



Pollination Lab

In this lab, we will test to see if the flowers on a chosen plant are **self compatible** or **self incompatible**. Self-compatible flowers can be pollinated by their own pollen. Self-incompatible flowers will abort if they are pollinated by their own pollen, and will only accept pollen from other plants. Self incompatibility is a way to ensure that inbreeding does not occur in a population. Some plant species are self compatible and some are self incompatible.

Materials you will need:

- Two flowering individual plants (of the same species) with perfect flowers, in a garden or potted
- Netting material (as in very fine mosquito netting or cheesecloth)
- Labels & markers
- String or clothespins
- Toothpicks

Lab activity

1. Label your two individual plants as A and B
2. On plant A, choose two flowers and pollinate them with their own pollen, using a toothpick to carefully scrape pollen off of the anther and place the pollen on the stigma. The stigma should be sticky and the pollen should stick to it easily.
3. Cover the flowers you have pollinated with the netting material and tie the end or use a clothespin to close it around the flower. This is to ensure that no insects will come along and bring pollen from other flowers to your experimental flowers. The netting will still allow light, air and moisture through. Label the netting or put a label around the stem of the flower that says “self-pollinated.”
4. On plant B, choose two flowers and pollinate them with their own pollen, as you did on plant A, and cover them with netting.
5. Now choose two flowers on plant A that will be cross-pollinated with flowers from plant B. Scrape pollen of the anthers of a flower of plant B (using a clean toothpick, do not use the same one as before) and pollinate the two chosen flowers on plant A. Emasculate the flower by removing all of the stamen (just snap them off at the filament). This will ensure that the cross-pollinated flower will not self-pollinate on its own.
6. Cover the flowers with netting and label the bags “cross-pollinated.”
7. Repeat the process on plant B, using pollen from plant A.
8. Now choose two flowers on each plant to be controls. Cover these with the netting without pollinating them and label them “control.” Emasculate these as well (remove the stamens) to ensure the controls do not self pollinate.

9. Observe the flowers in one week. (If no fruit has appeared, come back in another week, some species take longer to fruit than others). If the self-pollinated flowers have gone to fruit, you know the plant is self compatible. If the self-pollinated flowers have not gone to fruit, but the cross-pollinated flowers have, then the plant is most likely self incompatible.
10. Remember to account for human error. Humans are not great pollinators, like bees or butterflies, so if some of your cross-pollinated flowers go to fruit and others do not, it may only mean that they were not pollinated correctly. In some cases the flowers could have been pollinated by accident before the experiment or during the experiment.

Note: Try to do this experiment with flowers that you can be sure have not been visited by insects prior to the experiment. There are several ways you can ensure this:

- a. Grow the flowering plant indoors, in the classroom. This will allow you to have more control of the plants, and flowers are less likely to receive insect visitors while indoors. Do the experiment on the day the flowers open.
- b. If you are using flowering plants that are growing outside, you can put the netting material over some unopened flower buds. When the buds open they will be protected from visitors until you have the opportunity to pollinate them.
- c. If you are using flowering plants growing outside and you cannot do *b*, you can often tell if the flower has been visited by determining if there is still nectar in the flower. This method is not foolproof, but flowers that are dry have likely been visited. Flowers with ample nectar are likely still waiting to be visited. (Obviously this method only works on flowers that produce nectar, which not all do).

