

BIOL 324 - Midterm Examination
October 25, 2011

1. In Hitchcock and Cronquist's Flora of the Pacific North West Brassicaceae is known as:
 - (a) Oleraceae
 - (b) Cruciferae
 - (c) Compositae
 - (d) Brassicoideae
 - (e) Canolaceae

2. *Aconitum* (monkshood) is in the:
 - (a) Ranunculaceae
 - (b) Malvaceae
 - (c) Magnoliaceae
 - (d) Papaveraceae
 - (e) Canolaceae

3. Phylogenetics refers to grouping by:
 - (a) biochemistry
 - (b) morphological variation
 - (c) colour
 - (d) evolutionary descent
 - (e) pollinator

4. The first large-scale molecular phylogeny of angiosperms was made using sequence data from the following gene:
 - (a) large subunit of rubisco (rbcL)
 - (b) mitogen-activated protein kinase (MAPK)
 - (c) AGAMOUS (AG)
 - (d) MADS-box genes
 - (e) histone deacetylase

5. The largest flower of any angiosperm belongs to:
 - (a) *Euphorbia*
 - (b) *Rafflesia*
 - (c) *Cornus*
 - (d) *Arum*
 - (e) *Triticum*

6. In the ABC model of floral development, stamens are specified by the expression of :
 - (a) A-class MADS box genes only
 - (b) A and B-class MADS box genes together
 - (c) B-class MADS box genes only
 - (d) B and C class MADS box genes together
 - (e) C-class genes only

7. *Lacandonia schismatica* from the Yucatan peninsula is notable because of its:
- (a) enormous flowers
 - (b) bat pollination
 - (c) stamens formed above the carpels
 - (d) climbing roots
 - (e) density of hairs
8. A carpel is homologous to a single highly modified organ of the following type:
- (a) root
 - (b) leaf
 - (c) stem
 - (d) pistil
 - (e) style
9. Generally the first type of angiosperm pollen to appear in the fossil record is:
- (a) tricolpate
 - (b) triporate
 - (c) monosulcate
 - (d) monoporate
 - (e) tricolporate
10. The flowering plant lineage that is currently thought to be the sister group of all other angiosperms is:
- (a) Magnoliaceae
 - (b) Amborellaceae
 - (c) Winteraceae
 - (d) Lauraceae
 - (e) Austrobaileyaceae
11. Most waterlilies (Nymphaeaceae) are pollinated by:
- (a) bees
 - (b) beetles
 - (c) hummingbirds
 - (d) flies
 - (e) moths
12. A cyathium is a:
- (a) specialised flower of grasses
 - (b) modified leaf found in carnivorous plants
 - (c) specialised inflorescence found in Euphorbia
 - (d) aerial root of orchids
 - (e) term for a fruit of Cucurbitaceae

13. The gene *CYCLOIDEA* controls:

- (a) floral symmetry
- (b) photosynthesis
- (c) leaf development
- (d) stamen identity
- (e) floral scent production

14. The primitive carpel is considered to be:

- (a) ascidiate
- (b) plicate
- (c) valvate
- (d) infundibuliform
- (e) sigmoid

15. A raceme is an inflorescence that is:

- (a) determinate, unbranched
- (b) determinate, branched
- (c) indeterminate unbranched
- (d) indeterminate, branched
- (e) thyrsoid

16. Willows (*Salix*) are:

- (a) monoecious
- (b) dioecious
- (c) trioecious
- (d) hermaphrodite and self-incompatible
- (e) hermaphrodite and self-compatible

17. The inflorescences of *Babiana ringens* (rat-tail babiana) are unusual because:

- (a) they are rodent-pollinated
- (b) they are the largest known in flowering plants
- (c) they are uniflorous
- (d) they have evolved into the primary photosynthetic organs of the plant
- (e) they have evolved into perches for pollinating birds

18. The starting date for scientific botanical nomenclature is:

- (a) 1642
- (b) 1753
- (c) 1864
- (d) 1935
- (e) 1975

19. The following were pioneers of the "multiple garden" experimental design for investigating plant variation:

- (a) Schwann, Schleiden, and Virchow
- (b) Watson, Crick and Wilkins
- (c) Humboldt, Bonpland and Kunth
- (d) De Vries, Tschermak, and Correns
- (e) Clausen, Keck and Hiesey

20. The legume *Cadia* is unusual because it:

- (a) is pollinated by tree sloths
- (b) has green flowers
- (c) has radially symmetrical flowers
- (d) is highly poisonous
- (e) occurs in the high arctic

