



Filo Chordata

011 0212 Zoologia Aplicada...

Prof. Alexandre Reis Percequillo

Origem, diversidade dos cordados e impactos de
atividades antrópicas

Ofidismo

Roedores e morcegos: importância biológica e
impactos nas atividades humanas



Filo Chordata

Diversidade

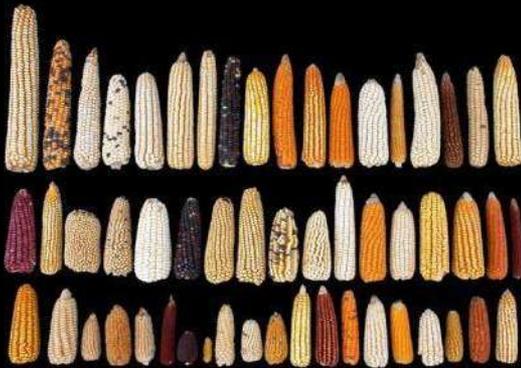
Posição Filogenética

Morfologia

Biologia

**Diversidade dos cordados e
Importância/Impactos**

Diversidade



classical audio different fusion dance free art tracks soul old particular head recorded top cultural new song world based genres common record song party evolved trend charts simple blues mass recording musical singers form fan solo music listeners transmission people sub distinction index styles band traditional songs period artists popularity wave culture jazz singer references regional group links radio artist chorus high style popular fans folk list long traditions related Certain contemporary play

Seventh-Day Adventist Mormonism Satanism Amish Mayan Religion Hinduism Confucianism Christianity Shinto Unitarian Universalism Islam Hare Krishna Jehovah's Witnesses Judaism Baptist Bahai Faith Taoism Catholic Epicureanism Unification Church Neopaganism Church of Christ Later Day Saints Chopra Catholicism Epicureanism Cao Dai Protestant

O que é diversidade biológica ou biodiversidade?

“The variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” (CBD, 1992)

“The totality of genes, species, and ecosystems in a region” (Global Biodiversity Strategy; World Resources Institute et al., 1992)



Componentes da diversidade

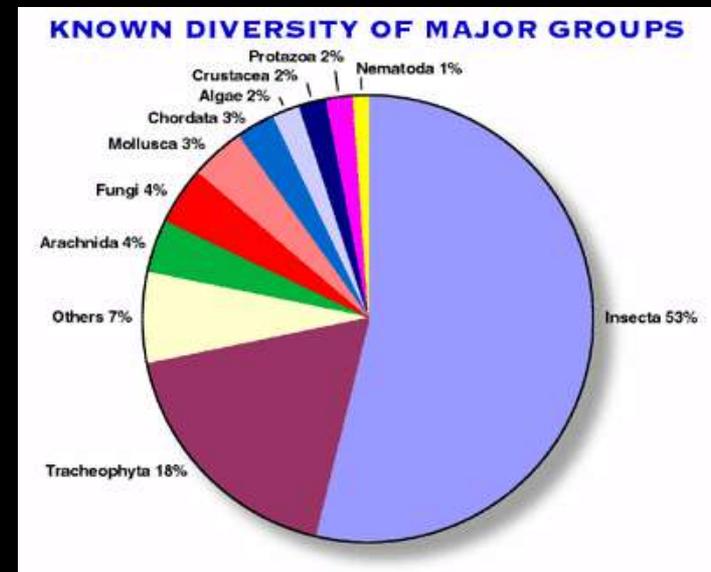
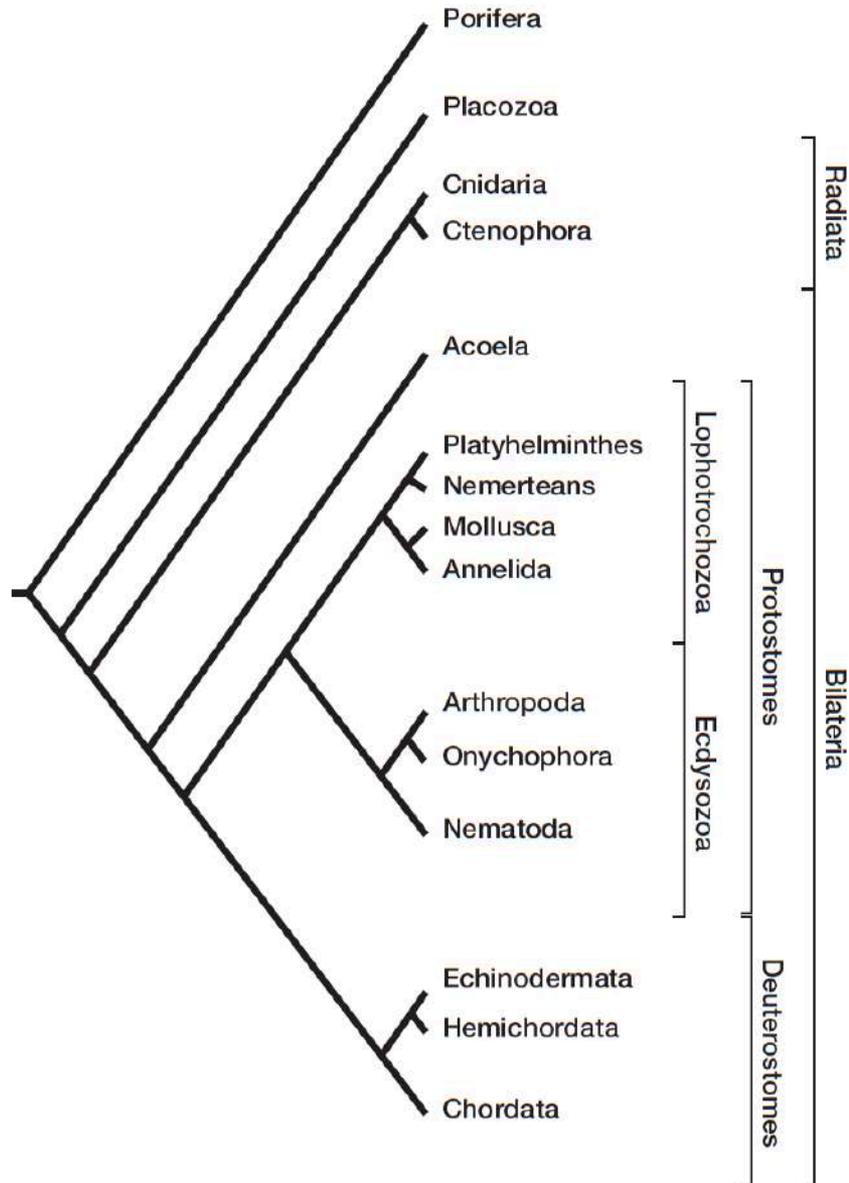
Diversity within the **species** is the genetic diversity

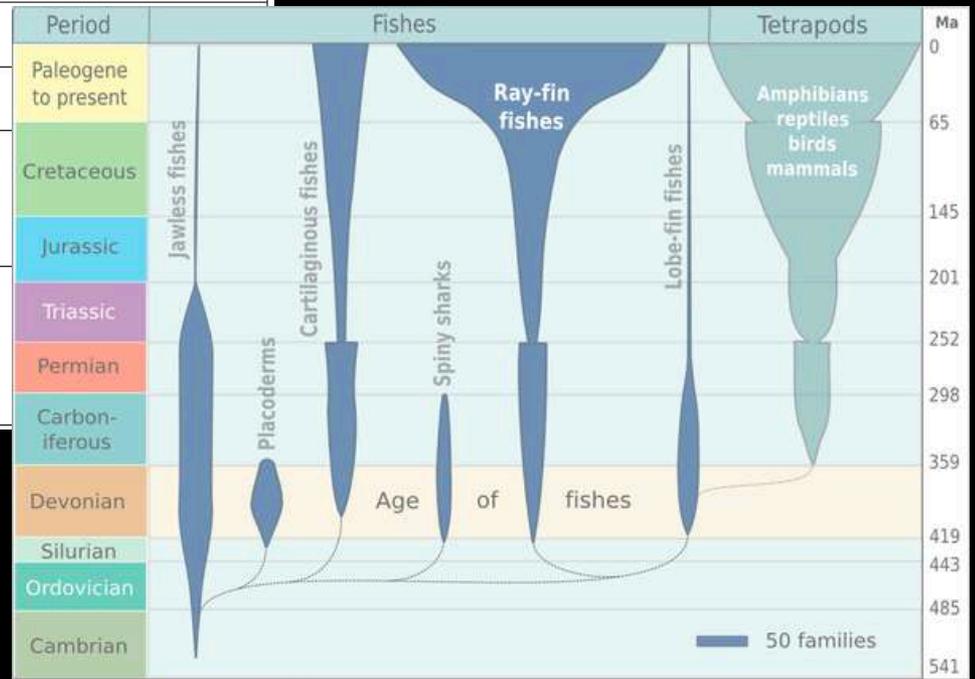
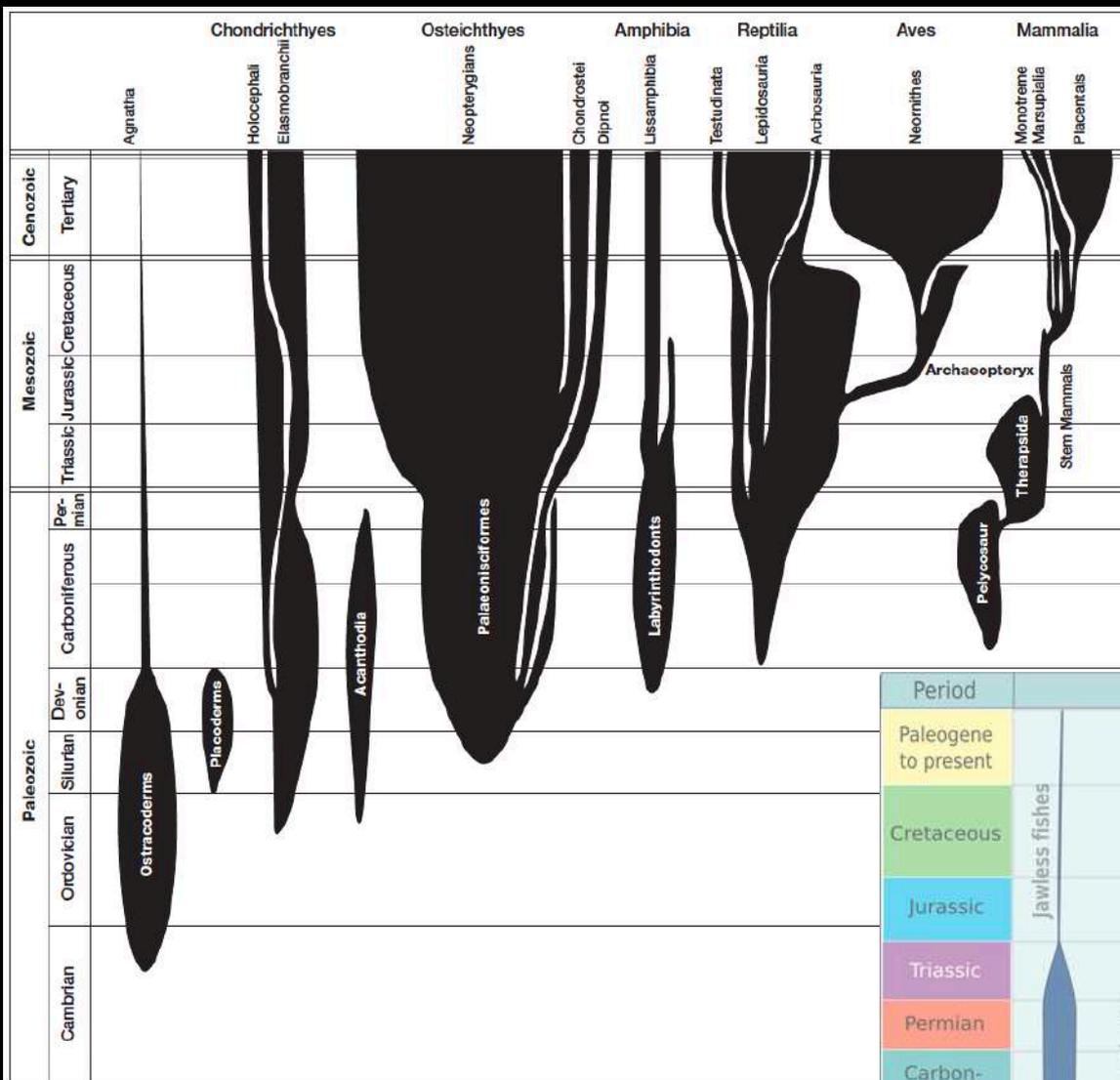
Diversity between the **species** is the species, taxonomic or organismic diversity

Diversity on the ecosystems is the ecological or habitat diversity



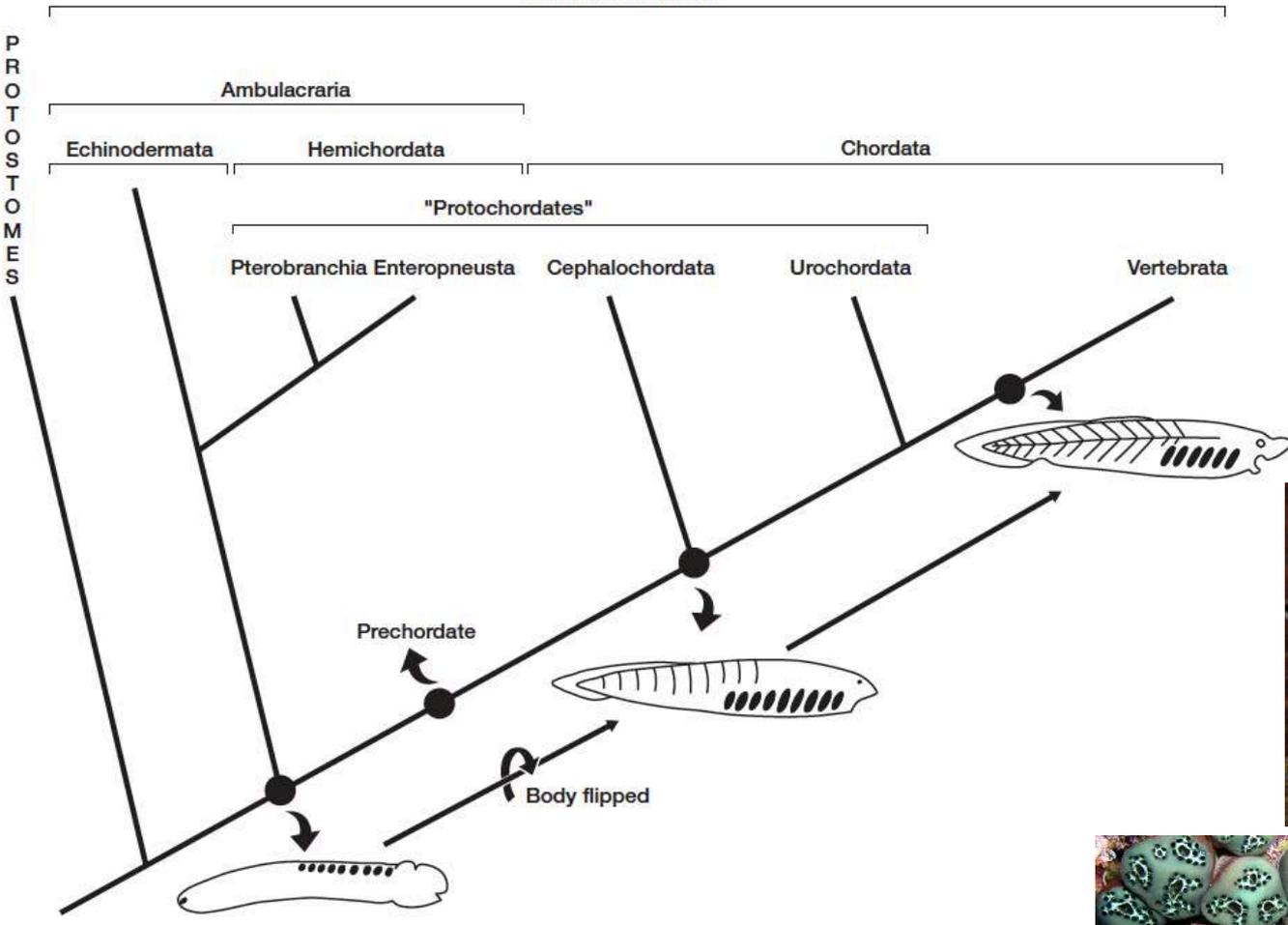
Diversidade de Cordados





DEUTEROSTOMES

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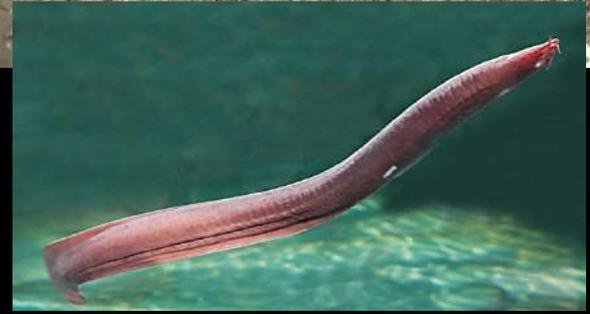
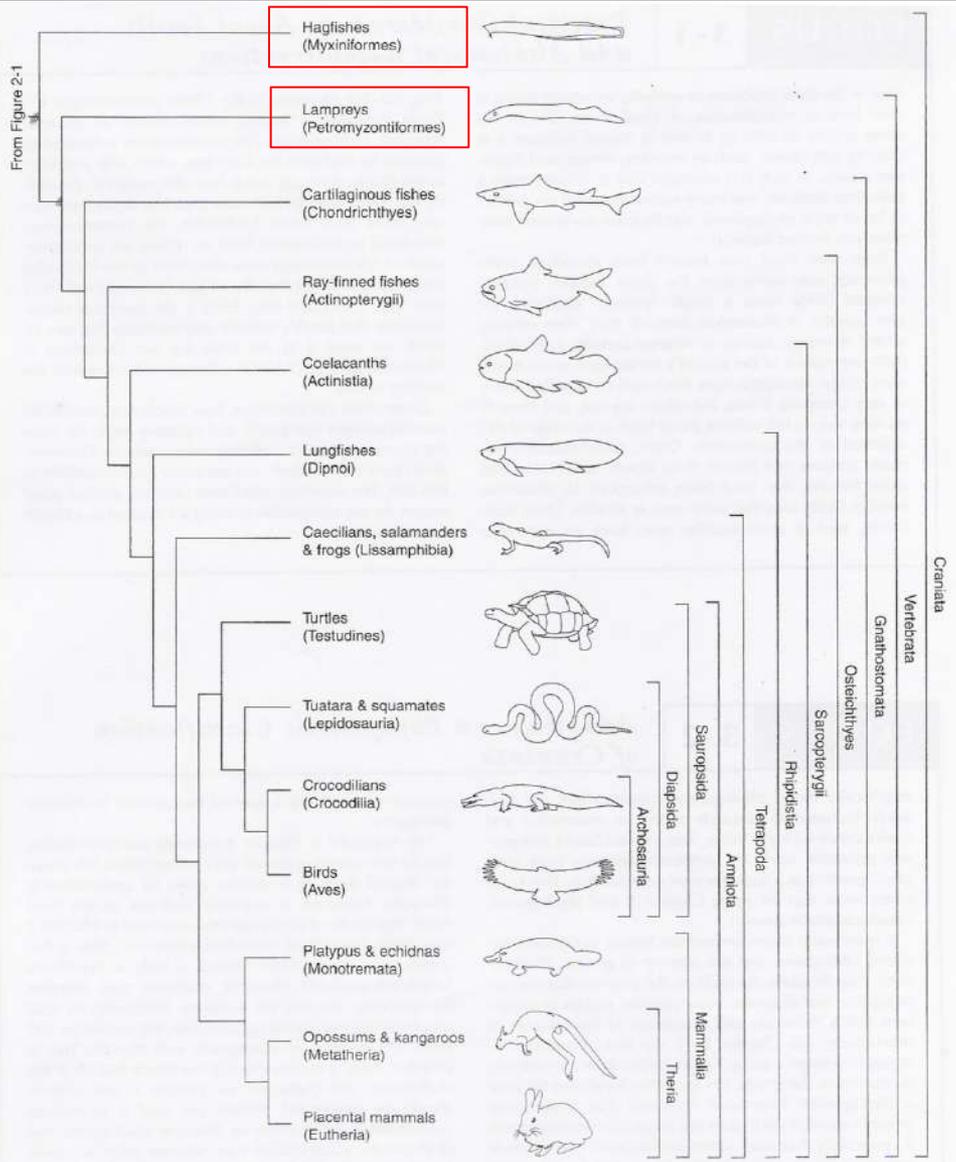
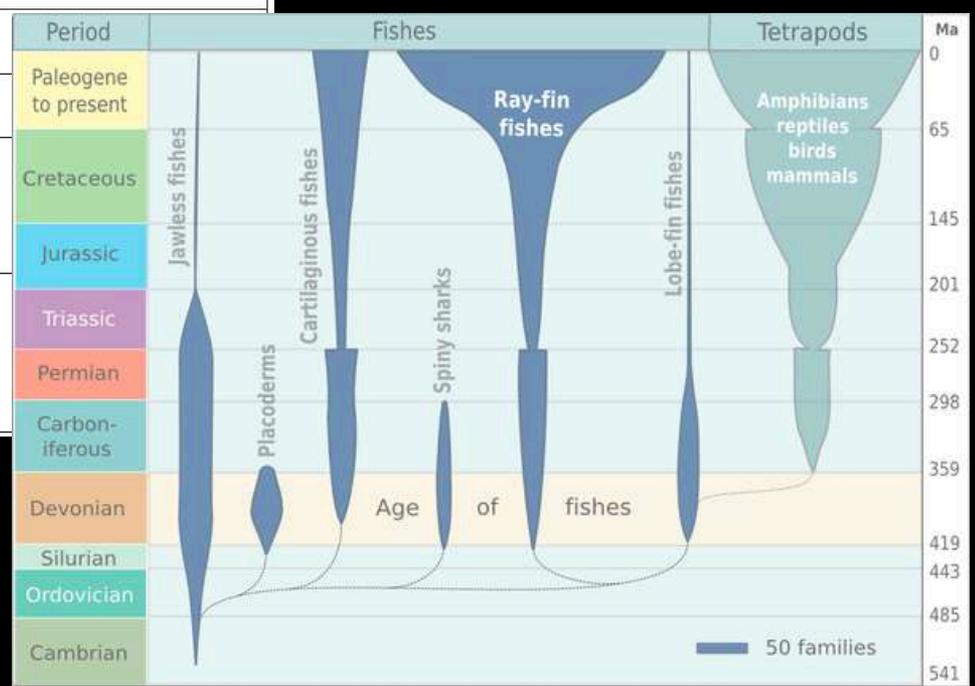
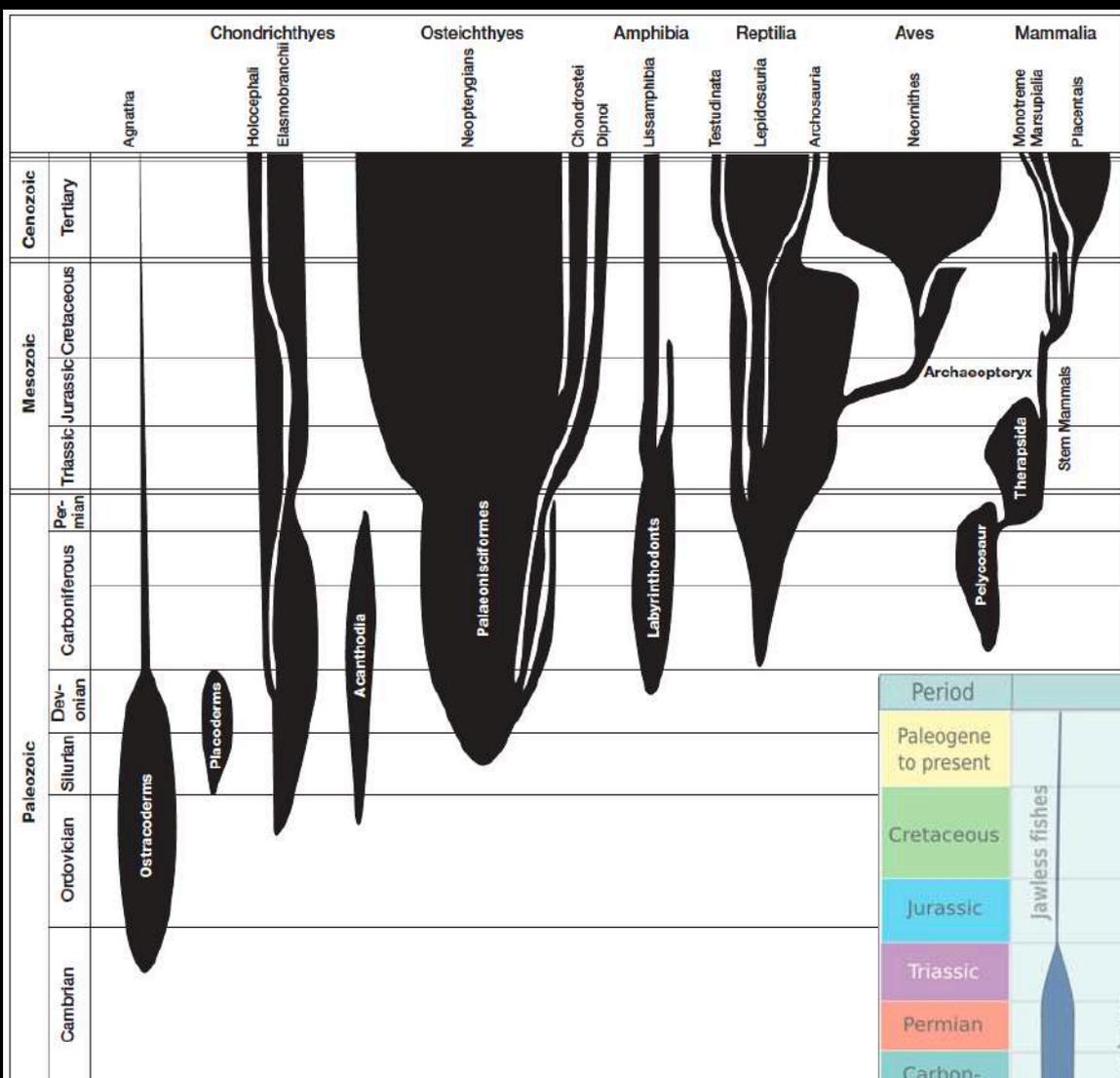


FIGURE 3-1
 Phylogeny of the major extant (i.e., living) clades of craniates, highlighting major patterns in vertebrate evolution and the phylogenetic classification used in this book.



