Source: Todd Pierson

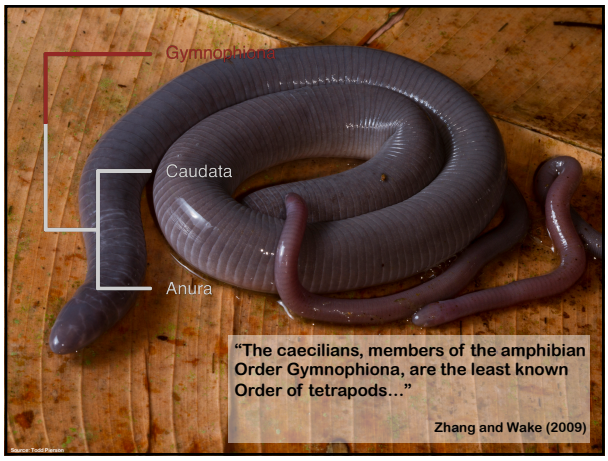
Salamander Evolution / and Diversity

(and caecilian)

Todd W. Pierson
WFS 433/533
26 January 2017

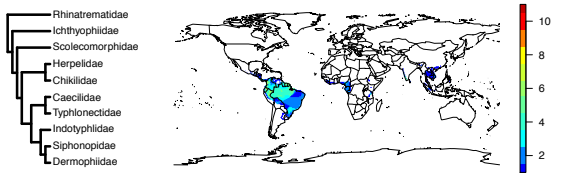
Source: Todd Pierson

1. Describe the global evolutionary and ecological diversity of salamanders and caecilians.
2. Describe major patterns in salamander evolution.



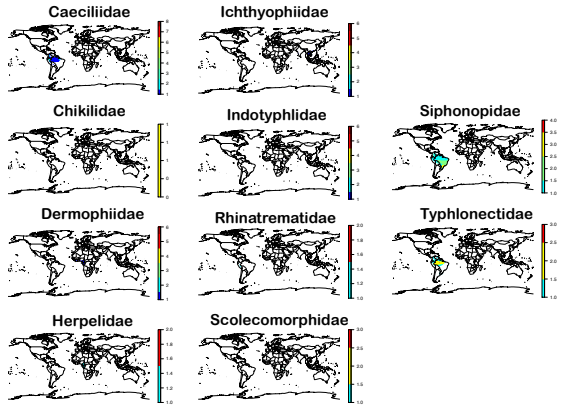
Source: Todd Pierson

Phylogenies presented here are adapted from Pough *et al.*'s Herpetology (4th Edition), which summarized data from Loader *et al.* (2007), Roelants *et al.* (2007), San Mauro *et al.* (2009, 2012, 2014), Zhang and Wake (2009), Pyron and Wiens (2011), Wilkinson *et al.* (2011), and Kamei *et al.* (2012). All maps are derived from distribution data provided by the IUCN and plotted using the package 'letsR' in R. All photos not by TWP are available under Creative Commons licenses.



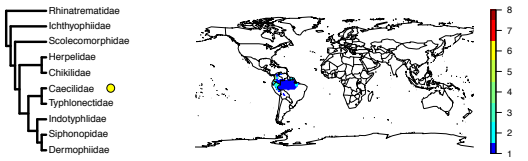
Order Gymnophiona (205 species)

Data from AmphibiaWeb
23 January 2017



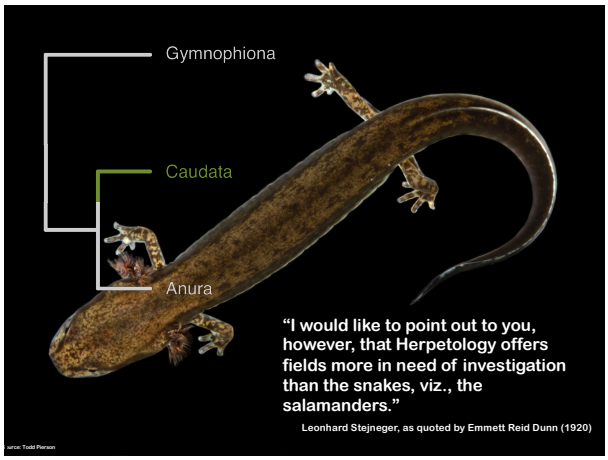
Family Ichthyophiidae (57 species)

