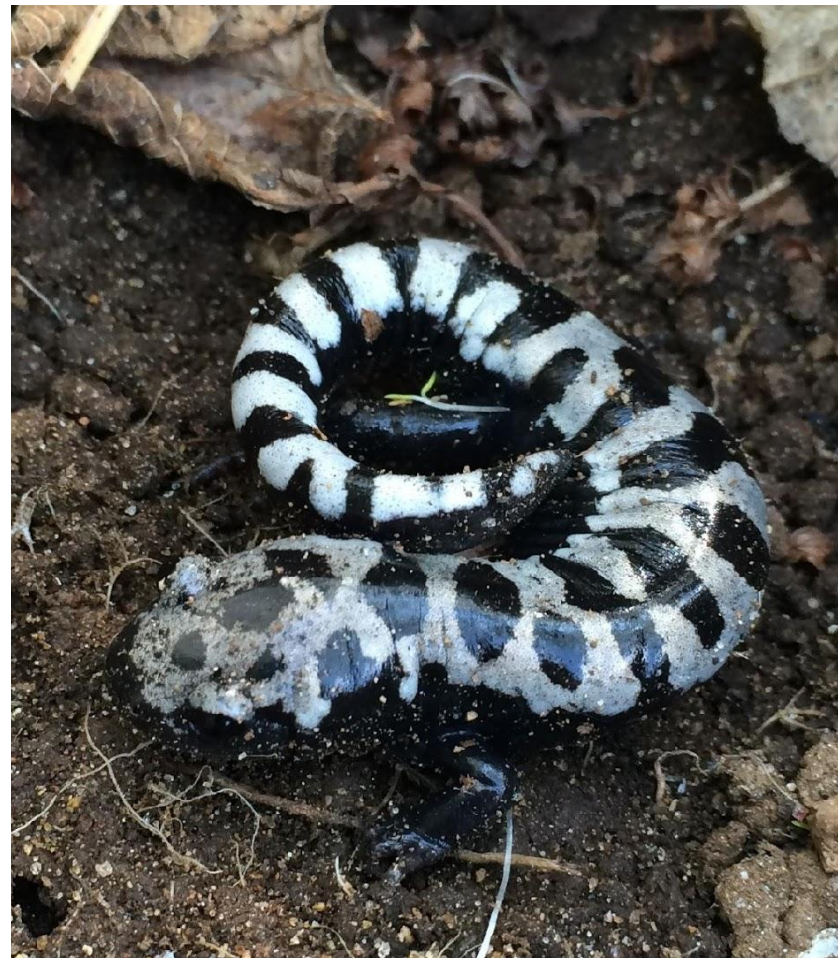


# Salamanders of Connecticut

Tuesday May 8th 2017



# Announcements!

Oops, sorry about posting the lecture notes...

How did you hear about Field Herpetology?

Please print and sign your name on the IACUC training form

A brief note about week 3 of Field Herpetology

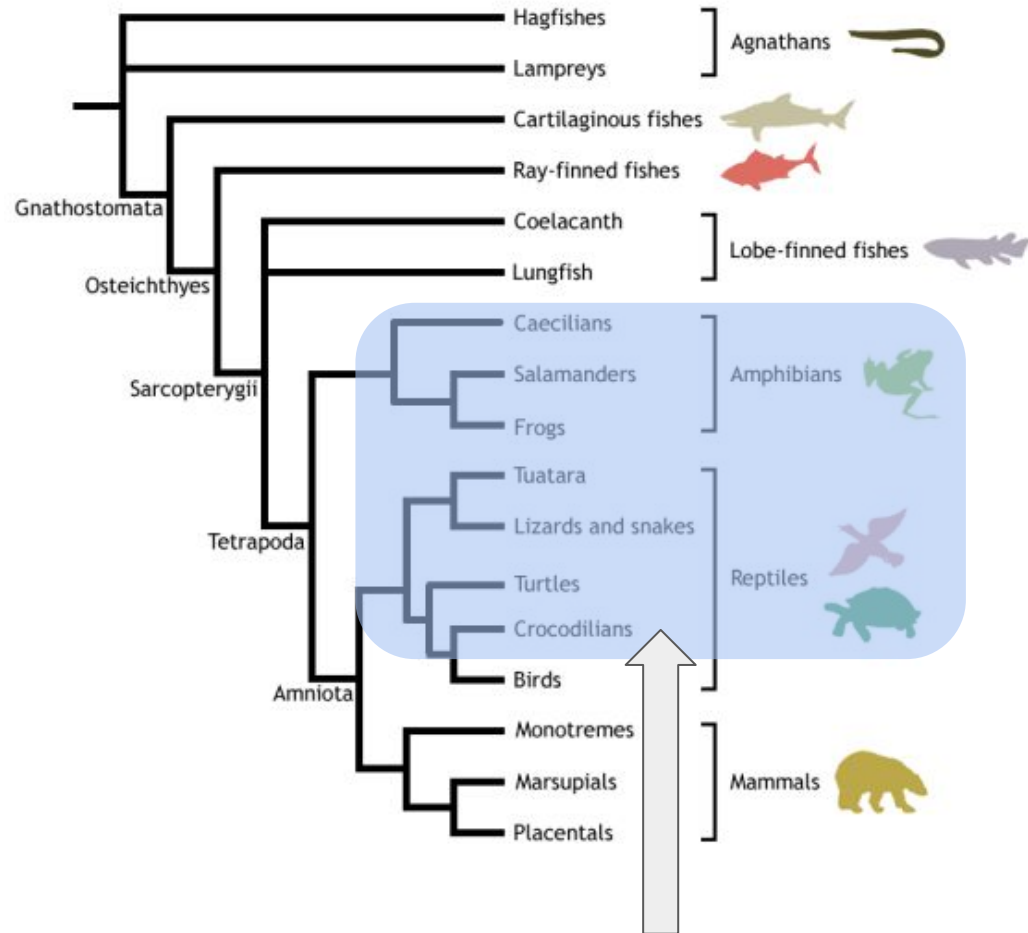
A change in location today

# Assignment #1: **5 Research Questions**

- In a **Word document**, send me 5 scientific questions based on your observations in the field, or just your curiosity
  - Name your file: LastName\_ResearchQuestions.docx
  - Email it to me with subject line: Field Herpetology Research Questions
- Due by 9am on Wednesday May 10th
- Expect feedback Wednesday afternoon
- My intention is to filter for ideas that you can feasibly test!

