

BIOL 325 – Plant Systematics  
Fall 2011 – Dr. Hardy

Full Name: \_\_\_\_\_

Exam 1 ( 50 pts)

- \*Record your answers directly onto your test sheet.
- \*Chose the best single answer.
- \*All questions are worth 1 point unless otherwise indicated.
- \*Do not turn this page over and start until instructed to do so.

1. A biological monograph is typically which type of botanical work?
  - a. a comprehensive treatment of a particular flora.
  - b. a comprehensive treatment of a particular taxon.
  - c. a comprehensive treatment of the geological history of a region.
  
2. Seed plants are typically divided into which two major groups?
  - a. conifers and angiosperms
  - b. gymnosperms and angiosperms
  - c. monocotyledons and dicotyledons
  - d. non-vascular plants (bryophytes) and vascular plants
  - e. Primitive dicots and Eudicots
  
3. The major groups of gymnosperms talked about in lecture are..
  - a. Cycadopsida, Ginkgopsida, Pinopsida, Magnoliopsida
  - b. Psilotophytina, Cycadopsida, Ginkgopsida, Pinopsida, Magnoliopsida
  - c. Ginkgopsida, Pinopsida, Magnoliopsida
  - d. Cycadopsida, Ginkgopsida, Pinopsida
  - e. Psilotophytina, Lycopodiophytina, Polypodiophytina, Equisetophytina
  
4. The major groups of free-sporing vascular plants are..
  - a. Cycadopsida, Ginkgopsida, Pinopsida, Magnoliopsida
  - b. Psilotophytina, Cycadopsida, Ginkgopsida, Pinopsida, Magnoliopsida
  - c. Ginkgopsida, Pinopsida, Magnoliopsida
  - d. Cycadopsida, Ginkgopsida, Pinopsida
  - e. Lycopodiophytina, Polypodiophytina
  
5. Horsetails belong to which major group?
  - a. Cycadopsida
  - b. Pinopsida
  - c. Psilotopsida
  - d. Lycopodiophytina
  - e. Equisetopsida
  
6. The suffix for the rank of class is..
  - a. -opsida
  - b. -aceae
  - c. -ophyta
  - d. -idea
  - e. -ales
  
7. The science of naming and classifying organisms. This definition best applies to which term?
  - a. biogeography
  - b. evolutionary biology
  - c. taxonomy
  - d. systematics
  - e. taxidermy

8. The term “flora” has two meanings:
- a. both a book describing the plants that grow in a specific region, as well as a set of illustrations of the plants.
  - b. both the plants and animals that live in a certain region of the world.
  - c. a book describing the plants that grow in a specific region, as well as the all of the plants or plant species that actually that live in a certain region.

9. Arrange the following taxonomic ranks in order of least inclusive to most inclusive

(1) order, (2) species, (3) genus, (4) family, (5) variety, (6) class, (7) division, (8) kingdom

- a. 5, 2, 3, 4, 1, 6, 7, 8
- b. 7, 1, 3, 2, 4, 8, 6, 5
- c. 5, 6, 7, 4, 2, 3, 1, 8
- d. 7, 3, 1, 2, 4, 5, 6, 8

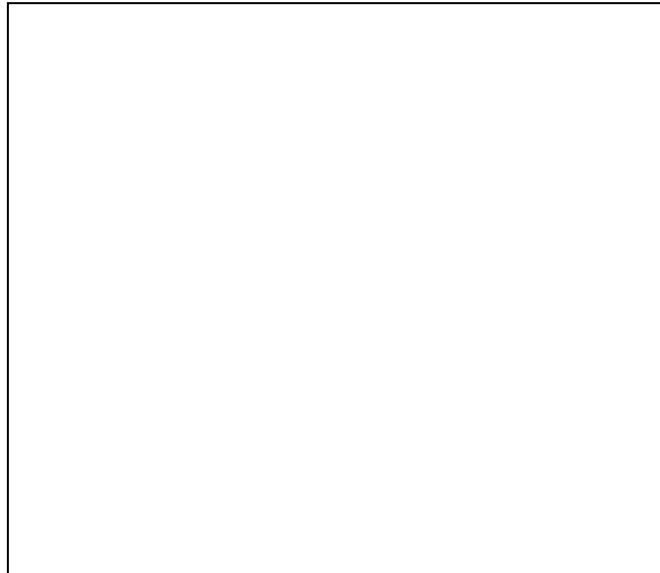
10. Which taxon includes the more “primitive” of angiosperms (in terms of flower and pollen morphology)?

