

How should this label have printed the scientific name?



- A. *ginkgo biloba*
- B. *Ginkgo Biloba*
- C. Ginkgo biloba
- D. *ginkgo Biloba*
- E. *Ginkgo biloba*

Which type of **flower** is this?

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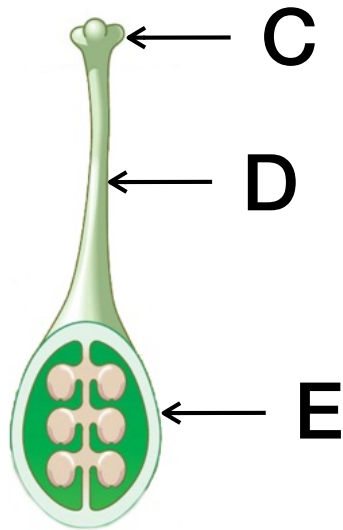
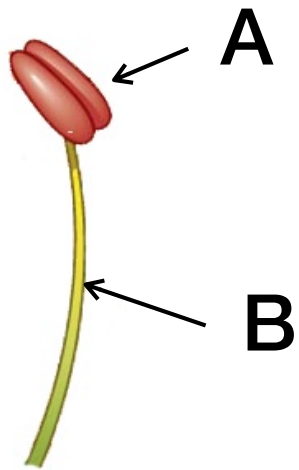
- A. Hypogynous
- B. Epigynous
- C. Perigynous
- D. Superior
- E. Inferior

Which type of **ovary** does this flower have?



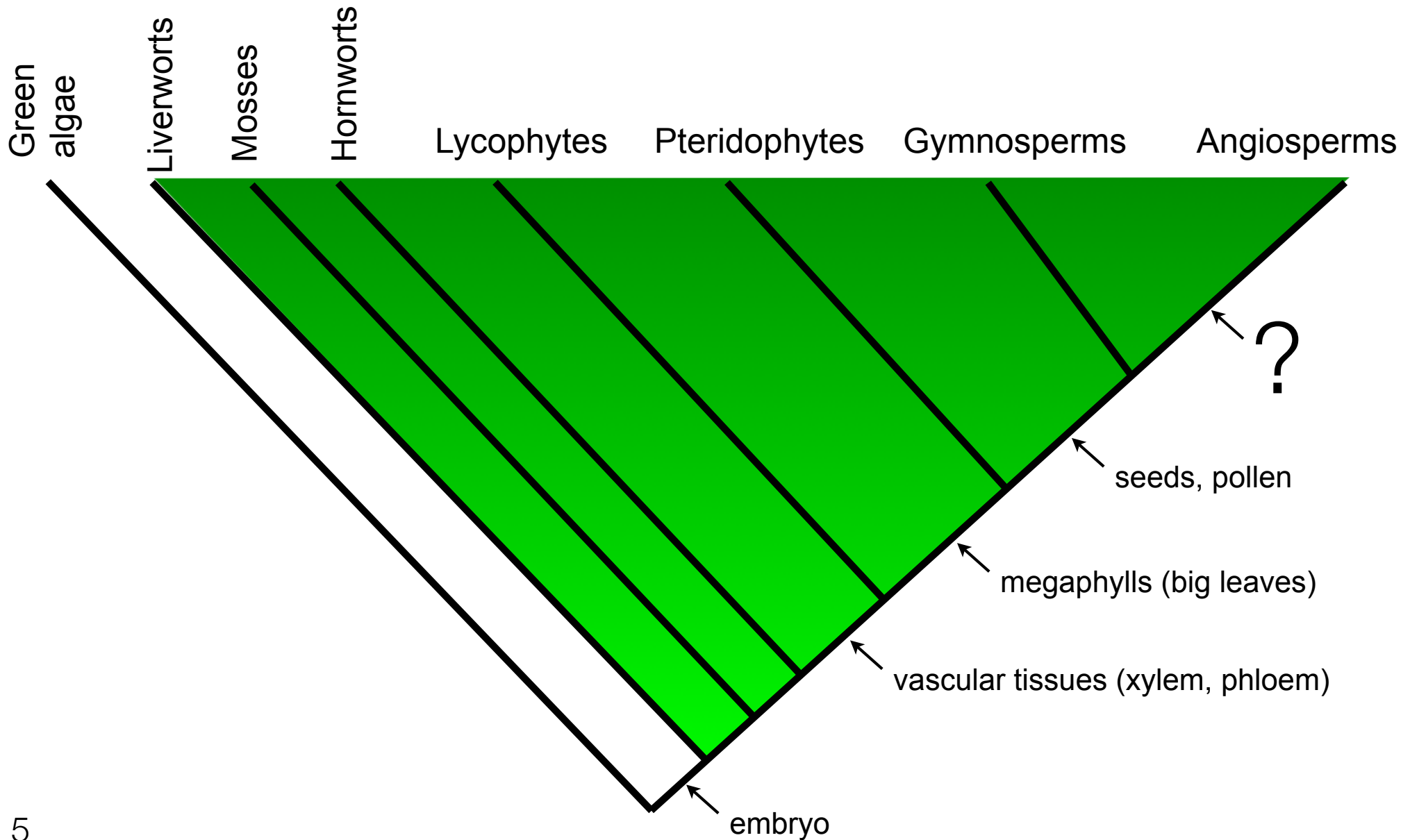
- A. Hypogynous
- B. Epigynous
- C. Perigynous
- D. Superior
- E. Inferior

A single strand of corn silk corresponds to which of the following flower parts?



strand of corn silk

What was last great innovation?



Question for thought: what type of flower?