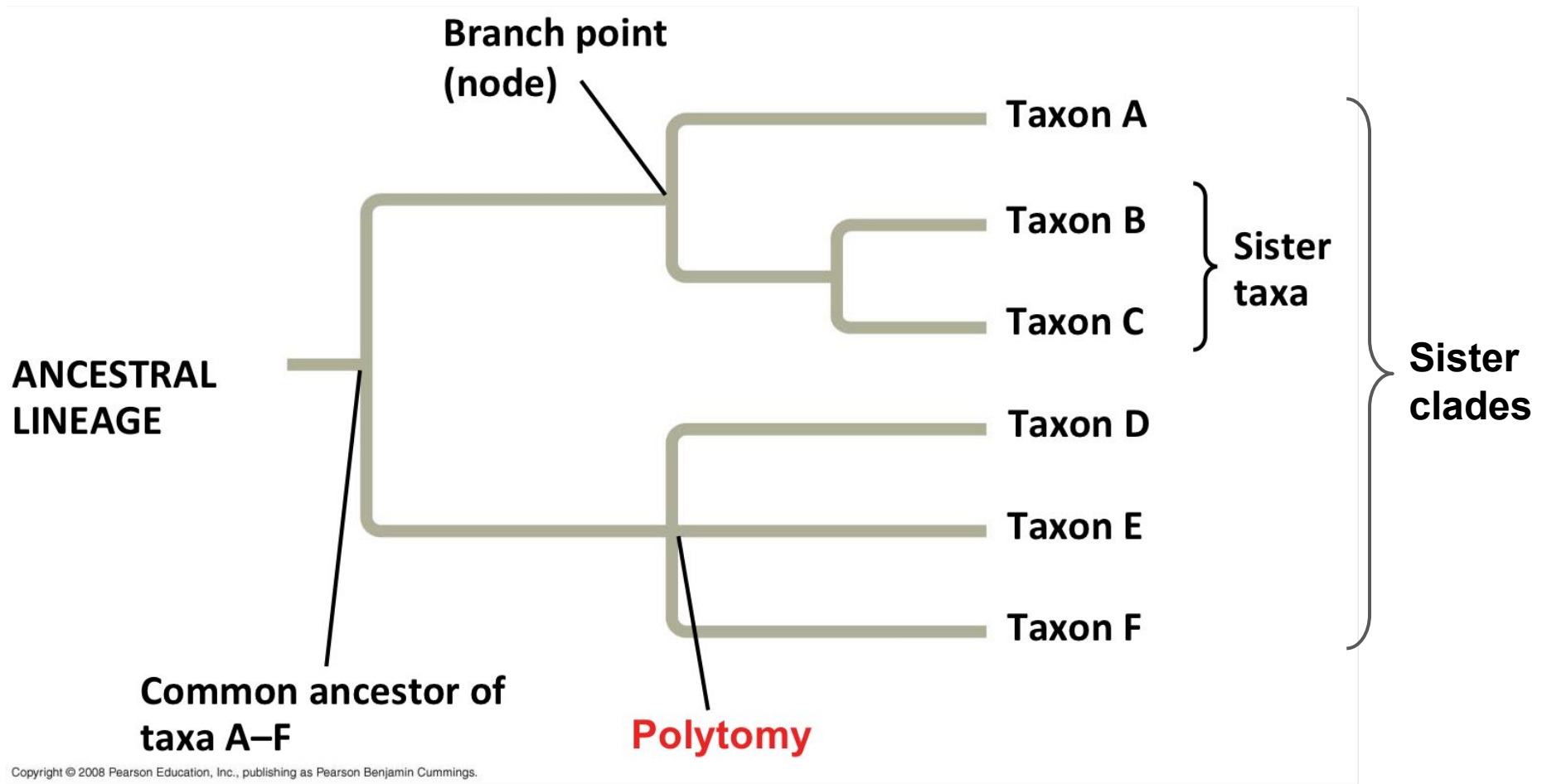
# Herpetology Systematics

- Oddly enough, **animals studied by herpetologists aren't a clade!**
- Herpetologists exist today because...
  - Historical precedent
    - People keep training those damn graduate students...
    - Also, thank Linnaeus
  - These animals share important similarities as terrestrial vertebrate ectotherms



**Animals studied by herpetologists.**

# Herpetology Systematics: **Some Terminology**



Kingdom, Phylum, Class, Order, Family, Genus, Species



# Class Lissamphibia: **Extant Amphibians**

Three major **orders**:



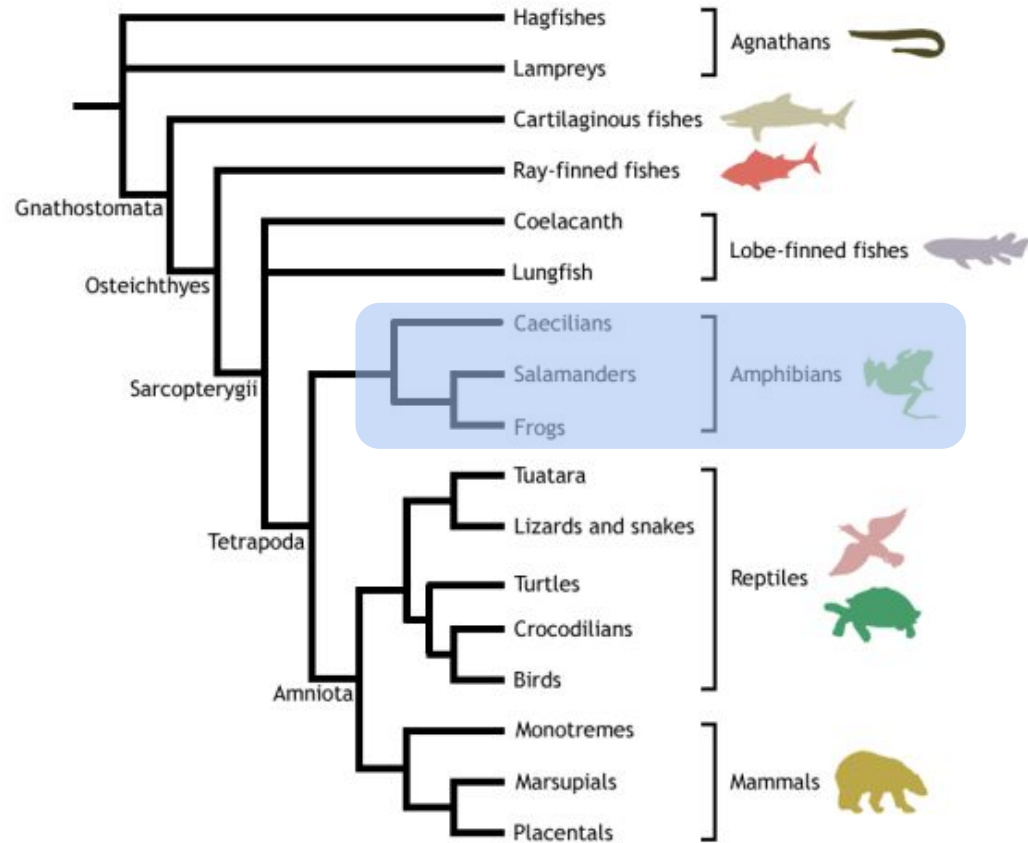
Gymnophiona  
(caecilians)



Caudata  
(salamanders)



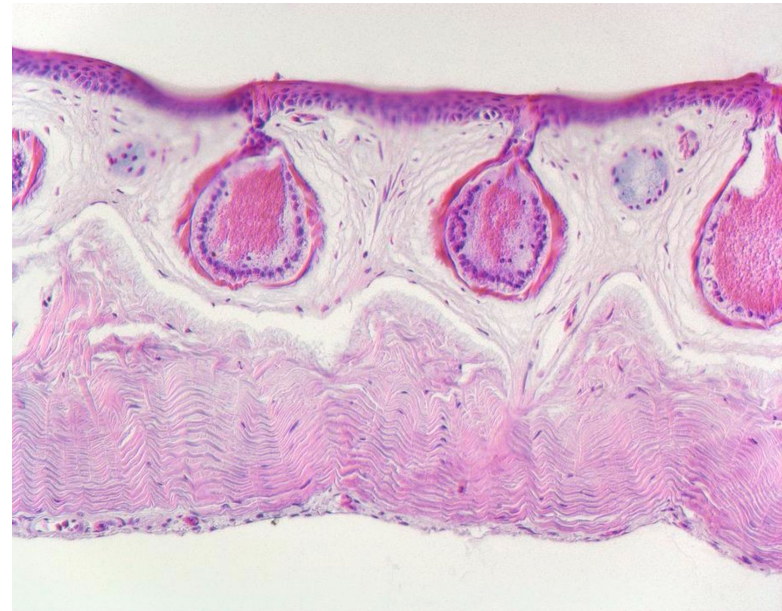
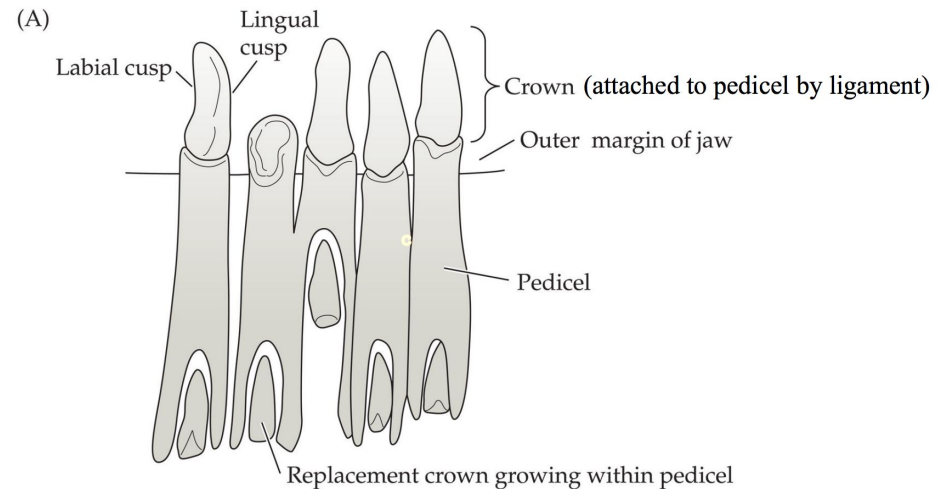
Anura  
(frogs)



# Class Lissamphibia: **Extant Amphibians**

## Shared characters:

- **Pedicellate & bicuspid** teeth
- The **operculum**, an inner ear structure
  - Attaches, via the opercular muscle, to the suprascapula (a pectoral girdle bone)
- The **papilla amphibiorum**, a patch of sensory cells in the inner ear
  - Receives low frequency sounds
- Broadly similar **skin structure**, containing **glands** and allowing **cutaneous respiration**