Data from AmphibiaWeb
23 January 2017



Family Caeciliidae (42 species)

Data from AmphibiaWeb
23 January 2017



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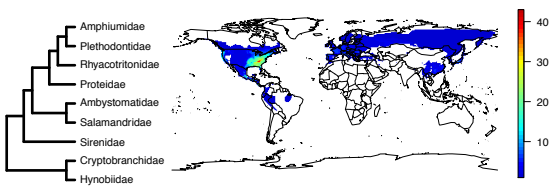
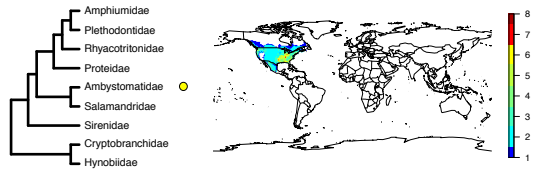


Order Caudata (695 species)

Data from AmphibiaWeb
23 January 2017

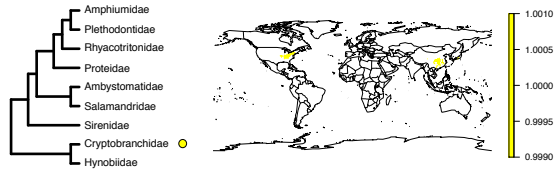


Family Ambystomatidae (32 + 4 species)

Data from AmphibiaWeb
23 January 2017

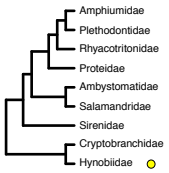
Family Amphiumidae (3 species)

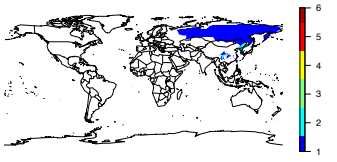
Data from AmphibiaWeb
23 January 2017



Family Cryptobranchidae (3 species)

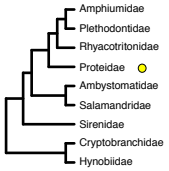
Data from AmphibiaWeb
23 January 2017





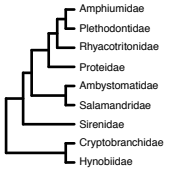
Family Hynobiidae (66 species)

Data from AmphibiaWeb
23 January 2017



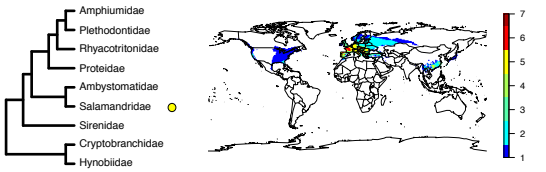
Family Proteidae (6 species)

Data from AmphibiaWeb
23 January 2017



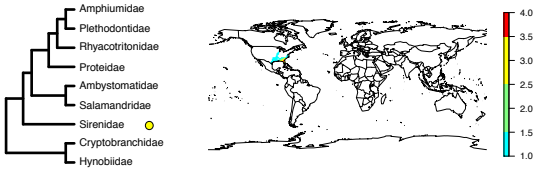
Family Rhyacotritonidae (4 species)

Data from AmphibiaWeb
23 January 2017



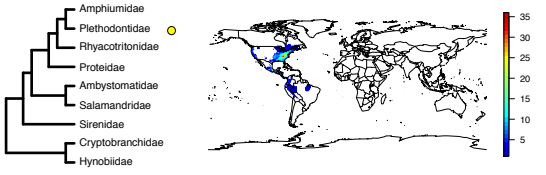
Family Salamandridae (115 species)

