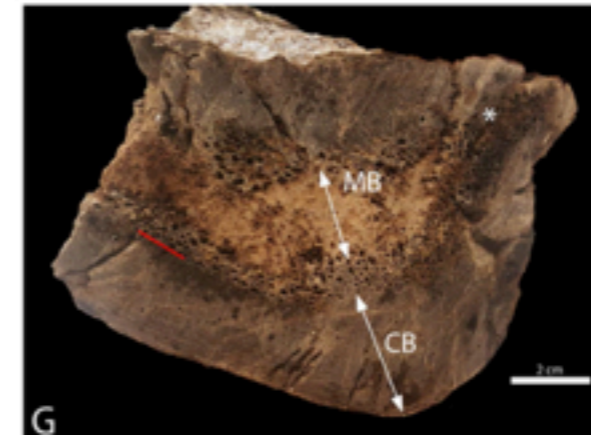
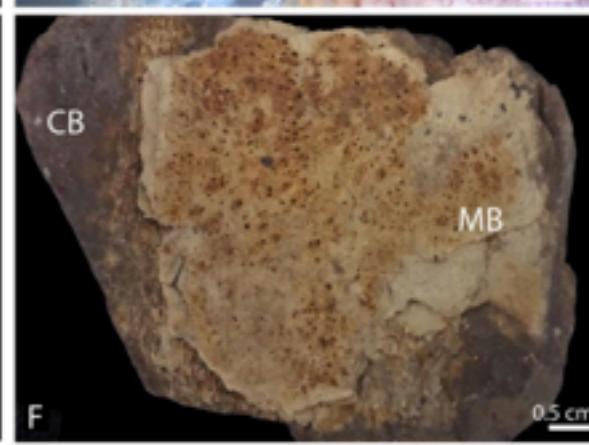
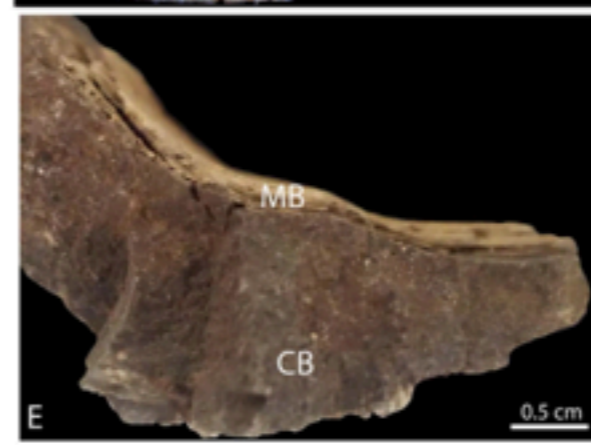
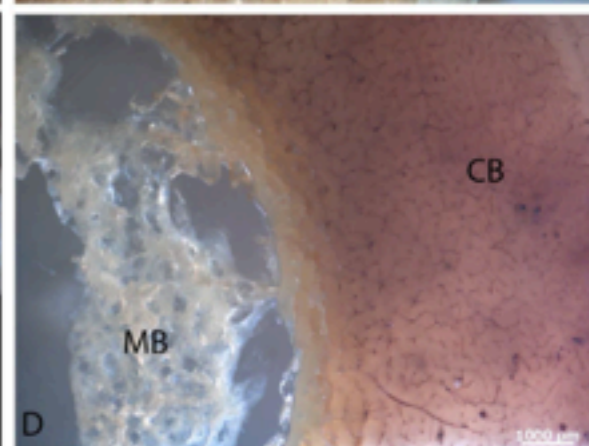
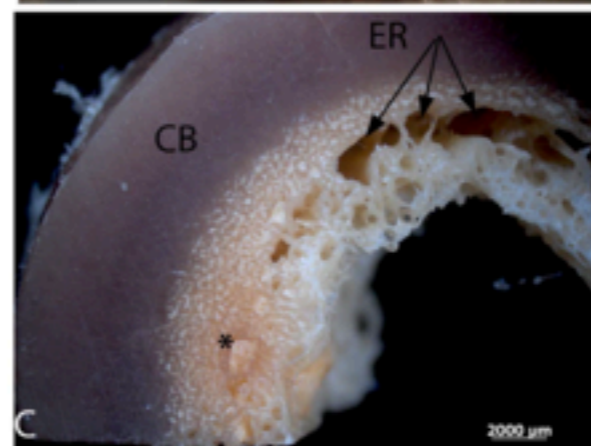
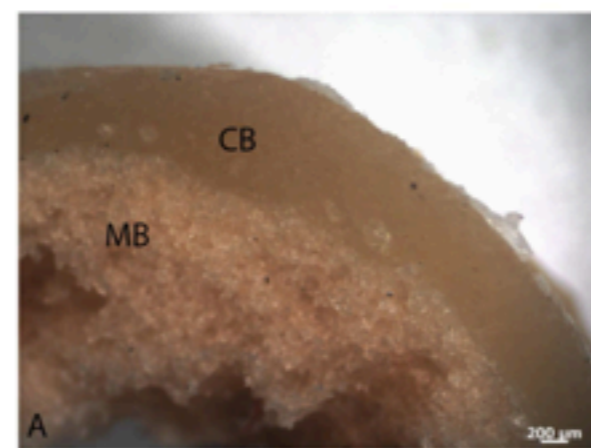




ELE OU ELA?



ELE OU ELA?

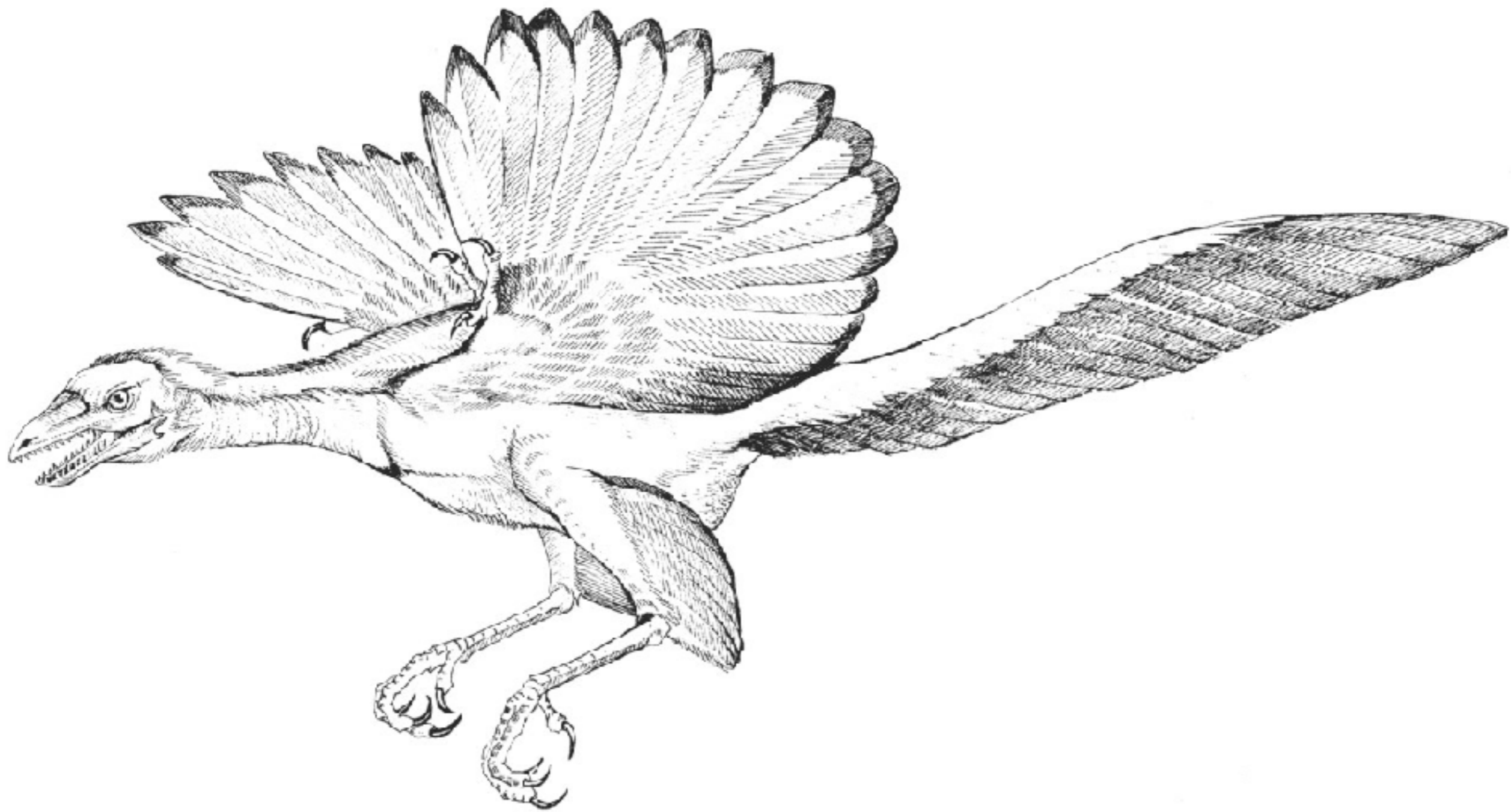


ELE OU ELA?





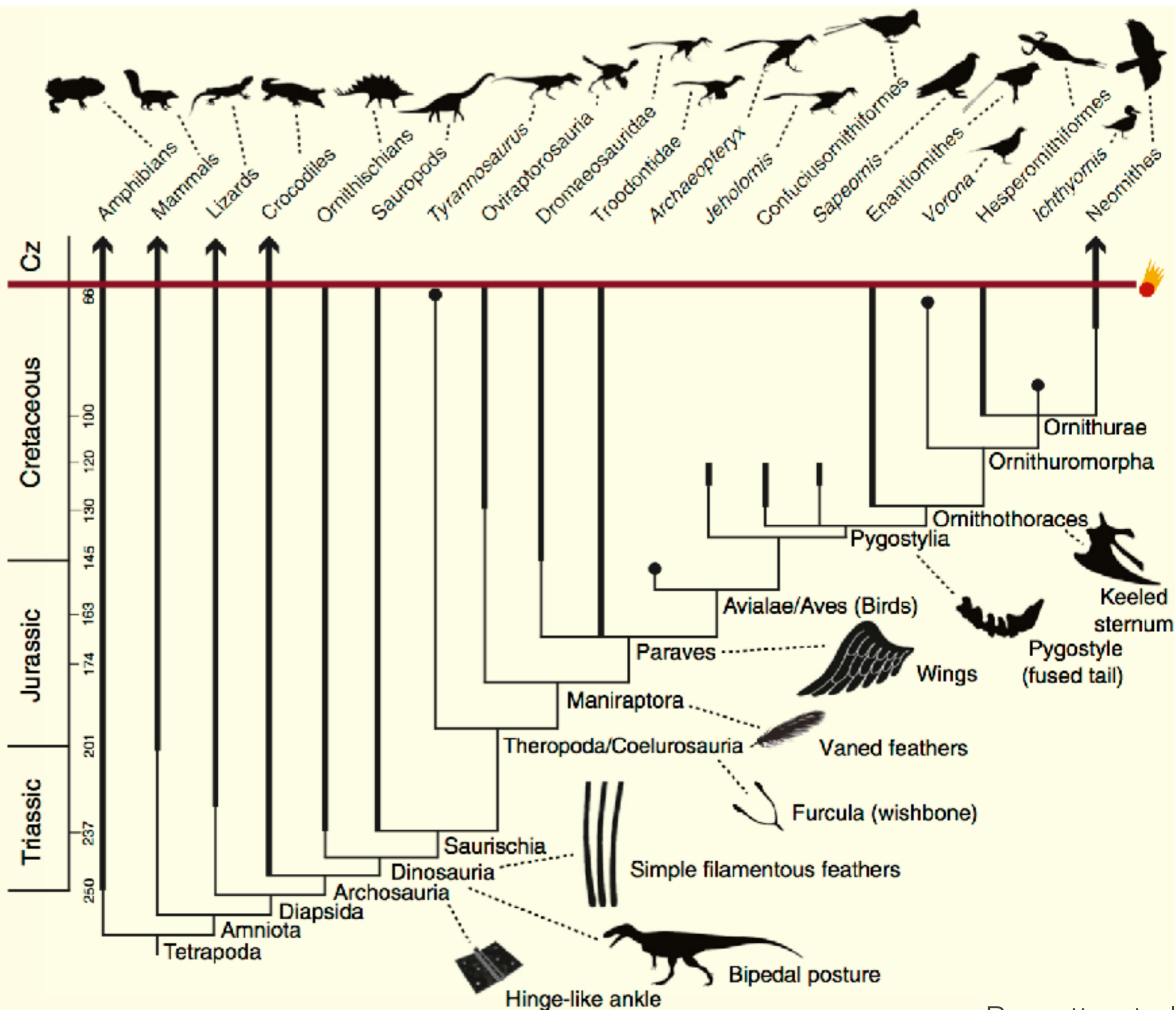
Archaeopteryx

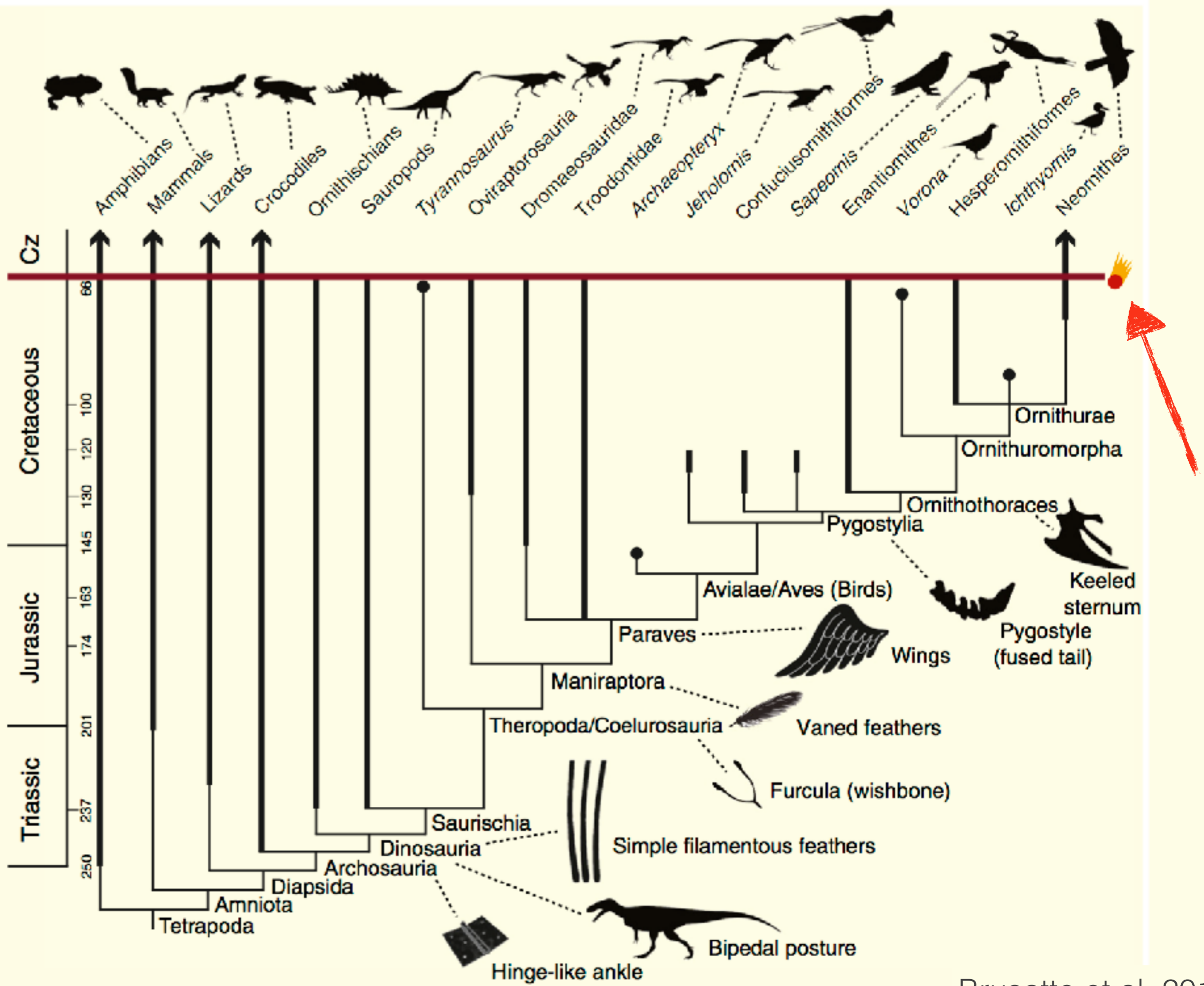


Archaeopteryx

RESUMO DA HISTÓRIA









NO WE DON'T WANT TO GET
IN YOUR STUPID BUNKER!





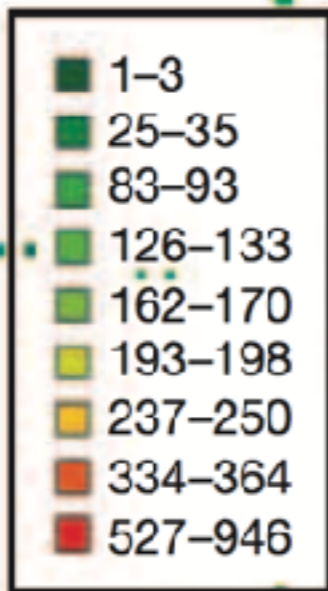
I am the almighty!

Fear the fuzzy!

Fear it!

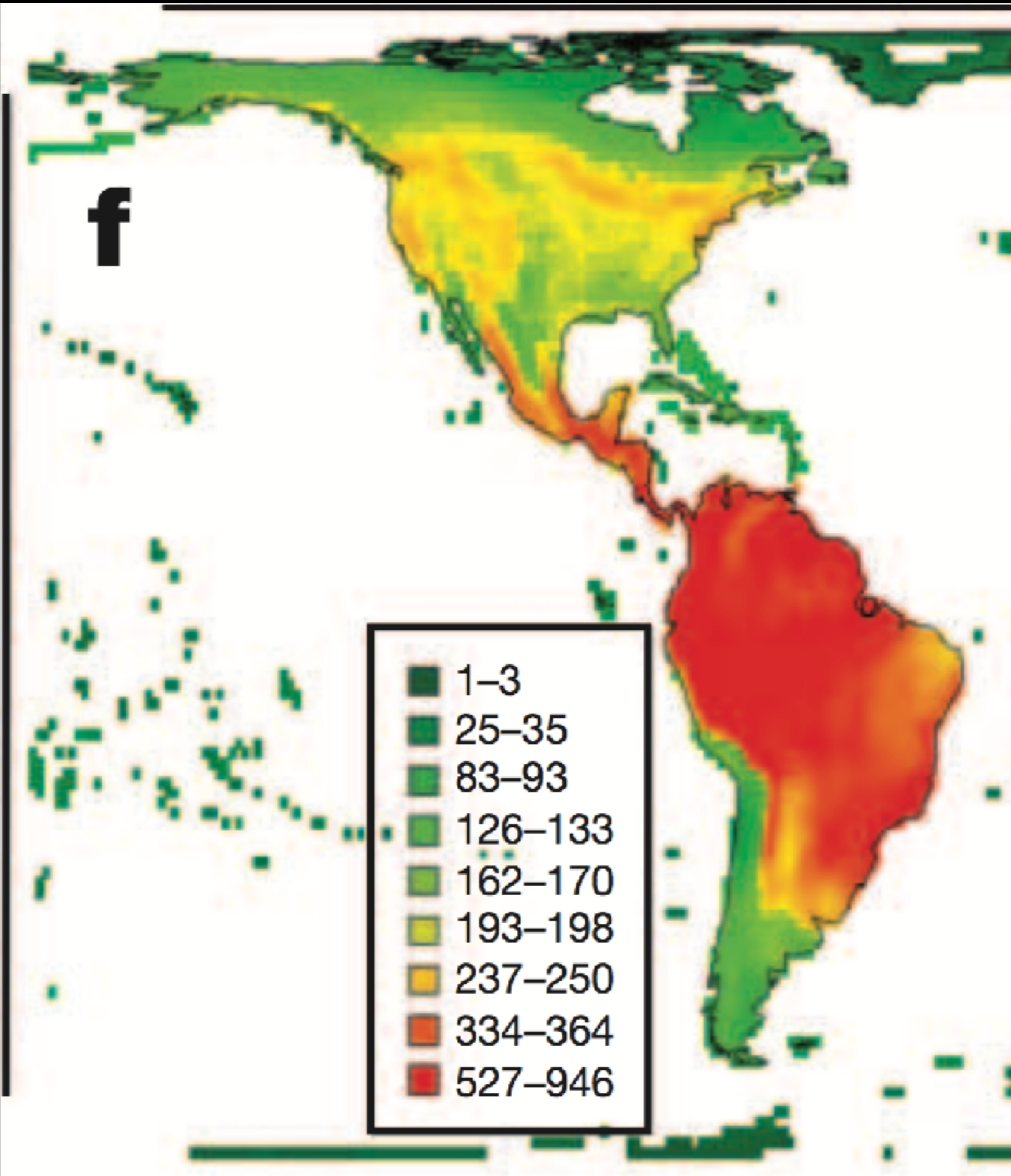


f



Richness all

f





1.373 spp.

VENEZUELA

Georgetown

GUYANA

Paramaribo

Cayenne

SURINAME

FRENCH GUIANA

1.829 spp.

COLOMBIA

1.590 spp.

ECUADOR

Amazonas

B R A Z I L

1.870 spp.

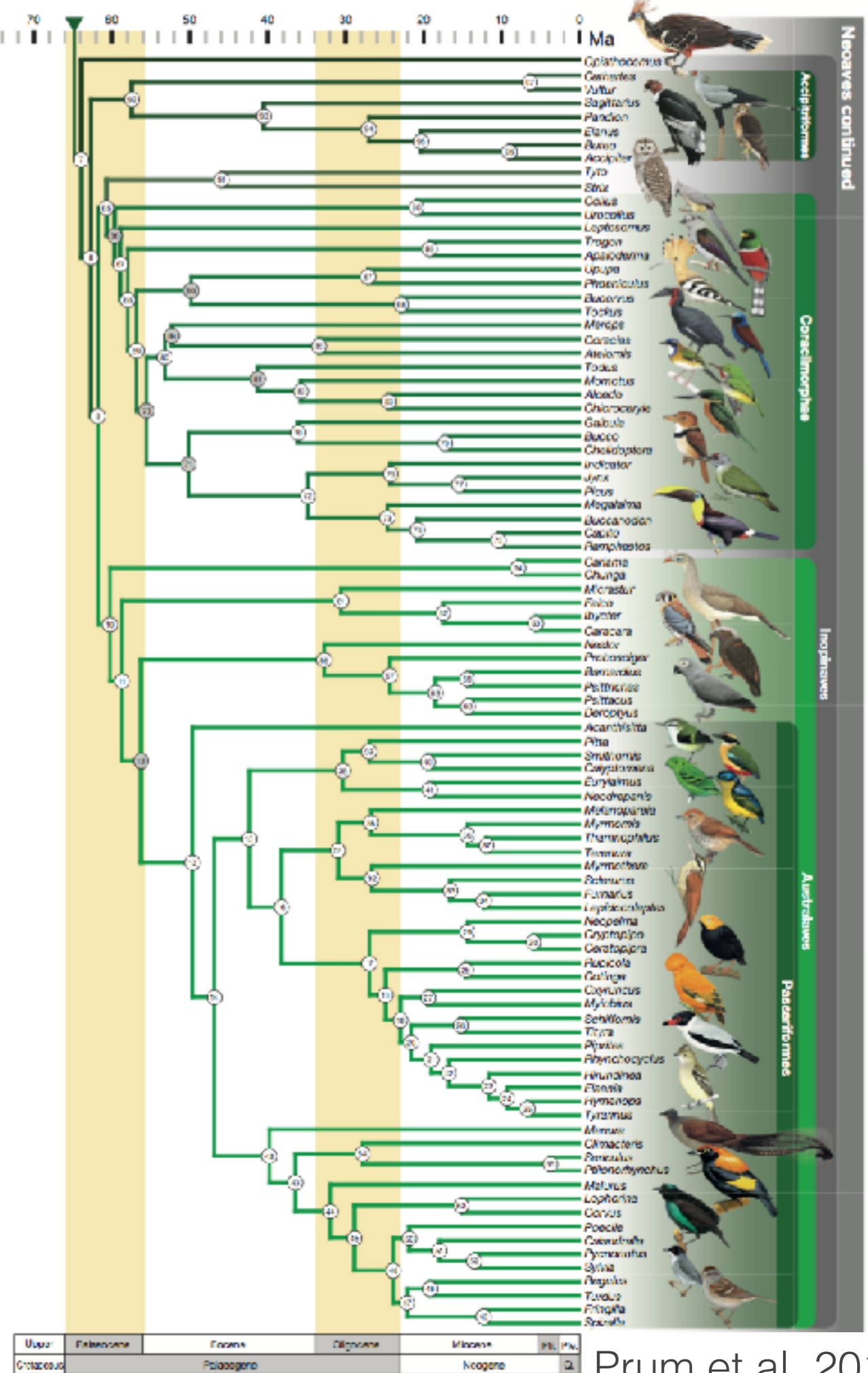
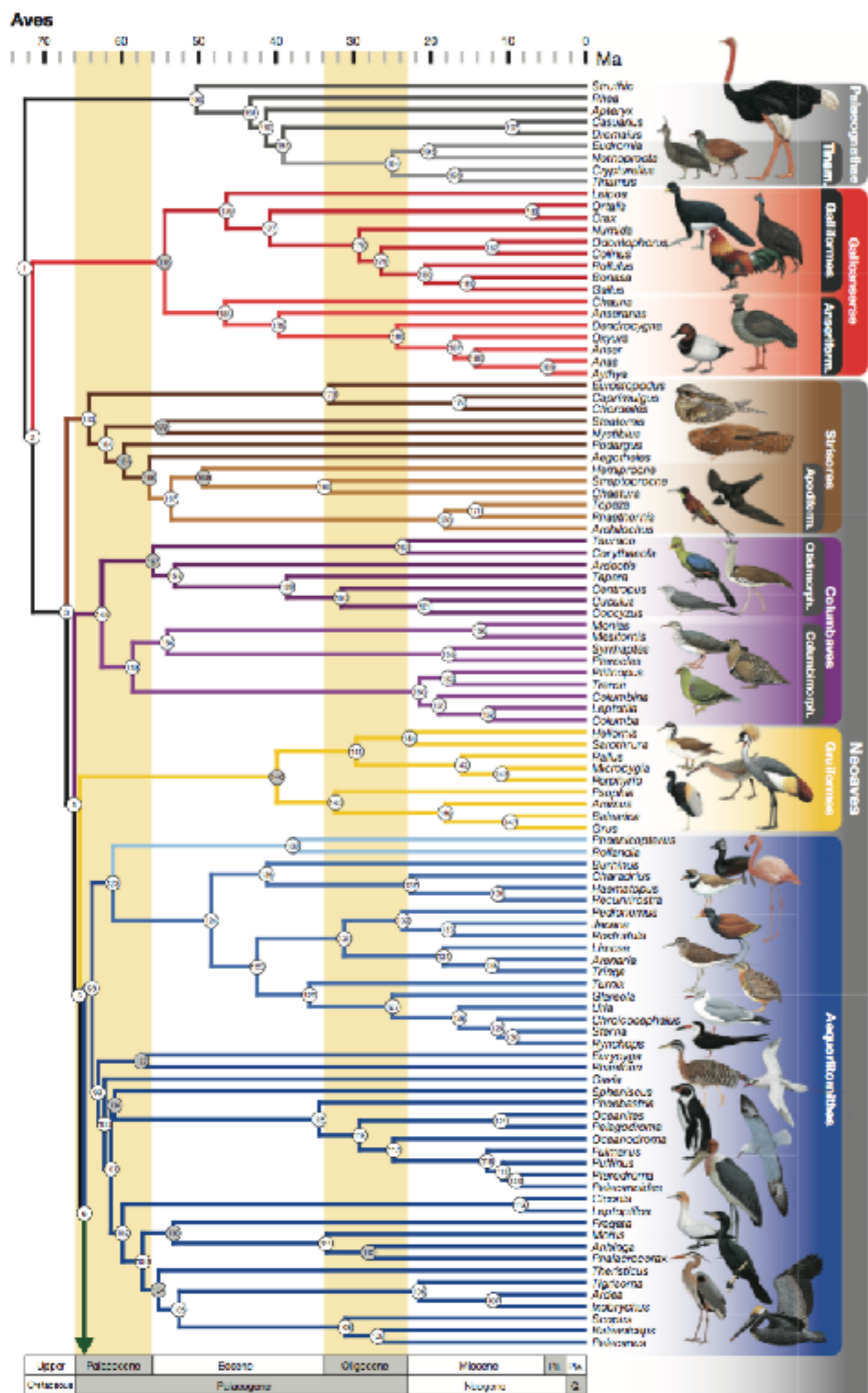
PERU

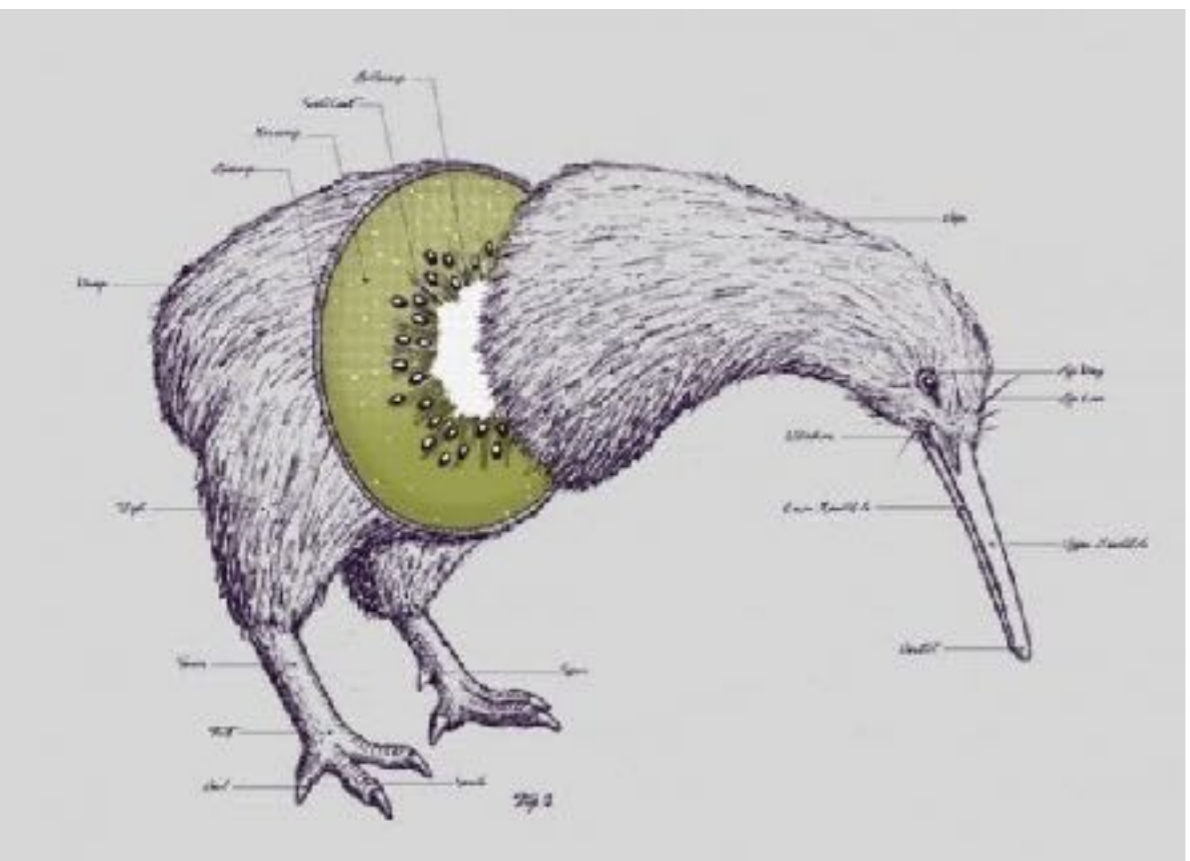
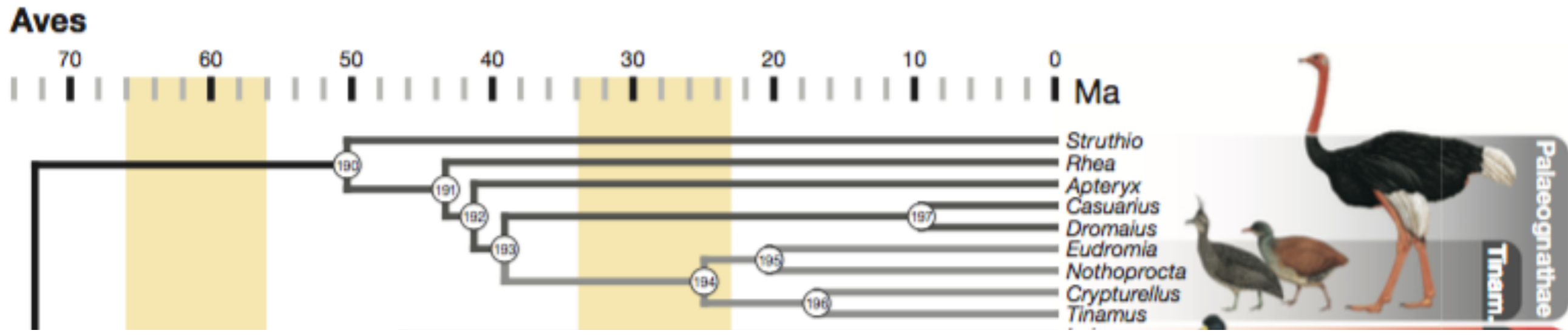
1.760 spp.

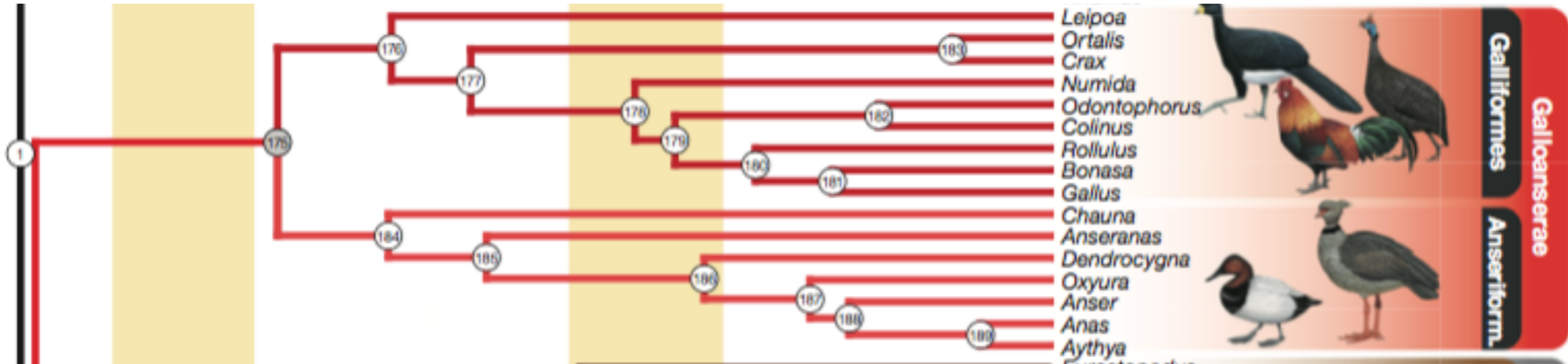
1.381 spp.