# Order Caudata: **Salamanders**

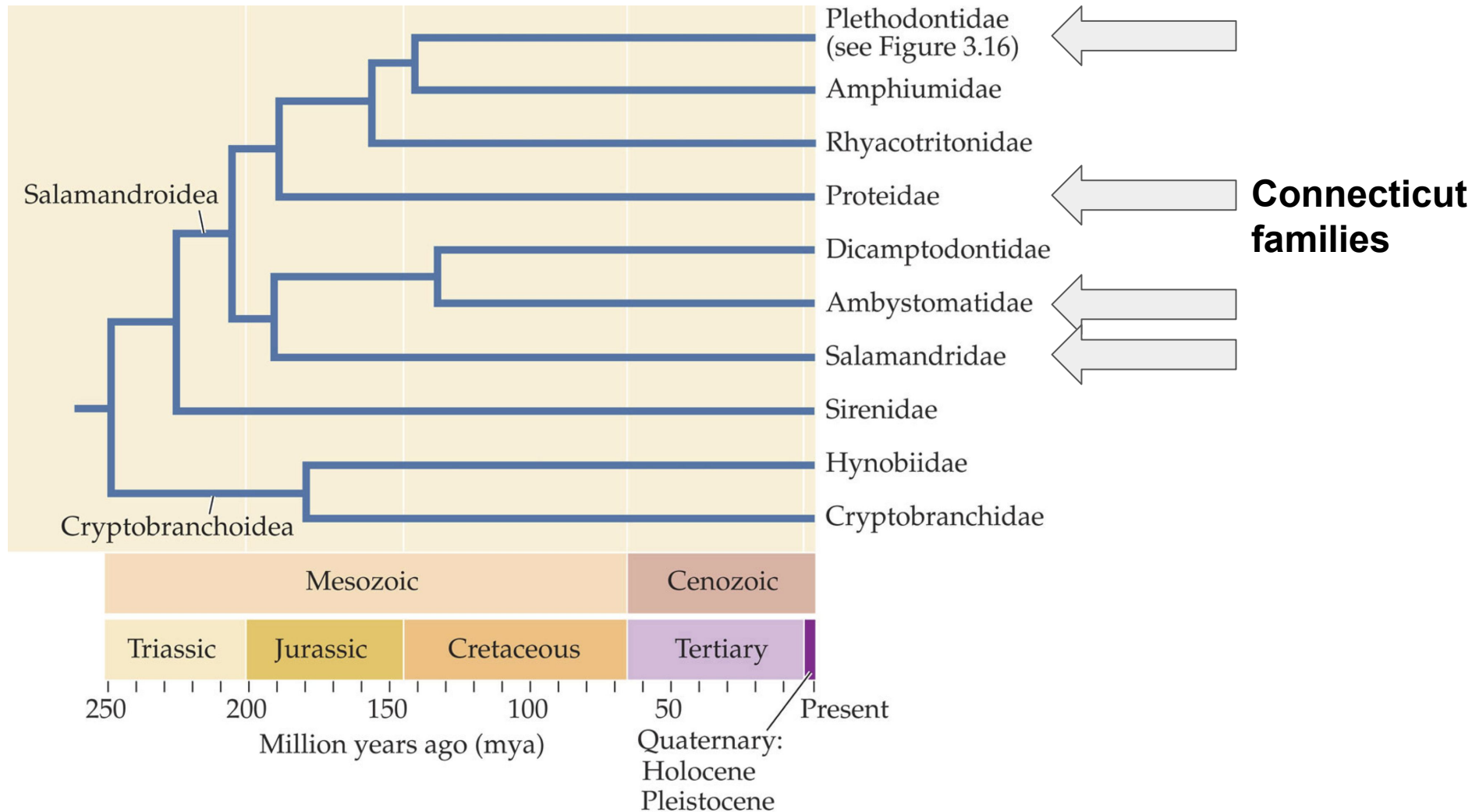
- Occasionally called “**Urodela**”
- 10 families with 600 species worldwide
- 4 families with 12 species in Connecticut
- Shared characters:
  - Elongate body form with tail
  - **Costal grooves**
  - Four limbs (unless later lost)



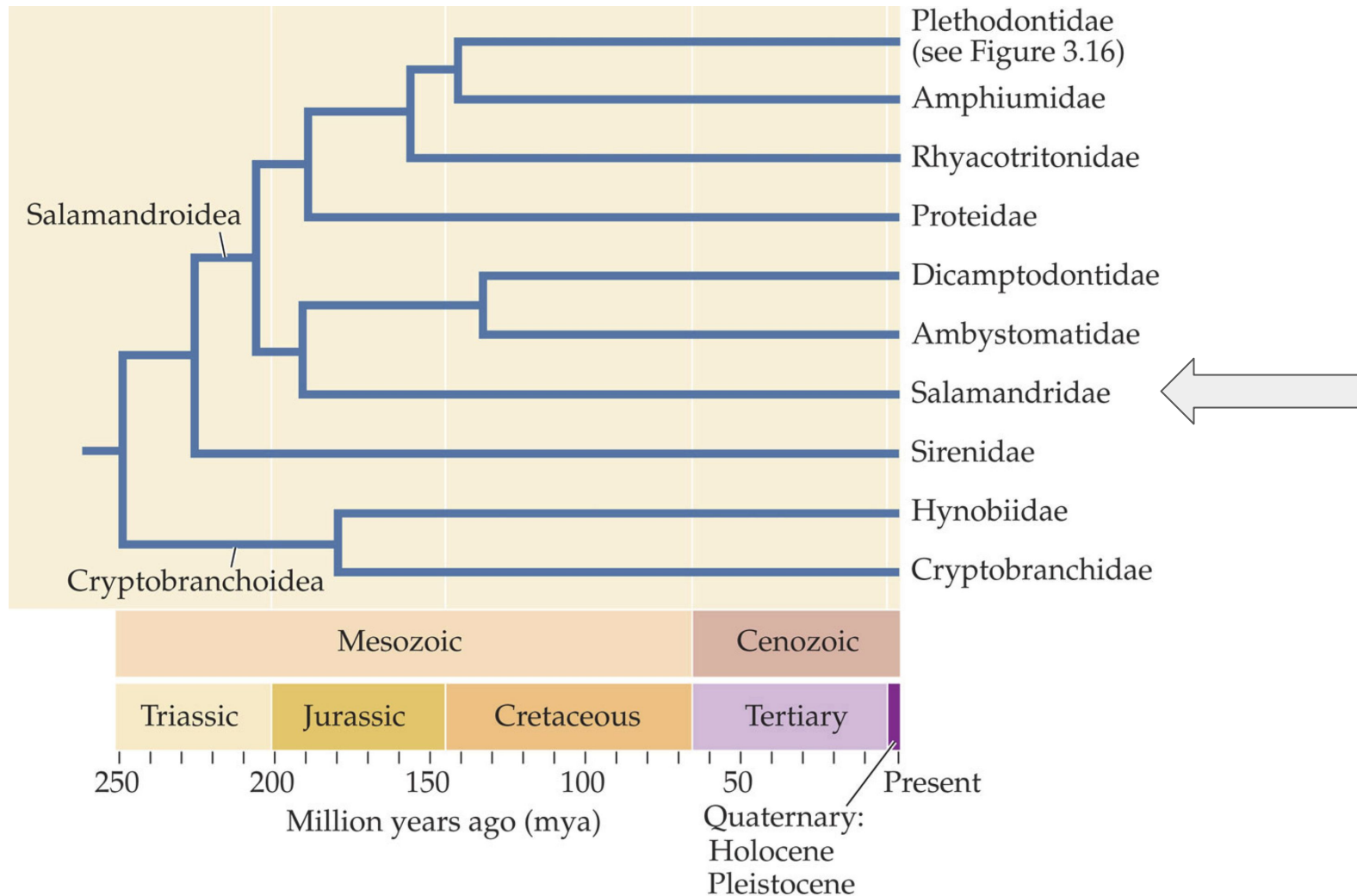
*HERPETOLOGY 4e, Figure 3.4*  
Photograph © blickwinkel/Alamy.



# Order Caudata: Salamanders



# Order Caudata: **Salamanders**



# Family Salamandridae: **Newts**

A diverse family,  
known for...

