

Empirical distributions

IMAX Tropical Rainforest,
http://www.youtube.com/watch?v=YUuA-C_13DE

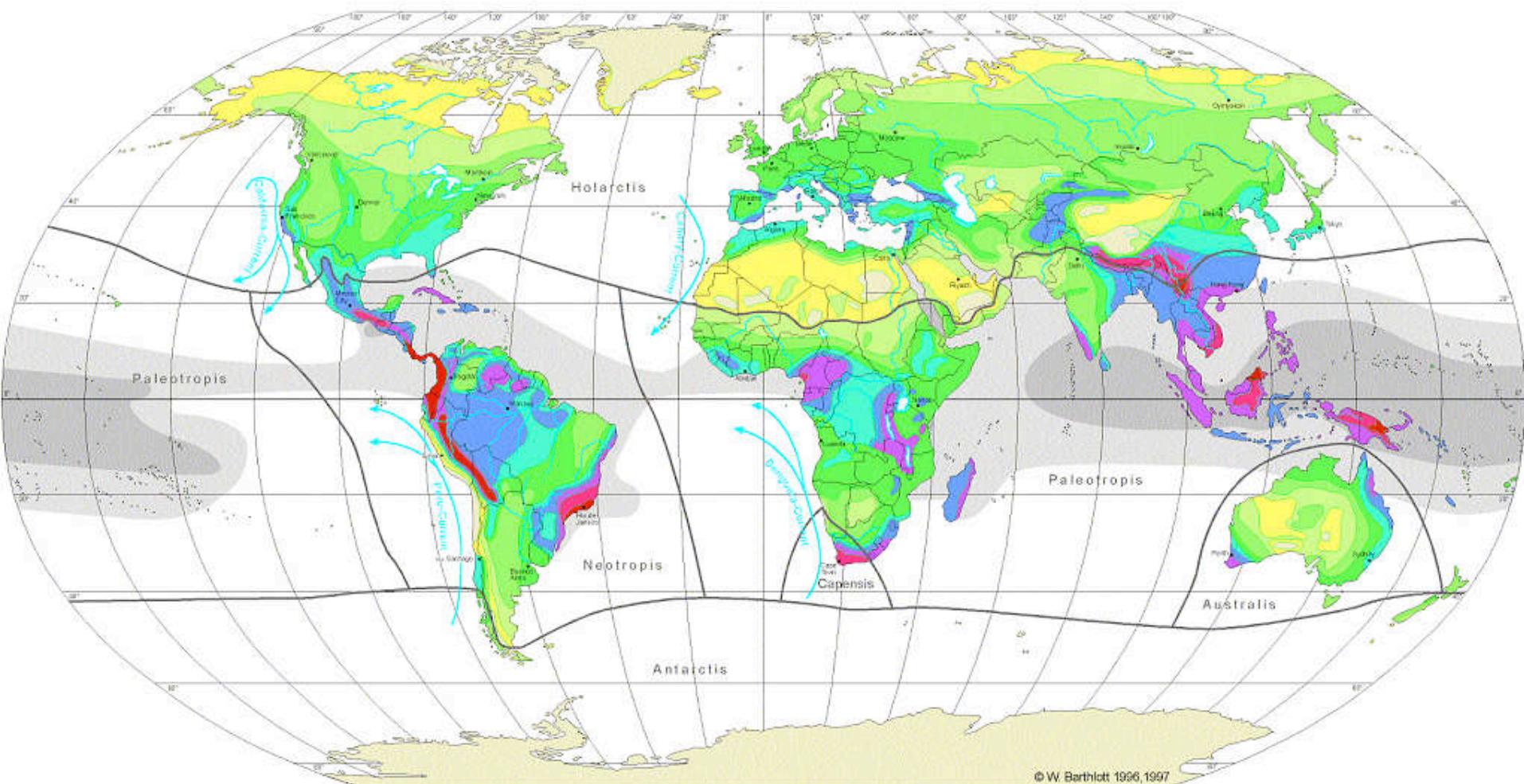
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EEB464 Fall 2019



Learning objectives:

- Macroevolution is a process.
- What patterns should it describe?

GLOBAL BIODIVERSITY: SPECIES NUMBERS OF VASCULAR PLANTS



Robinson Projection
Standard Parallels 38°N und 38°S
Scale 1: 130000000

Diversity Zones (DZ): Number of species per 10,000km²

DZ 1 (<100)	DZ 5 (1000 - 1500)	DZ 9 (4000 - 5000)
DZ 2 (100 - 200)	DZ 6 (1500 - 2000)	DZ 10 (>5000)
DZ 3 (200 - 500)	DZ 7 (2000 - 3000)	
DZ 4 (500 - 1000)	DZ 8 (3000 - 4000)	

Capensis floristic regions

sea surface temperature

>29°C
>27°C

cold currents

W. Barthlott, N. Biedinger, G. Braun
F. Feig, G. Kier, W. Lauer & J. Mutke 1997
modified after
W. Barthlott, W. Lauer & A. Plaetze 1996
Department of Botany and Geography
University of Bonn
German Aerospace Research Establishment, Cologne
Cartography: M. Gref
Department of Geography
University of Bonn