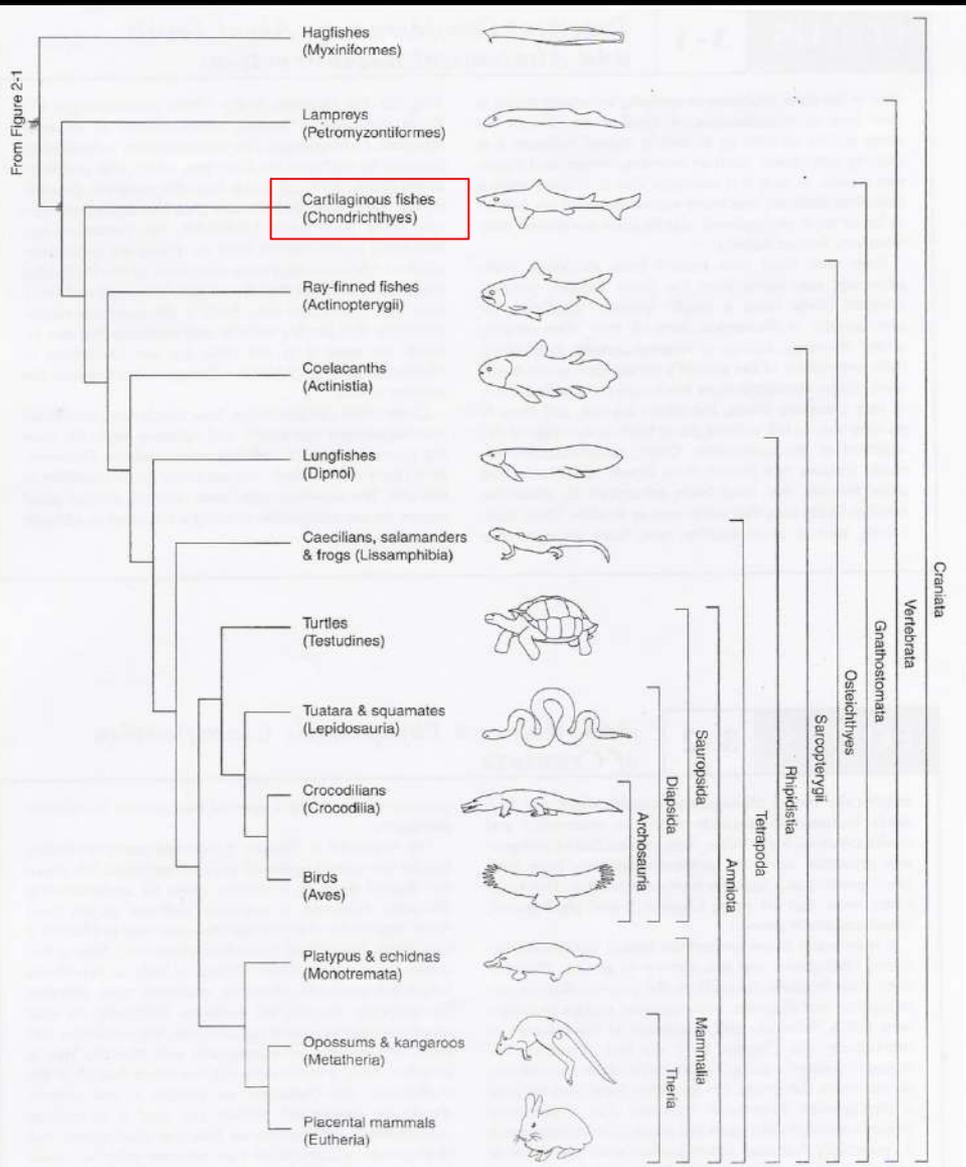
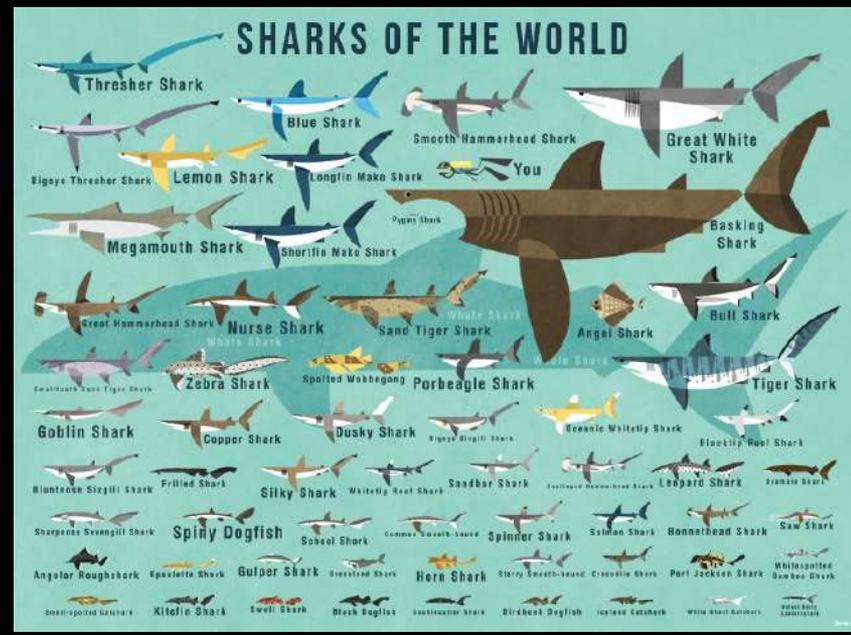
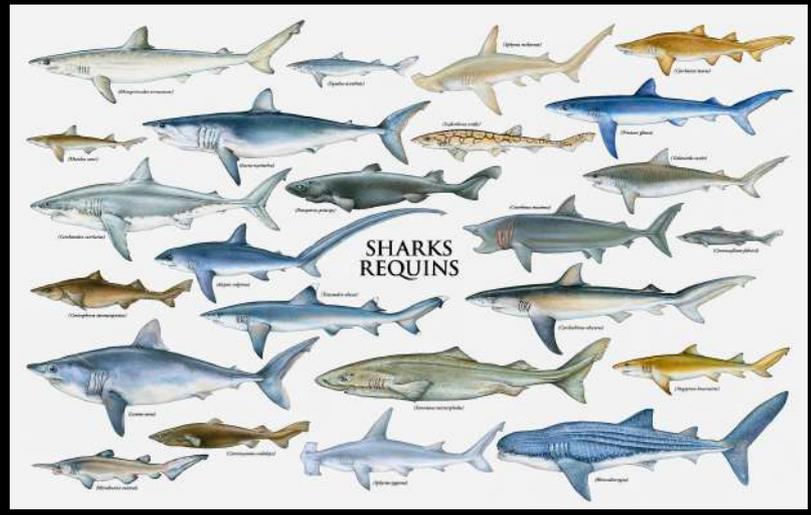


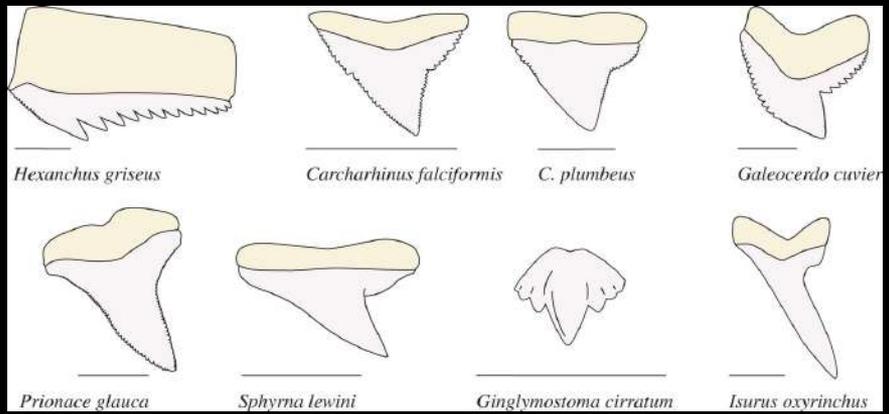
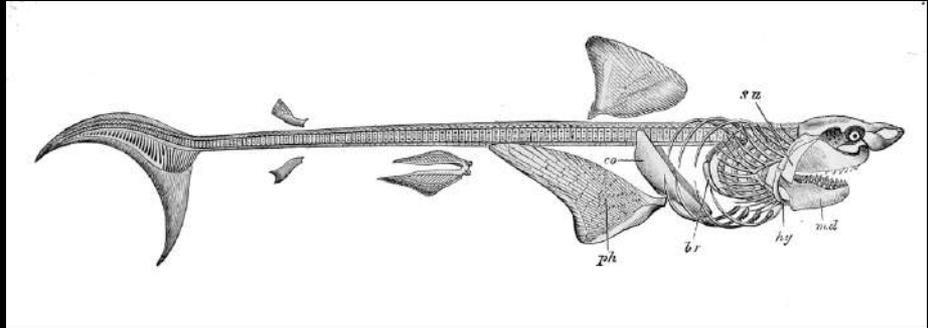
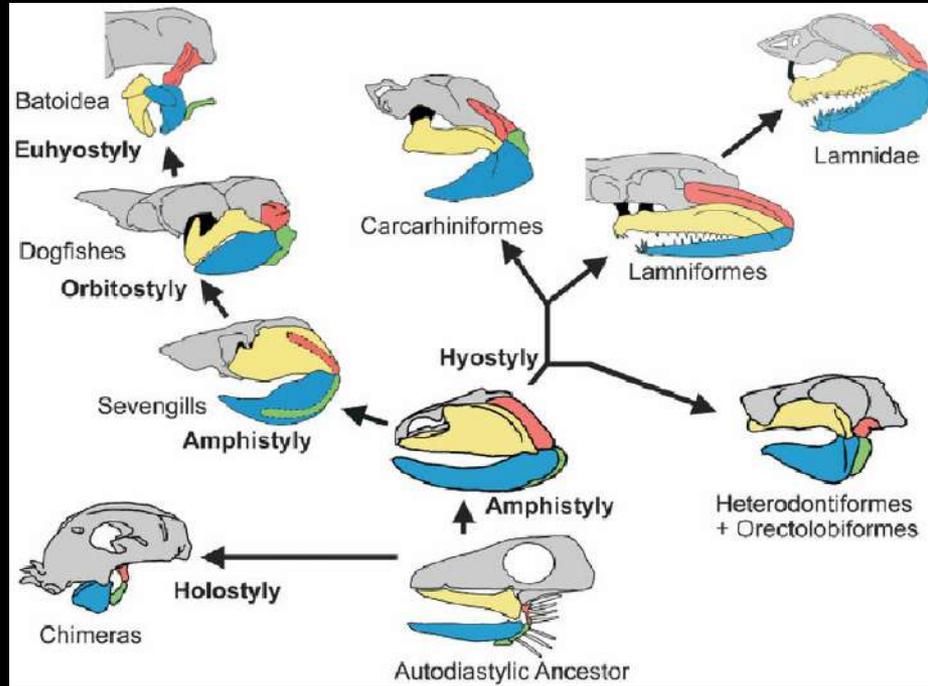
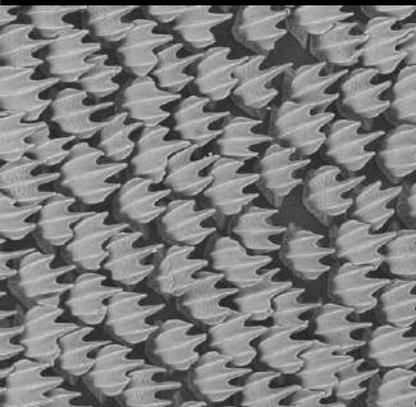
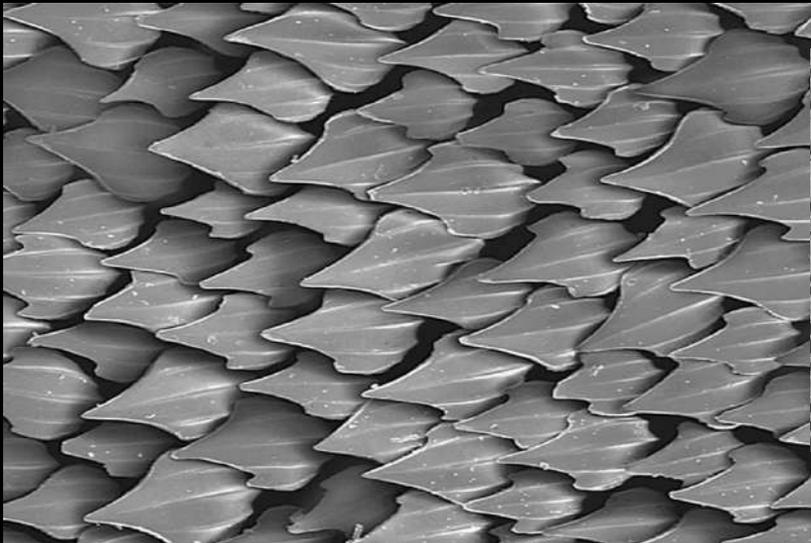
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Peixes Cartilagosos

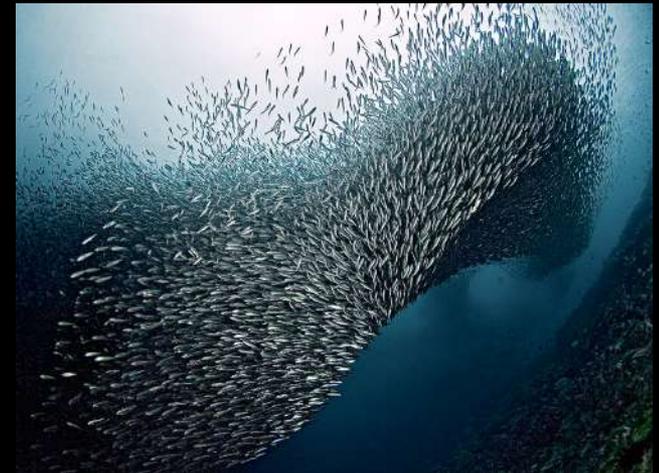
Chondrichthyes



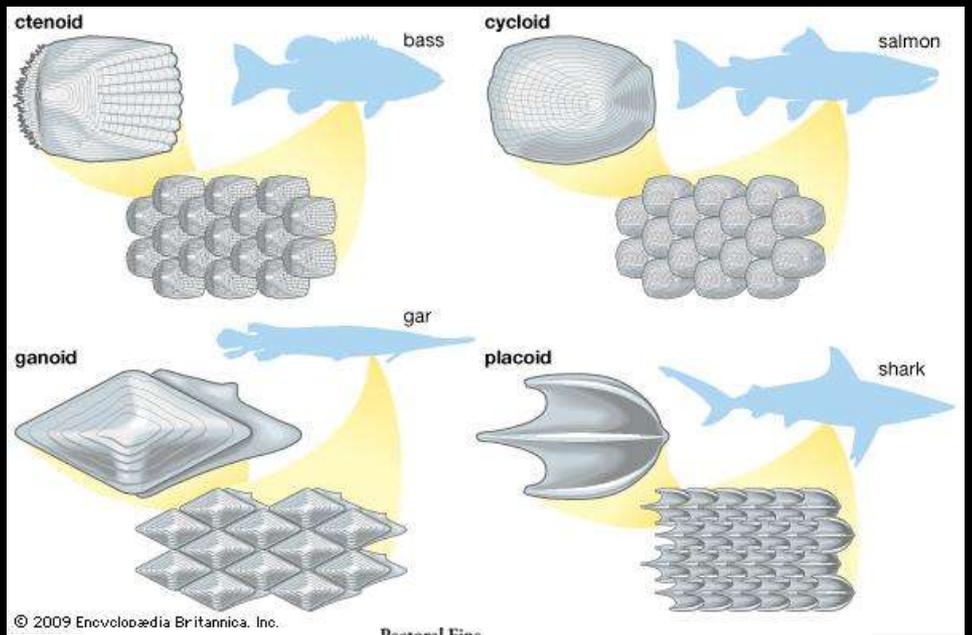
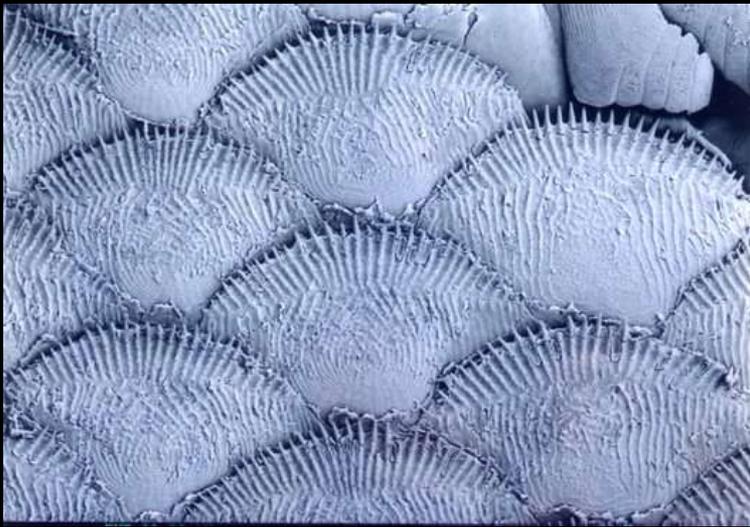


Peixes de nadadeiras raiadas

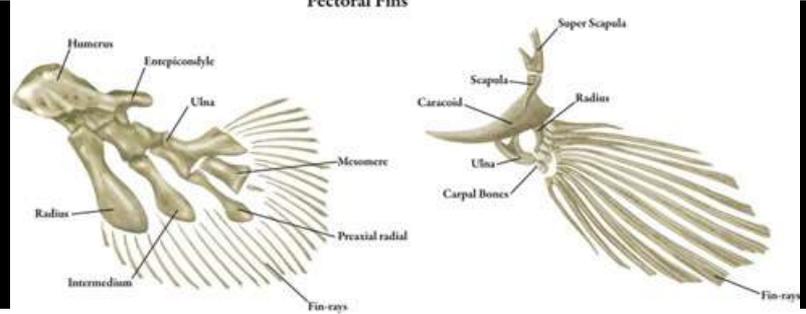
Actinopterygii



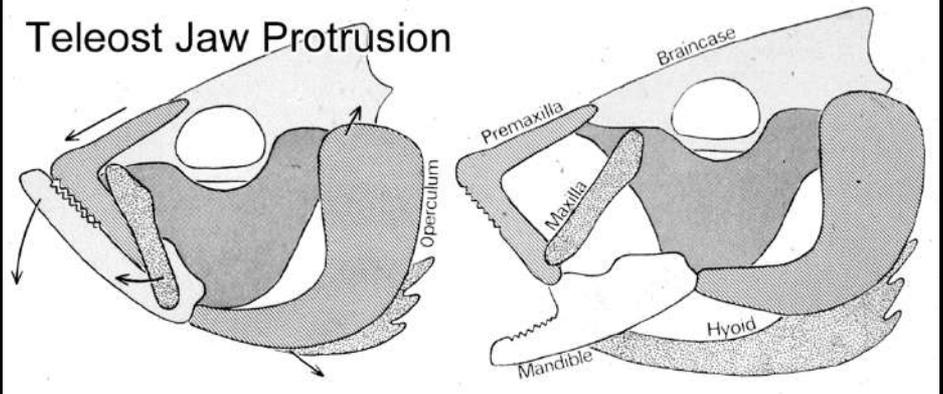




Pectoral Fins



Teleost Jaw Protrusion



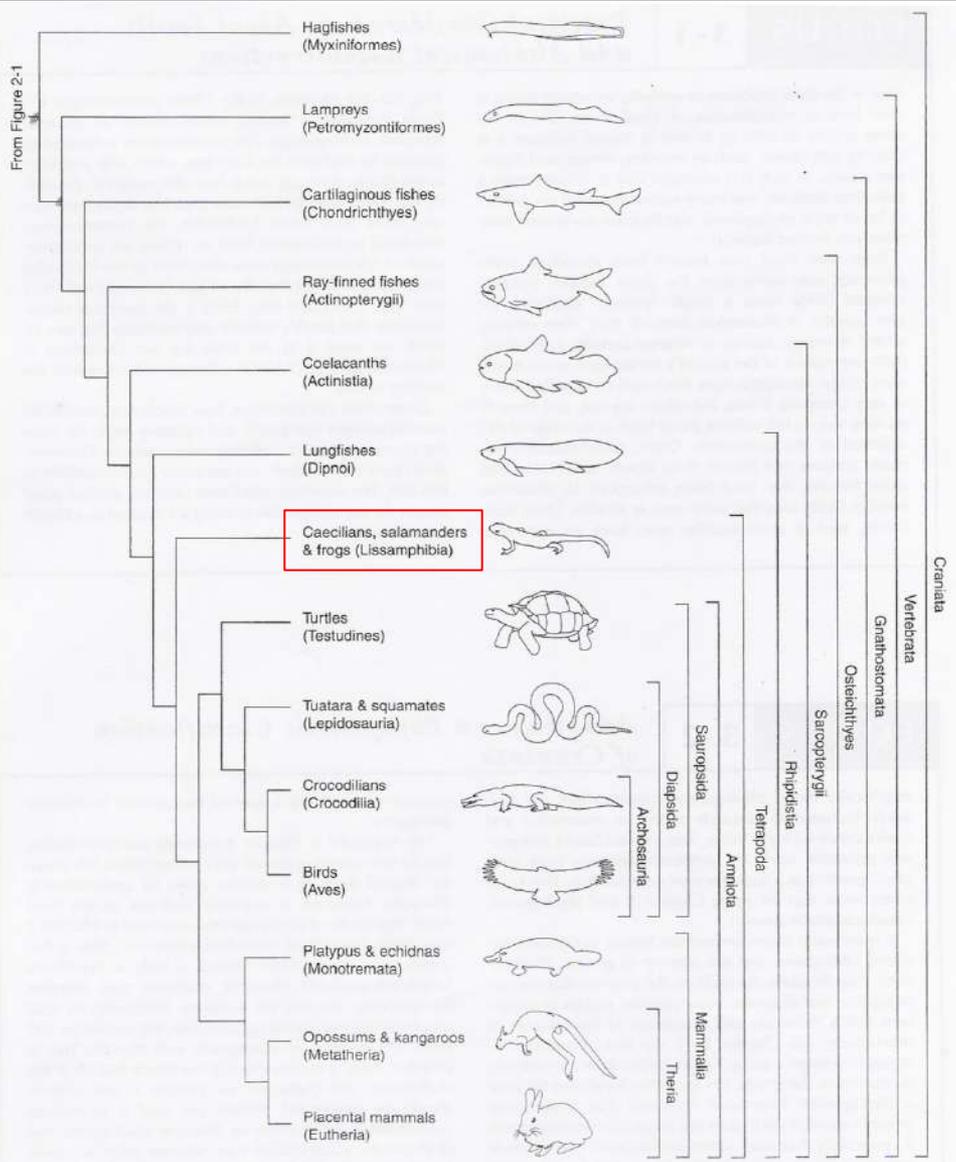


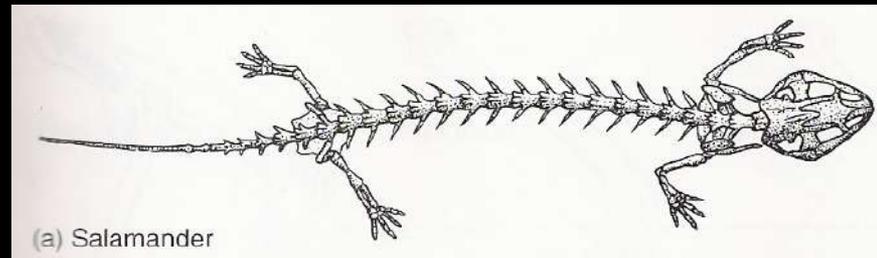
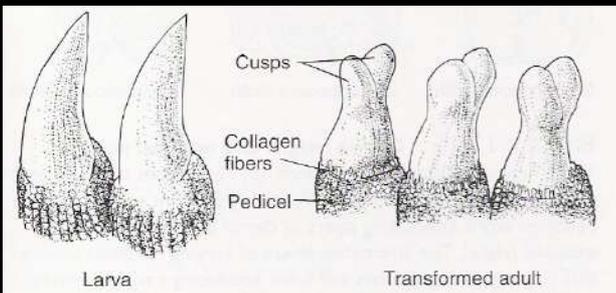
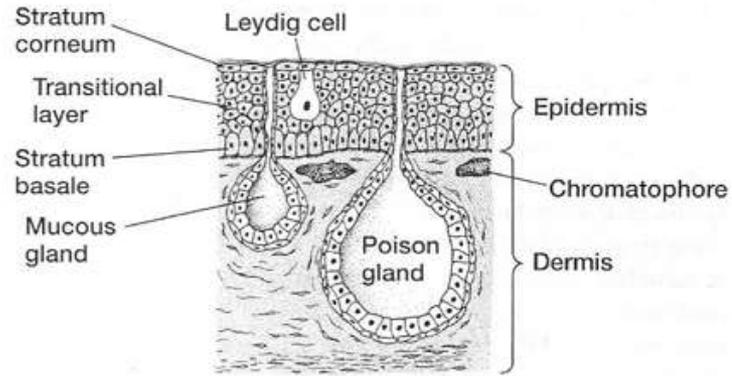
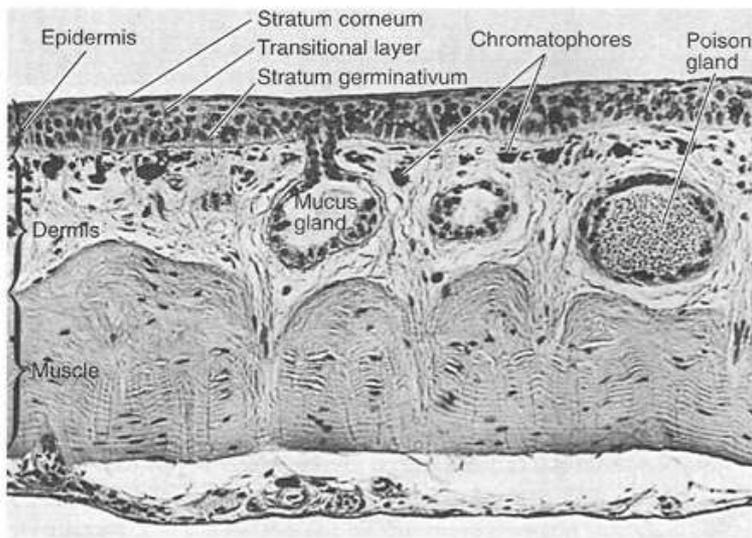
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Sapos, salamandras e cecílias

Lissamphibia





Anura or Salientia (frogs)

5858 species; cosmopolitan.