(A)



(B)



(C)



- Rough skin
- Absent or very subtle costal grooves
- Comparatively elongate limbs

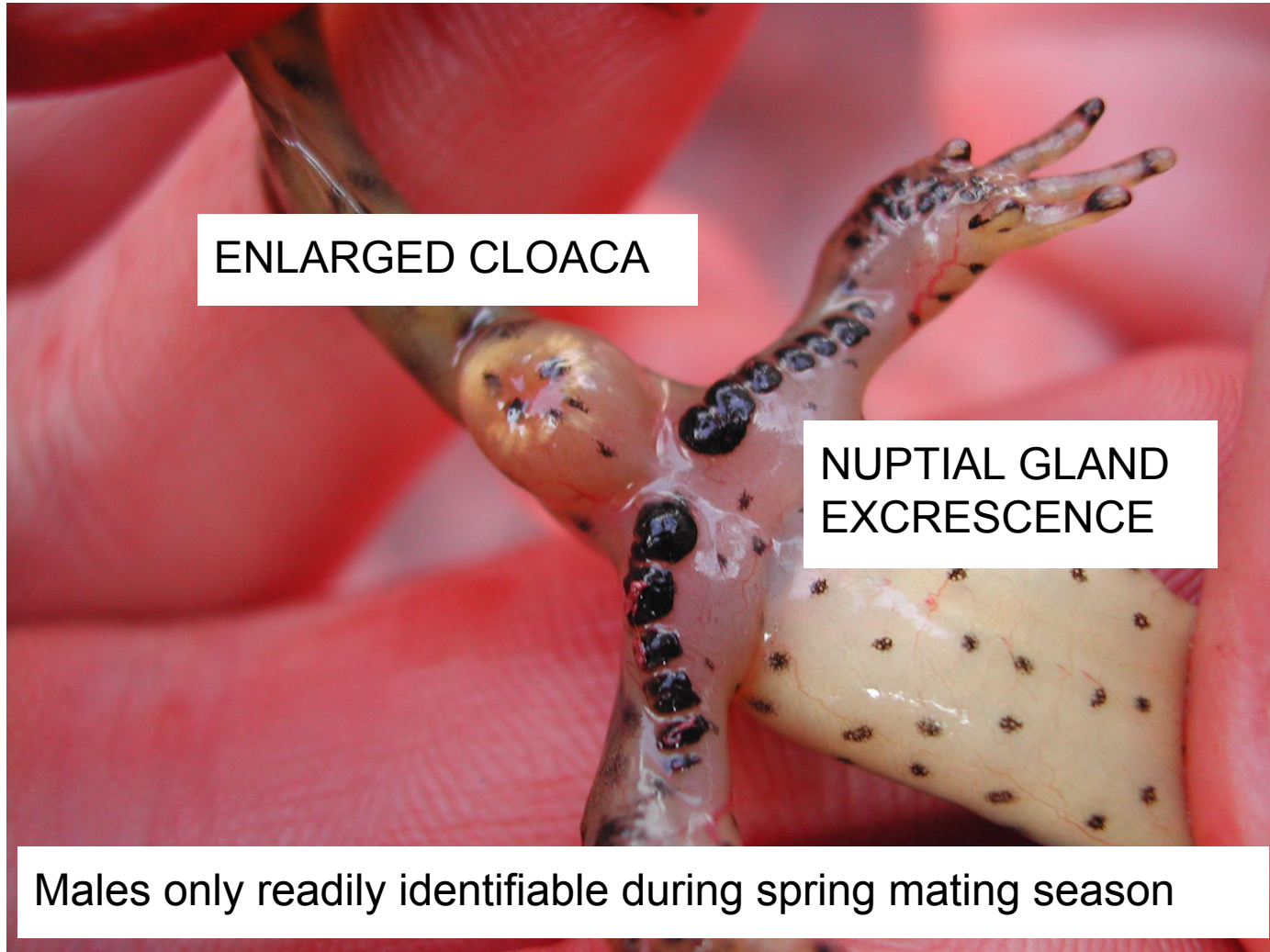
# *Notophthalmus viridescens*: Red Spotted Newt

- Only member of Salamandridae in CT
- Common throughout the state
- Three stage life cycle.
  - Aquatic larva
  - Terrestrial eft
  - Aquatic adult
- Toxic

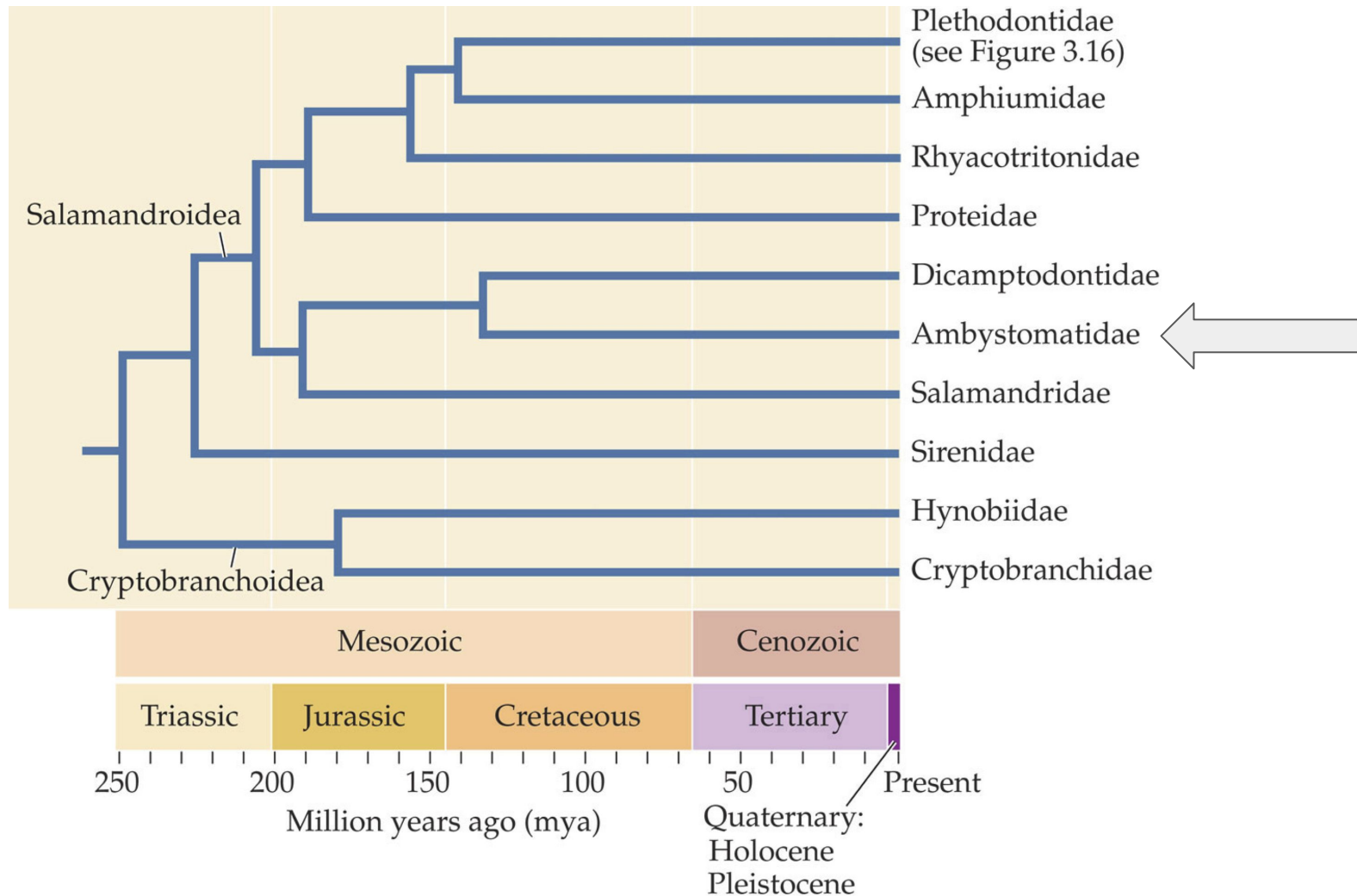




# *Notophthalmus viridescens*: **Red Spotted Newt Males**



# Order Caudata: **Salamanders**



# Family Ambystomidae: **Mole Salamanders**

- A salamander family with only one genus, **Ambystoma**
- Typically large, short and fat salamanders with pronounced costal grooves
- Have egg sacks covered by a jelly-like substance, may appear green due to symbiosis with green algae
- 4 species in CT



# Family Ambystomidae: Mole Salamander Males & Females



**Males:** enlarged cloaca, especially during breeding season



**Females:** always a relatively smaller cloaca, similar in width to the tail



# *Ambystoma maculatum*: Spotted Salamander

- Largest salamander of the state, heavy-bodied
- Common in CT
- Spends much of the year underground
- Comes out to breed early in the **spring**, migrates en masse to vernal pools
- May see some in the meadow by the Fenton!