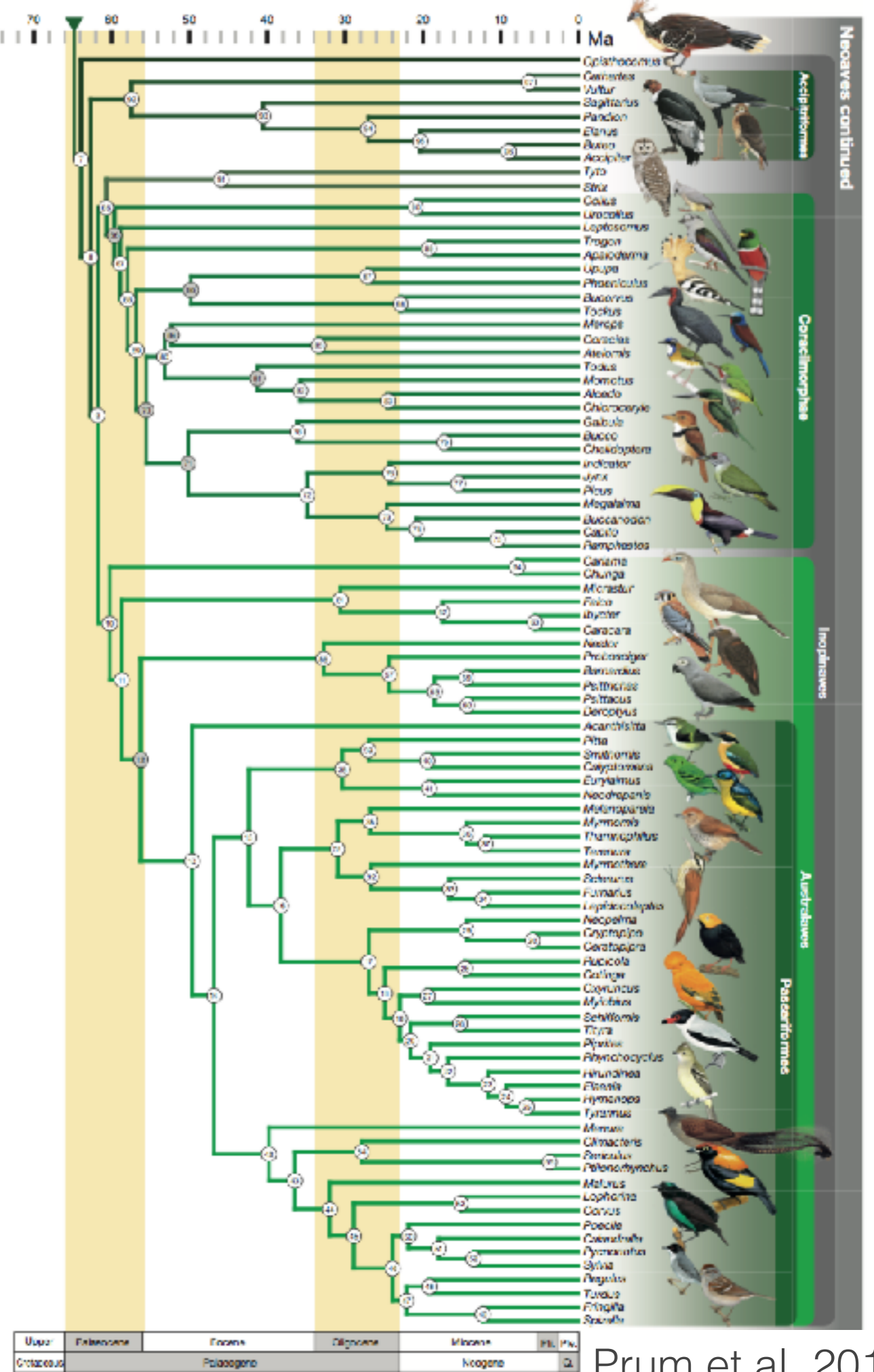
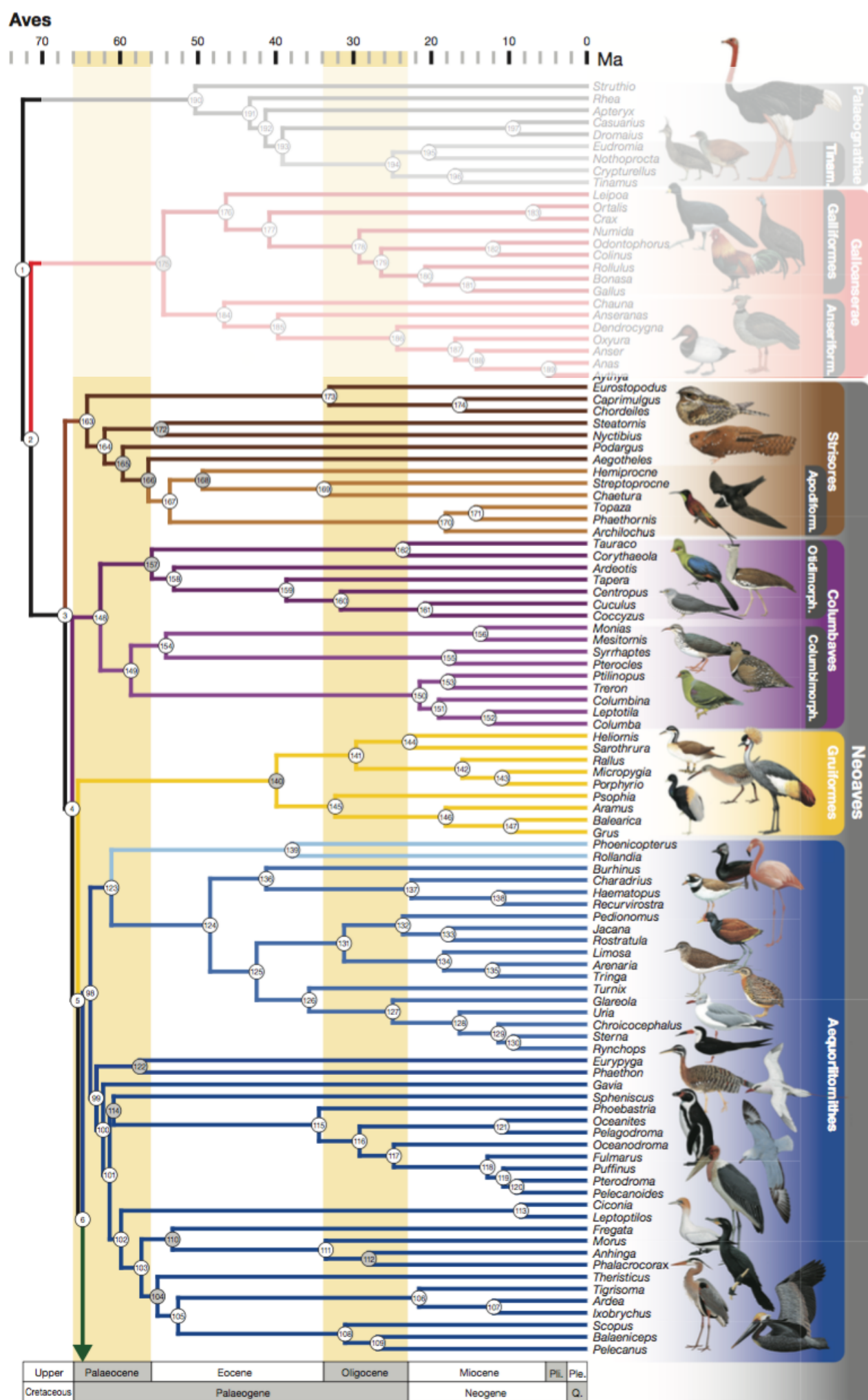
BOLIVIA

PARAGUAY

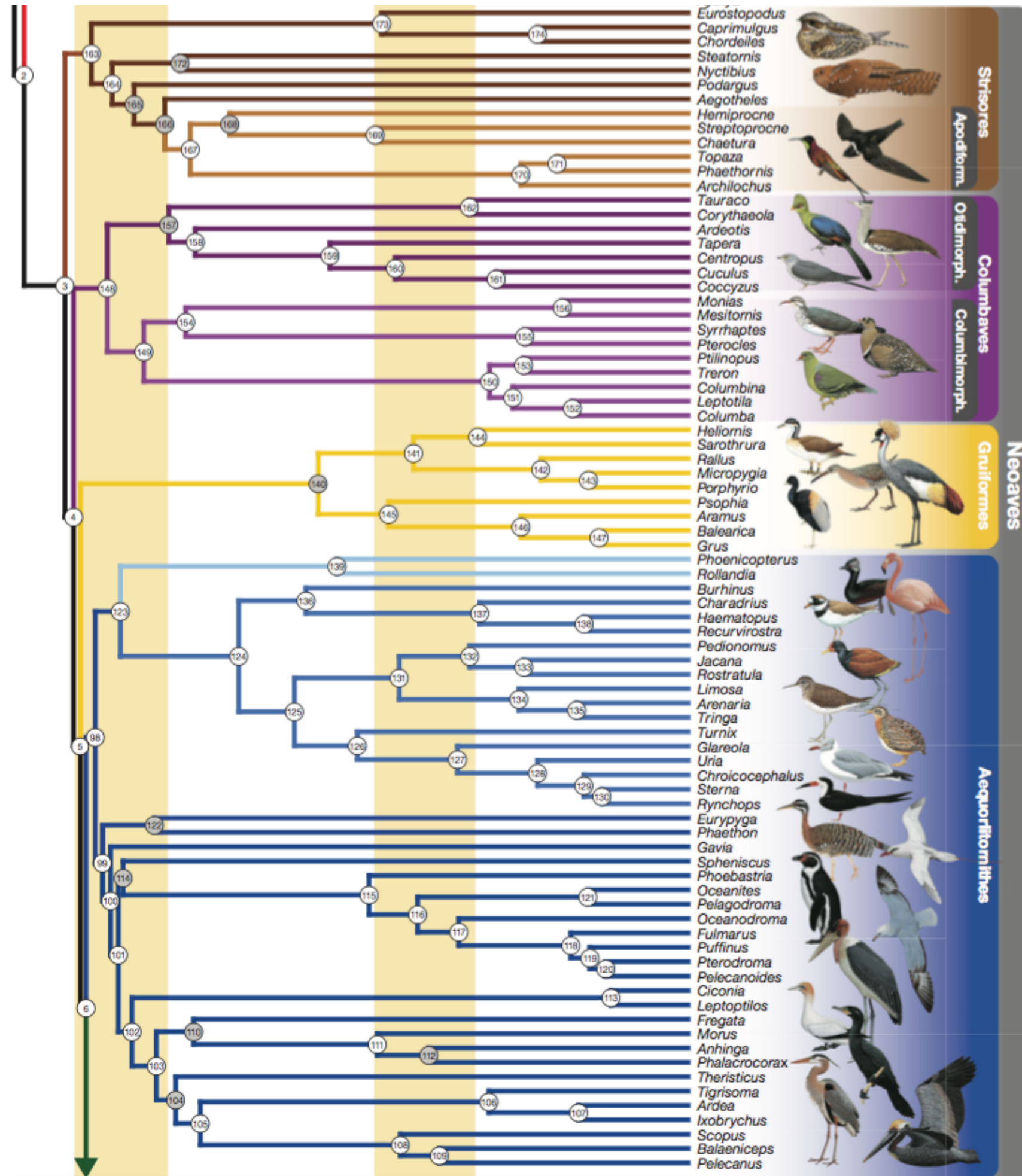






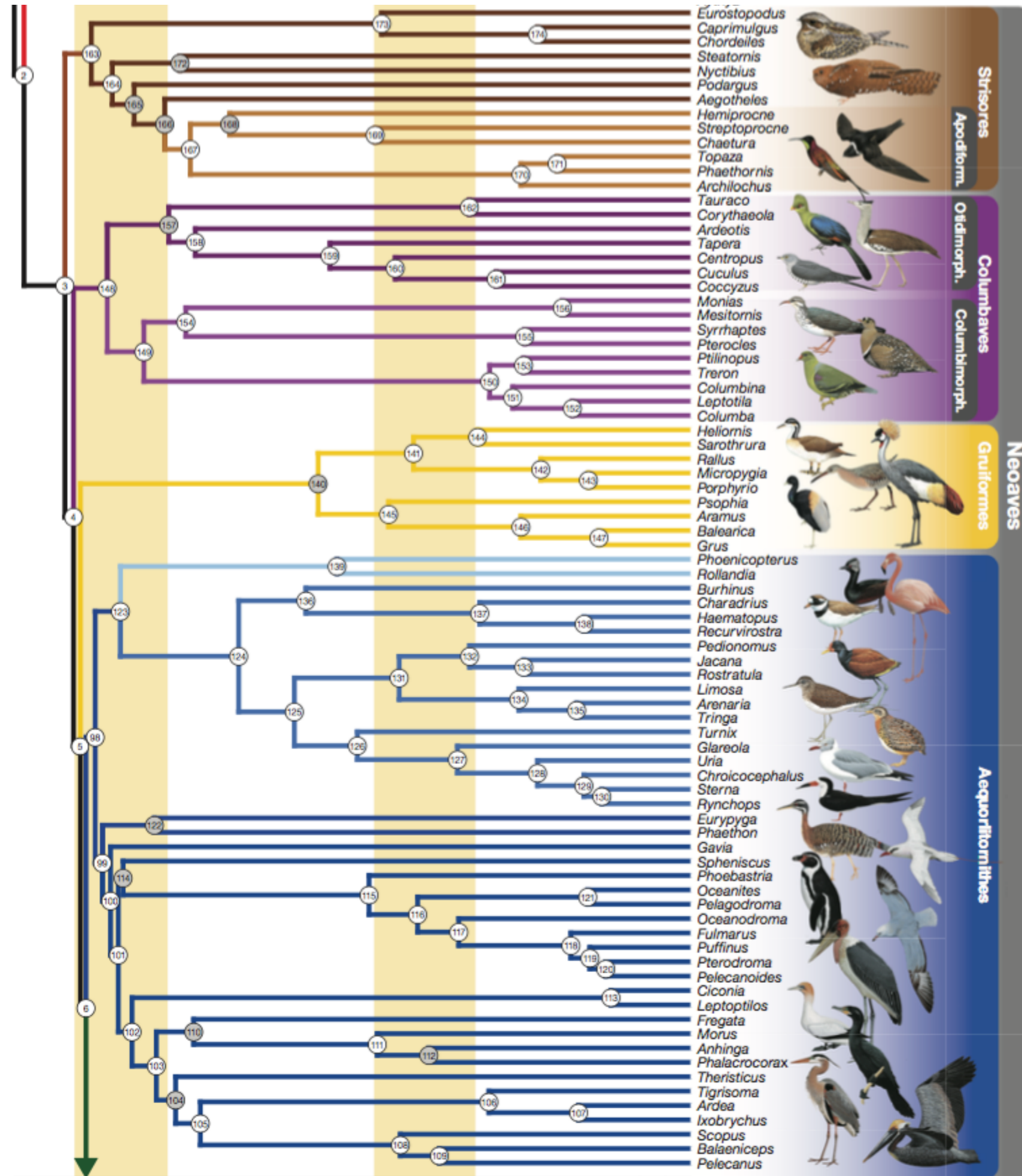


Strisores (~600 spp)



Strisores (~600 spp)

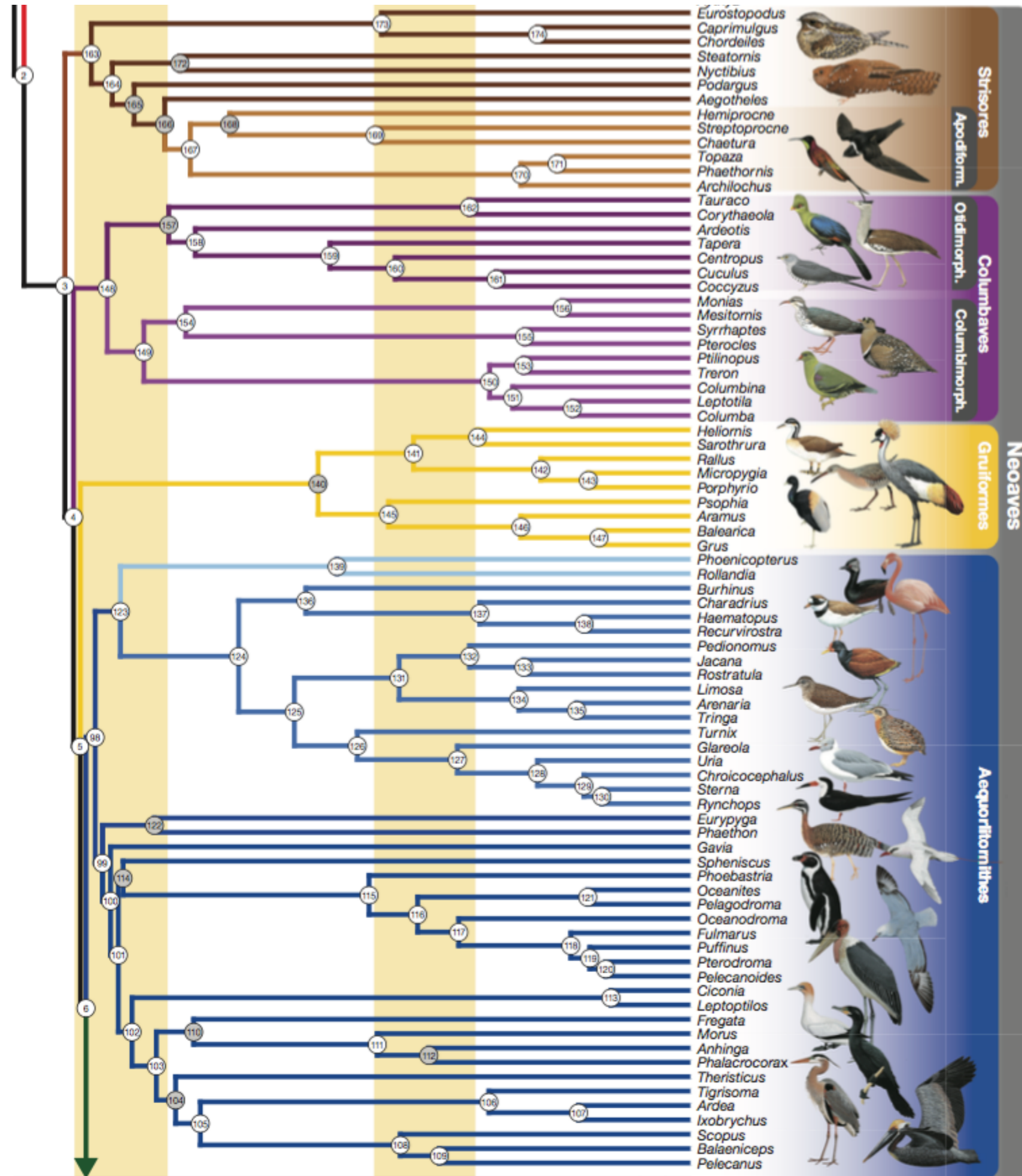
Columbaves (~395 spp)



Strisores (~600 spp)

Columbaves (~395 spp)

Gruiformes (~170 spp)

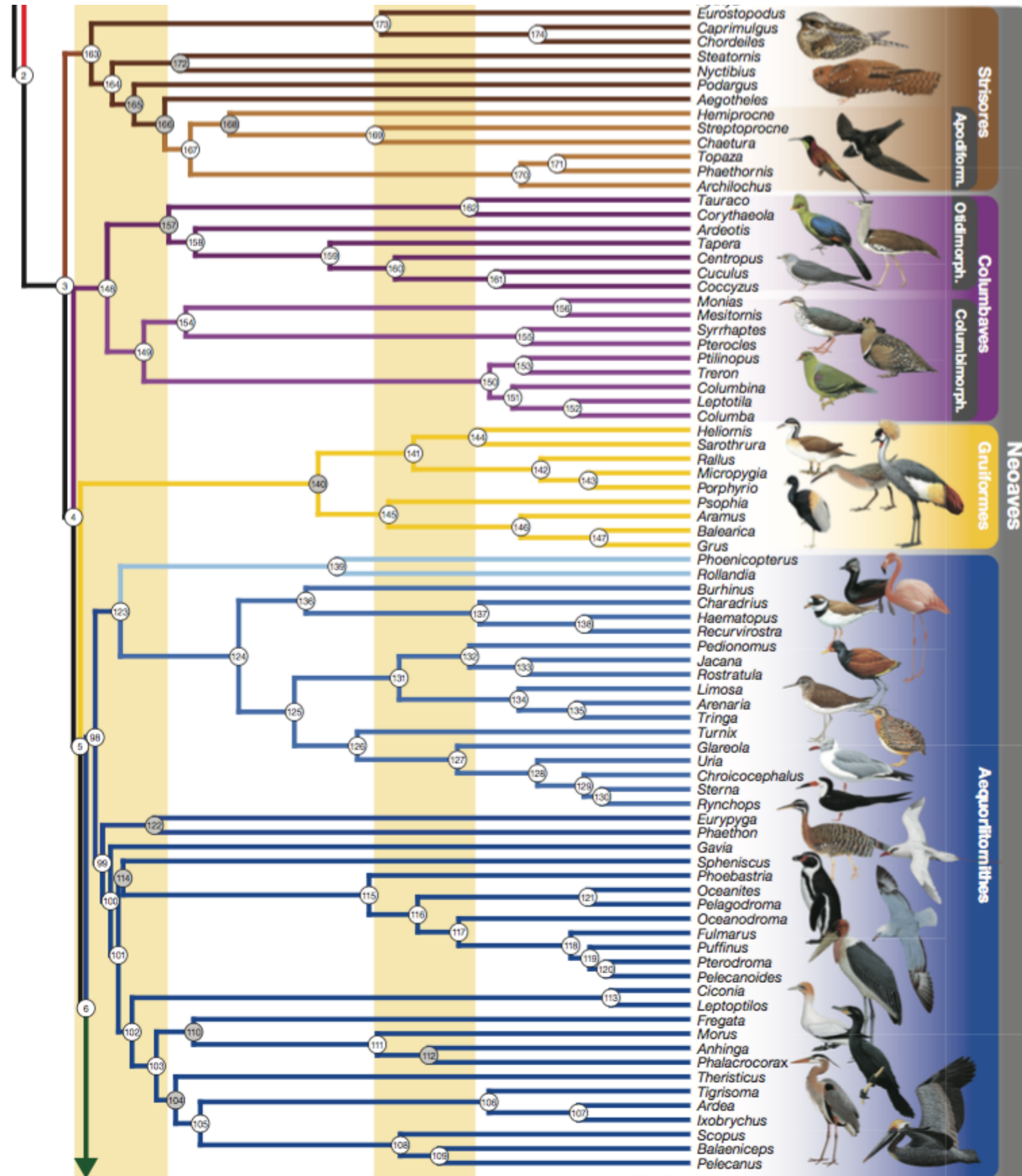


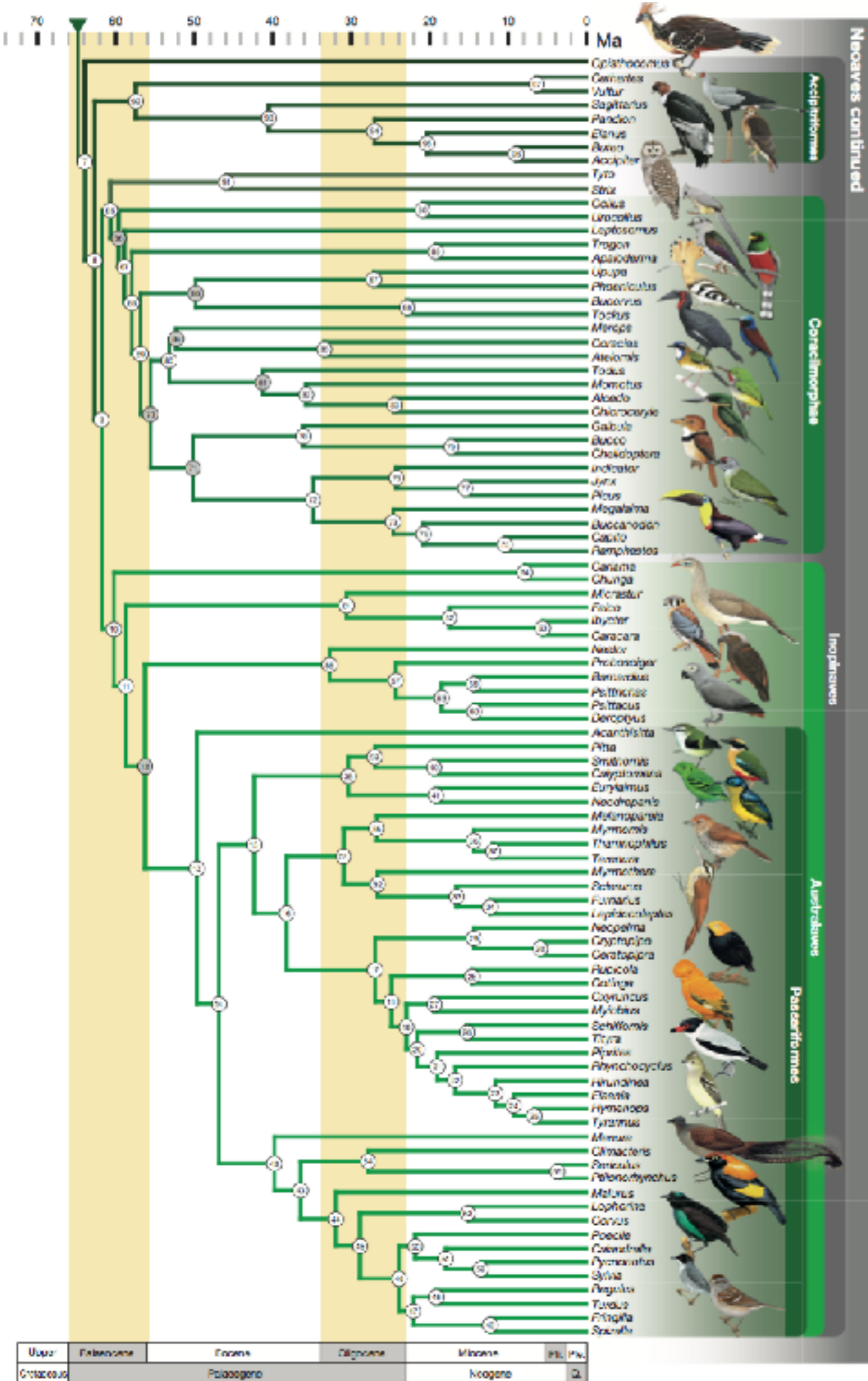
Strisores (~600 spp)

Columbaves (~395 spp)

Gruiformes (~170 spp)

Aequorltonithes (~700 spp)

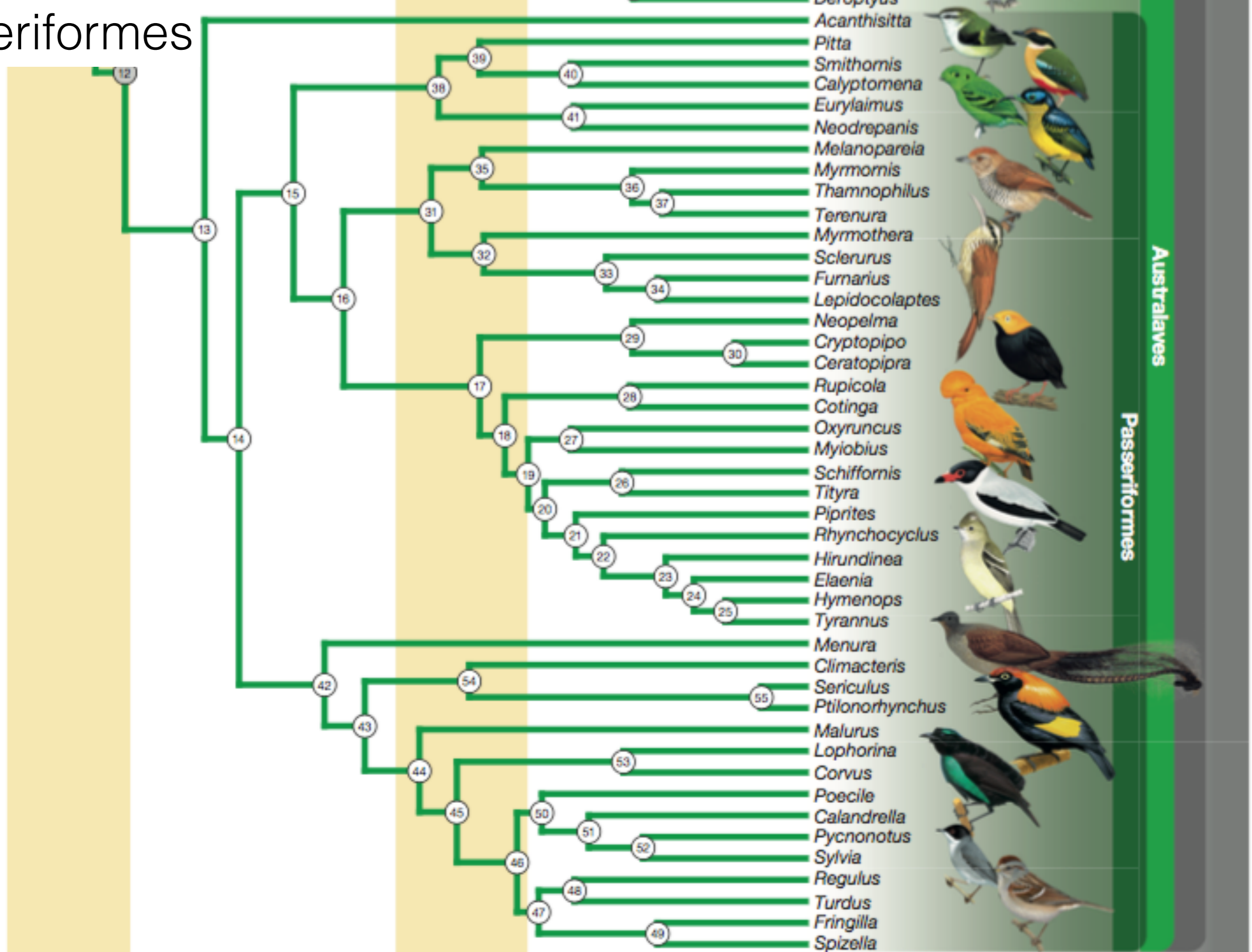




Telluraves (aves terrestres)



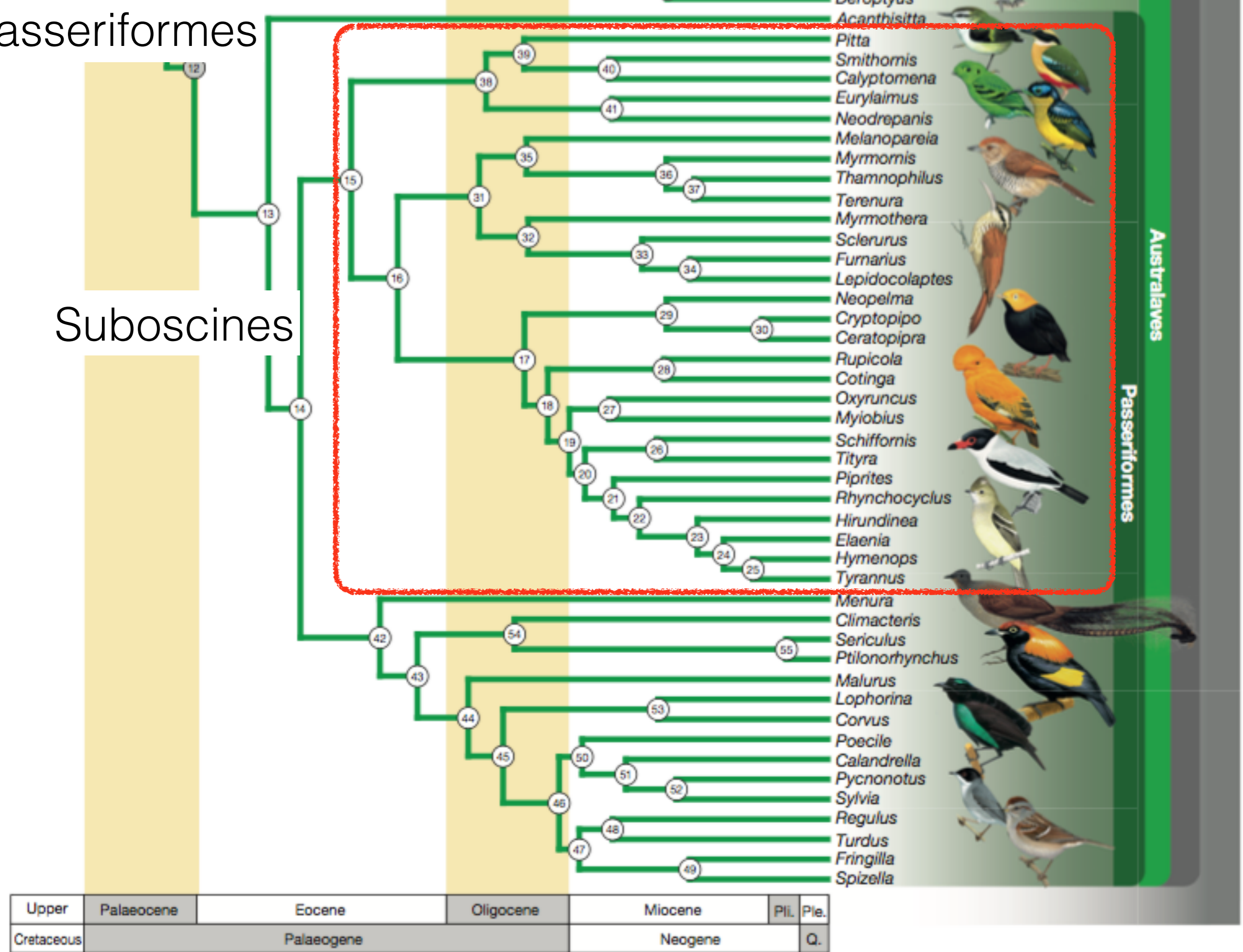
Passeriformes



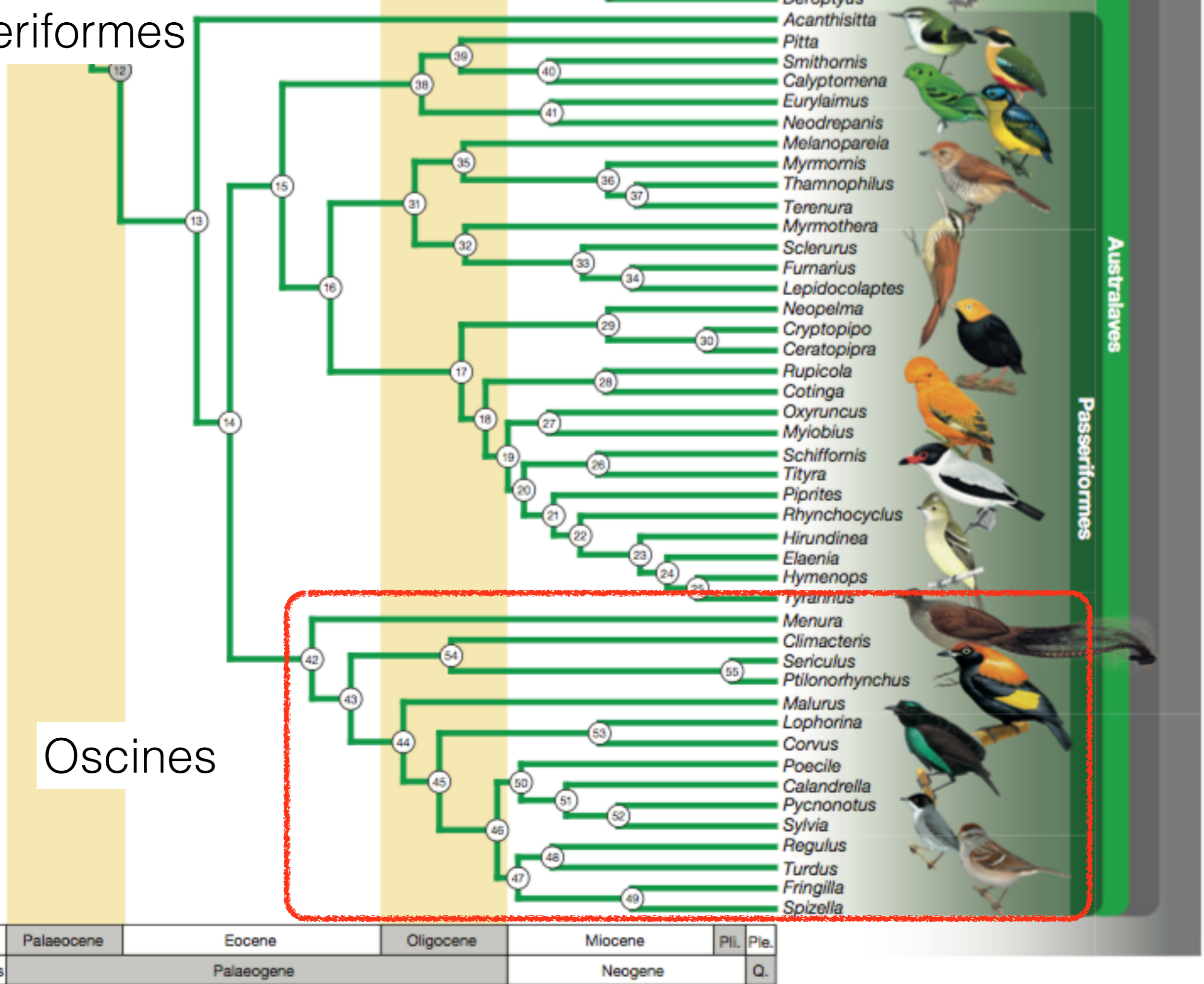
Upper	Palaeocene	Eocene	Oligocene	Miocene	Pli.	Ple.
Cretaceous	Palaeogene		Neogene			Q.

Passeriformes

Suboscines



Passeriformes

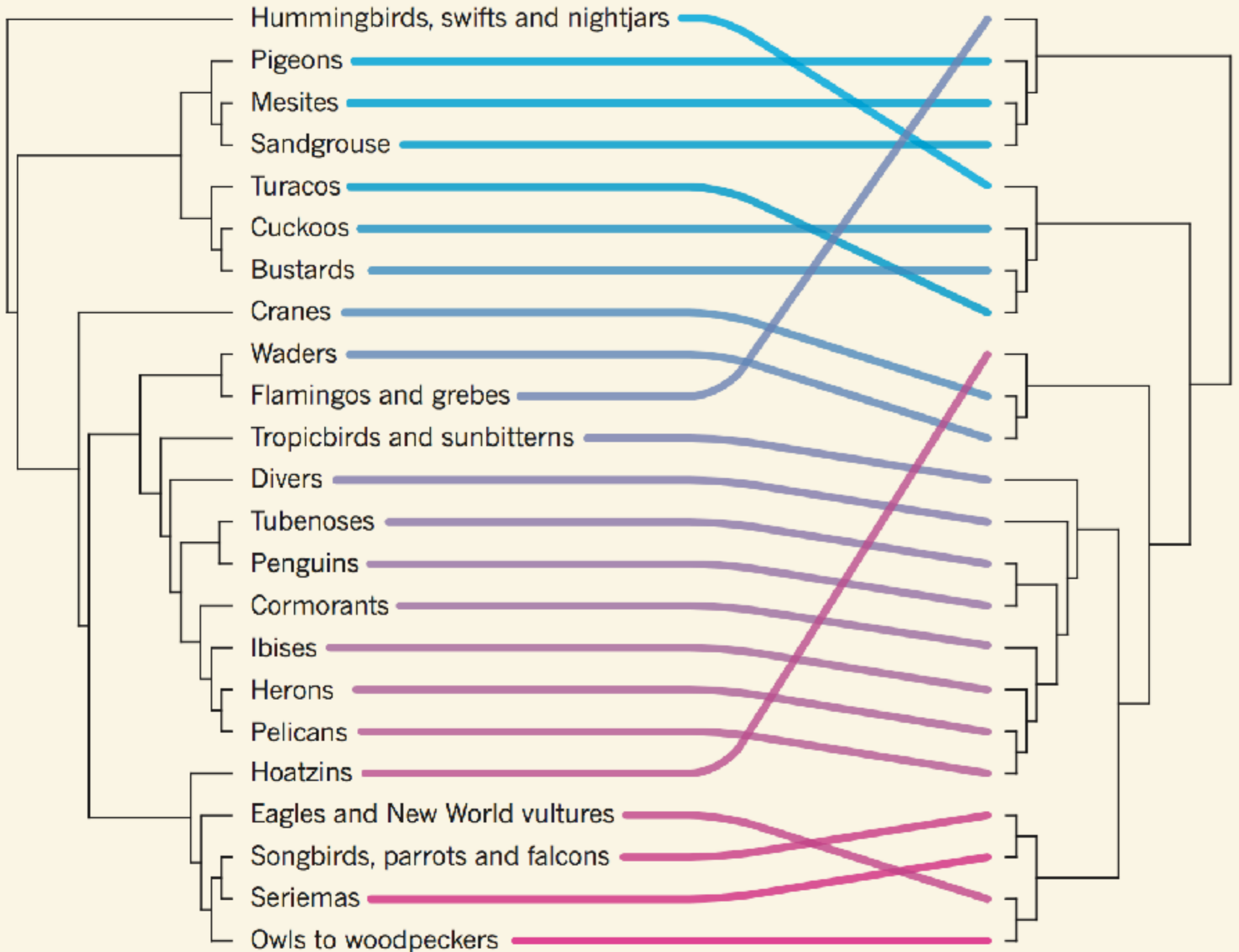


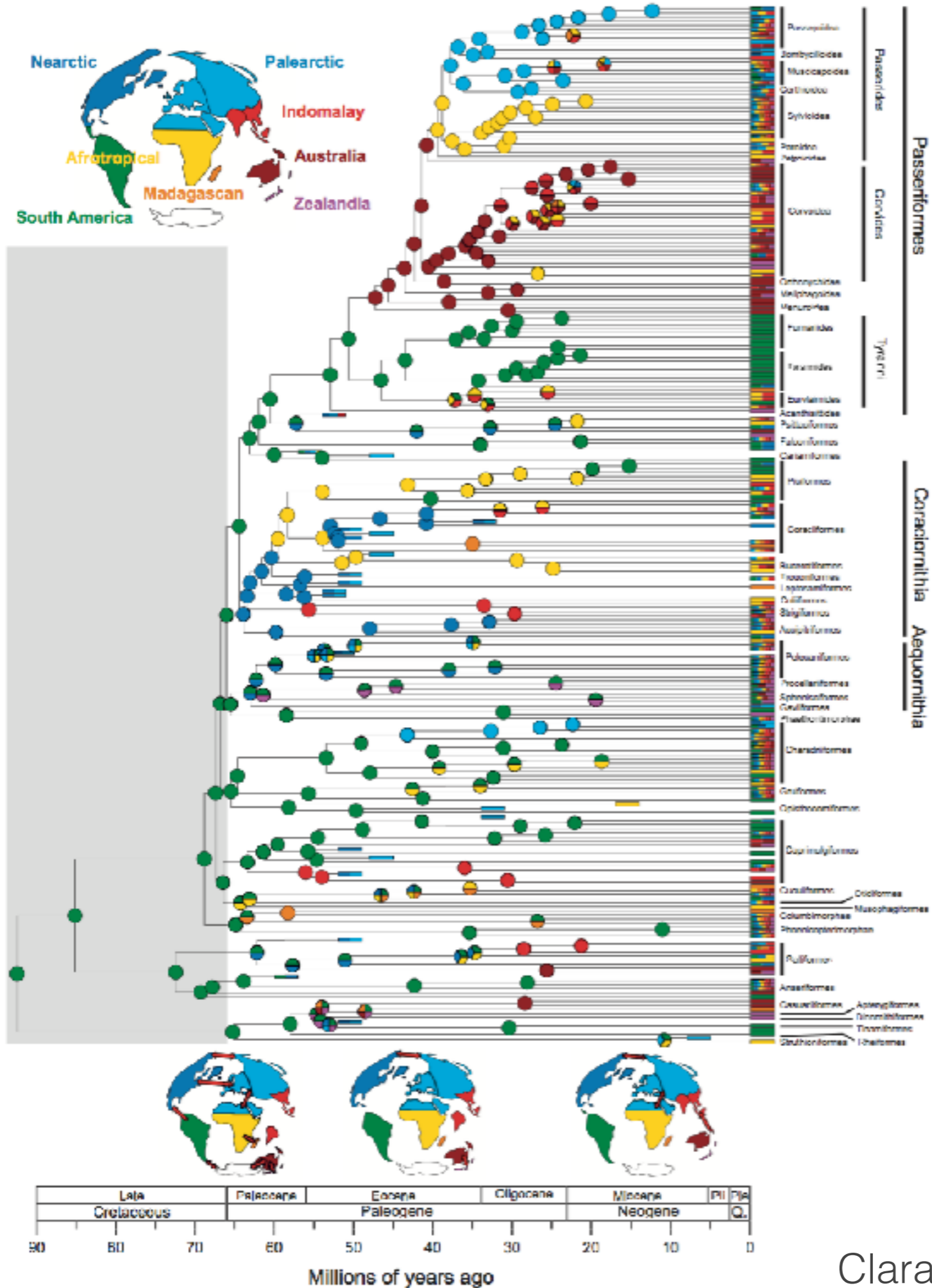
Oscines

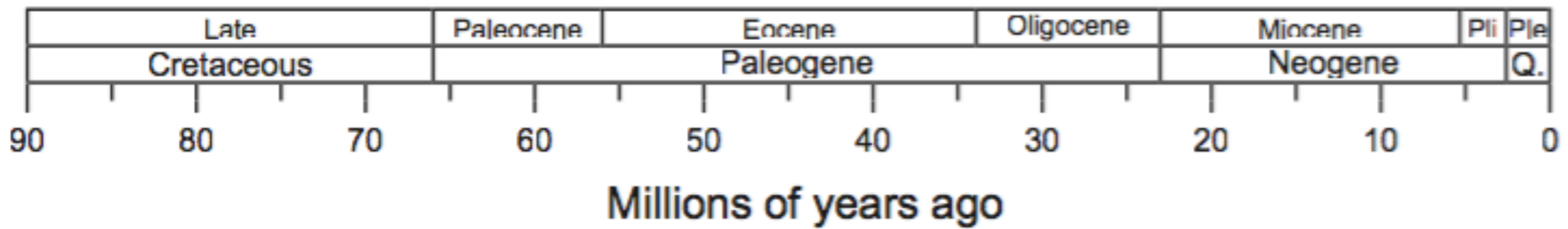
Upper	Palaeocene	Eocene	Oligocene	Miocene	Pli.	Ple.
Cretaceous	Palaeogene		Neogene			Q.