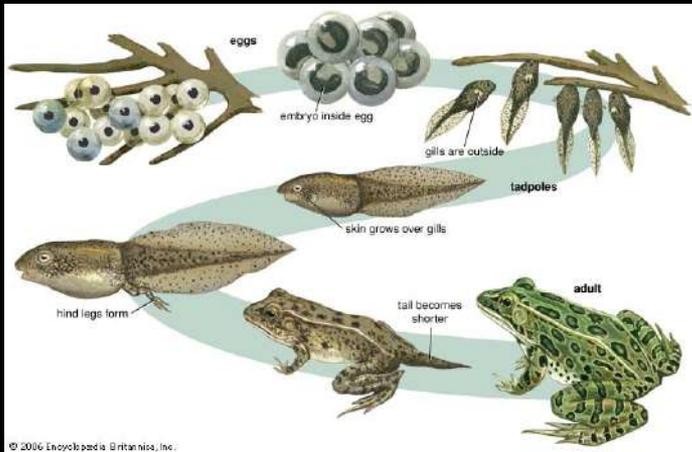
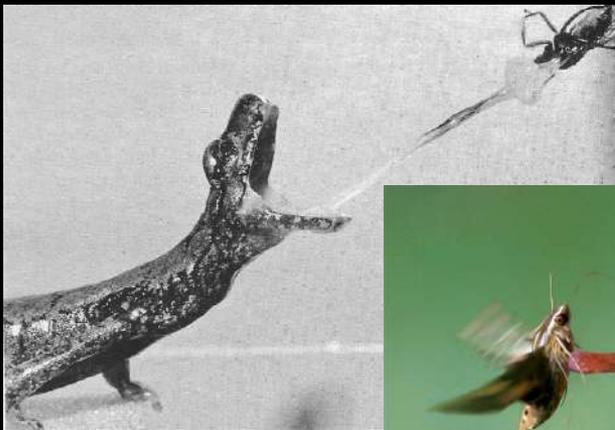
Urodela or Caudata (salamanders)

597 species; predominantly holartic.

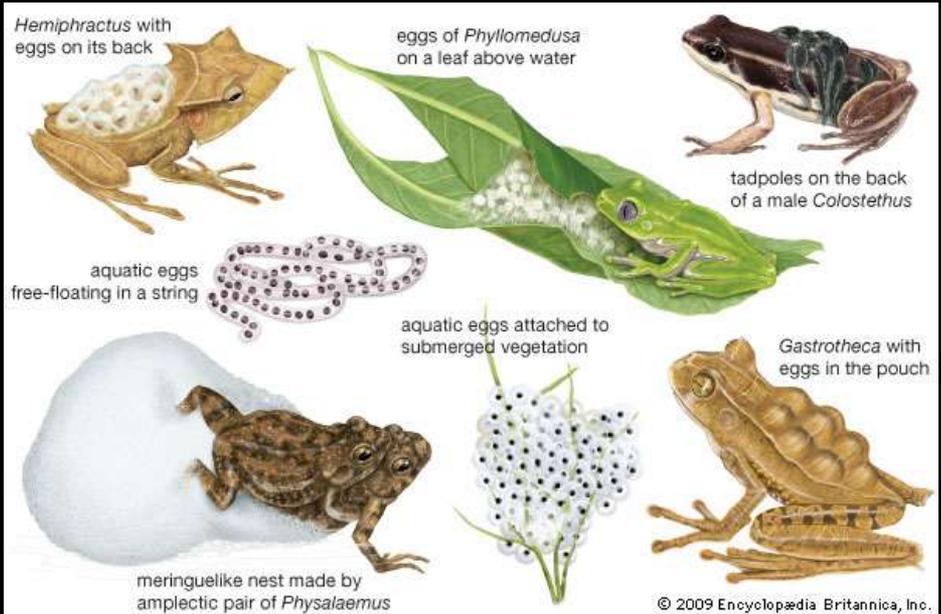
Gymnophiona or Apoda (Caecilians)

183 species; pan-tropical





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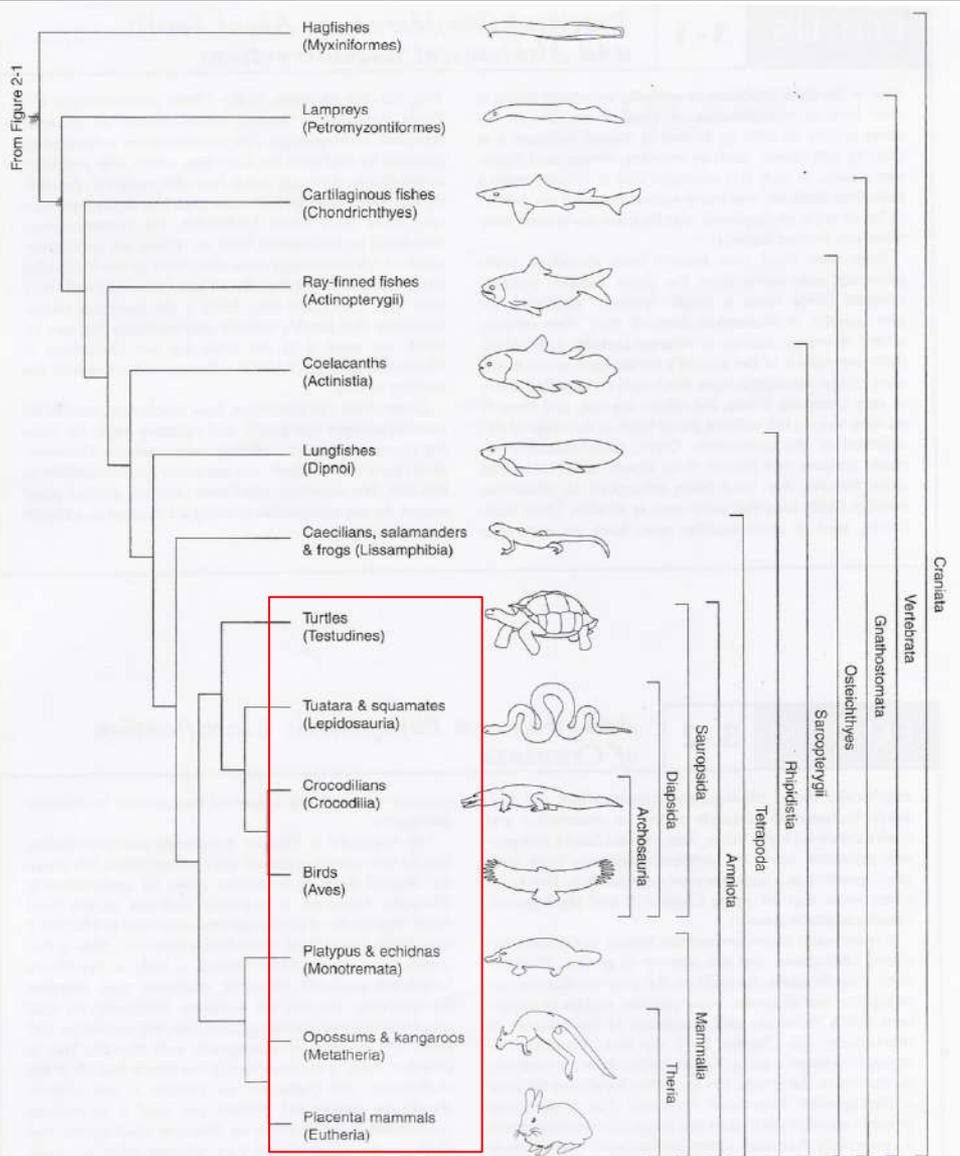
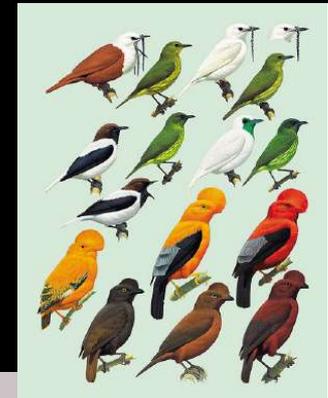


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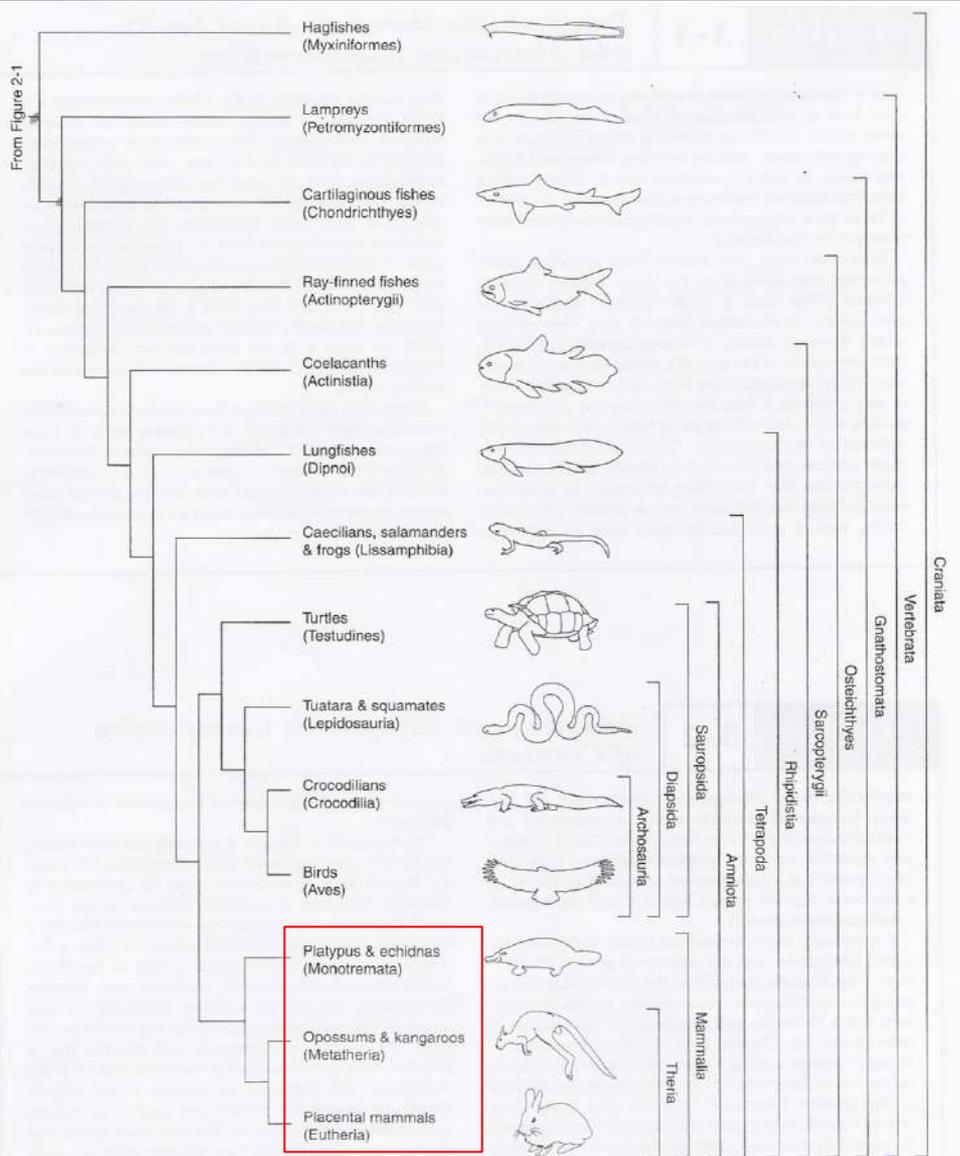
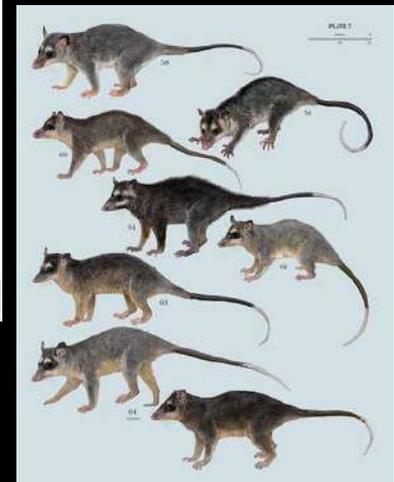
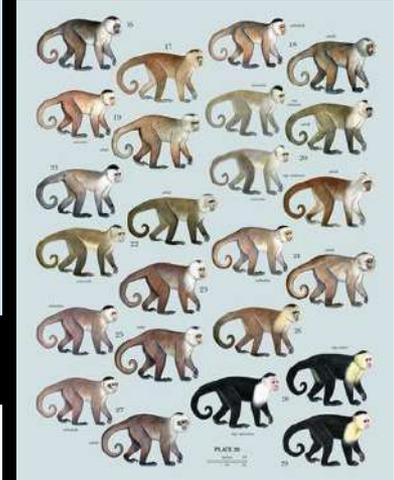
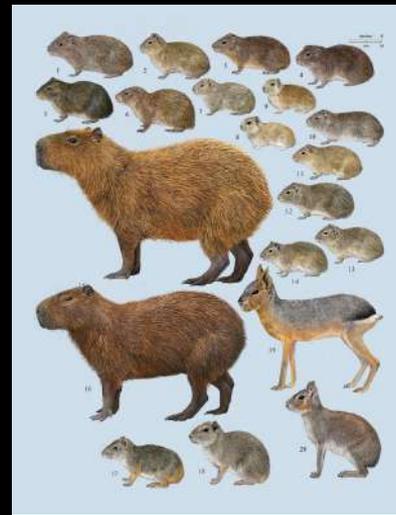


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Mamíferos Mammalia

Monotremata

5 espécies



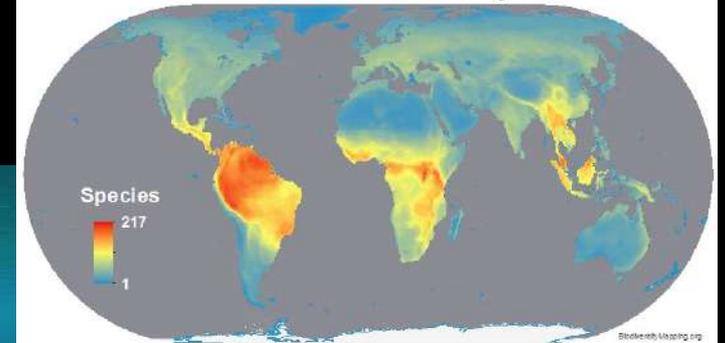
Metatheria (marsupiais)

339 espécies



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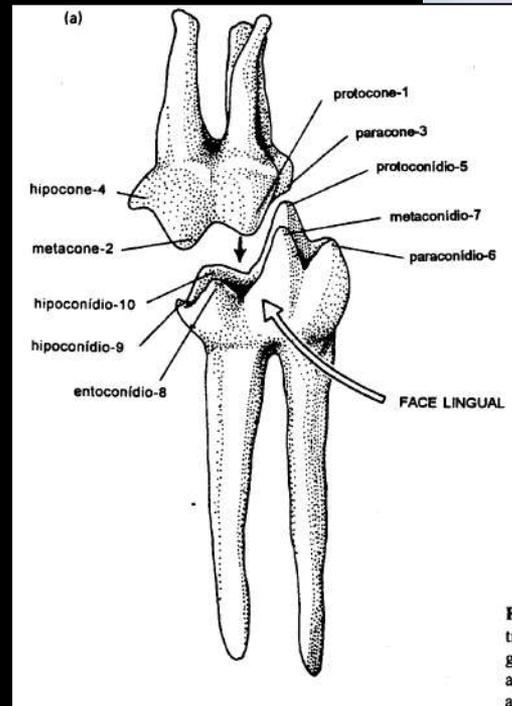
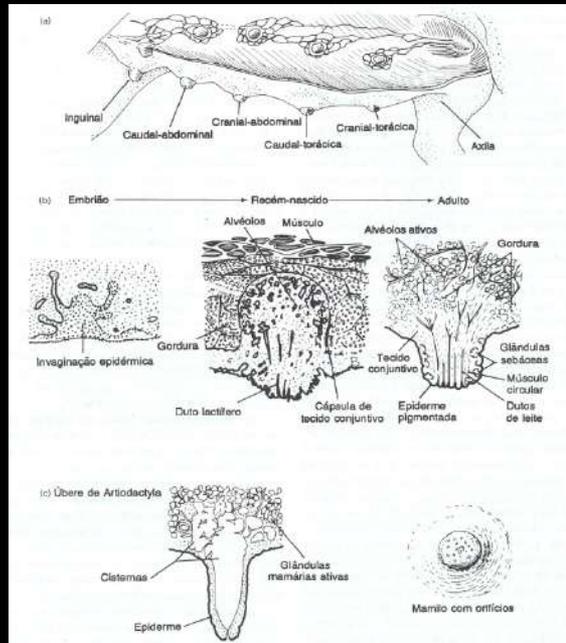
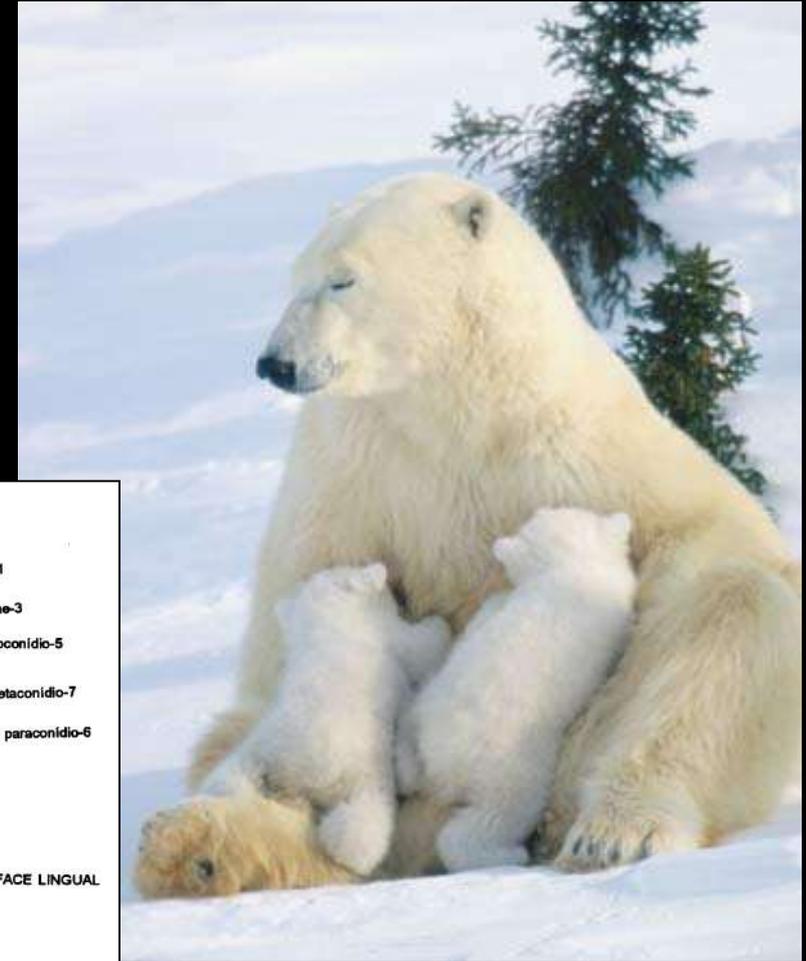
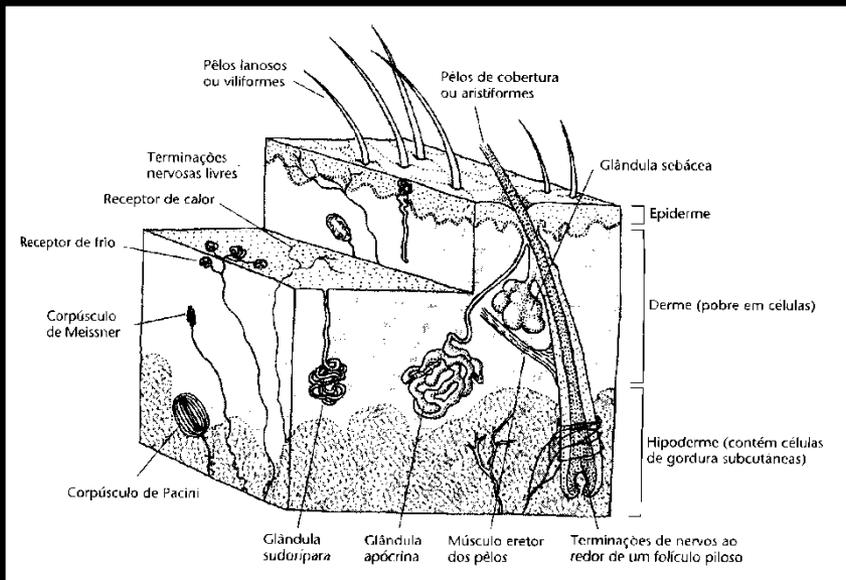
Mammal Diversity

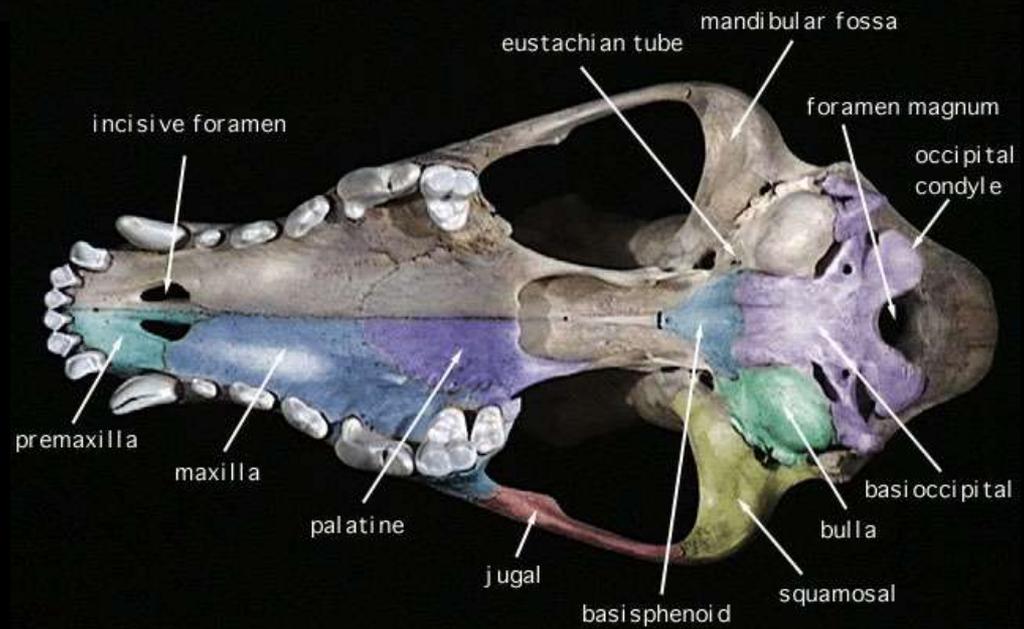
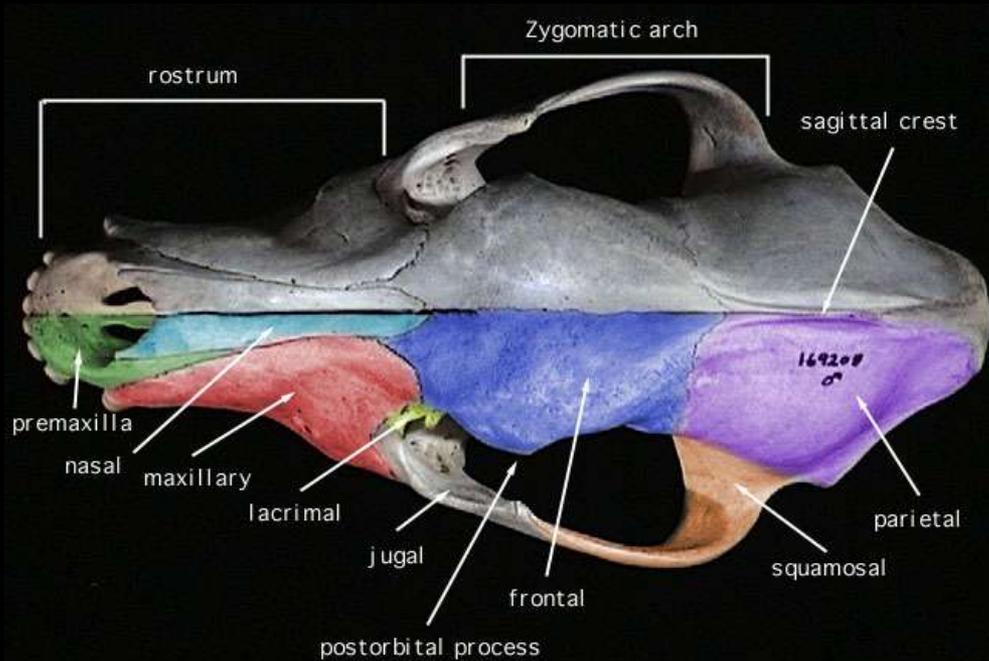