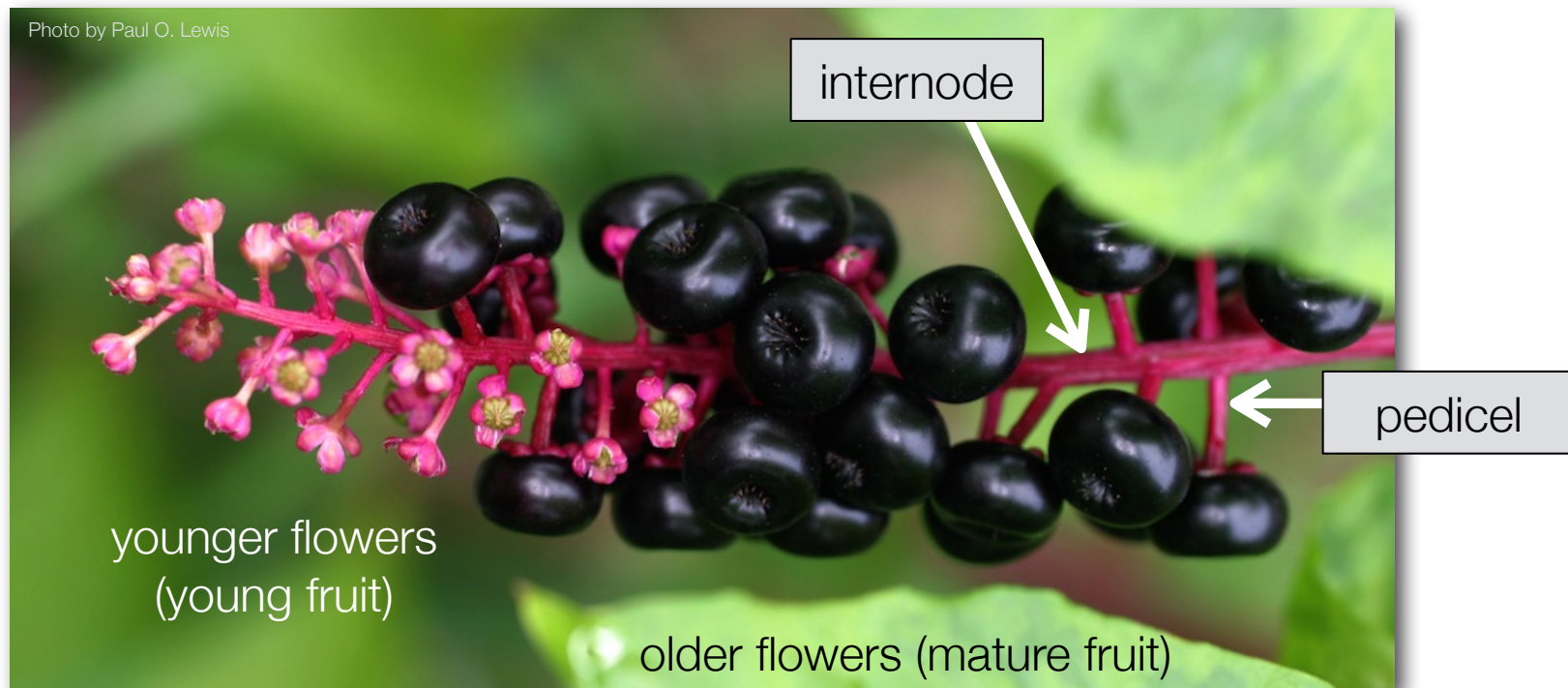


- A. hypogynous
- B. perigynous
- C. epigynous

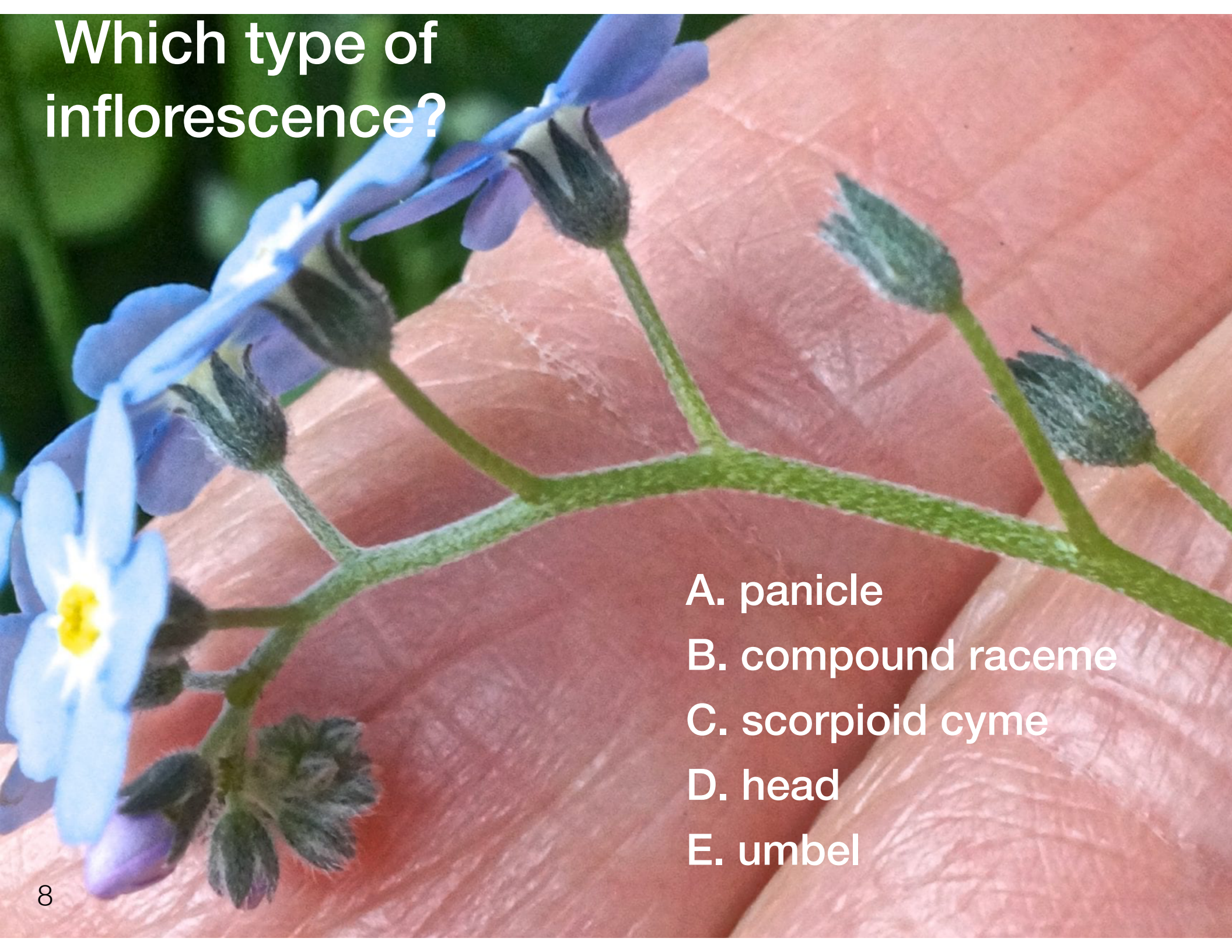
Helianthus

Which type of inflorescence?

- A. panicle
- B. raceme
- C. cyme
- D. head
- E. umbel



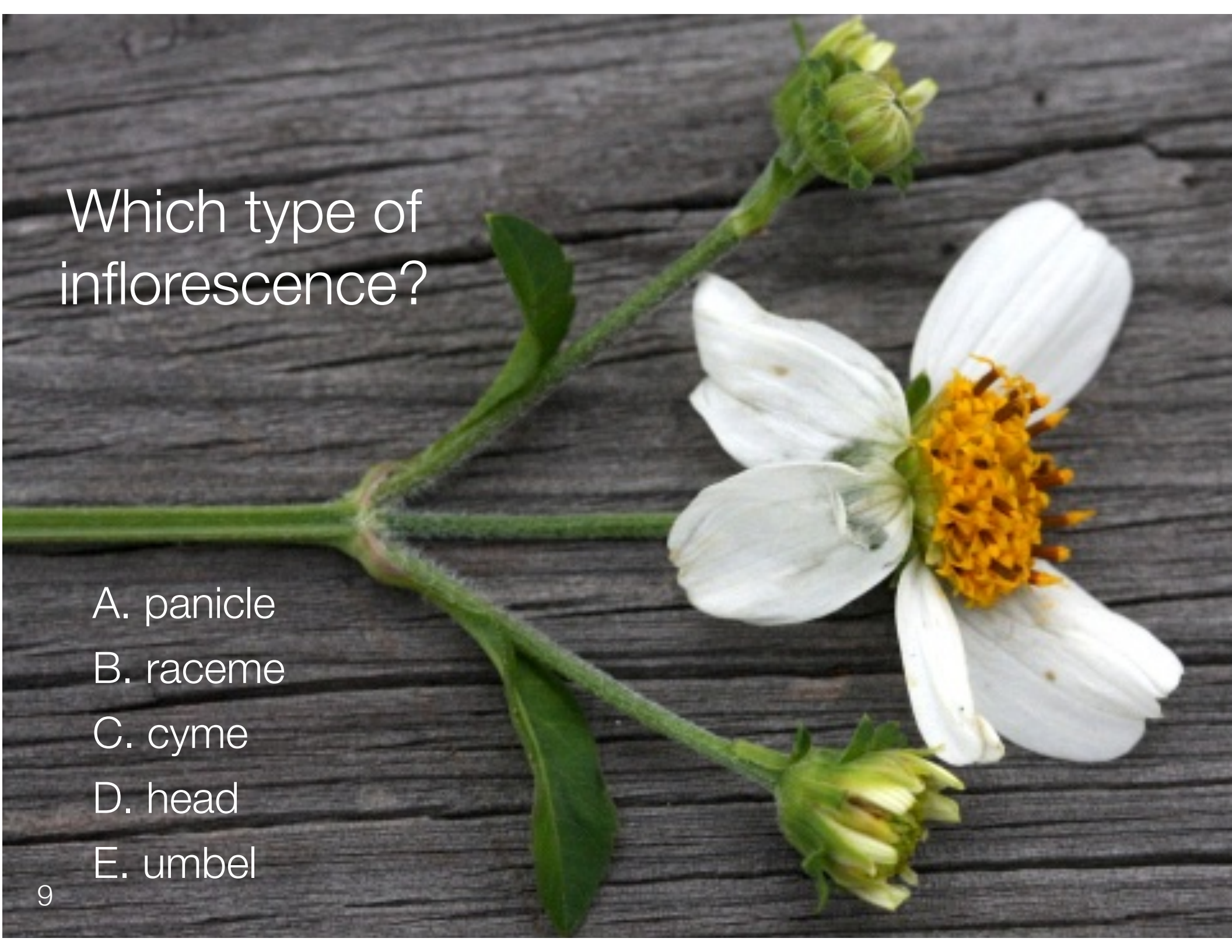
Which type of inflorescence?