# *Ambystoma opacum*: Marbled Salamander

- Prefers drier, almost sandy-like soil
- Common in CT
- Can also sex by subtle color differences:
  - Males are bright white and smaller
  - Females are silver and larger
- Comes out to breed early in the **fall**, migrates en masse to permanent ponds
  - Larvae overwinter in these ponds



# *Ambystoma laterale*: **Blue Spotted Salamander**

- Smaller than *A. maculatum* and *A. opacum*
- DEEP Status: **SPECIAL CONCERN**
- Thought to prefer more swamp and marsh-like habitat
- Breed VERY early in the **spring**, hard to spot any other time
- Populations isolated near border with Rhode Island (Quinebaug River + Valley), but mostly west of CT River (West Hartford, Farmington, Avon)



©2008 John P. Clare



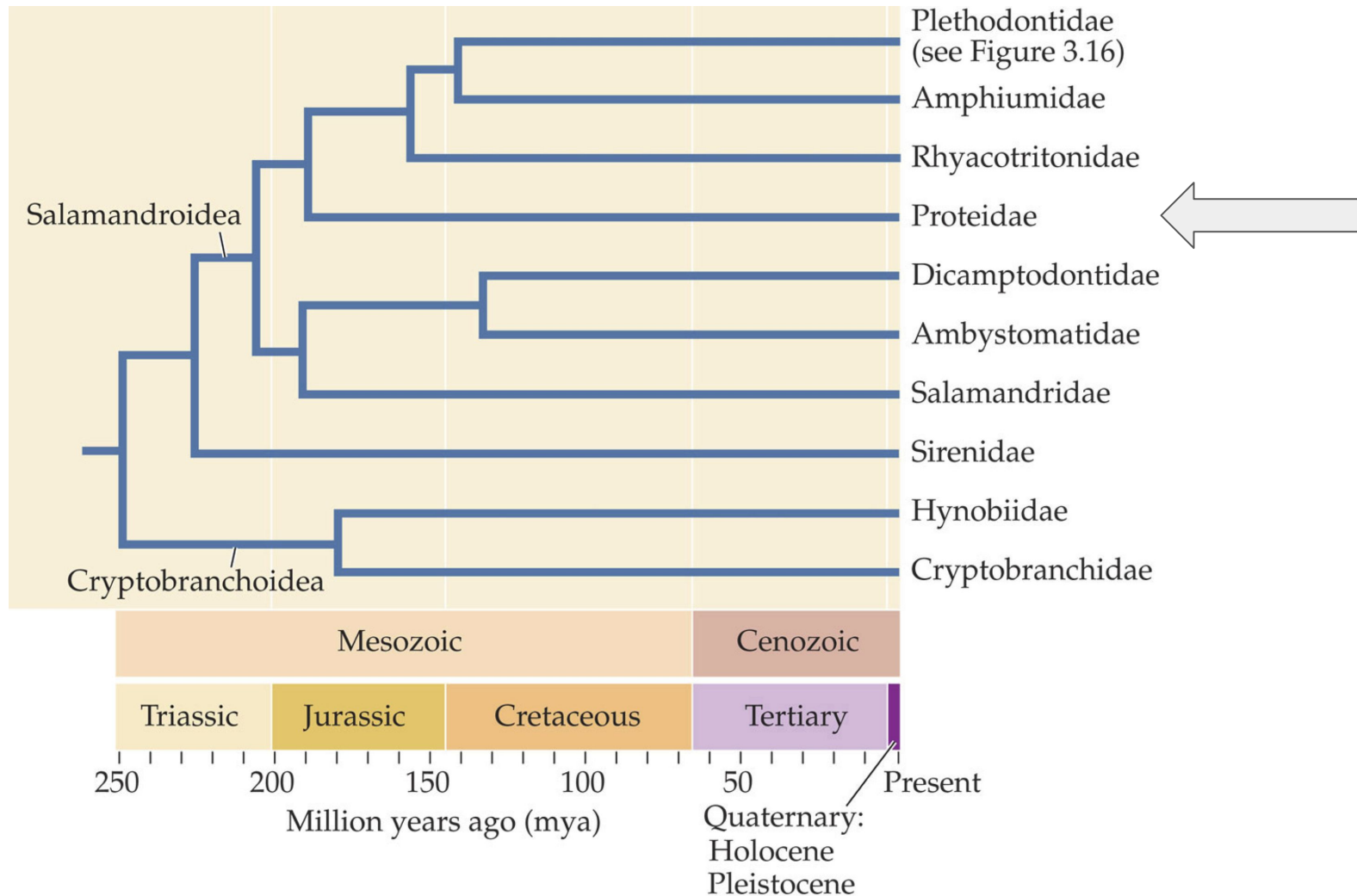
# *Ambystoma jeffersonianum*: **Jefferson's Salamander**



- Slightly larger than *A. laterale*
- DEEP Status: **SPECIAL CONCERN**
- Only found west of the Connecticut River
- Rarely seen outside of the breeding season
  - Breed VERY early in the **spring**
  - Tend to be found more in vernal pools



# Order Caudata: **Salamanders**



# Family Proteidae: Mudpuppies & Olms

- Two genera: the American *Necturus* and the European *Proteus*
- All of these salamanders are large and pedomorphic (they retain their juvenile external gills)
- One species in Connecticut

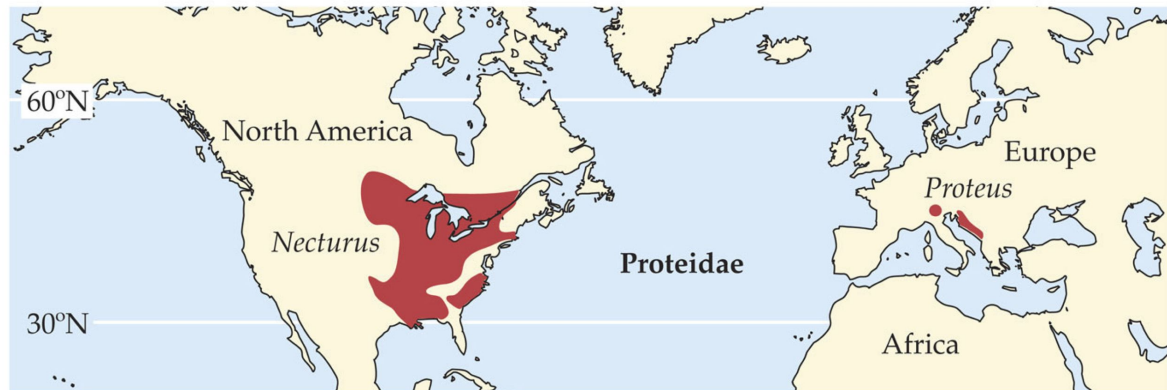
(A)



(B)



(C)



HERPETOLOGY 4e, Figure 3.13

© 2015 Sinauer Associates, Inc. (Photographs: A, courtesy of Todd W. Pierson; B, © Hodalic/Nature Picture Library/Corbis.)

# *Necturus maculosus*: Common Mudpuppy



- Collections exist from the 1870s, but possibly reintroduced in the 1950s from biology labs
- Most are found in CT River and tributaries, and other larger permanent bodies of water
- Mostly nocturnal, spend the day in burrows at the bottom of the water
- Mate and lay eggs through late fall until early spring

Where  
am I  
from  
?!?!



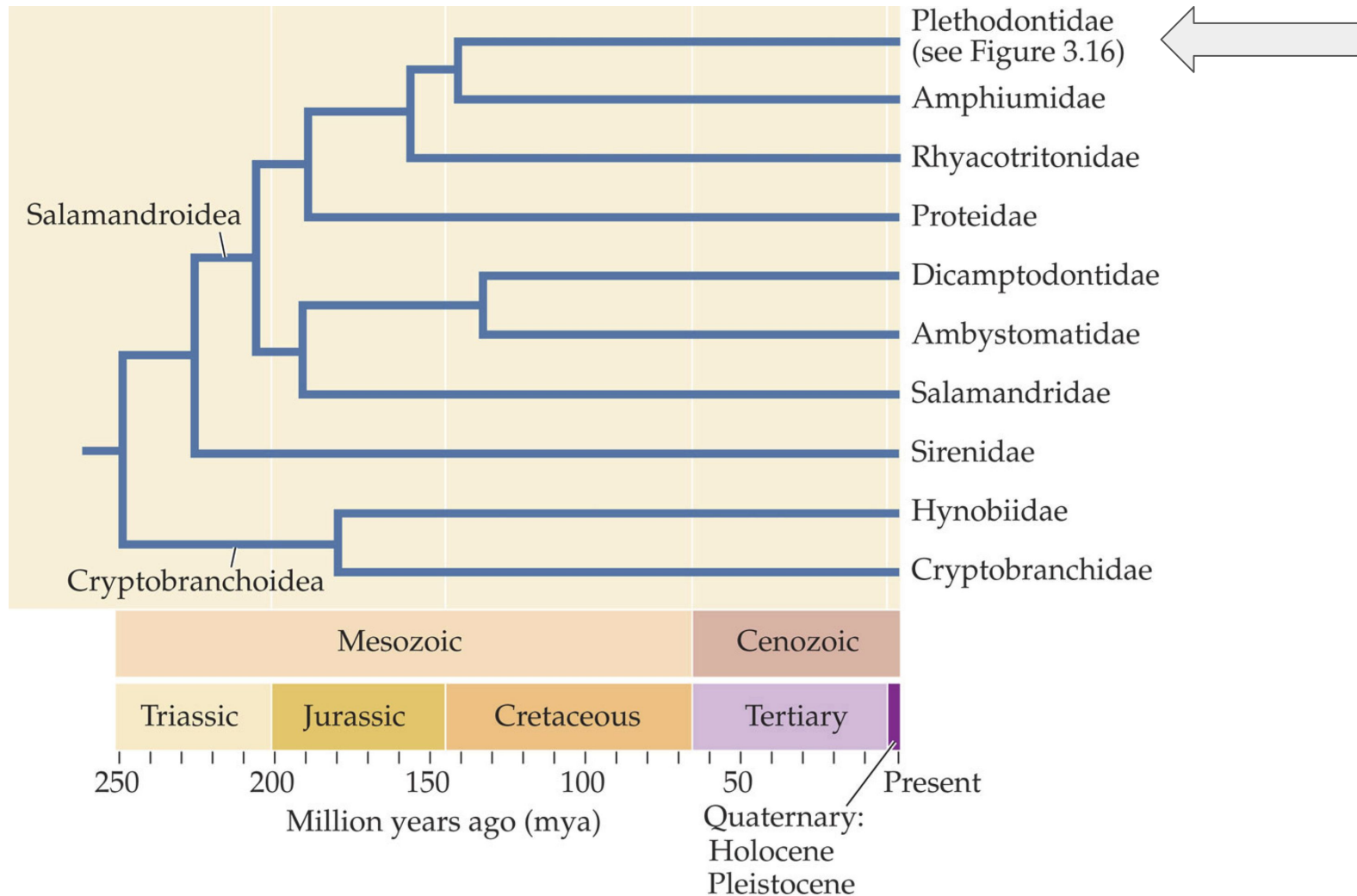
# *Necturus maculosus*: **Common Mudpuppy Males**