Eutheria (placentários)

5072 espécies







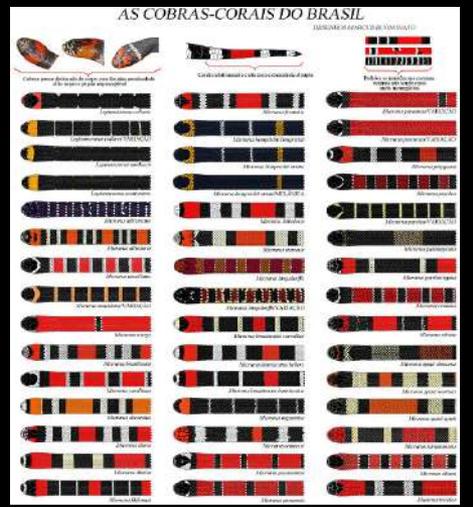
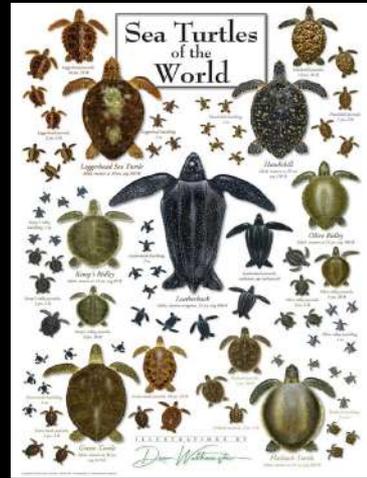
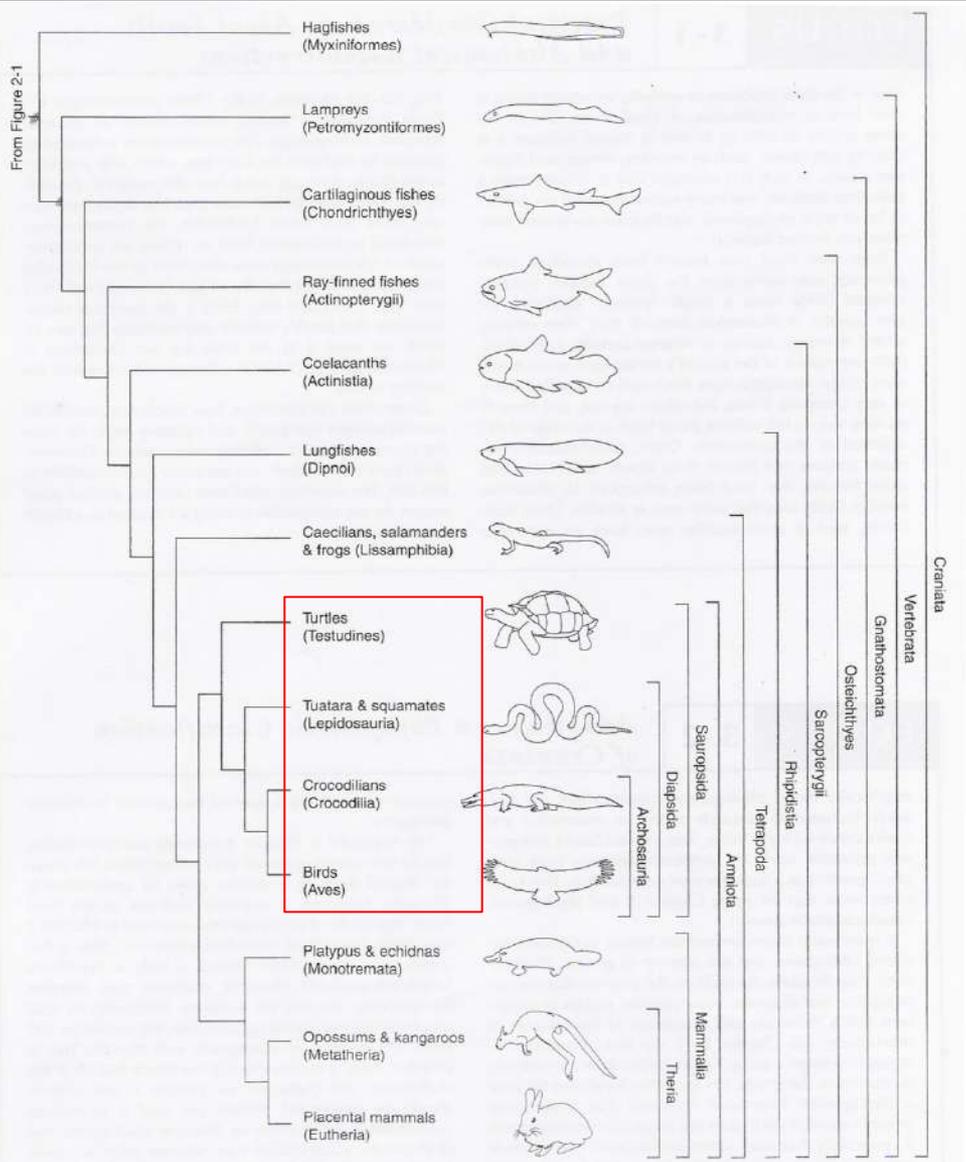


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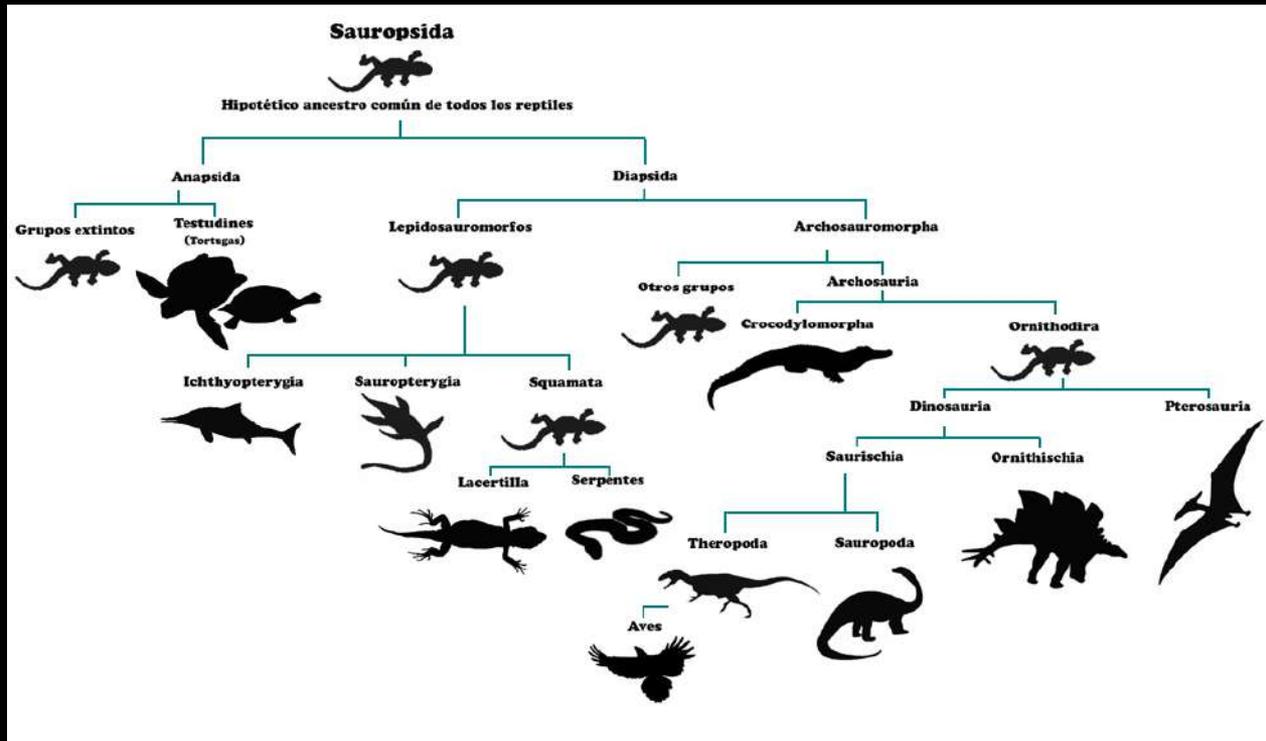
Sauropsida

Chelonia, Testudines: Tartarugas

Lepidosauria: Sphenodontia: tuatara; Squamata: lagartos, serpentes, cobras de duas cabeças

Archosauria: Crocodylia: crocodilos, gaviais e jacarés

Archosauria: Aves: aves e pássaros



Chelonia

Tartarugas, jabutis e cágados



Testudines
341 espécies



Lepidosauria

Serpentes

4038 espécies



“Lizards”

7310 espécies

Amphisbaenia

201 espécies

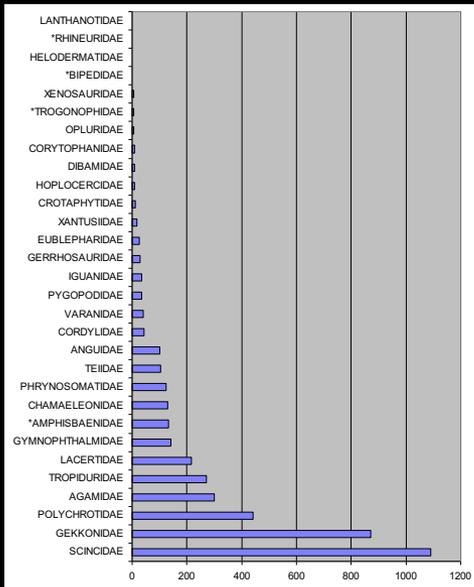


Squamata

Sphenodontia

Rhynchocephalia

1 espécie

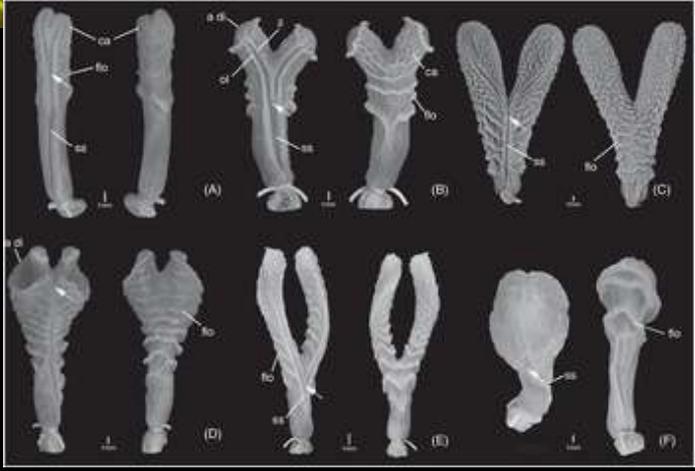
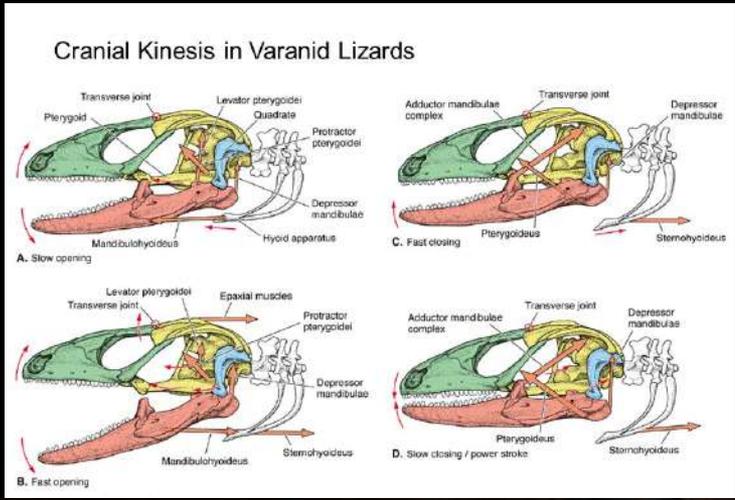
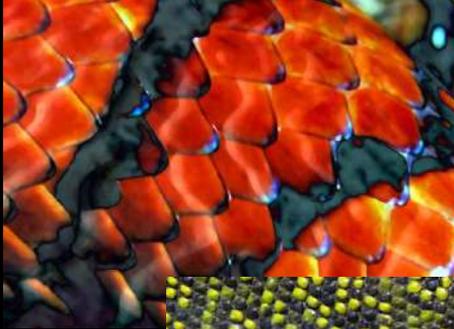
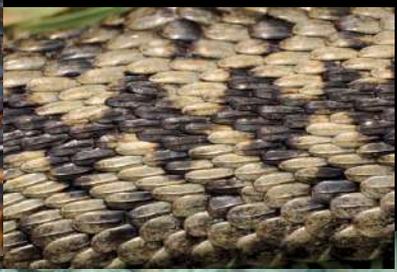


Crocodylia



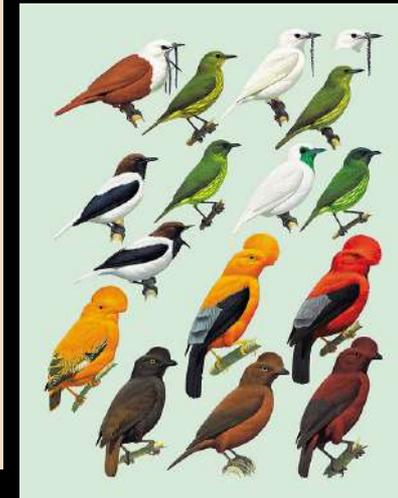
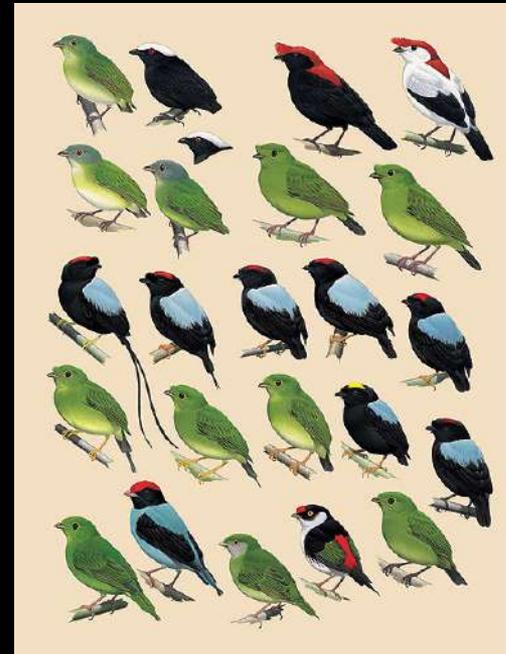
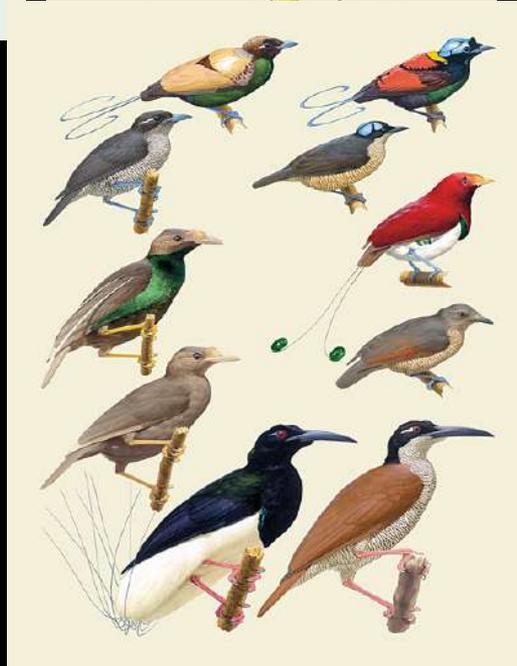
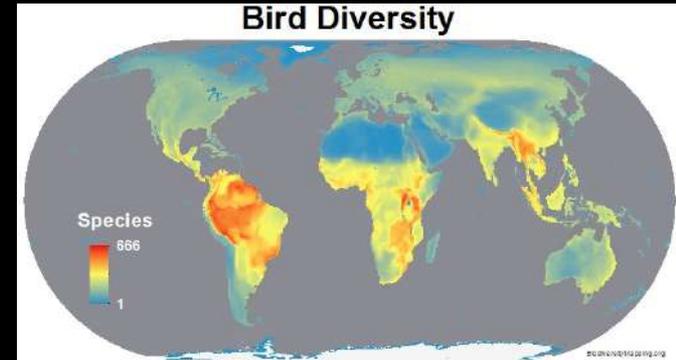
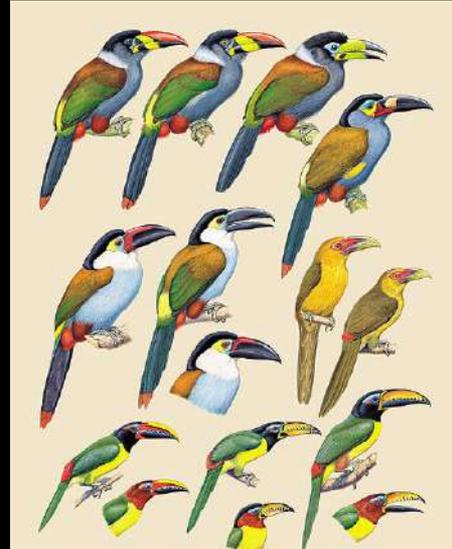
Crocodylia
25 espèces

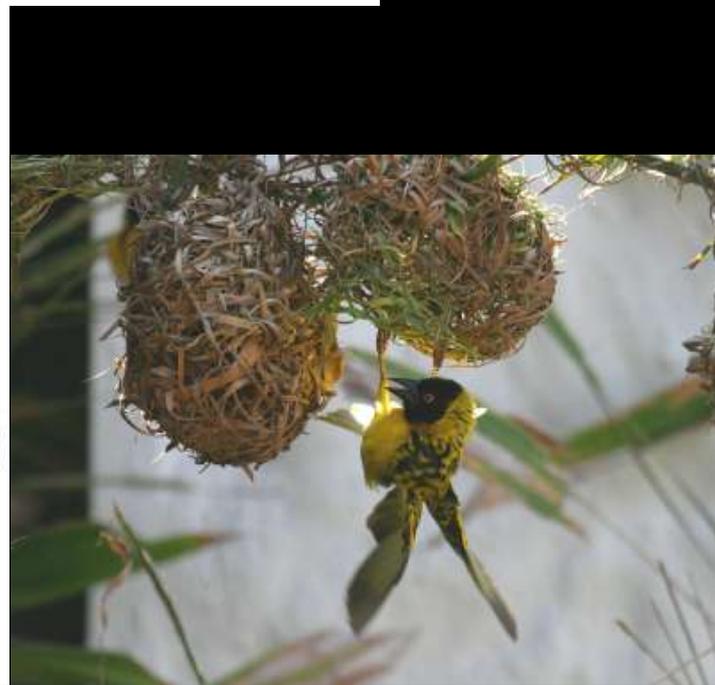
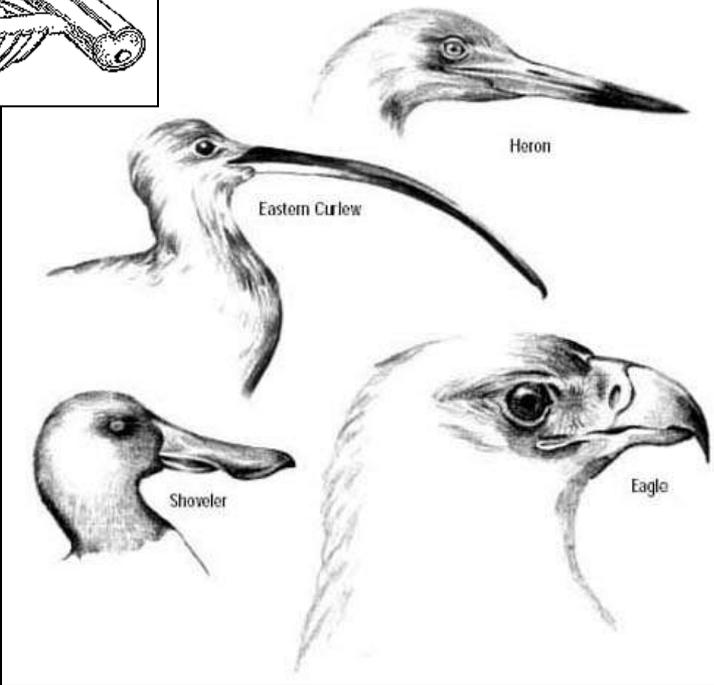
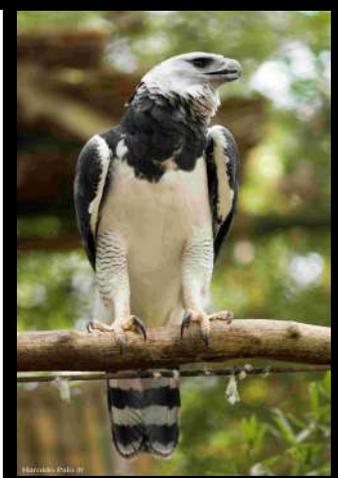
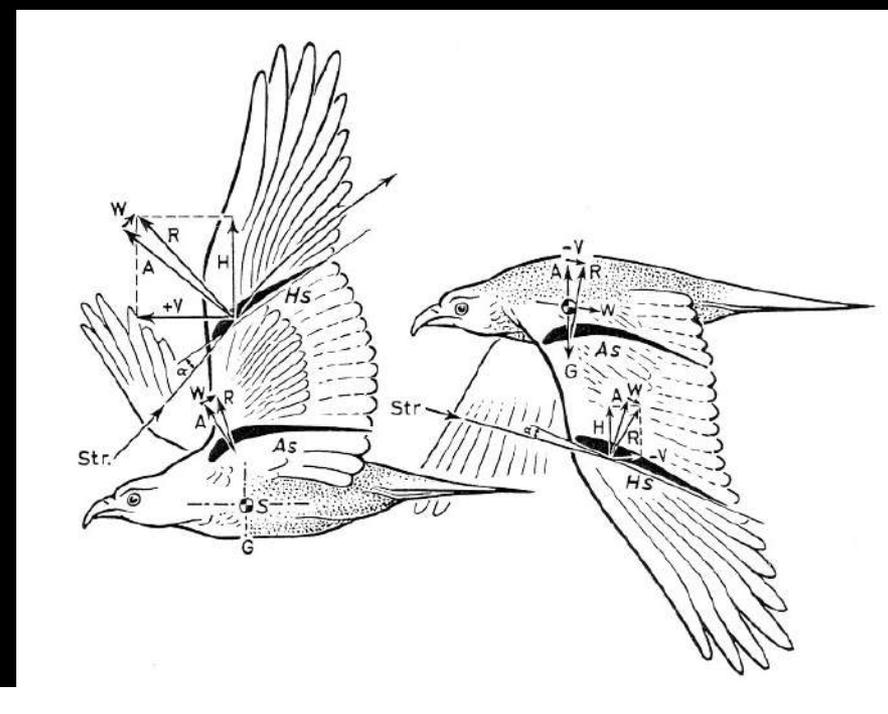
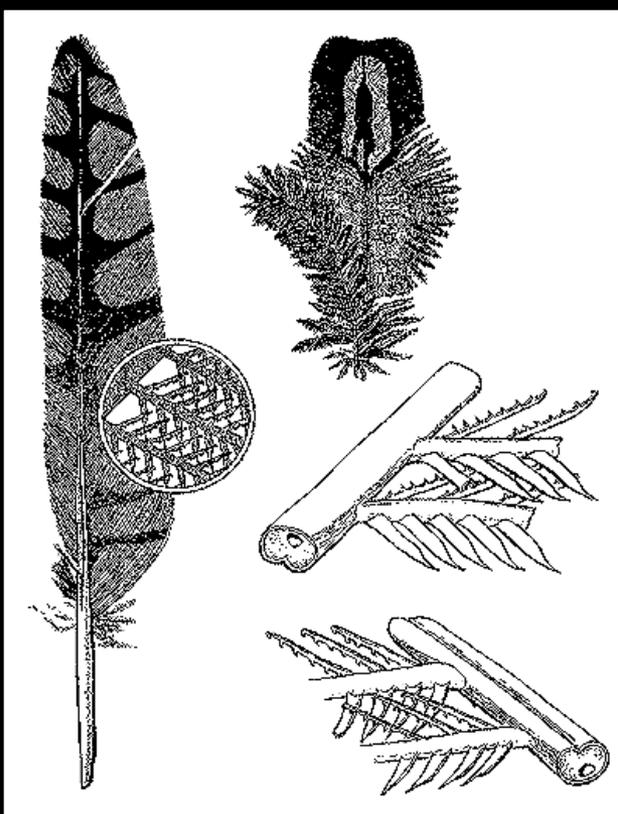