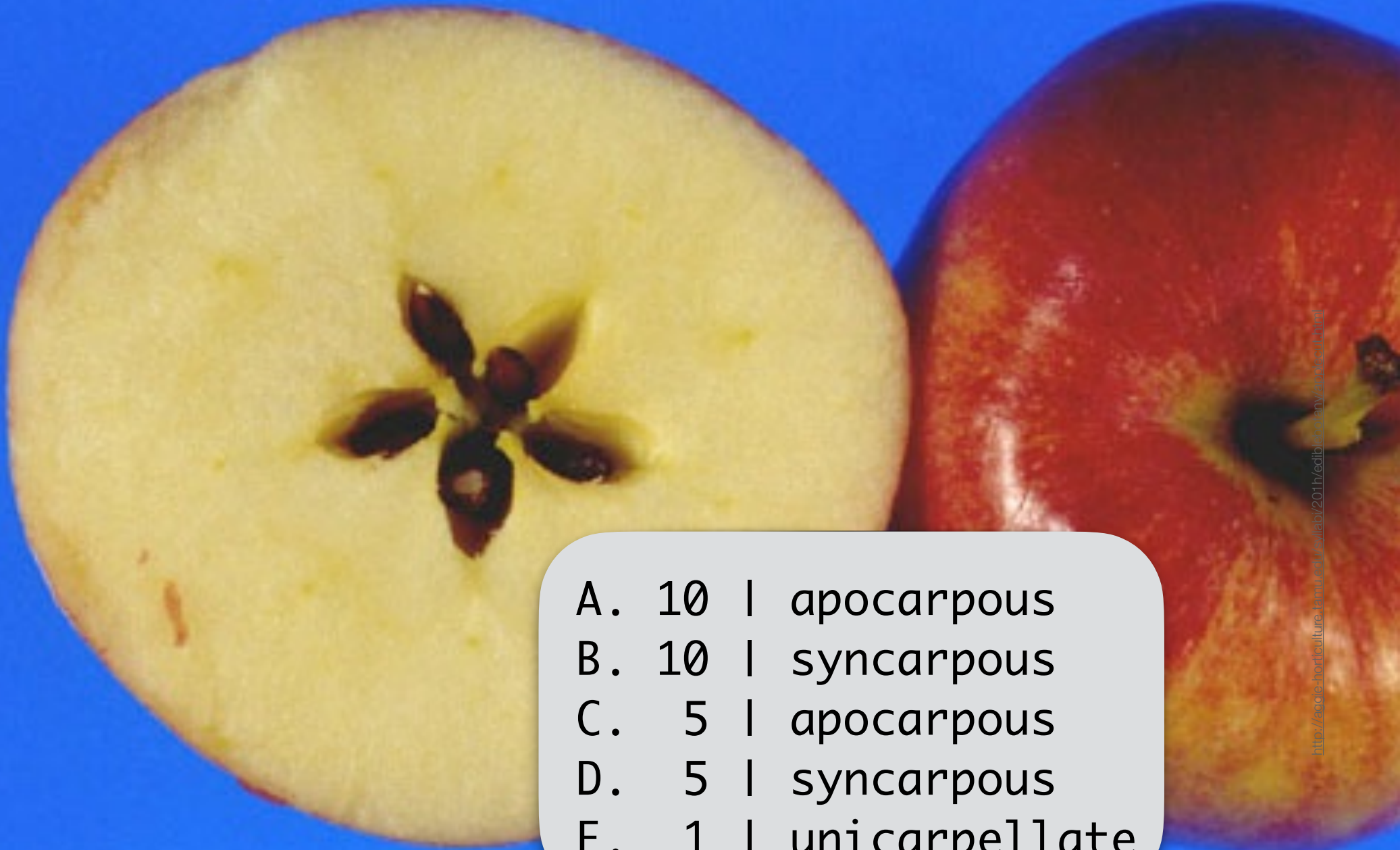
- A. panicle
- B. compound raceme
- C. scorpioid cyme
- D. head
- E. umbel

Which type of
inflorescence?

- A. panicle
- B. raceme
- C. cyme
- D. head
- E. umbel

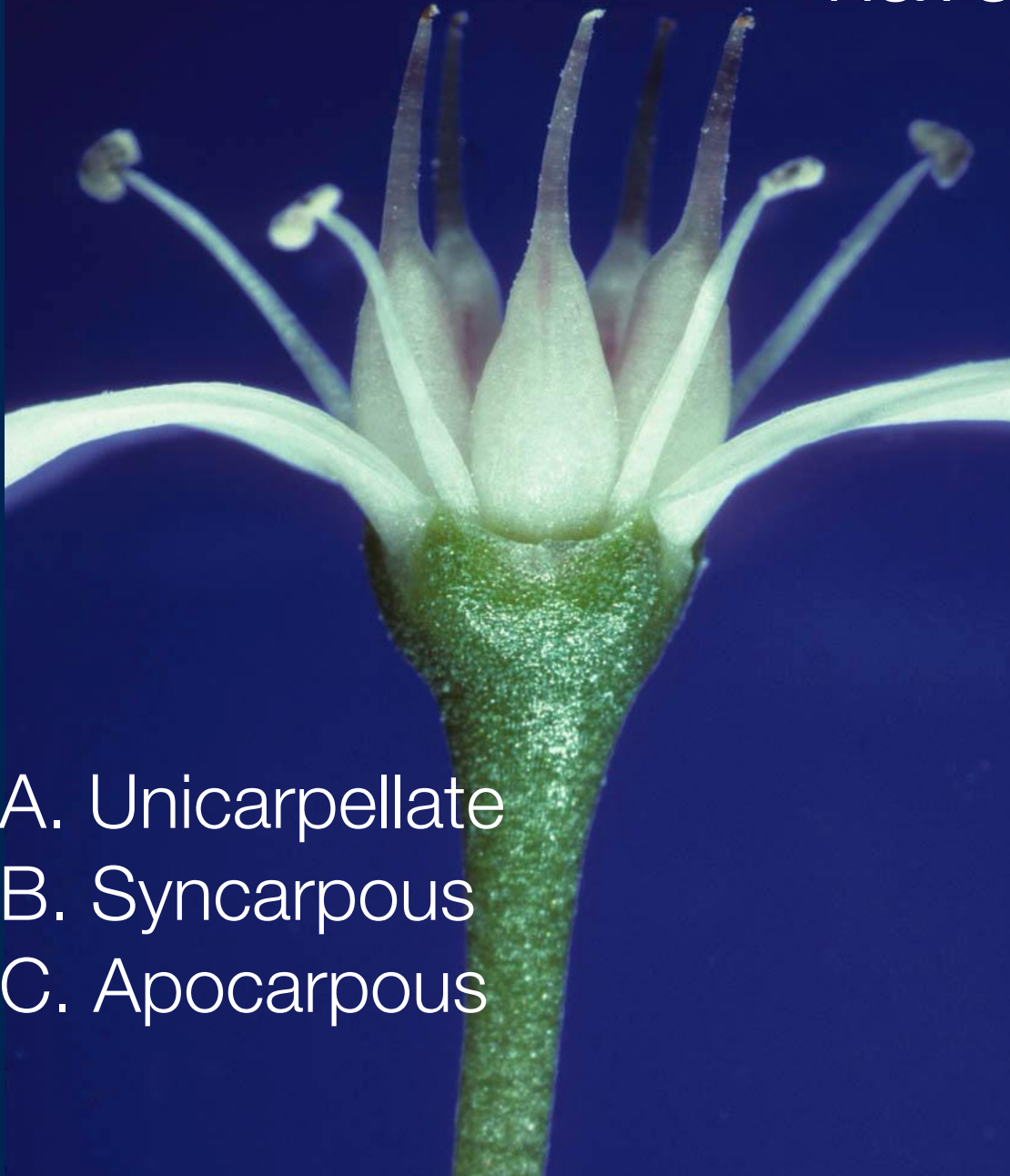


The flower that developed into this apple had _____ carpels and a(n) _____ gynoecium.



- A. 10 | apocarpous
- B. 10 | syncarpous
- C. 5 | apocarpous
- D. 5 | syncarpous
- E. 1 | unilocarpellate

What type of gynoecium does this flower have?



- A. Unicarpellate
- B. Syncarpous
- C. Apocarpous

What is this fruit type (note: only a single flower shown)



- A. achene
- B. grain
- C. schizocarp
- D. hesperidium
- E. pome

What pollinates tobacco?



- A. bat
- B. fly
- C. bee
- D. moth
- E. bird

What pollinates *Salvia*?

- A. bat
- B. fly
- C. bee
- D. moth
- E. bird



Which is more likely to be the cause of your allergies in late summer?



Is eating local honey likely to help with your hay fever allergies?