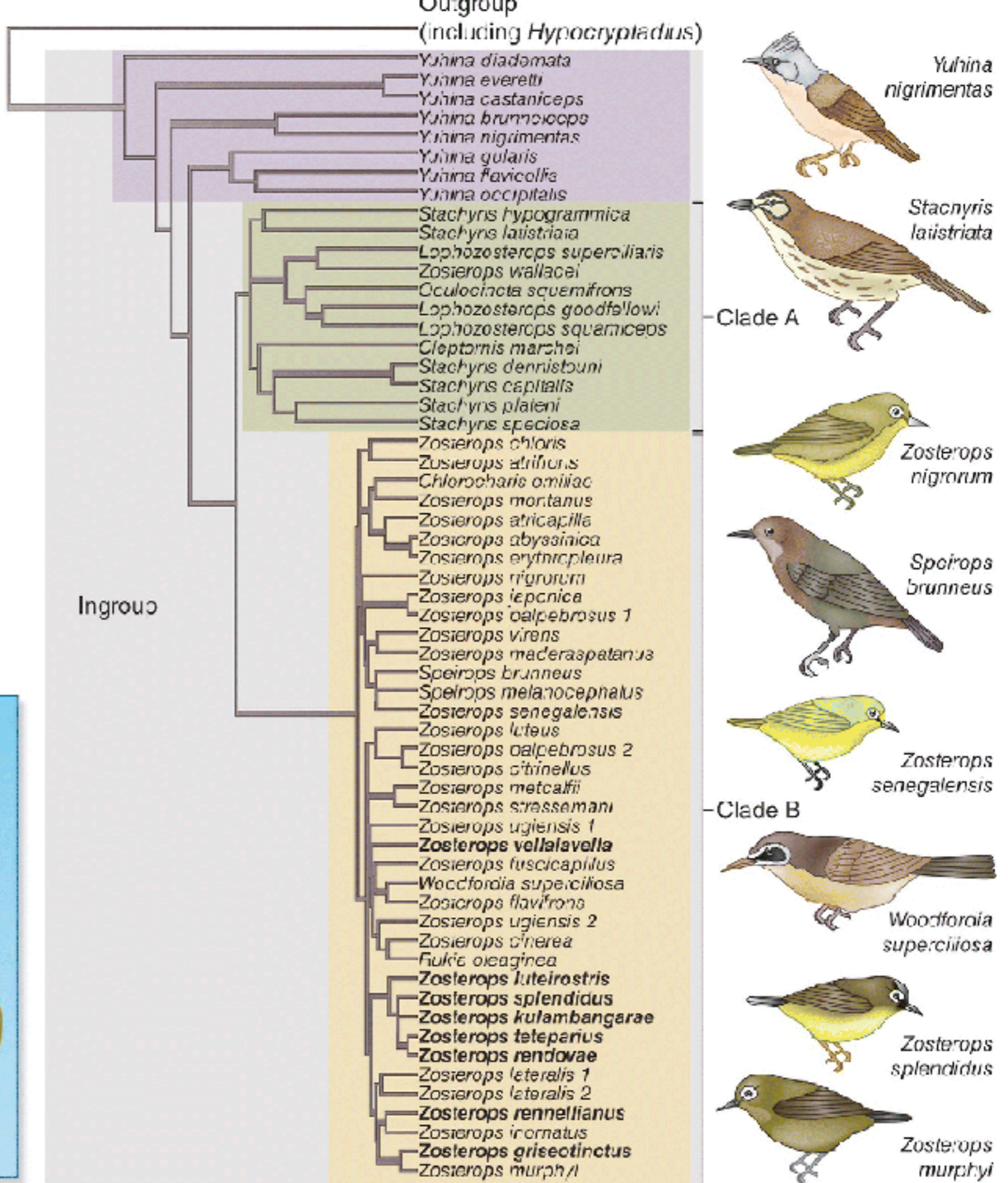
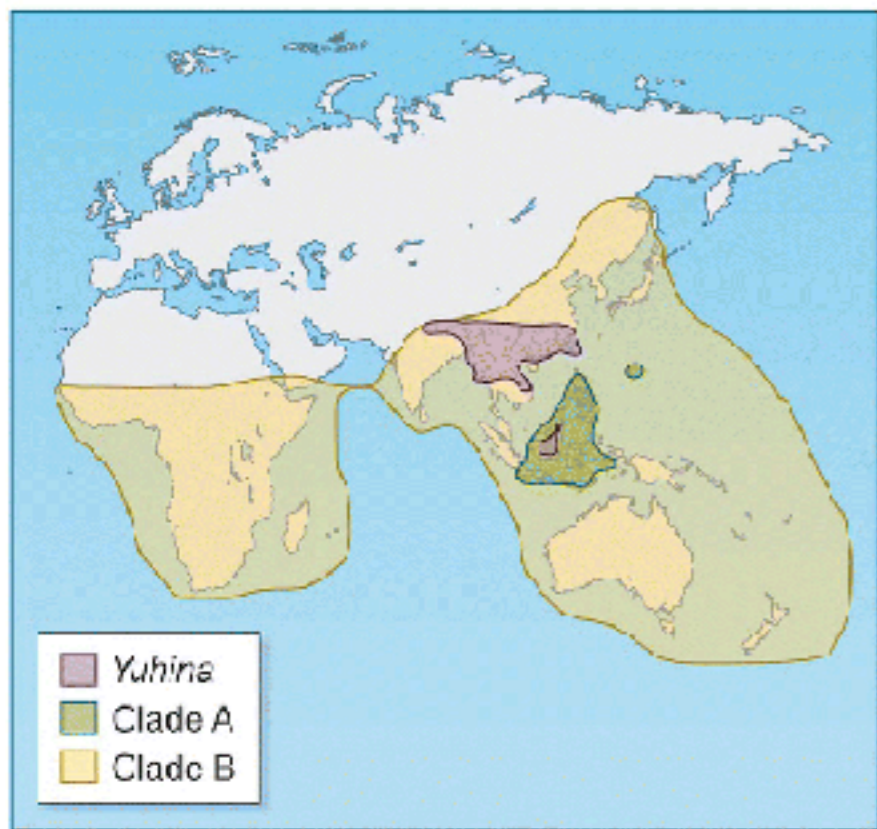
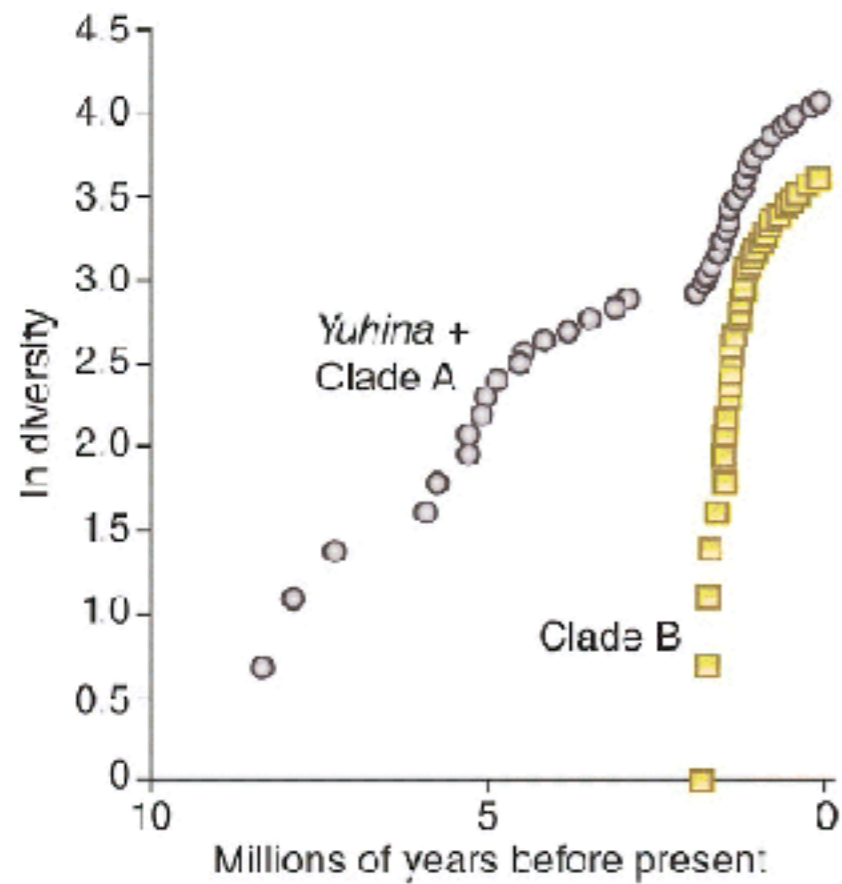
Prum *et al.*

Jarvis *et al.*









APRESENTAÇÃO FERNANDA

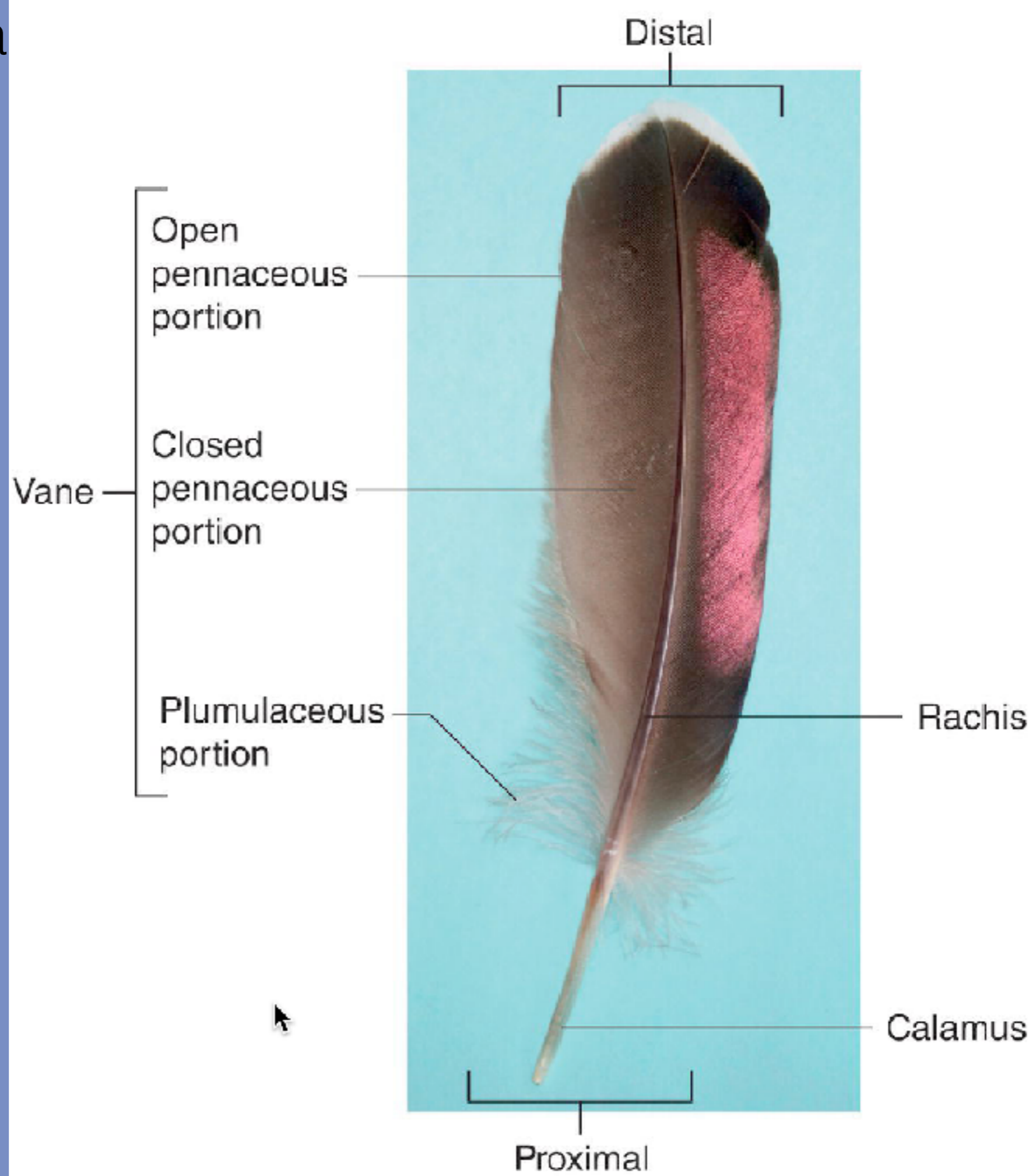




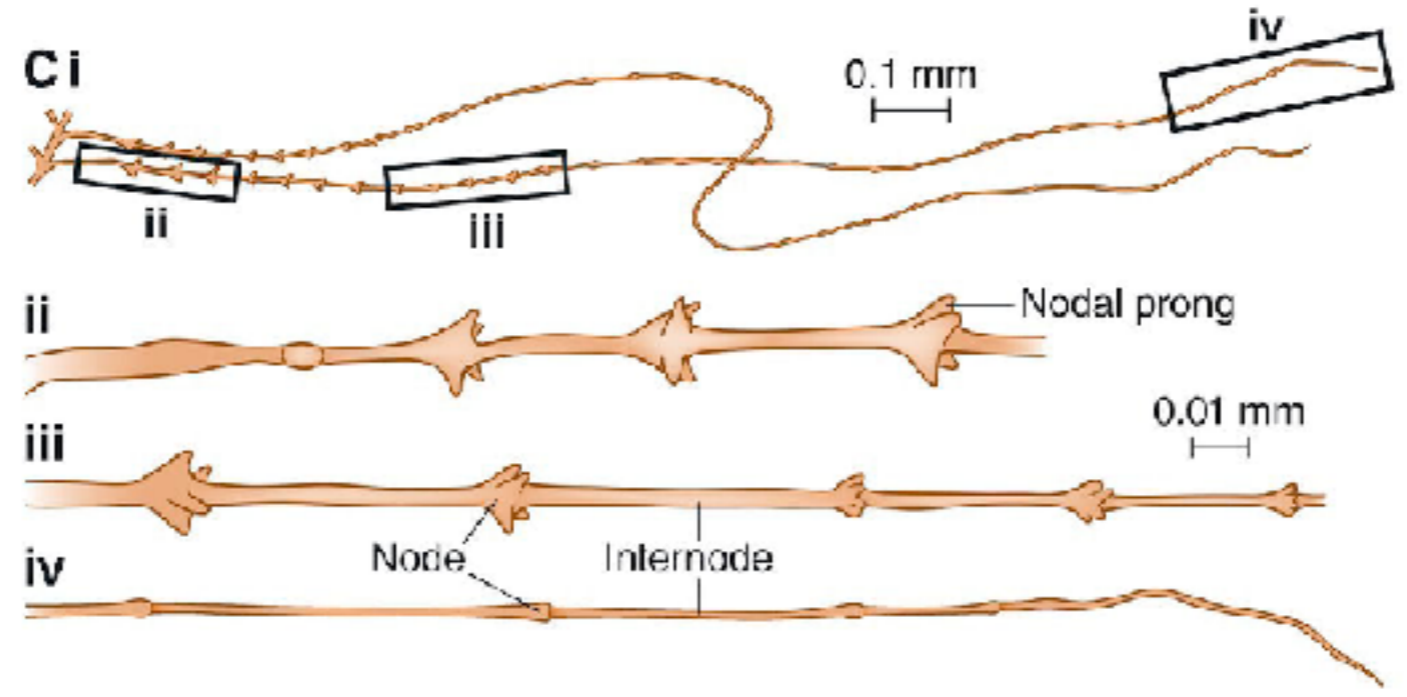
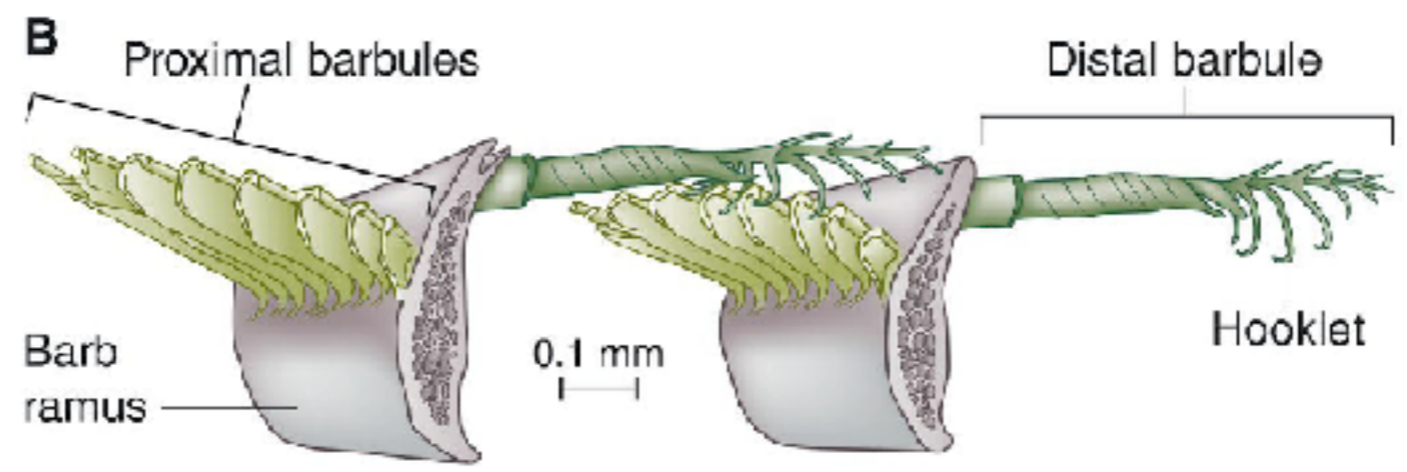
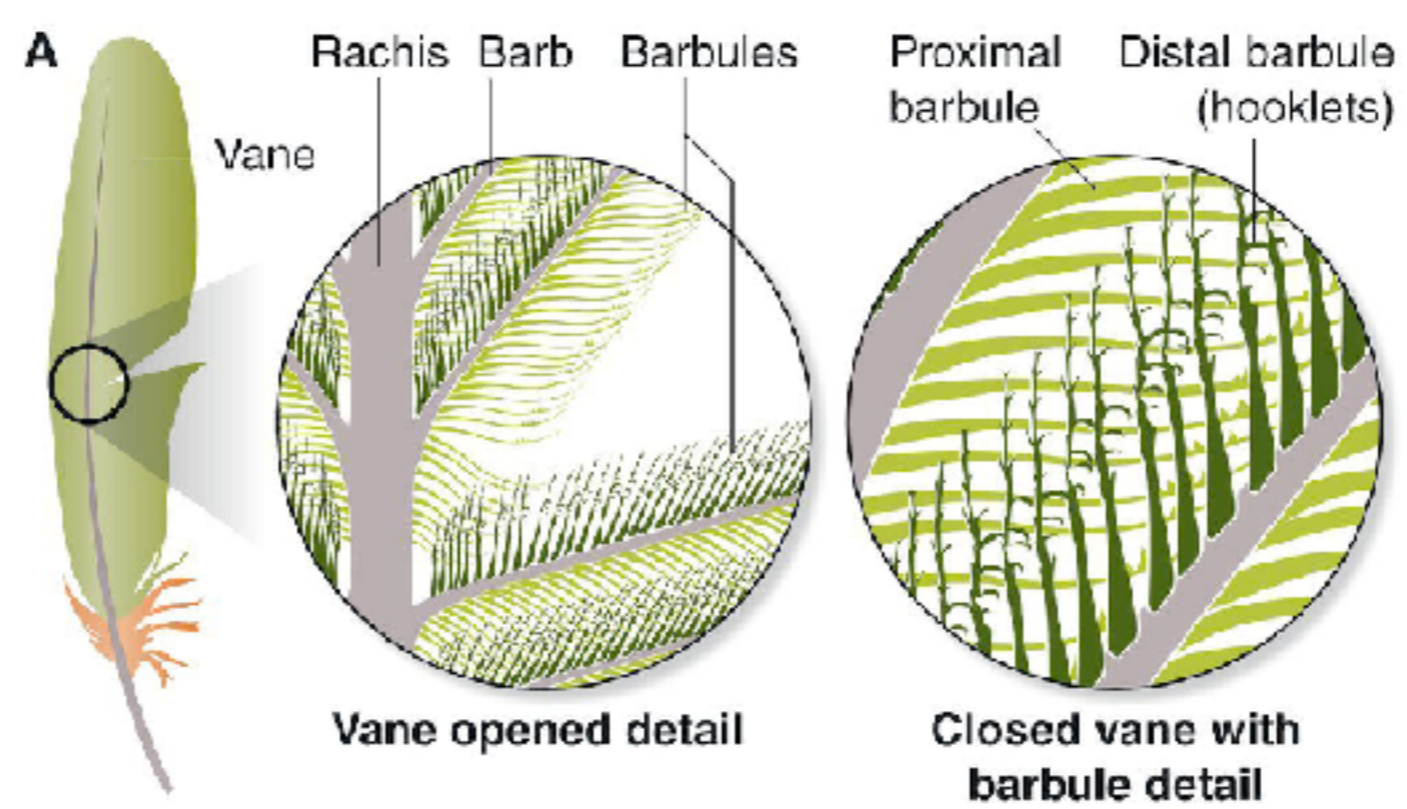
Corpo otimizado para o voo

Falco peregrinus

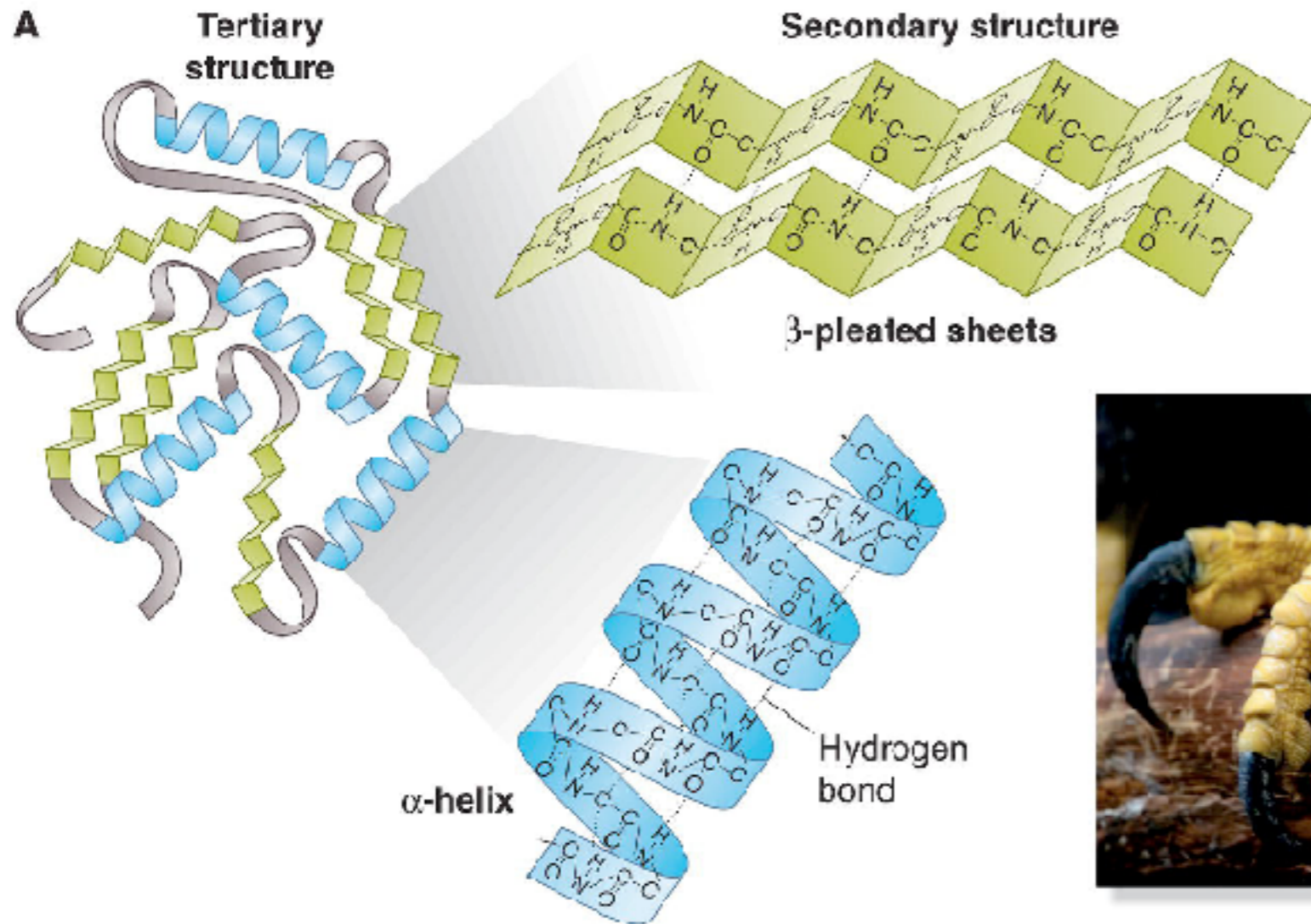
Pena/estrutura



Pena/estrutura



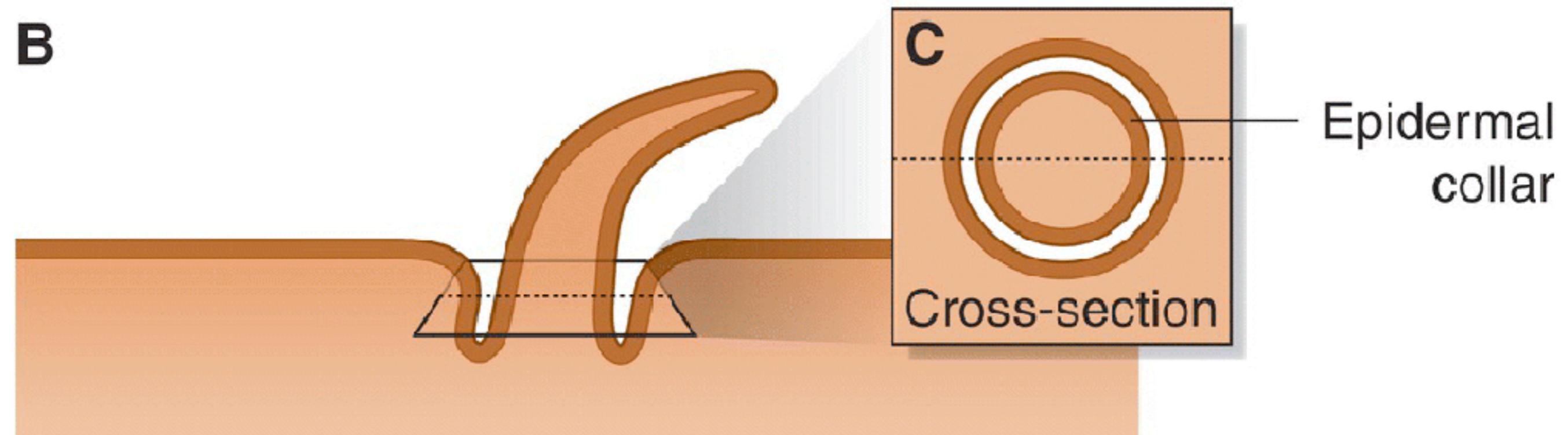
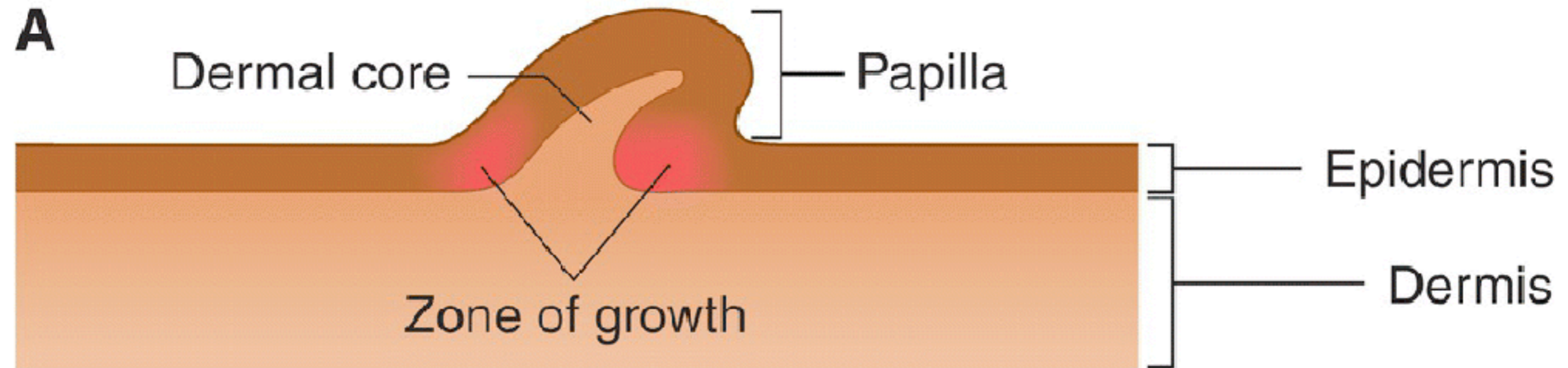
Queratina



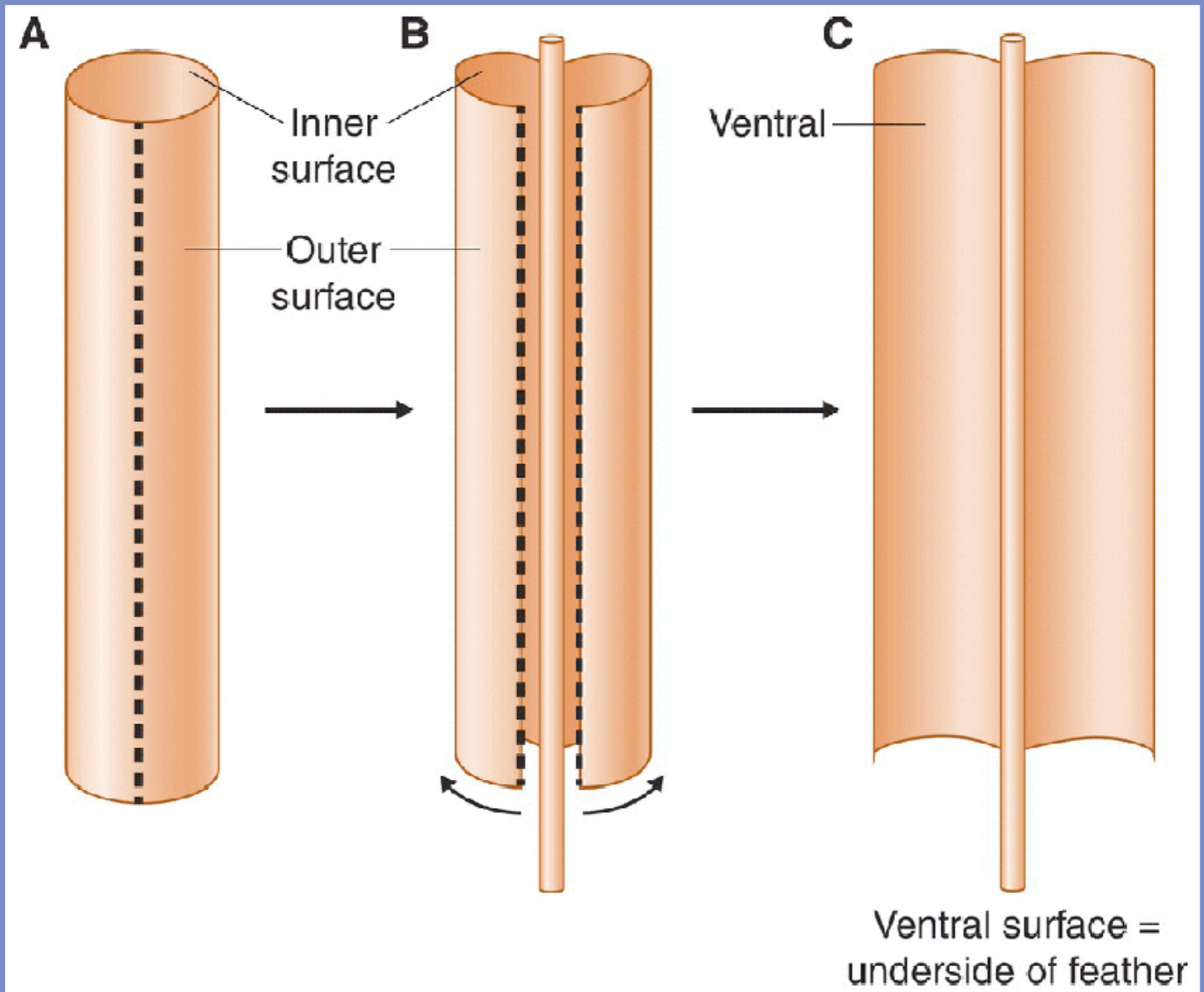
Desenvolvimento



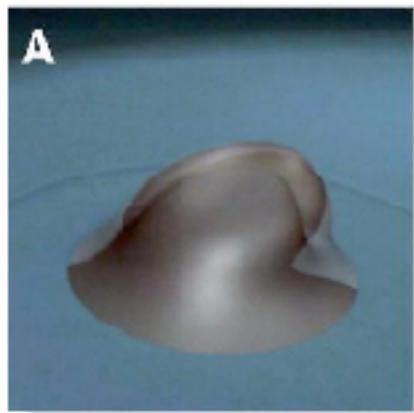
Desenvolvimento/anatomia folículo



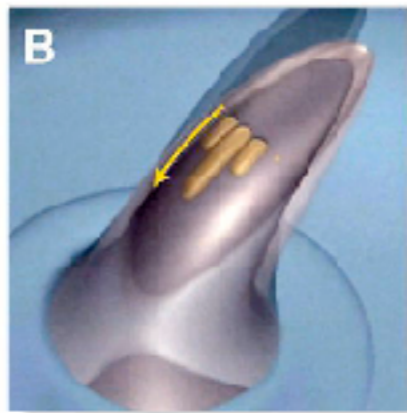
Desenvolvimento/anatomia folículo



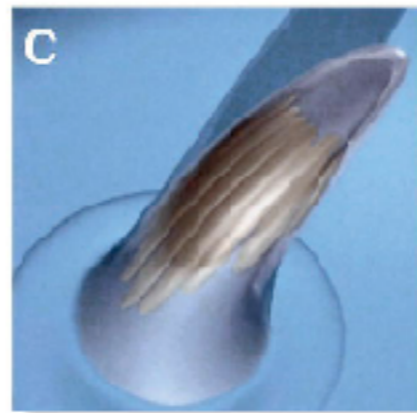
Desenvolvimento/anatomia folículo



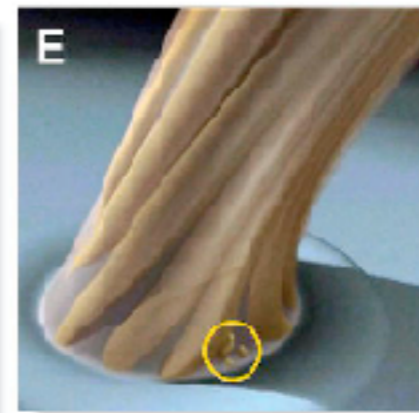
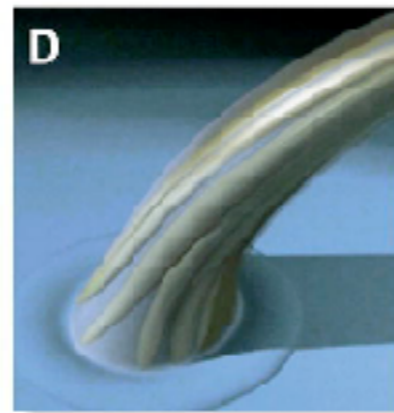
A
Placode



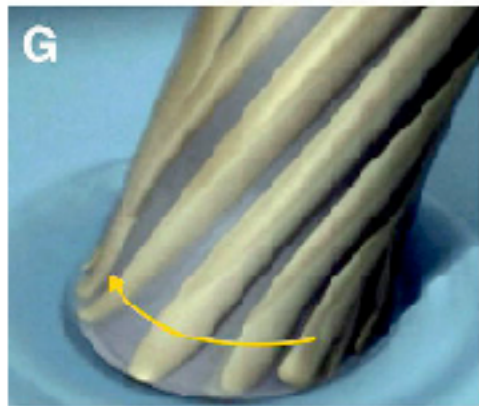
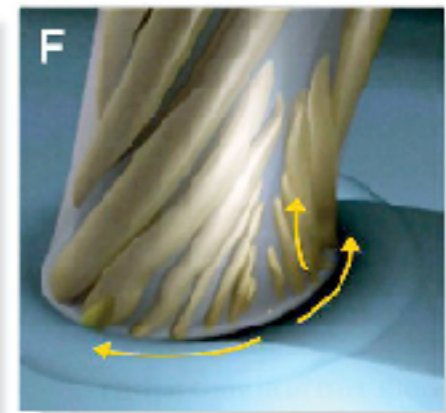
B
Barb ridges initiate
in epidermal collar