9693 - 10610 espécies
19676 - 20988 subespécies

Aves





Total number of species (estimated): 7–100 millions (identified and unidentified), including:

5–10 million bacteria;

74,000–120,000 fungi;

Of the *identified* eukaryote species we have:

1.6 million, including:

297,326 plants, including:

15,000 mosses,

13,025 Ferns and horsetails,

980 gymnosperms,

258,650 angiosperms,

199,350 dicotyledons,

59,300 monocotyledons,

9,671 Red and green algae,

28,849 fungi & other non-animals:

10,000 lichens,

16,000 mushrooms,

2,849 brown algae,

1,250,000 animals, including:

1,203,375 invertebrates:

950,000 insects,

81,000 mollusks,

40,000 crustaceans,

2,175 corals,

130,200 others;

59,811 vertebrates:

29,300 fish,

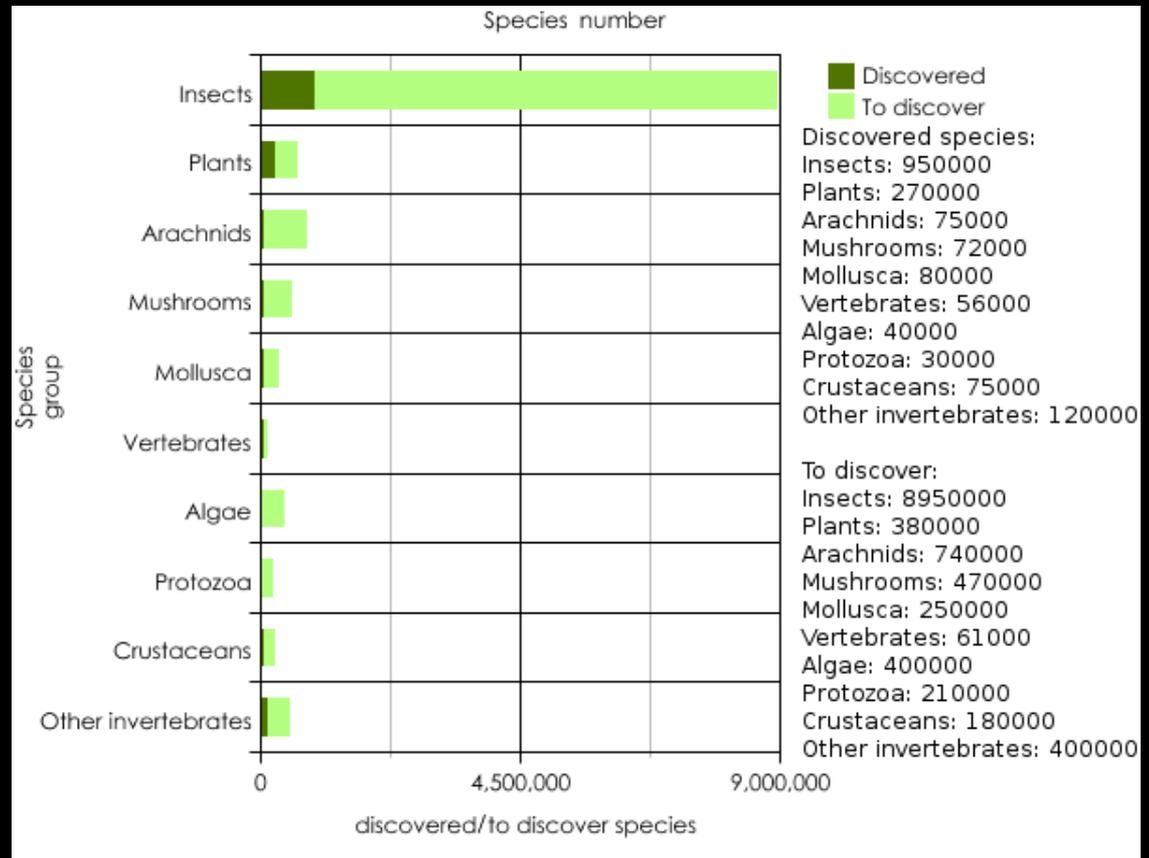
6,199 amphibians,

8,240 reptiles,

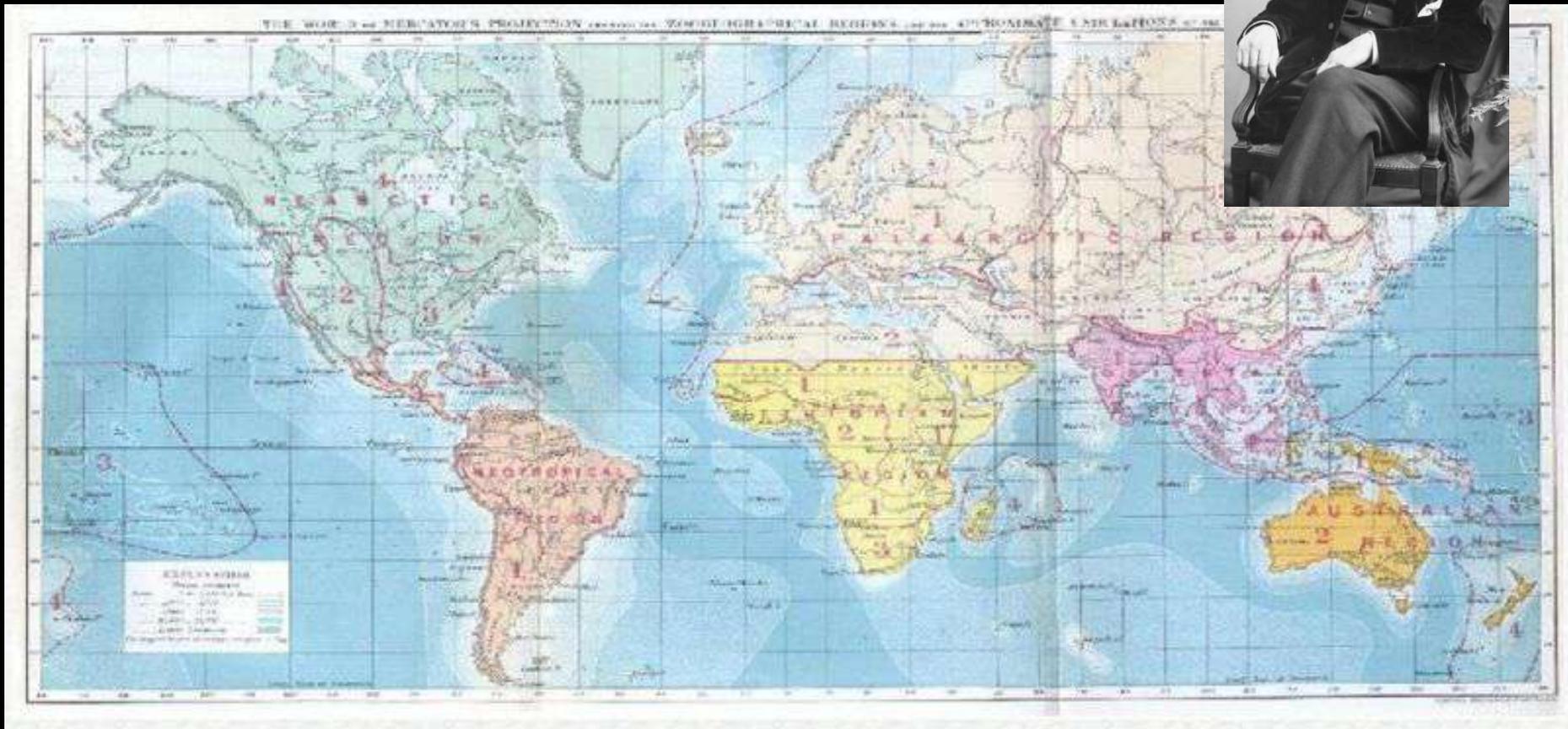
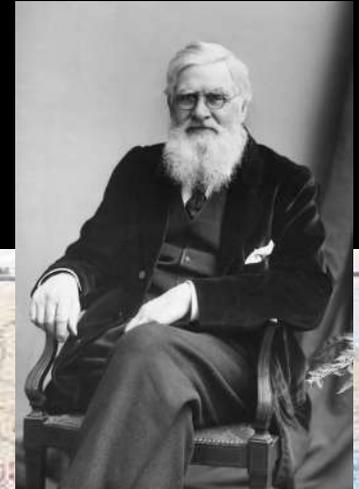
9,956 birds,

5,416 mammals.

Quantas espécies existem?

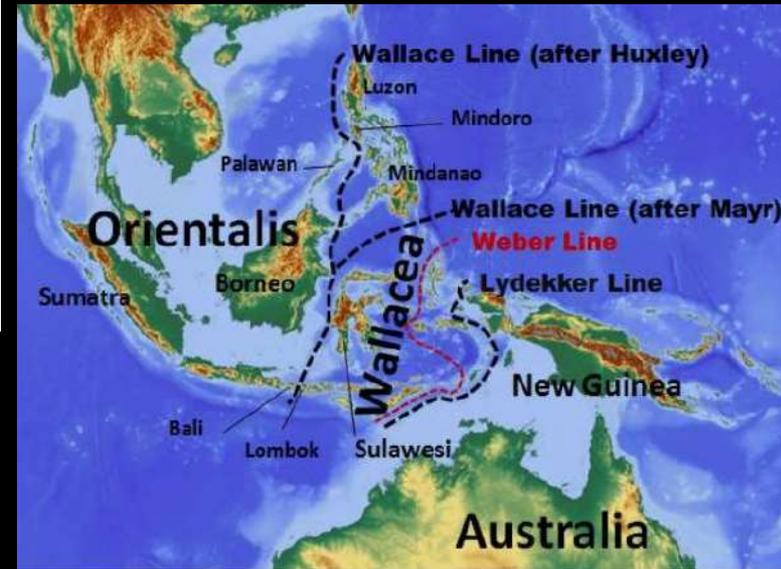
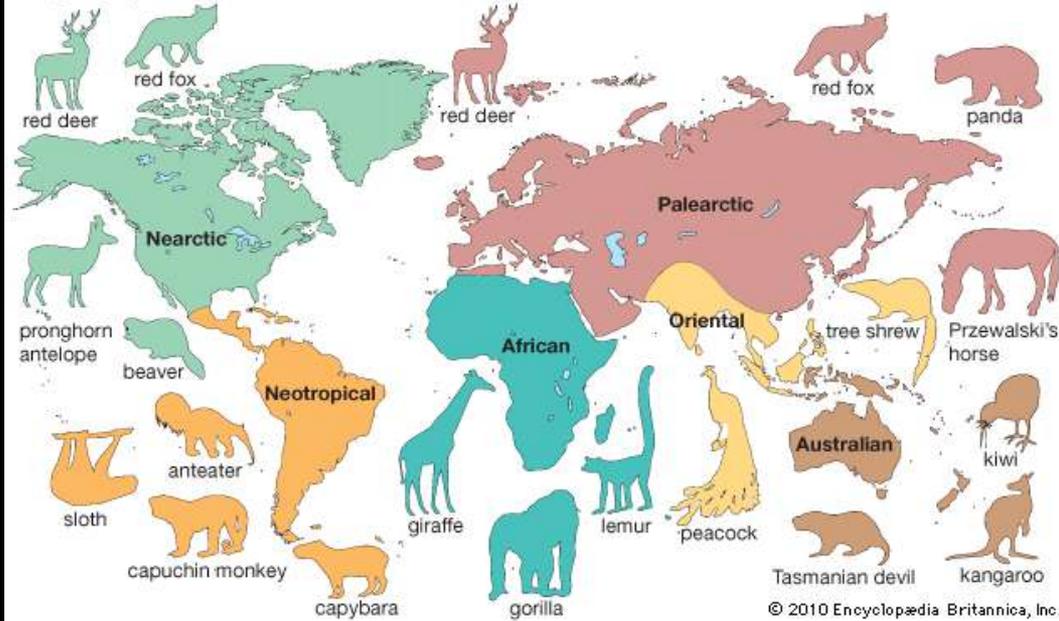


Distribuição da Biodiversidade



Distribuição da Biodiversidade

Zoogeographic regions and some characteristic animals



Distribuição da Biodiversidade

Hotspots is a biogeographic region with significant levels of biodiversity that is under threat from humans.

Key concepts: irreplaceability and threat (Myers et al., 2000)

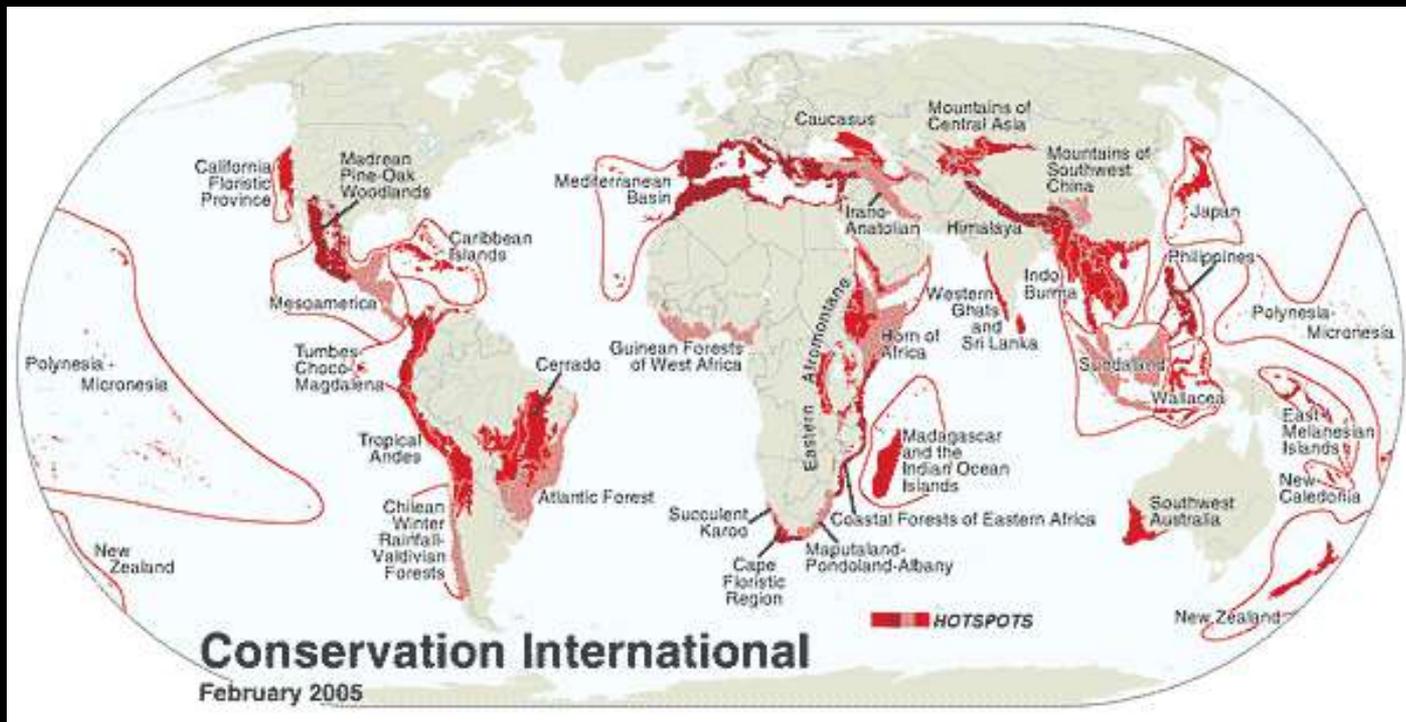


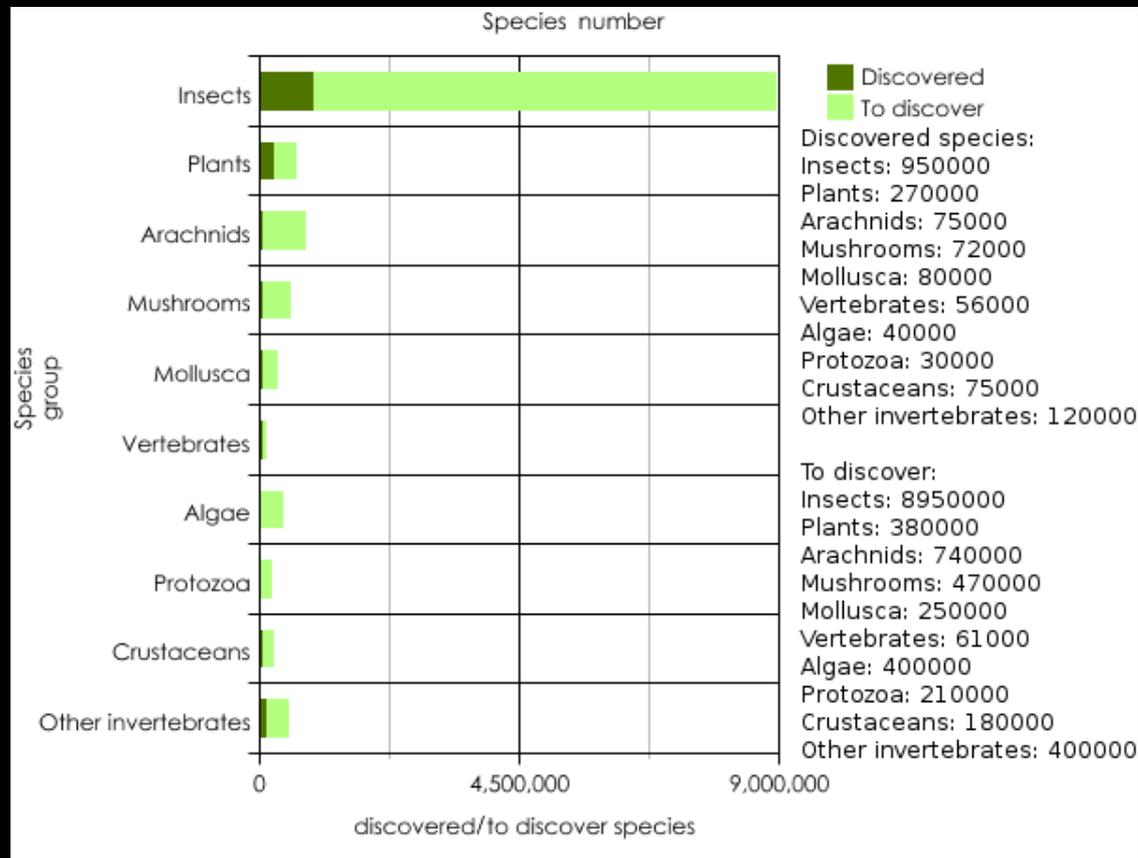
Table 19.1 Characteristics of 25 of the highest ranked biodiversity hotspots.

Hotspot	Original extent of vegetation (km ²)	Percent remaining original vegetation	No. of plant species	No. of endemic plant species	No. of vertebrate species	No. of endemic vertebrate species
Tropical Andes	1,258,000	25.0	30,000	15,000	3389	1567
Mesoamerica	1,155,000	20.0	17,000	2941	2859	1159
Caribbean	263,500	11.3	13,000	6550	1518	779
Brazil's Atlantic Forest	1,227,600	7.5	20,000	8000	1361	567
Turnbes/Choco/Western Ecuador	260,600	24.2	11,000	2750	1625	418
Brazil's Cerrado	1,783,200	20.0	22,000	10,000	1268	117
Chile/Valdivian Forest	300,000	30.0	3892	1957	335	61
California	324,000	24.7	3488	2124	584	71
Madagascar	594,150	9.9	13,000	11,600	987	771
Eastern Afromontane and Coastal Forests of East Africa	30,000	6.7	11,598	4106	1019	121
Guinean West African Forests	1,265,000	10.0	9000	1800	1320	270
Cape Floristic Province	74,000	24.3	9000	6210	562	53
Succulent Karoo	112,000	26.8	6356	2439	472	45
Mediterranean Basin	2,362,000	4.7	22,500	11,700	770	235
Caucasus	500,000	10.0	6400	1600	632	59
Sundaland	1,600,000	7.8	25,000	15,000	1800	701
Wallacea	347,000	15.0	10,000	1500	1142	529
Philippines	300,800	3.0	9253	6091	1093	518
Indo-Burma and Himalaya	2,060,000	4.9	23,500	10,160	2185	528
Southwest China	800,000	8.0	12,000	3500	1141	178
Western Ghats/Sri Lanka	182,500	6.8	5916	3049	1073	355
SW Australia	309,850	10.8	5571	2948	456	100
New Caledonia	18,600	28.0	3270	2432	190	84
New Zealand	270,500	22.0	2300	1865	217	136
Polynesia/Micronesia	46,000	21.8	5330	3074	342	223

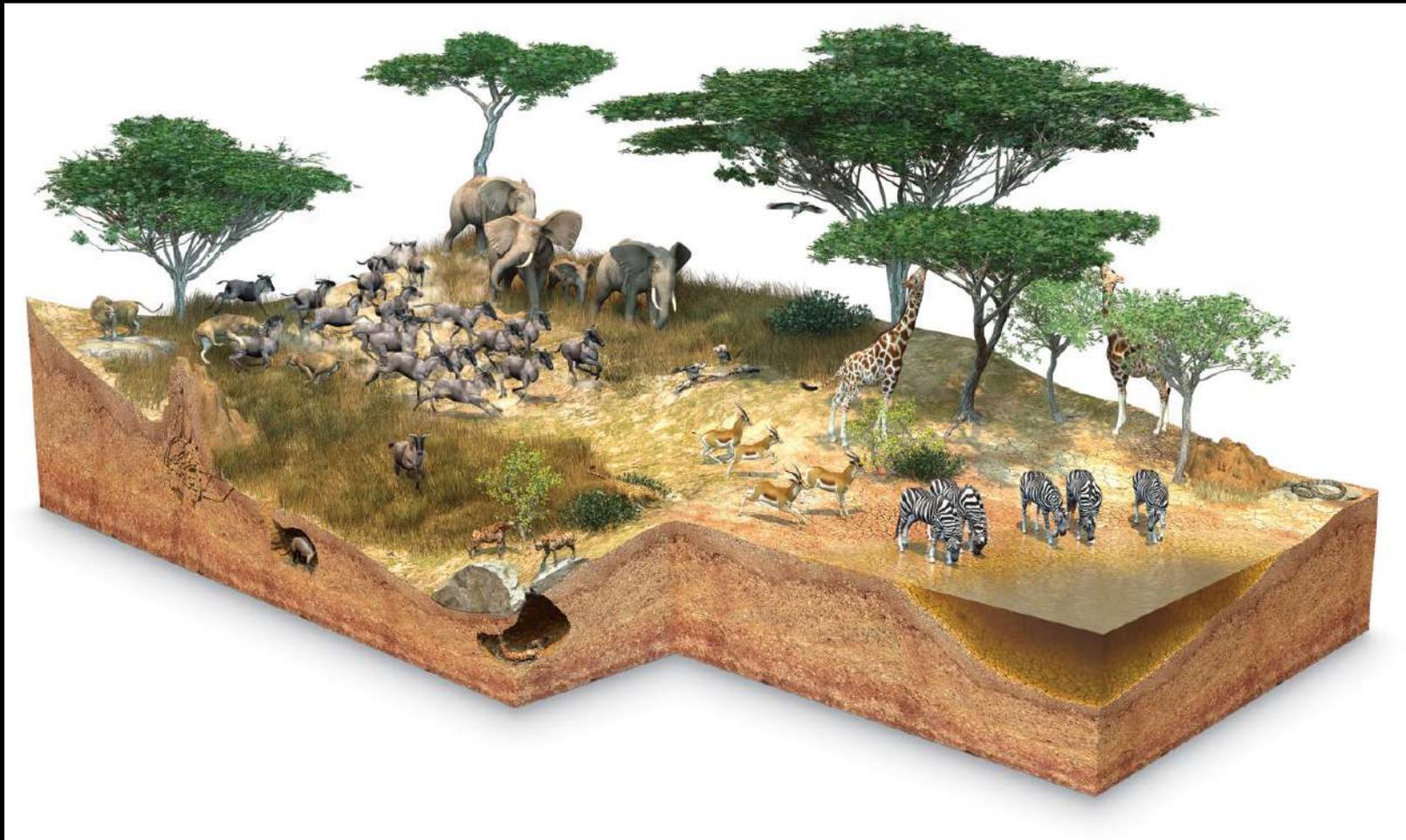
NOTE: There are approximately 300,000 described plant species on Earth, and approximately 28,595 described vertebrate species (excluding fish). Fishes are not included in the vertebrate tally. The eight hottest hotspots are shown in boldface type. Figure 19.10 shows a map of these regions.