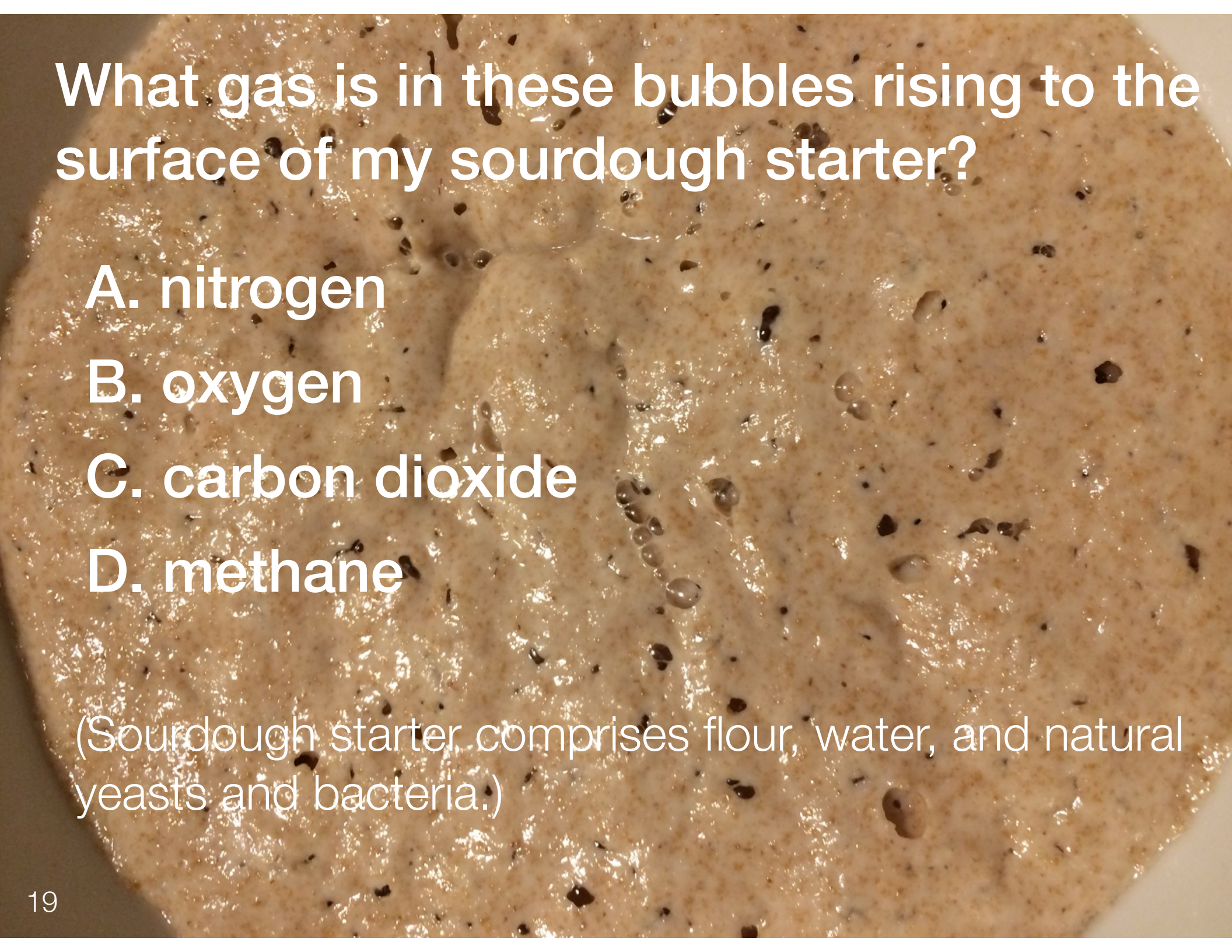
- A. yes because it contains local pollen
- B. no because the pollen it contains is carried by bees and is thus never reaches your nose

Fungi *differ from plants* in using _____ in their cell walls and *differ from animals* in that they are _____

- A. cellulose | heterotrophs
- B. chitin | absorptive heterotrophs
- C. cellulose | absorptive heterotrophs
- D. chitin | ingestive heterotrophs
- E. starch | autotrophs

What type of fungus?

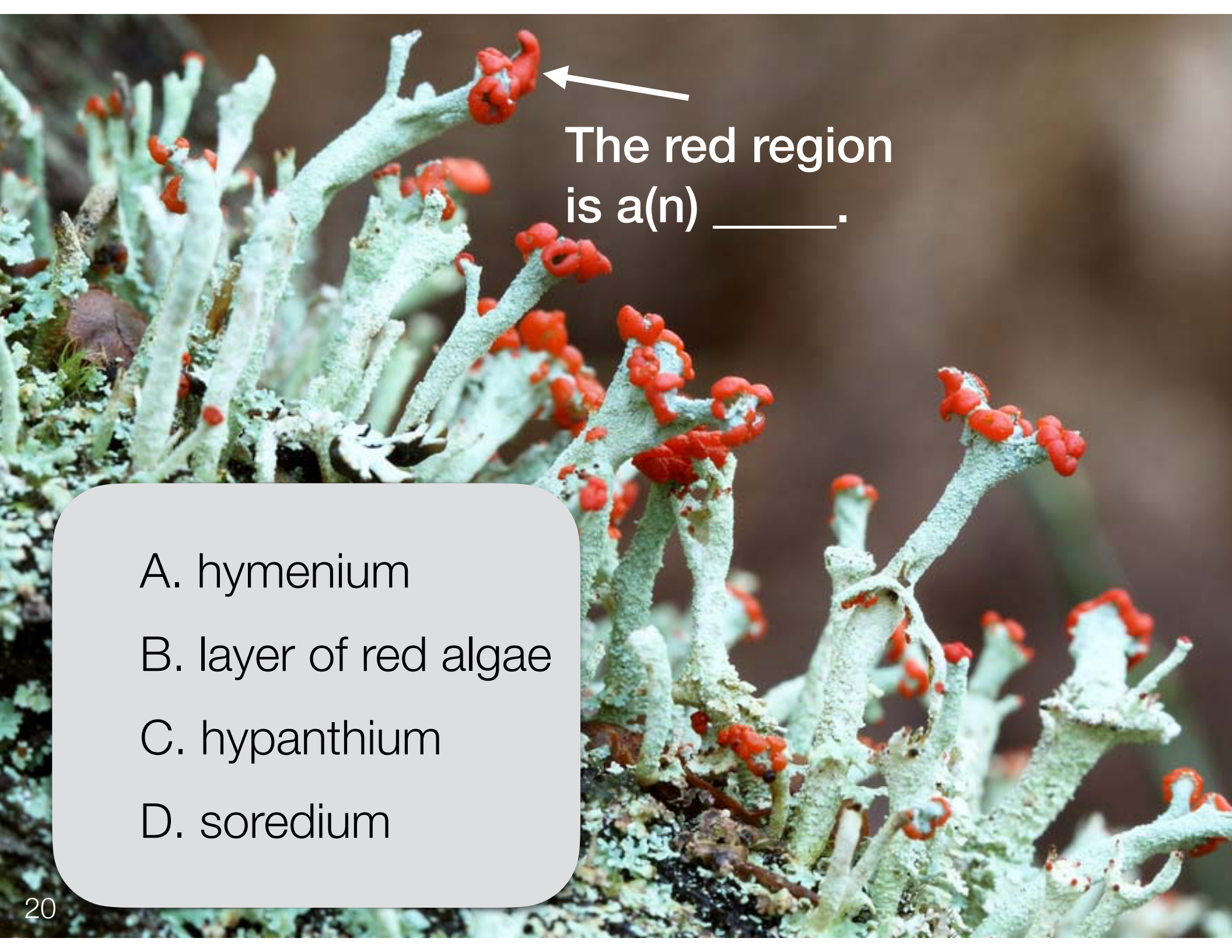
- A. zygomycete (bread mold)
- B. glomeromycete (mycorrhizae)
- C. ascomycete (sac fungus)
- D. basidiomycete (club fungus)



What gas is in these bubbles rising to the surface of my sourdough starter?

