

Ecology 182 T/Th 2 PM
2nd Midterm – Tough Bonine Questions

Mean **70.6**
Median **74**
Max **106**
Min **30**

See Dr. Schaffer's announcements on his webpage for discussion of challenging questions from his portion of the 2nd midterm (questions 45-51)

2. A situation in which two haploid cells fuse, but their nuclei do not, is

- a. rather common in fungi
- b. called a dikaryotic life stage
- c. called fission
- d. called sex
- e. two of the above are correct

2

Response	Frequency	Percent	
* E	120	45.45	<div style="width: 45.45%; background-color: blue;"></div>
D	5	1.89	<div style="width: 1.89%; background-color: blue;"></div>
C	19	7.20	<div style="width: 7.20%; background-color: blue;"></div>
B	116	43.94	<div style="width: 43.94%; background-color: blue;"></div>
A	4	1.52	<div style="width: 1.52%; background-color: blue;"></div>
Missing	0	0.00	<div style="width: 0.00%; background-color: blue;"></div>

The description in the question is of a dikaryote (b). Many of you answered this but did not also recall that most fungal groups (a) have a dikaryotic stage (see slide 25 from the fungi lecture for a useful picture).

8. The most recent common ancestor of both fungi and plants lived about

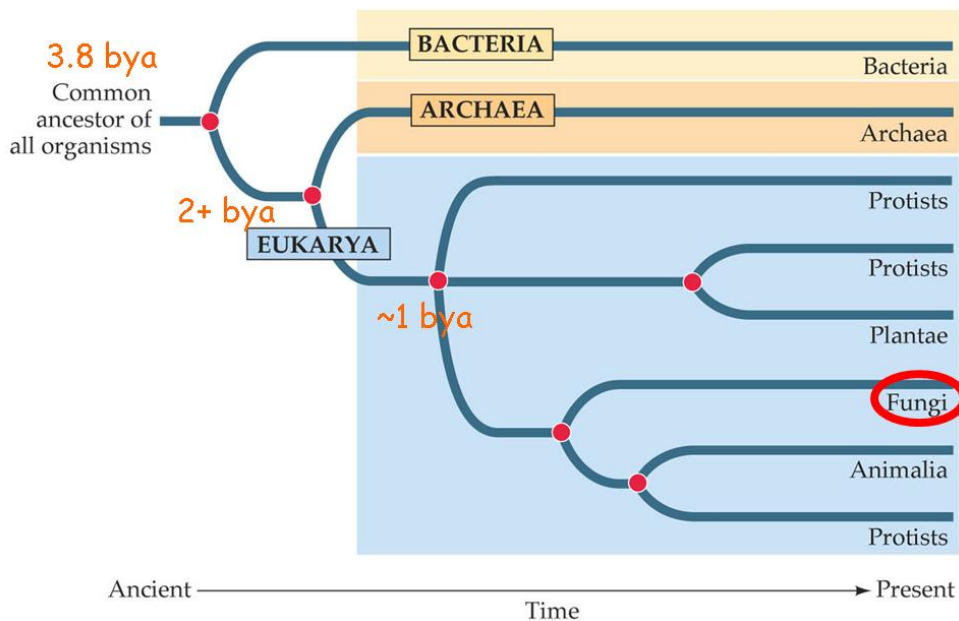
- a. 4 billion years ago
- b. 450 million years ago
- c. 2 billion years ago
- d. 1 billion years ago
- e. 225 million years ago

8

Response	Frequency	Percent
E	24	9.09
*D	65	24.62
C	47	17.80
B	90	34.09
A	37	14.02
Missing	1	0.38

At 450 million years ago, plants and fungi were well differentiated and many mutualisms between these groups facilitated invasion of land by plants. Many of you may have mistakenly been thinking about the common ancestor of the Opisthokonts (slide 5 from fungi lecture), but that also was not much less than 1 bya.

Tree of Life



[See slide 4 from Fungi lecture. Also see questions 1 & 2 from the fungi review questions.]