Data from AmphibiaWeb
23 January 2017



Family Sirenidae (4 species)

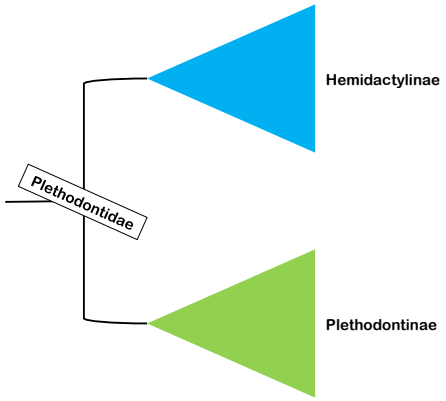
Data from AmphibiaWeb
23 January 2017

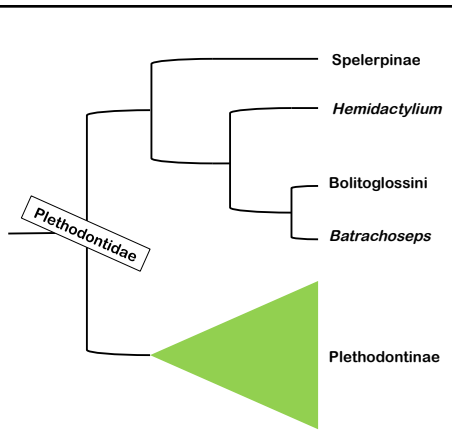


Family Plethodontidae (458 species)

Data from AmphibiaWeb
23 January 2017

Phylogeny presented is reflective of Shen *et al.* (2015), but uncertainty remains as to the relationships between groups with Plethodontidae.