21. Bread wheat (*Triticum*) is:

- (a) diploid,
- (b) triploid
- (c) tetraploid
- (d) pentaploid
- (e) hexaploid

22. The presence of a stipular sheath (ochrea) around the stem at the nodes is characteristic of the family:

- (a) Brassicaceae
- (b) Polygonaceae
- (c) Caryophyllaceae
- (d) Malvaceae
- (e) Ericaceae

23. In Hitchcock and Cronquist's Flora of the Pacific North West Fabaceae is known as:

- (a) Malvaceae
- (b) Faboideae
- (c) Caryophyllaceae
- (d) Fabulaceae
- (e) Leguminosae

24. A whole branch of a phylogenetic tree is known as a:

- (a) node
- (b) phylon
- (c) clade
- (d) bush
- (e) codon

25. A tube formed from the adnation of sepals, petals and stamens is called a:
- (a) pipe
 - (b) bowl
 - (c) epistrium
 - (d) hypanthium
 - (e) epigynium
26. The shape of the corolla commonly found in *Vaccinium* and *Arbutus* species is described as:
- (a) hypocrateriform
 - (b) urceolate
 - (c) digitate
 - (d) divergent
 - (e) campanulate
27. A corymb is similar to a raceme but is:
- (a) elongated
 - (b) flat topped
 - (c) nodding
 - (d) cymose
 - (e) pilose
28. The fruit of a legume is a:
- (a) legume
 - (b) follicle
 - (c) capsule
 - (d) berry
 - (e) mericarp
29. In the ABC model of floral development the expression of A class genes alone leads to the formation of:
- (a) bracts
 - (b) sepals
 - (c) petals
 - (d) stamens
 - (e) carpels
30. In parietal placentation the ovules are attached to the:
- (a) central column of the ovary
 - (b) the wall of the ovary
 - (c) the base of the ovary
 - (d) the top of the ovary
 - (e) the replum
31. The following is an example of a fruit formed from one carpel:
- (a) pea pod
 - (b) tomato
 - (c) strawberry
 - (d) coconut
 - (e) okra

32. The replum is a development of which part of the fruit:
- (a) the endocarp
 - (b) the placenta
 - (c) ovary wall
 - (d) receptacle tissue
 - (e) invaginated style
33. A replum is characteristic of the fruits of which family:
- (a) Malvaceae
 - (b) Ericaceae
 - (c) Rosaceae
 - (d) Brassicaceae
 - (e) Ranunculaceae
34. A colpus differs from a sulcus because it:
- (a) is longer
 - (b) crosses the pole of the pollen grain
 - (c) crosses the equatorial plane of the pollen grain
 - (d) has a thickened margin
 - (e) has a wavy margin
35. The order Austrobaileyales (as currently circumscribed) includes the families Austrobaileyaceae, Trimeniaceae and one other, which is the:
- (a) Magnoliaceae
 - (b) Illiciaceae
 - (c) Annonaceae
 - (d) Lauraceae
 - (e) Myristicaceae
36. An example of an angiosperm that does not have vessels is:
- (a) *Magnolia*
 - (b) *Gnetum*
 - (c) *Illicium*
 - (d) *Nicotiana*
 - (e) *Amborella*
37. Thermogenic flowers are found in the following family:
- (a) Brassicaceae
 - (b) Nymphaeaceae
 - (c) Ranunculaceae
 - (d) Moraceae
 - (e) Ericaceae
38. Monocots tend to have perianth parts in:
- (a) fives or multiples of five
 - (b) fours or multiples of four
 - (c) threes or multiples of three
 - (d) indefinite numbers
 - (e) pairs

39. Many *Salvia* stamens are unusual in that they have:
- (a) swollen tips
 - (b) dense hairs
 - (c) exploding anthers
 - (d) no connective
 - (e) a lever mechanism
40. Self-pollinated plants are commonly found in:
- (a) areas with high rainfall
 - (b) aquatic habitats
 - (c) disturbed habitats
 - (d) tropical rainforest
 - (e) epiphyte communities
41. Versatile anthers are often found in:
- (a) butterfly pollinated plants
 - (b) wind pollinated plants
 - (c) self-pollinated plants
 - (d) orchids
 - (e) water-lilies
42. *Angraecum sesquipedale*, a famous orchid from Madagascar, is pollinated by:
- (a) swallowtail butterflies
 - (b) hawkmoths
 - (c) carpenter bees
 - (d) fruit flies
 - (e) sunbirds
43. Plants pollinated by night-flying moths usually have flowers that are:
- (a) white
 - (b) blue
 - (c) yellow
 - (d) green
 - (e) brown
44. Determinacy of inflorescences is influenced by the gene:
- (a) PISTILLATA (PI)
 - (b) APETALA3 (AP3)
 - (c) RUBISCO large subunit (rbcL)
 - (d) AGAMOUS (AG)
 - (e) TERMINAL FLOWER1 (TFL1)
45. Branching of inflorescence is strongly influence by the gene:
- (a) LEAFY (LFY)
 - (b) maturaseK (matK)
 - (c) KNOTTED-LIKE HOMEODOMAIN BOX1 (KNOX1)
 - (d) SEPALLATA (SEP)
 - (e) MONOPTEROS (MP)