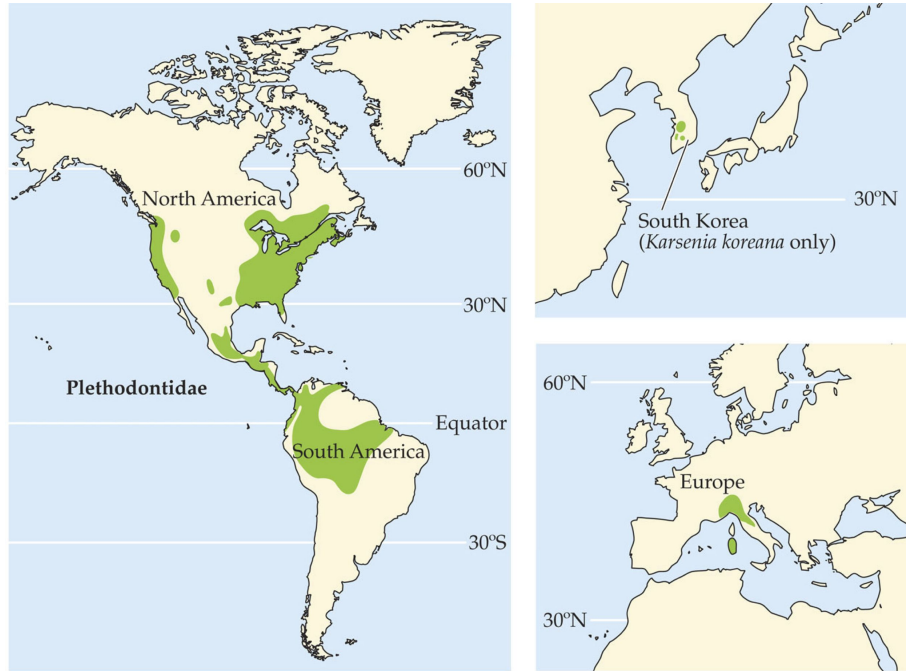
**Males:** enlarged cloaca,  
especially during  
breeding season



# Order Caudata: **Salamanders**



# Family Plethodontidae: Lungless Salamanders



HERPETOLOGY 4e, Figure 3.17  
© 2015 Sinauer Associates, Inc.

- The most species rich group of salamanders in the world



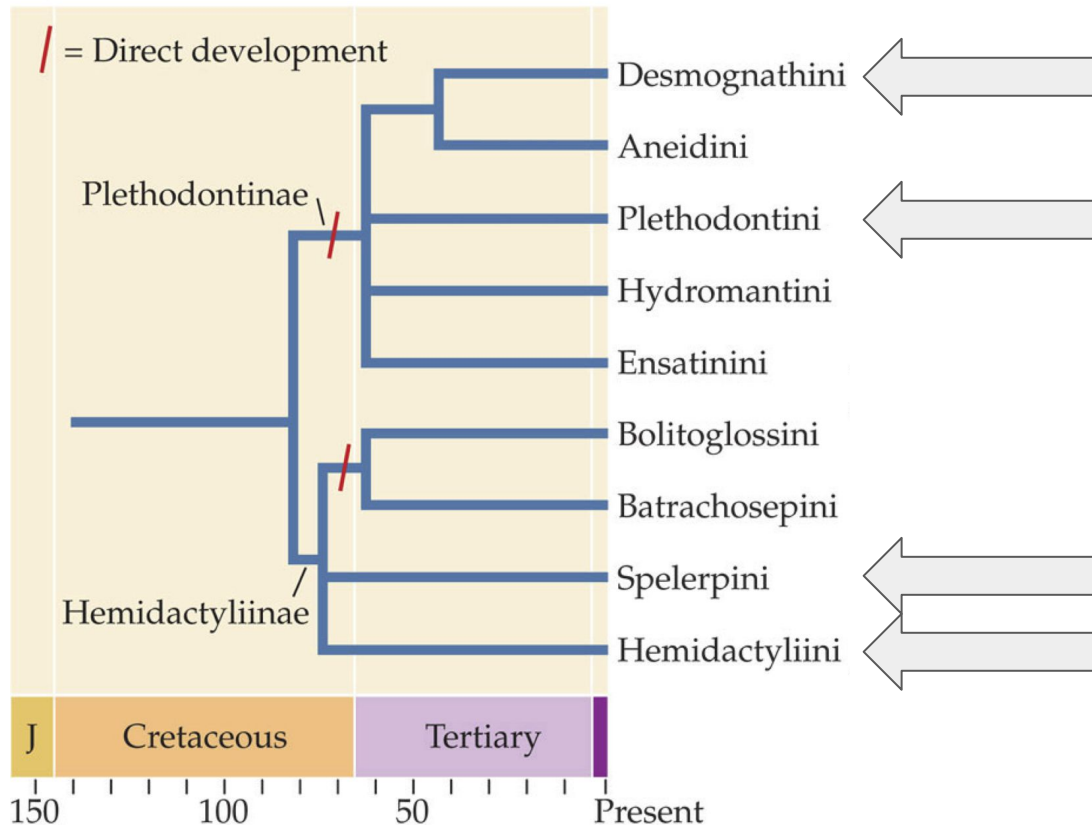
HERPETOLOGY 4e, Figure 3.16 (Part 2)

Photographs: B–D, G–J, courtesy of Todd W. Pierson; E, courtesy of Daniel M. Portik; F, courtesy of L. Lee Grismer.

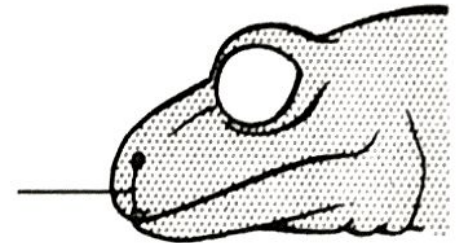
- A huge variety of lifestyles
  - Fossorial
  - Terrestrial
  - Aquatic
  - Arboreal

# Family Plethodontidae: Lungless Salamanders

(A)



- Separated into “tribes” - Connecticut has 4 tribes of plethodontids
- All plethodontids possess a **nasolabial groove**