Described living species:
Total 1.8 million

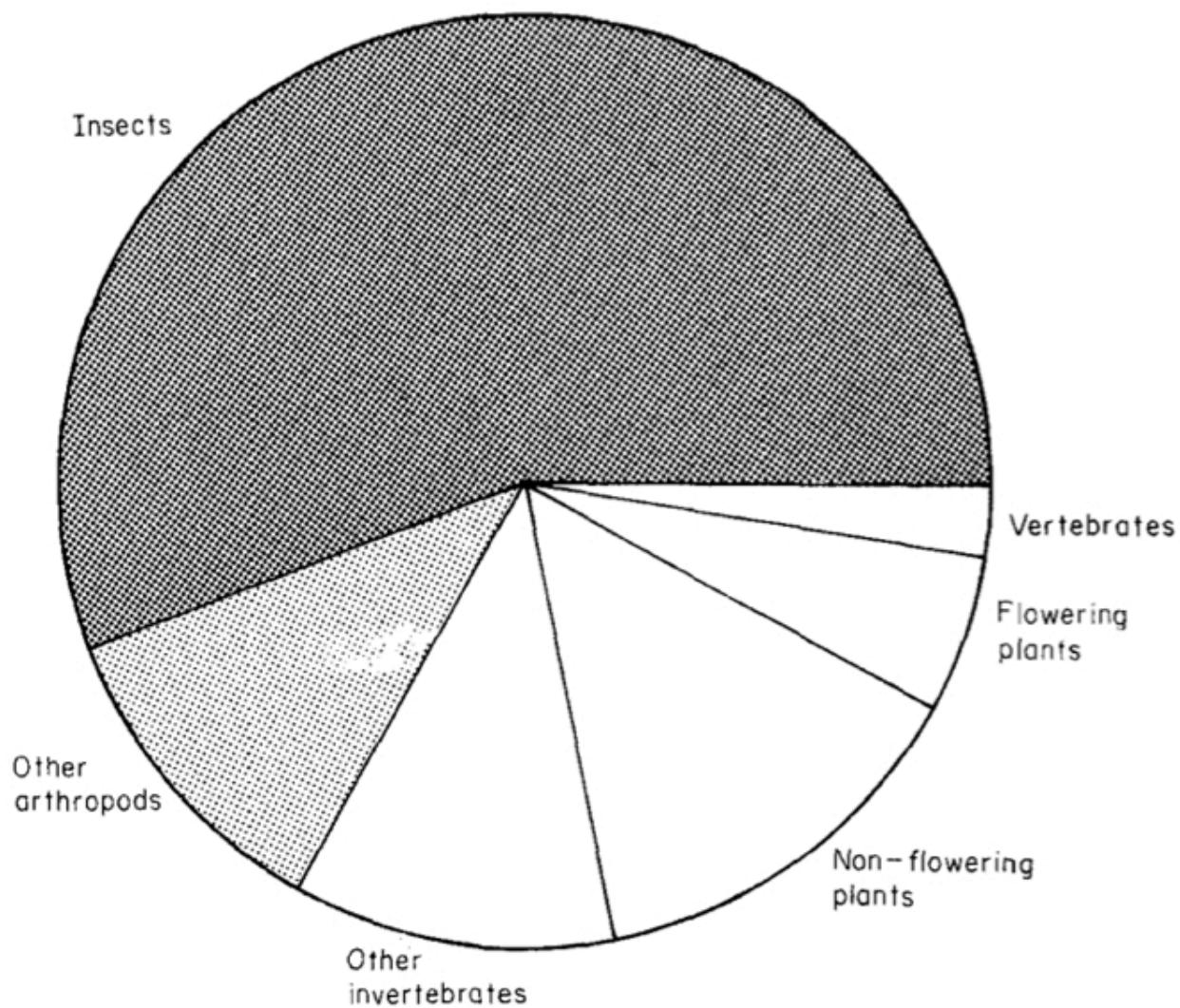


Figure 1. A pie-chart representing all of the 1.82 million described species of animals and plants divided into the major groups (data supplied by Dr N. M. Collins, Conservation Monitoring Centre, IUCN).