(From www.biodiversityhotspots.org.)

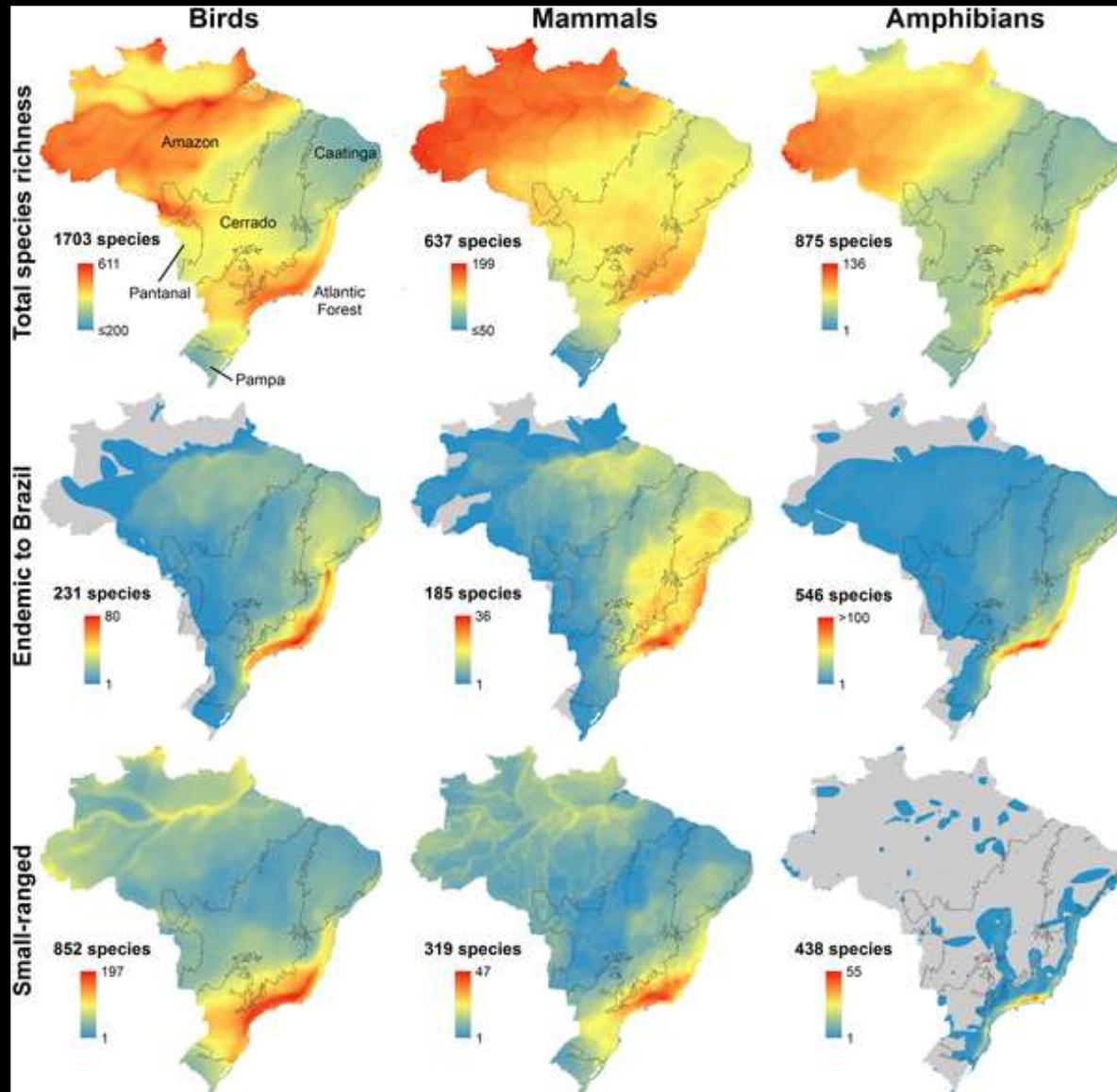
Porque é tão importante saber a diversidade de um grupo que representa apenas 3% dos organismos vivos?



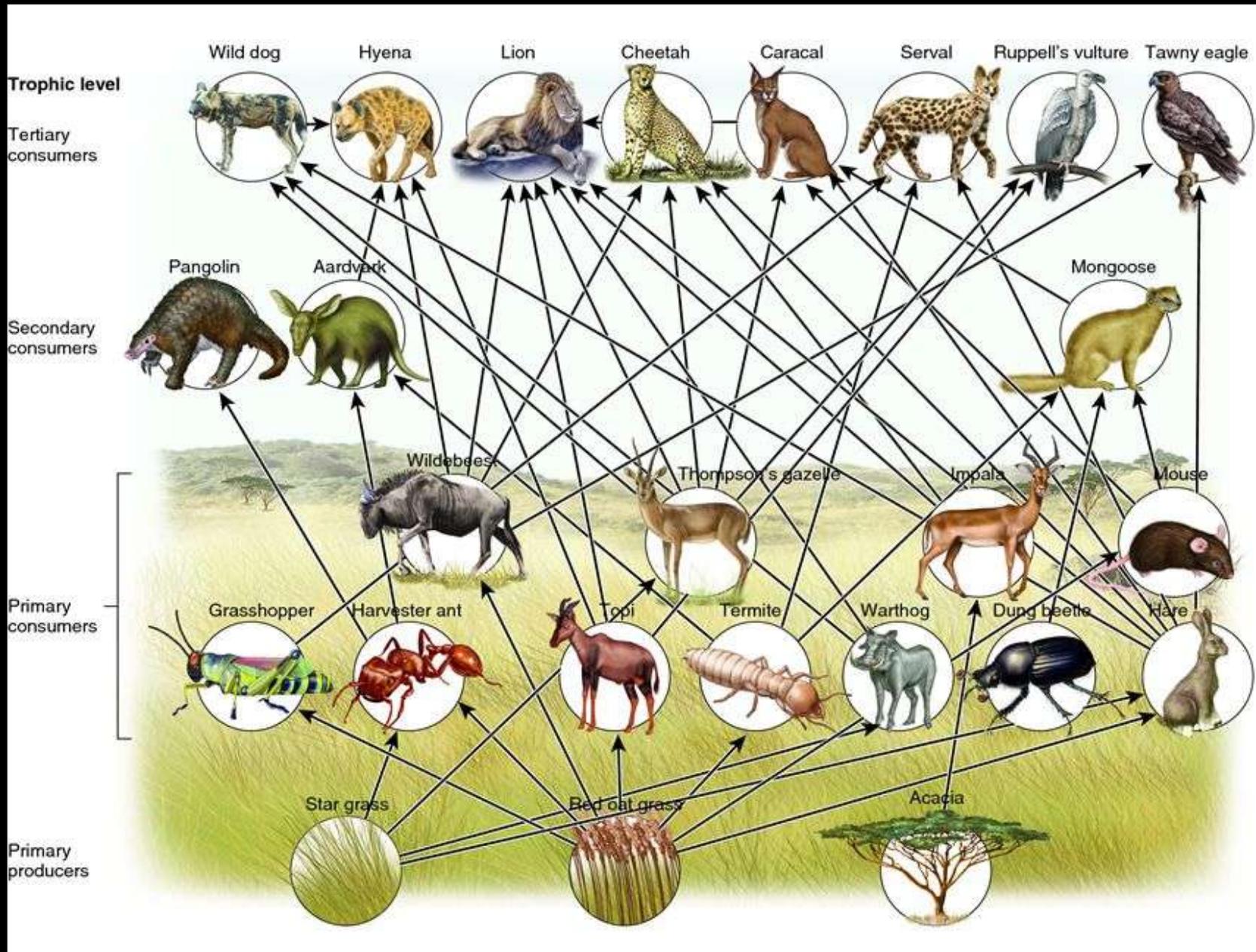
Grupo conspicuo



Diversidade relativamente bem conhecida



Interações ecológicas são melhor conhecidas



Grande associação a biomas e habitats





12 orders
36 families
399 species

Porque é tão importante saber a diversidade de um grupo que representa apenas 3% dos organismos vivos?

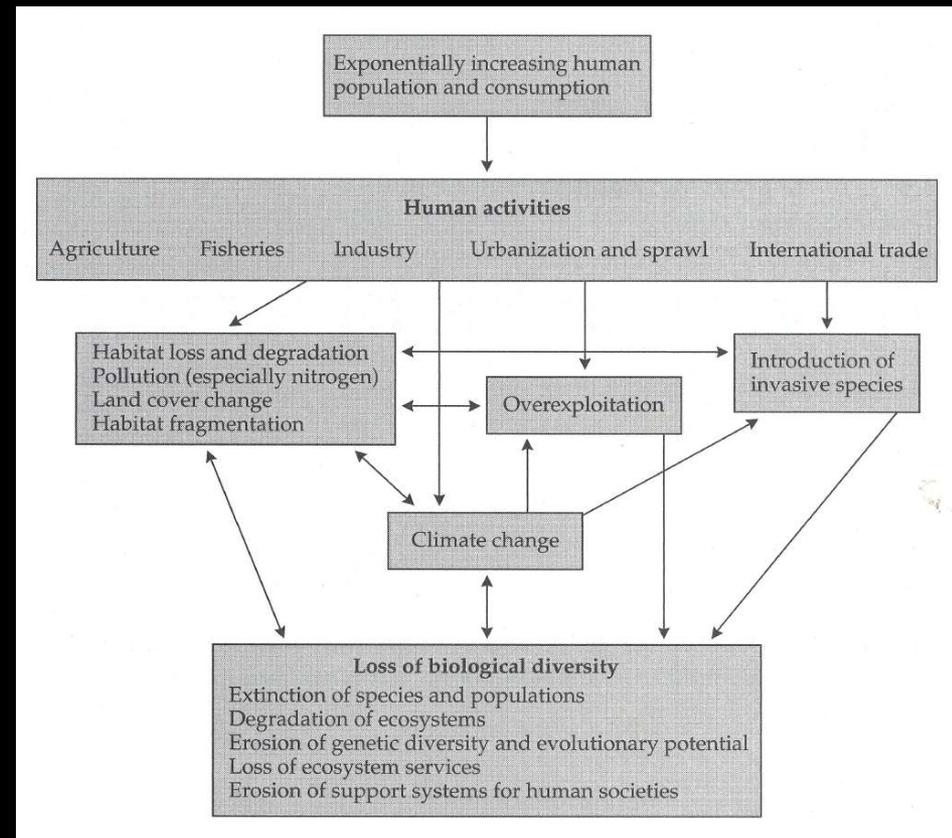
Bons indicadores

Paisagens conservadas

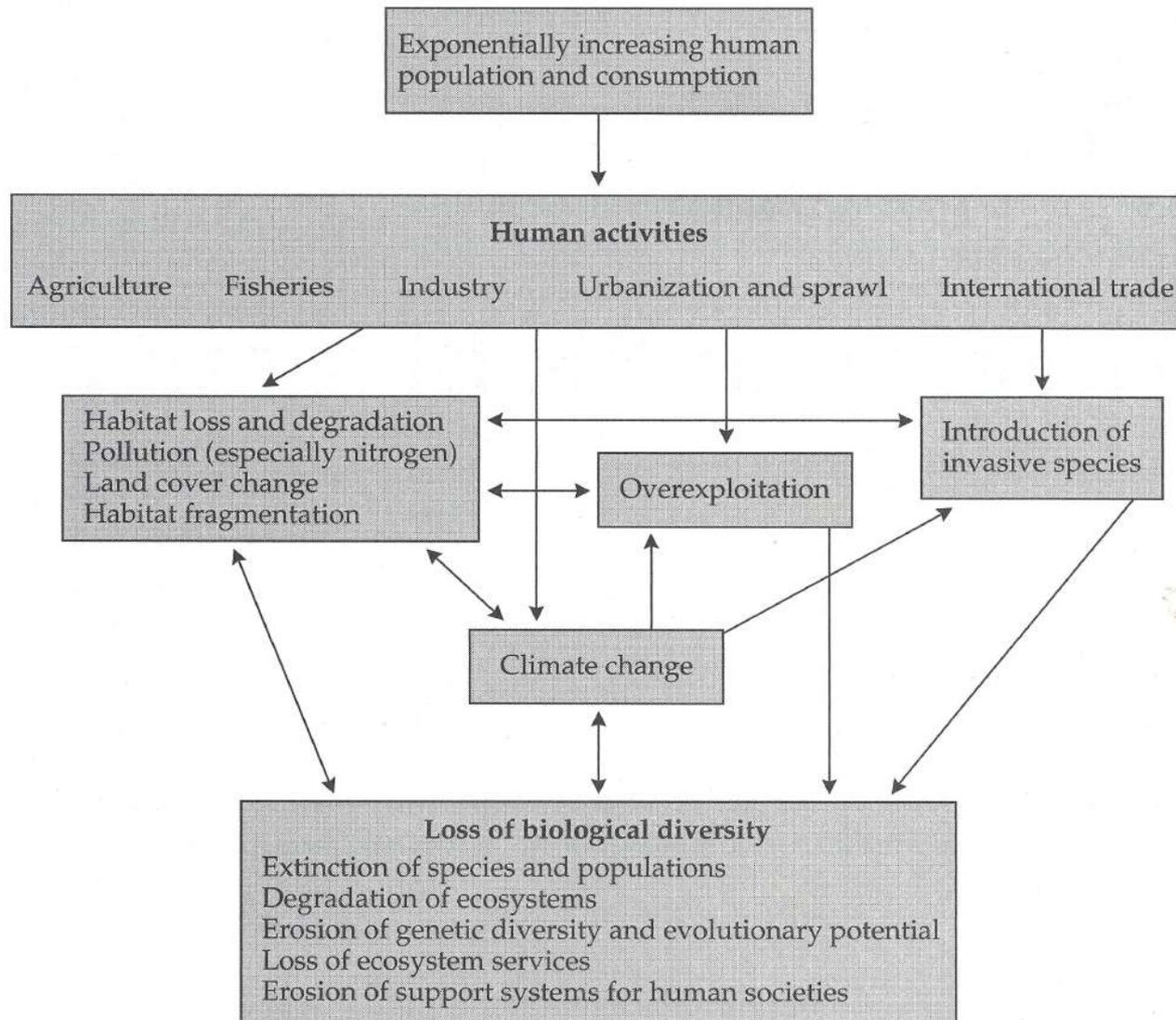
Paisagens antropizadas

Identificar e diagnosticar:

Ameaças à Biodiversidade!



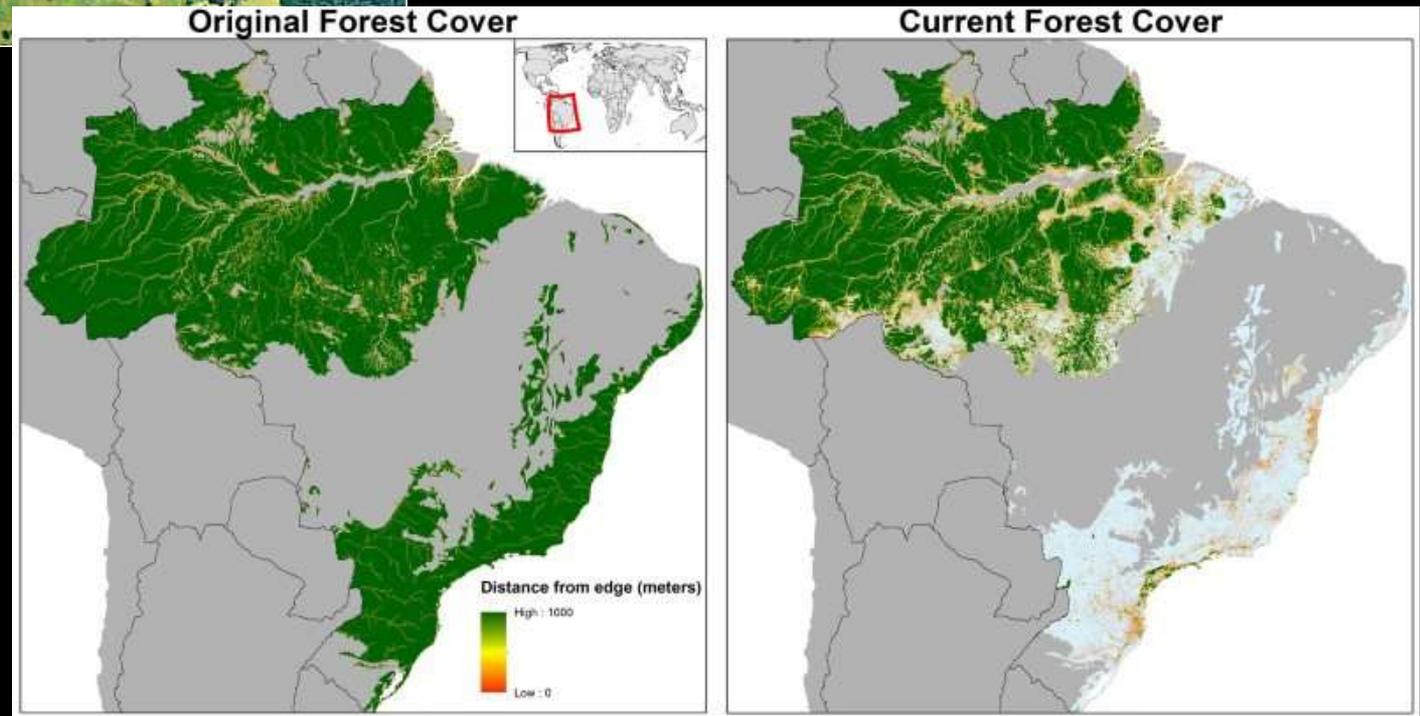
Ameaças à Biodiversidade



Degradação e perda de Hábitat



Degradação e perda de Hábitat



Degradação e perda de Hábitat

Core Habitat, Habitat Edge and Connectivity



Maximum habitat interior (core habitat) and minimum edge



Maximum habitat edge and no interior habitat



Connect core habitat 'nodes' to prevent habitat fragmentation

Images courtesy of Benjamin Penington, 1000 Friends of Florida

Maintain large circular nodes (core areas) of habitat to maximize interior habitat and minimize edge. Habitat edges occur at the border of incompatible land and are generally detrimental to priority wildlife species because edges are more accessible to predators and parasites that reduce the survival of their young. For this reason, wider wildlife travel corridors are better. Wildlife also need to be able to travel through uninterrupted, contiguous habitat.

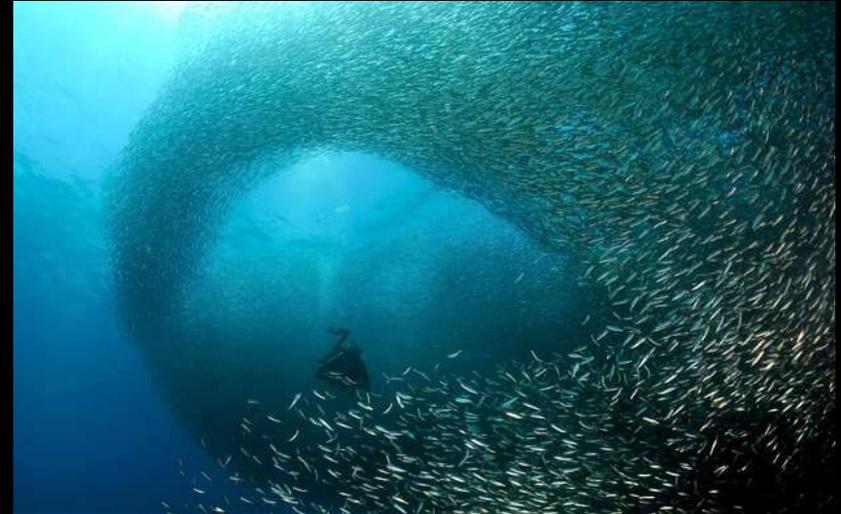
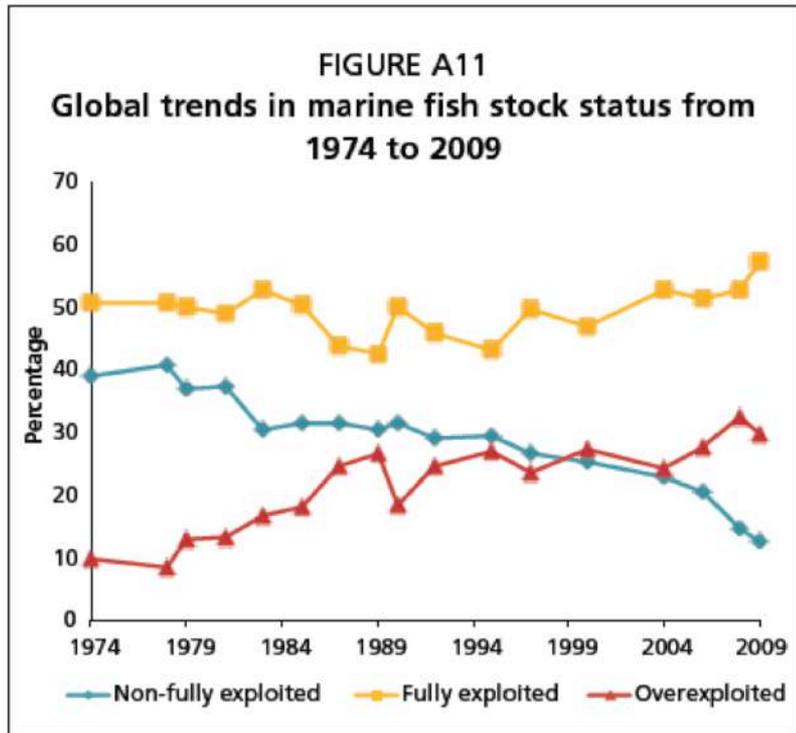


Total area = 1 ha
Total edge = 400 m



Total area = 1 ha
Total edge = 1,600 m

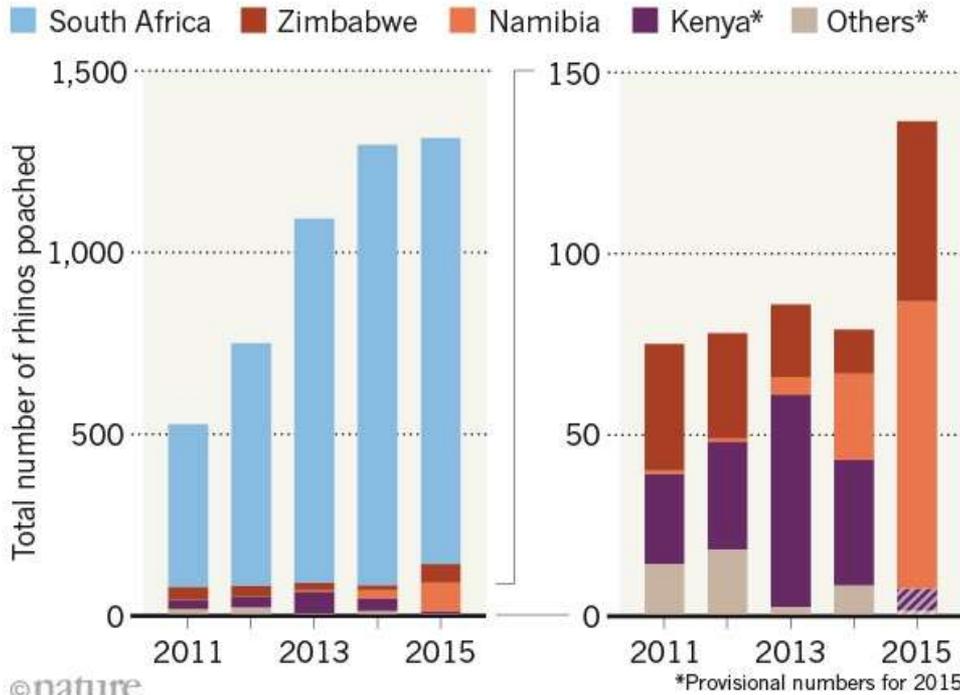
Sobre Exploração



Sobre Exploração

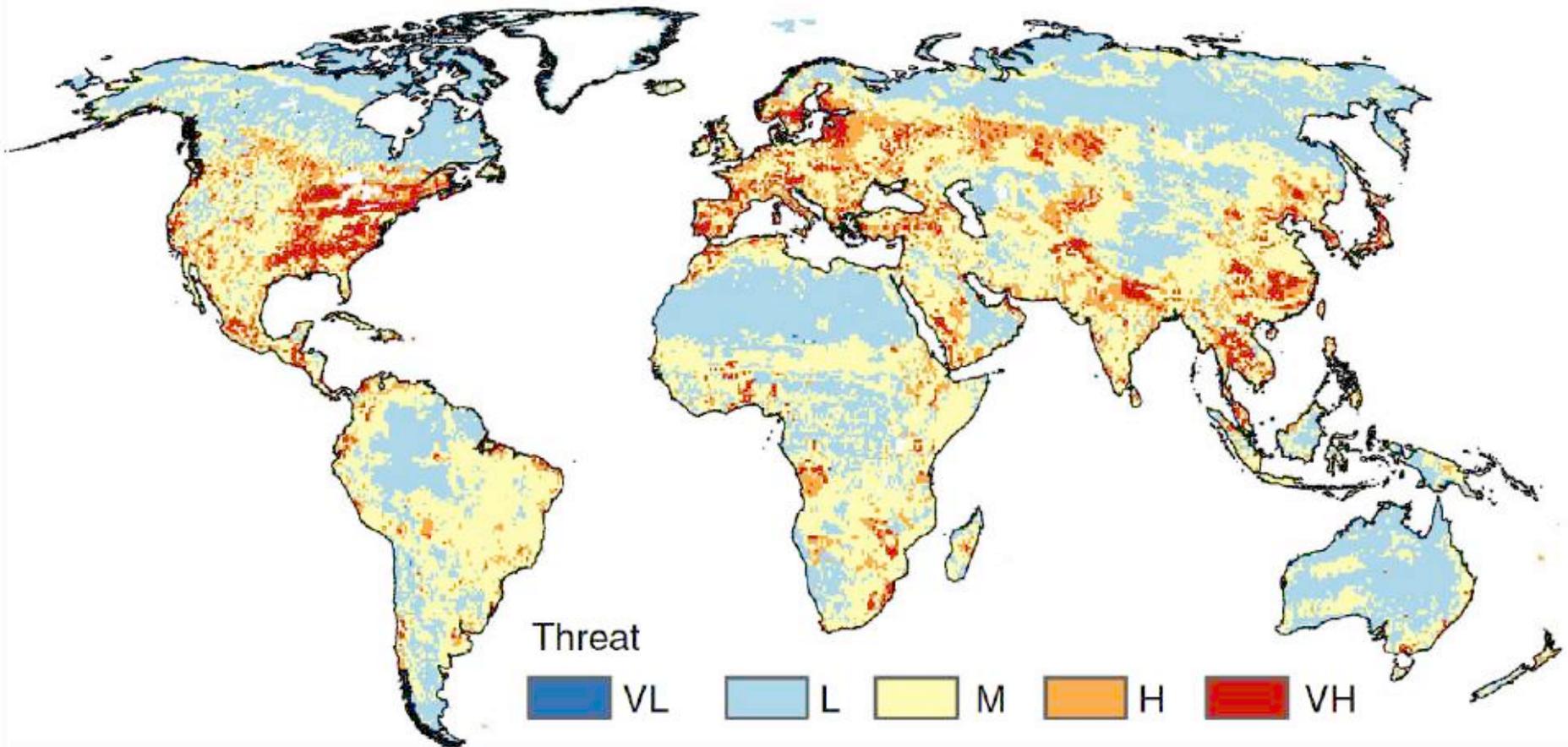
AFRICAN RHINO POACHING ON THE RISE

2015 is the worst year in decades for rhino poaching — although South Africa reported a small decrease.