# Family Plethodontidae: Lungless Salamander Males & Female



**Female**



**Male**

**Males:** square nose due to presence of **cirri**, mustache like protrusions from upper lip used to deliver pheromones

**Females:** rounded nose, no cirri present



TODD PIERSON 2011

**Males:** also have an enlarged **mental gland** underneath their chin during mating season, produces pheromones



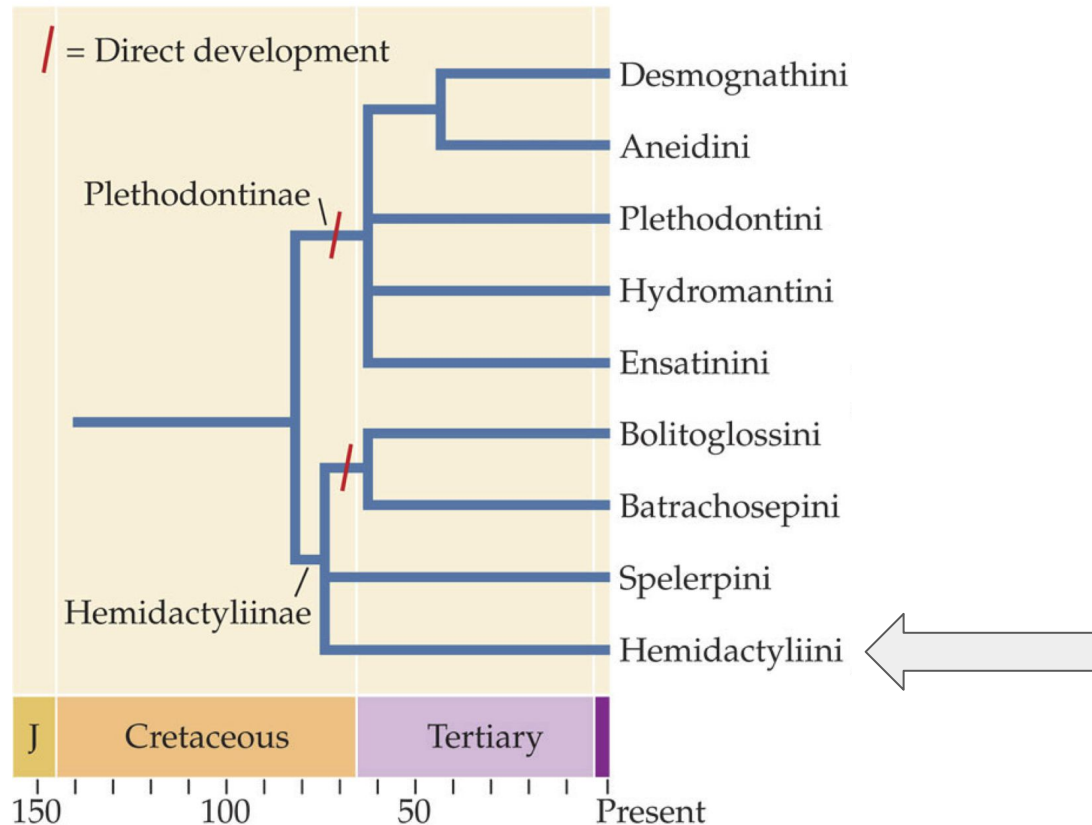
# Family Plethodontidae: Lungless Salamander Males & Female



**Females:** gravid females (those carrying eggs) can be identified in some species, like *Plethodon cinereus* and *Eurycea bislineata*

# Family Plethodontidae: Lungless Salamanders

(A)





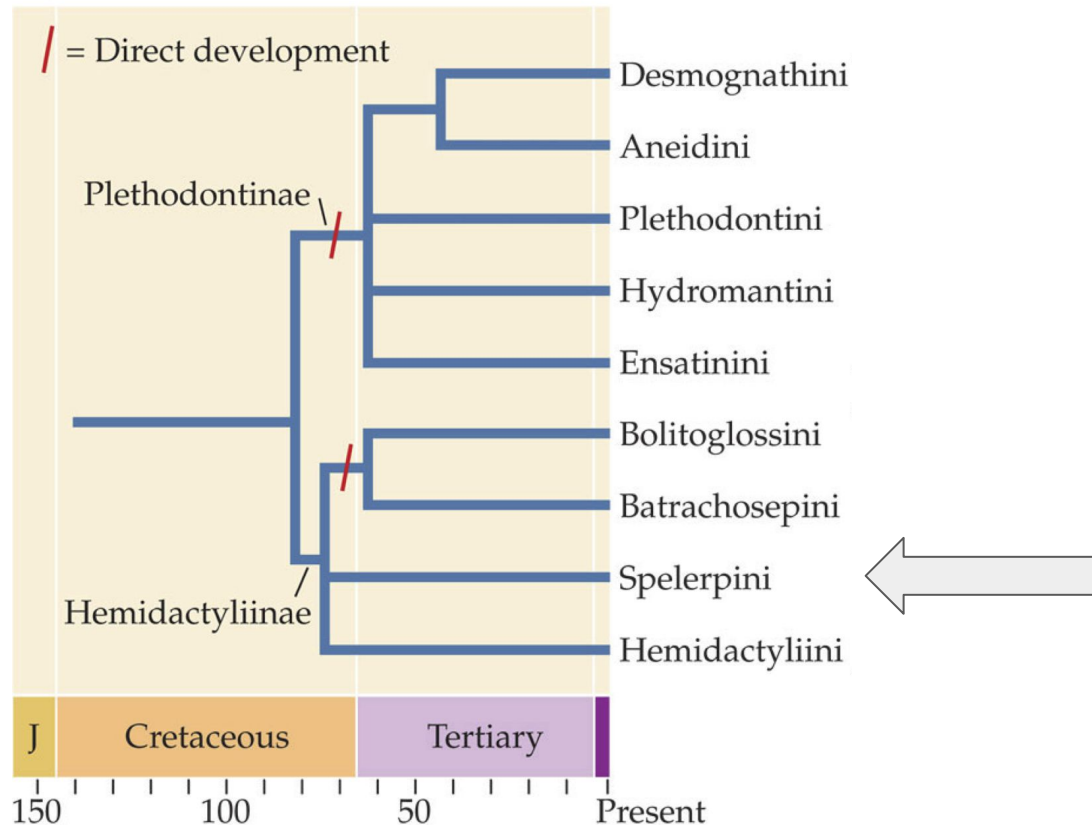
# *Hemidactylum scutatum*: Four Toed Salamander

- The only species in the entire tribe!
- Common in CT
- Reddish-brown back, with a black-flecked white underbelly
  - Also, if you look closely, only have four toes on hind limb
- Lays their eggs under sphagnum mats in bogs and marshes in late spring
- Females guard eggs
- **Aquatic larvae, terrestrial adults**



# Family Plethodontidae: Lungless Salamanders

(A)





# *Eurycea bislineata*: Two Lined Salamander

- Slender body, yellow colored
- Mostly an in-stream or stream-side salamander
- Eggs are laid on the underside of stones in the stream
- Females guard eggs
- **Aquatic larvae, aquatic adults**



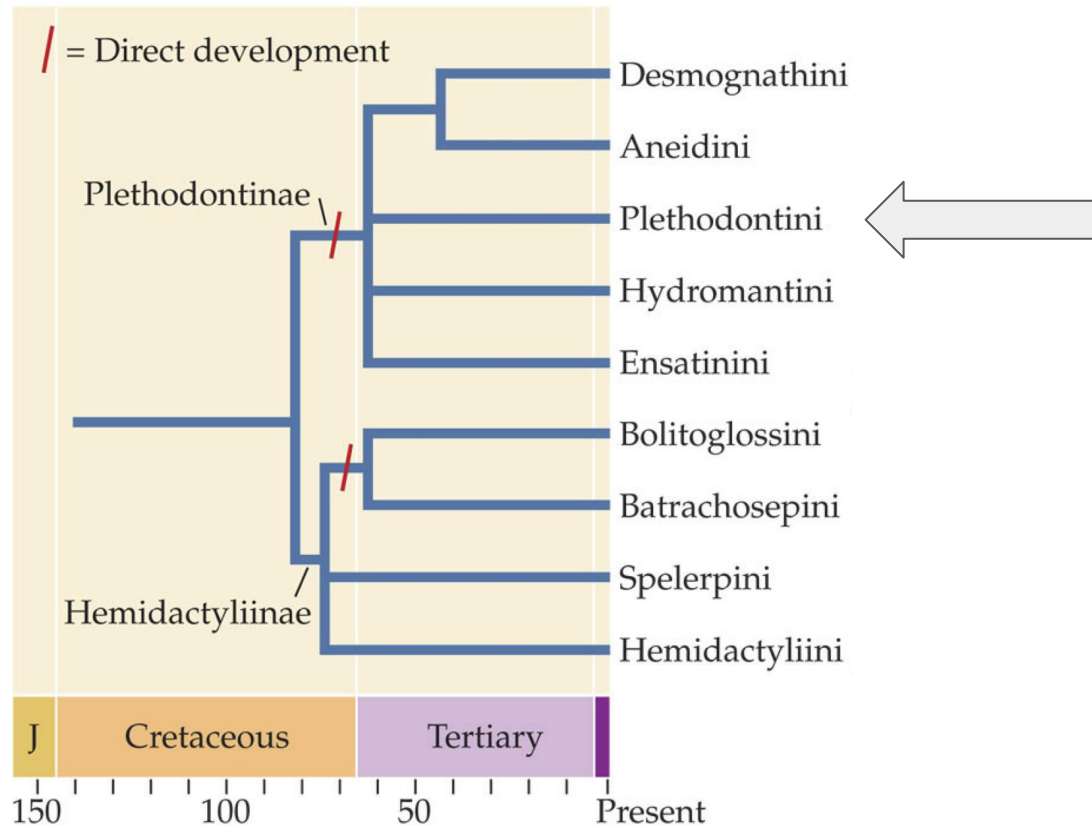
# *Gyrinophilus porphyriticus*: Spring Salamander

- DEEP Status: **THREATENED**
- Large, mostly aquatic predator of smaller salamanders
- Uncommon, but typically found in pristine cold, seepage areas in the “uplands”
- Breeds mid-October, female guards eggs in the water under submerged rocks & logs, eggs hatch in the spring
- **Aquatic larvae, aquatic adults**



# Family Plethodontidae: Lungless Salamanders

(A)





# *Plethodon cinereus*: Red-backed Salamander

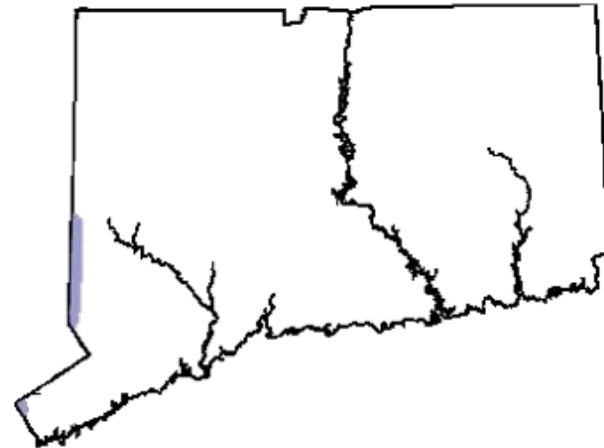
- Most common salamander in this region
- **Completely terrestrial lifecycle**
  - Directly develops into a terrestrial subadult, skipping aquatic larvae
- Very phenotypically diverse...but why?
  - Red-stripe morph
  - “Lead” morph
  - Red erythristic morph (mimic of *N. viridescens*?)





