

IOD = interpretation of data (45% - 55%)

SIN = Scientific investigation (20% - 30%)

EMI = evaluation of models, inferences

and experimental results (25% - 35%)

4



4

PASSAGE II

Certain species of flowers attract more bees than others with the scent of their pollen. The pollen is found on a structure within the flower called the *anther*, which is located on top of another structure called the *stamen*. Flowers typically have multiple anthers and stamens.

Bees carry the pollen from the flowers on their legs. The bees move from flower to flower while collecting pollen. Some of the pollen falls from their legs as they land on another flower. This depositing of pollen causes cross-pollination to occur (fertilization of the other flowers). Three studies were conducted to study this process.

Study 1

For two flower species (A and B), pollen quantity per anther in milligrams (mg), anther quantity per flower in number, and percentage of stamens covered with pollen were recorded (see Table 1).

Flower species	Pollen quantity (mg) per anther	Anther quantity per flower	Stamens covered with pollen (%)
A	4.9	12	27
B	7.6	19	27

Study 2

Three study sites were established to determine the pollen collection rate of one species of bee for the flowers used in Study 1. In Site 1, Species A flowers were absent. In Site 2, Species B flowers were absent. In Site 3, both Species A and B flowers were absent.

Two pollen containers were placed at each site: one containing 50 mg Species A pollen and one containing 50 mg Species B pollen. The containers were left in place for 36 hours and the amount of pollen that was taken from the containers was measured. The results are recorded in Table 2.

Site	Flower species absent	Amount of Pollen (mg) removed from dishes containing pollen from:	
		Species A	Species B
1	A	26	13
2	B	12	35
3	A and B	2	4

Study 3

The researchers hand-pollinated flowers from a third species, Species C. They also observed the Species C plants being cross-pollinated by the bees in the area. All flowers were observed for 2 years. The scientists recorded the results in Table 3.

Cross-pollination of Species C flowers	Results from:	
	Hand-pollinated flowers	Bee-pollinated flowers
Flowers that reproduced	31	12
Flowers reproducing after 1 year	10	34
Flowers reproducing after 2 years	8	15
Total flowers produced after 2 years	50	43

8. Based on the results of Study 3, one could generalize that compared to flowers pollinated by hand, flowers pollinated by bees resulted in:
- F. an overall increase in flower production.
 - G. an overall decrease in flower production.
 - H. increased number of flowers still reproducing after 2 years.
 - J. decreased number of flowers still reproducing after 2 years.
9. Which of the following variables was controlled in the design of Study 2?
- A. The amount of pollen placed at each site
 - B. The level of pollen on each flower
 - C. The total amount of pollen removed by the bees from each site
 - D. The number of bees present at each site
10. According to the results of the studies, Species A and Species B are most similar in that their:
- F. percentage of stamens covered with pollen is equivalent.
 - G. anther quantity per flower is equivalent.
 - H. pollen quantity per anther is equivalent.
 - J. rate of cross-pollination after 2 years is equivalent.

GO ON TO THE NEXT PAGE.

4



4

11. In Study 2, Site 3 was used to study the:

- A. pollen preference when Species A flowers only were present.
- B. pollen preference when both Species A and Species B flowers were missing.
- C. pollen preference when Species B flowers only were missing.
- D. pollen preference when both Species A and Species B flowers were present.

12. Which of the following is a weakness in the design of Study 2?

- F. Some species of flowers were not at both sites.
- G. Some species of bees were not present at both sites.
- H. The pollen could have been taken away by something other than bees.
- J. The containers did not hold enough pollen for accurate measurements.

13. The results of Study 2 suggest that which of the following factors most affects the flower preference of bees?

- A. Level of pollen count on the stamen.
- B. Location of the particular flower species within the area.
- C. Type of a particular flower species available in the area.
- D. Number of anthers on a flower.

GO ON TO THE NEXT PAGE.