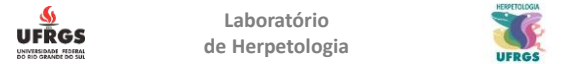
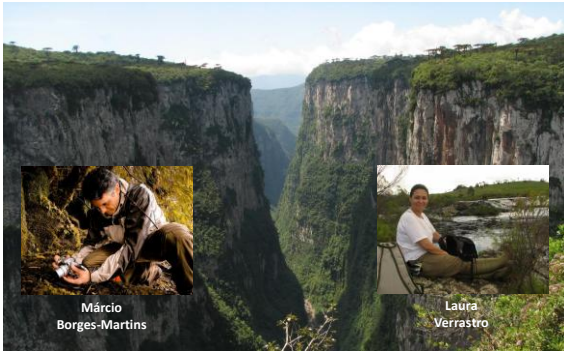




1



2



3



4



Los testudines continentales y marinos. Crocodylia



*Se presentará un panorama de la diversidad, distribución y evolución de los Crocodylia e testudines continentales y marinos de la región Neotropical, así como aspectos de la historia natural y conservación de especies representativas de esta fauna.



5



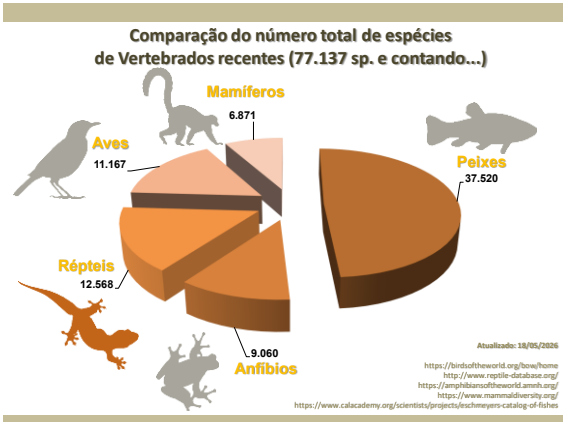
Los testudines continentales y marinos. Crocodylia



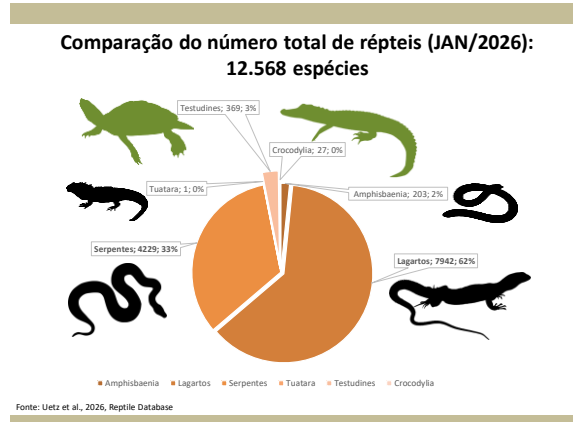
• Quem são os Testudines e Crocodylia?



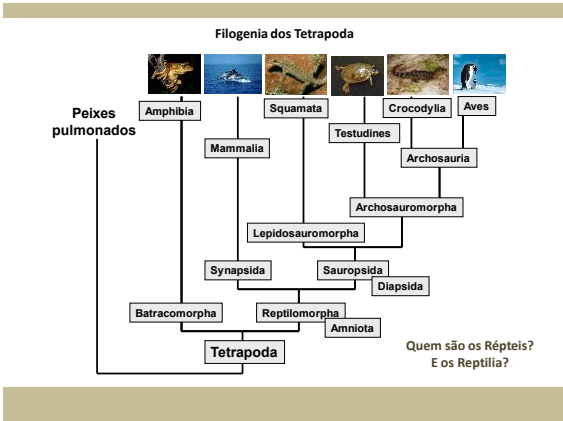
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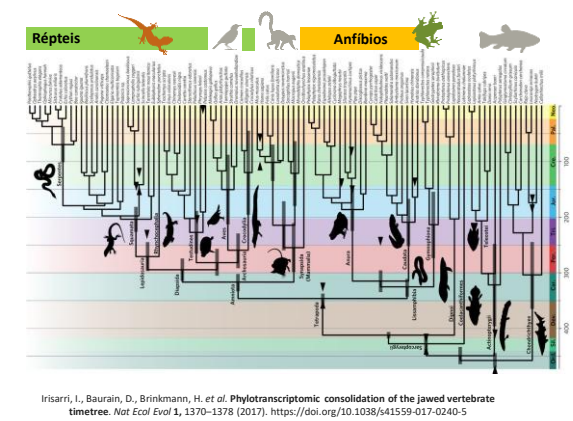
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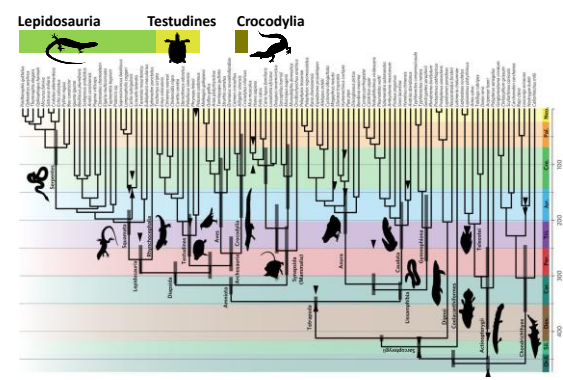


9



Irisarri, I., Baurain, D., Brinkmann, H. et al. Phylotranscriptomic consolidation of the jawed vertebrate timetree. *Nat Ecol Evol* 1, 1370–1378 (2017). <https://doi.org/10.1038/s41559-017-0240-5>

10



Irisarri, I., Baurain, D., Brinkmann, H. et al. Phylotranscriptomic consolidation of the jawed vertebrate timetree. *Nat Ecol Evol* 1, 1370–1378 (2017). <https://doi.org/10.1038/s41559-017-0240-5>

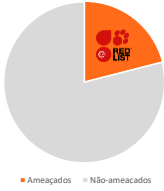
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Los testudines continentales y marinos. Crocodylia

• A triste conexão entre Testudines e Crocodylia: Alto risco de extinção...

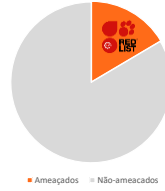
12

21% das espécies de Répteis estão ameaçadas de extinção.



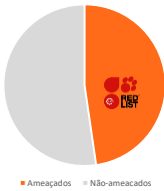
13

16,5% das espécies de Squamata estão ameaçadas de extinção.



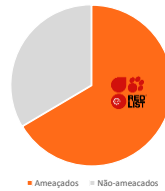
14

47,7% das espécies de Crocodylia estão ameaçadas de extinção.



15

66,5% das espécies de Testudines estão ameaçadas de extinção.



16

Padrões taxonômicos de risco de extinção em Tetrapoda

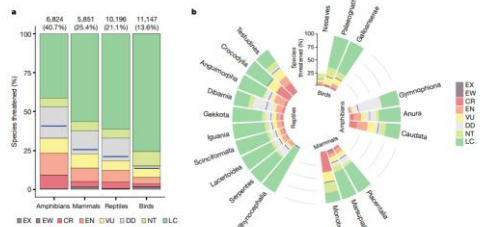


Fig. 1 | Taxonomic patterns of extinction risk in tetrapods. a, Taxonomic patterns organized by class. The numbers above each column refer to the numbers and percentages of species threatened (that is, those categorized as critically endangered, endangered, vulnerable). b, Extinction risk by major taxonomic groups. Blue lines indicate the best estimate of the percentage of species threatened. CR, critically endangered; DD, data deficient; EN, endangered; EW, extinct in the wild; EX, extinct; LC, least concern; NT, near threatened; YU, vulnerable.