46. What do the taxa *Cornus*, *Viburnum*, *Euphorbia*, *Hydrangea* and Asteraceae have in common:
- (a) they all have cymose inflorescences
 - (b) they are all strongly scented
 - (c) they all have some species which produce berry fruit
 - (d) they all contain a high proportion of self-pollinating species
 - (e) they all contain species with pseudanthial inflorescences
47. In *Arum* the part of the inflorescence that is thermogenic is called the:
- (a) appendix
 - (b) spathe
 - (c) rachis
 - (d) rachilla
 - (e) calorus
48. In *Ficus* the fig wasp forms galls in:
- (a) male flowers
 - (b) long-styled female flowers
 - (c) short-styled female flowers
 - (d) fruit wall
 - (e) hermaphrodite flowers
49. A caprifig is a:
- (a) desert fig
 - (b) parthenogenetic fig
 - (c) functionally male fig
 - (d) functionally female fig
 - (e) dessert fig
50. Sessile leaves are leaves without:
- (a) veins
 - (b) blades
 - (c) stipules
 - (d) axillary buds
 - (e) petioles
51. Perianths of undifferentiated tepals are characteristic of the basal angiosperms but occur in some eudicot families like the:
- (a) Rosaceae
 - (b) Solanaceae
 - (c) Onagraceae
 - (d) Papaveraceae
 - (e) Cactaceae:
52. A pappus is present in which one of the following families:
- (a) Brassicaceae
 - (b) Umbelliferae
 - (c) Illiciaceae
 - (d) Lamiaceae
 - (e) Asteraceae

53. An actinomorphic flower is one with:

- (a) free petals
- (b) radial symmetry
- (c) exserted stamens
- (d) strong patterning under uv light
- (e) separation of stamens and stigma

54. Which one of the following families does NOT have some or all members with zygomorphic flowers:

- (a) Lamiaceae
- (b) Scrophulariaceae
- (c) Ranunculaceae
- (d) Asteraceae
- (e) Rosaceae

55. A gynoecium of free carpels is termed:

- (a) apocarpous
- (b) syncarpous
- (c) exocarpous
- (d) heterocarpous
- (e) allocarpous

56. An example of a monoecious plant is:

- (a) *Salix*
- (b) *Brassica*
- (c) *Capsicum*
- (d) *Quercus*
- (e) *Aconitum*

57. The pollen genotype is involved in controlling:

- (a) gametophytic SI
- (b) heterostyly
- (c) sporophytic SI
- (d) dioecy
- (e) zenogamy

58. Which of the following is NOT a form of placentation:

- (a) axile
- (b) parietal
- (c) basal
- (d) free central
- (e) perpendicular

59. If the ovary is inferior then the flower is:

- (a) epigynous
- (b) hypogynous
- (c) perigynous
- (d) basigynous
- (e) amphigynous

60. The following family has an inferior ovary formed by an expansion of the receptacle (stem tissue) around the ovary:

- (a) Ranunculaceae
- (b) Polygonaceae
- (c) Cactaceae
- (d) Ericaceae
- (e) Onagraceae

61. Which of the following is NOT a syncarp:

- (a) strawberry
- (b) fig
- (c) pineapple
- (d) breadfruit
- (e) mulberry

62. Which of the following is NOT a dry dehiscent fruit:

- (a) capsule
- (b) legume
- (c) silicula
- (d) achene
- (e) silique

63. A raspberry is made up of an aggregate of:

- (a) follicles
- (b) berries
- (c) achenes
- (d) drupes
- (e) pomes

64. In the rayed form of *Senecio vulgaris* the rays were acquired by means of:

- (a) mutation
- (b) transposon activity
- (c) environmental change
- (d) hybridization with another species
- (e) developmental instability

65. Homeosis is:

- (a) a change in organ polarity
- (b) a change in organ modularity
- (c) a change in organ relative growth
- (d) a change in organ identity
- (e) a change in the timing of development