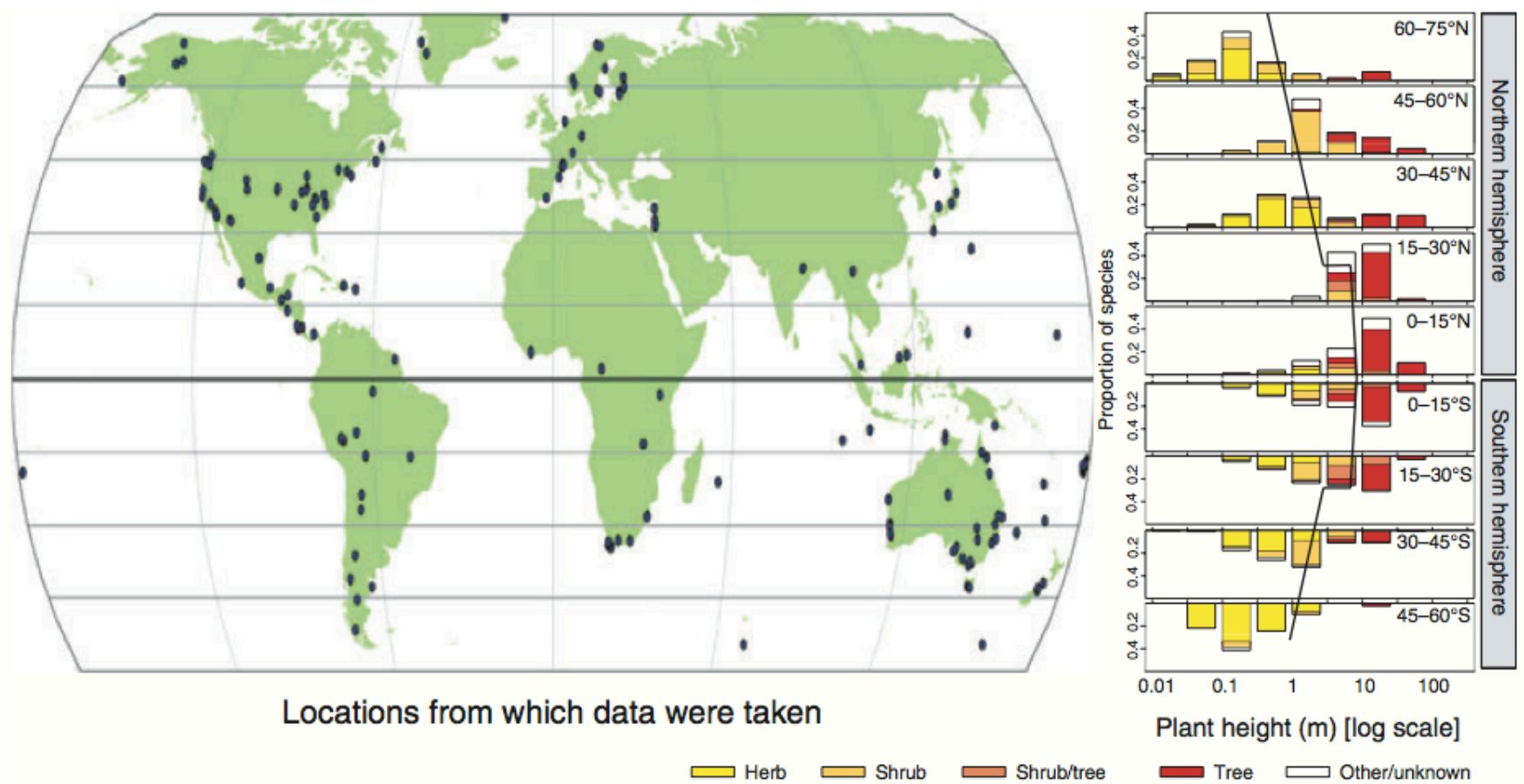


Fig. 1. Global patterns in plant height. The panel at the left shows the locations from which data were taken. The panel at the right shows the latitudinal gradient in plant height. To facilitate interpretation, we have presented the data in frequency histograms for species in each of nine latitudinal bands (these bands correspond to the latitude lines on the map on the left). However, latitude and height are continuous variables, and they were treated as such in all analyses. Data are shaded according to growth form: trees in red, shrub/trees in dark orange, shrubs in light orange, herbs in yellow and species whose growth form was unknown or difficult to classify are shown in white. The black line running across the individual height histograms shows the best-fit relationship between height and latitude.