Cox, N., Young, B.E., Bowles, P. et al. A global reptile assessment highlights shared conservation needs of tetrapods. *Nature* 605, 285–290 (2022). <https://doi.org/10.1038/s41586-022-04664-7>

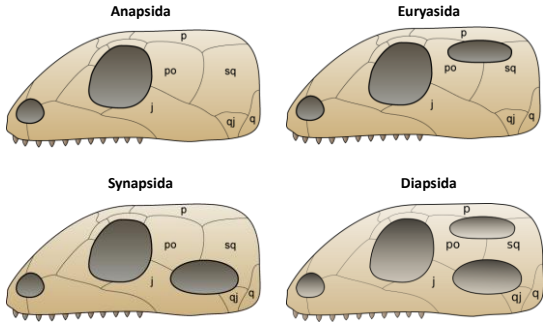
17

Testudines (Anápsida ou Diápsida?)

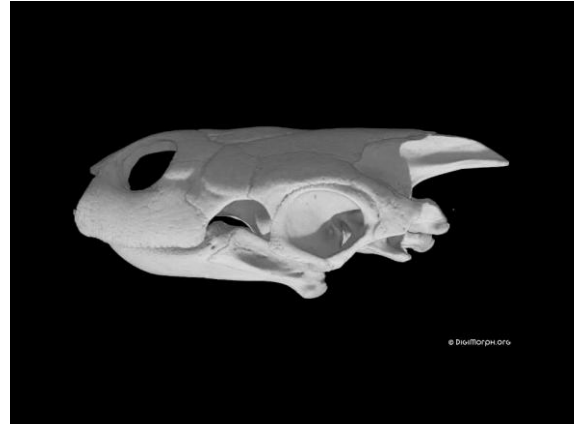


18

Fenestras temporais



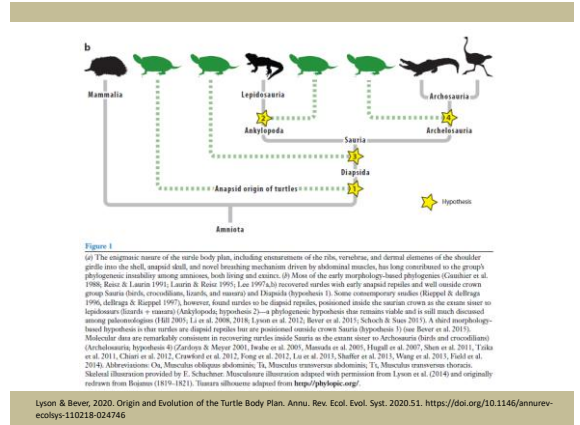
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20

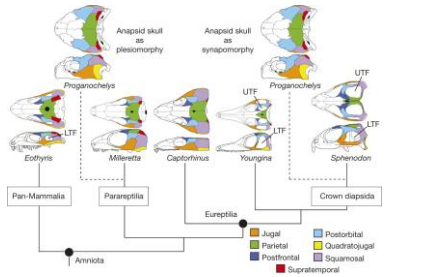


21



22

Competing hypotheses for the origin of the anapsid skull of modern turtles.

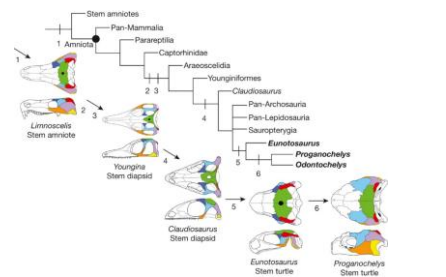


GS Bever et al. *Nature* 000, 1–4 (2015) doi:10.1038/nature14900

nature

23

Generalized amniote phylogeny showing sequence of major transformations in the origin of the turtle skull.



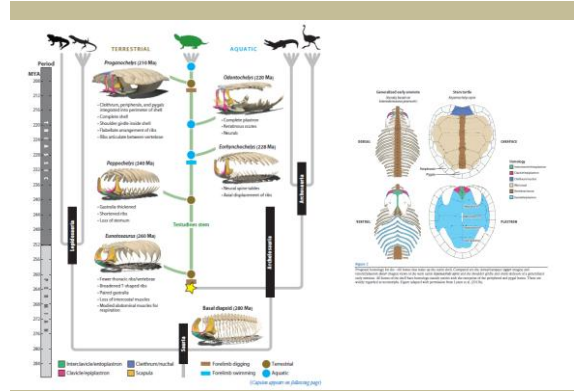
GS Bever et al. *Nature* 000, 1–4 (2015) doi:10.1038/nature14900

nature

24

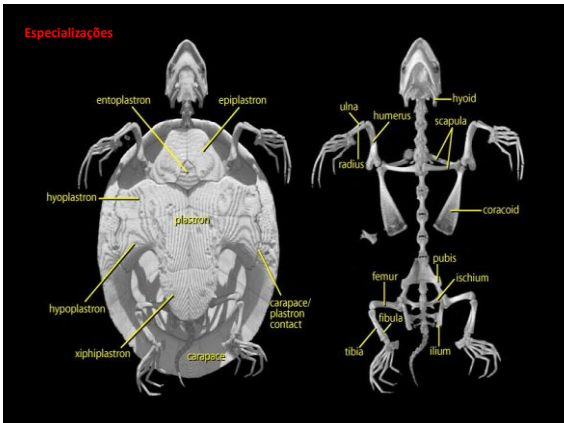


25



Lyon & Bever, 2020. Origin and Evolution of the Turtle Body Plan. Annu. Rev. Ecol. Syst. 2020.51. <https://doi.org/10.1146/annurev-ecolsys-110218-024746>

26



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Los testudines continentales y marinos. Crocodylia

•Quem são os Testudines e Crocodylia Neotropicais?

28

Los testudines continentales y marinos. Crocodylia

Podocnemididae (8sp)

ANIBALLA — REPTILIA
Magdalena River Turtle
Podocnemis lewysana
Decreasing

Podocnemididae

29

Los testudines continentales y marinos. Crocodylia

Podocnemididae (8sp)

Podocnemis expansa

Number of females:
1-400
400-800
800-1600
1600-3200
3200-6400
6400-12800
12800-25600

*O estudo registrou mais de 147 mil fêmeas protegidas ou monitoradas por 89 iniciativas e programas de conservação entre 2012 e 2014. Outras totais, dois terços estavam no Brasil (109 mil), seguidos pela Bolívia (30 mil), Peru (4,2 mil), Colômbia (2,4 mil), Venezuela (1 mil) e Equador (6).

<https://brasil.mongabay.com/2020/01/tartaruga-da-amazonia-se-multiplica-mas-mudancas-climaticas-ainda-representam-risco/>

30

Los testudines continentales y marinos. Crocodylia Chelidae (66sp)



Chaco Side-necked Turtle
Acanthochelys pallidipectoris
 ↓ Decreasing CEN



31



32



33




34





35

Los testudines continentales y marinos. Crocodylia Chelydridae (5sp)



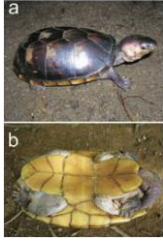
Central American Snapping Turtle
Chelydra rossignoni
 Unknown CVU

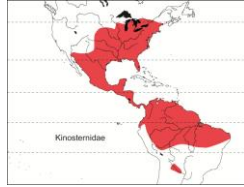
36

Los testudines continentales y marinos. Crocodylia

Kinosternidae (34sp)

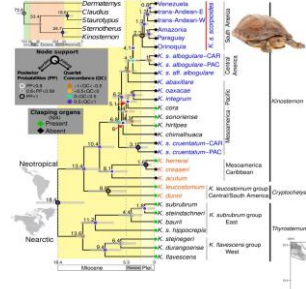


ANIMALIA - REPTILIA
Narrow-bridged Mud Turtle
Kinosternon angustipons

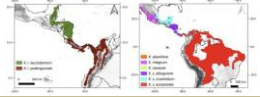


Los testudines continentales y marinos. Crocodylia

Kinosternidae (34sp)



Hurtado-Gómez et al. 2024. Diversity and biogeography of South American mud turtles elucidated by multilocus DNA sequencing (Testudines: Kinosternidae). Molecular Phylogenetics and Evolution, Volume 197.