- A. nitrogen
- B. oxygen
- C. carbon dioxide
- D. methane

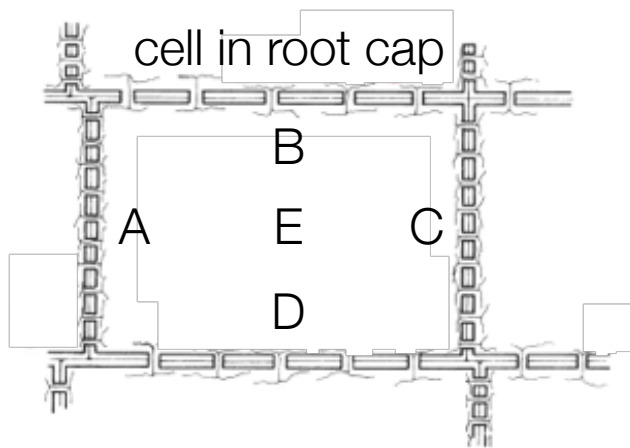
(Sourdough starter comprises flour, water, and natural yeasts and bacteria.)



The red region
is a(n) _____.

- A. hymenium
- B. layer of red algae
- C. hypanthium
- D. soredium

Where will amyloplasts accumulate in this root tip that has become horizontally oriented?



root lying on its side

Which of the following plant hormones is responsible for the saying "*one bad apple spoils the bunch*"?

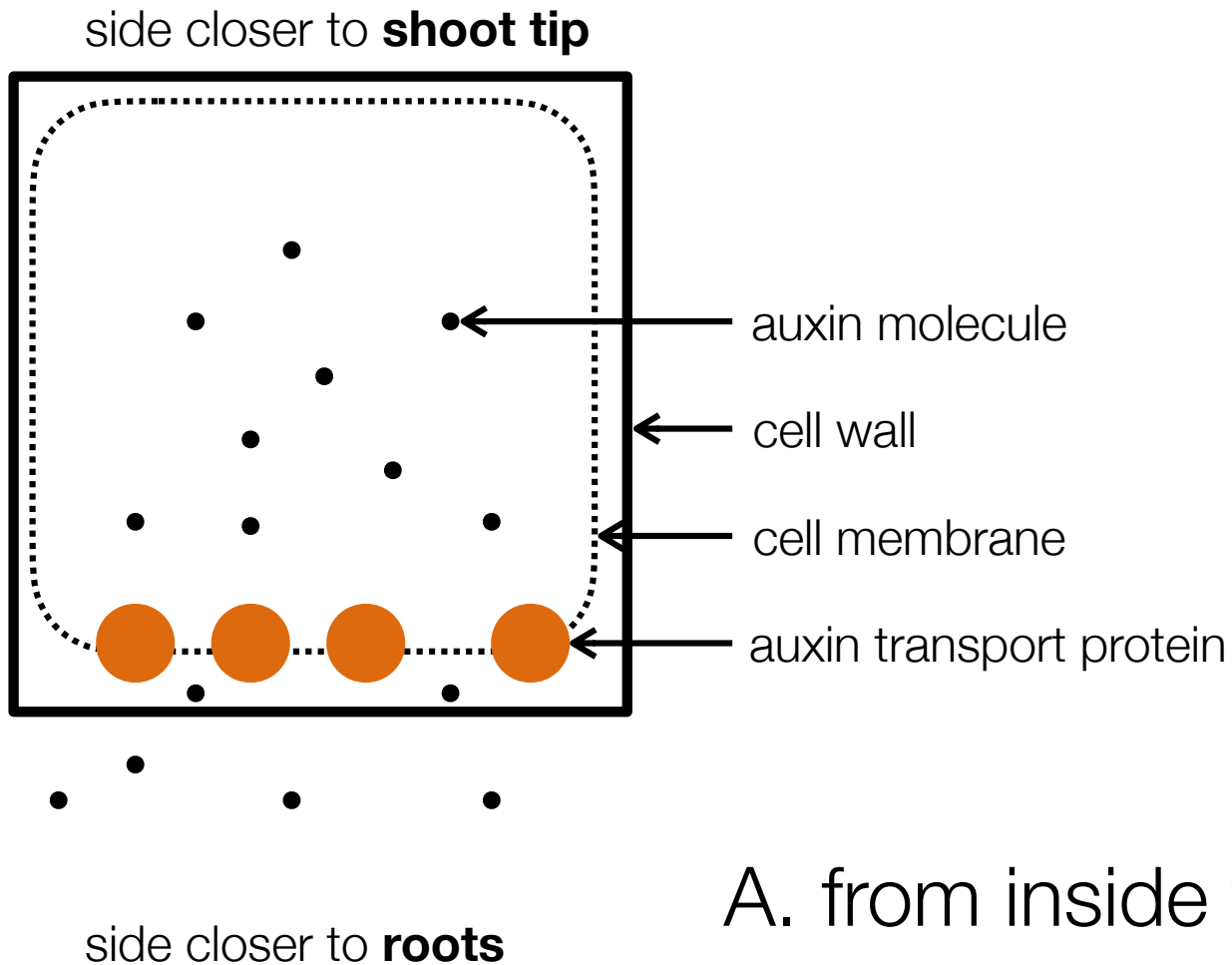
- A. auxin
- B. cytokinin
- C. gibberellic acid
- D. ethylene
- E. abscissic acid

What is wheat **germ**, exactly?

- A. bran
- B. endosperm
- C. seed coat
- D. embryo
- E. fruit



In which direction do the auxin transport proteins shown move auxin molecules?

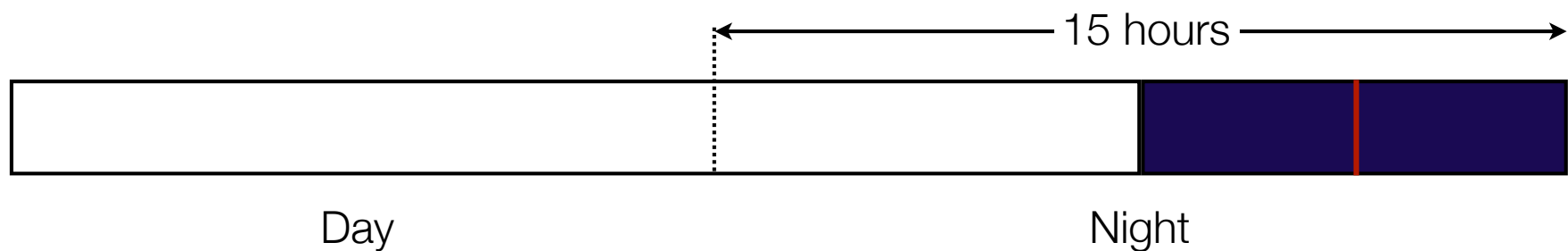


- A. from inside to outside cell
- B. from outside to inside cell
- C. both directions randomly



Will it flower?

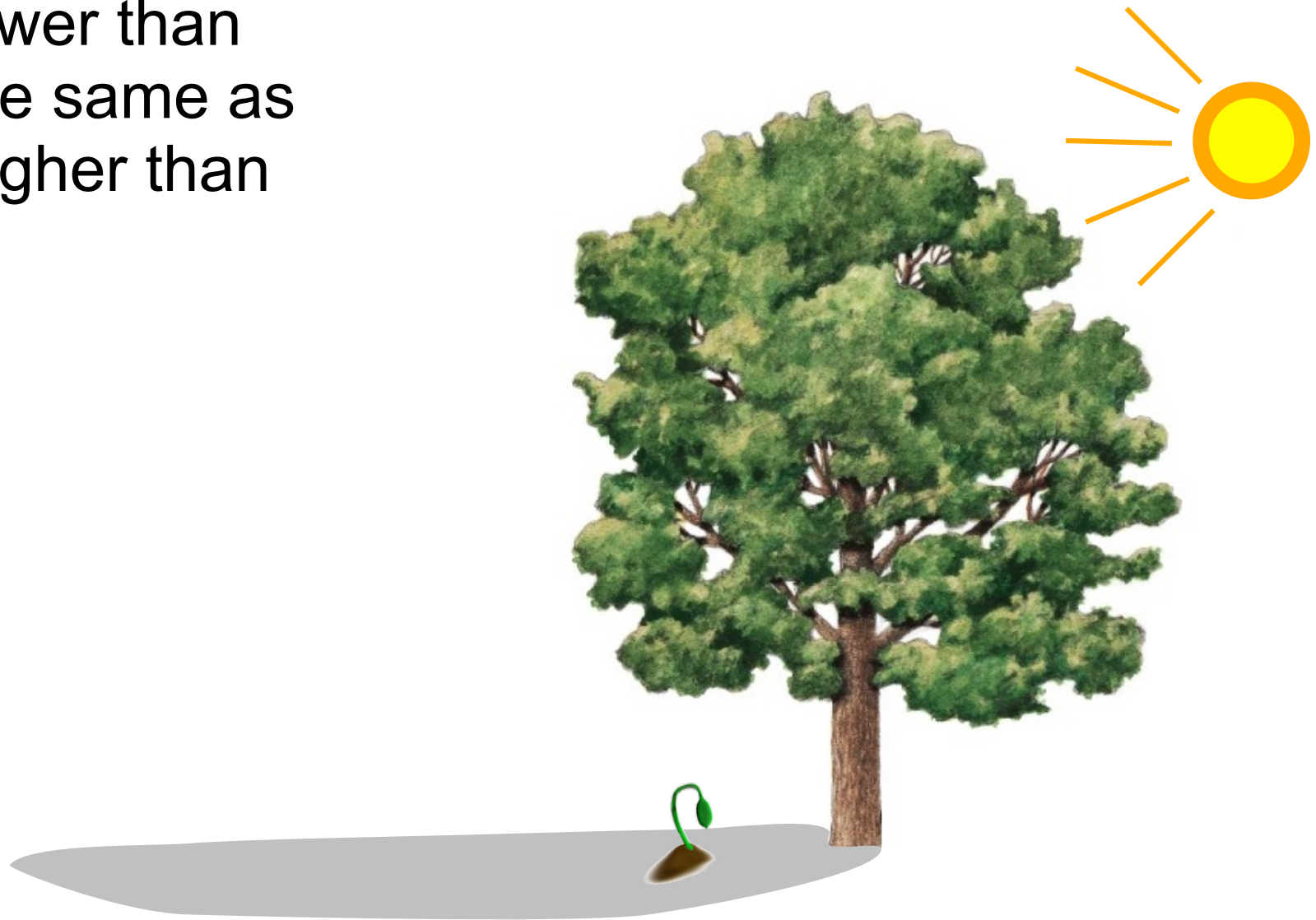
Poinsettias get the signal to initiate flowering if they ever have **at least 15 hours** of uninterrupted darkness. Suppose a poinsettia is only provided with **7.5 hours of darkness**, but a **flash of far red** light is issued during this period.