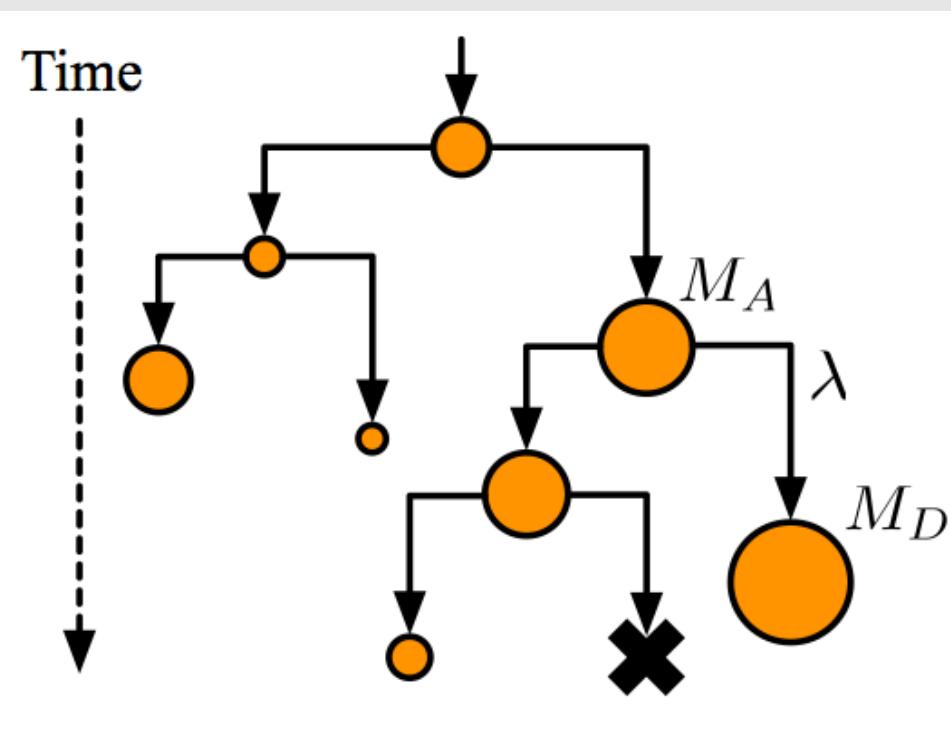
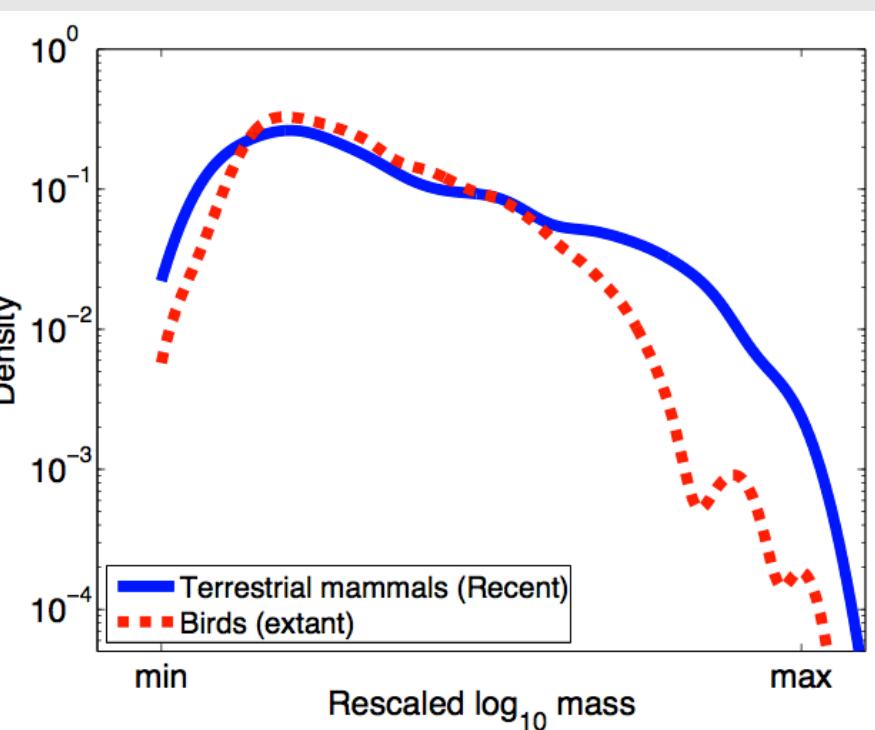
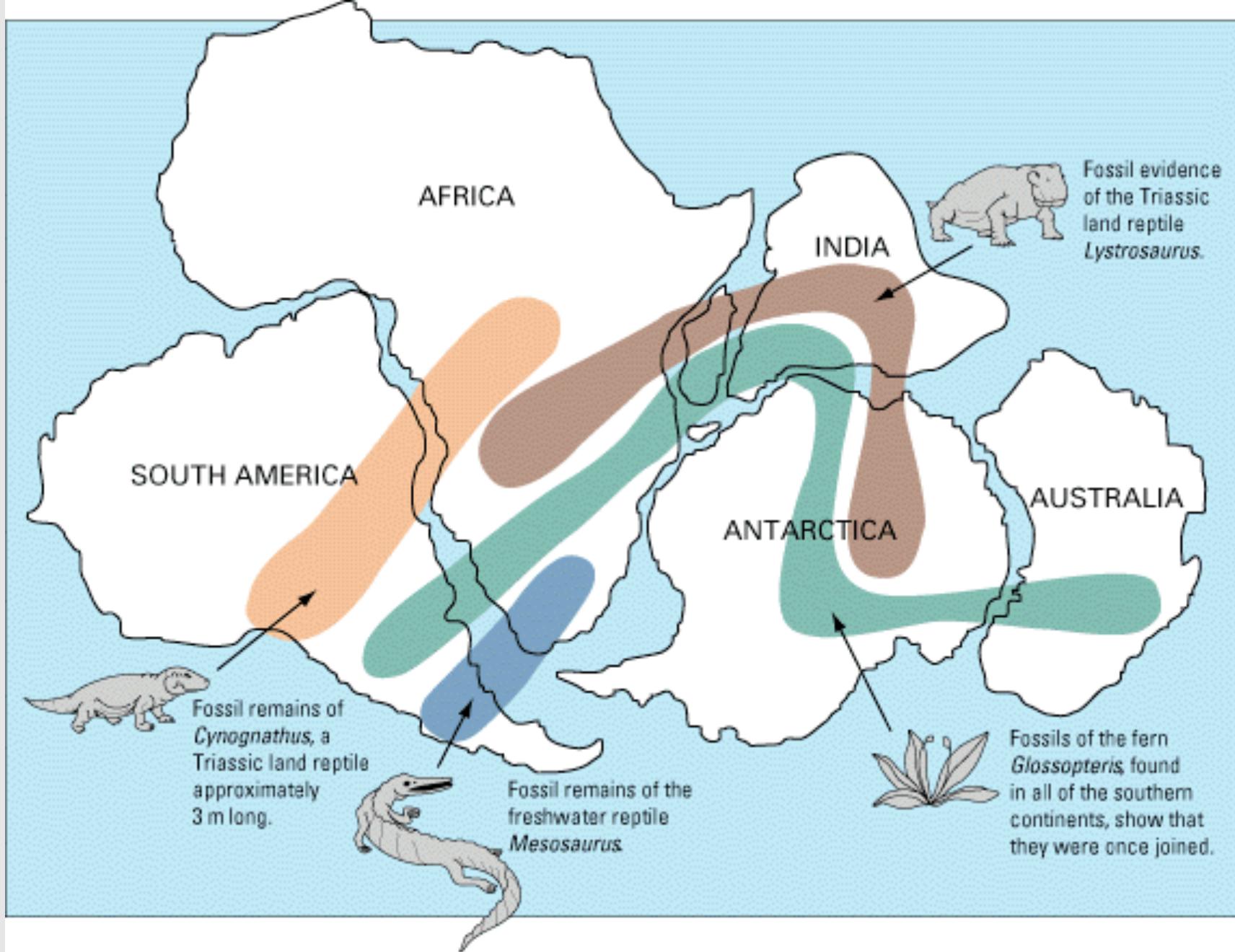


FIG. 1 (a) An illustration of the similarity of the body mass distributions for different taxonomic groups, using data for 4002 Recent terrestrial mammals (Smith et al., 2003) and 8617 extant birds (Dunning Jr., 2007). For visual clarity, the empirical distributions have been smoothed using a Gaussian kernel (Wasserman, 2006) and rescaled to lay on the same abscissa interval. **(b)** A schematic showing the basic clado-genetic diffusion process by which species mass varies over evolutionary time. The masses of a descendant M_D is related to the mass of its ancestor M_A by a random multiplicative factor λ , which represents the total selective influence on species mass from all sources, i.e., $M_D = \lambda M_A$.