37

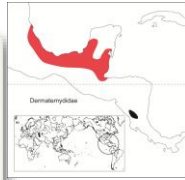
38

Los testudines continentales y marinos. Crocodylia

Dermatemydidae (1sp)



ANIMALIA - REPTILIA
Dermatemyd mawii
Decreasing

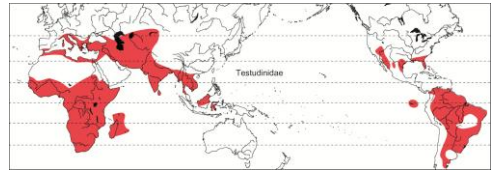


Los testudines continentales y marinos. Crocodylia

Testudinidae (47sp)



ANIMALIA - REPTILIA
Santiago Giant Tortoise
Chelonoidis darwini
Increasing



39

40

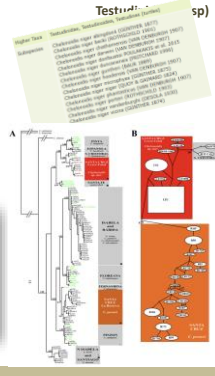
Los testudines continentales y marinos. Crocodylia

Testudinidae (47sp)



RESEARCH ARTICLE
Description of a New Galapagos Giant Tortoise Species (*Chelonoidis*; Testudinidae) from Cerro Fatal on Santa Cruz Island

Nikolaos Poulakakis^{1,2*}, Danielle L. Edwards^{3,4*}, Ylenia Chiar⁵, Ryan C. Garrick⁶, Michael A. Russello⁷, Edgar Benavides⁸, Gregory J. Watkins-Cowan⁹, Scott Galloway¹⁰, Washington Tapia¹¹, James G. Giblin¹², Linda A. Cayan¹³, Adalgisa Caccone¹⁴



Los testudines continentales y marinos. Crocodylia

Testudinidae (47sp)

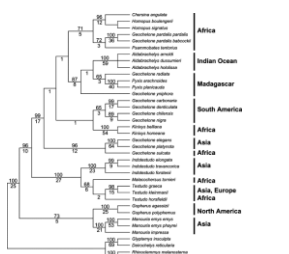


Fig. 2. The maximum parsimony tree based on all data combined. This is the strict consensus of two most parsimonious trees. (TL = 4232; CI = 0.39; RI = 0.50). The combined five gene dataset includes 1327 aligned characters of which 550 are potentially parsimony informative. Numbers above and below branches are bootstrap values and Bremer values, respectively. The geographic distribution of each taxon is indicated in the right column.

Fig. 4. Testudinidae area cladogram based on the strict consensus of the tree topologies shown in Fig. 2. The ancestral area optimizations found by dispersal-likelihood analysis (DLA) are shown for each node: As (Asia), Af (Africa), Madagascar and Indian Ocean (MI), North America (NA), and South America (SA).

Le et al. 2006. A molecular phylogeny of tortoises (Testudinidae) based on mitochondrial and nuclear genes. Molecular Phylogenetics and Evolution 40(2)

41

42

Los testudines continentales y marinos. Crocodylia **Testudinidae (47sp)**

(a) Diversification trajectory of the Testudinidae lineages within the clade, along the geologic time. (b) Net diversification rate of Testudinidae, which is the difference between the extinction and the speciation rates, along the geologic time. The solid line represents the mean rate and the shadow around the line represents the associated 95% highest posterior density interval. (c) Mean longevity of lineages within Testudinidae along the geologic time. Eoc, Eocene; H, Holocene; Ma, Mega annum; Mio, Miocene; Oli, Oligocene; Pal, Palaeocene; Plu, Pleistocene; Plu, Pliocene.

Oliveira, I., Upanishi, A., Martinez, P. A., & Eduardo, A. A. (2023). The global Cenozoic diversification process of turtles (Testudinidae). *The Anatomical Record*, 306(6), 1528–1536. <https://doi.org/10.1002/ar.25182>

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Los testudines continentales y marinos. Crocodylia **Geoemydidae (75 sp)**

ANIMLIA – REPTILIA
Large-nosed Wood Turtle
Rhinochelys nasuta

Rhinochelys nasuta
Isay Palma
© Aizen Corraldo

Geoemydidae

44

Los testudines continentales y marinos. Crocodylia **Emyidae (58sp)**

ANIMLIA – REPTILIA
Maranhão Slider
Trachemys adiutrix

Trachemys adiutrix

45

Trachemys dorbigni
Emyidae

46

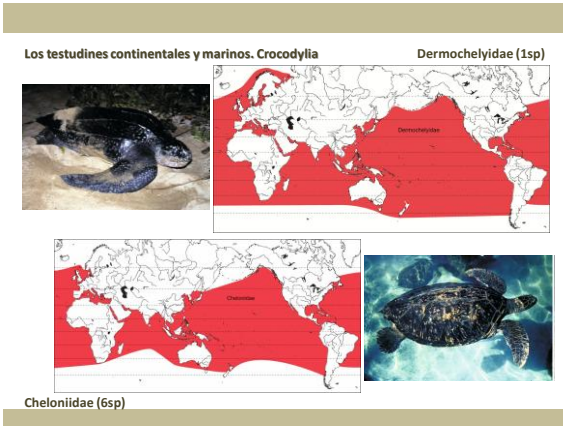
Trachemys adiutrix
Emyidae

<https://www.inaturalist.org/observations/284095183>

47

Fritz, U., Stuckas, H., Vargas-Ramirez, M., Hundsdoerfer, A. K., Maran, J., & Pickert, M. (2011). Molecular phylogeny of Central and South American slider turtles: Implications for biogeography and systematics (Testudines: Emydidae: Trachemys). *Journal of Zoological Systematics and Evolutionary Research*, 50(2), 125–136. doi:10.1111/j.1439-0469.2011.00647.x

48



49



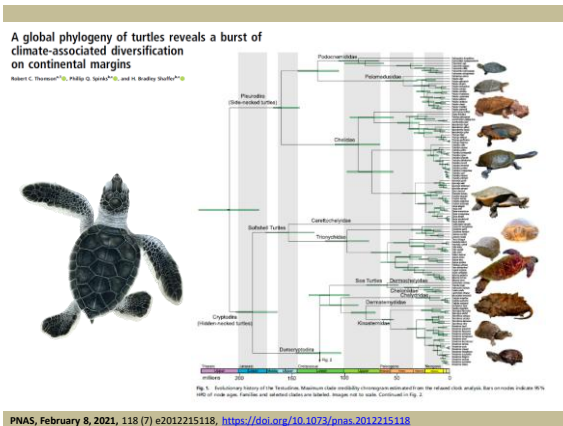
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51

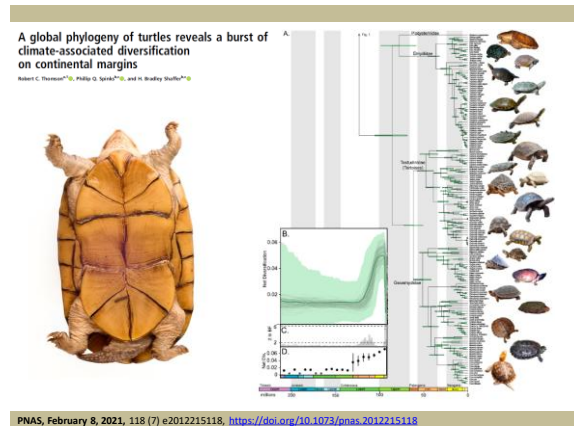


52



PNAS, February 8, 2021, 118 (7) e2012215118, <https://doi.org/10.1073/pnas.2012215118>