- A. the poinsettia will **get** the signal to begin flowering
- B. the poinsettia will **fail to get** the signal to begin flowering

The Pfr:Pr ratio in the shaded seedling is _____ it would be if the seedling were in full sun.

- A. lower than
- B. the same as
- C. higher than



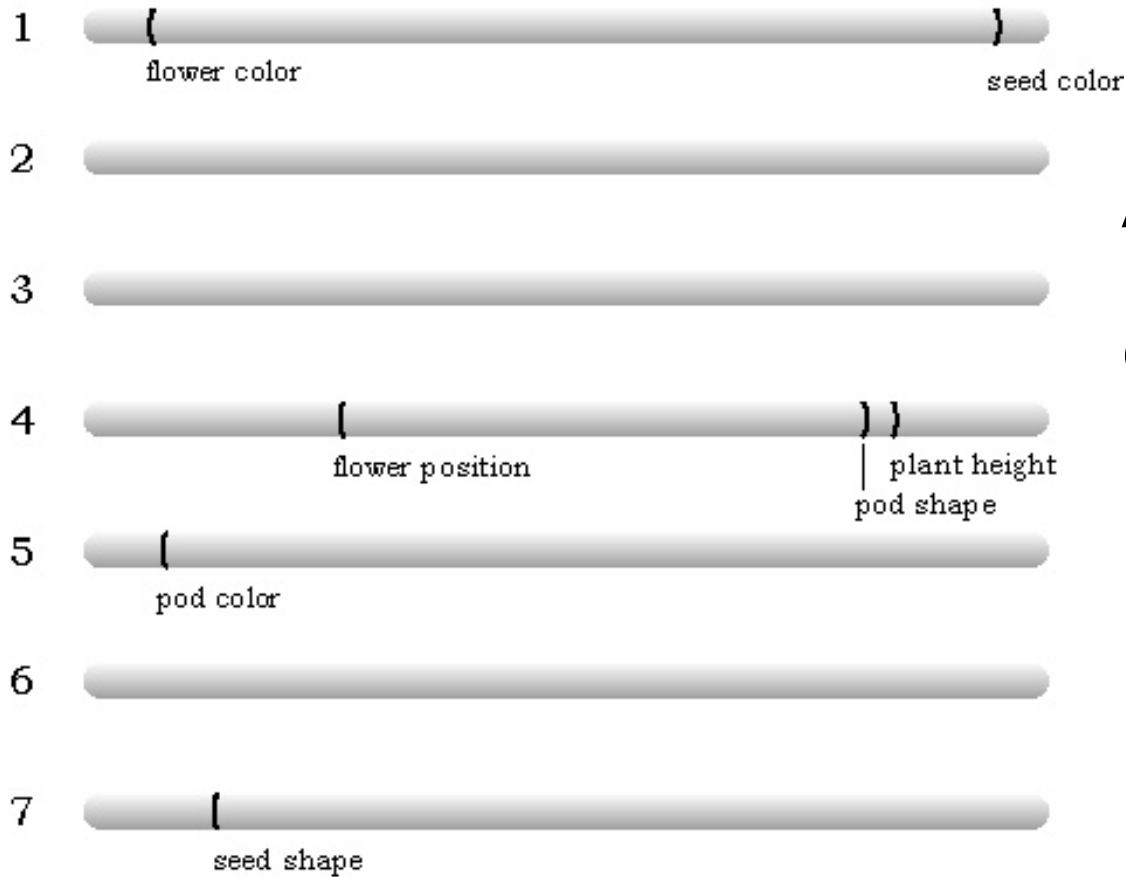
Brewers make use of the plant hormone _____ to stimulate _____ cells to make amylase when they malt barley.

- A. auxin | root
- B. cytokinin | callus
- C. ethylene | lacunae
- D. ABA | guard
- E. GA | aleurone



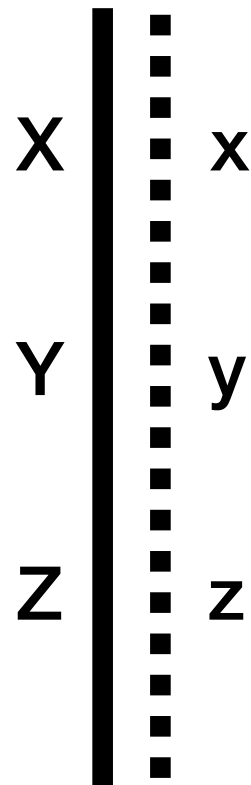
http://en.wikipedia.org/wiki/Image:Sjb_whiskey_malt.jpg

Which 2 trait loci are unlinked?



- A. plant height, flower position
- B. flower position, pod shape
- C. pod shape, plant height
- D. pod color, seed shape
- E. flower color, seed color

What haplotypes would you get if a single crossover occurred **between X and Y** and ALSO **between Y and Z**?



- A. xyz and XYZ
- B. Xyz and xYZ
- C. xyZ and XYz
- D. XyZ and xYz
- E. xYz and XYZ

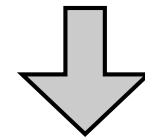
Meet the parentals

The *parental* haplotypes donated by the AaBb individual are _____.

- A. AB,ab
- B. AB,Ab
- C. Ab,aB
- D. aB,ab

Test cross

AaBb X aabb



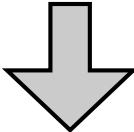
AaBb	0.01
Aabb	0.48
aaBb	0.49
aabb	0.02
Genotypes of offspring	Proportion of offspring

Recombination fraction?

The *recombination fraction* is _____.

- A. 0.48
- B. 0.49
- C. 0.01
- D. 0.02
- E. 0.03

Test cross
AaBb X aabb



AaBb	0.01
Aabb	0.48
aaBb	0.49
aabb	0.02

Genotypes of offspring **Proportion of offspring**

Which two loci are closest to each other?