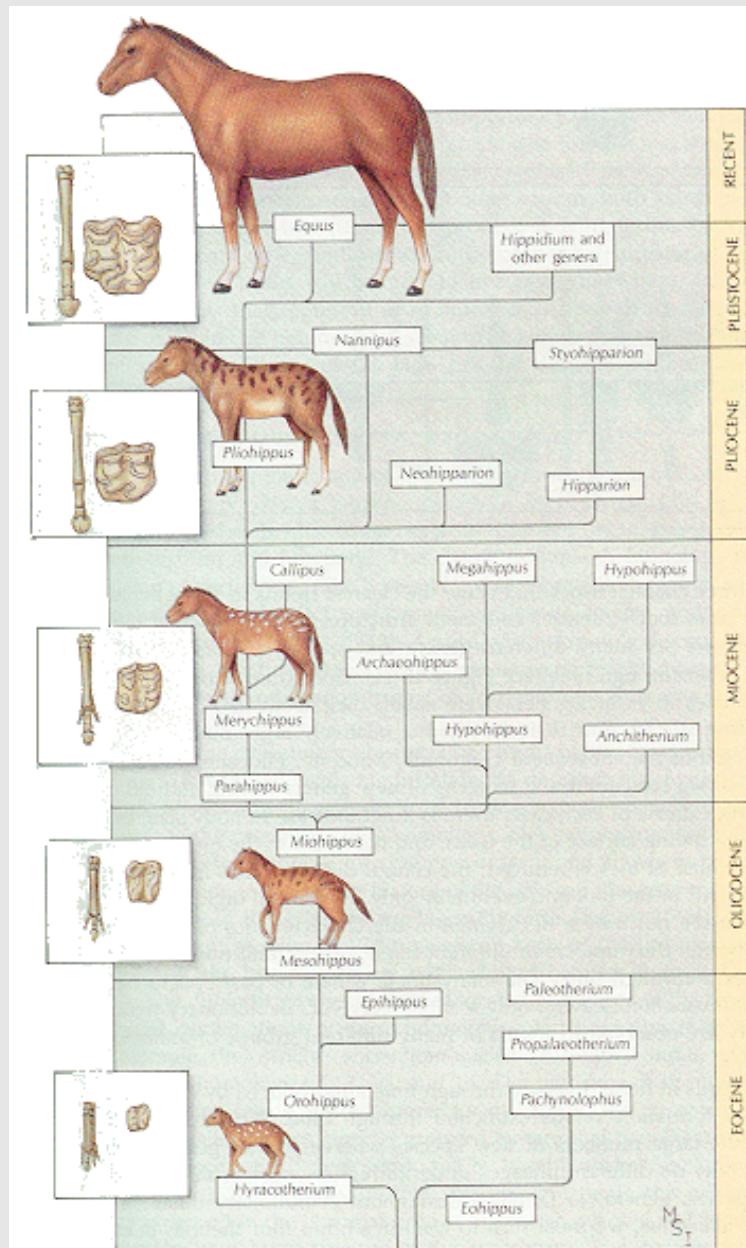
<http://www.fossilmuseum.net/plantfossils/Metasequoia/DawnRedwood.htm>



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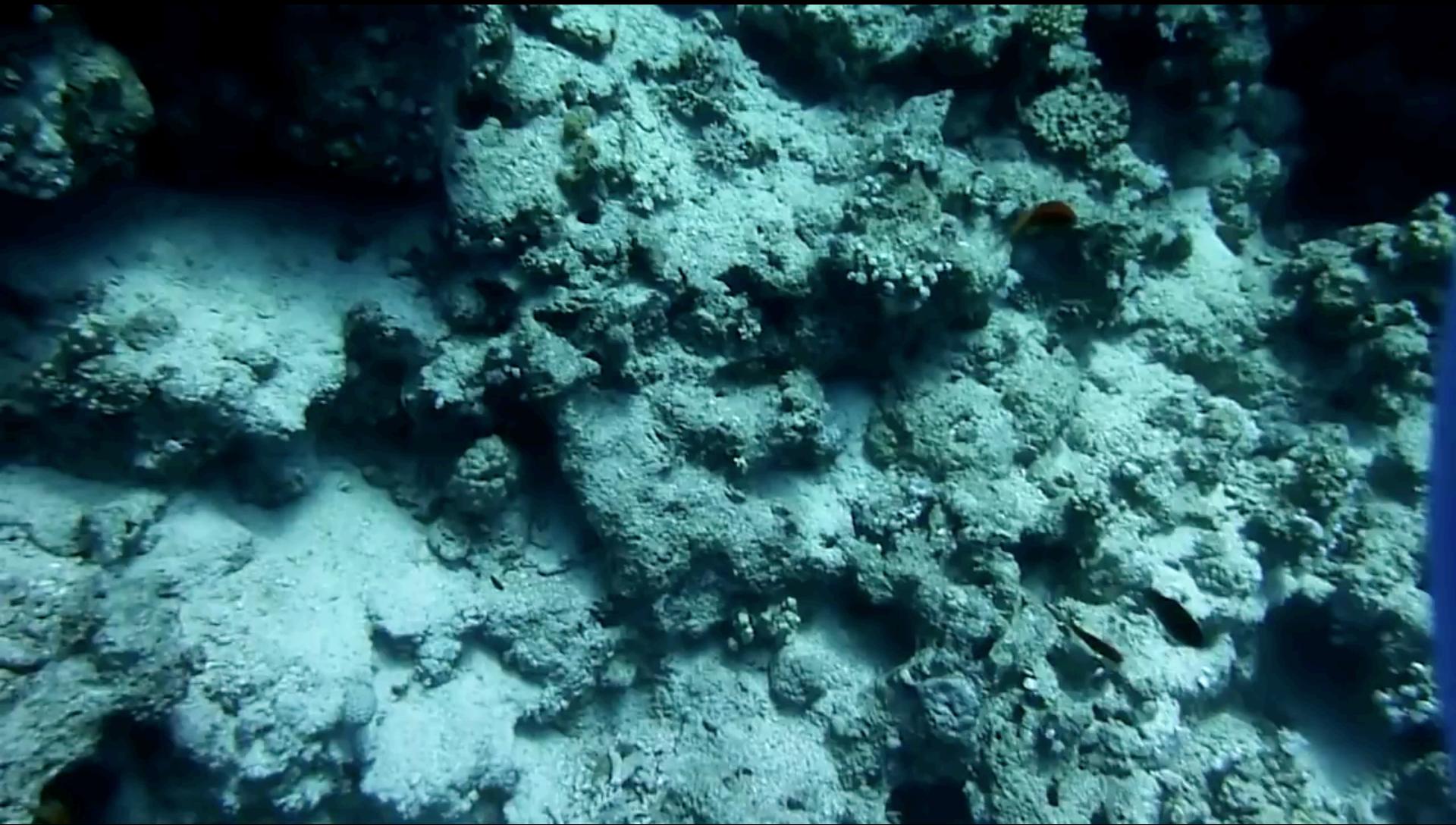
Cope's rule