- a. Asteridae
- b. Rosidae
- c. Ranunculidae
- d. Magnoliidae
- e. Caryophyllidae

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**For questions 11-14, refer to the following figure and name the organ type and use the following possible answers**

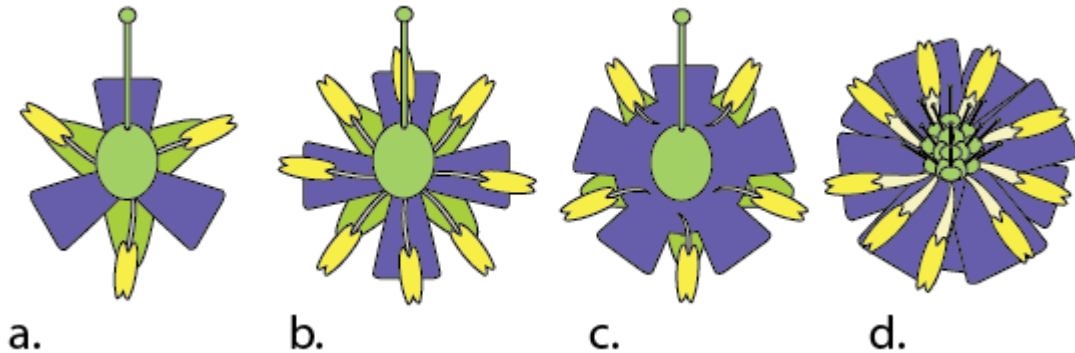
- a. Petal
- b. Stamen
- c. Carpel(s)
- d. Sepal
- e. Pistol



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**For questions 15-19, answer by reference to the following figure**



15. Which flower above would most likely be found in the Magnoliidae?

16. Which flower above would most likely be found in the monocots?

17. Which flower above would most likely be found in the Asteridae?

18. Which flower above would most likely be found in the Liliidae?

19. Which flower above would most likely be found in the Rosidae?

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20. In which taxon would you most likely find a mix of the advanced dicot character of “triperturate” pollen with poor differentiation between calyx and corolla, along with free parts?

- a. Asteridae
- b. Rosidae
- c. Ranunculidae
- d. Magnoliidae
- e. Liliidae

21. Where do many of our spice plants with ethereal oil cells reside?

- a. Asteridae
- b. Rosidae
- c. Ranunculidae
- d. Magnoliidae
- e. Caryophyllidae

22. In which taxon do we find aquatic plants with primitive floral forms?
- Asteridae
  - Liliidae
  - Nymphaeidae
  - Magnoliidae
  - Caryophyllidae
23. The Virginia creeper, *Parthenocissus quinquefolia* (L.) Planch., has an interesting nomenclatural history. Which history below is most likely?
- The species was originally described as *Hedera quinquefolia* by Jules Planchon, then was transferred to the genus *Parthenocissus* by Carl Linnaeus.
  - The species was originally described as *Hedera quinquefolia* by Jules Planch, then was transferred to the genus *Parthenocissus* by Carl Linnaeus.
  - The species was originally described through a collaborative effort between Linnaeus and Planch.
  - The species was originally described as *Hedera quinquefolia* by Linnaeus, then was transferred by Jules Planch to *Parthenocissus*.
  - The species was originally described as *Hedera quinquefolia* by Linnaeus, then was transferred to *Parthenocissus* by Jules Planchon.
24. The far majority of plant species are described from studies in ...
- botanical gardens
  - herbaria
  - the field
  - plant nurseries
  - zoological museums
25. Plant collections for herbaria are prepared using...
- a printing press
  - a steam press
  - a lemon press
  - a plant press
  - a garden press
26. Which of the following lineages lack true roots and leaves
- Lycopodiophytina, Polypodiophytina, and Equisetophytina
  - Polypodiophytina and Lycopodiophytina
  - Lycopodiophytina
  - Psilotopsida
  - Equisetopsida
27. Which of the floral formulas below represents that of a monocot?
- $\text{Ca}^5 \text{Co}^5 \text{A}^{10} \text{G}^{[5]}$
  - $\text{P}^{3+3} \text{A}^6 \text{G}^{[3]}$
  - $\text{P}^{\text{many}} \text{A}^{\text{many}} \text{G}^{\text{many}}$
  - $\text{P}^4 \text{A}^{4-8} \text{G}^{[4]}$
  - $\text{Ca}^{[5]} \text{Co}^{[5]} \text{A}^{10} \text{G}^{[5]}$

28. Which family is represented below?



- A. Nymphaeaceae
- B. Magnoliaceae
- C. Cactaceae
- D. Caryophyllaceae
- E. Alismataceae