Test cross of 1 vs. 2

AB	0.44
Ab	0.06
aB	0.05
ab	0.45

- A. 1 and 2
- B. 1 and 3
- C. 2 and 3

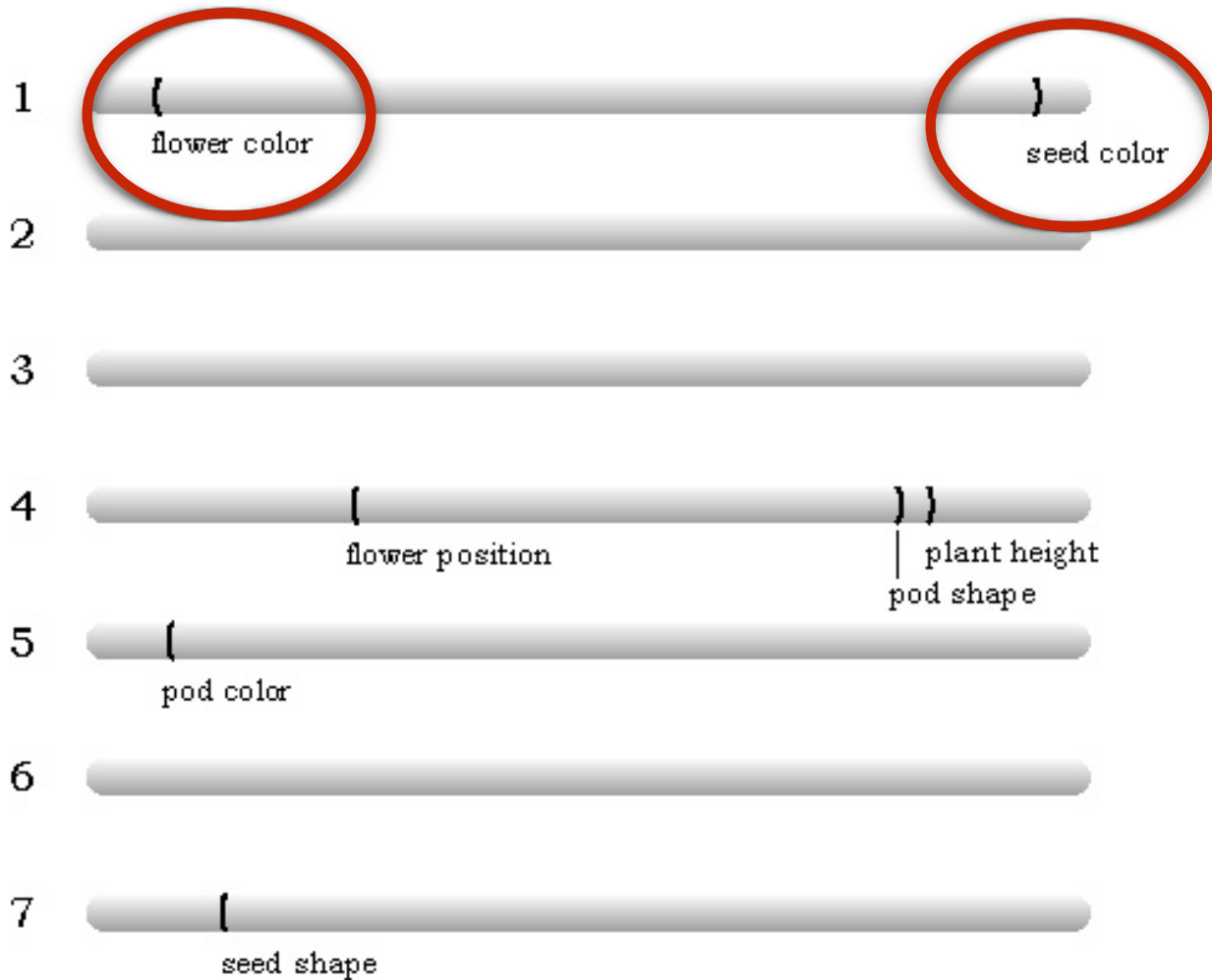
Test cross of 1 vs. 3

AC	0.00
Ac	0.50
aC	0.48
ac	0.02

Test cross of 2 vs. 3

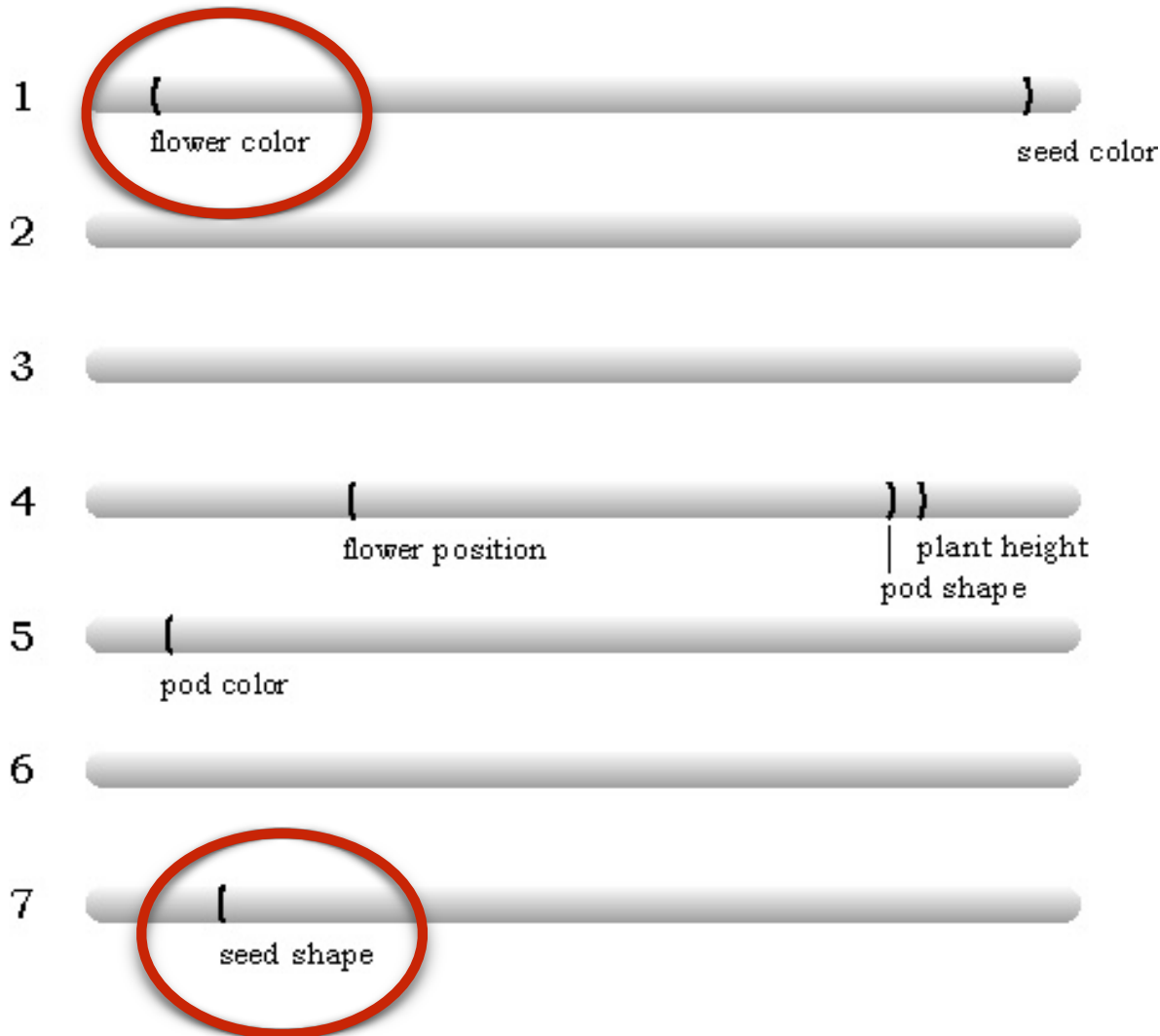
BC	0.45
Bc	0.04
bC	0.05
bc	0.46

What recombination fraction would you expect in a test cross involving these two loci?



- A. 0.05
- B. 0.50
- C. 0.95
- D. 1.00
- E. 5.00

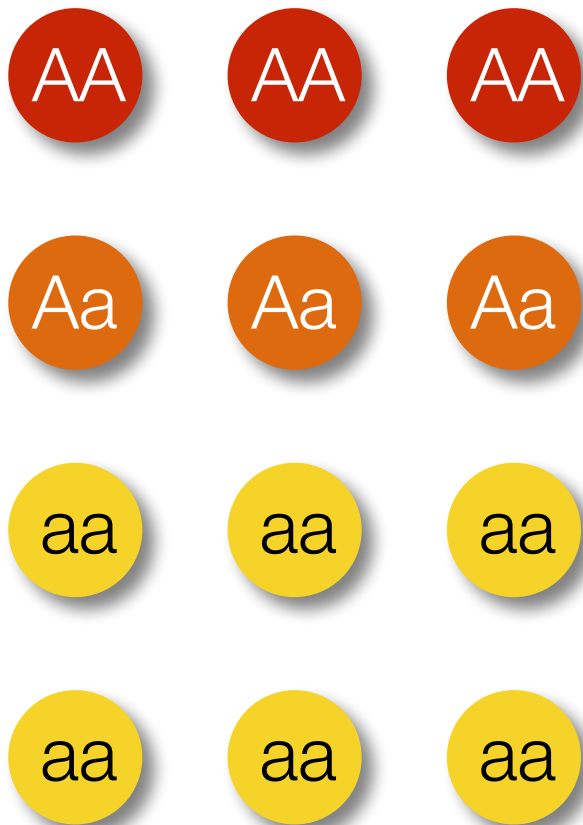
What recombination fraction would you expect in a test cross involving these two loci?



