

Practice questions, Herpetology test 2, 2017

1 Draw the most plausible phylogenetic tree of Ascaphidae, *Alligator mississippiensis*, Ranidae, *Ambystoma*, *Plethodon*, *Triadobatrachus*, snapping turtles, *Caiman crocodilus*, *Gavialis gangeticus*, *Tomistoma schlegelii*.

2 Give a node-based definition for the group-name Reptilia. Give a stem-based definition for Sauropsida, which includes the extant Reptilia and its fossil sister species that evolved after the evolutionary split of Reptilia and Mammalia.

3 Describe a herpetological example where phylogenetic rooting position is important for explaining differences between results from different studies.

4 Give two synapomorphies for each of the following groups. Also describe each synapomorphy in terms of its structure.

Anura
Gymnophiona
Testudines
Amphibia

5 Describe functions of the turtle shell.

6 Describe the history of studies of the relationships of the three major lineages of amphibians (relative to each other, not within lineages). What relationships have been suggested for these lineages, what evidence has been offered, and what relationships are preferred today?

7 What is paedomorphosis? List two species of salamanders that evolved paedomorphic traits convergently. Also list two species of salamanders for which paedomorphic traits are homologous.

8 How can you distinguish Sirenids from Amphiumids?

9 Approximately how many species are recognized in the Family Plethodontidae?
(2, 25, or 350)

How many species are in the family Ascaphidae? (2, 25, or 350)

10 Contrast internal fertilization in frogs, salamanders, and caecilians.

11 Describe the skin of amphibians, including unusual traits relative to other Tetrapods.

12 List some characteristics that vary between caecilian species.

- 13 Describe the history of phylogenetic studies of reptiles, including alternative hypotheses, problem taxa, and current studies.
- 14 Contrast the skull of a caecilian with the skull of a frog.
- 15 Discuss the history of phylogenetic analyses of Anura. Include discussion of major taxonomic groups, phylogenetic approaches, data, and authors. What hypothesis is currently favored?
- 16 List five Families of salamanders. For each Family, list some anatomical trait members of this Family possess that is not shared by all salamanders.
- 17 List five Families of frogs. For each Family, list some anatomical trait members of this Family possess that is not shared by all frogs.
- 18 List five Families of turtles. For each Family, list whether the members of that family are aquatic, terrestrial, or both; and whether they are cryptodire or pleurodire. Anatomically, how could you assess whether a given turtle was cryptodire or pleurodire?
- 19 List genera of Crocodylians. For each genus, state whether the members of that genus are more closely related to *Crocodylus rhombifer* or to *Alligator mississippiensis*.
- 20 Describe parental care in crocodylians.
- 21 Which of the following is true? Explain your answer.
- a. *Triadobatrachus* is more closely related to frogs than to salamanders
 - b. *Triadobatrachus* is approximately equally related to salamanders and frogs but more distantly related to caecilians
 - c. *Triadobatrachus* is approximately equally related to salamanders, frogs, and caecilians
- 22 Characterize the following groups as arboreal, fossorial, aquatic, and/or terrestrial (list all terms that apply).

Gymnophiona
Caudata
Typhlonectes
Anura
Hylidae
Pipidae
Rhinophrynidae
Ambystomatidae

Chelonidae
Testudinidae

23 Do caecilians engage in parental care? If so, describe an example.

25 Describe the hearing system(s) of amphibians.

26 Members of which amphibian group have a tentacle? What is a tentacle?

27 A new Family, Chikilidae, was erected for some species of Gymnophiona found in India. Did the rules and standards of taxonomy require that a new Family be erected, based on the results presented by Kamei et al. (2012)? If not, what other options were available to the authors? Suggest a valid, existing, alternative Family name for the caecilians assigned to Chikilidae.

28 Wilkinson et al. and Pyron and Wiens propose alternative taxonomies of Caecilians. Argue (present evidence, use logic) in favor of one of these systems, or argue that they are equally valid.

29 Discuss alternative arrangements of jaw-closing musculature in caecilians.

30 Describe why frog populations have declined or gone extinct in El Cope (Parque Omar Torrijos) park in Panama. What conservation measures have been taken to counteract these declines?

31 Discuss crocodylian farming as an approach to conservation of crocodylians. What aspects have been identified as difficulties for the "success" of this approach? Discuss a species for which farming has been a successful conservation approach. Discuss another species for which ranching has not been successful.

32 Complete the following statement:

Interior crocodile alligator _____.

33 Describe cooperative feeding in crocodylians.

34 Describe ballistic tongue projection in (some) plethodontid salamanders, and contrast this approach with how frogs project the tongue.

35 What approaches do male frogs use to attract a mate?

36 What is amplexus?

37 Describe the "alternative" mating strategies of *clutch piracy* and *functional necrophilia* in frogs. In your opinion, which of these approaches is more f-ed up?

38 Describe approaches to parental care in Dendrobatids, *Rhinella*, *Rheobatrachus*, and *Pipa*.

39 Describe some areas where frogs deposit eggs (what kinds of nests, what kinds of substrate, etc.).

40 What is the chief difference between "XY" and "ZW" genetic systems? Would you expect to see these differences in crocodylians? Why or why not?

41 How are gynogenetic and hybridogenetic breeding systems similar? How are they different?

42 Salamanders have an extraordinarily large genome relative to other Tetrapods. Is this condition properly interpreted as a synapomorphy of Caudata? Why or why not?

43 How do turtles breathe? (be more detailed than "via lungs").

44 How is the amniotic egg different from a frog egg?

45 True or false: both Cryptodira and Pleurodira are monophyletic. Explain your answer.

46 What anatomical traits possessed by most caecilian species suggest that most species of this clade are fossorial?

47 What anatomical changes accompany the ontogeny of a tadpole turning into an adult frog?

48 Give an approximate number of species for each of the following groups:

Anura
Gymnophiona
Caudata
Crocodylia
Testudines

49 Contrast burrowing in *Scaphiopus* and *Rhinophrynus*. What anatomical traits are associated with each approach?

50 Which frog Family is well known for its skin toxins being used by humans for hunting?

51 What is/are the best approach/es for catching *Anolis* lizards?