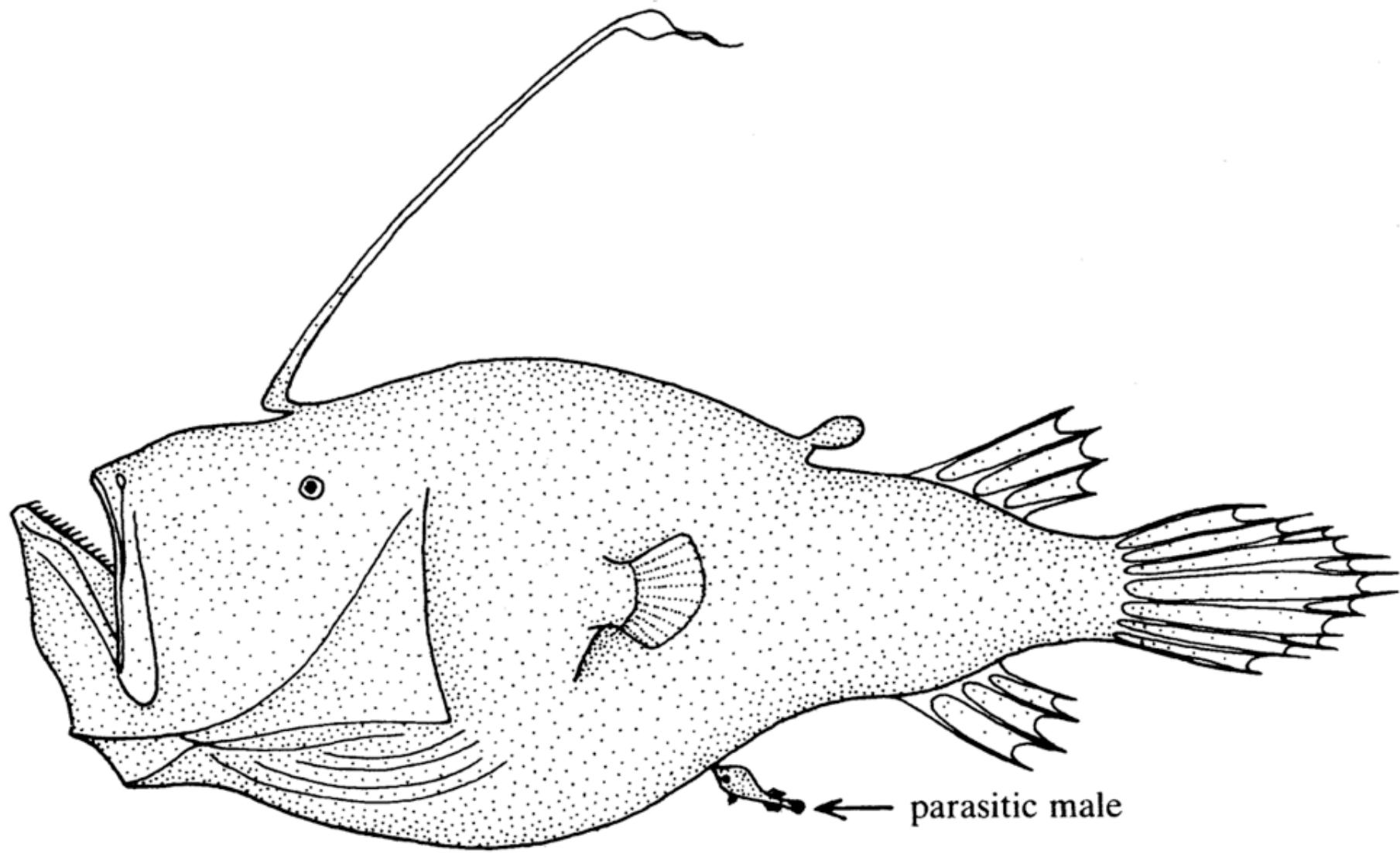
Examples



<http://www.youtube.com/watch?v=TOC2Qc2Qedw>



<http://www.youtube.com/watch?feature=fvwp&v=TOa8y95khK8>



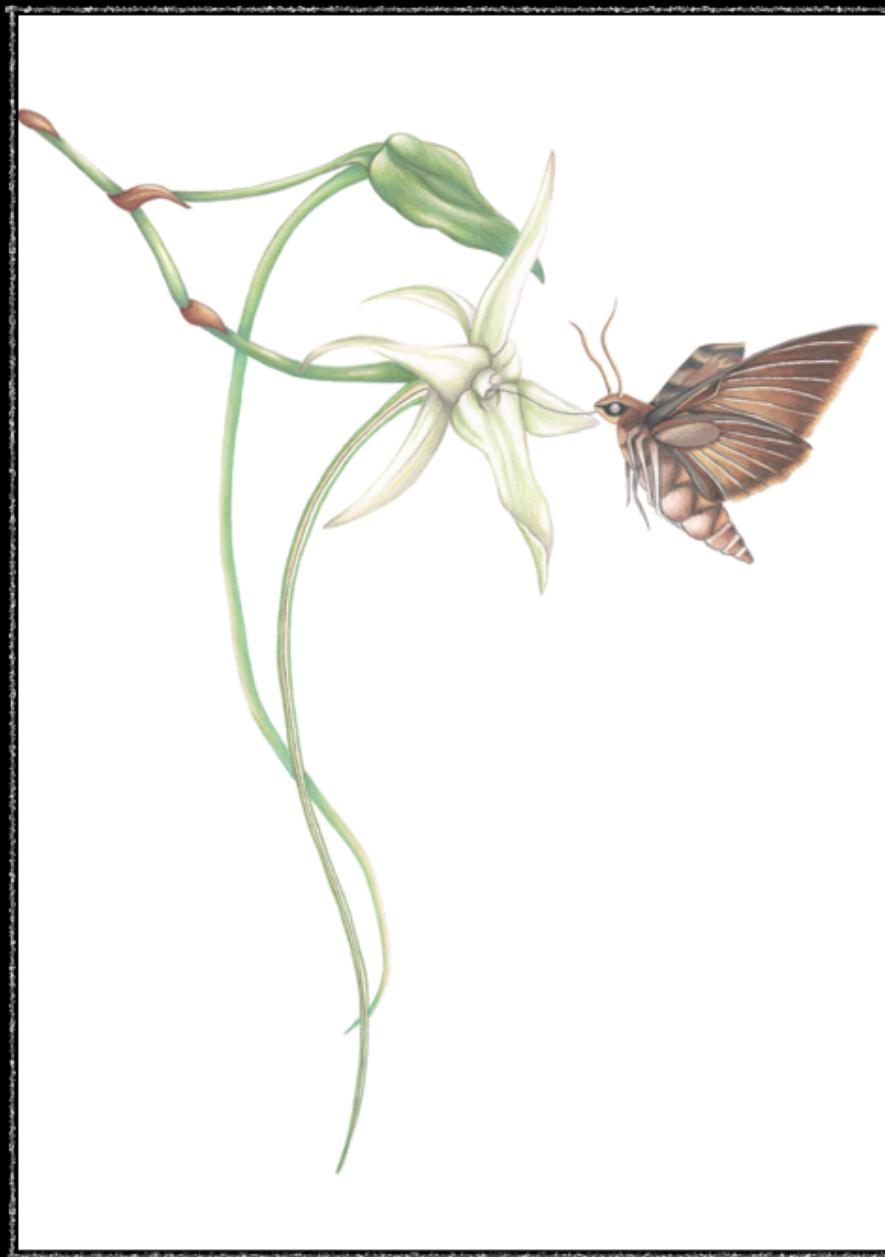
Dr Tony Ayling