- A. 0.05
- B. 0.50
- C. 0.95
- D. 1.00
- E. 5.00

What is the frequency (p) of the A allele?

Population size: 12 diploid individuals



- A. $3/12$
- B. $6/12$
- C. $9/12$
- D. $9/24$
- E. $12/24$

What is the observed heterozygosity (H_o)?

Population size: 12 diploid individuals

AA AA AA

Aa Aa Aa

aa aa aa

aa aa aa

A. $3/12$

B. $6/12$

C. $9/12$

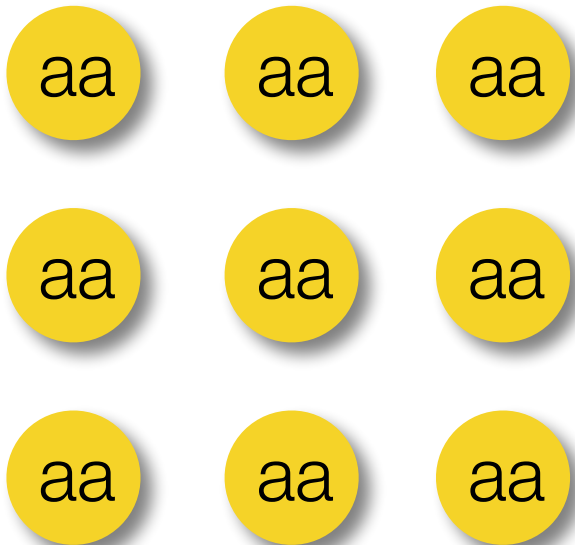
D. $9/24$

E. $12/24$

What are the Hardy-Weinberg expected genotype proportions in the next generation?

current population

AA



$$p = \frac{1}{10}$$

$$q = \frac{9}{10}$$

A B C D

0	$\frac{1}{100}$	$\frac{25}{100}$	$\frac{1}{100}$
0	$\frac{18}{100}$	$\frac{50}{100}$	$\frac{81}{100}$
1	$\frac{81}{100}$	$\frac{25}{100}$	$\frac{18}{100}$

Violation of which HWE assumption is most to blame here?



- A. Random mating
- B. No mutation
- C. No migration
- D. Large pop. size
- E. No selection

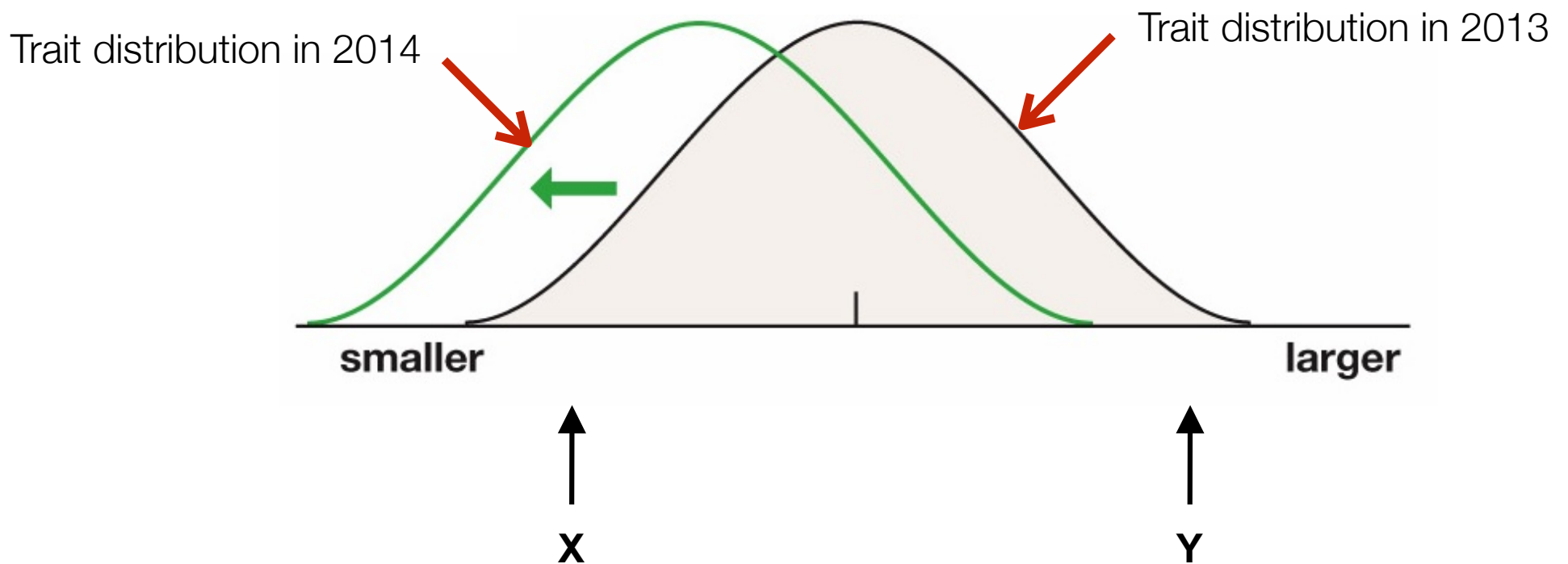
Phlox cuspidata data for Got-2 locus:

Population	p	q	Expected Heterozygosity (2pq)	Observed Heterozygosity
8	0.37	0.62	0.46	0.17
16	0.87	0.13	0.23	0.09
27	0.91	0.09	0.16	0.06
43	0.82	0.18	0.30	0.09

Photo of *Phlox cuspidata* from http://www.wildflower.org/plants/result.php?id_plant=PHCU2

Individuals in 2013 with **larger** trait values (e.g. Y) left _____ offspring (on average) to the 2014 population compared to individuals with **smaller** trait values (e.g. X)

- A. more
- B. fewer
- C. the same number of



If **aa** and **bb** are lethal, what fraction of offspring will survive if a plant with genotype **AaBb** is selfed?
 (Assume locus A and locus B are unlinked.)

	AB 0.25	Ab 0.25	aB 0.25	ab 0.25
AB 0.25	AABB 0.0625	AABb 0.0625	AaBB 0.0625	AaBb 0.0625
Ab 0.25	AABb 0.0625	AAbb 0.0625	AaBb 0.0625	Aabb 0.0625
aB 0.25	AaBB 0.0625	AaBb 0.0625	aaBB 0.0625	aaBb 0.0625
ab 0.25	AaBb 0.0625	Aabb 0.0625	aaBb 0.0625	aabb 0.0625

- A. all
- B. 9/16
- C. 7/16
- D. 3/16
- E. none

Decay

When plants and animals die, bacteria and fungi in the soil produce ammonium from the N-containing compounds in their bodies in a process known as _____.

- A. nitrogen fixation
- B. ammonification
- C. nitrification
- D. denitrification
- E. deammonification

Bad!

The process carried out by soil bacteria that converts nitrate to N_2 , which escapes into the atmosphere, is called _____.

- A. nitrogen fixation
- B. ammonification
- C. nitrification
- D. weathering
- E. denitrification

Potassium

Fertilizers have an N-P-K number. We've talked about why N and P are important to plants, but why is K (potassium) important?

- A. K is an element making up DNA and RNA
- B. K is part of every amino acid
- C. K is used by guard cells to control osmosis
- D. K is central to the structure of disulfide bridges in proteins

Answers

1.	E	11.	C	21.	D	31.	E
2.	B	12.	C	22.	D	32.	B
3.	D	13.	D	23.	D	33.	B
4.	D	14.	E	24.	A	34.	B
5.	carpels	15.	B	25.	B	35.	D
6.	C	16.	B	26.	A	36.	A
7.	B	17.	B	27.	E	37.	B
8.	C	18.	C	28.	D	38.	A
9.	C	19.	C	29.	D	39.	B
10.	D	20.	C	30.	C	40.	B

Answers (continued)

41. B

42. E

43. C