53



PNAS, February 8, 2021, 118 (7) e2012215118, <https://doi.org/10.1073/pnas.2012215118>

54

Turtle biogeography: Global regionalization and conservation priorities

Joshua R. Ennen^{1,2}, Mickey Agha³, Sarah C. Sweat⁴, Wilfredo A. Matamoros⁵, Jeffrey E. Lovich⁶, Anders G.J. Rhodin⁷, John B. Iverson⁸, Christopher W. Hoagstrom⁹

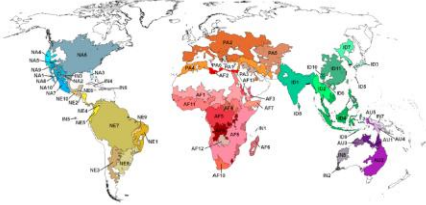


Fig. 1. A map of 63 turtle regions of the world using 342 turtle species and 5029 individual HydroBasins. Each three-digit code (two letters and a number) represents a turtle-region ID that identifies each turtle region by name (Appendix A; Supplemental Table A and B). Turtle regions of similar color have relatively similar species composition and comprise turtle realms as follows: Blue (Nearctic), Green (Palearctic), Red (Afrotropical), Brown (Indomalaya), Yellow (Indo-Malaya), and Purple (Australasia). Turtle regions shaded gray represent independent, singleton branches that each share no species with any other turtle region (Fig. 2). Filter resolution maps of each turtle realm are available in the supplemental materials (Supplemental Figures A–F) (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article).

Joshua R. Ennen, Mickey Agha, Sarah C. Sweat, Wilfredo A. Matamoros, Jeffrey E. Lovich, Anders G.J. Rhodin, John B. Iverson, Christopher W. Hoagstrom, Turtle Biogeography: Global regionalization and conservation priorities, *Biological Conservation*, Volume 241, 2020.

55

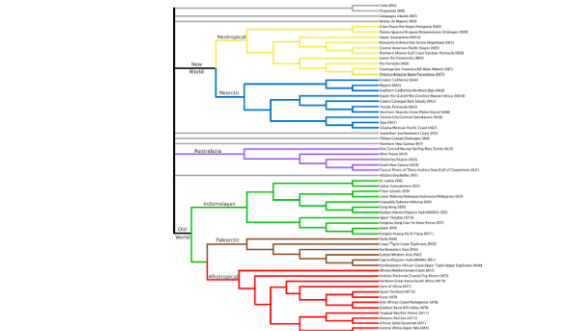


Fig. 3. A detailed phylogenetic tree of turtle species using unrooted post-ghost net phylogenetic trees based on the maximum parsimony of James's dominance index (Ennen, 2017) across 342 turtle species for 5029 HydroBasins. Each individual branch indicates a unique turtle region identified with a turtle region name and ID. Colored polygons represent the turtle biogeographic realm for each turtle region (Appendix A; Supplemental Table A and B). Turtle regions of similar color have relatively similar species composition and comprise turtle realms as follows: Blue (Nearctic), Green (Palearctic), Red (Afrotropical), Brown (Indomalaya), Yellow (Indo-Malaya), and Purple (Australasia). Turtle regions shaded gray represent independent, singleton branches that each share no species with any other turtle region (Fig. 2). Filter resolution maps of each turtle realm are available in the supplemental materials (Supplemental Figures A–F) (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article).

56

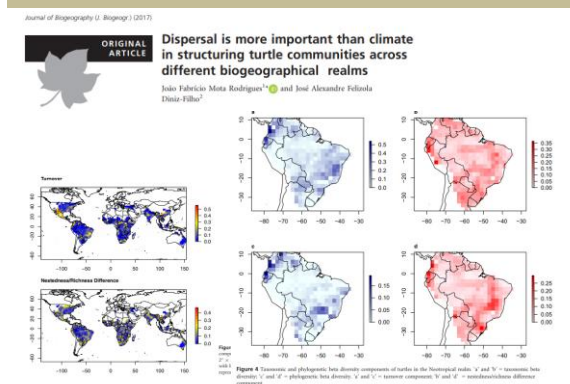
<https://doi.org/10.1073/pnas.2012151118>

	HIGHEST BIODIVERSITY (2)	LOW HUMAN FOOTPRINT (3)	HIGH HUMAN FOOTPRINT (4)	HIGH HUMAN FOOTPRINT (7)
HIGH LIGHT ENDONEMIC (2)	NEE	NEE	NEE	NEE
LOW RESTRICTED BIODIVERSITY (3)	AFI	AFI	AFI	AFI
LOW RESTRICTED BIODIVERSITY (4)	AFI	AFI	AFI	AFI
HIGH LIGHT ENDONEMIC (5)	NEE	NEE	NEE	NEE
HIGH LIGHT ENDONEMIC (6)	NEE	NEE	NEE	NEE
HIGH LIGHT ENDONEMIC (7)	NEE	NEE	NEE	NEE

Fig. 4. A matrix displaying biodiversity and conservation terminal branches from the classification tree analyses (Fig. 3). Global turtle regions (with ID numbers) are listed within the matrix according to their placement on branches within the biodiversity (rows) and conservation (columns) classification trees. Turtle regions with red highlight are highest conservation priorities because of high biodiversity and threatened species. Turtle regions with yellow highlight are considered intermediate because of high biodiversity with either high human footprint or threatened species. The colored and numbered hexagons correspond with classification tree branches in Fig. 3. Although excluded from the classification tree analyses due to missing data, we manually inserted the collages islandic turtle region into this matrix, based on its high light endonemism and low BII relative to other turtle regions. Empty cells, colored gray, have no turtle regions (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article).

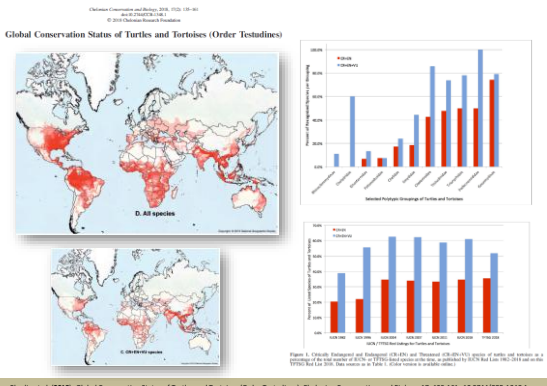
<https://doi.org/10.1073/pnas.2012151118>

57



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<http://wileyonlinelibrary.com/journal/jbi> 1 doi:10.1111/jbi.13003



Rhodin et al. (2018). Global Conservation Status of Turtles and Tortoises (Order Testudines), *Chelonian Conservation and Biology*, 17, 135-161. 10.7446/CCB-1348.1

59


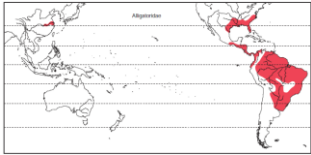
Los testudines continentales y marinos. Crocodylia

•Quem são os Testudines e Crocodylia Neotropicais?