http://www.youtube.com/watch?v=L54bxmZy_NE : BBC Planet Earth



BBC's The Life of Birds https://www.youtube.com/watch?v=87_shPJxdns



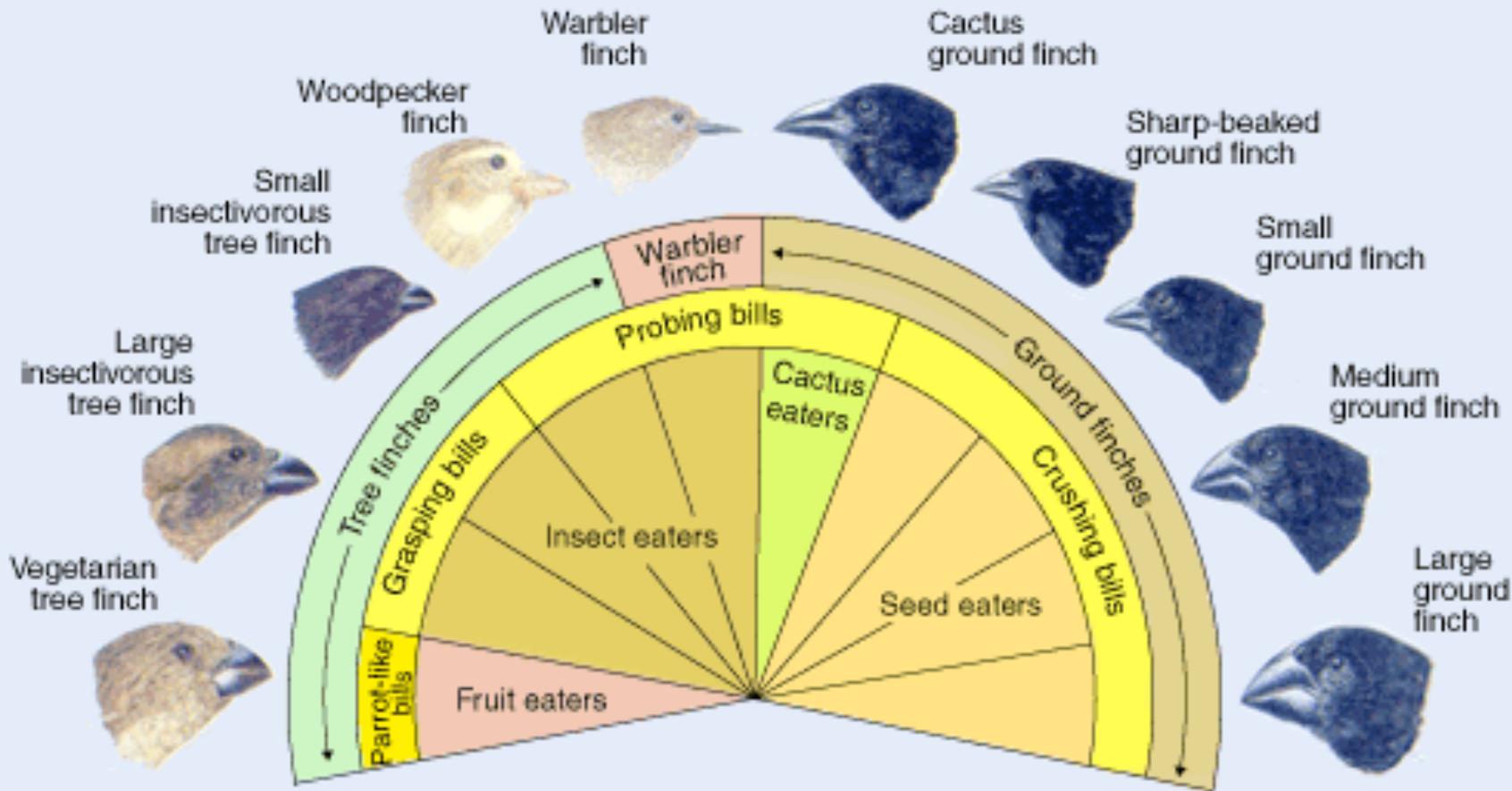
<http://www.racheldiazbastian.com>

