Herpetology 2022 Test 1 Study Guide

Topics to know:

History of field of the Herpetology; Arguments for studying "herps" in a single group; Identification of herp species from Albuquerque; Species concepts; Species discovery; Species description; Speciation; Allopatry, sympatry; Vicariance, dispersal; Ring species; Phylogenetic tree structure, terminology; Character evolution concepts, terminology; Homology; Basics of Panamanian frog declines.

Be able to…

--understand new (i.e., not from lecture) examples of terms of character evolution (homology,

homoplasy, etc.). [Example: Are lungs for breathing in turtles and lizards homologous or homoplastic or both? Explain/support your answer]

--Identify (based on photo or verbal description) local herps, especially those considered to be very common (Spelling counts! Both common and scientific names! Proper name construction counts!)

--judge whether two or more phylogenetic trees present the same or conflicting relationships

--know basic biology of salamanders, frogs, caecilians, crocodylians, lizards, turtles.

--given some evolutionary scenario, describe whether aspects of speciation like allopatry,

vicariance, etc., apply. [Example: During a hurricane, a group of 8 individuals of Uta

stansburiana in Baja California floats across the Gulf of California to Isla Angel de la Guarda.

Over thousands of years, these 8 individuals interbreed and produce offspring and the

population prospers in this new environment. Is this a case of speciation by vicariance? Explain

your answer.]

Practice questions:

1 Discuss some anatomical traits that are characteristic of amphibians.

2 How would you distinguish a caecilian from a snake?

3 What does John Wiens see as the main problem with most speciation research? What is his

solution? How does he describe the process of speciation?

4 Describe the steps involved with describing a new species—i.e., the components of a good

species description.

5 True or false: an individual of a species cannot interbreed with an individual of a different

species and produce viable offspring. Explain your answer.

6 What is ‘vicariance?’ Contrast this term with ‘dispersal.’ What do these terms have to do with

speciation, if anything? Give an example of each of these terms using vertebrates (a contrived

example is OK for now if you can't think of a real one).

7 Define the terms "holotype" and "paratype" and give examples of each.

8 Assume you decide to name a new species of frog of the genus *Craugastor* after

UNM biologist Lisa Barrow. What do you name this species?

9 How are new species discovered?

10 Give herpetological examples of the following terms: synapomorphy, plesiomorphy, homology, homoplasy, reversal. Be sure to identify the taxa involved (i.e., make it clear why your example reflects the term you are describing).

[Note—your best road to understanding these terms is to think of new examples, rather than to

memorize examples from class. For example, try to think of a synapomorphy of lizards and

turtles relative to mammals, or of turtles relative to other clades. Try to imagine

examples of each of these terms from molecules and behavior as well as morphology, e.g., is

presence of a cell nucleus in most cells of the body homologous between *Anolis* and *Trachemys*?].

11 Describe Kevin de Queiroz' view of "species." How does de Queiroz view the myriad species

'concepts' (e.g. BSC, cohesion SC, PSC) relative to his own view (you may need to reread his

1998 paper)?

12 Compare and contrast the following terms: Taxonomy, Systematics, Classification,

Nomenclature.

13 Most phylogenetic trees are presented with dichotomous splits. How would you interpret a

tree that is presented with a trichotomous split?

14 Discuss the ideas of species concept and species criterion with reference to the species

definitions we discussed in lecture.

15 List five graduate programs and/or museums that are well known for herpetological study. Also list associated professors for each group.

16 Discuss arguments that have been presented for studying amphibians and reptiles together as the single informal group "herps."

17 Discuss the contributions of three important figures in the history of herpetology. Include figures from both pre- and post-1900. Describe what they studied, where they worked, and one or more important publications.

18 What processes of speciation seem to be operating in *Ensatina* salamanders in California?

19 List three herp genera found on New Mexico.



20 Contrast the terms "monophyly" and "paraphyly" and illustrate these terms graphically using phylogenetic trees.

21 Circle all trees that show the same relationships as tree \*.