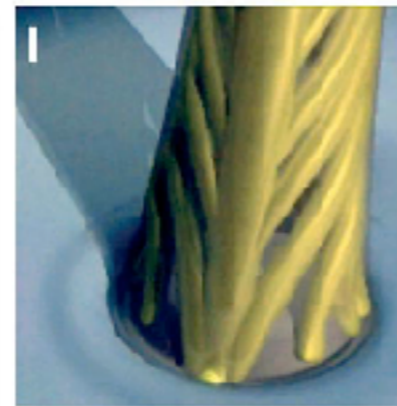
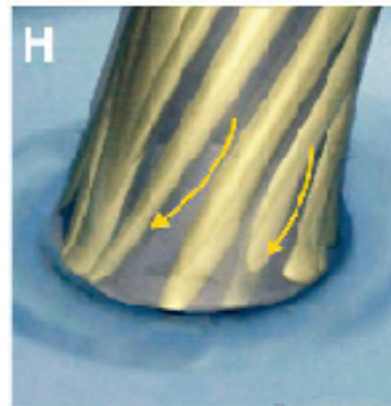
C
Barb ridges grow to epidermal collar



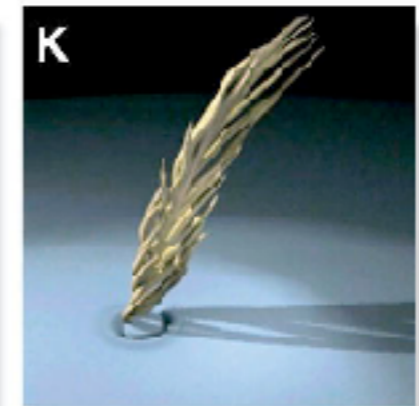
E
Ventral barb ridge formation



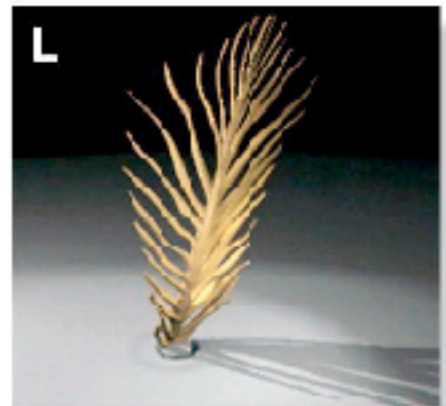
G
Helical growth of barb ridges end with rachis fusion



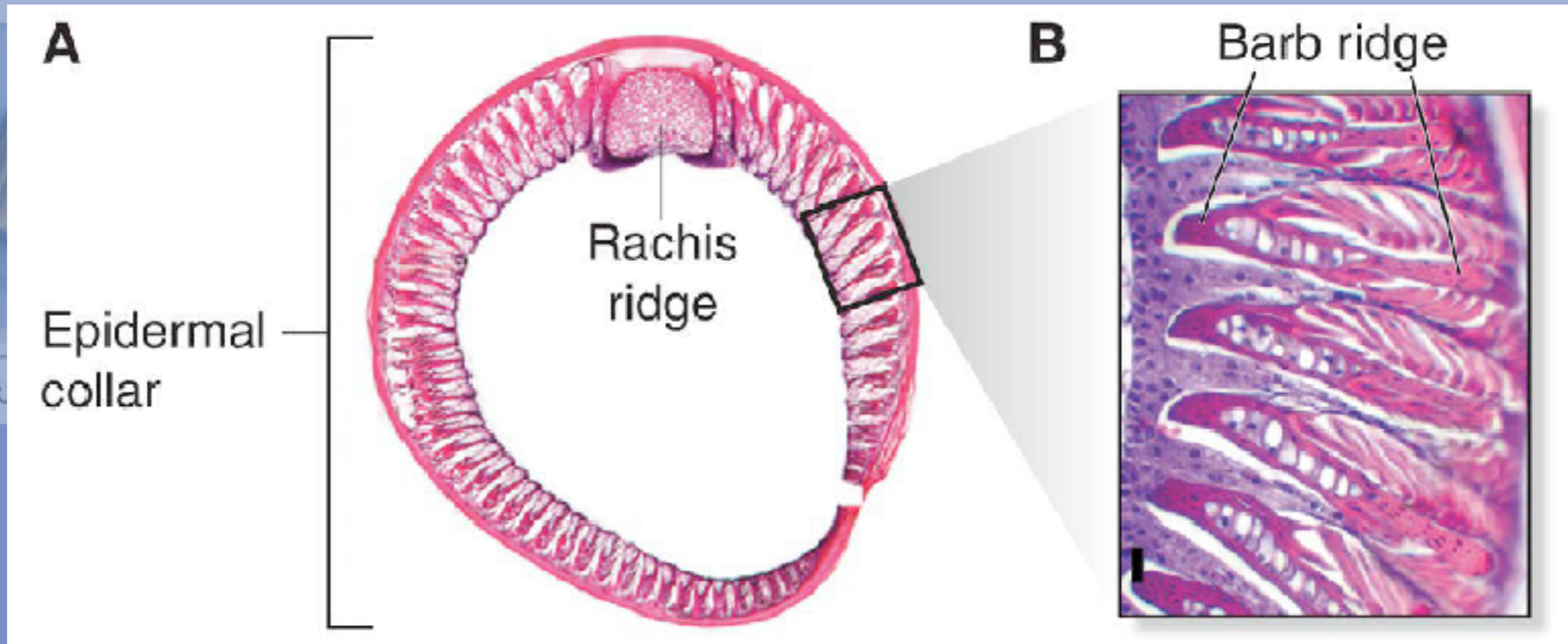
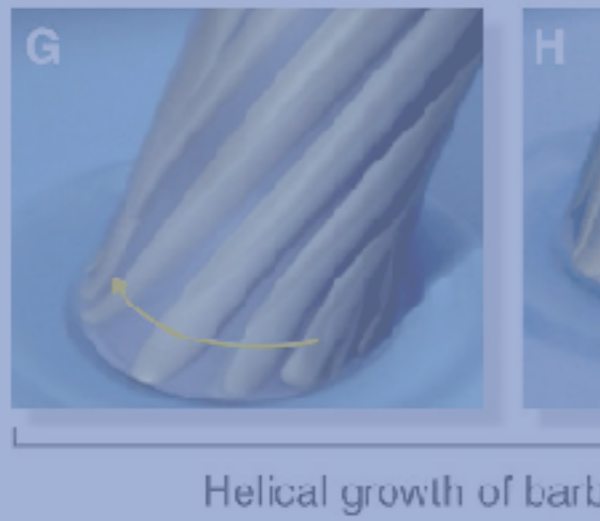
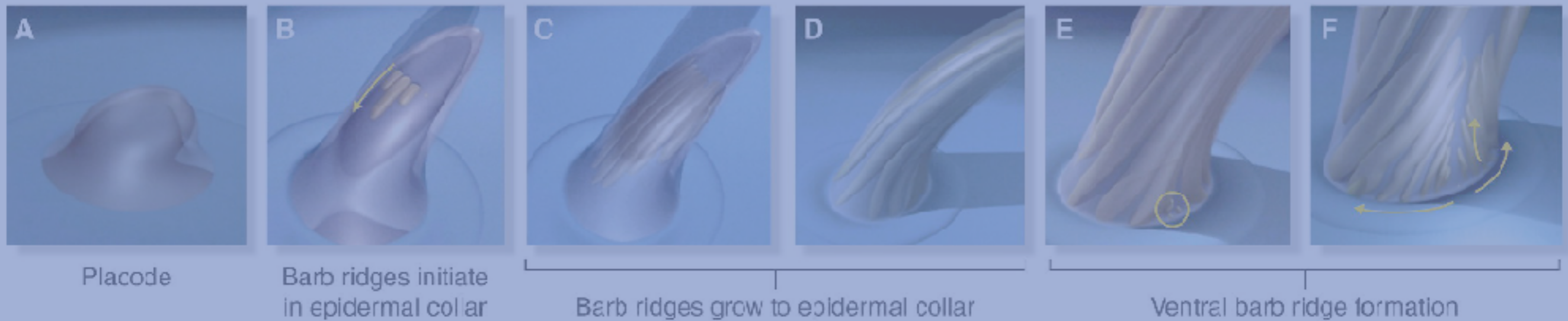
J
Sheath degenerates



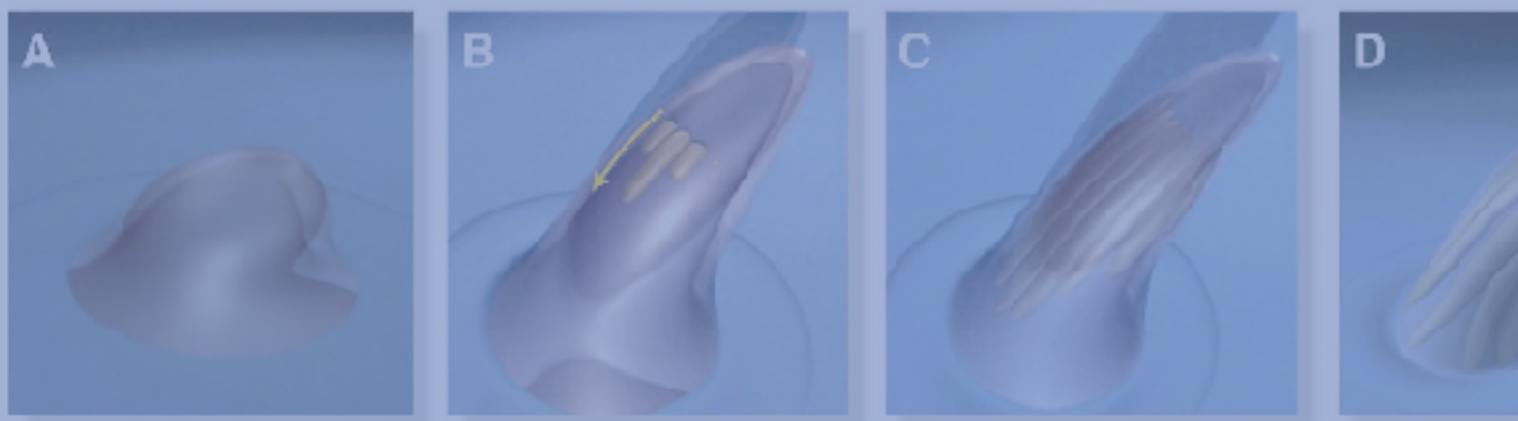
K
Feather unfurls



Desenvolvimento/anatomia folículo



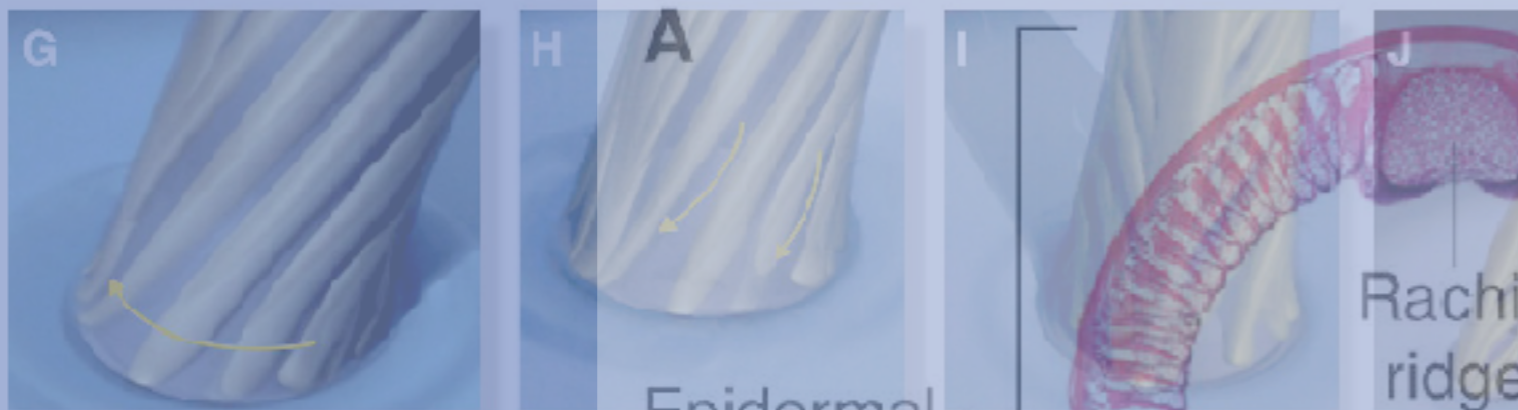
Desenvolvimento/anatomia folículo



Placode

Barb ridges initiate in epidermal collar

Barb ridges grow to epidermal collar



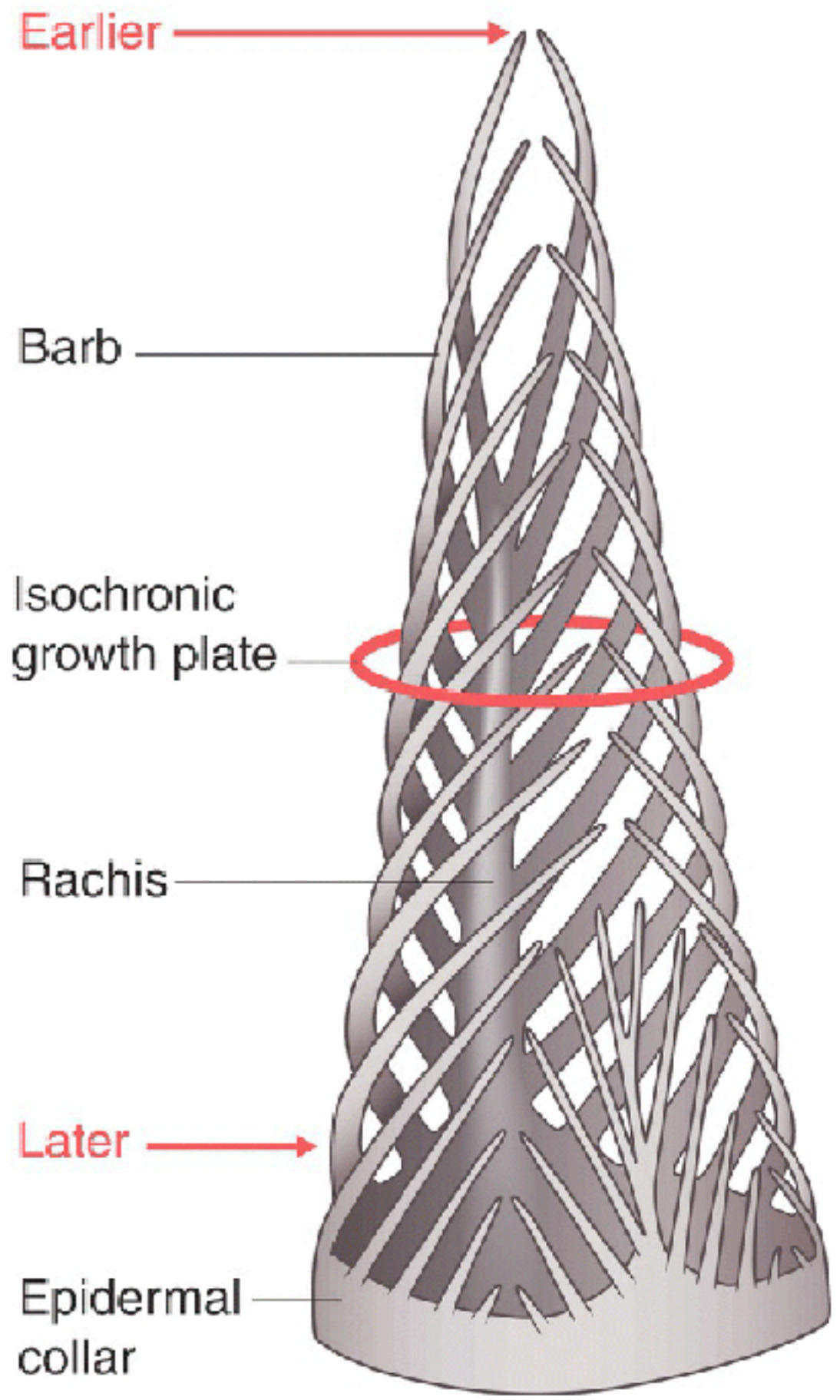
Helical growth of barb ridges

Epidermal collar

Rachis ridge

Sheath of rachis

Relative timing of feather formation



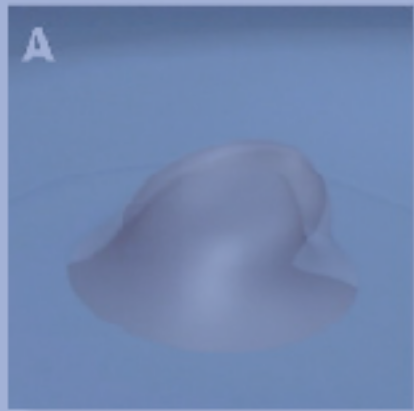
Desenvolvimento/anatomia folículo

Relative timing of feather formation

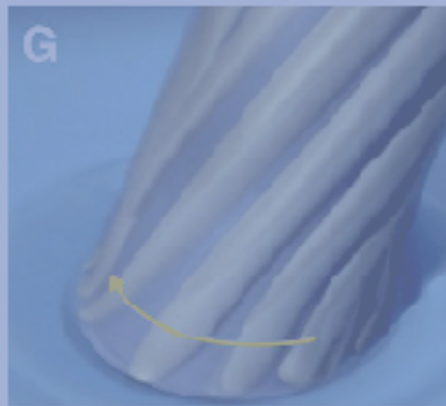


Emerging feather

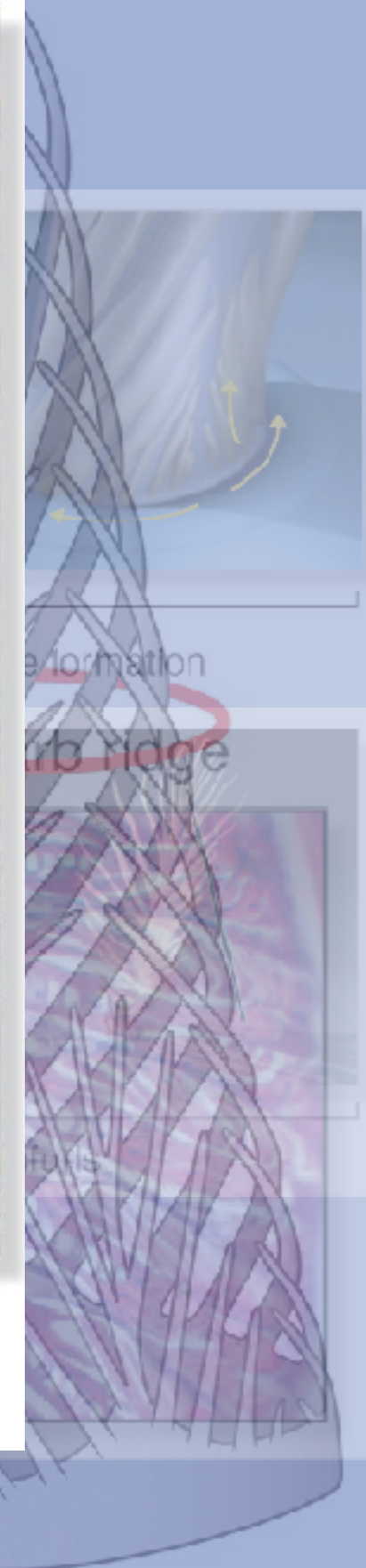
Sheath (waxy coat around new feather)



Placode

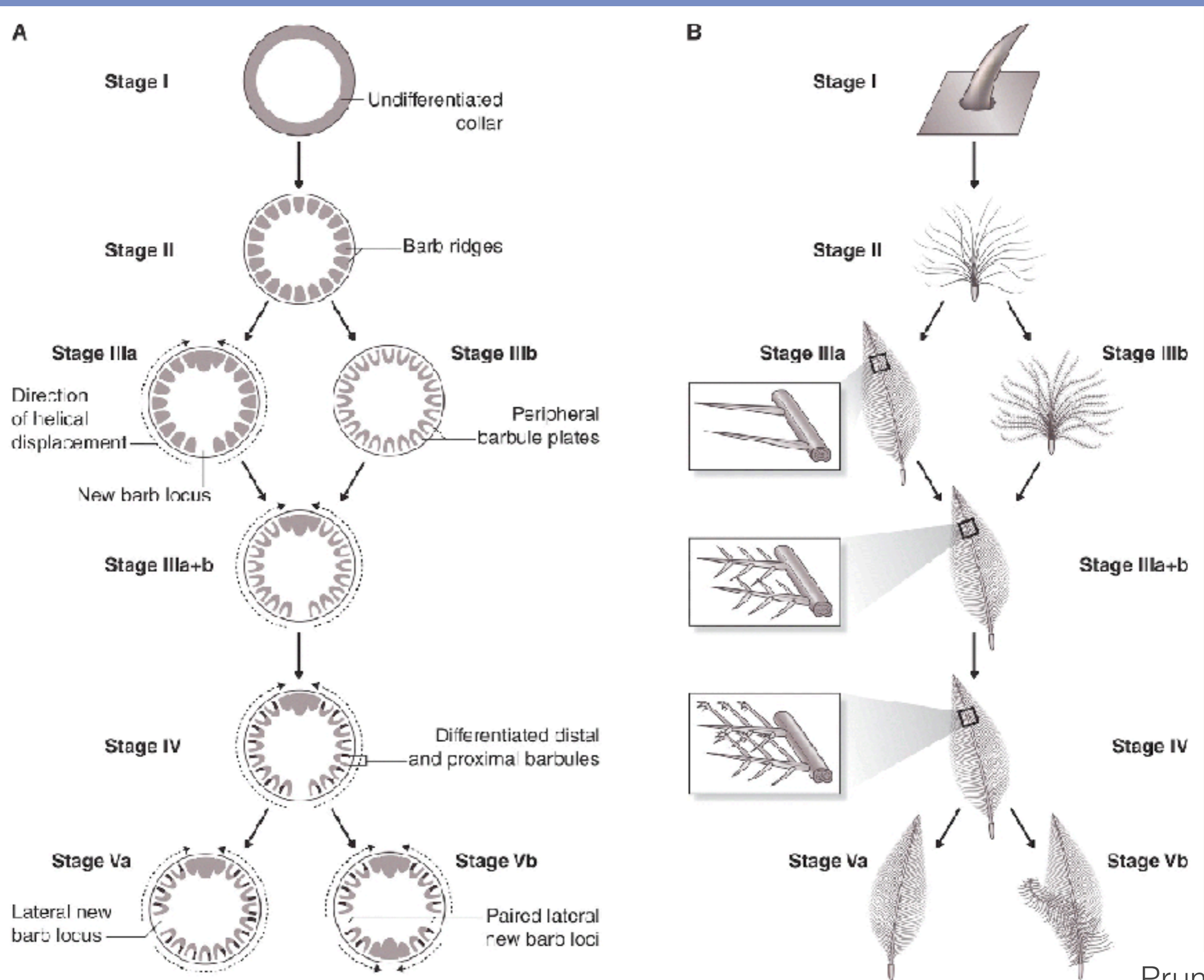


Helical growth

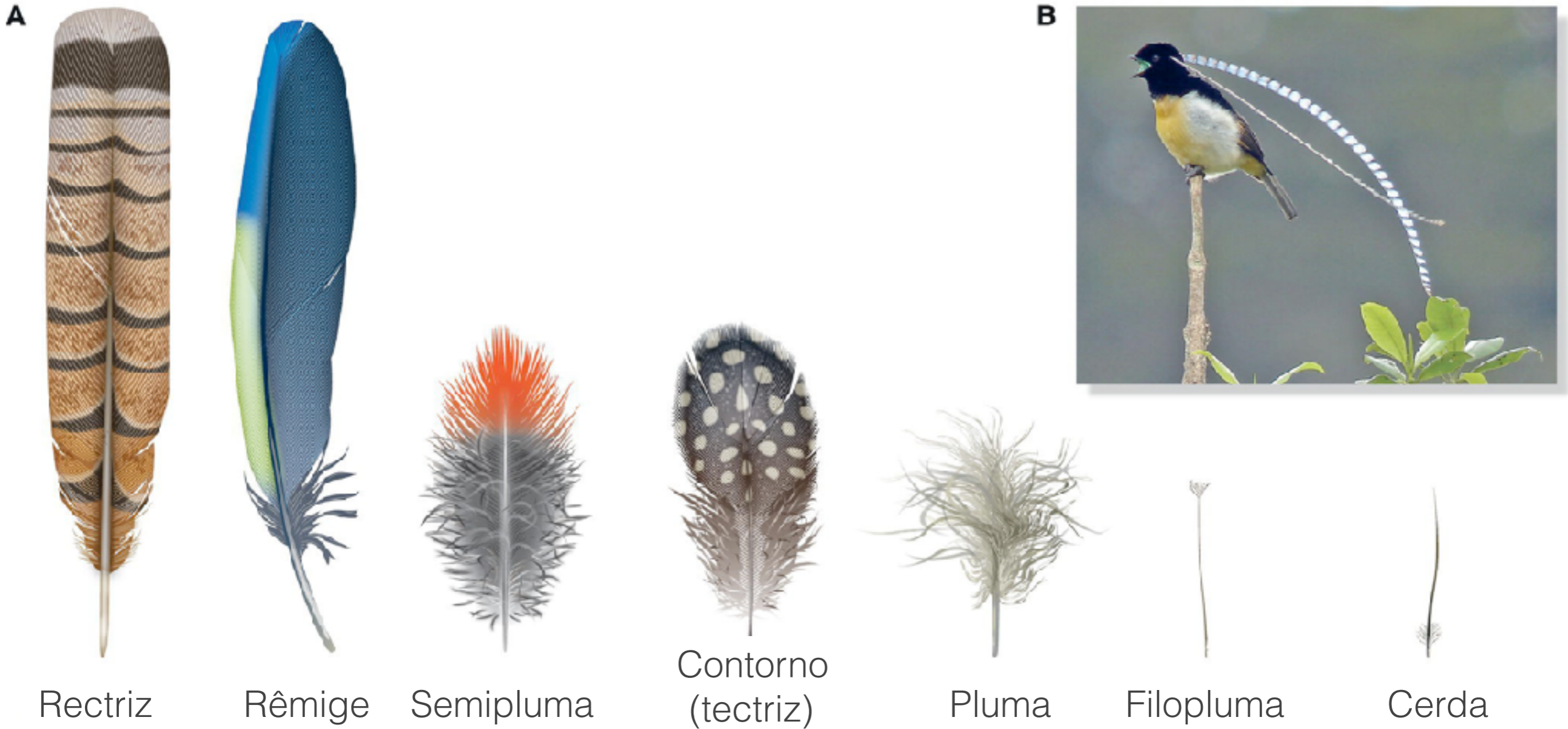


Epidermal collar

Um cenário para a evolução das penas



Tipos de penas



Manutenção da temperatura

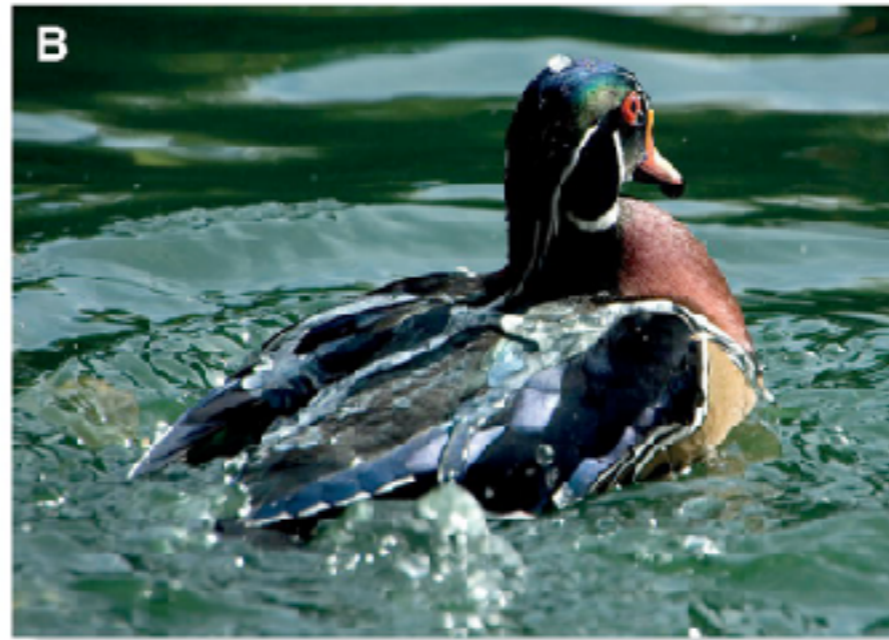
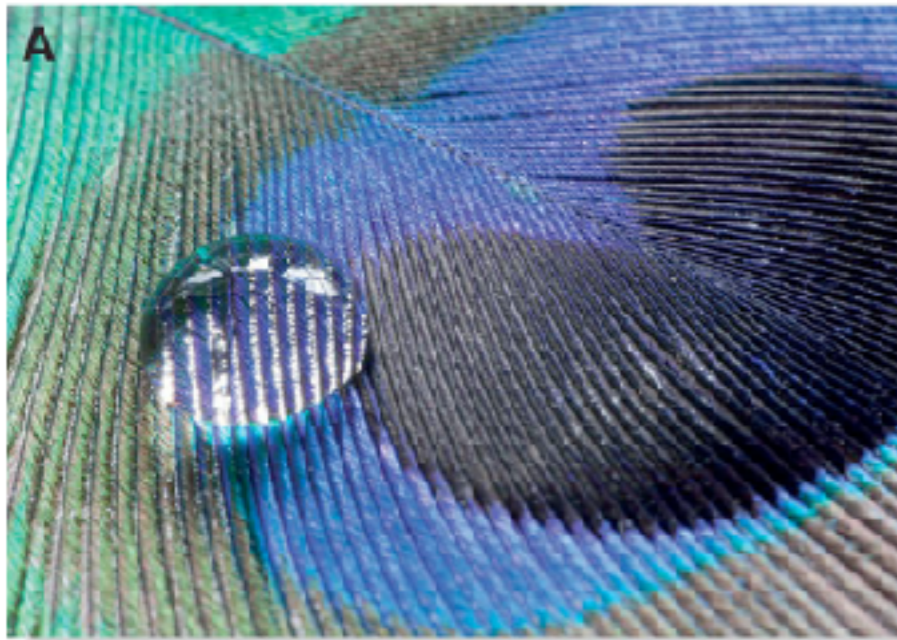


Thalassarche eremita

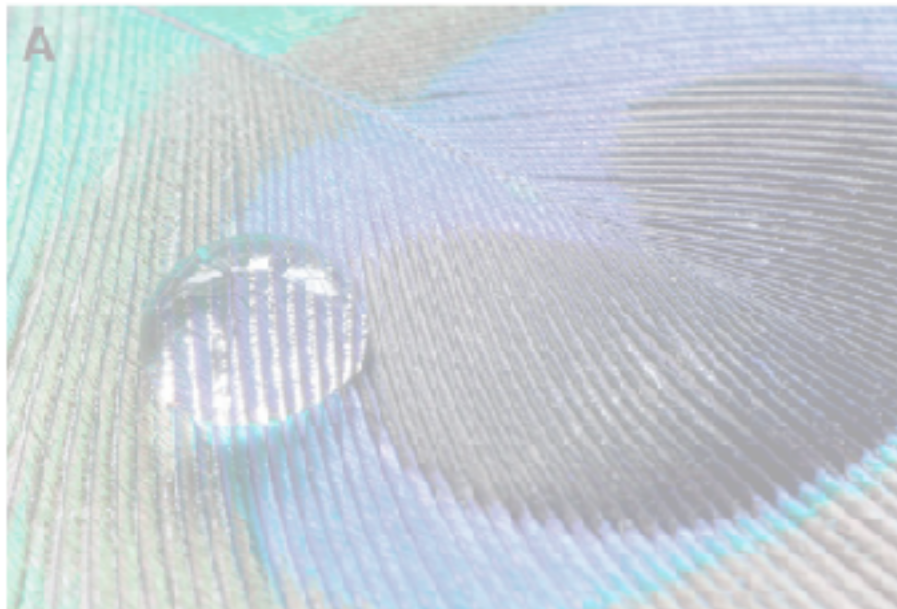
Termorregulação



Impermeabilização



Impermeabilização



Saturação/lastro

Comunicação



Lophorina superba

Comunicação



Corte

Corte



Corte

MODE **PLAY ▶** F/SEC P **30**



FRAME **-001389** TIME **-001389 MS**



HOODED P

This bird's bright colors serve as a warning to predators. It ingests chemicals from the beetles and plants it eats, and its body converts them into toxins that can make attackers violently ill, even kill them. **LIFE: 120**

Say What? Two other pitohui species are poisonous.