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Los testudines continentales y marinos. Crocodylia **Alligatoridae (8/6sp)**

Spectacled Caiman	<i>Caiman crocodilus</i>	— Stable	Global	LC
Broad-nouted Caiman	<i>Caiman latirostris</i>	— Stable	Global	LC
Yacaré	<i>Caiman yacare</i>	— Stable	Global	LC
Black Caiman	<i>Melanosuchus niger</i>	↑ Increasing	Global	LC
Dwarf Caiman	<i>Paleosuchus palpebrosus</i>	— Stable	Global	LC
Smooth-fronted Caiman	<i>Paleosuchus trigonatus</i>	— Stable	Global	LC

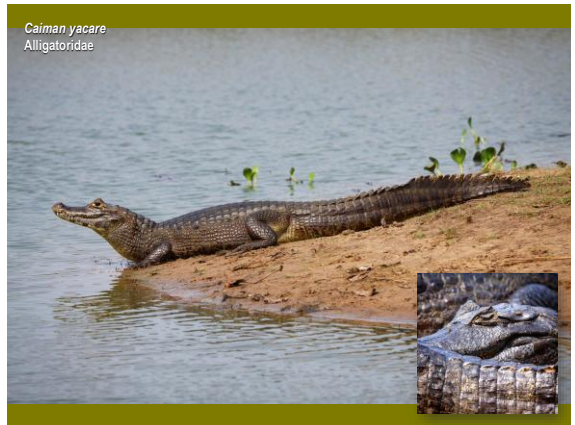
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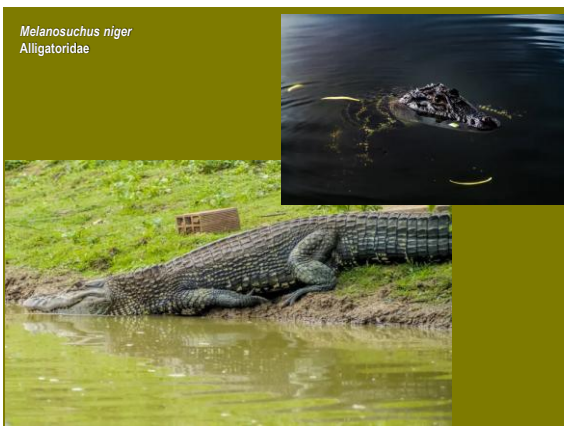
62



63



64




65



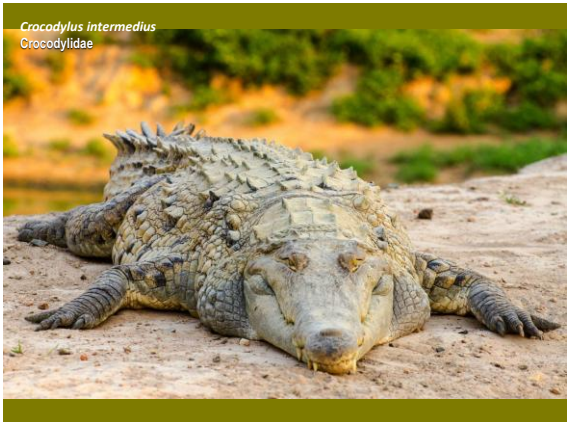
66

Los testudines continentales y marinos. Crocodylia Crocodylidae (17/4sp)

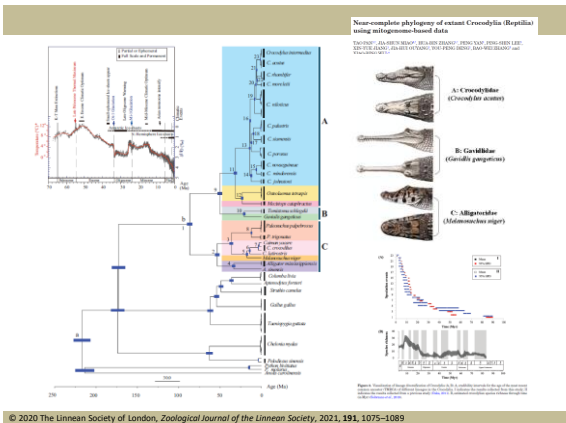
American Crocodile	<i>Crocodylus acutus</i>	↑ Increasing	Global	LC
Orinoco Crocodile	<i>Crocodylus intermedius</i>	↓ Decreasing	Global	CR
Morelet's Crocodile	<i>Crocodylus moreletii</i>	↔ Stable	Global	LC
Cuban Crocodile	<i>Crocodylus rhombifer</i>	↓ Decreasing	Global	CR




67



68



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Los testudines continentales y marinos. Crocodylia

• Reprodução de Testudines e Crocodylia



70

Testudines

Reprodução

- Fecundação interna com órgão copulatório simples.
- Ovíparos
- Sem cuidado parental
- TSD



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73



74



75



76



77



TSD em Testudines

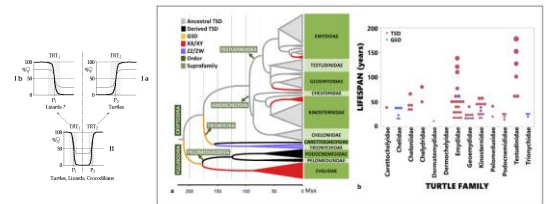
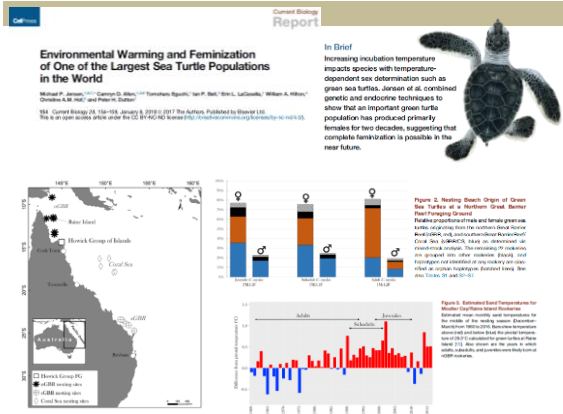


Fig. 1. Phylogenetic relationships among turtle families and their sex-determining mechanisms (Brito and Valenzuela, 2021). (b) Turtle lifespan by taxonomic family (data from Isahah et al., 2016). Circle size is proportional to lifespan value.

Valenzuela N: Podocnemis expansa: Turtles Hint to a Unifying Explanation for the Evolution of Temperature-Dependent Sex Determination in Long-Lived and Short-Lived Vertebrates. Sex Dev 2021;15:23-37. doi: 10.1159/000515208

78



79

Crocodylia

Reprodução

Fecundação interna com órgão copulatório simples.

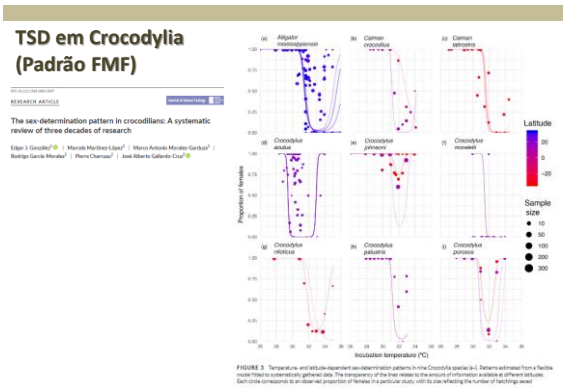
Ovíparos

Com cuidado parental

TSD

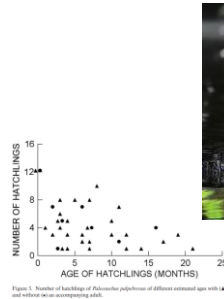


80



81

Cuidado Parental em Crocodylia



Campos, Z., Sanziotti, T., Munitz, F., Farias, I., & Magnusson, W. E. (2012). Parental care in the dwarf caiman, *Paleosuchus palpebrosus* (Crocodylia: Alligatoridae). *Journal of Natural History*, 46(47-48), 2979-2984. doi:10.1080/00222933.2012.724723

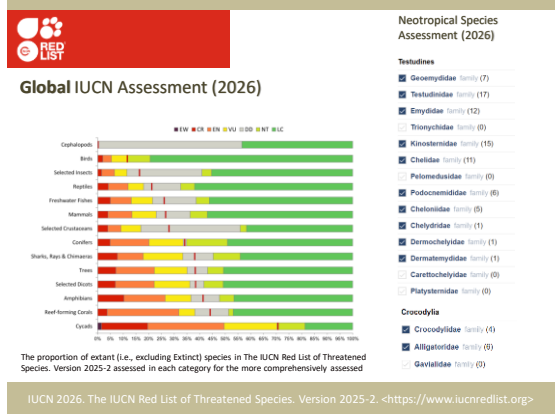
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Los testudines continentales y marinos. Crocodylia