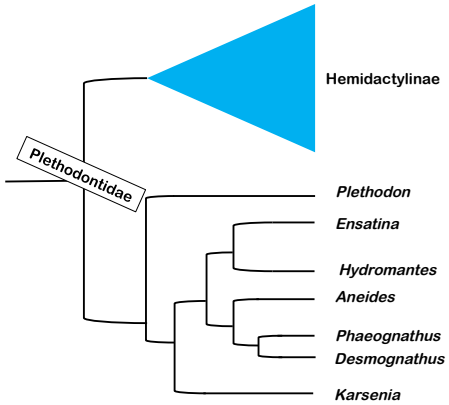
Spelerpinae

Source: Todd Pierson

Hemidactylium

Bolitoglossini

Batrachoseps



Plethodon

Ensatina

Hydromantes

Aneides

Phaeognathus

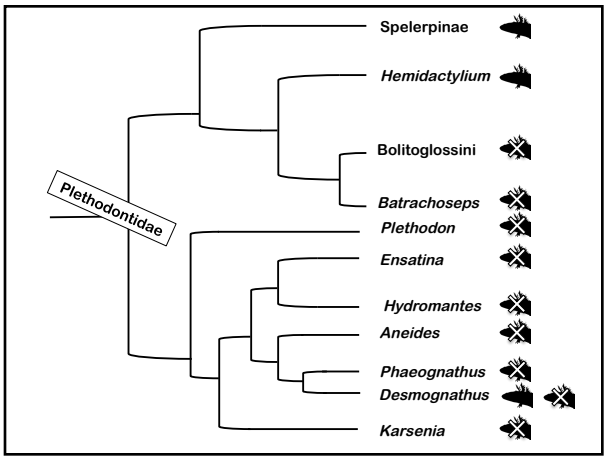
Desmognathus

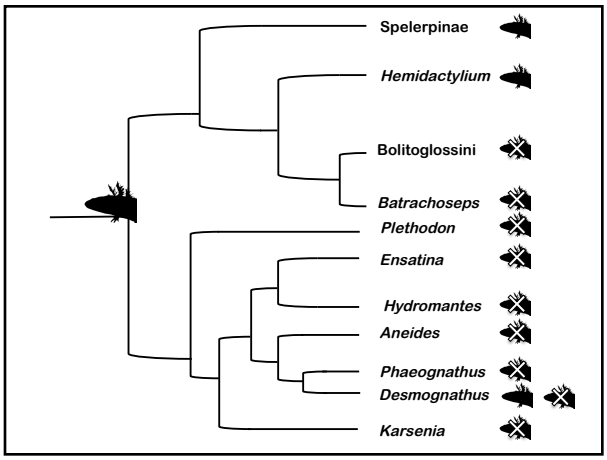
Karsenia

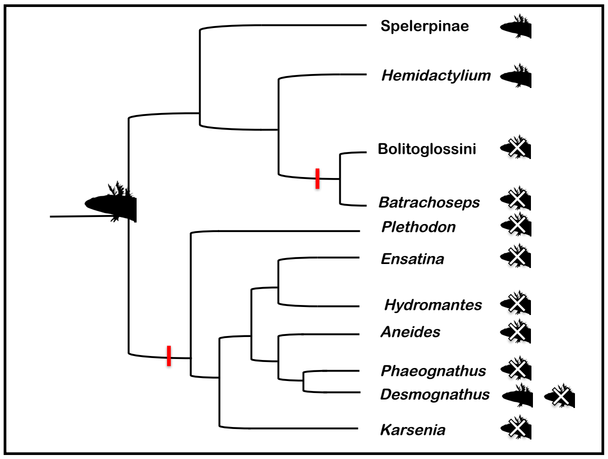
Discovery of the first Asian plethodontid salamander

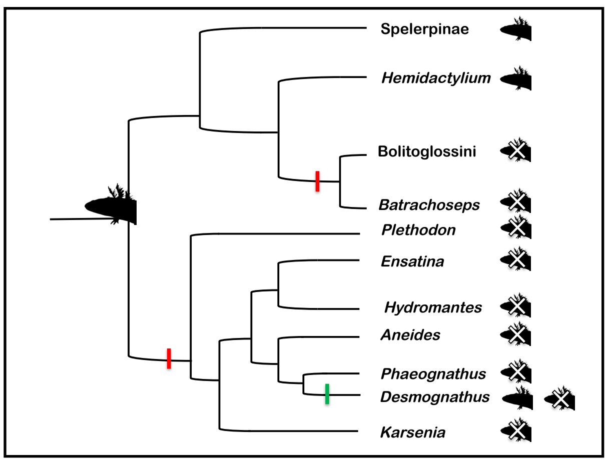
M. S. Min[1], S. Y. Yang[2], R. M. Bonett[3], D. R. Vieites[3], R. A. Brandon[4] & D. B. Wake[3]

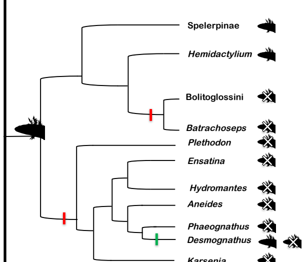
[1]*Conservation Genome Resource Bank for Korean Wildlife, and Brain Korea 21, School of Agricultural Biotechnology, Seoul National University, Seoul 151-742, South Korea*
[2]*Department of Biology, Inha University, Incheon 402-751, South Korea*
[3]*Museum of Vertebrate Zoology and Department of Integrative Biology, University of California, Berkeley, California 94720, USA*
[4]*Department of Zoology, Southern Illinois University, Carbondale, Illinois 62901, USA*