TOXIC TERRORS **ATTACK: 3** **DEFENSE: 6**

Aposematismo

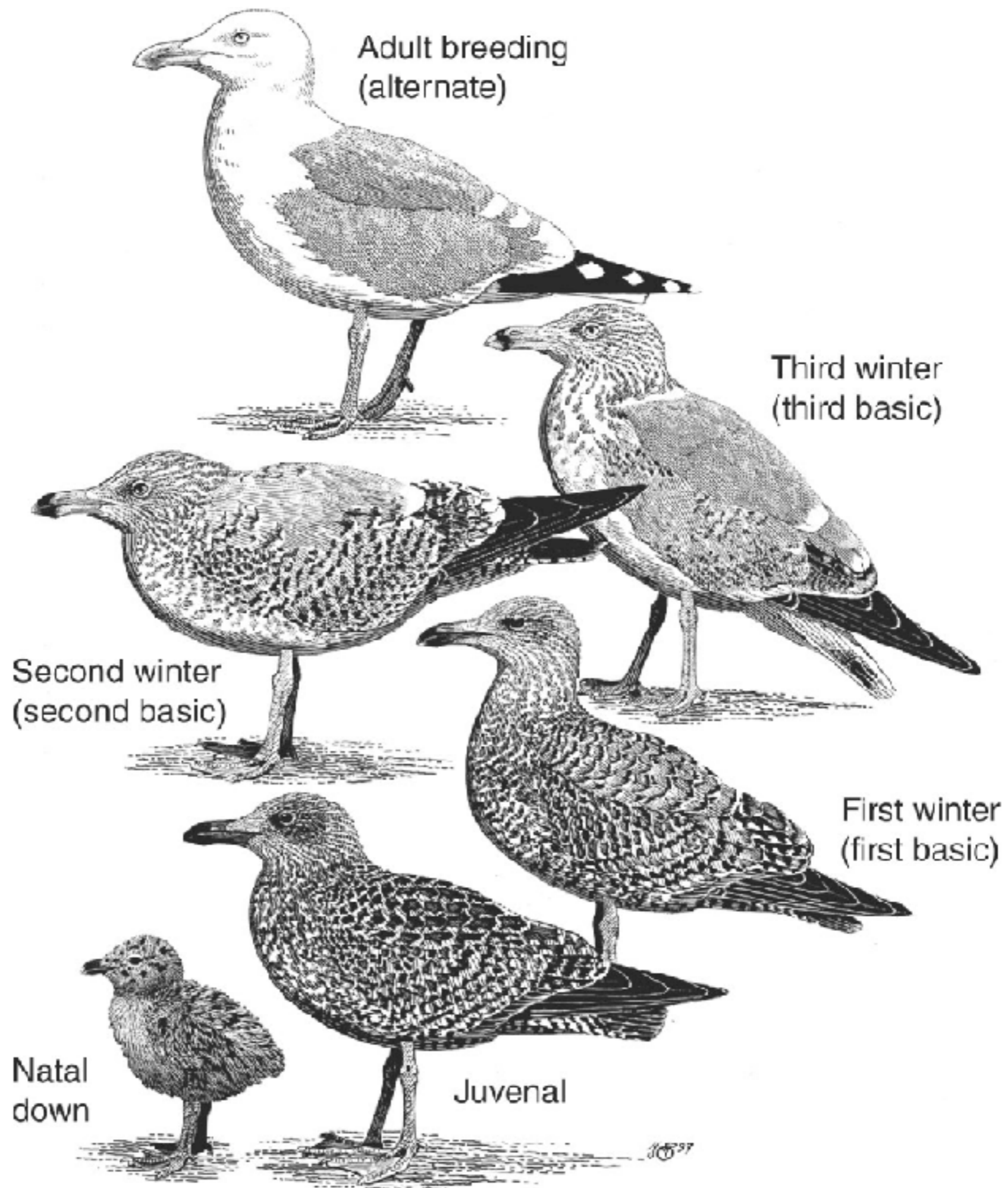
Manutenção das penas



Manutenção das penas



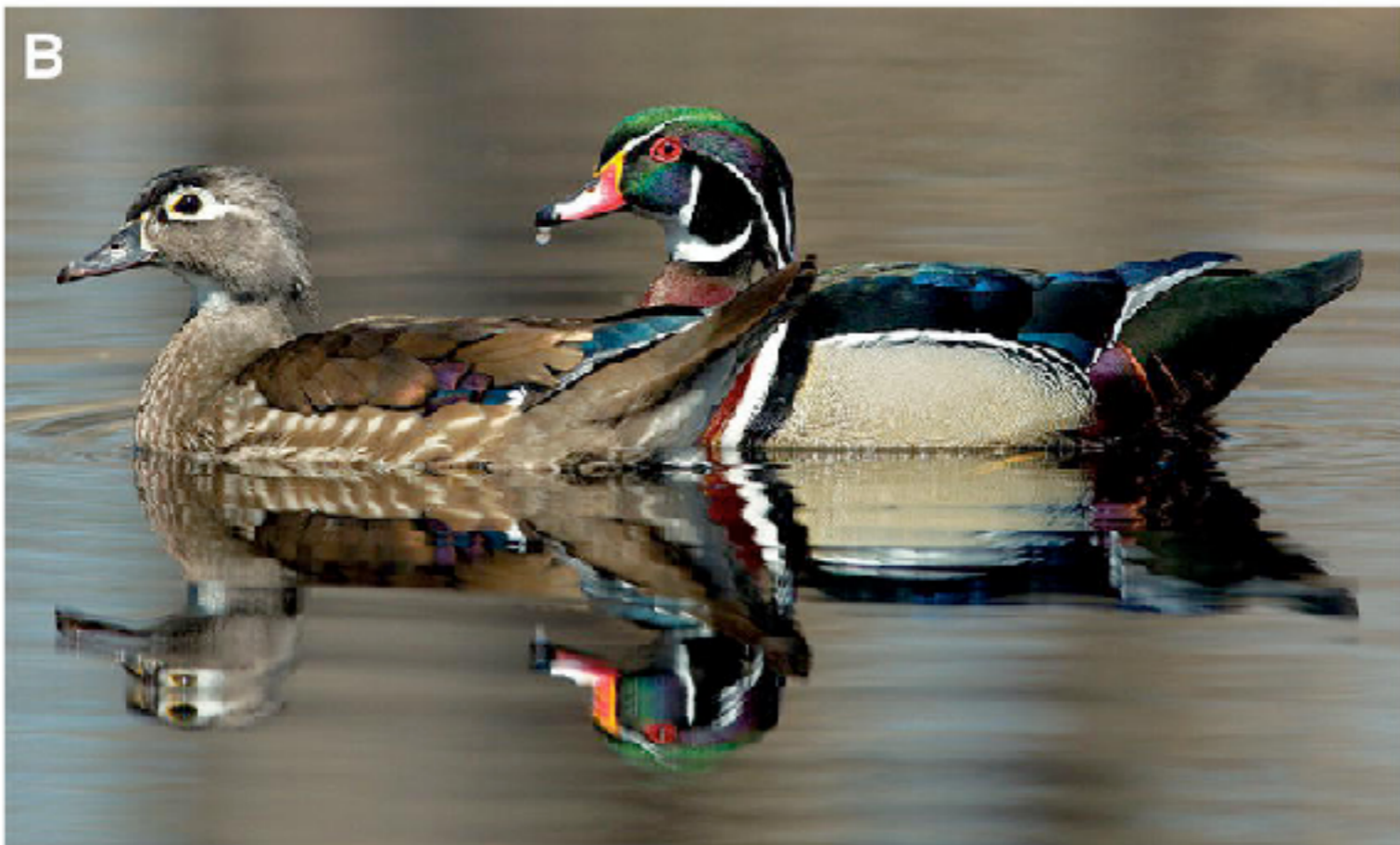
Muda



Muda



Muda



Aix sponsa



Esporas



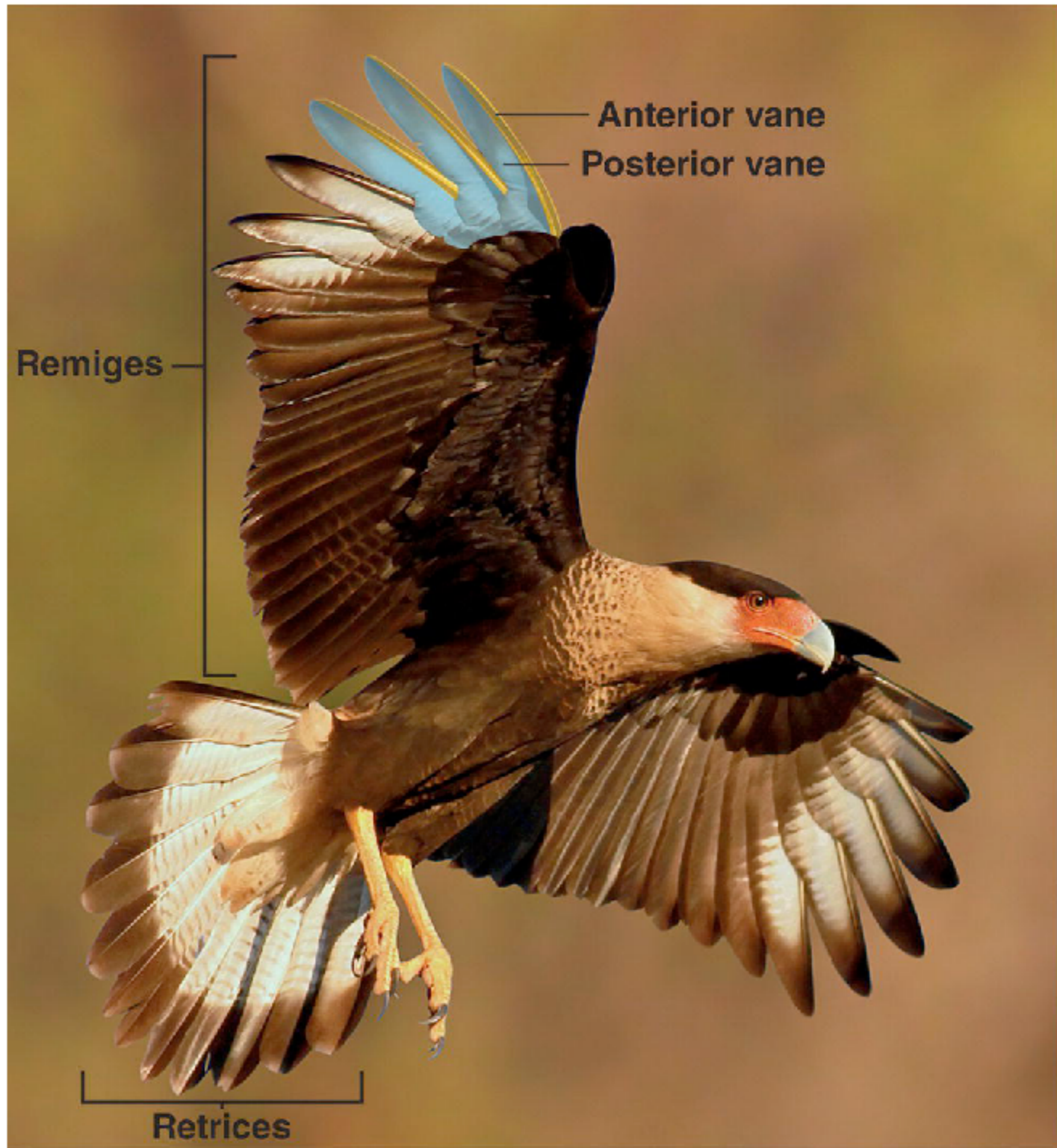
Dente de ovo



Bico queratinizado



Voo

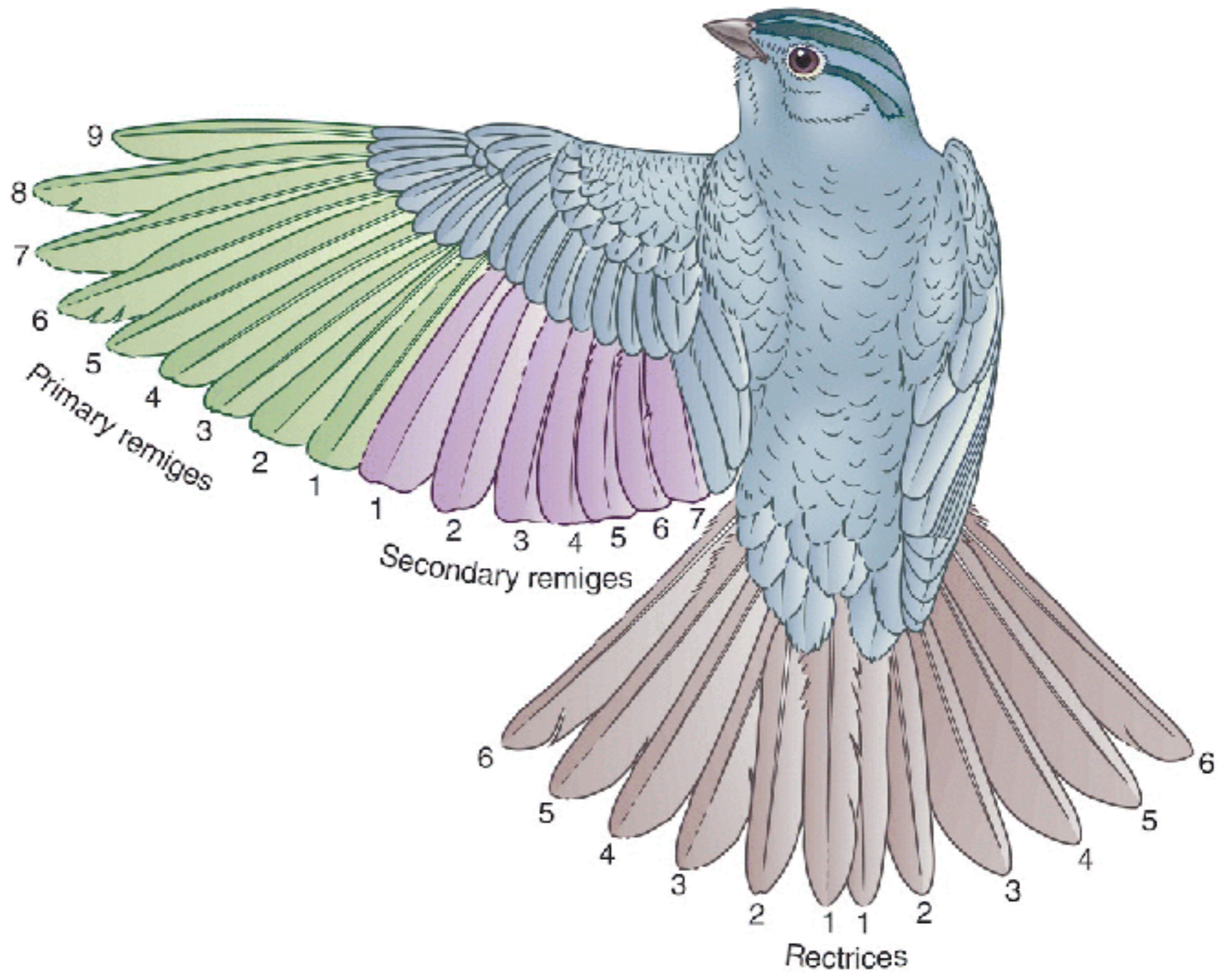
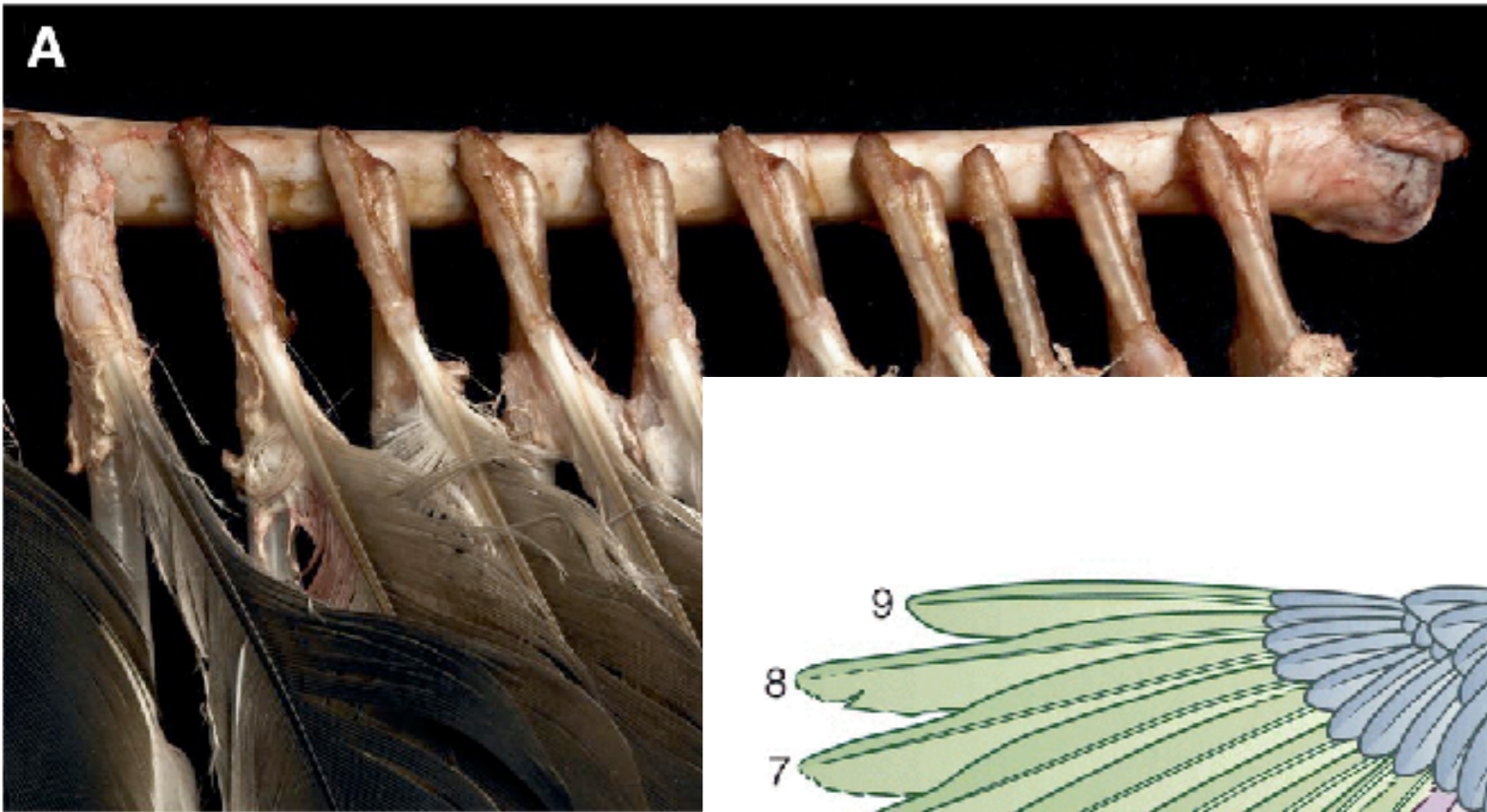


Caracara cheriway

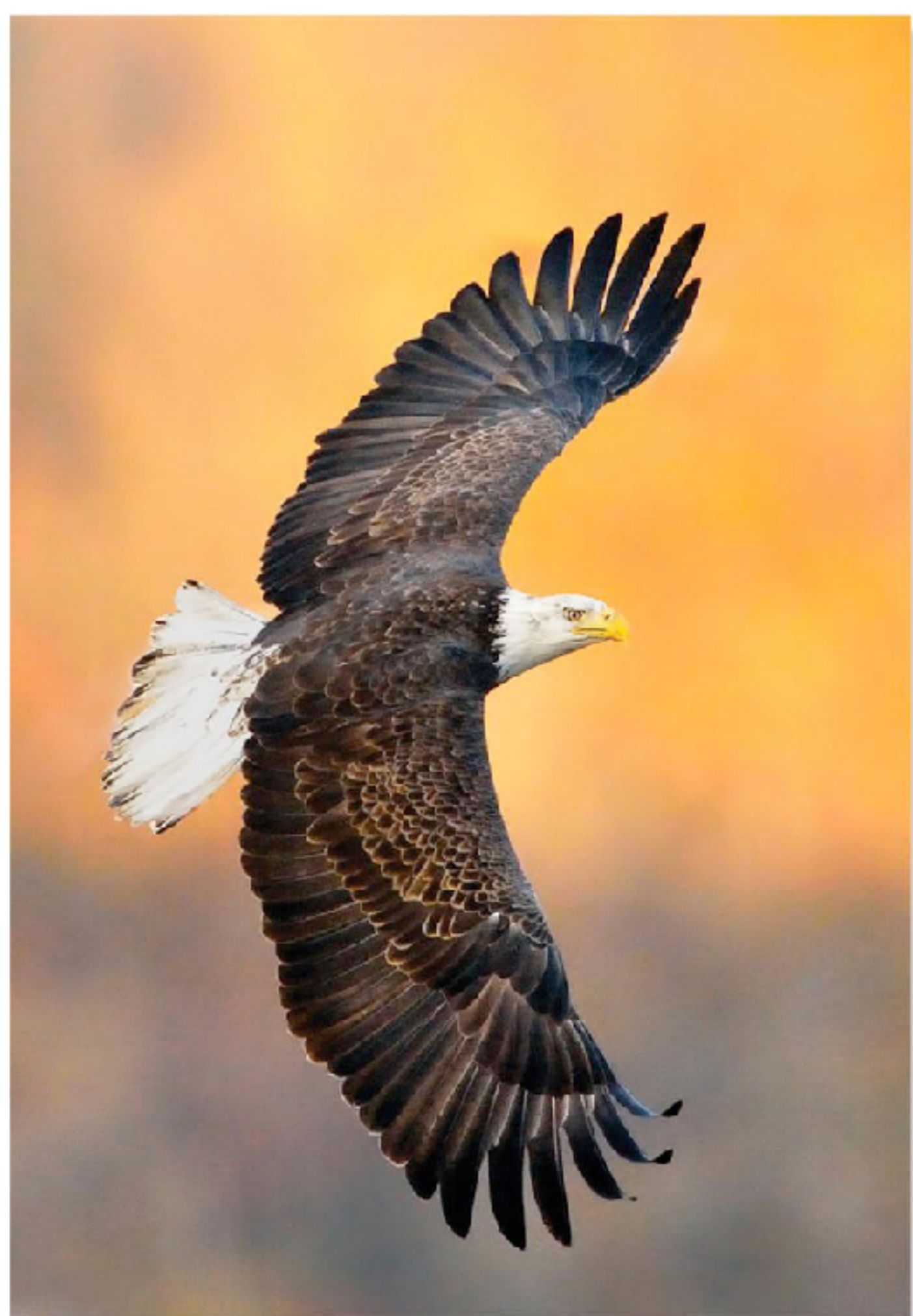
Voo



Voo/função penas

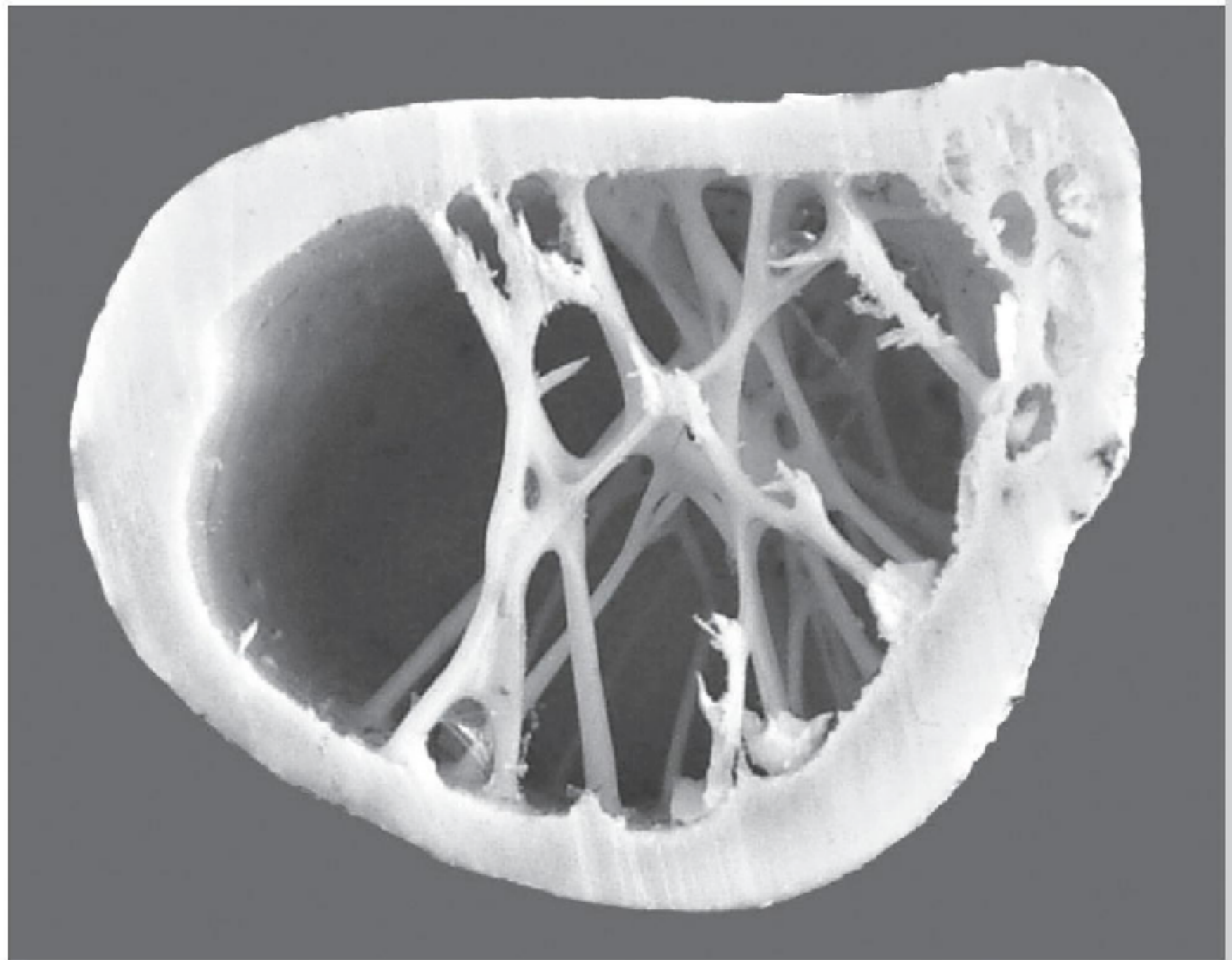


Adaptações para o voo



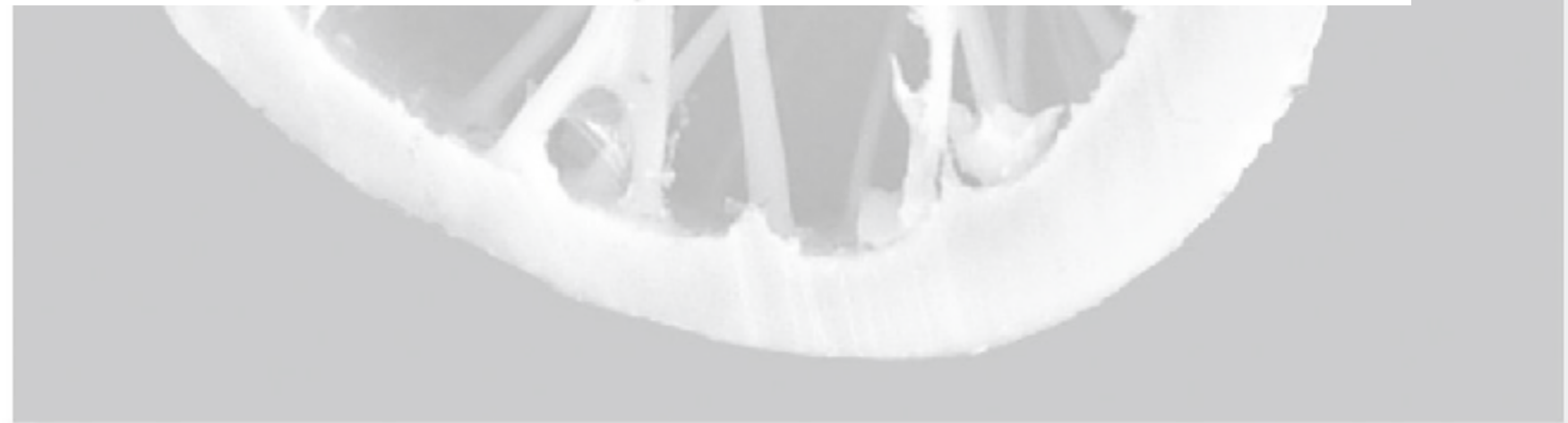
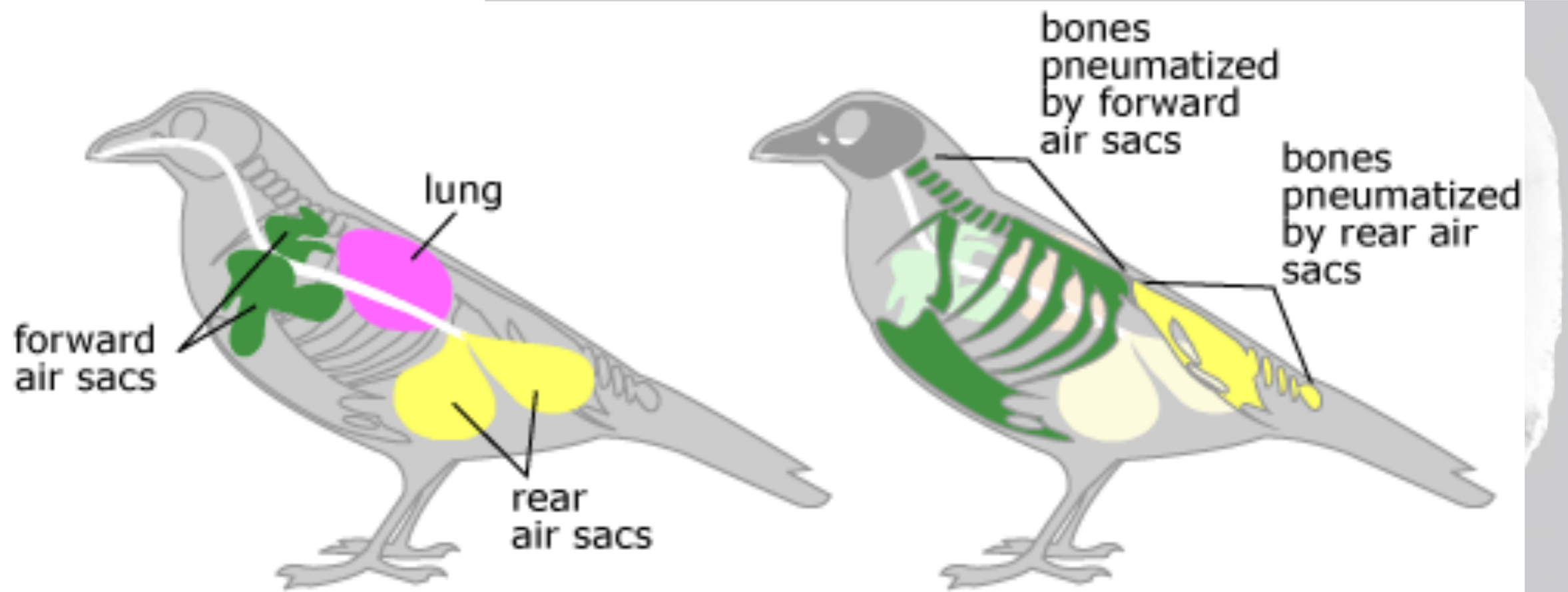
Haliaeetus leucocephalus

Adaptações para o voo: menor peso

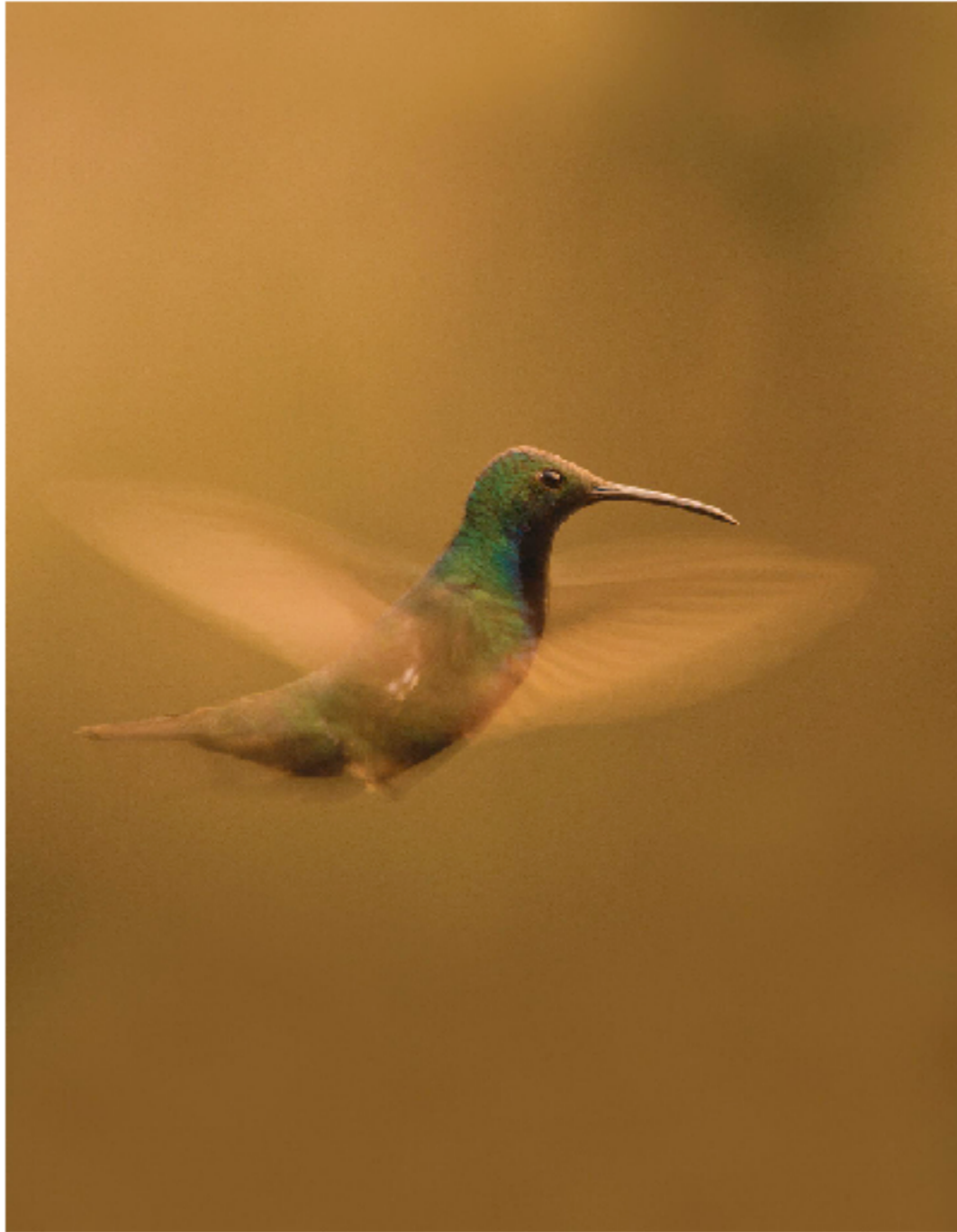


Ossos pneumáticos

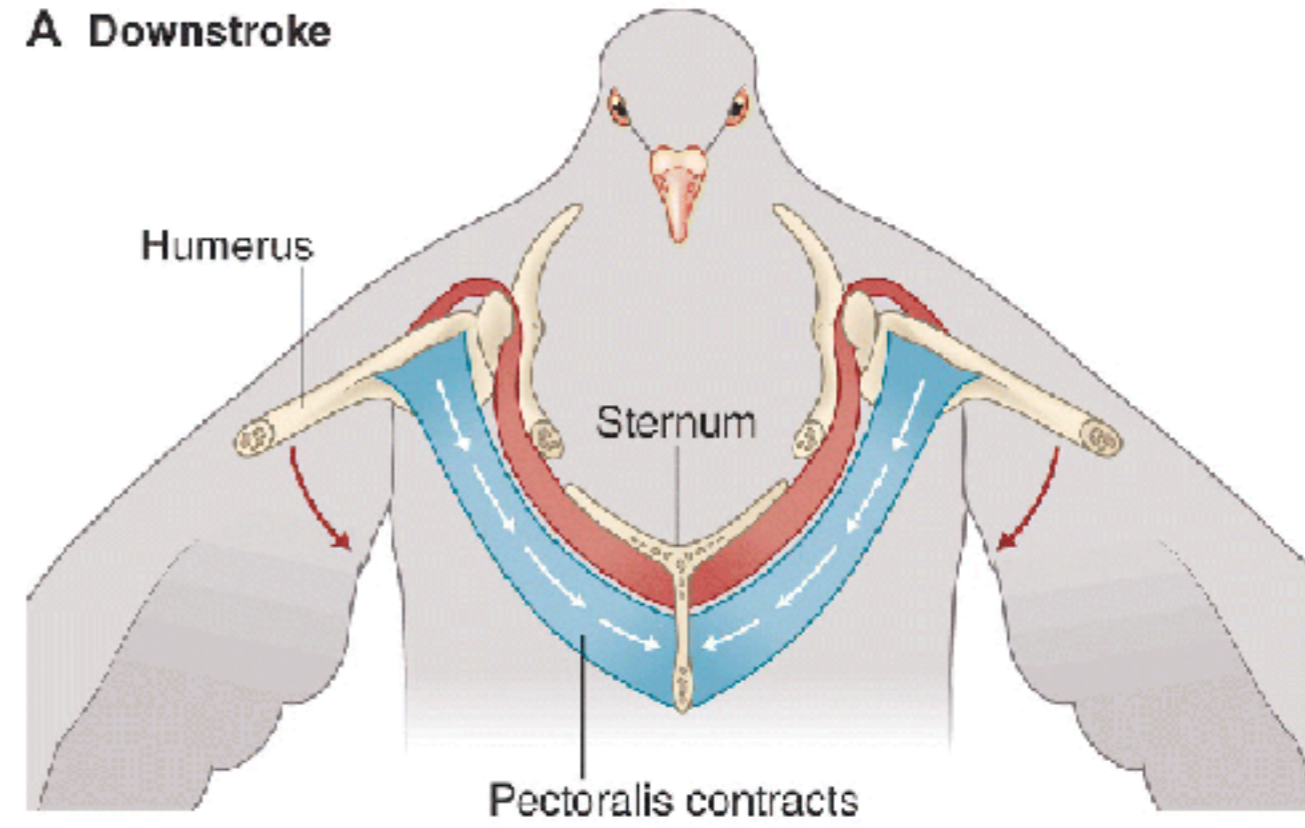
Adaptações para o voo: menor peso



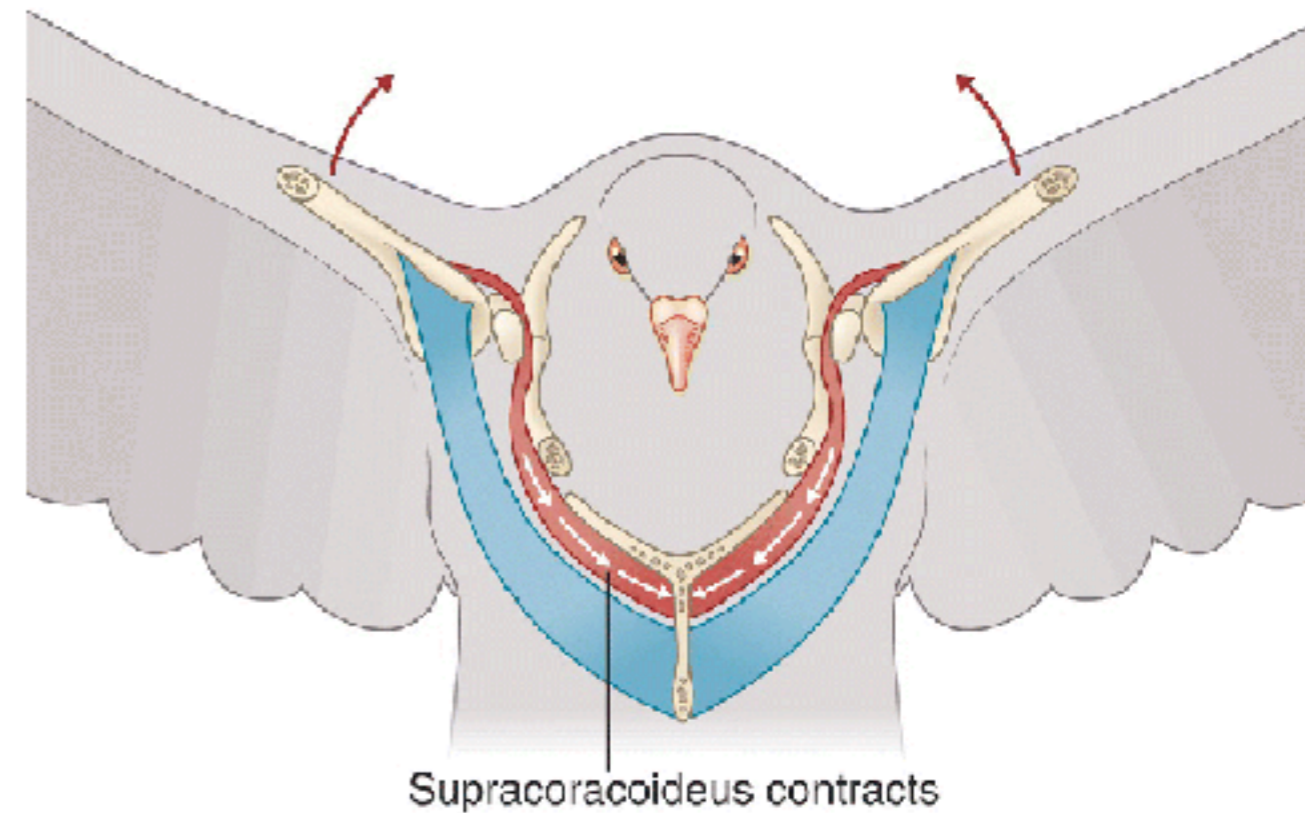
Adaptações para o voo: maior atividade muscular