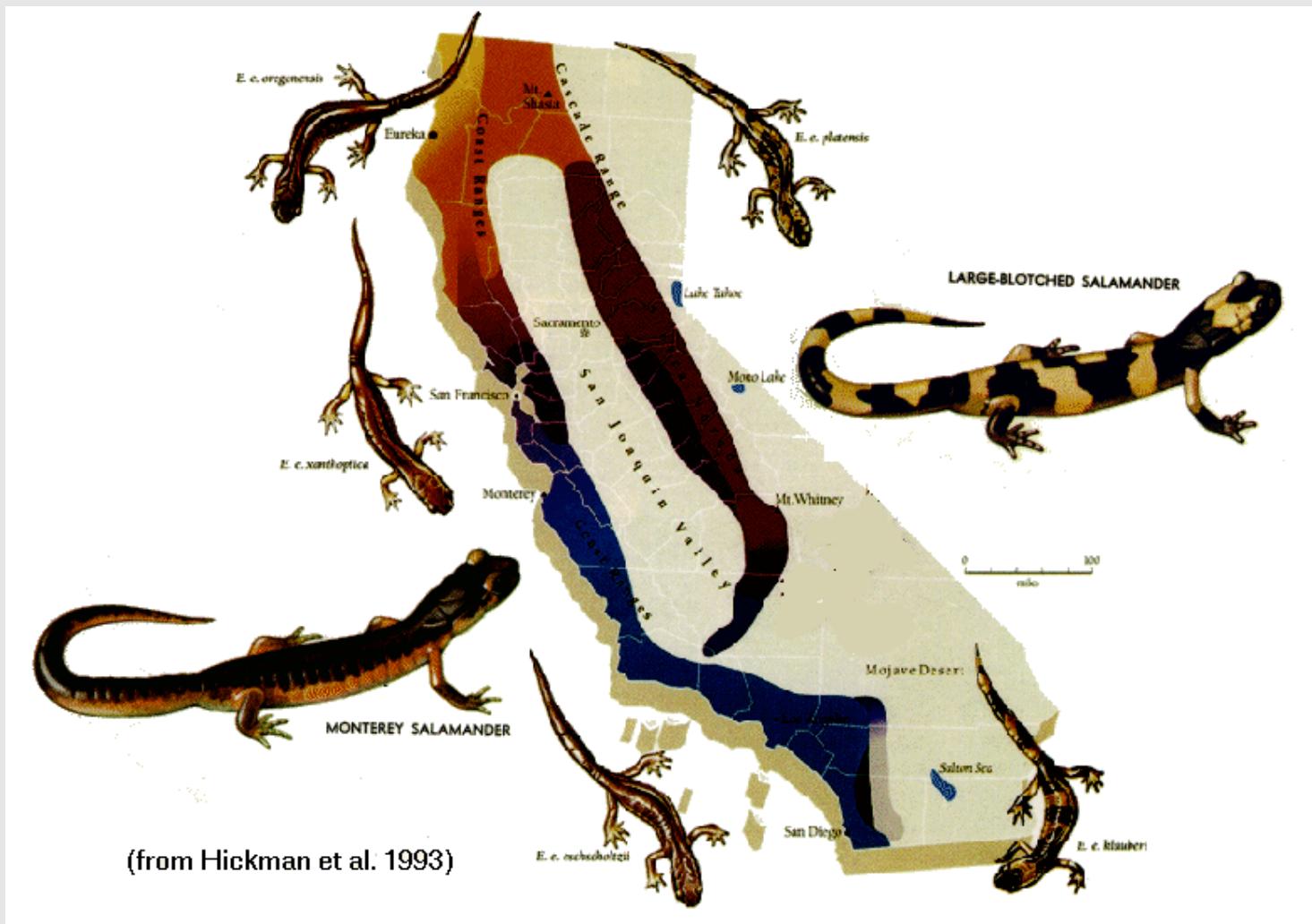


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Marsupial mammals

Plantigale



Marsupial mole



Sugar glider



Eutherian mammals

Deer mouse



Mole



Flying squirrel