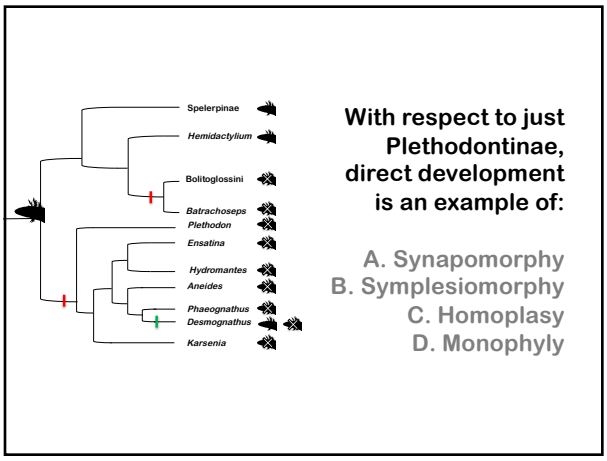






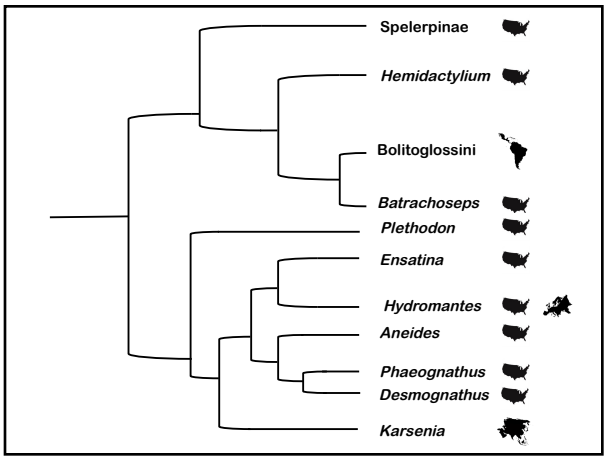
With respect to all of Plethodontidae, direct development is an example of:

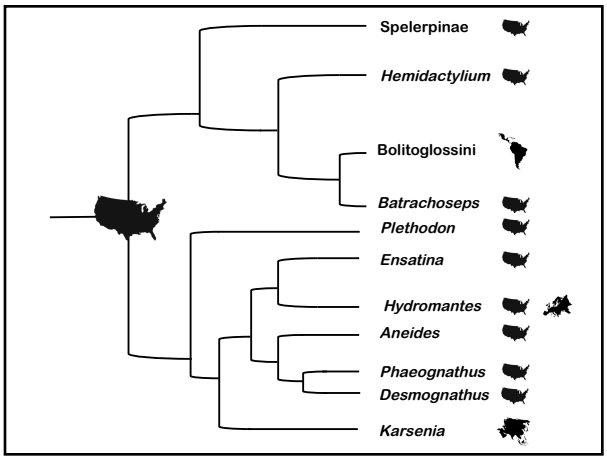
A. Homoplasy
B. Synapomorphy
C. Paraphyly
D. Paedomorphy