A Downstroke

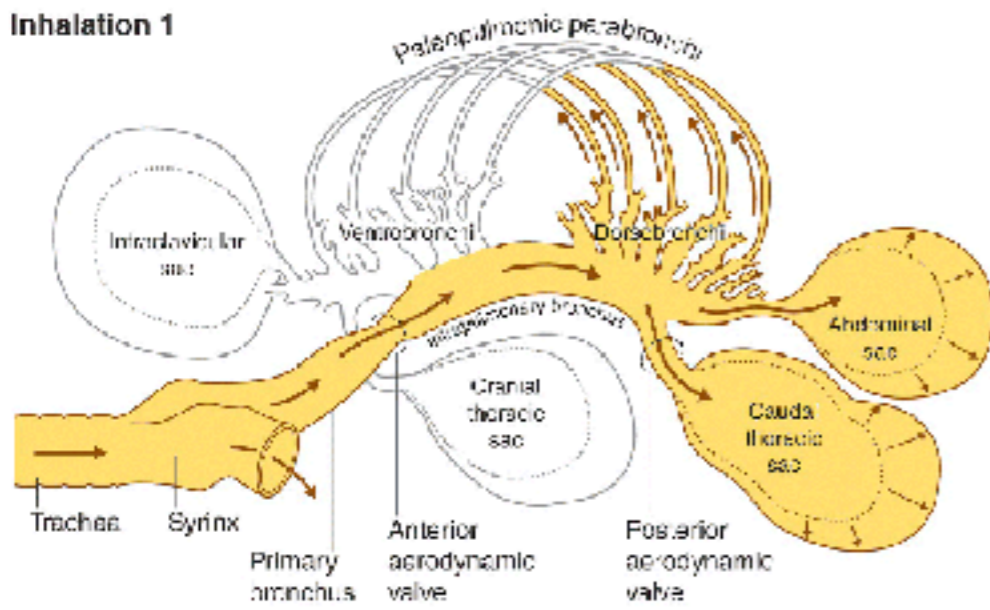


B Upstroke

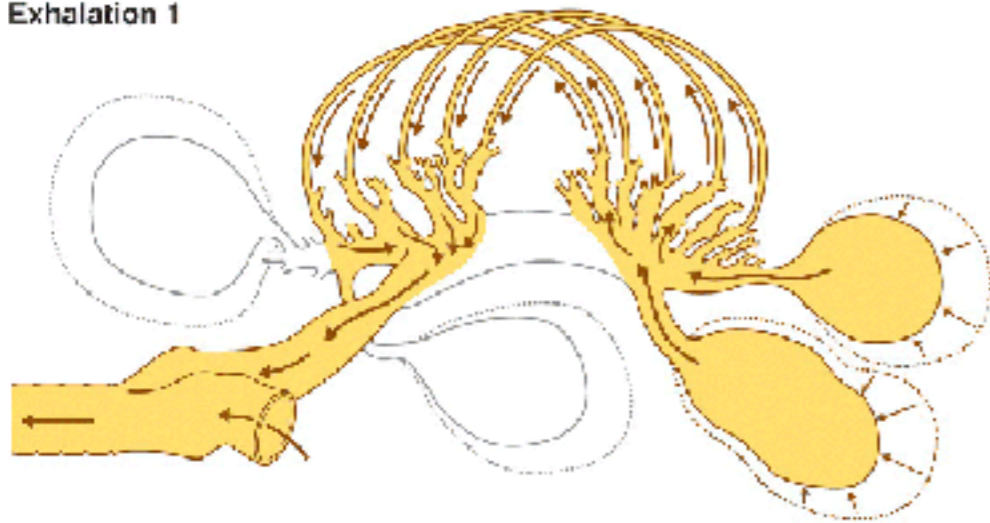


Adaptações para o voo: maior atividade muscular

A Inhalation 1

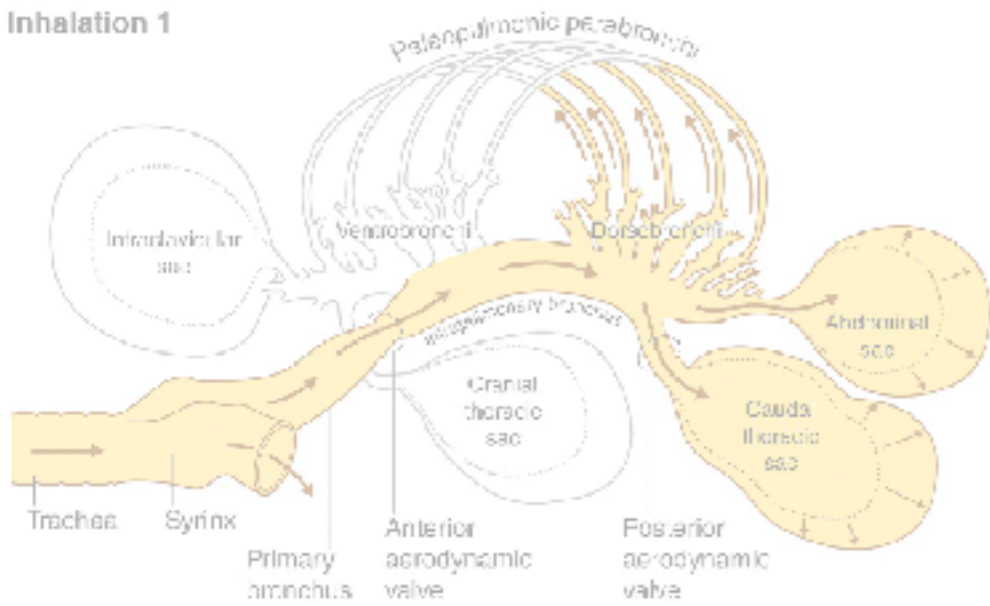


B Exhalation 1



Adaptações para o voo: maior atividade muscular

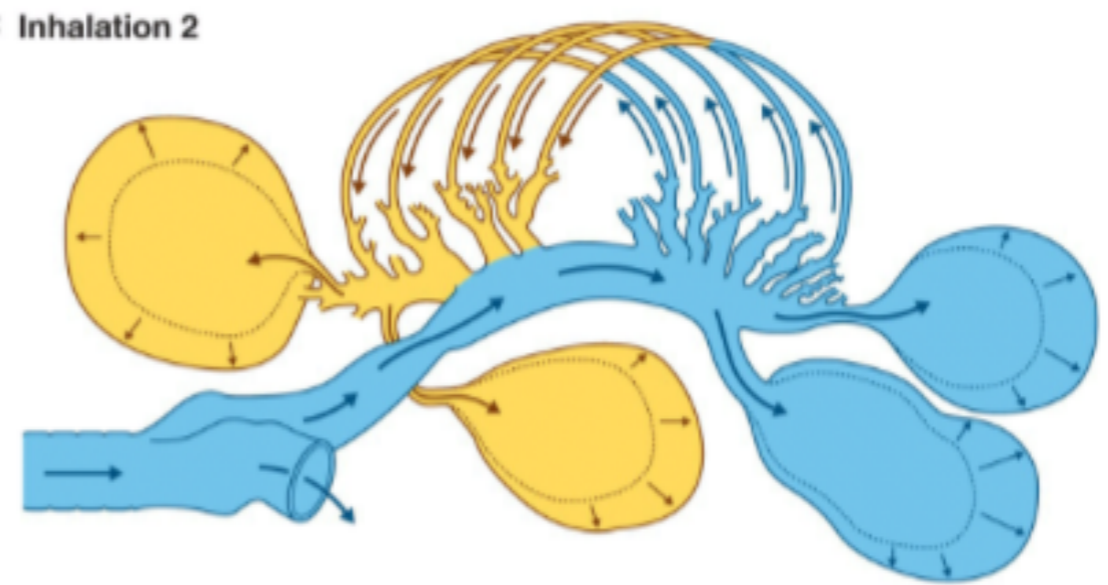
A Inhalation 1



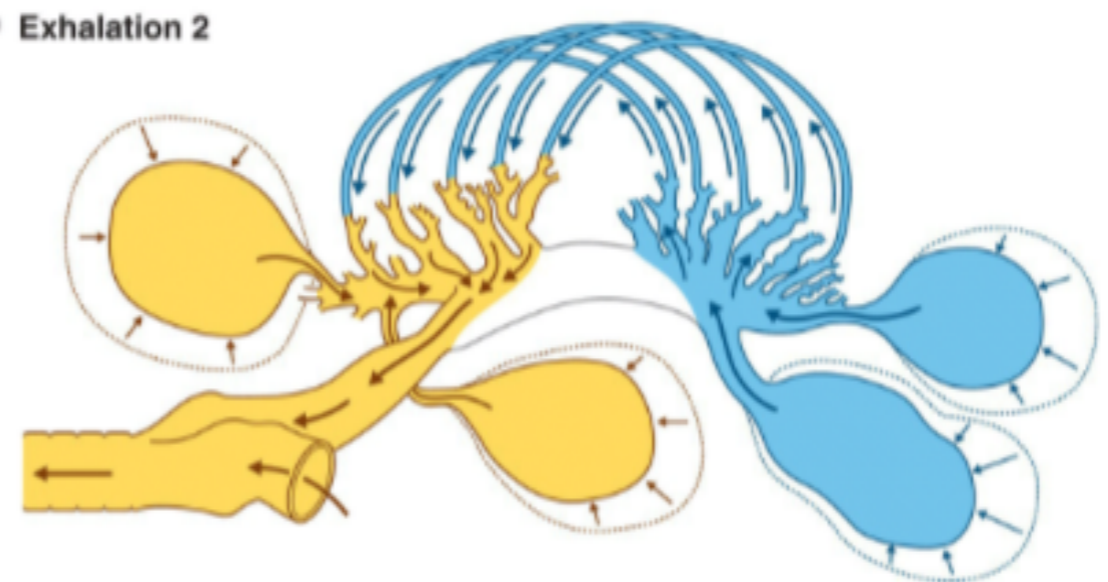
B Exhalation 1



C Inhalation 2

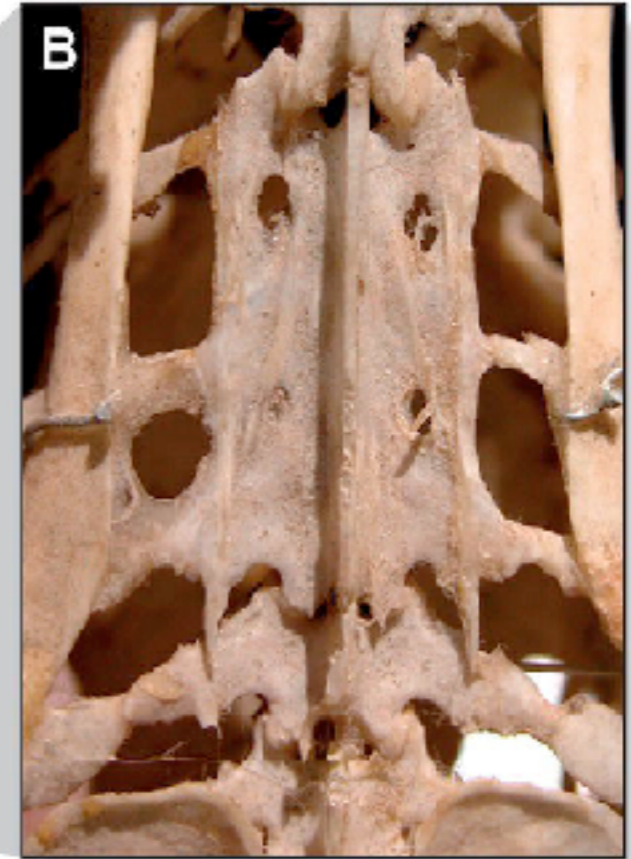
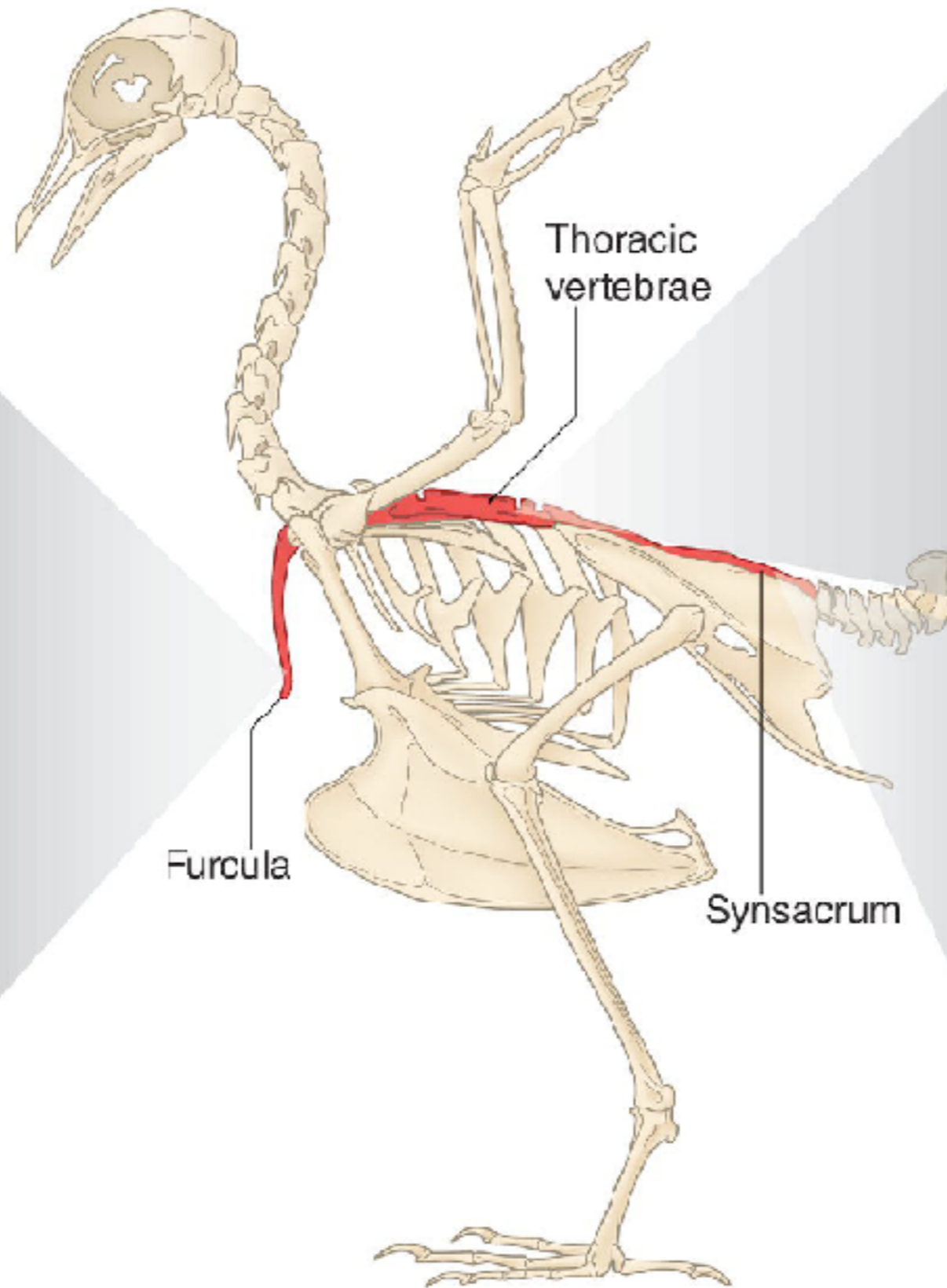


D Exhalation 2

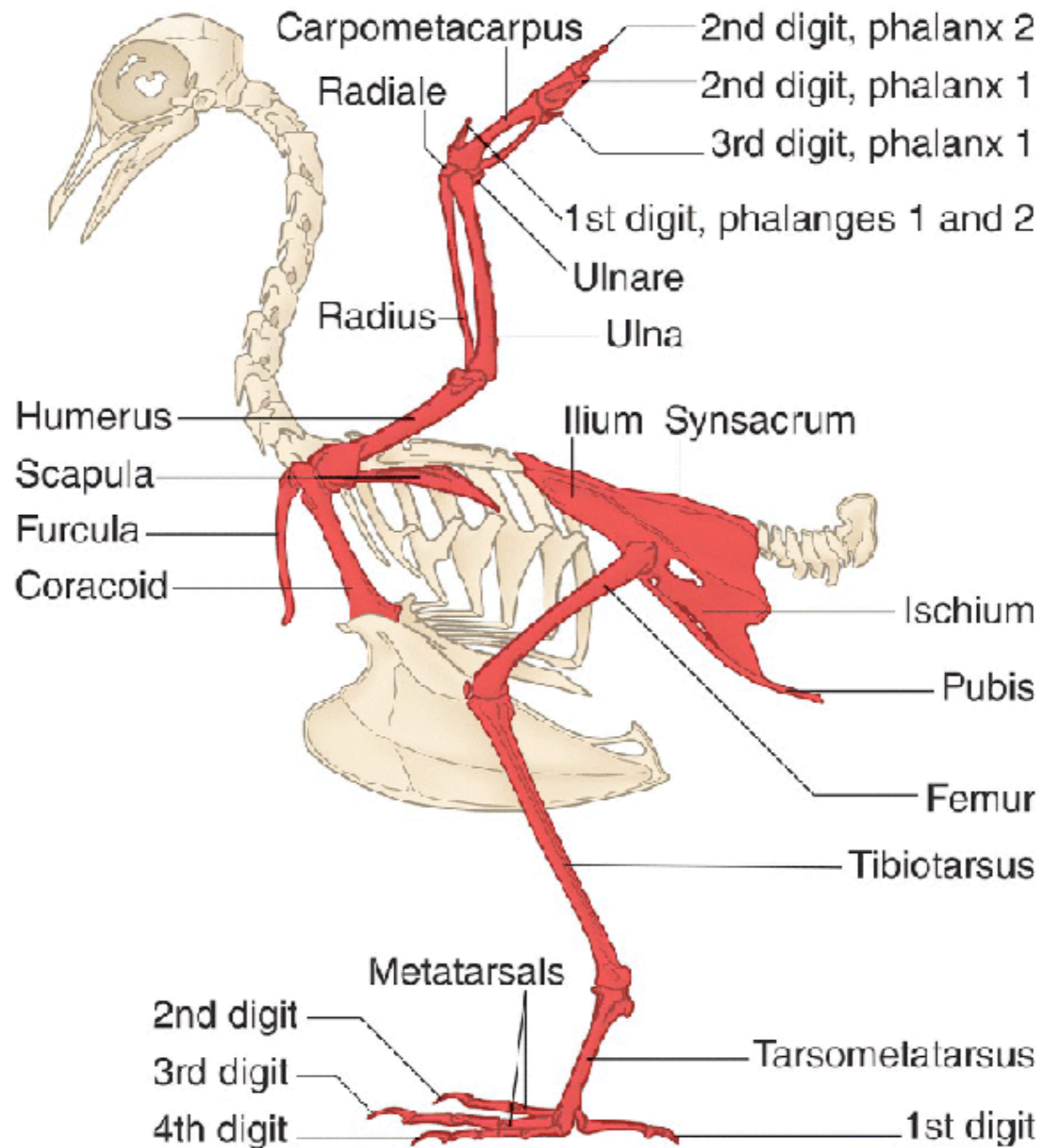




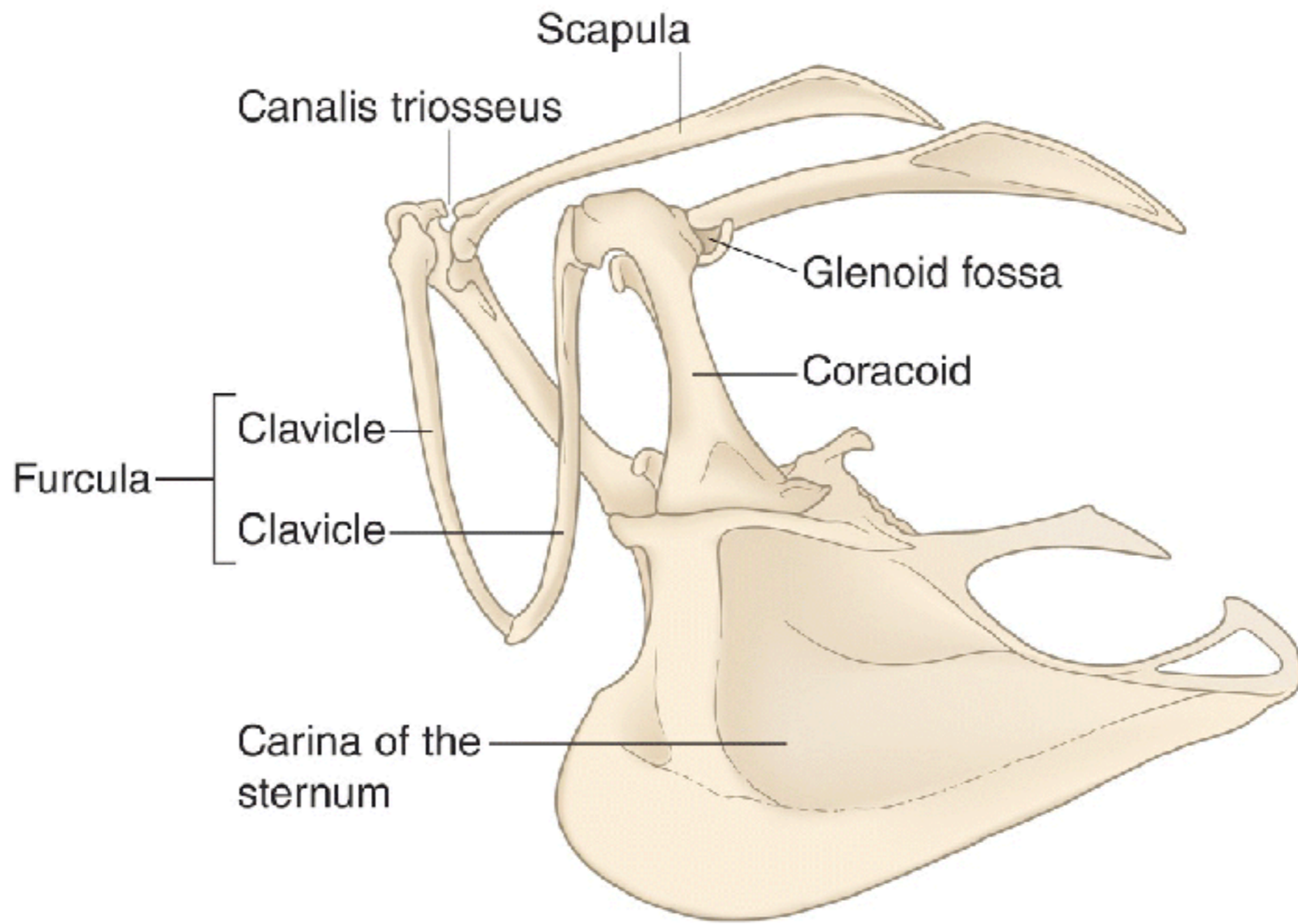
Esqueleto



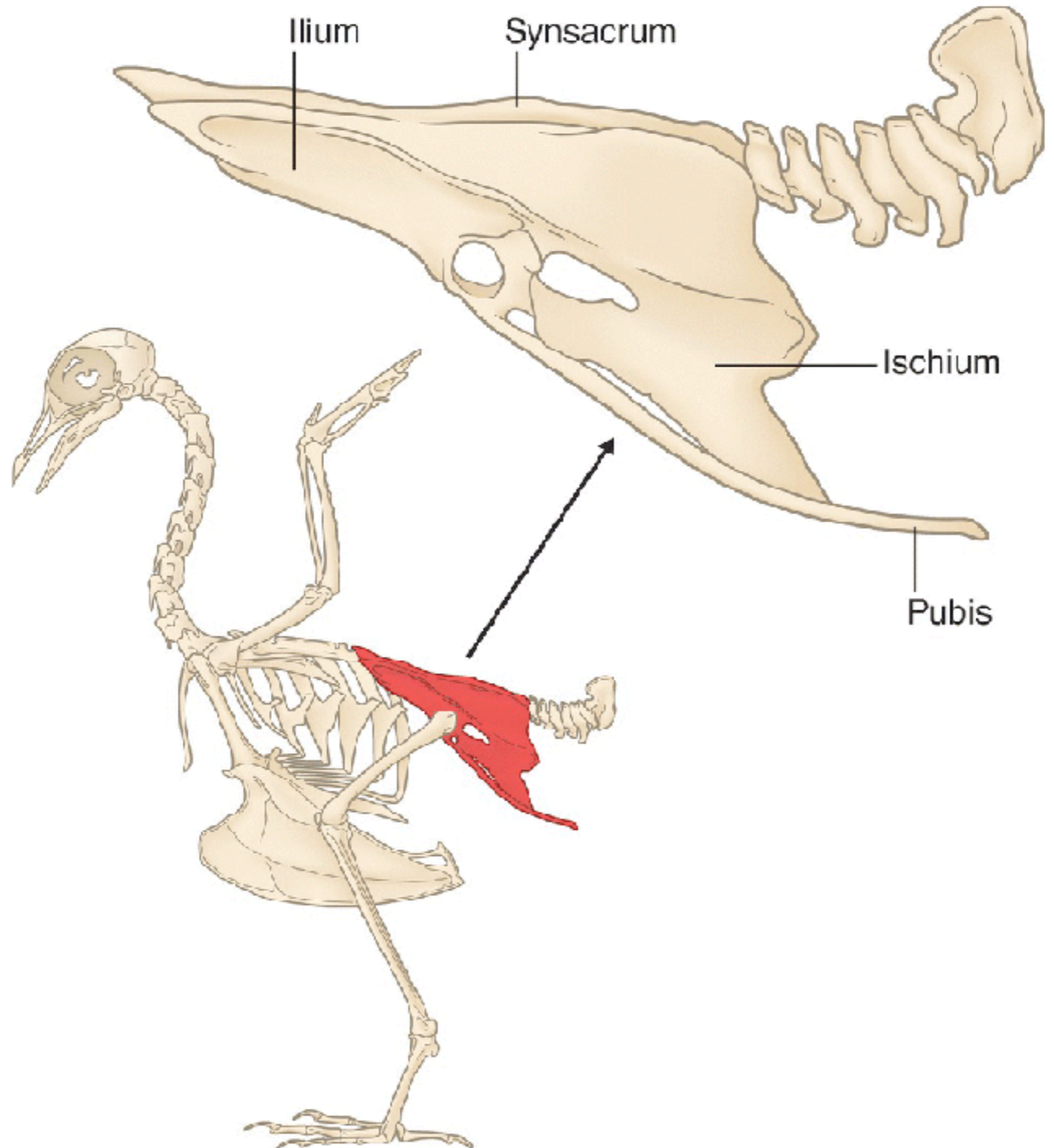
Esqueleto: Tórax e abdome



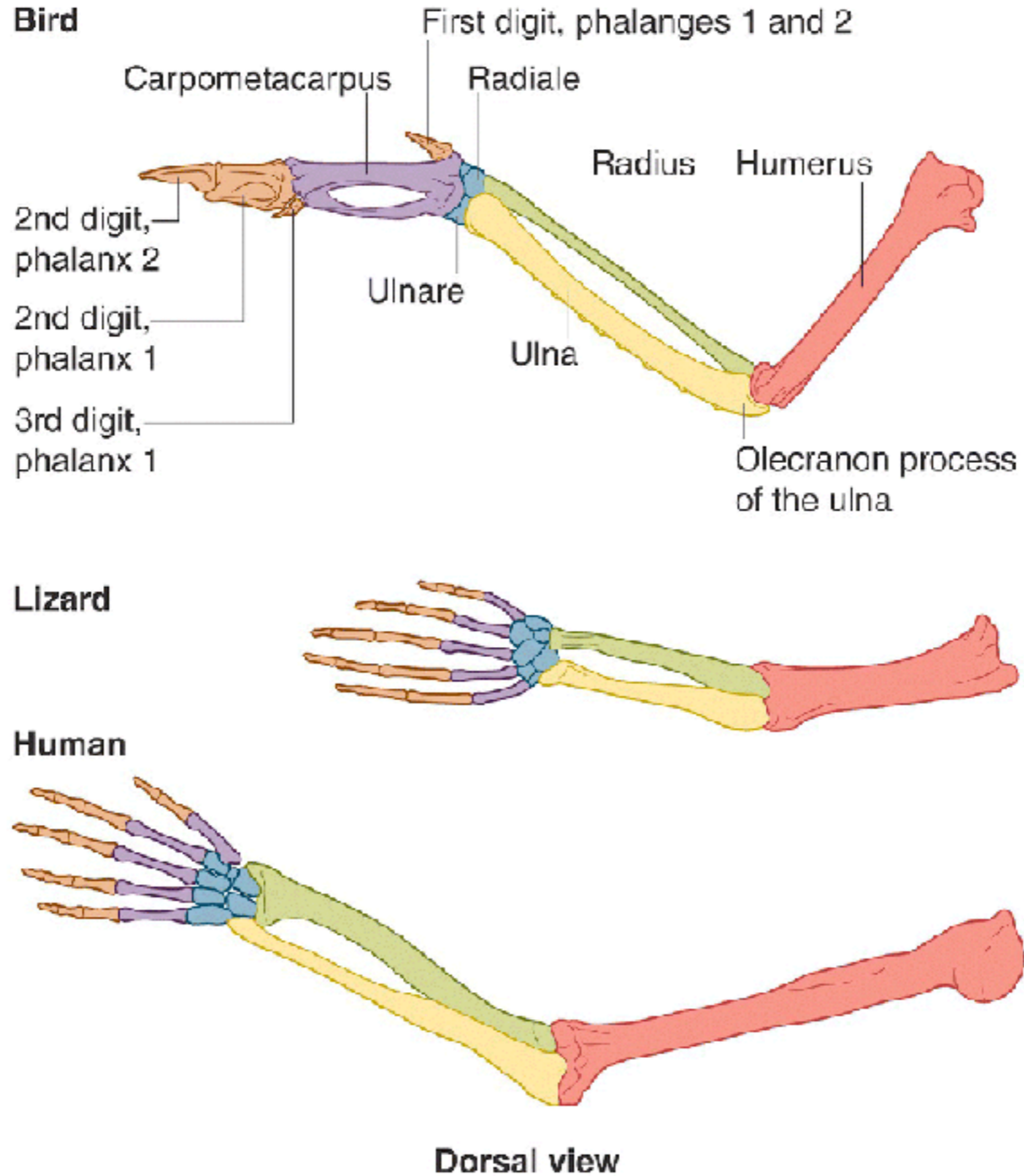
Esqueleto: Tórax e abdome



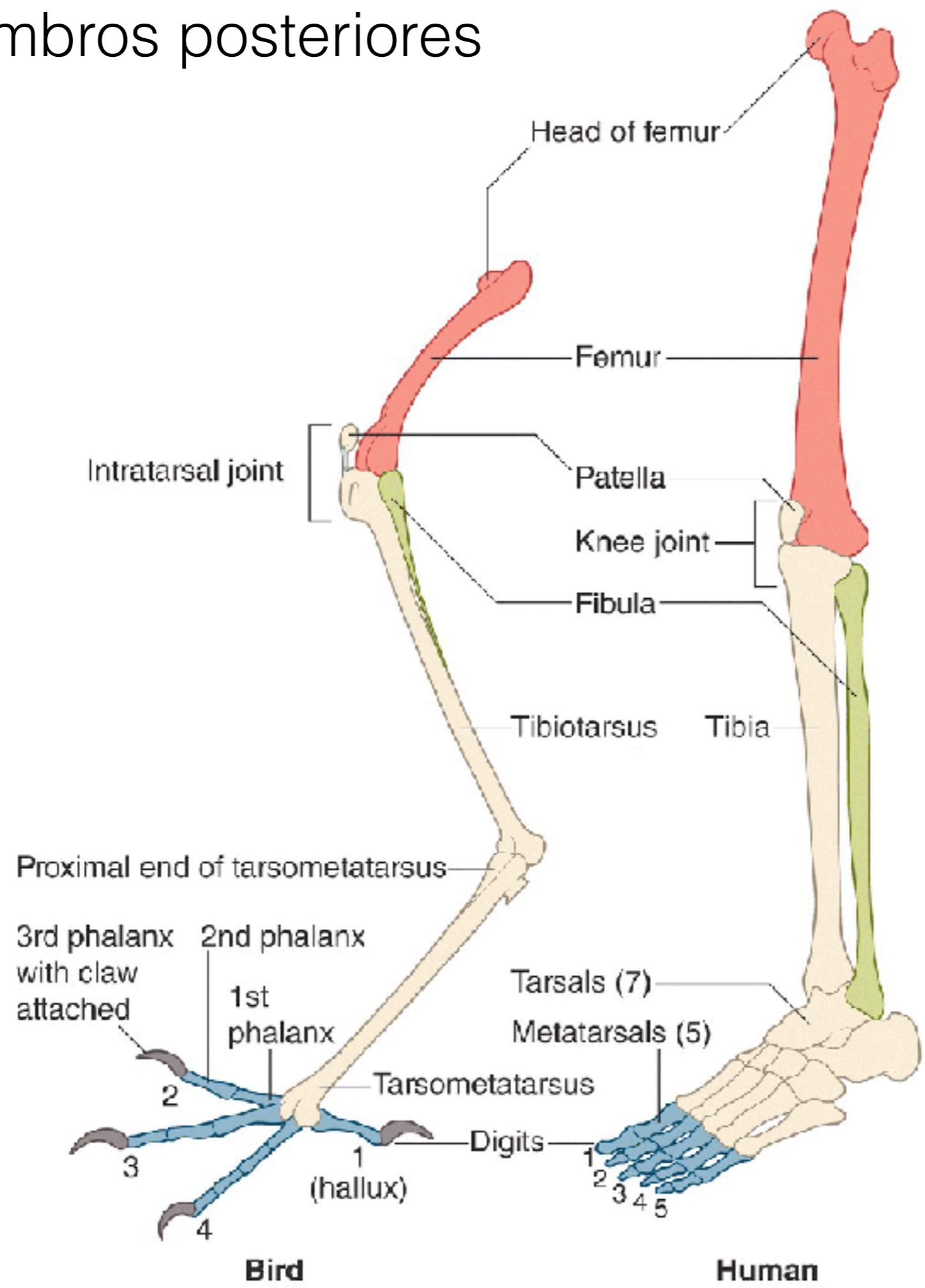
Esqueleto: Tórax e abdome



Esqueleto: Asas

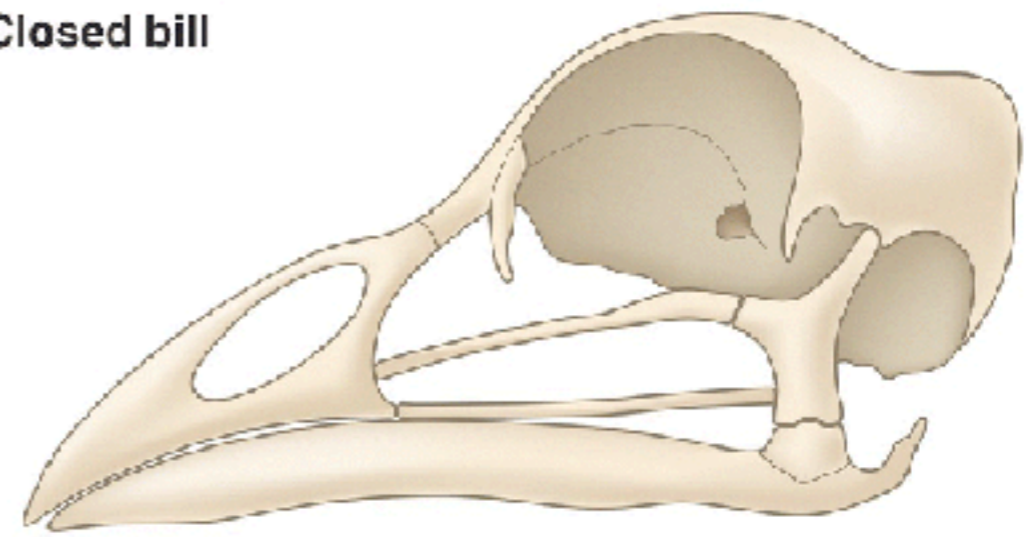


Esqueleto: Miembros posteriores

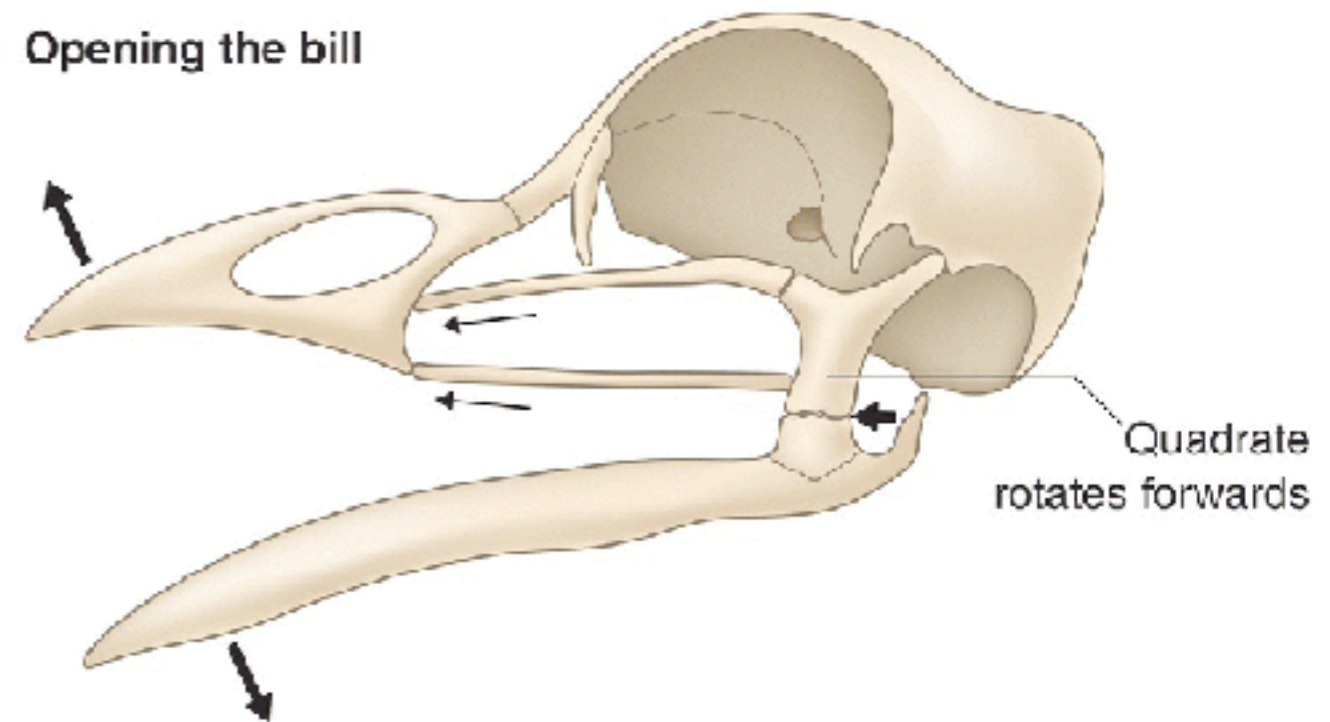


Esqueleto: Crânio

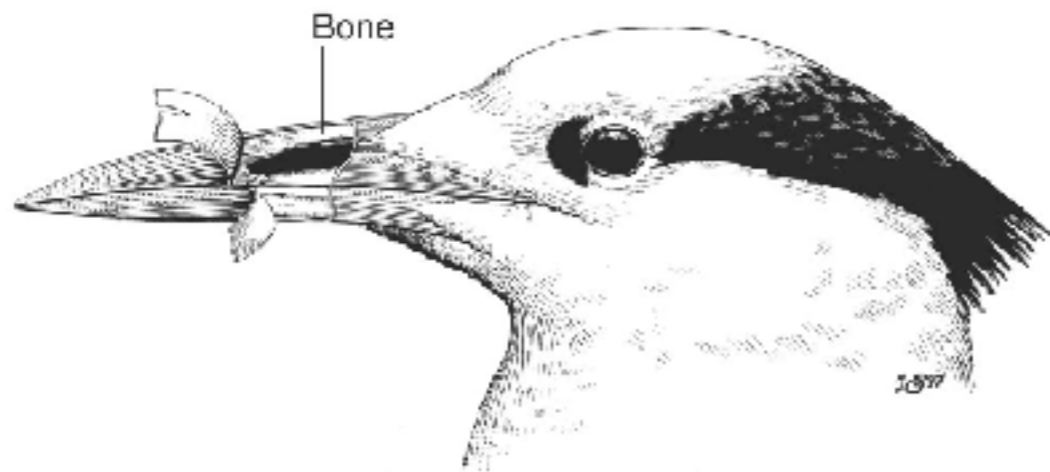
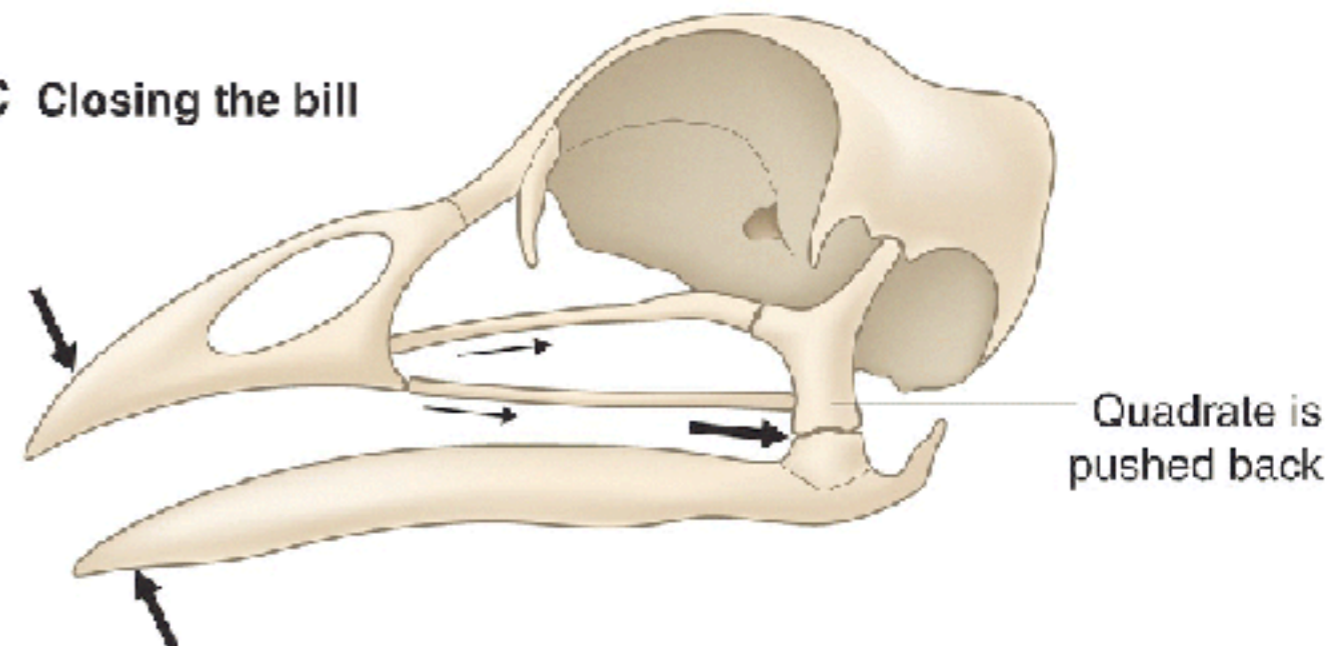
A Closed bill