• Conservação de Testudines e Crocodylia



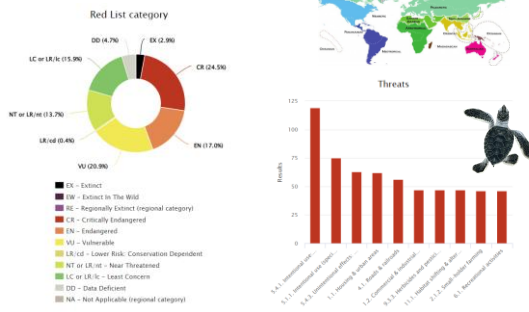
83



IUCN 2026. The IUCN Red List of Threatened Species. Version 2025-2. <<https://www.iucnredlist.org>>

84

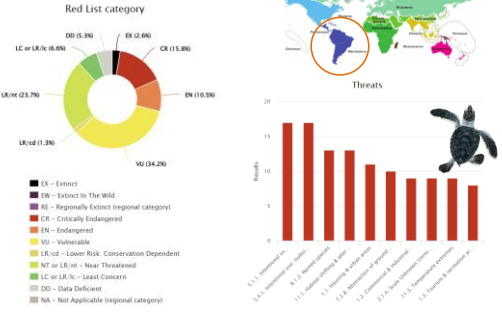
Global IUCN Assessment for 277 Testudines (2026)



IUCN 2026. The IUCN Red List of Threatened Species. Version 2025-2. <<https://www.iucnredlist.org>>

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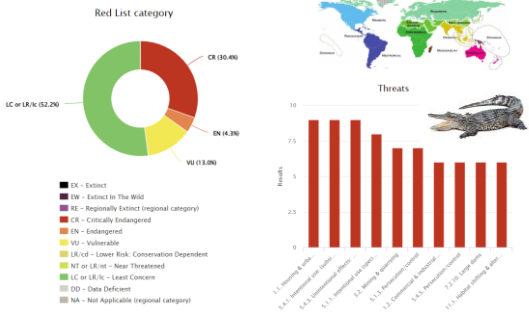
Neotropical IUCN Assessment for 76 Testudines (2026)



IUCN 2026. The IUCN Red List of Threatened Species. Version 2025-2. <<https://www.iucnredlist.org>>

86

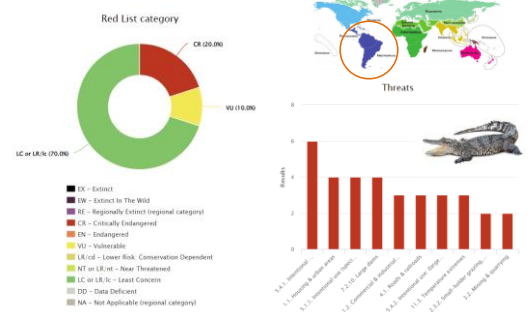
Global IUCN Assessment for 23 Crocodylia (2026)



IUCN 2026. The IUCN Red List of Threatened Species. Version 2025-2. <<https://www.iucnredlist.org>>

87

Neotropical IUCN Assessment for 10 Crocodylia (2026)



IUCN 2026. The IUCN Red List of Threatened Species. Version 2025-2. <<https://www.iucnredlist.org>>

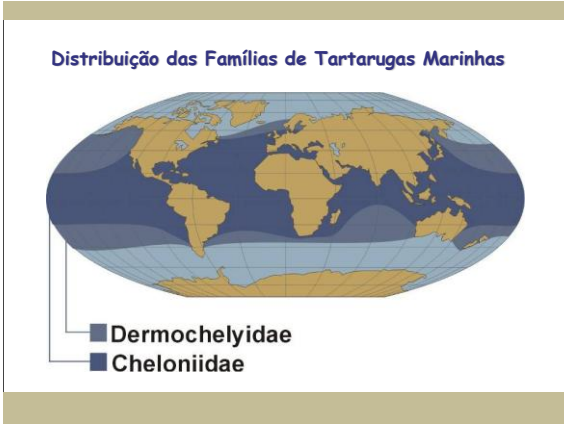
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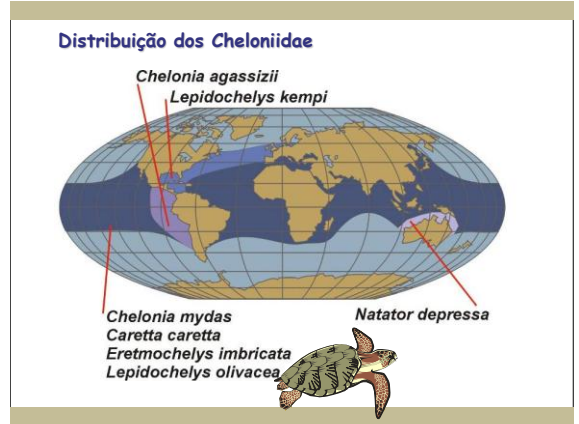
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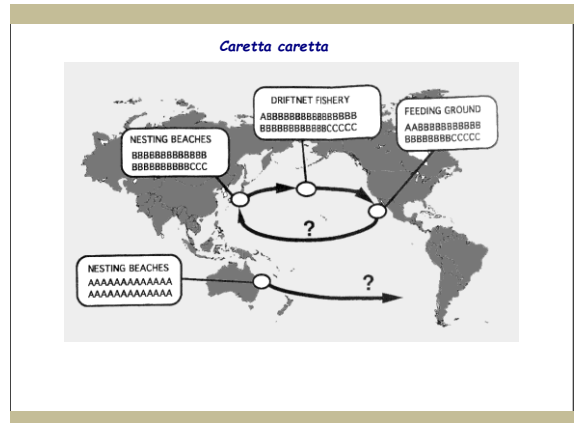
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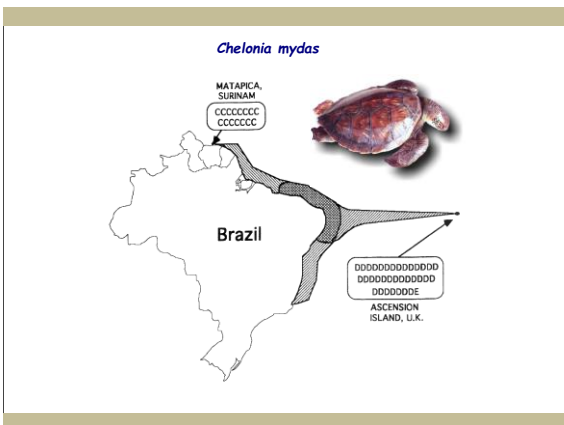
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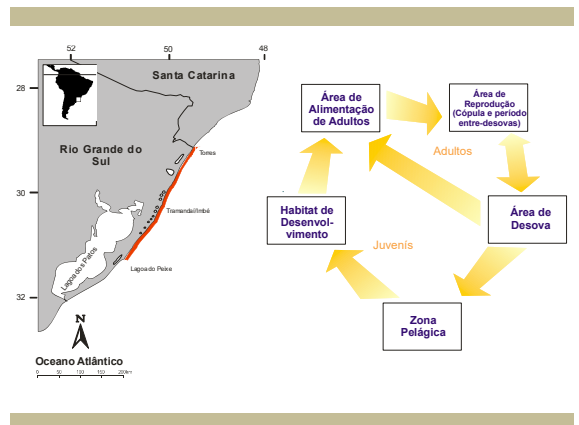
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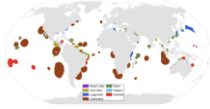
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Article | Open access | Published: 21 March 2024
Thermal vulnerability of sea turtle foraging grounds around the globe

Fotouah Goudari¹, Aygeleki Dova, Mahmoud-Reza Hemami² & Antonios D. Maitelis¹
 Communications Biology 7, Article number: 347 (2024) | Cite this article

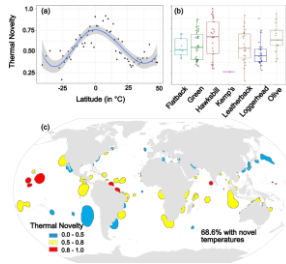
Less than 2% of global foraging grounds are covered by MPAs.