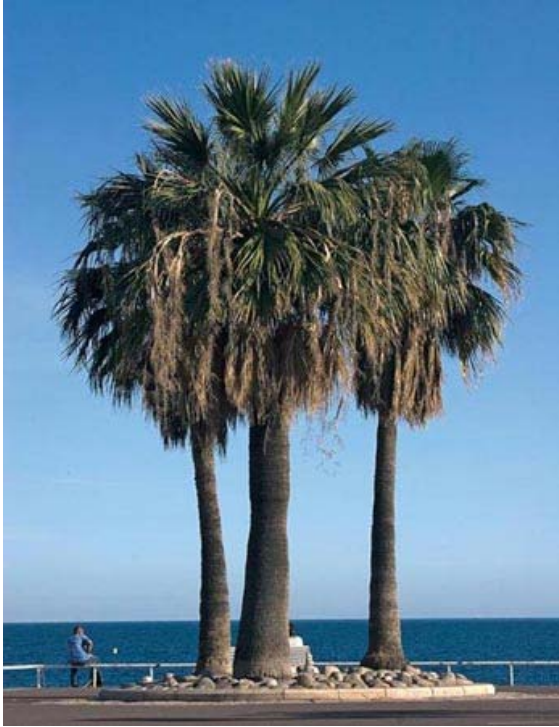
29. Which family includes flowers such as the one pictured below?

- a. Lauraceae
- b. Alismataceae
- c. Liliaceae
- d. Orchidaceae
- e. Arecaceae



30. Which family below includes plants and/or plant parts such as those depicted below?

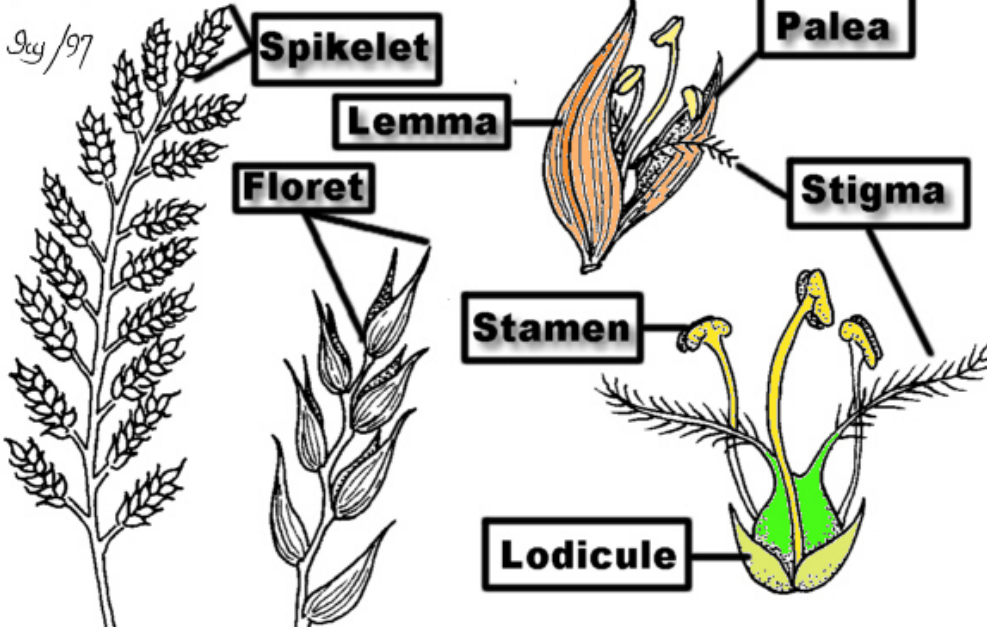
- a. Araceae      b. Ericaceae      c. Liliaceae      d. Poaceae      e. Arecaceae



31. Which family is represented below?

- a. Araceae      b. Alismataceae      c. Liliaceae      d. Poaceae      e. Arecaceae

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32. The excerpt below from an economic botany study depicts the most important step of any scientific study in which the identity of the species investigated is crucial. That is the...

- a. ...washing of the leaves with water.
- b. ... identification of the plant family.
- c. ... identity and location of the voucher specimen.