B Opening the bill



C Closing the bill



Tipos de bicos



Generalist



Insect catching



Surface skimming



Scything



Grain eating



Coniferous-seed eating



Probing



Filter feeding



Nectar feeding



Fruit eating



Aerial fishing



Pursuit fishing



Chiseling



Dip netting

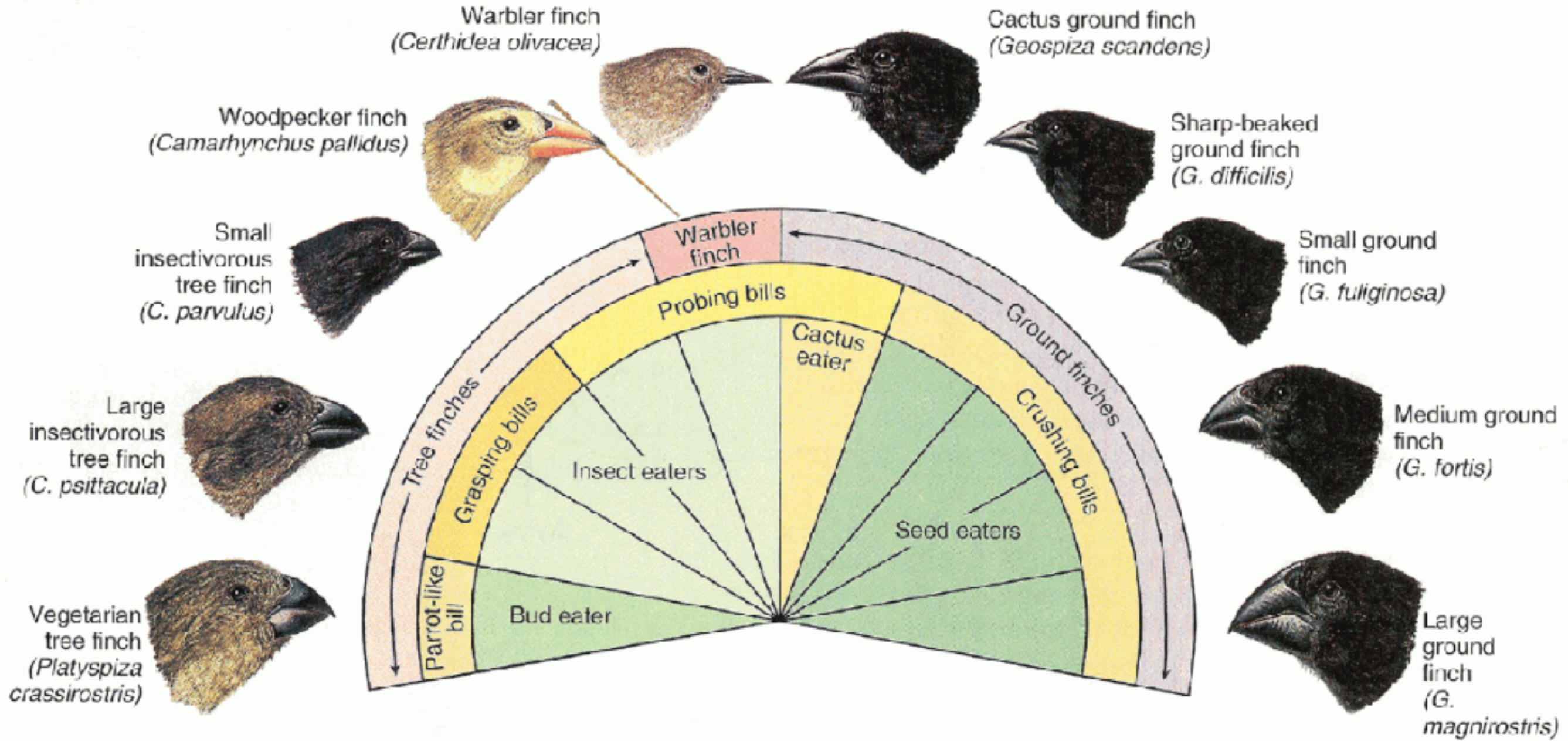


Scavenging

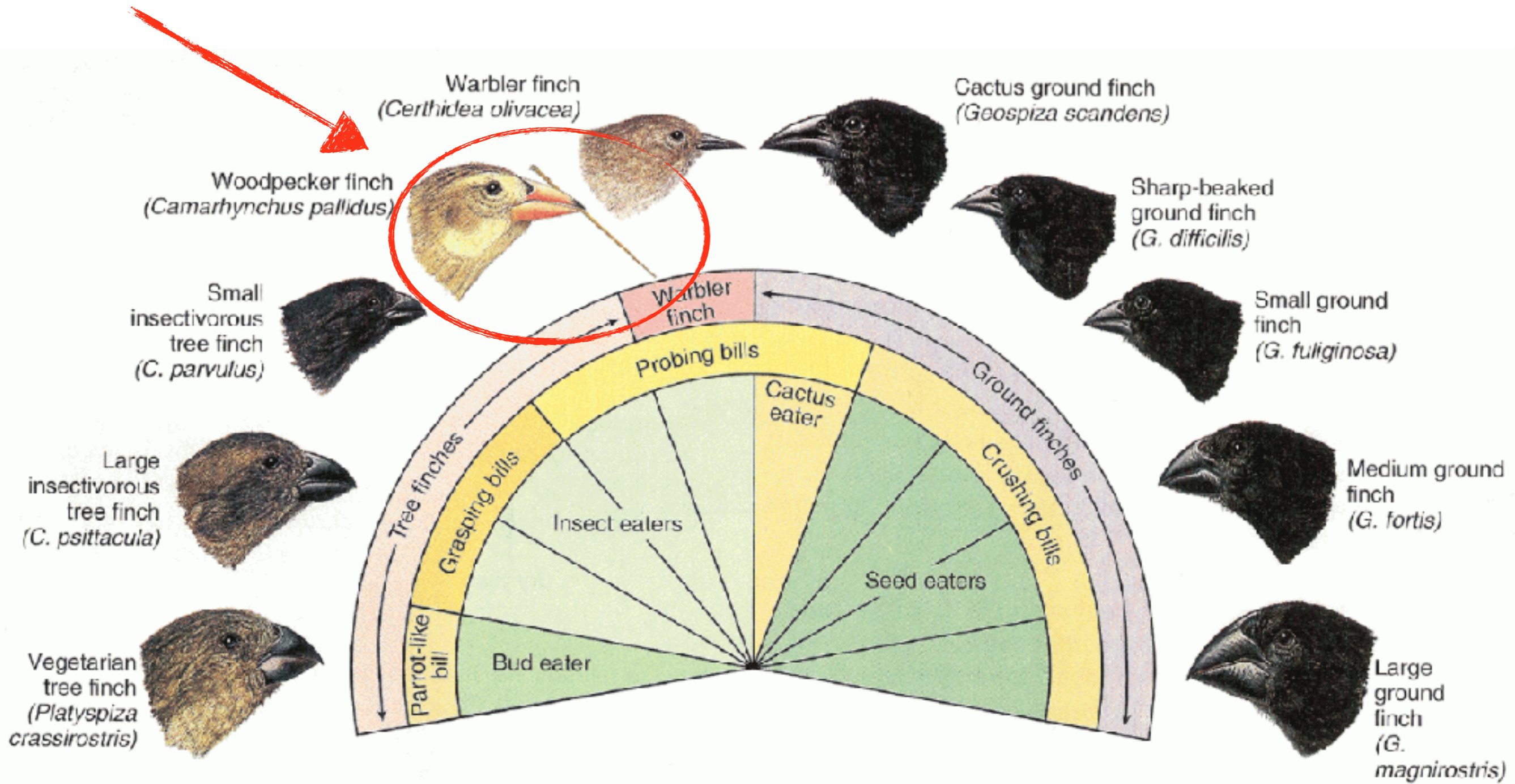


Raptorial

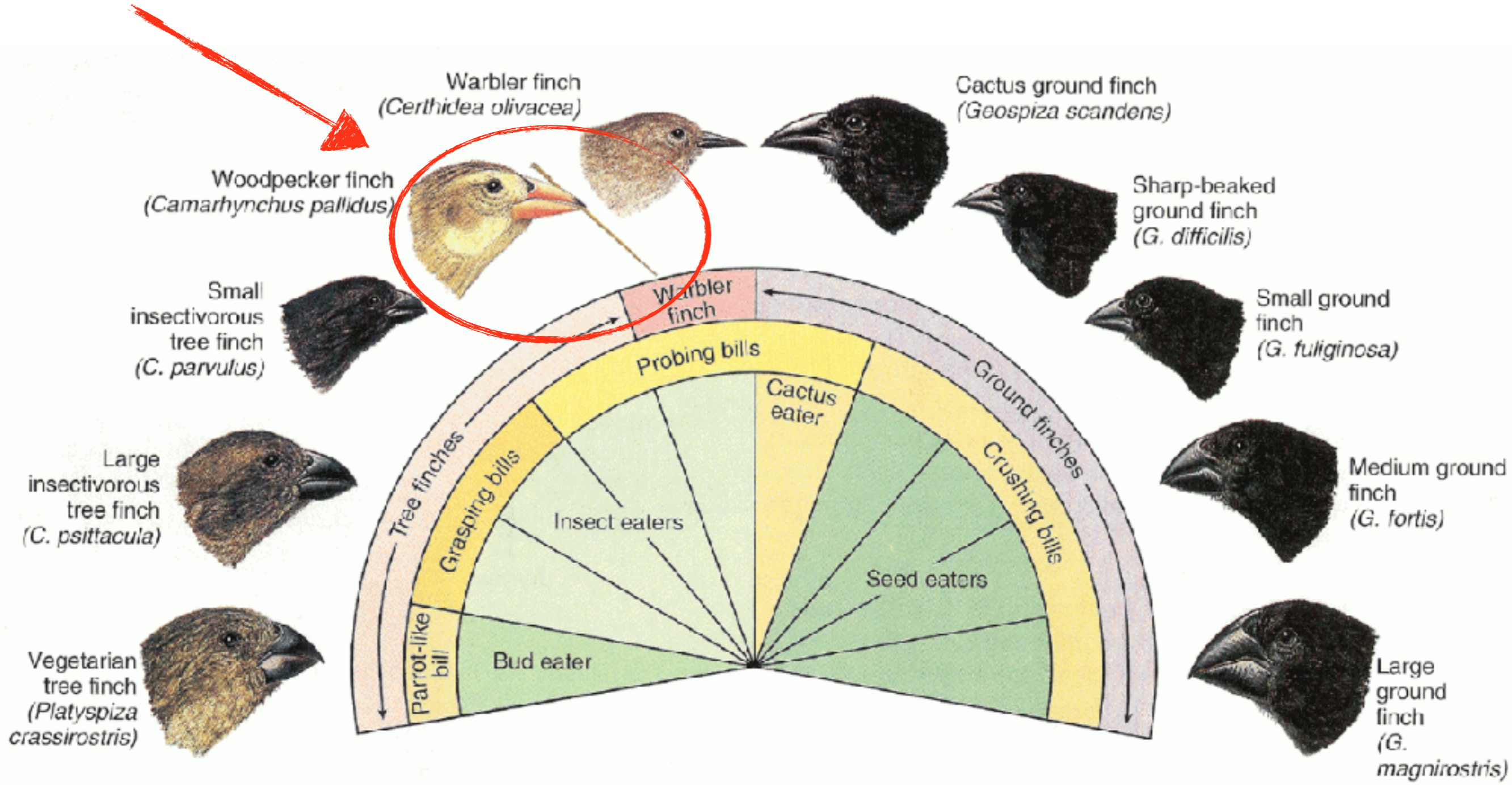
Tipos de bicos



Tipos de bicos



Uso de ferramentas



Uso de ferramentas

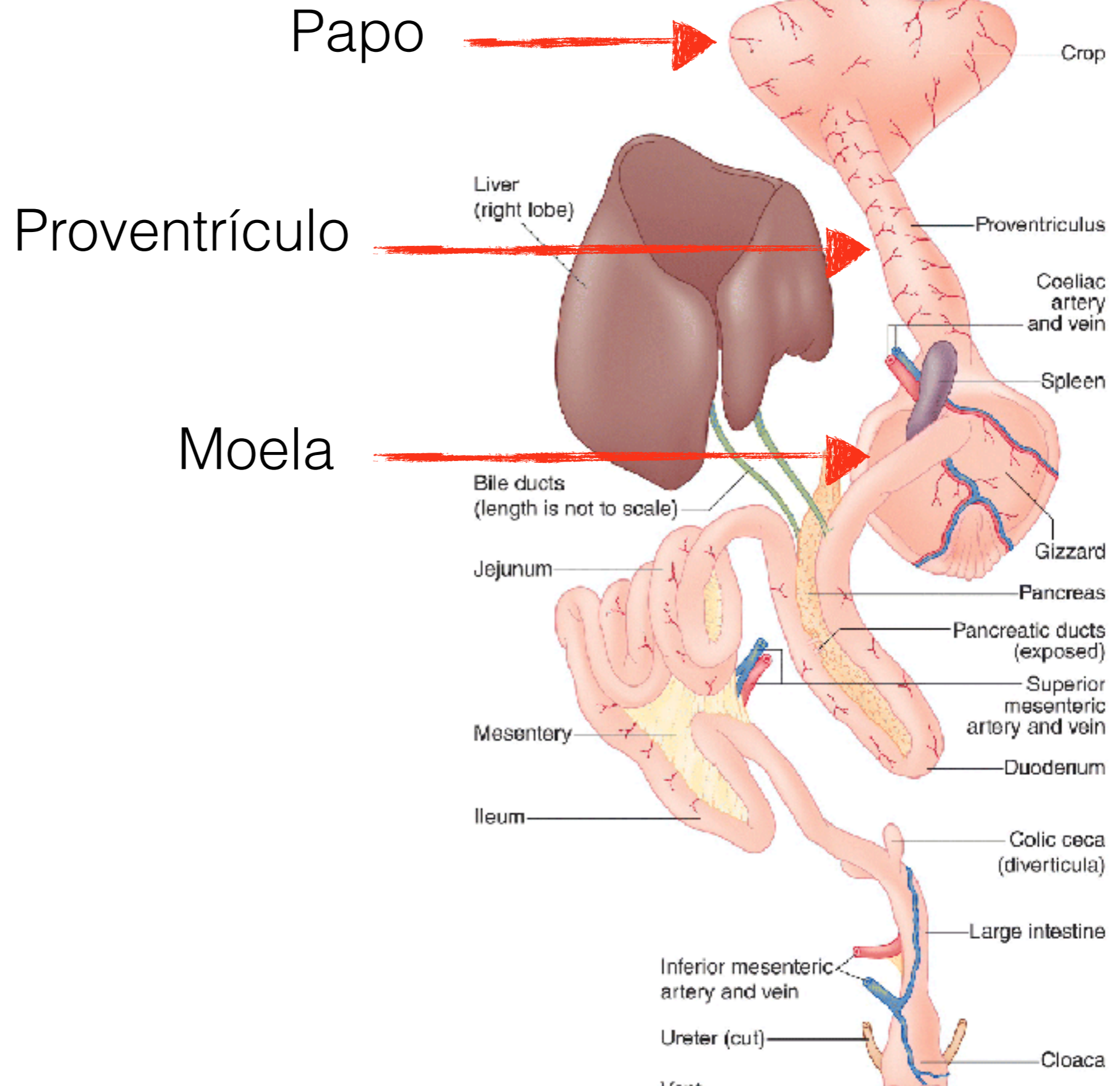


Discovery of species-wide tool use in the Hawaiian crow

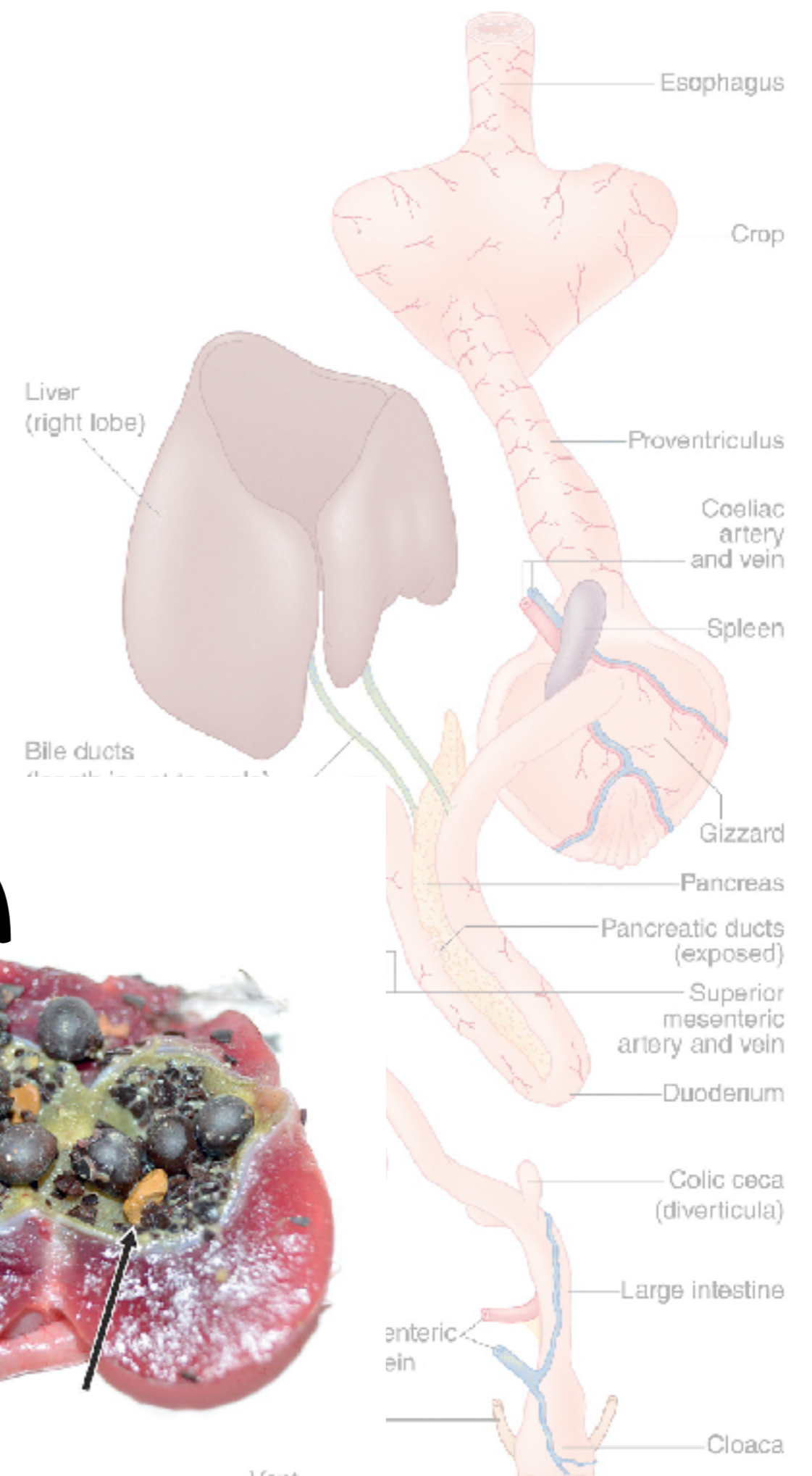
Christian Rutz¹, Barbara C. Klump¹, Lisa Komarczyk², Rosanna Leighton², Joshua Kramer³, Saskia Wischnewski¹, Shoko Sugawara¹, Michael B. Morrissey¹, Richard James⁴, James J. H. St Clair¹, Richard A. Switzer⁵ & Bryce M. Masuda²



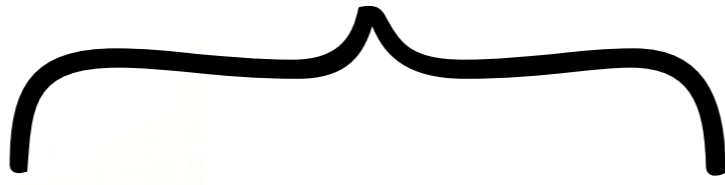
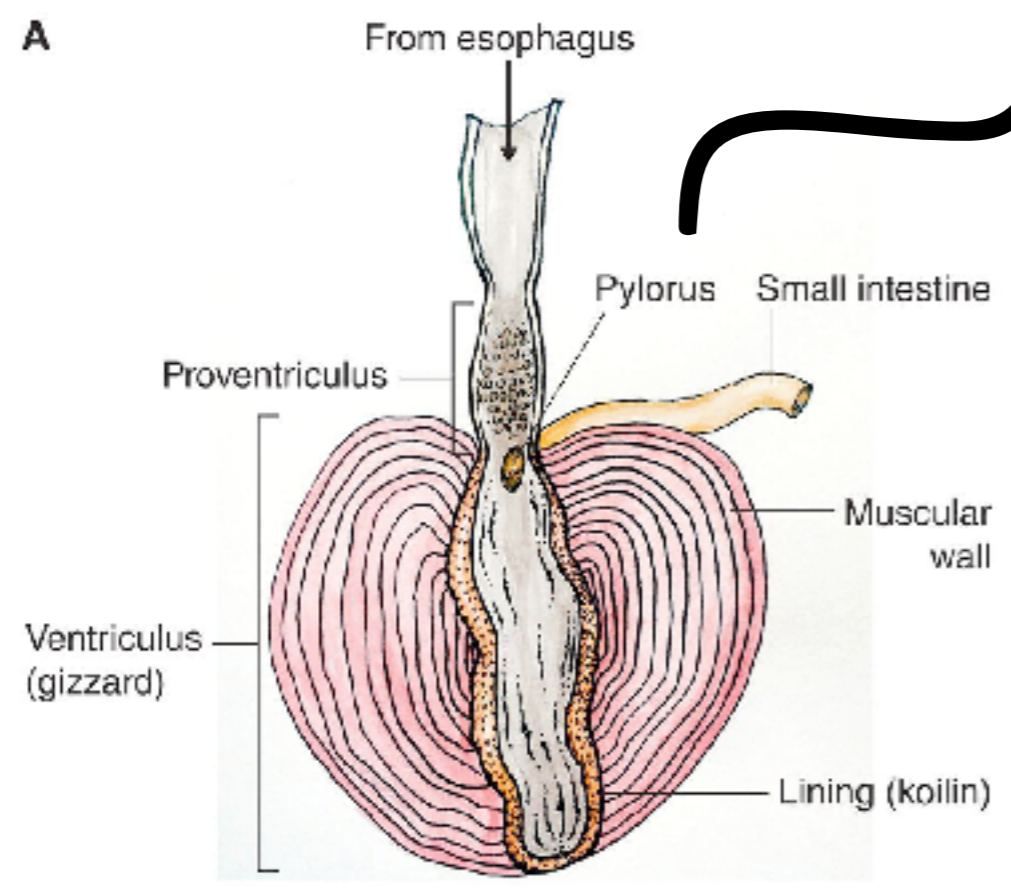
Sistema digestivo



Sistema digestivo



Moela





Comportamento: Seleção sexual

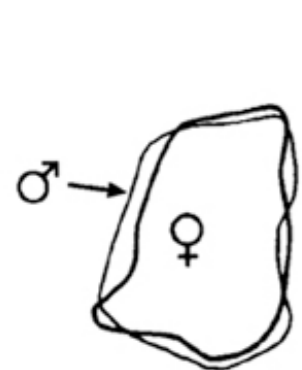


Rupicola peruvianus

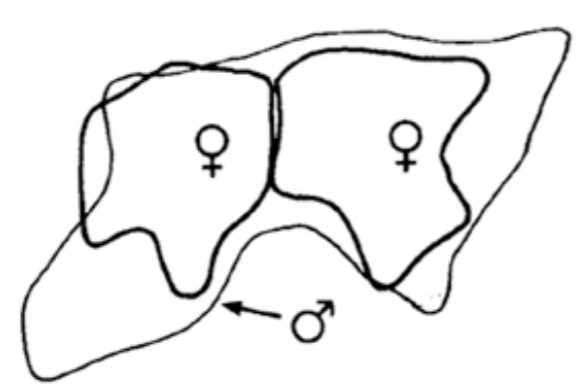
Comportamento: Seleção sexual



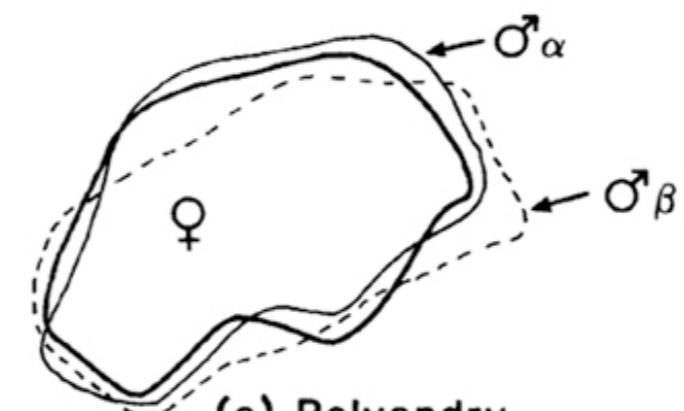
Comportamento: Sistemas de acasalamento



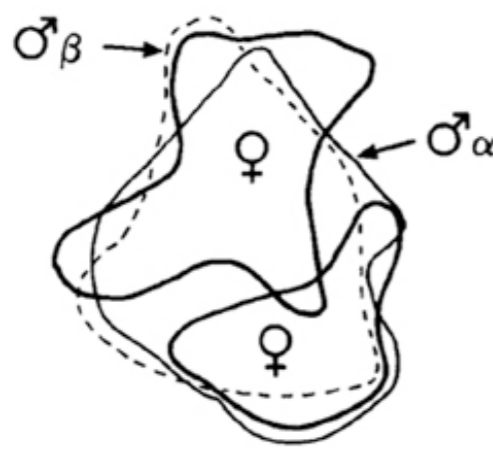
(a) Monogamy



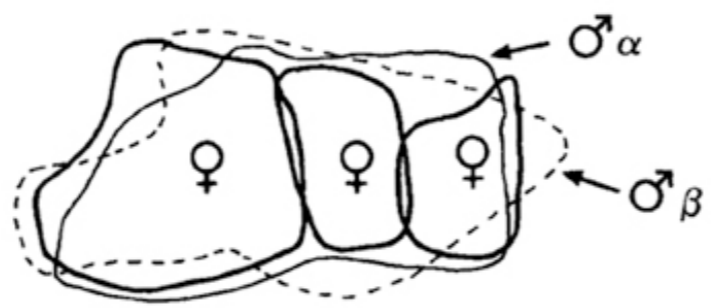
(b) Polygyny



(c) Polyandry



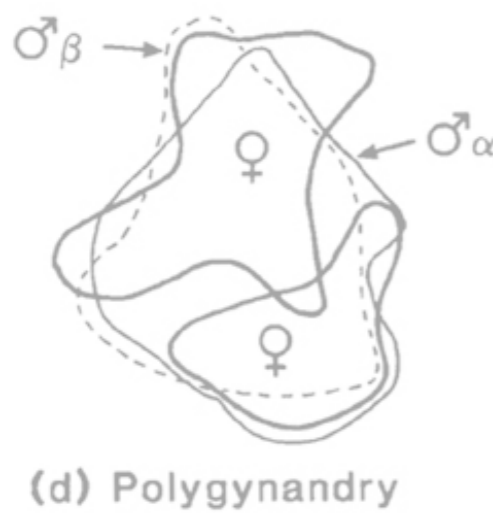
(d) Polygynandry



(e) Polygynandry

50 m

Comportamento: Sistemas de acasalamento



Monogamy: A blue bird is paired with a diagram showing one male (M) and one female (F) connected by a solid line.

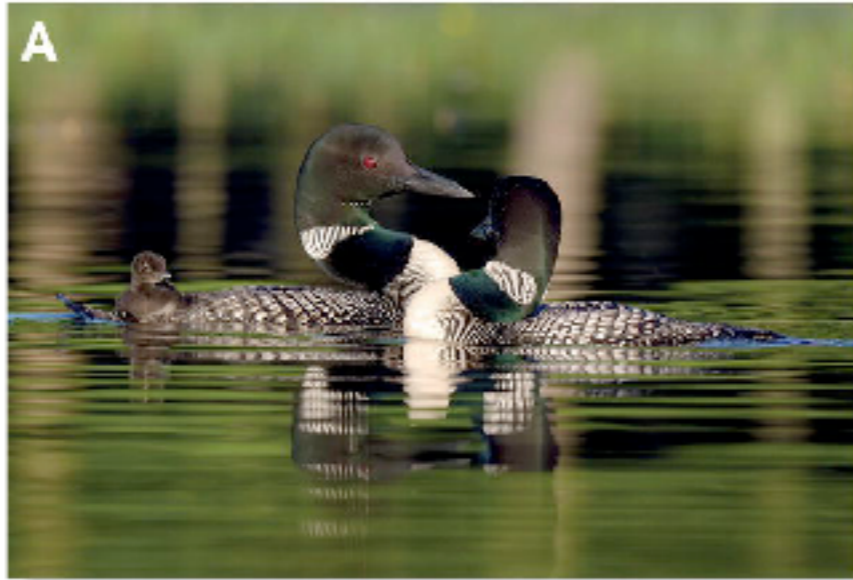
Polygyny: A red cardinal is paired with a diagram showing one male (M) connected to three females (F) by solid lines.

Polyandry: A brown bird is paired with a diagram showing one female (F) connected to three males (M) by solid lines.

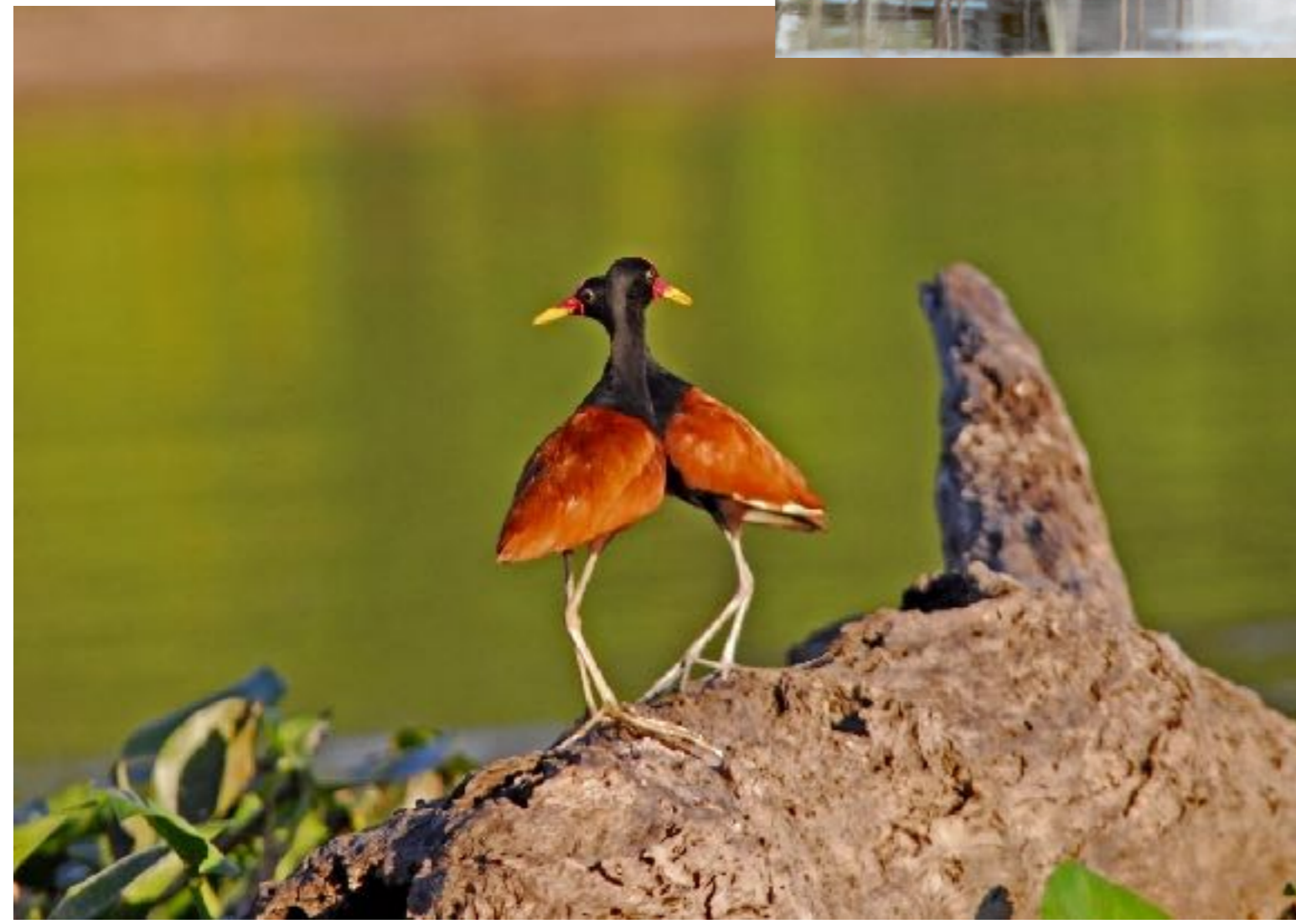
Polygynandry: A black bird is paired with a diagram showing one male (M) connected to three females (F) by solid lines.

Polygyny (alternative): A brown bird is paired with a diagram showing one male (M) connected to three females (F) by dashed lines.

Monogamia



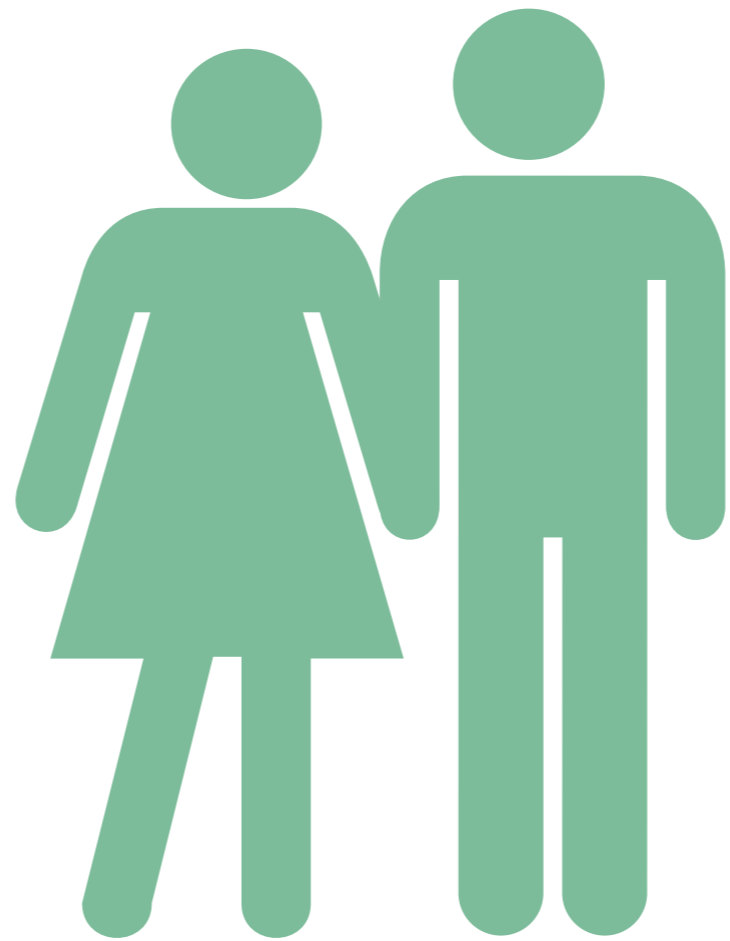
Poliandria



A POLIANDRIA GENÉTICA SOB A PERSPECTIVA DAS FÊMEAS

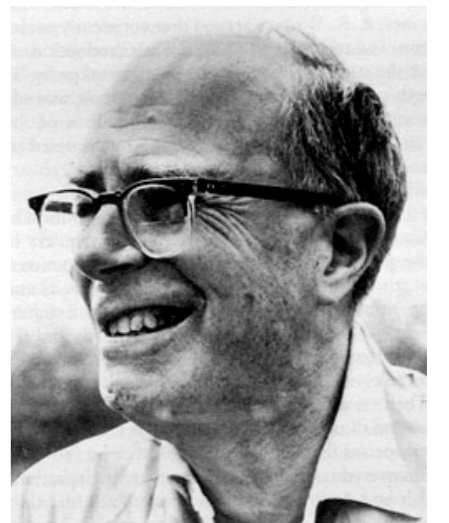


O PARADIGMA DA MONOGAMIA



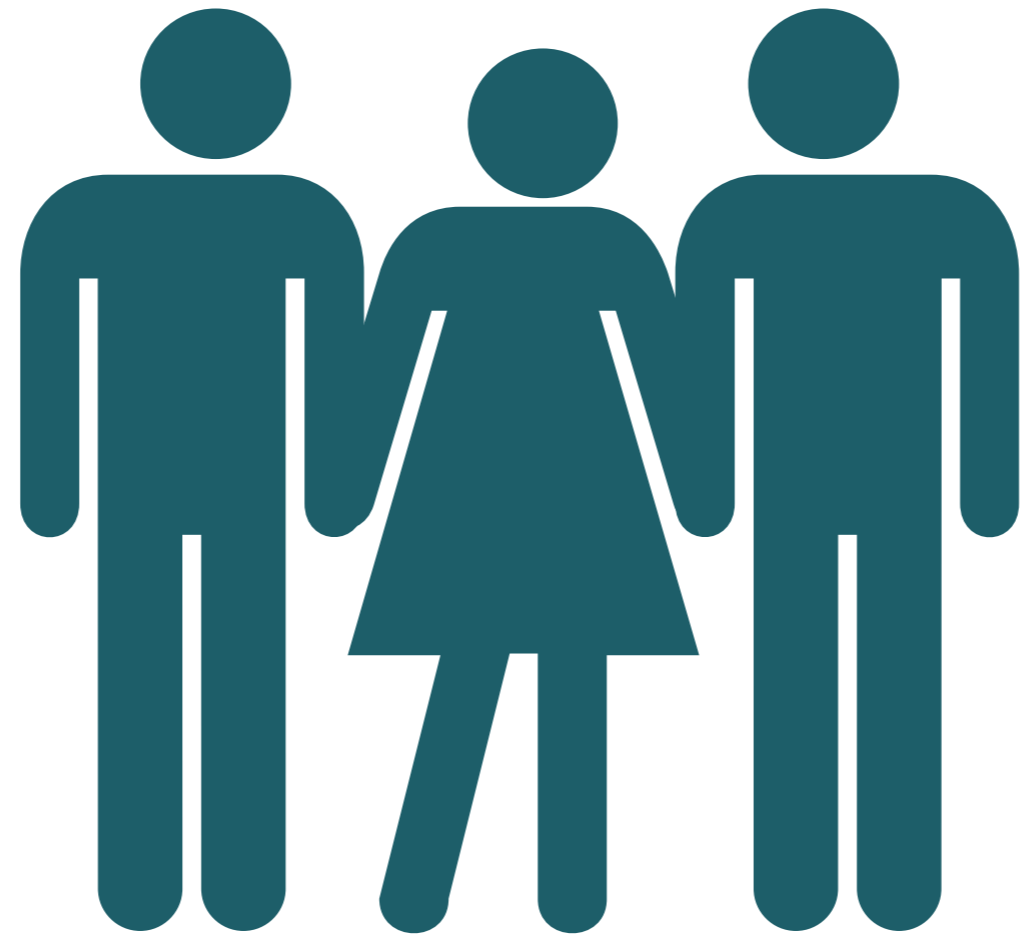
O PARADIGMA DA MONOGAMIA

"Well over nine-tenths [93%] of ALL passerine subfamilies are normally MONOGAMOUS... Polyandry is UNKNOWN"



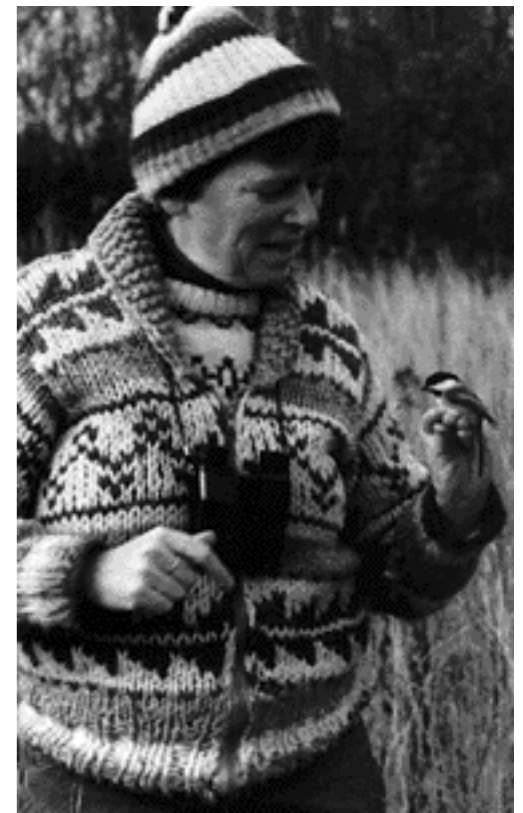
LACK (1968)

A REVOLUÇÃO DA POLIANDRIA





black-capped
chickadee



SMITH (1988)

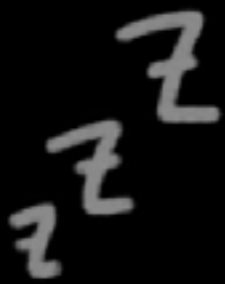
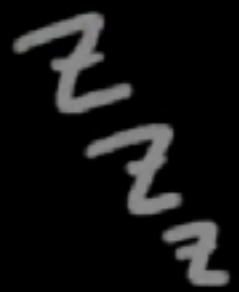
A REVOLUÇÃO DA POLIANDRIA