Fig. 1: The worldwide distribution of key foraging hotspots of adult sea turtles.



One-third of the total coverage of foraging hotspots is situated in high seas, where conservation focus is often neglected. Our analyses revealed that **more than two-thirds of these vital marine habitats will experience new sea surface temperature (SST) conditions by 2100**, exposing sea turtles to potential thermal risks.

Fig. 3: Thermal novelty (TNo) within sea turtles' foraging hotspots by 2100.



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Litoral norte do Rio Grande do Sul, sul do Brasil

Monitoramentos de praia
 Torres a Mostardas
 29° 19' S a 31° 22' W
 aprox. 270 km de praias arenosas

Acompanhamento de embarcações
 Torres e Imbé
 frota de pesca
 costeira de emalhe



110

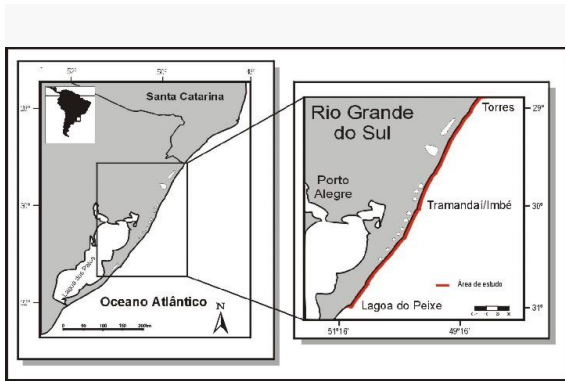


Figura 1 - Localização das duas comunidades pesqueiras estudadas e da área permitida neste estudo para a coleta de exemplares na íntima encalhados.

111



112



- Coleções científicas;
- Séries temporais longas;
- Obtenção não-letal de dados;
- Espero que alguém use isso...

113



114



115

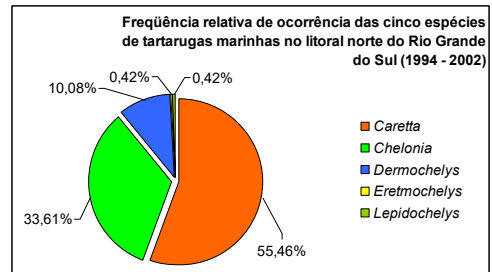


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117

Encalhes



118

Austral Ecology A journal of ecology in the Southern Hemisphere
 Austral Ecology (2016) 41, 580–590

Skeletochronological estimation of age and growth of loggerhead sea turtles (*Caretta caretta*) in the western South Atlantic Ocean



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Vol. 58b: 191–201, 2017
<https://doi.org/10.3354/meps.12056> MARINE ECOLOGY PROGRESS SERIES
 Mar Ecol Prog Ser Published March 24

Age and growth of juvenile green turtles *Chelonia mydas* in the western South Atlantic Ocean



120



Esqueletocronologia?

Estudo de marcas sazonais de crescimento em partes do esqueleto;

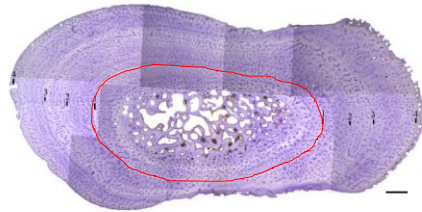


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Esqueletocronologia?

Estudo de marcas sazonais de crescimento em partes do esqueleto;

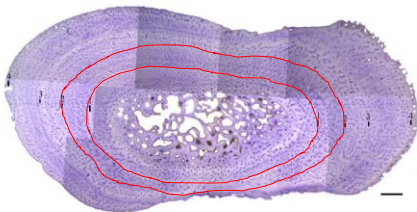


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Esqueletocronologia?

Estudo de marcas sazonais de crescimento em partes do esqueleto;

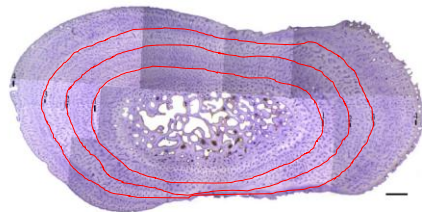


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Esqueletocronologia?

Estudo de marcas sazonais de crescimento em partes do esqueleto;



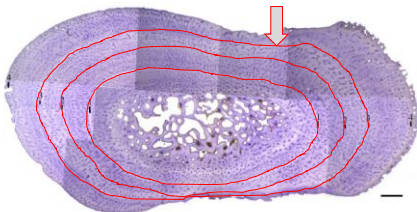
124



Esqueletocronologia?

Estudo de marcas sazonais de crescimento em partes do esqueleto;

Contagem e medição das marcas sazonais de crescimento permite inferir a idade e o crescimento



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Austral Ecology (2016) 41, 580–590

Skeletochronological estimation of age and growth of loggerhead sea turtles (*Caretta caretta*) in the western South Atlantic Ocean

ANA JÚLIA LENZ,^{1,3*} LARISA AVENS,² CARIANE CAMPOS TRIGO^{4,5} AND MÂRCIO BORGES-MARTINS^{3,5}

¹Instituto de Desenvolvimento Sustentável Mamirauá, Tefé, Amazonas, Brazil (Email:anajuliabio@gmail.com), ²NOAA National Marine Fisheries Service, Southeast Fisheries Science Center, Beaufort Laboratory, Beaufort, North Carolina, USA, ³Programa de Pós-Graduação em Biologia Animal, Departamento de Zoologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, ⁴Centro de Estudos Costeiros, Limnológicos e Marinhos, Universidade Federal do Rio Grande do Sul, Imbê, and ⁵Grupo de Estudos de Mamíferos Aquáticos do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil



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doi:10.1111/aec.12347

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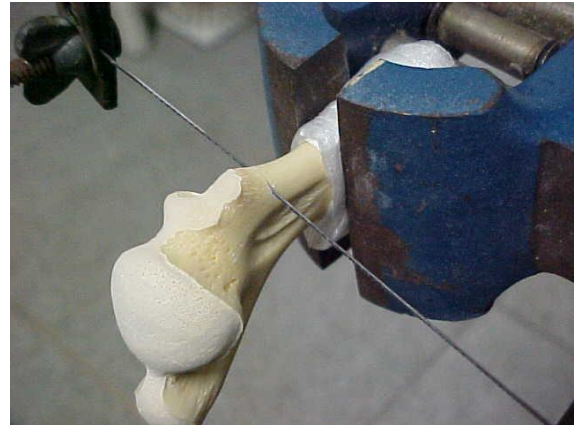
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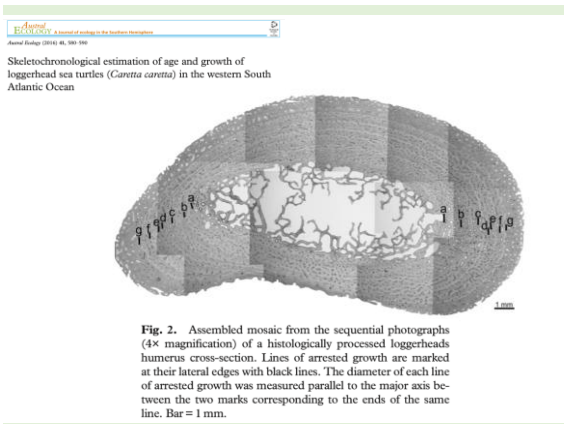
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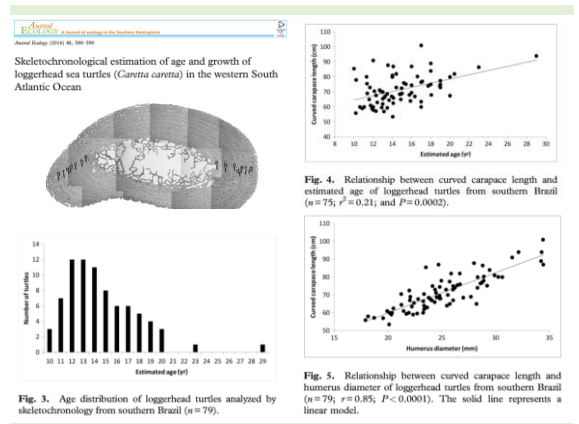
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Age and growth of juvenile green turtles *Chelonia mydas* in the western South Atlantic Ocean