**Materials and Methods**

**Collection of plant**

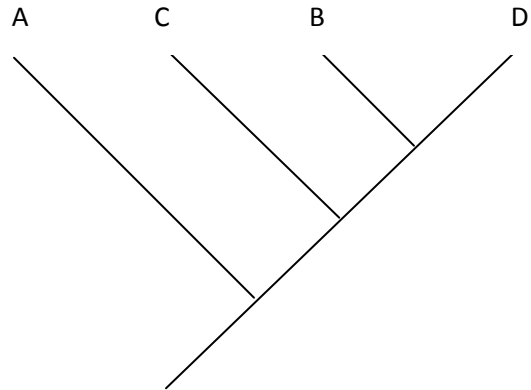
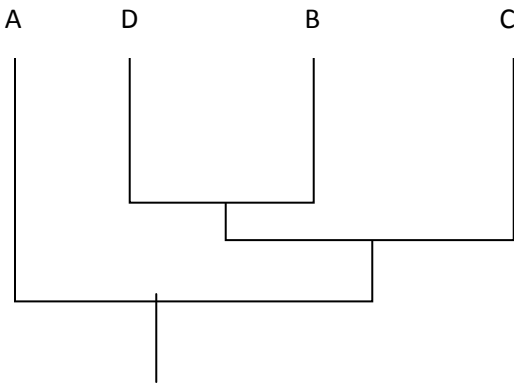
*Cordyline terminalis* Kunth. (Liliaceae) was collected from the district of Narail during the month of January' 2003 in its flowering stage and was identified by the National Herbarium of Bangladesh (accession no. 29752).

**Extraction**

The collected plant parts (leaves) were washed with water, separated from undesirable materials or plants or plant parts. They were sun-dried for one week after cutting into small pieces and were ground into a fine powder with the help of a suitable grinder (Capacitor start

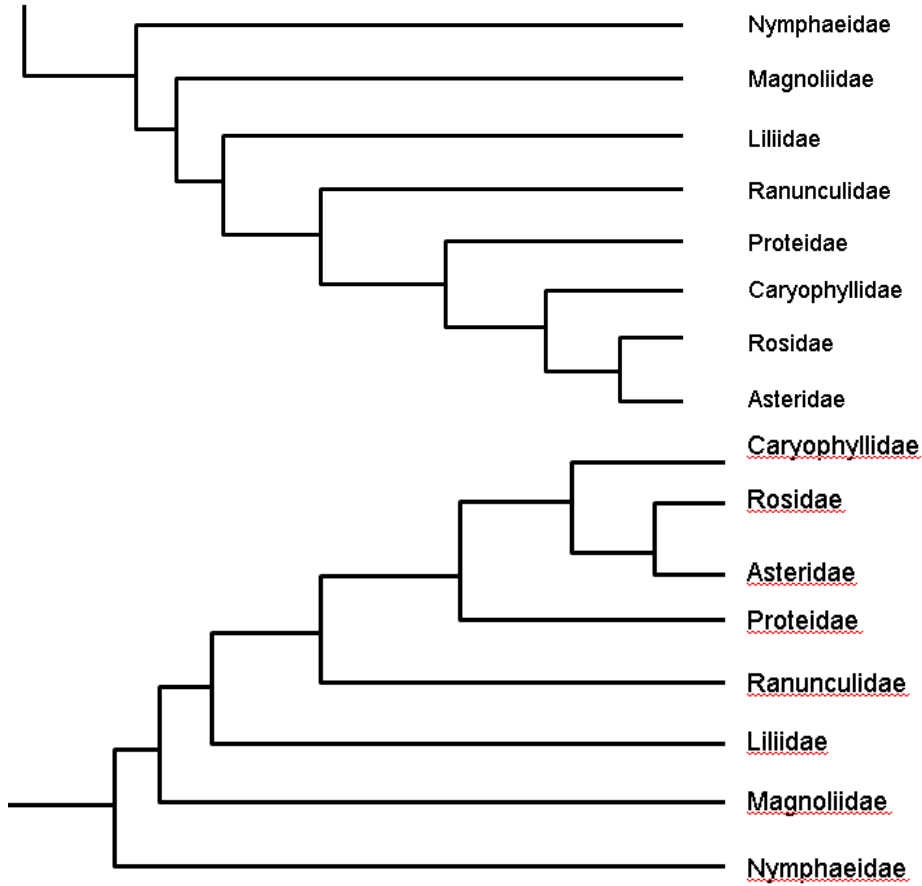
33. The two cladograms below express the same set of phylogenetic relationships.

- a. True
- b. False.