~ **90%** of birds **ARE** genetically **POLYANDROUS**

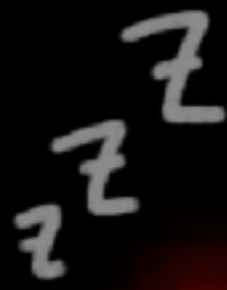
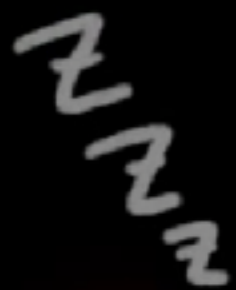
A POLIANDRIA GENÉTICA SOB A PERSPECTIVA DAS FÊMEAS



A POLIANDRIA GENÉTICA SOB A PERSPECTIVA DAS FÊMEAS



A POLIANDRIA GENÉTICA SOB A PERSPECTIVA DAS FÊMEAS

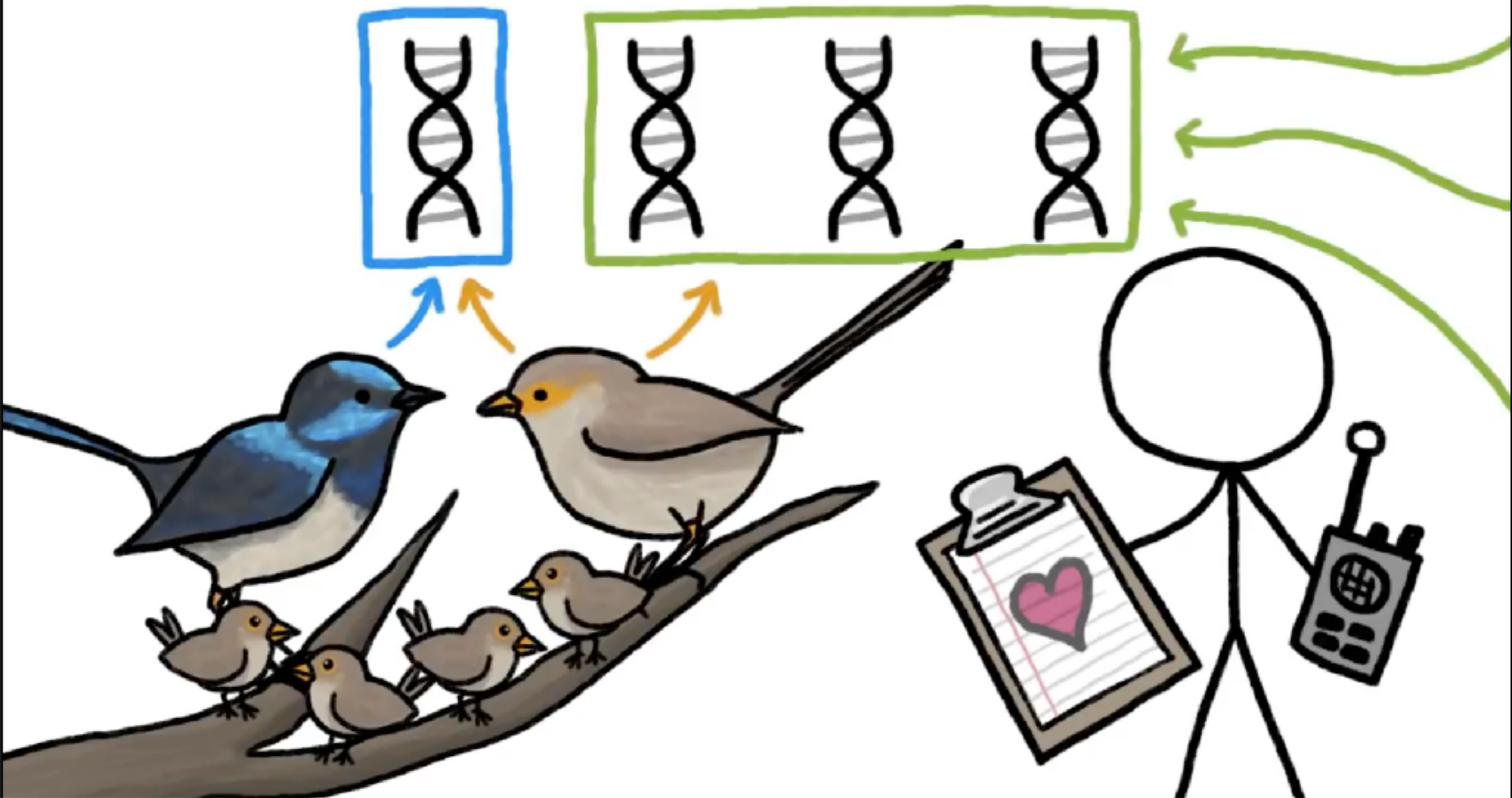


A POLIANDRIA GENÉTICA SOB A PERSPECTIVA DAS FÊMEAS

zzzz

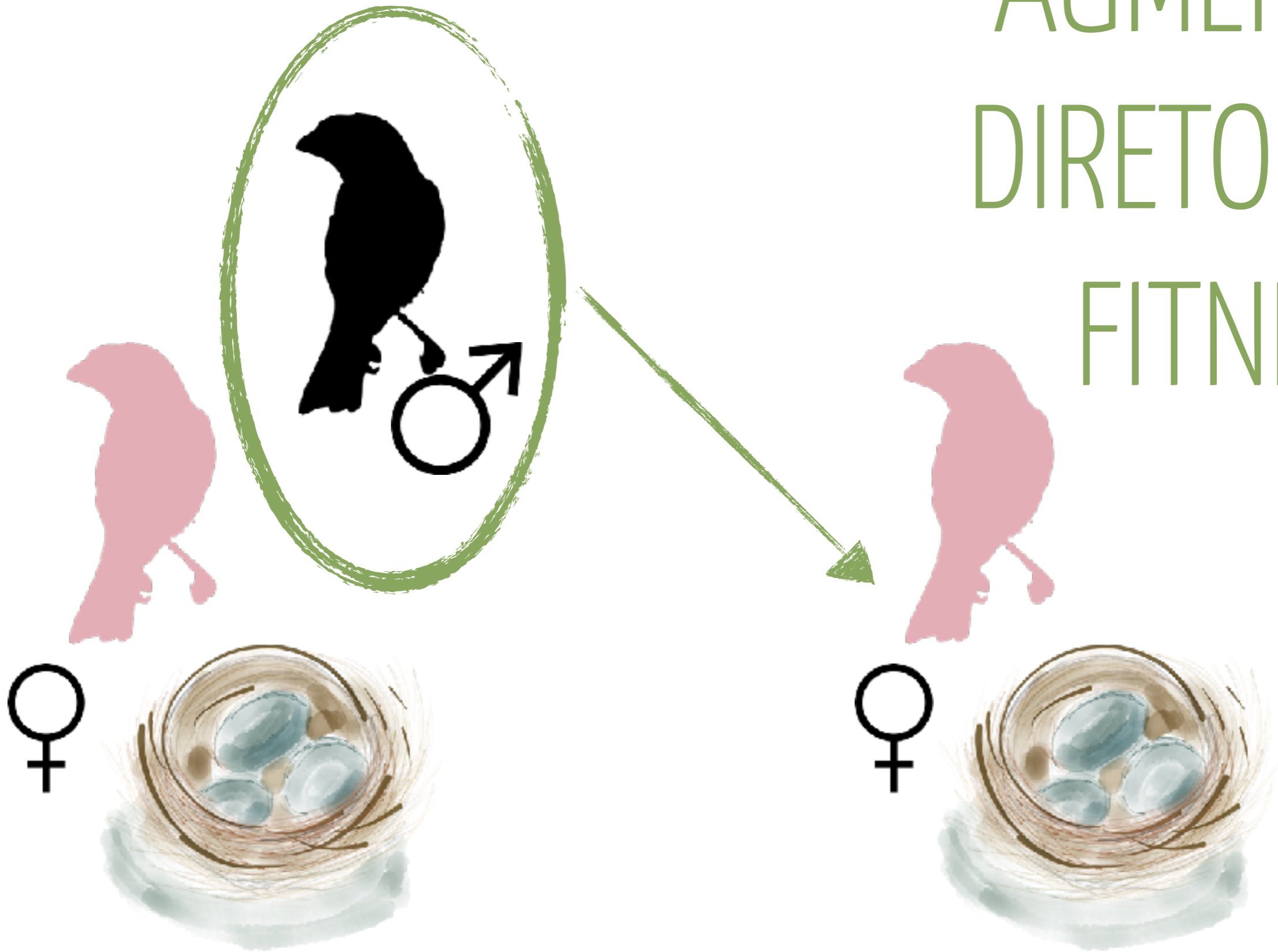


A POLIANDRIA GENÉTICA SOB A PERSPECTIVA DAS FÊMEAS





AUMENTO
DIRETO DO
FITNESS

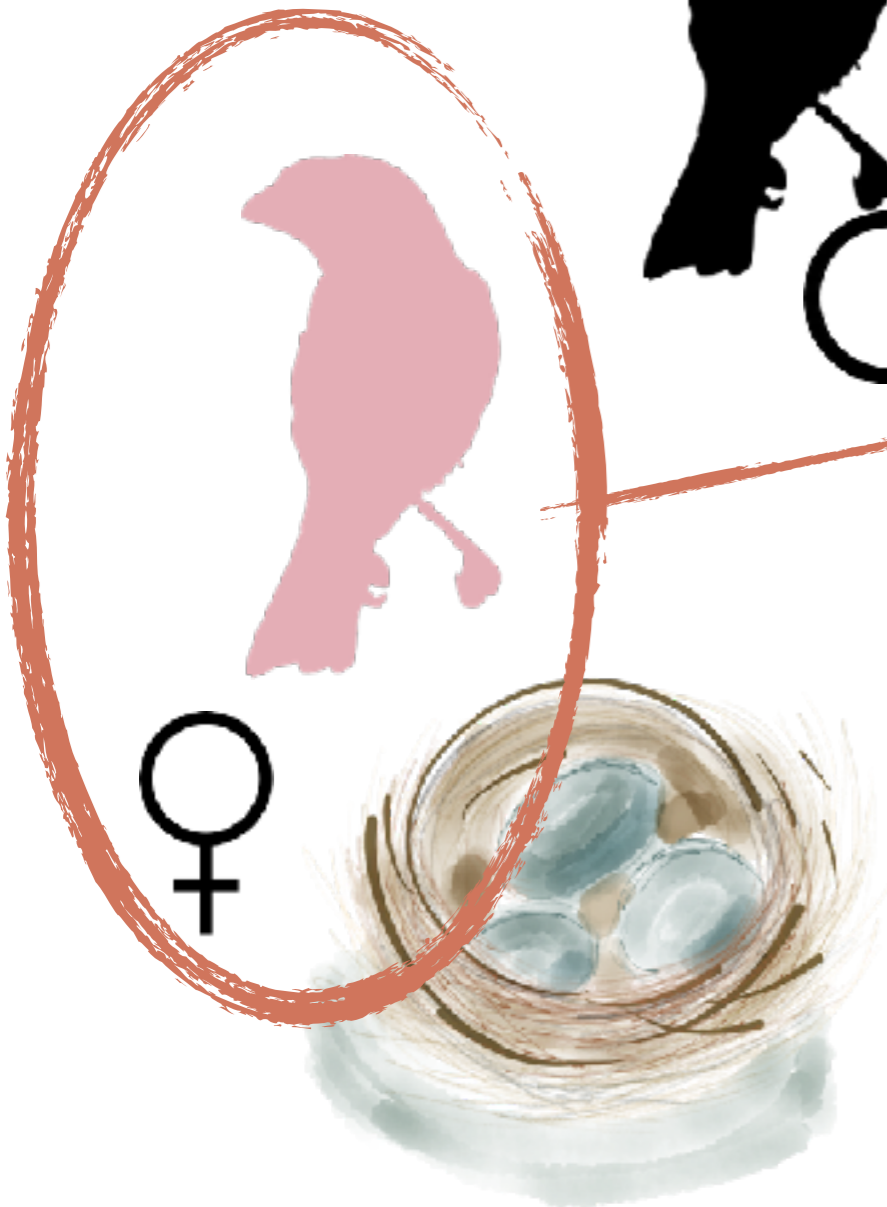


QUAL É A

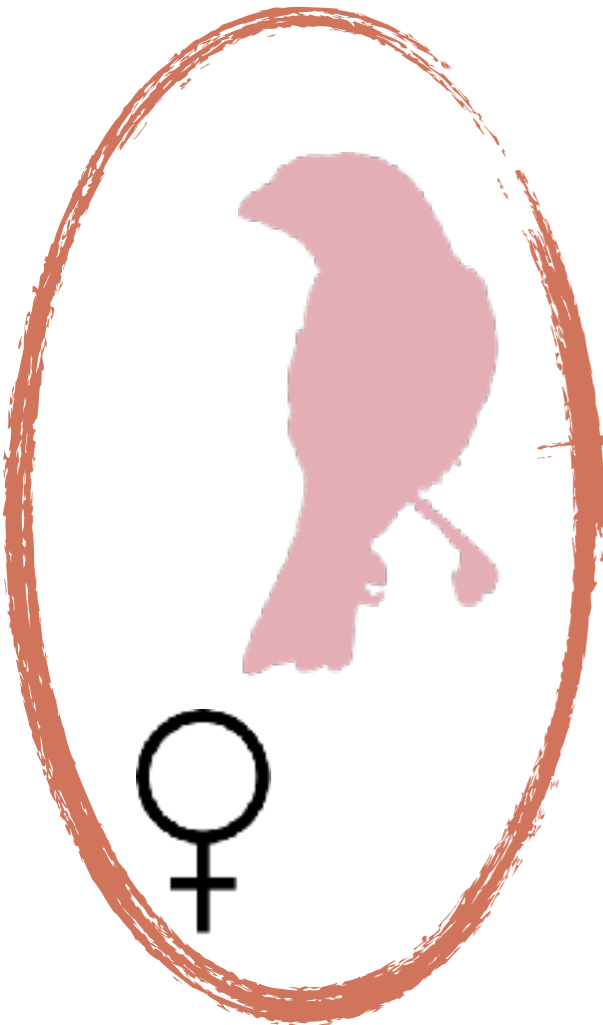


RAZÃO

ADAPTATIVA?



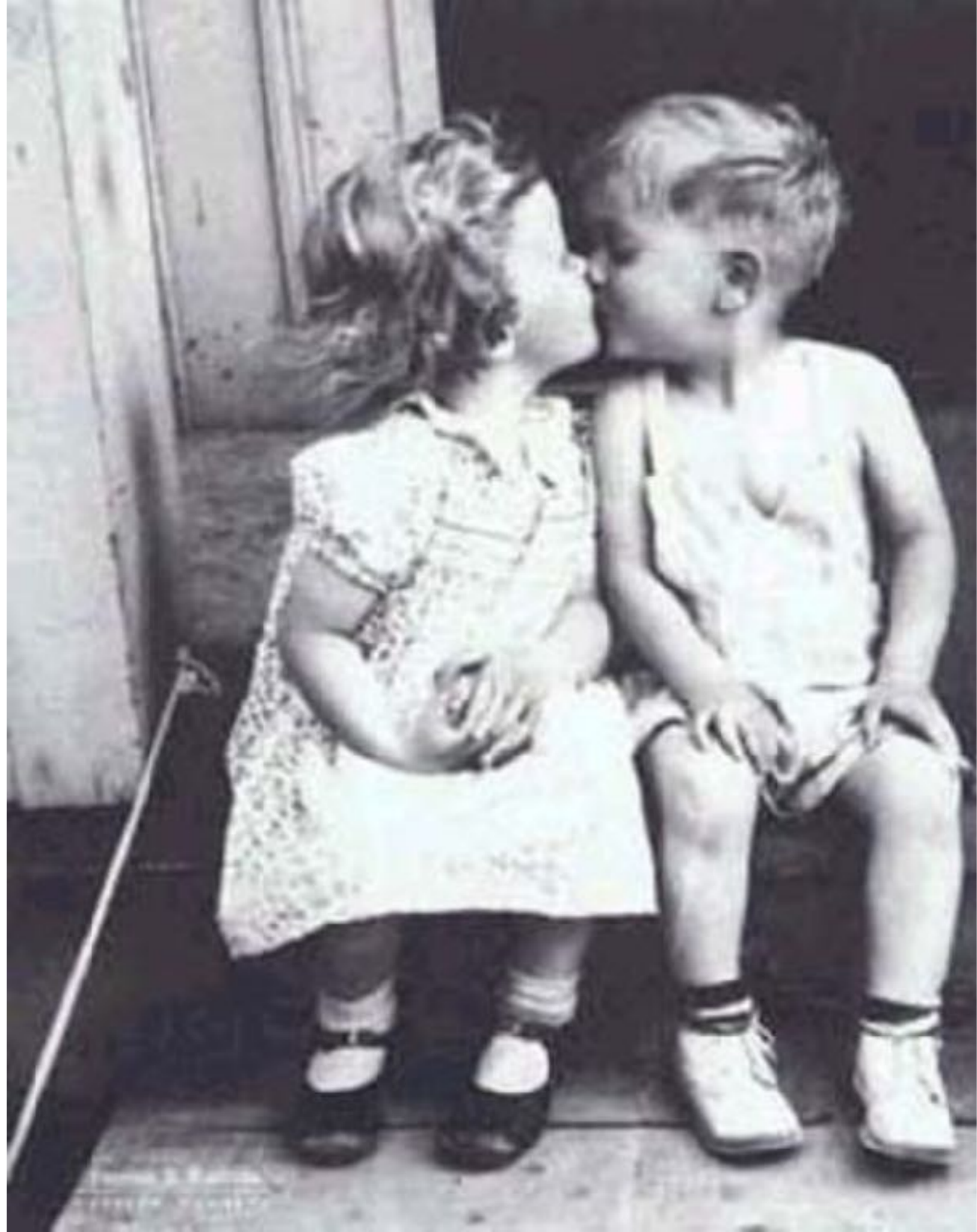
POR QUE FÊMEAS BUSCAM



CÓPULAS COM VÁRIOS MACHOS?

ACASALAMENTOS

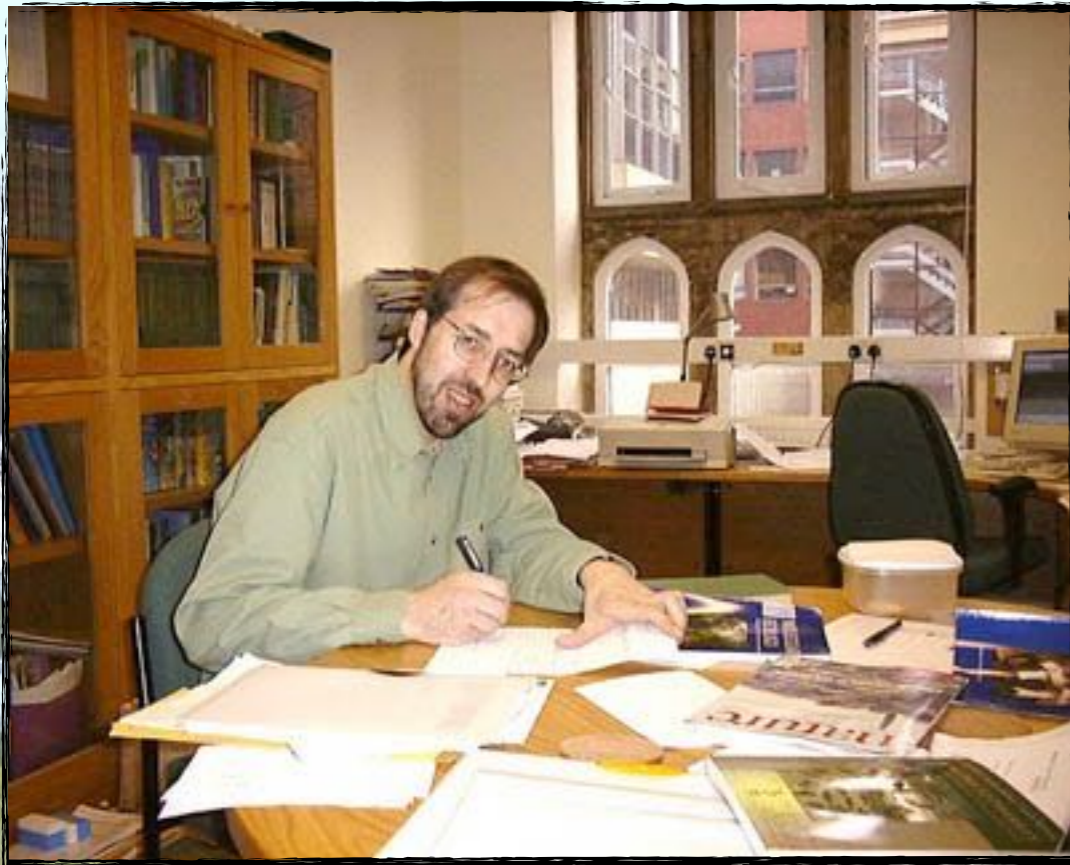
EXTRA-PAR







o dunnock (vulgo **rosquinha**)



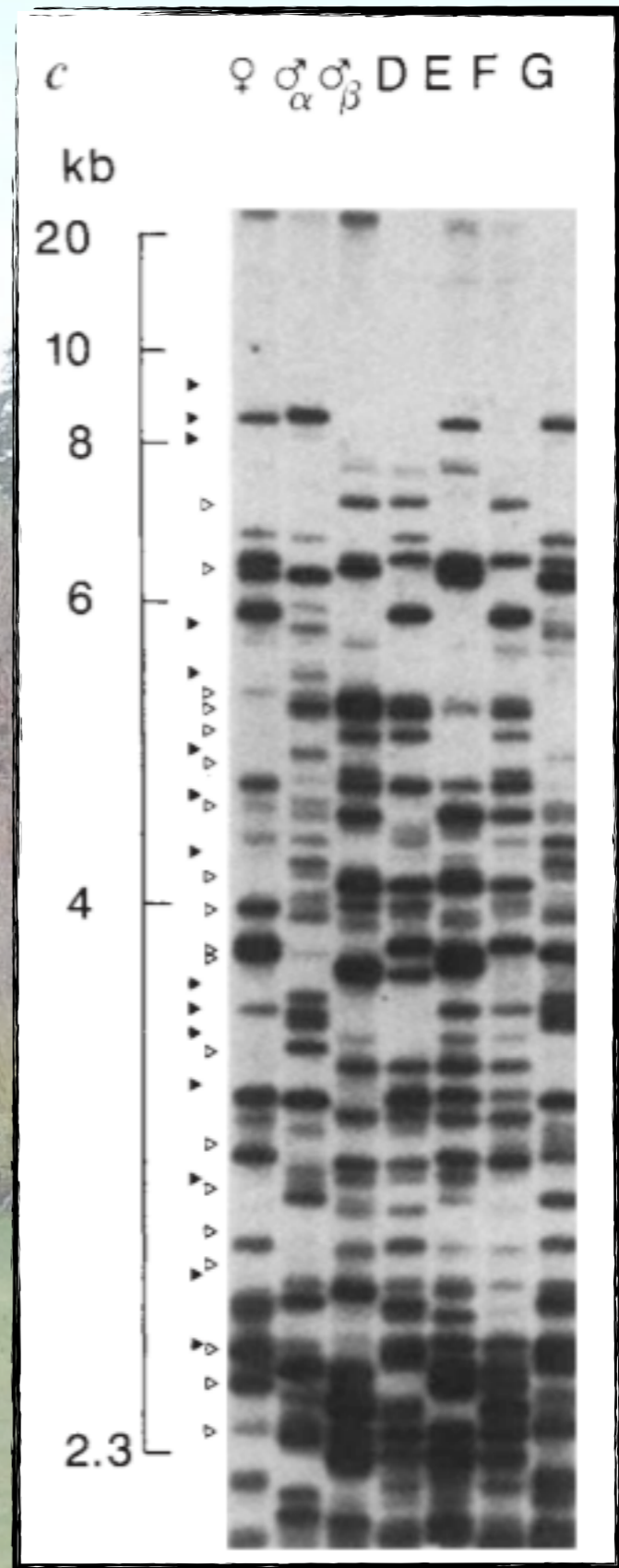
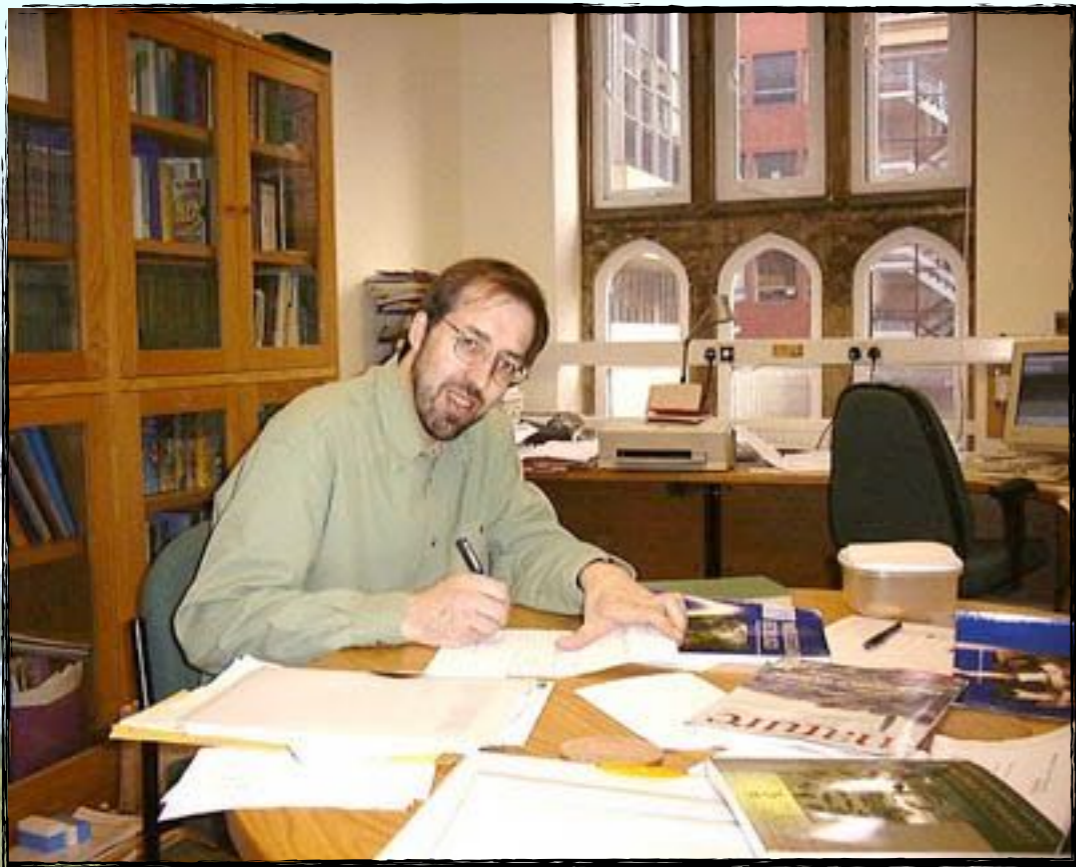
Parental care and mating behaviour of polyandrous dunnocks *Prunella modularis* related to paternity by DNA fingerprinting

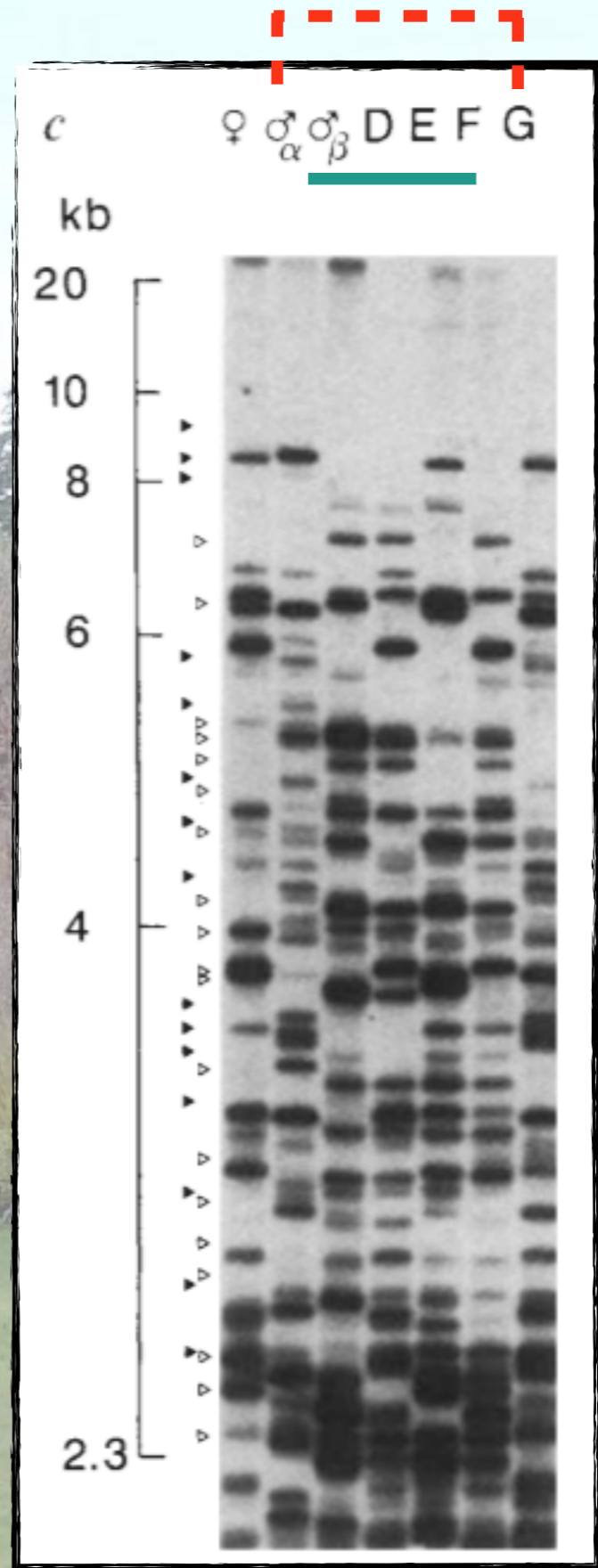
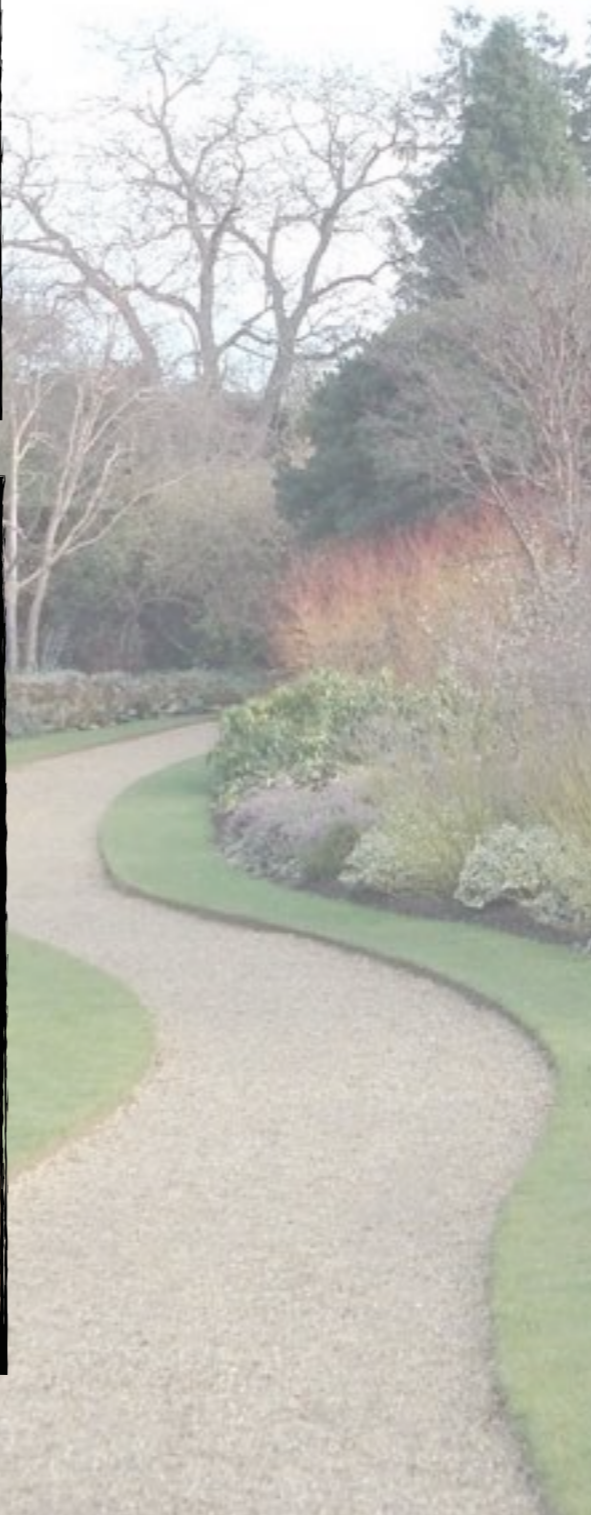
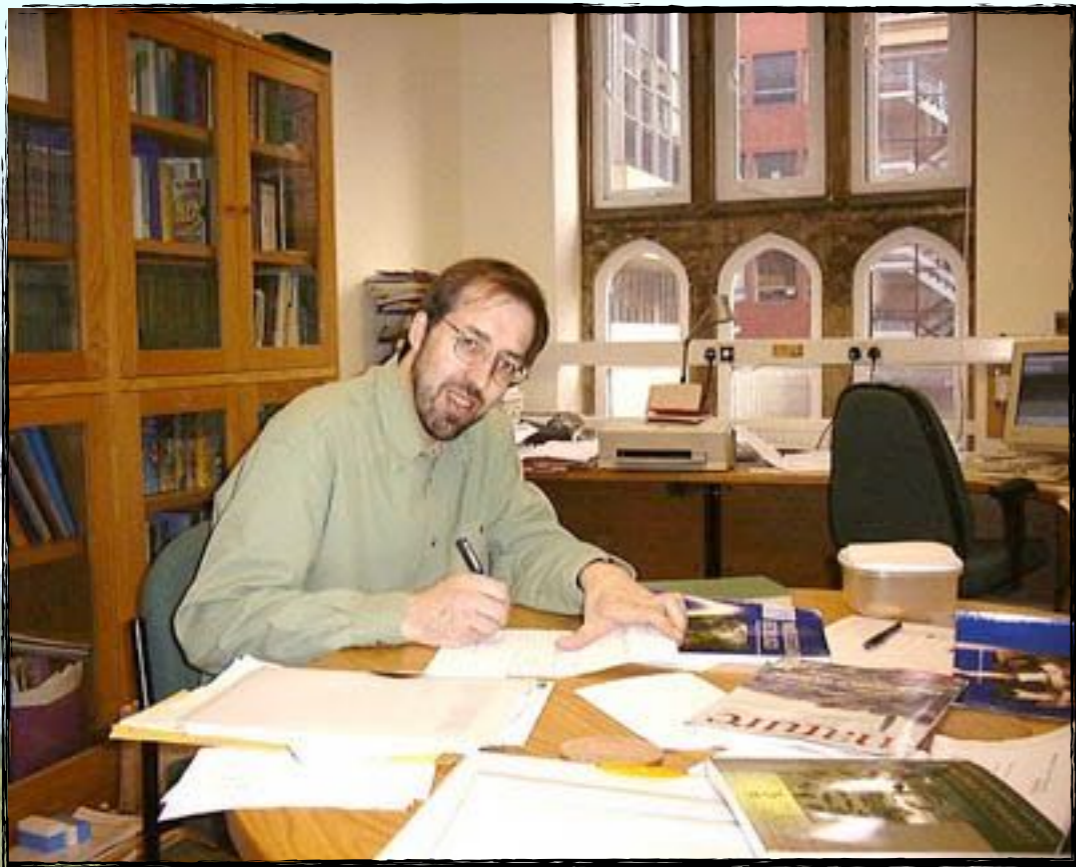
T. Burke*, N. B. Davies†, M. W. Bruford* & B. J. Hatchwell†

* Department of Zoology, University of Leicester, Leicester, LE1 7RH, UK

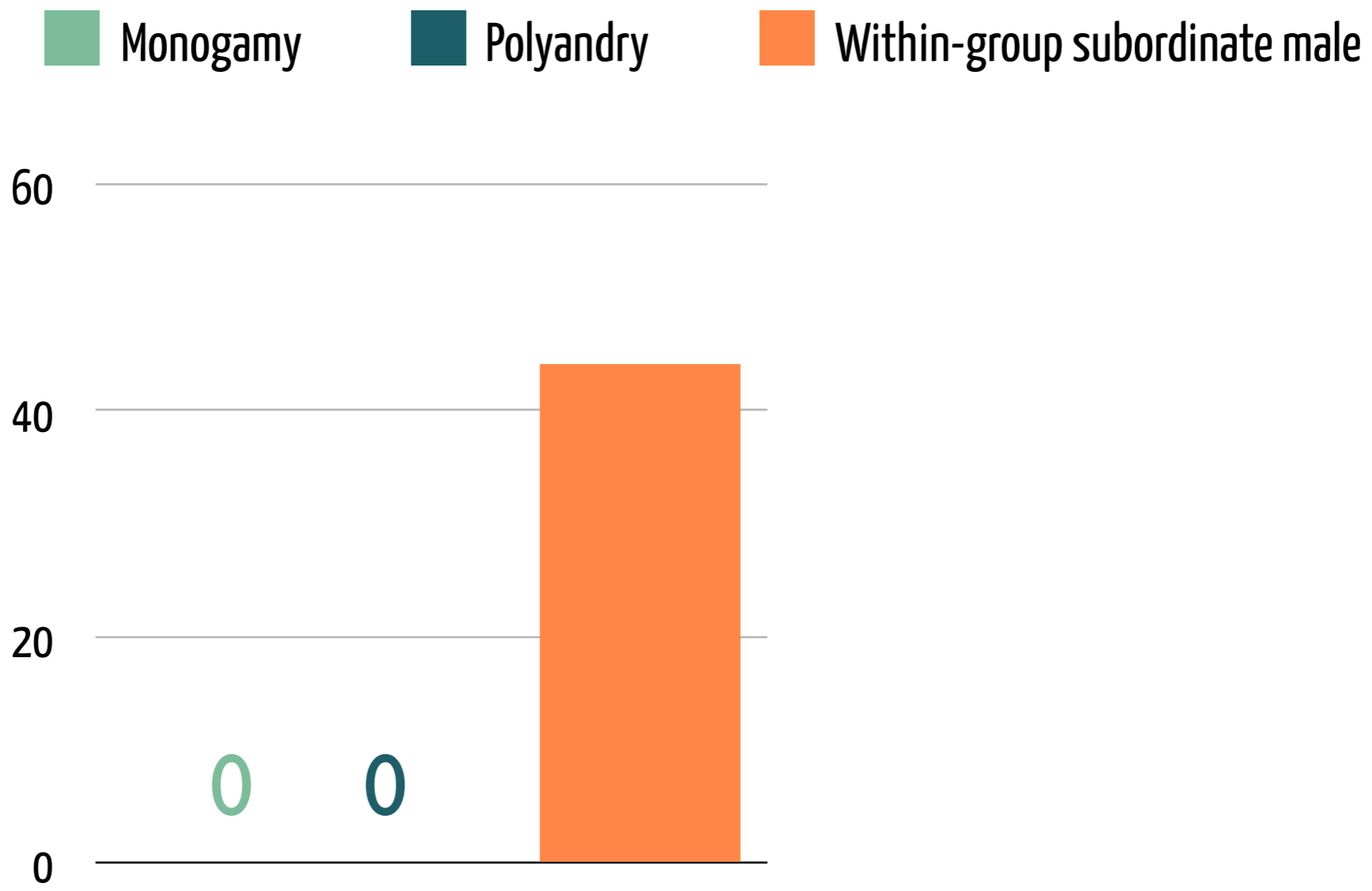
† Department of Zoology, University of Cambridge, Cambridge, CB2 3EJ, UK







Frequency of extra-pair young



Frequency of extra-pair young