Ana Júlia Lenz^{1,4,*}, Larisa Avens², Márcio Borges-Martins^{1,3}

¹Programa de Pós-Graduação em Biologia Animal, Departamento de Zoologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul 91501-970, Brazil
²NOAA National Marine Fisheries Service, Southeast Fisheries Science Center, Beaufort Laboratory, Beaufort, North Carolina 28516, USA
³Grupo de Estudos de Mamíferos Aquáticos do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil
⁴Present address: Instituto de Desenvolvimento Sustentável Mamirauá, Tefé, Amazonas 69553-225, Brazil



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Age and growth of juvenile green turtles *Chelonia mydas* in the western South Atlantic Ocean

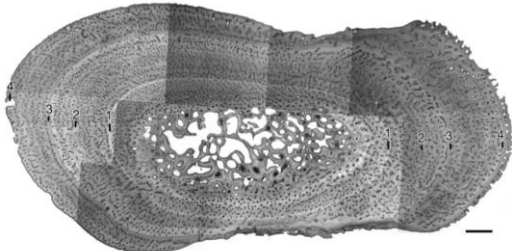


Fig. 2. Mosaic assembled from sequential photographs of a humerus section of green turtles. Lines of arrested growth (LAGs) are marked with black lines with their respective numbers. Line 1 represents the annulus. Scale bar: 1 mm

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Age and growth of juvenile green turtles *Chelonia mydas* in the western South Atlantic Ocean

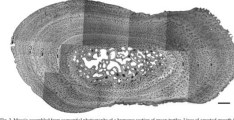


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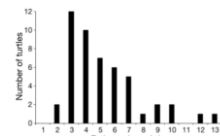


Fig. 3. Age distribution of the green turtles from the southern coast of Brazil, estimated by skeletochronology (n = 49)

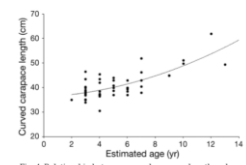


Fig. 4. Relationship between curved carapace length and estimated age for green turtles on the southern coast of Brazil ($r^2 = 0.55$, $p < 0.0001$, $n = 45$). The solid line represents the polynomial equation

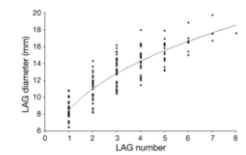


Fig. 5. Relationship between diameter and number of lines of arrested growth (LAGs) of green turtles from the southern coast of Brazil that retained the annulus ($r^2 = 0.77$, $n = 109$ LAGs)

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Age and growth of juvenile green turtles *Chelonia mydas* in the western South Atlantic Ocean

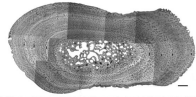


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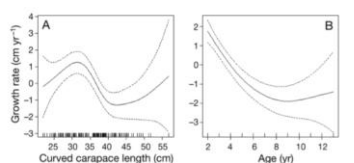
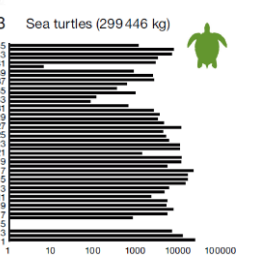
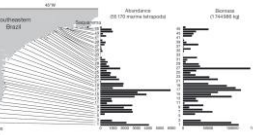
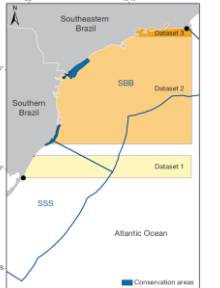


Fig. 6. Summary of generalized additive mixed model (GAMM) growth response relative to the potential covariates (A) curved carapace length (CCL) and (B) age of green turtles from southern coast of Brazil. Within each plot, the solid line represents mean growth response (on a scale centered around 0) for the covariate conditioned on other covariates included in the model and dashed lines represent the extent of the 95% Bayesian credible interval. Short, vertical lines above the horizontal axis (rug plot) signify the distributions of covariate values

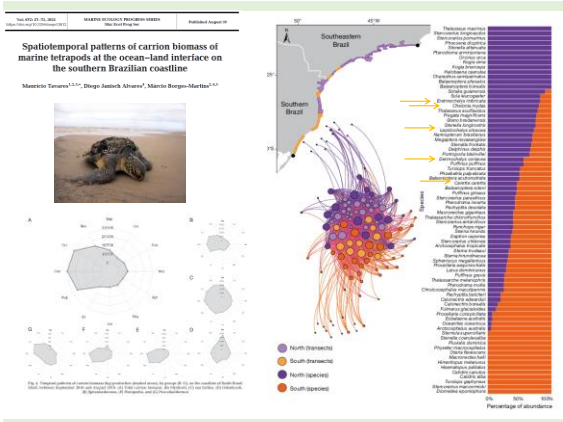
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Spatiotemporal patterns of carrion biomass of marine tetrapods at the ocean-land interface on the southern Brazilian coastline

Márcio Borges-Martins^{1,2,3}, Diego Salvoch Azeiteiro⁴, Márcio Borges-Martins^{1,2,3}



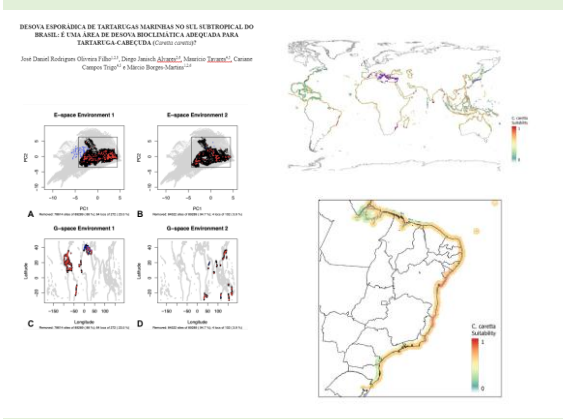
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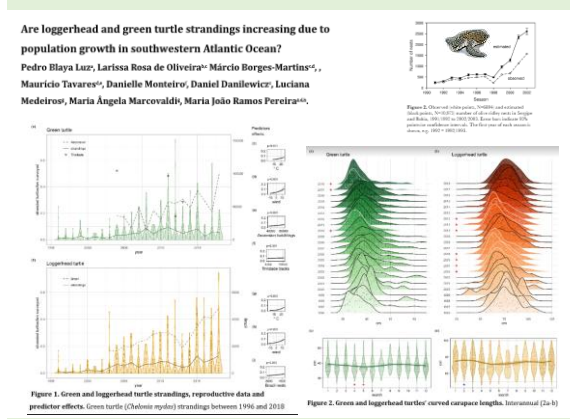
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