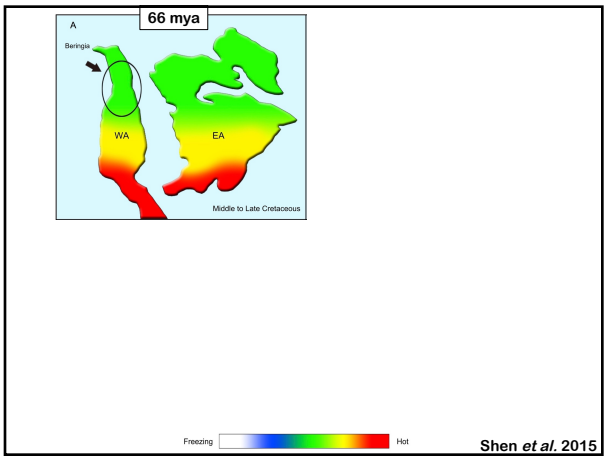


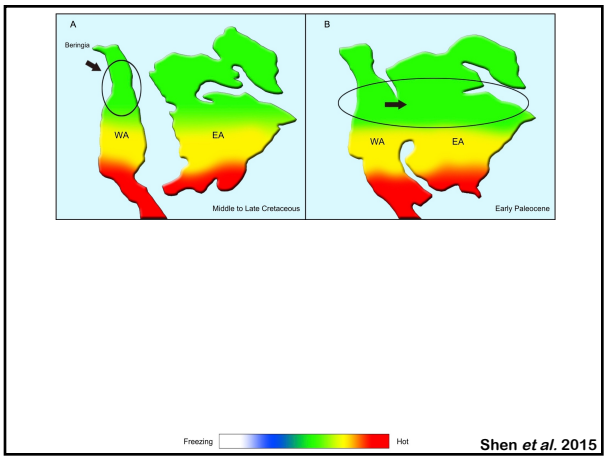
With respect to just Plethodontinae, direct development is an example of:

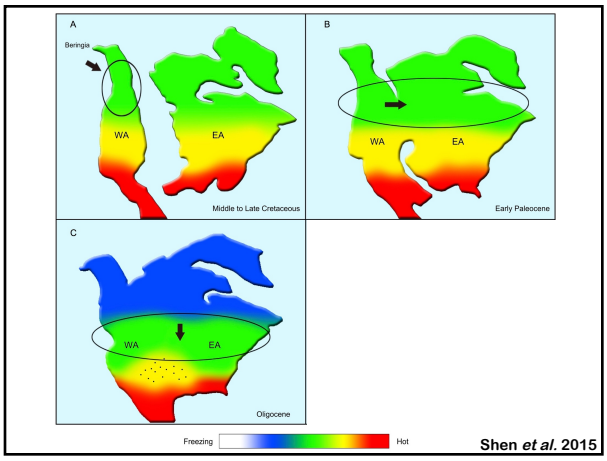
A. Synapomorphy
B. Symplesiomorphy
C. Homoplasy
D. Monophyly

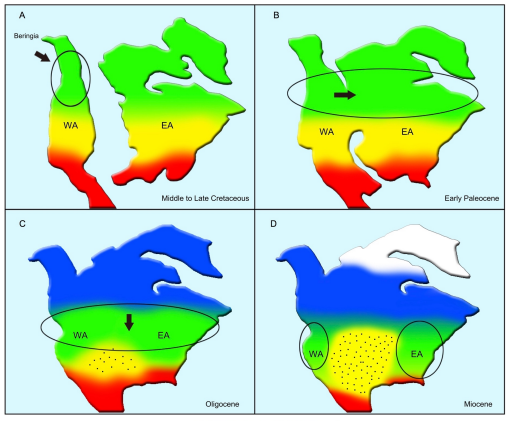





66 mya
A
Beringia
WA
EA
Middle to Late Cretaceous
Freezing
Hot
Shen *et al.* 2015

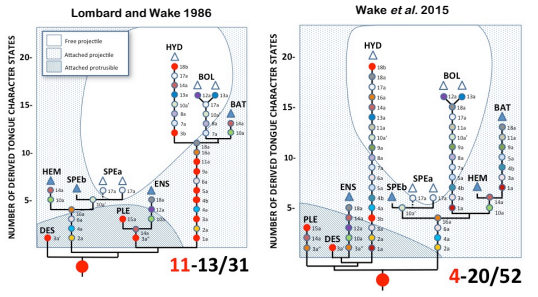

A
Beringia
WA
EA
Middle to Late Cretaceous
B
WA
EA
Early Paleocene
Freezing
Hot
Shen *et al.* 2015


A
Beringia
WA
EA
Middle to Late Cretaceous
B
WA
EA
Early Paleocene
C
WA
EA
Oligocene
Freezing
Hot
Shen *et al.* 2015



Shen *et al.* 2015

Unique synapomorphies vs. homoplastic characters/homoplastic events



[Slide adapted from David Wake]

1. Describe the global evolutionary and ecological diversity of salamanders and caecilians.
2. Describe major patterns in salamander evolution.


Source: Todd Pierson
questions?