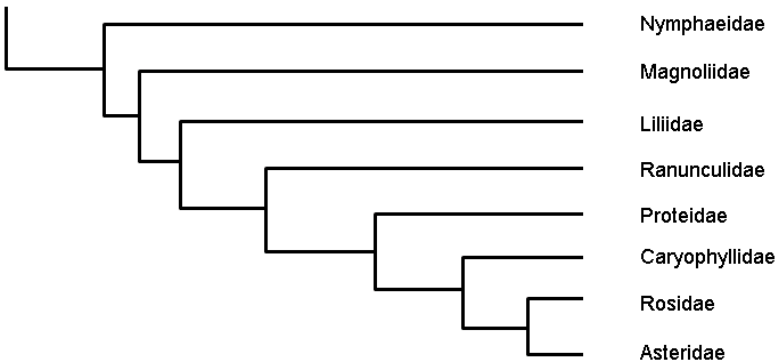




34. Do the two cladograms below depict the same set of relationships?  
 a. yes b. no



35. The taxa in the cladogram below depict Dr. Hardy's representation of which of the following more inclusive groups?  
 a. Pinopsida  
 b. Ginkgopsida  
 c. Magnoliophyta  
 d. Magnoliopsida  
 e. Polypodiopsida



36. In the cladogram depicted in question #35 above, who is more closely related to the Proteidae?

- a. Nymphaeidae
- b. Magnoliidae
- c. Liliidae
- d. Ranunculidae
- e. Asteridae

37. In the cladogram depicted in question #35 above, who is the most phylogenetically isolated from (the most distantly related to) any other of the groups depicted?

- a. Nymphaeidae
- b. Magnoliidae
- c. Liliidae
- d. Ranunculidae
- e. Asteridae

38. The plant pictured below belongs to which subdivision?



- a. Lycopodiophytina
- b. Polypodiophytina
- c. Magnoliophytina
- d. None of the above

39. What are the spore-bearing structures in the picture above properly called?

- a. cones
- b. strobili
- c. anthers
- d. ovules
- e. flowers

40. Of the following branching patterns, which is the more primitive?
- a. Alternate
  - b. Whorled
  - c. Axillary
  - d. Dichotomous
  - e. Opposite

41. What group of plants does the following plant in the picture belong to?



- a. Lycopodiophytina
- b. Polypodiophytina
- c. Magnoliopsida

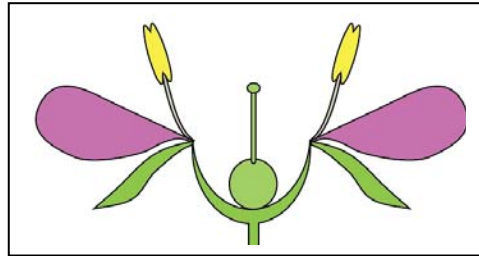
42. Which taxon does the following plant in the picture belong to (the circular patches on the underside of this leaf are clusters of sporangia)?



- a. Lycopodiophytina
- b. Polypodiophytina
- c. Magnoliophytina
- d. None of the above

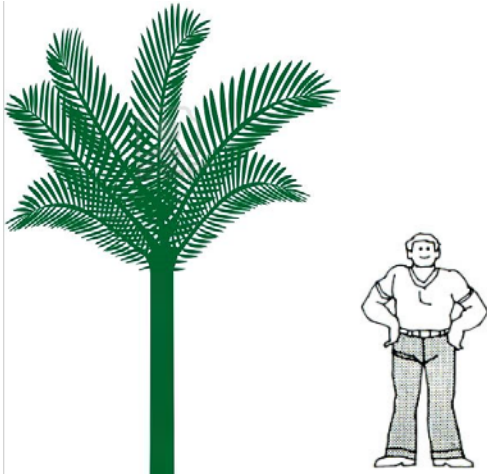
43. The flower depicted from a common Pennsylvanian tree below is from which taxon?

- a. Asteraceae
- b. Polygonaceae
- c. Cactaceae
- d. Lauraceae
- e. Rosaceae



44. Not knowing anything about the vernation or reproductive structures of the arborescent plant below, to which taxon or taxa might it belong?

- a. Cycadaceae    b. Ericaceae    c. Arecaceae    d. A or B    e. A or C



45. What are these structures taken off of evergreen trees with needle-like leaves?

- a. flowers    b. cones    c. strobili    d. strobilus    e. pollen



46. How are the structures pictured above in #45 different from the mature homologous structure of a yew? (one sentence answer)

47. Draw a diagram depicting the hierarchical sequence (from top, most inclusive, to bottom, least inclusive) of the following taxa (don't worry about any taxa missing from list, use only this list). Use arrows to show hierarchical relationships. Each row (horizontal plane) should include all of the listed taxa that belong to a single taxonomic rank and that rank should be indicated. (4 pts)

List of Taxa to include in Diagram: Nymphaeidae, Asteridae, Ginkgopsida, Ranunculidae, Plantae, Magnoliophyta, Lycopodiophytina, Magnoliophytina, Bryophyta, Cycadopsida, Pinopsida, Magnoliopsida, Rosidae

Below is an example of how this is to be done, using animal taxa:

