Zool 719 Macroevolution

Exam 1

Due: February, 22 2024

Instructions

This exam is take-home, due by 5pm Feb 22 by (bring to EDM 316 or make a nice scan and email to me). You may verbally discuss questions with each other in real time (in person, phone, or video chat), but you must not share written answers (no texting, messaging, email, etc.), and all answers must be your own work. Please do not abuse this policy, or future exams will be in class.

Please write your answers by hand, and please try to be concise. That is, directly answer the questions, providing specific examples as necessary to support your statement. No fluff. (As a rough guide, less than 2 college-ruled pages per question). Please answer three of the four questions.

Things to consider:

- I will expect you to understand the arguments presented in the readings.
- I will want you know what **you think** about them and to *support your views with evidence* from the readings.
- There is no single right answer, but there are views that are supported by evidence and those that are not supportable.

Questions

1. Compare and contrast the perspectives of "evolutionary systematics", "phylogenetic systematics", and "pattern cladism" (Patterson) on the conceptual reationship between taxonomy and Darwinian evolutionary theory. Be specific regarding which of Darwin's 5 theories of evolution (as identified by Mayr 1985) is relevant in each case (e.g., required, allowed but not necessary, or not used at all). How does each school regard monophyletic, paraphyletic, and polyphyletic taxa? For each perspective, what does a higher taxon represent and how is the recogntion of such taxa potentially useful for the study of macroevolution?

2. Compare and contrast the views of Patterson, de Quieroz, Kaplan, and Wagner on morphological characters and homology. How do they differ in their uses of ontogeny, the emphasis on "taxic" versus "transformational" homology, how they define and test for homology, and the relevance of homology to phylogeny? How does Roth heirarchically expand the concept

of homology and show how it can be a valid homology but yet fail the congruence test?

3. Briefly explain the "biological", "evolutionary", "recognition", "phylogenetic", and "unified" concepts of species. Is any single concept consistenty superior for studying adaptive evolution, origins of reproductive barriers, and vicariance biogeography, or should we have a pluralistic taxonomy in which several different kinds of species (concepts) are recognized simulataneously? It is reasonable to regard the species identified by any of these concepts as the basic unit of evolutionary change?

4. Two important components of Mayr's philosophy of biology are (1) the importance of the hypothetico-deductive method and (2) the rejection of essentialism. Briefly identify these principles and the importance of either or both (as appropriate) for the following controversies: (a) the ontological status of species, (b) the validity of paraphyletic "grade" taxa, and (c) the critiques of pattern cladism by de Queiroz and Mayr.