Espécies Invasoras

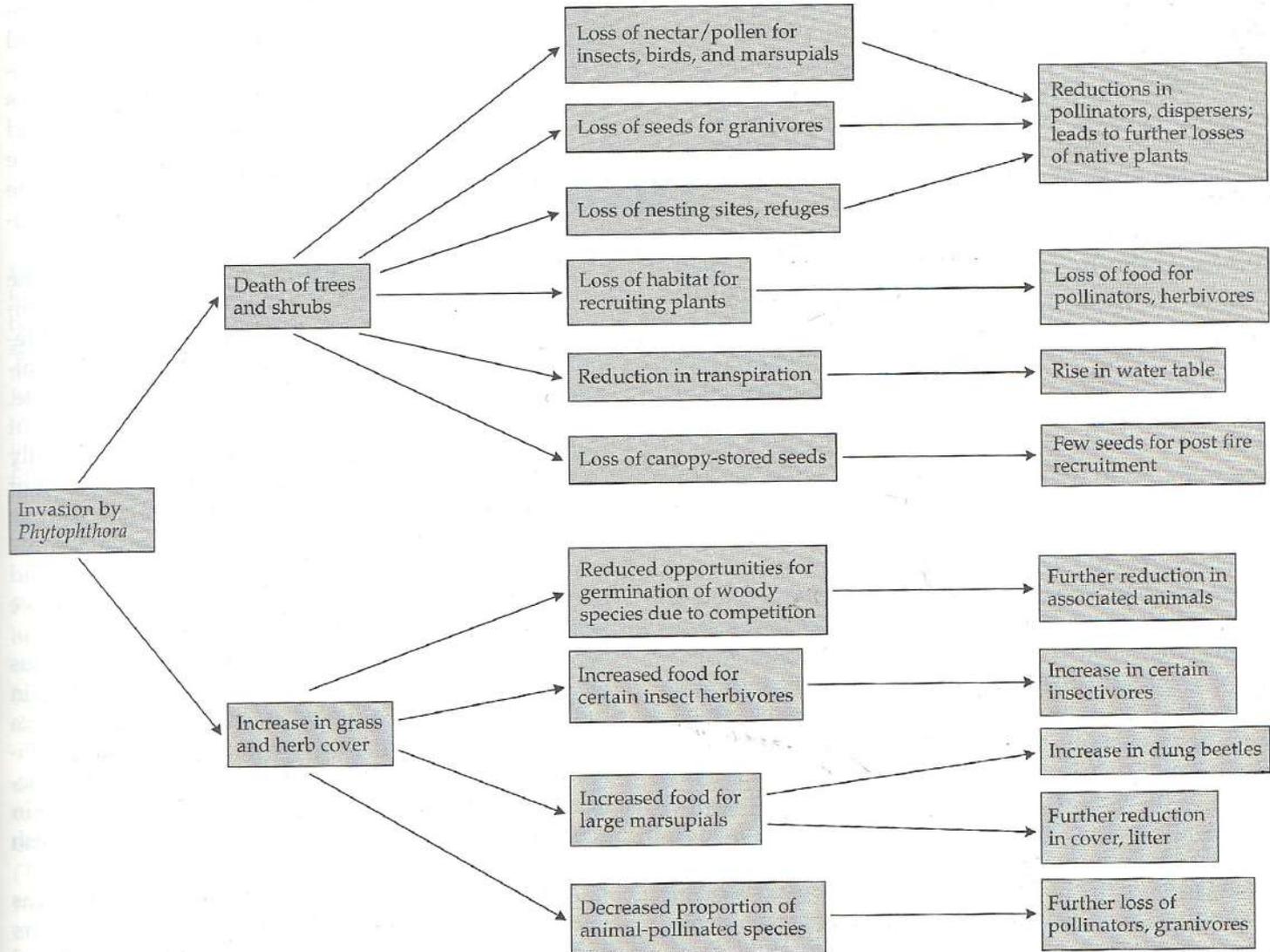
Threat from invasive species



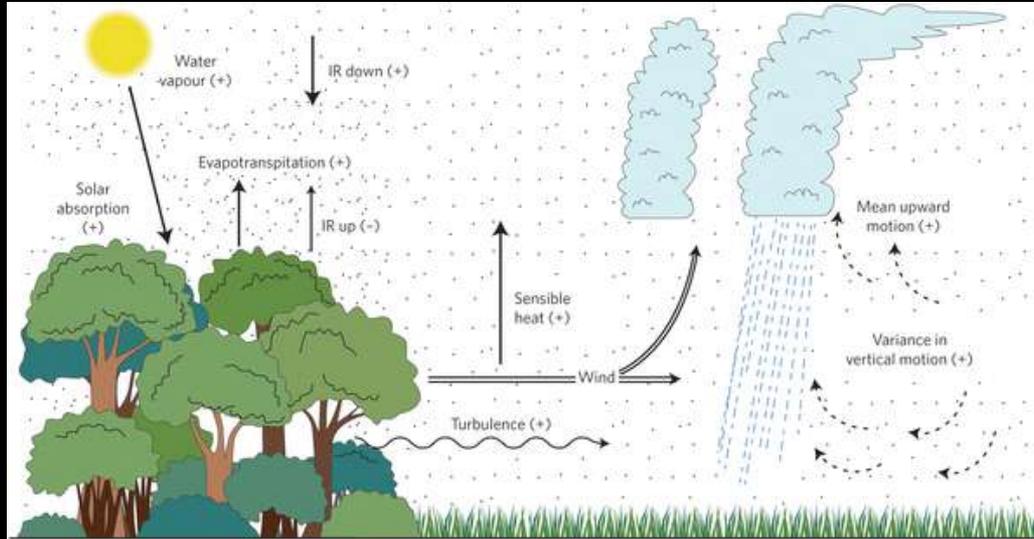
Espécies Invasoras



Espécies Invasoras

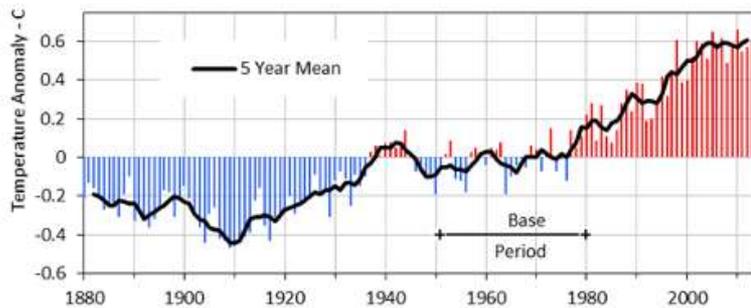


Mudanças Climáticas

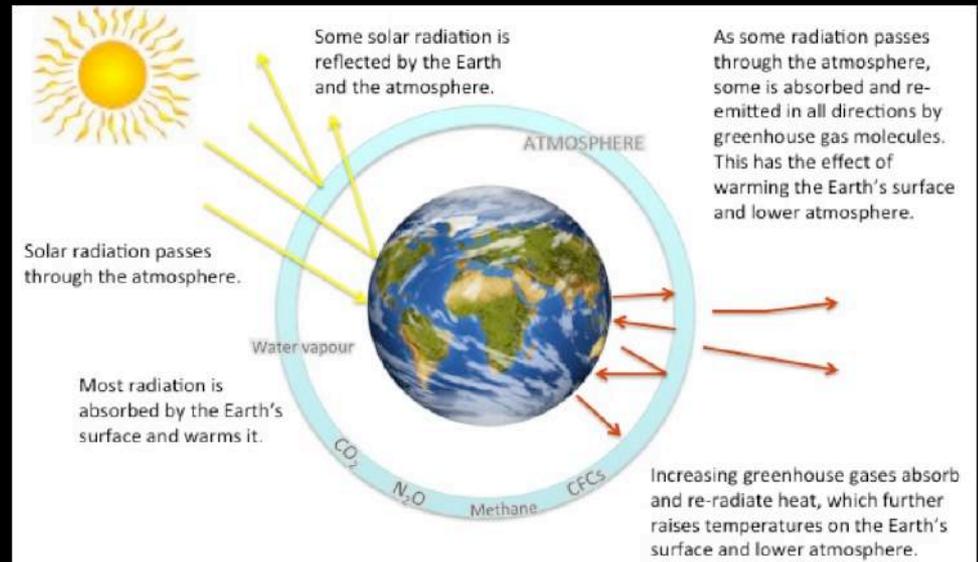


Global Temperature, 1880 - 2014

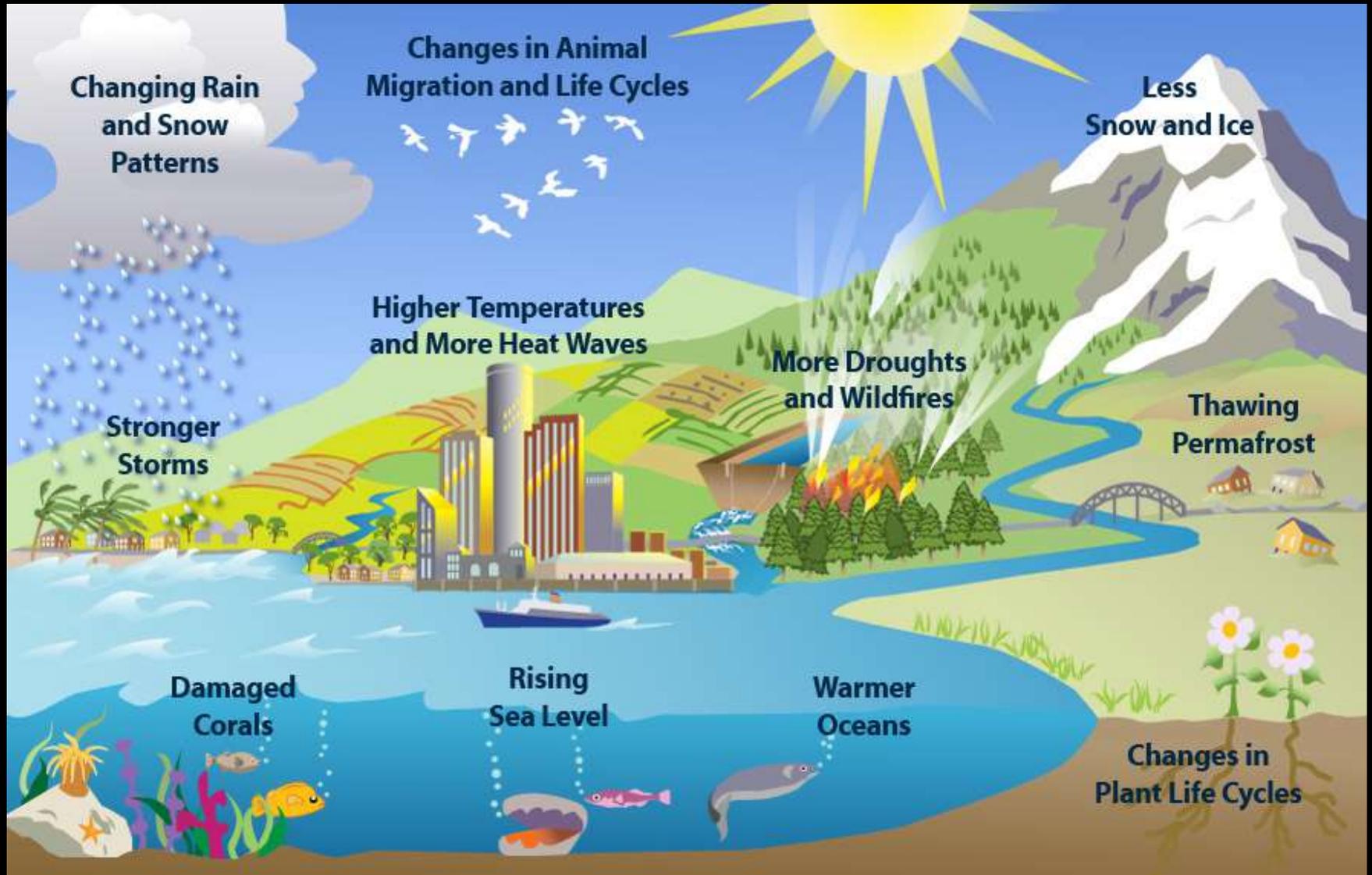
Land - Ocean Index: 1951-1980 Base



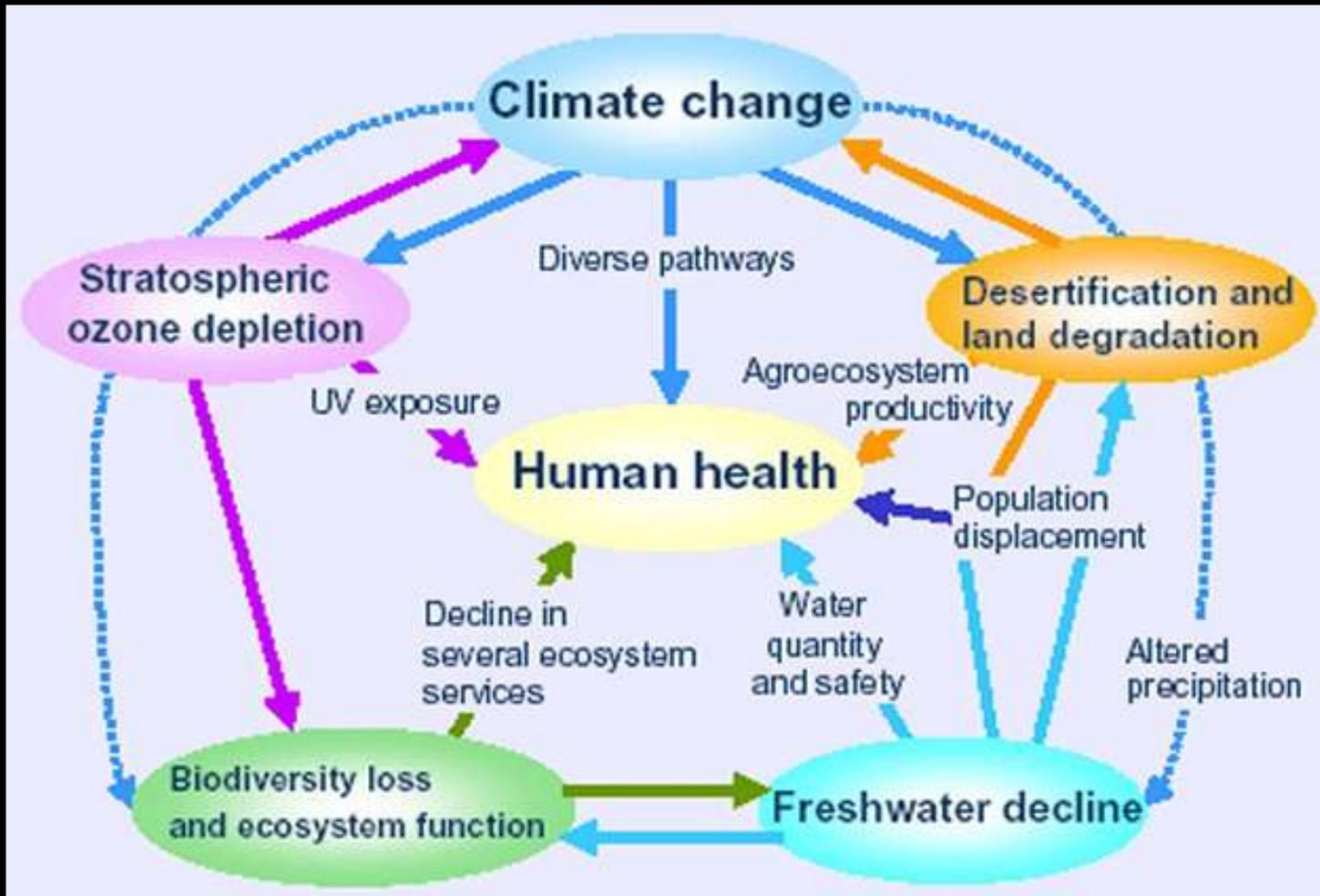
Source: Goddard Institute for Space Studies (GISS) and Climate Research Unit (CRU), prepared by ProcessTrends.com, updated by globalissues.org



Mudanças Climáticas

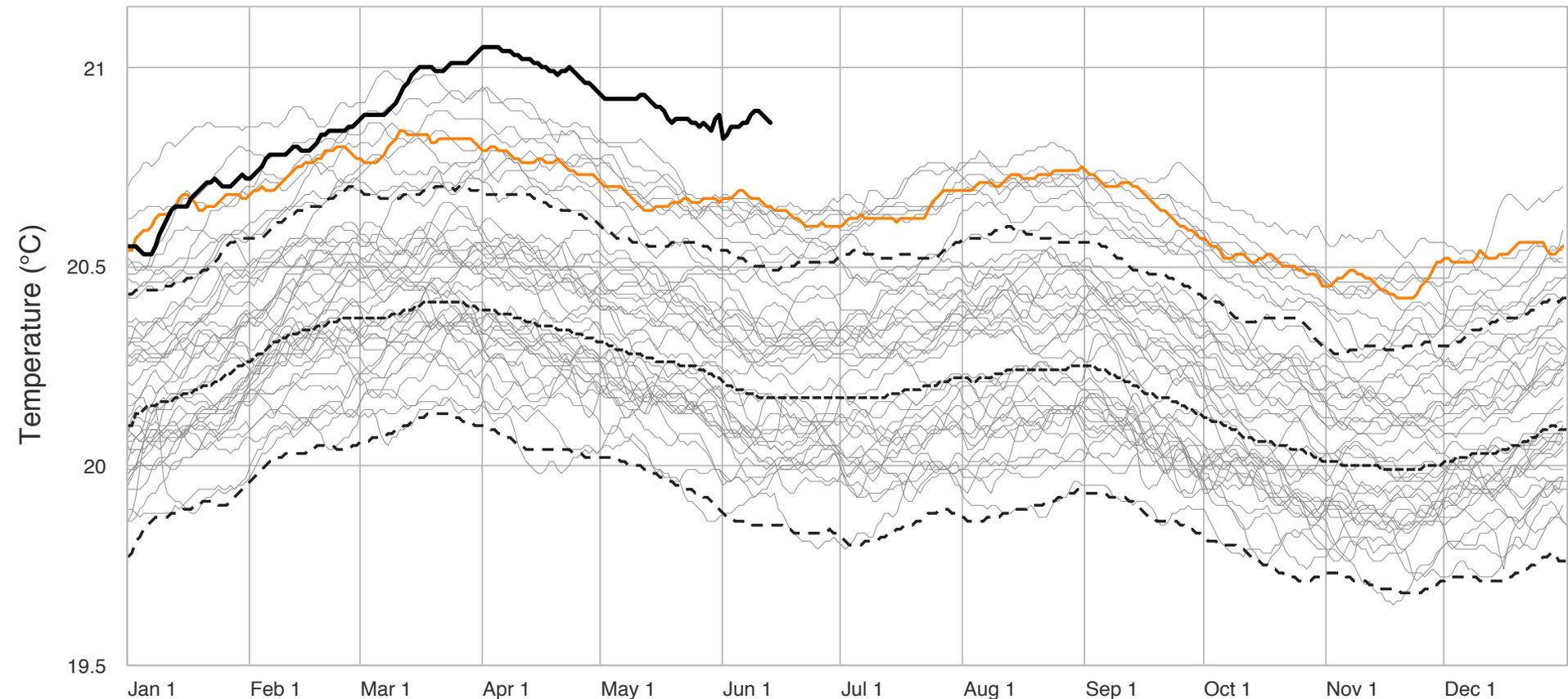


Mudanças Climáticas



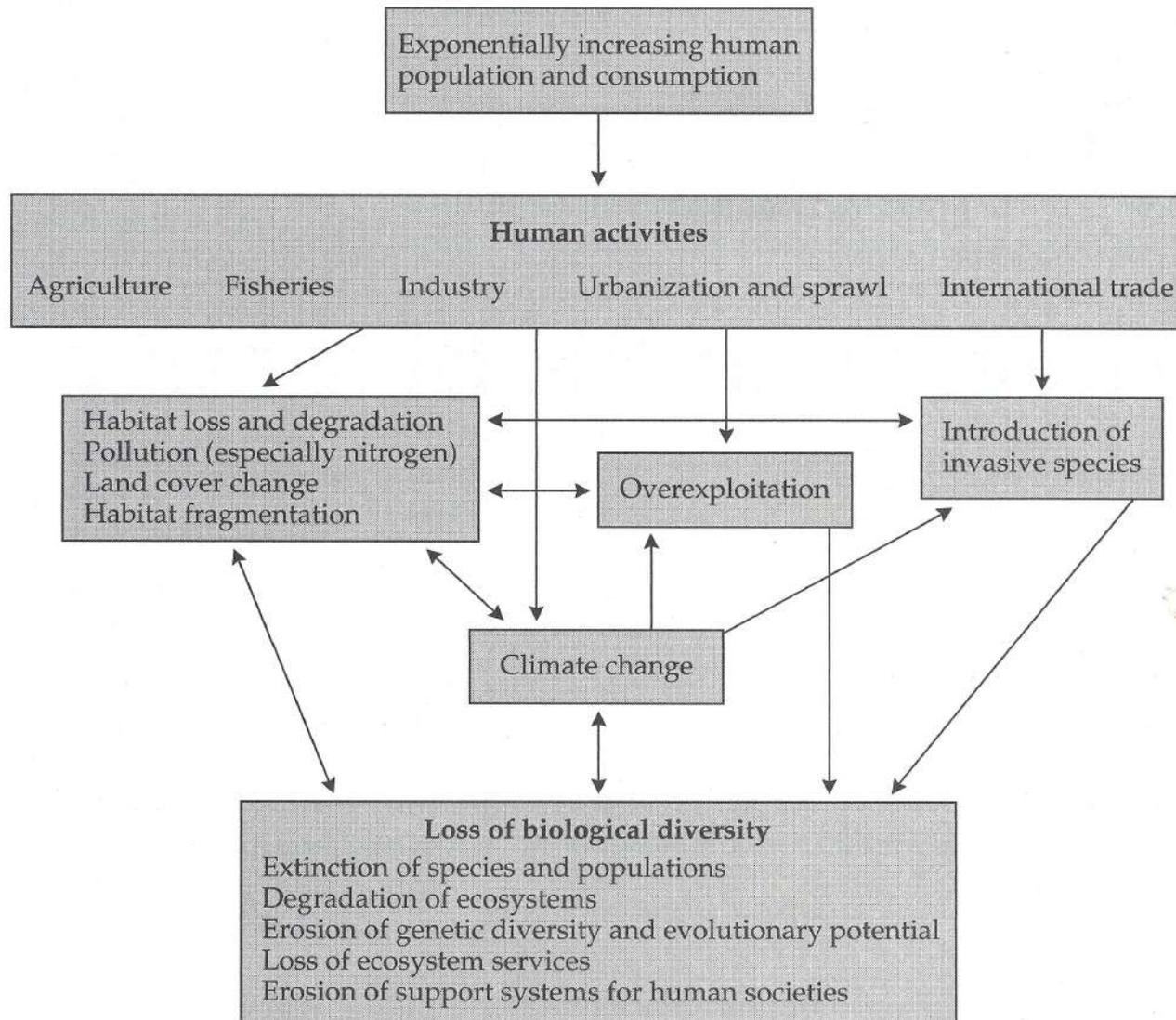
SST World (60S-60N)

