

### Botany 400 Exam 3 potential questions

1. The "primitive" monocot flower is considered to possess 3 sepals, 3 petals, 6 stamens, 3+ separate carpels with nectar and insect pollination. Give **two** examples, one in Alismatoids and one in Commelinoids, how floral reduction and loss of insect/nectar pollination is a recurrent theme in monocot evolution. Indicate **both** the type of pollination and the change in flowers/inflorescence that have accompanied the shift in pollination.
2. The ancestral aquatic monocot (now extinct of course) has been argued to have possessed leaves without blades and an inactive vascular cambium (for secondary growth). If this is correct, describe how monocots have been successful in dealing with both of these deficits.
3. Compare and contrast the inflorescence structure, bracts, and florets of a typical grass like *Avena* (oats) and *Carex* (sedge).
4. The Asterids (excluding the Lower Asterids) are one of the best defined groups of flowering plants. Indicate clearly (1) how they can be separated from Rosids, and (2) how the Lower Asterids differ generally from the typical Asterids.
5. Certain features within the Asterids are fairly good in defining subgroups (orders or sets of families), although most show some homoplasy. Discuss how the following features tie together orders or families: (a) inferior ovary, (b) pollen presentation, (c) opposite leaves, (d) tendency for congested inflorescences (head-like).
6. If you are holding a radiate head like a sunflower, describe all the structures (bracts, florets, etc.) you will see from the outside to the inside.
7. Vicariance and dispersalism are often considered to be the two main paradigms of historical biogeography. Using *Fuchsia* from the new world and old world, discuss how the two are involved in determining where species of *Fuchsia* are presently found.
8. The temperate and tropical floras of the southern hemisphere show different patterns of floristic linkage among South America, Africa, and

Australasia. Using continental drift arguments, indicate which pair of continents are more floristically similar for (a) temperate and (b) tropical regions.

9. Molecular systematics, although clearly important in modern phylogenetics, has several issues that must be recognized and dealt with. Explain how gene duplications, hybridization, and horizontal gene transfer occur and what must be done to recognize their occurrence.
10. Convergence and divergence are prevalent in angiosperms. Give examples from (1) head-like inflorescences in Asterids, (2) water pollination and marine habit in monocots, and (3) wind pollination and bracts that illustrate these problems.
11. Define "Adaptive Radiation" and illustrate this phenomenon with the following examples: (a) *Salvia* (sages) of mint family; (2) Hawaiian Lobeliaceae.

#### THE FOLLOWING ARE FROM THE LOST LECTURE - DO NOT NEED TO KNOW

12. Know the basic land plant extant phyla and place in order (oldest to most recent) their appearance in the fossil record: Bryophyta, Equisetophyta, Lycopodiophyta, Magnoliophyta, Pinophyta, Polypodiophyta.
13. What are some of the important land plant adaptations that occurred in the Ordovician and early Devonian?
14. What are some of the major extinct plant lineages?
15. What is known, using DNA data, about the ancestors of land plants, how the bryophytes are related to vascular plants, and what the basal vascular plants are?
16. Two of the major surprises of land plant evolution are the molecular phylogenetic placements of Psilophyta (whisk ferns) and Equisetophyta (horsetails). Where are they now placed?