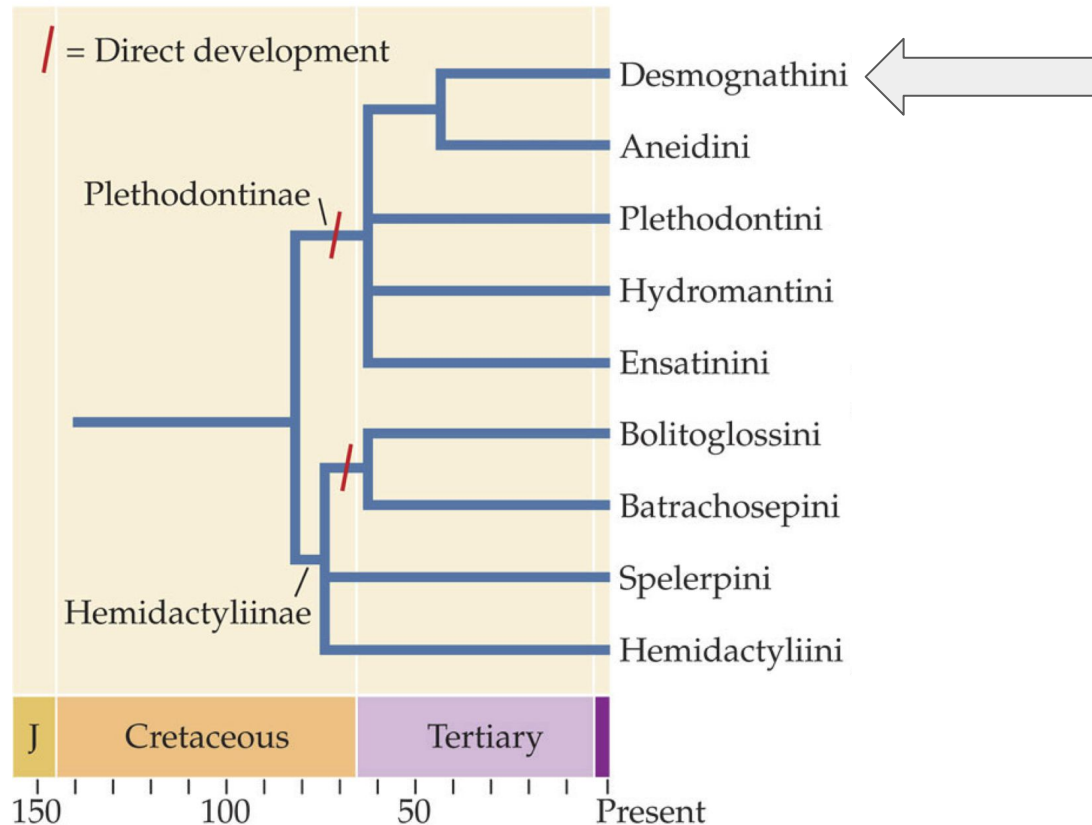
# *Plethodon glutinosus*: Slimy Salamander

- DEEP Status: **THREATENED**
- Like *P. cinereus*, has a **completely terrestrial lifecycle**
- Larger than *P. cinereus*
  - So big you could mistake it for an *Ambystoma*
- Main defense mechanism is create large amounts of slime
- Is at the northern most itty bitty part of its range in CT



# Family Plethodontidae: Lungless Salamanders

(A)



# *Desmognathus fuscus*: Northern Dusky Salamander

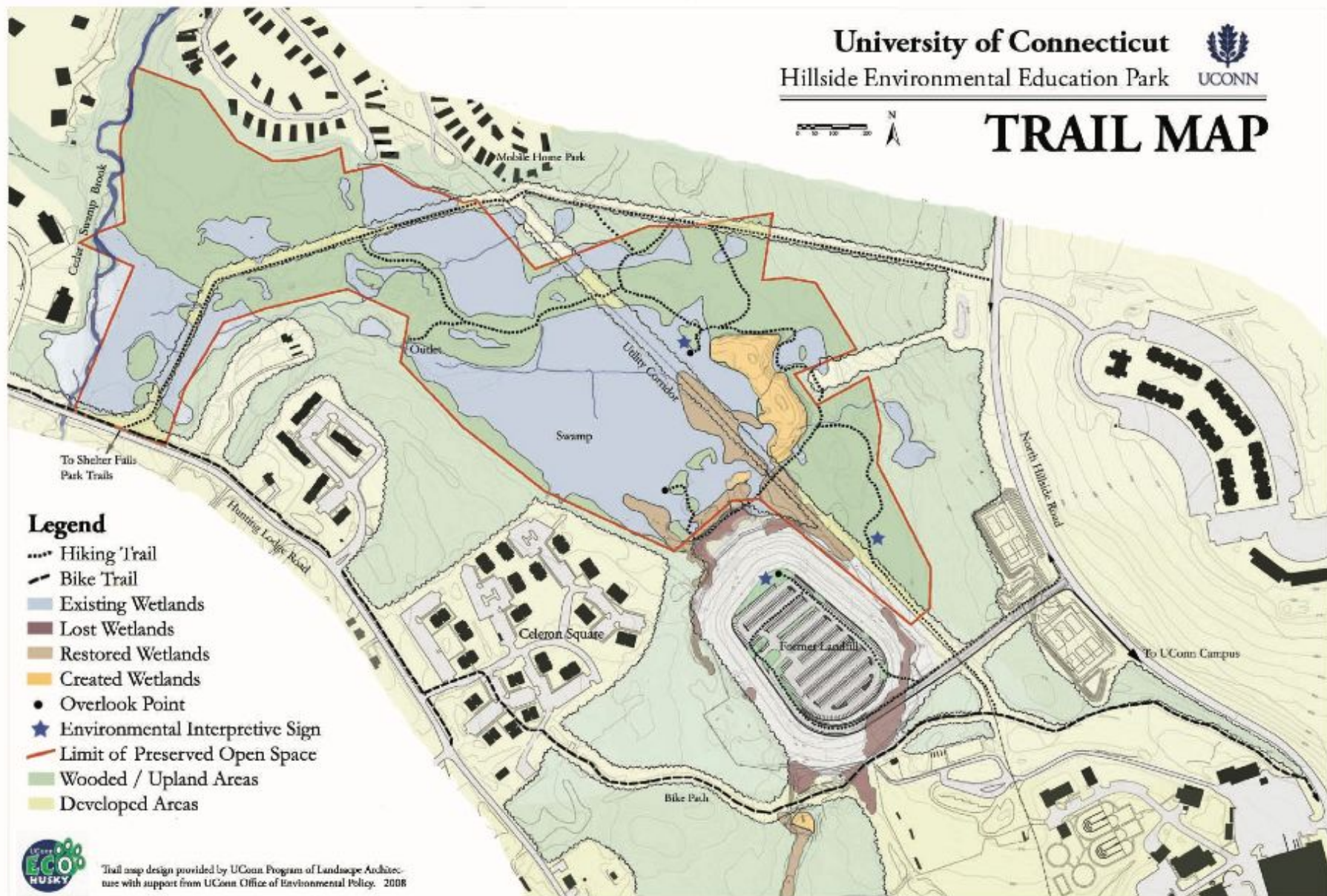
- Shorter and stouter than other Plethodontids
  - Hind limbs larger, wider
- Subtle line beneath the eye
- **Always in or near water**
- Common, but only in streams with plenty of leaf litter
- Eggs laid in damp mud nests
  - Larvae and juveniles in the stream litter itself
- Re-evolved aquatic larvae!







# TRAIL MAP



## Legend

- ..... Hiking Trail
- - - - - Bike Trail
- Existing Wetlands
- Lost Wetlands
- Restored Wetlands
- Created Wetlands
- Overlook Point
- ★ Environmental Interpretive Sign
- Limit of Preserved Open Space
- Wooded / Upland Areas
- Developed Areas



Trail map design provided by UConn Program of Landscape Architecture with support from UConn Office of Environmental Policy. 2008