NOAA OISST V2.1 | ClimateReanalyzer.org, Climate Change Institute, University of Maine



- | | | | | | | |
|--------|------------------|-----------------|-----------------|--------|--------|--------|
| — 1981 | — 1982 | — 1983 | — 1984 | — 1985 | — 1986 | — 1987 |
| — 1988 | — 1989 | — 1990 | — 1991 | — 1992 | — 1993 | — 1994 |
| — 1995 | — 1996 | — 1997 | — 1998 | — 1999 | — 2000 | — 2001 |
| — 2002 | — 2003 | — 2004 | — 2005 | — 2006 | — 2007 | — 2008 |
| — 2009 | — 2010 | — 2011 | — 2012 | — 2013 | — 2014 | — 2015 |
| — 2016 | — 2017 | — 2018 | — 2019 | — 2020 | — 2021 | — 2022 |
| — 2023 | — 1982-2011 mean | — $\pm 2\sigma$ | — $\pm 2\sigma$ | | | |

Ameaças à Biodiversidade



Ameaças à Biodiversidade

Monoculturas extensivas (Alfa-diversidade) = perda de biodiversidade

produtos cultivados

cultural

espécies

Beta-diversidade

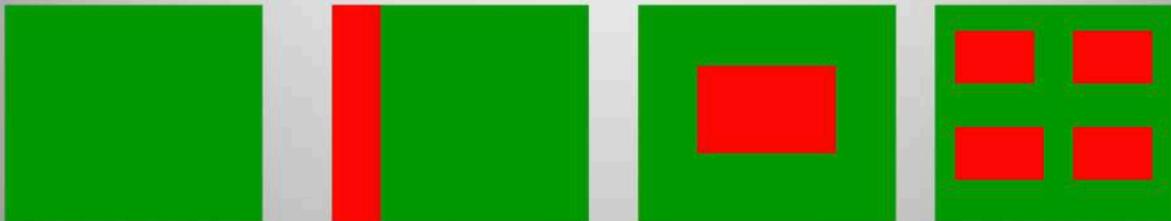


Ameaças à Biodiversidade

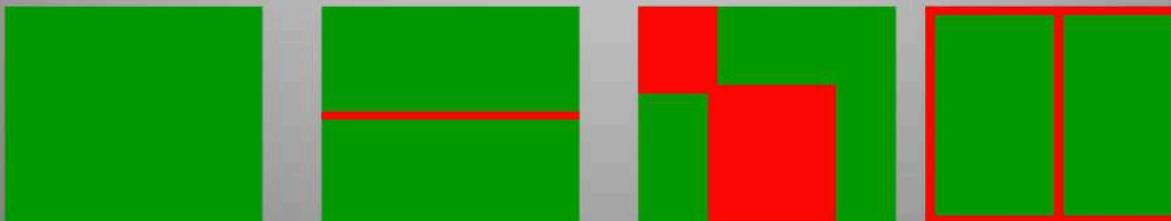
Perda de Diversidade Genética

FRAGMENTAÇÃO : ruptura na continuidade

Perda de habitat **SEM** fragmentação

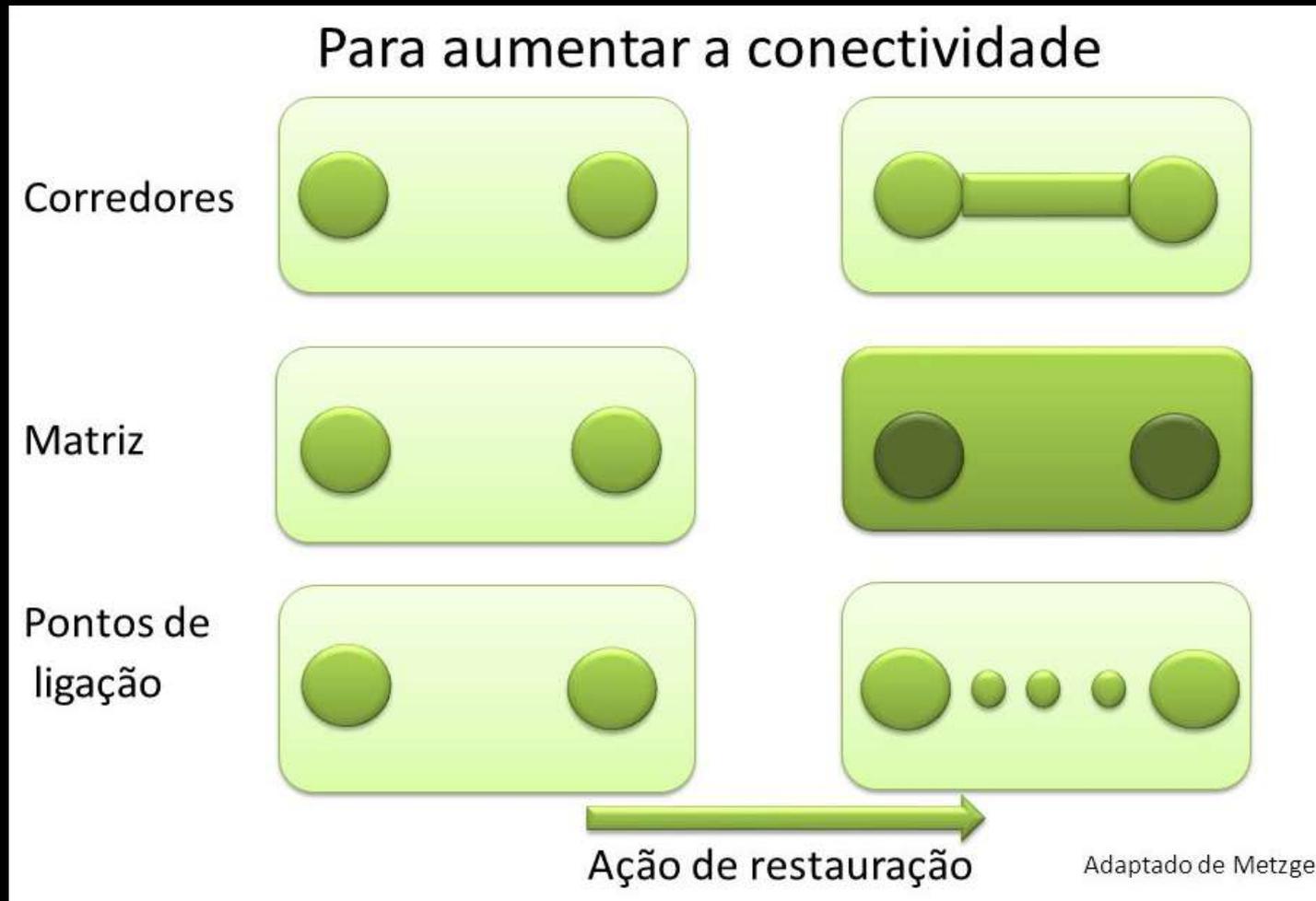


Perda de habitat **COM** fragmentação



Ameaças à Biodiversidade

Perda de Diversidade Genética



Ameaças à Biodiversidade

Perda de Diversidade Genética



Ameaças à Biodiversidade

Perda de Diversidade Genética



É um patrimônio biológico inestimável, com lugares que lembram como era a floresta atlântica no passado

— diz o ecólogo Marcelo Tabarelli sobre Serra Grande

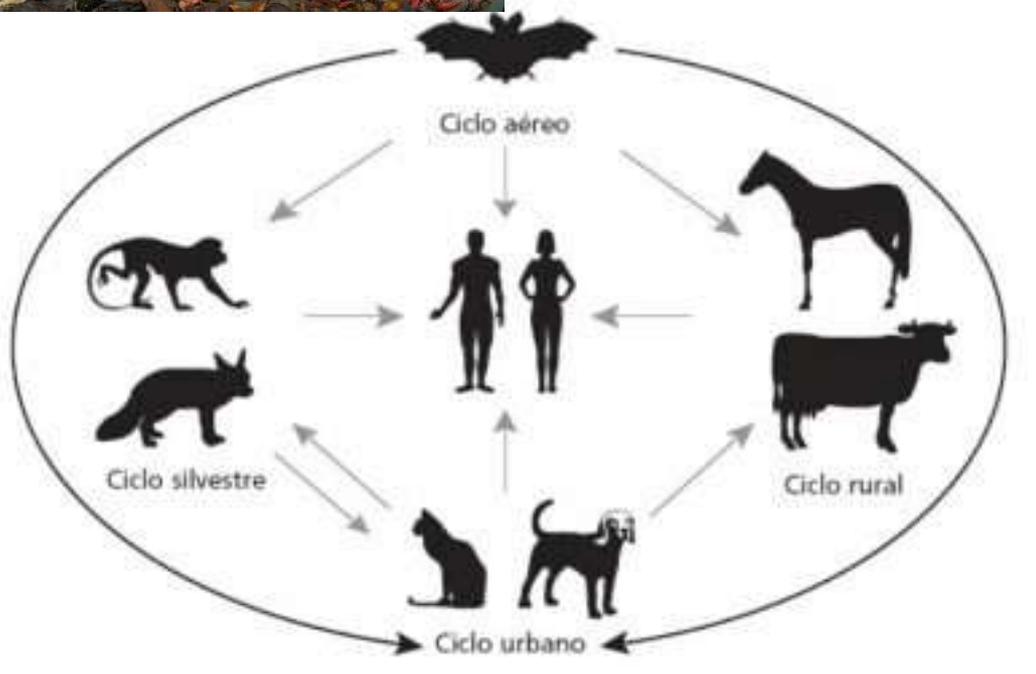
Ameaças à Biodiversidade

Conflitos Fauna



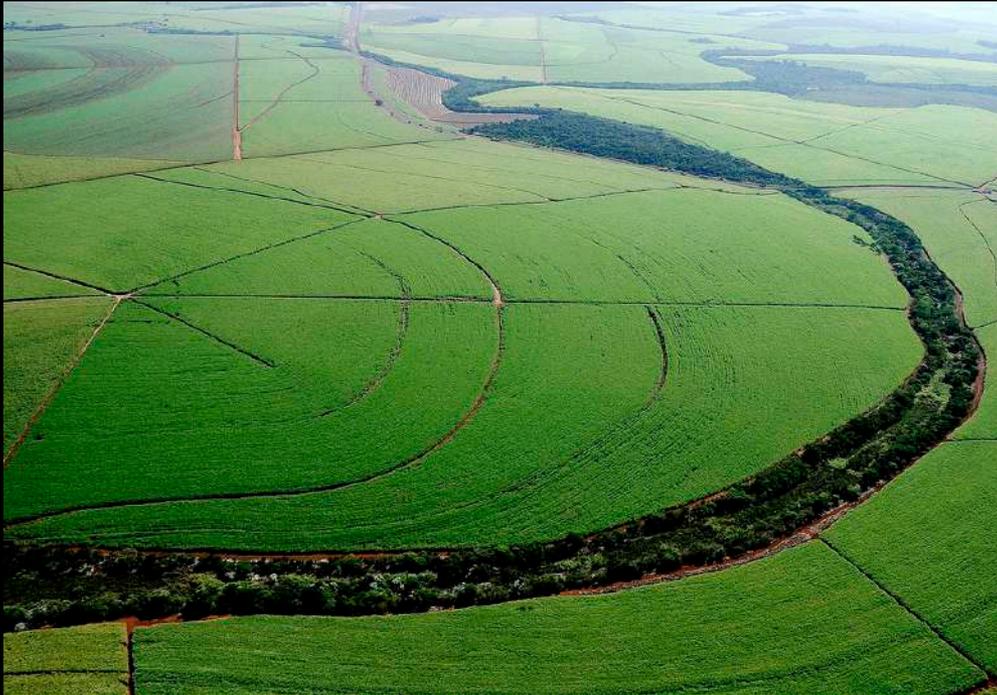
Ameaças à Biodiversidade

Conflitos Fauna/Zoonoses



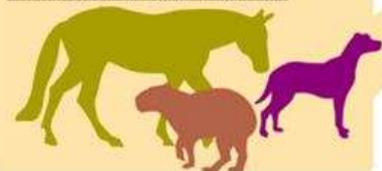
Ameaças à Biodiversidade

Conflitos Fauna/Zoonoses



O que é?

A febre maculosa é causada pela bactéria *Rickettsia rickettsii*, transmitida ao homem pela picada do carrapato-estrela, presente geralmente em bois, cavalos, cães, aves domésticas e roedores, especialmente na capivara. Os sintomas são febre alta, dor de cabeça e manchas na pele. Eles levam, em média, de sete a dez dias para se manifestar.



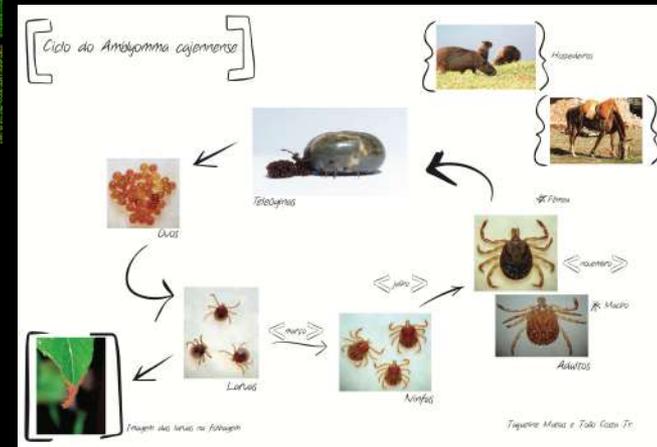
ENTENDA A DOENÇA

Como se contrai?

A doença é contraída somente pela picada do carrapato infectado, que em contato com a pele humana demora de quatro a seis horas para transmitir a bactéria que causa a doença. Não existe transmissão da doença de uma pessoa para outra.

Como é o tratamento?

A febre maculosa tem cura desde que o tratamento com antibióticos seja introduzido nos primeiros dois ou três dias. O atraso no diagnóstico pode provocar lesões vasculares e complicações graves, como o comprometimento do sistema nervoso central, dos rins e pulmões, e levar a óbito.



Ameaças à Biodiversidade

Caça

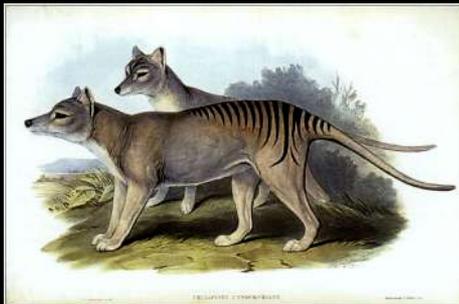


Risco de Extinção



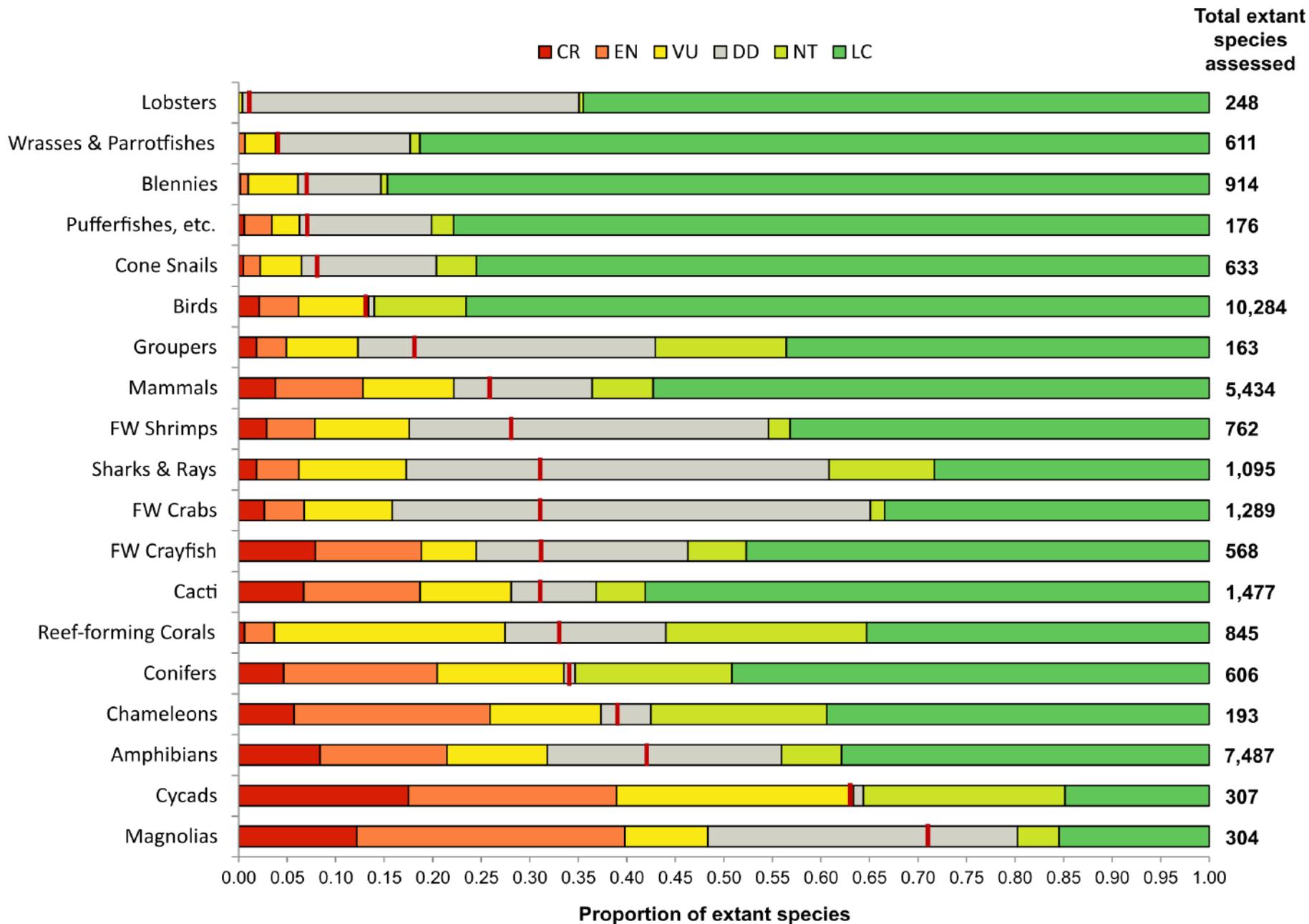
Listas de espécies ameaçadas – Global e regional

(IUCN;
www.iucnredlist.org)



SOUTH AMERICA

South America	Mammals	Birds	Reptiles*	Amphibians	Fishes*	Molluscs*	Other Inverts*	Plants*	Fungi & Protists*	Total*
Argentina	38	50	15	30	39	0	14	70	0	256
Bolivia, Plurinational States of	20	55	6	35	8	2	1	104	0	231
Brazil	81	165	29	36	86	22	33	521	0	973



Between 1990 and 2015, the world lost

129 million ha of forest



An area the size of South Africa

“ Everyone living on planet Earth should take part in the essential duty of preserving the nature. ”



FOOD SOURCE

Forests play a vital role in securing a stable and adequate food supply to the people in Ethiopia.



CLIMATE EFFECT

Deforestation releases more CO2 than the entire global transport sector. Forests also help to stabilize the Earth's climate.



EROSION & SUSTAINABLE AGRICULTURE

Forests protect against erosion, flood and drought and allow for sustainable agriculture.

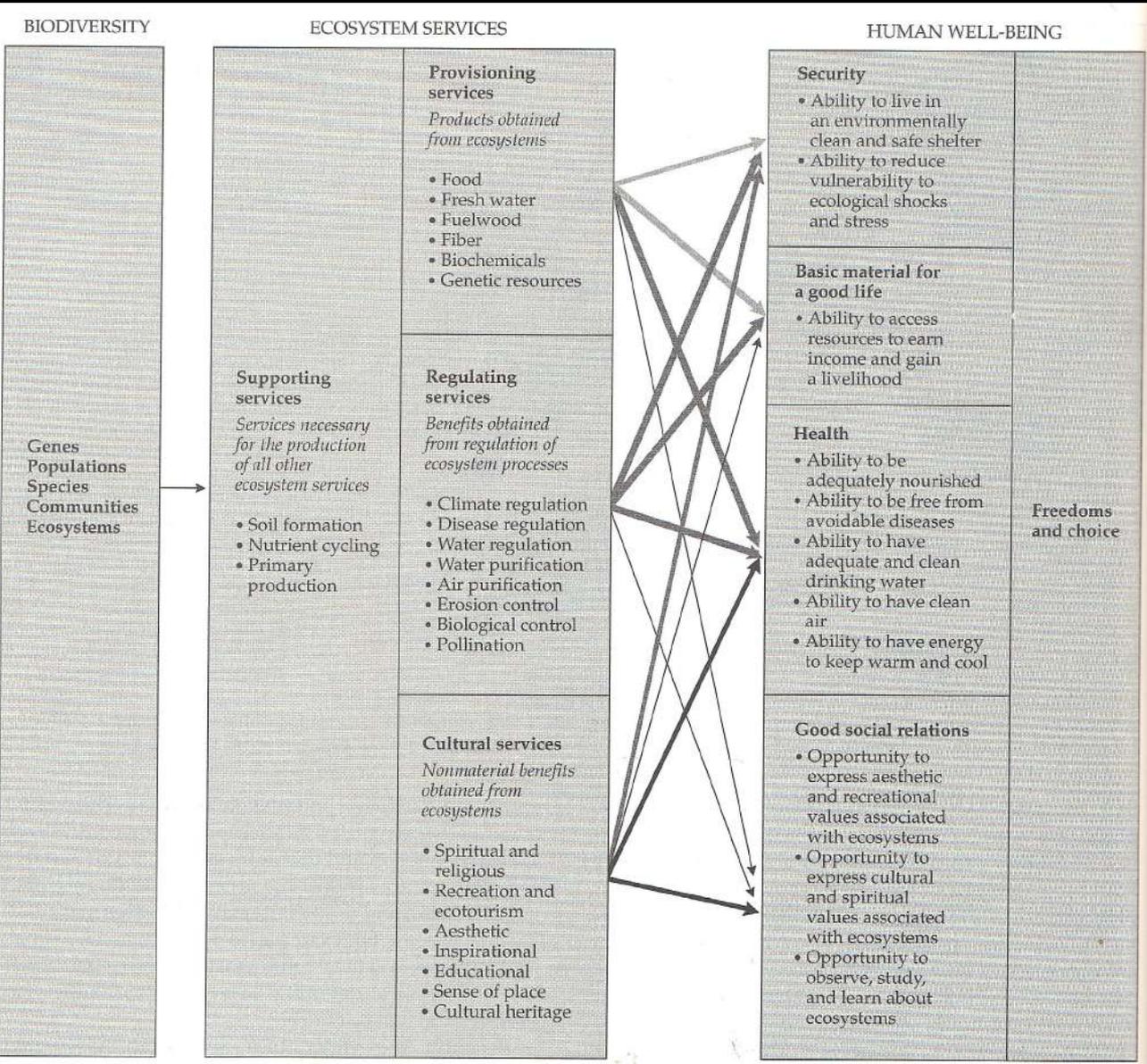


WORLD'S LIFE

Forests play home to half of all life on earth.



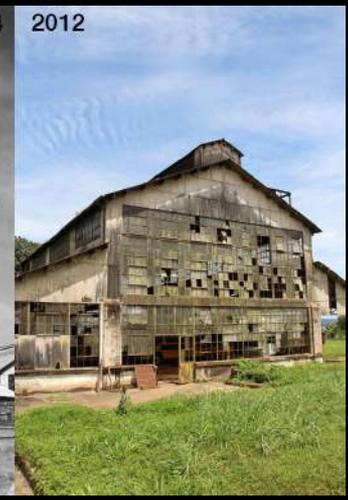
Millennium Ecosystem Assessment



Serviços Eossistêmicos
Diversidade Funcional

Ideias não muito boas

Fordlândia



Boas idéias

Jacu Bird Coffee



Desafios

Com população crescente, como conciliar alta produtividade de alimentos com:

- Suprimento de água
- Preservação dos habitats
- Diversidade de espécies

Desafios

Mudança de Paradigma

Educação Ambiental

Interação Homem – Natureza – Sistemas Produtivos

Homem é parte do processo

Manutenção de Serviços Ecossistêmicos

Responder às perguntas: Quantas espécies existem? E qual seu estado de conservação?

Grupos de Pesquisa ESALQ

Laboratório de Zoologia de Vertebrados

Laboratório de Mamíferos – Alexandre Reis Percequillo

Laboratório de herpetologia – Jaime Bertoluci

Laboratório Ecologia e Conservação da Biodiversidade – Katia Ferraz

Laboratório Ecologia Isotópica – Luciano Verdade (Conservação da Biodiversidade em paisagens agrícolas multifuncionais)

Plinio Camargo (Qualidade da água em bacias tropicais)

Laboratório de Restauração Florestal – Ricardo Rodrigues

Laboratório de Agroecologia – Flavio Gandara

Programas de Pós-graduação ESALQ

Ecologia Aplicada – Multidisciplinar ESALQ/CENA

(<http://www4.esalq.usp.br/pg/programas/ecologia-aplicada>)

Recursos Florestais– Ciências Florestais ESALQ

(<http://www4.esalq.usp.br/pg/programas/recursos-florestais>)

Outras iniciativas

NACE PTECA

Projeto Corredor Caipira, entre outros

(<http://www.nacepteca.esalq.usp.br>)

PET Ecologia

(<https://www.esalq.usp.br/svcex/programa-de-educacao-tutorial-ecologia-pet-ecologia>)