35. Which of these is an example of an imperfect flower?

- a. one that lacks sepals
- b. one that has only two carpels
- c. one that cannot self-pollinate
- d. one that has stamens and no pistils

35

Response	Frequency	Percent	
E	1	0.38	
*D	220	83.33	
*C	220	83.33	
B	8	3.03	
A	35	13.26	
Missing	0	0.00	

I was looking for 'd' because an imperfect flower is lacking either the male or female structures. Credit was also given for 'c' because an imperfect flower could not self itself 😊. However, imperfect flowers on a monoecious angiosperm might be able to self. [See review question 16 from the Seed Plant review questions.]

37. Endosperm is _____ and provides nutrition for the _____.

- a. mature, gametophyte
- b. haploid, pollen
- c. diploid, gametophyte
- d. triploid, sporophyte

37

Response	Frequency	Percent	
E	0	0.00	
*D	92	34.85	
C	118	44.70	
B	19	7.20	
A	35	13.26	
Missing	0	0.00	

The pollen contributes two sperm to stigma which unite with the egg (to form the zygote) and also with the two polar nuclei thus creating a triploid (3N) product that will nourish the diploid sporophytic zygote as it grows. [See slides 75 & 76 from Seed Plant lecture. See questions 10 & 13 from Seed Plant review questions. See figures 40.8 & 40.14 in Freeman 3rd Edition.]

39. Which of these plant nutrients is essential but often limiting to plant growth?

- a. carbon
- b. hydrogen
- c. oxygen
- d. nitrogen
- e. all of the above

39

Response	Frequency	Percent	
E	62	23.48	
*D	170	64.39	
C	8	3.03	
B	10	3.79	
A	13	4.92	
Missing	1	0.38	

40. Different nutrients are acquired from the soil by root cells in different ways. Often, protons are exchanged for _____ while _____ are cotransported with protons back into the root cell.

- a. micronutrients, macronutrients
- b. cations, anions
- c. anions, cations
- d. anions, fungi
- e. small bacteria, micronutrients

40

Response	Frequency	Percent	
E	3	1.14	
D	3	1.14	
C	68	25.76	
*B	168	63.64	
A	22	8.33	
Missing	0	0.00	

Please look over your notes about nutrient uptake. Protons are pumped out of root cells to facilitate exchange for positively charged nutrients (cations like K⁺). Anions are brought in coupled to protons moving back down their concentration/charge gradient.

BONUS

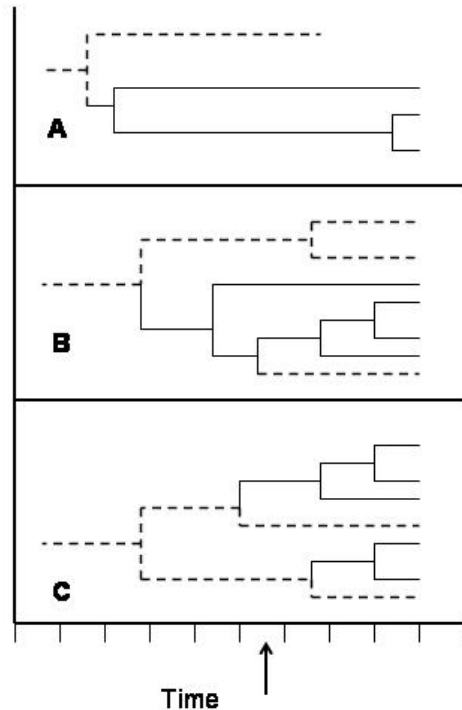
52-53. The figure to the right illustrates three different hypotheses (A, B, and C) about colonization and subsequent speciation in the Galapagos Islands. The far right of the figure is the present, the far left is the distant past. The arrow on the x-axis indicates the age of the oldest Galapagos islands currently present in the Pacific Ocean. The solid lines indicate phylogenetic relationships among Galapagos species. The dashed lines indicate relationships of Galapagos taxa to mainland South America taxa.

52. Which of the three hypotheses best corresponds to taxa like rodents, geckos, and lava lizards that have colonized the Galapagos more than once.

- a. Figure A
- b. Figure B
- c. Figure C
- d. All of the above

52

Response	Frequency	Percent	
E	0	0.00	
D	21	7.95	
*C	125	47.35	
B	93	35.23	
A	24	9.09	
Missing	1	0.38	



In figure B, what is depicted is a single colonization of the Galapagos from South America and then a single instance of a Galapagos species colonizing South America! Figure C depicts two invasions of the Galapagos.