

# CSI: Changing Species Investigation

## *Winged aphids*

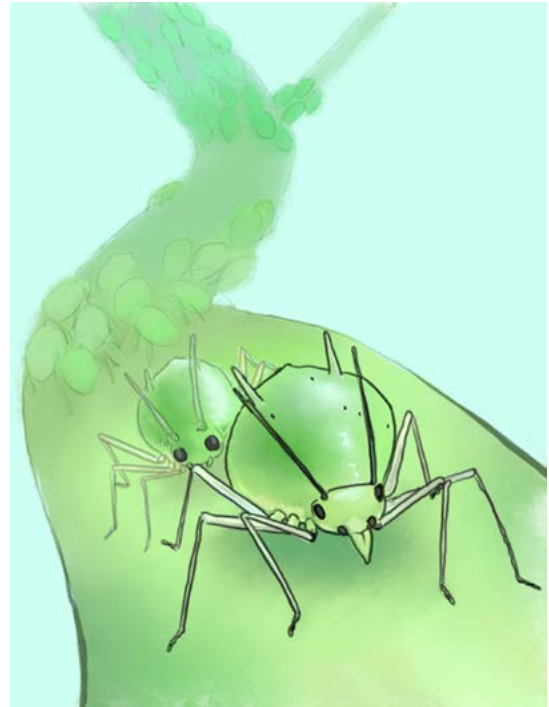
This file contains real data about aphid populations. Is there evidence of natural selection? You're on the case!

### Species Profile

Aphids are tiny insects that suck sap from plants. They're the opposite of picky eaters! If you have a garden, take a close look at any plant. There's a good chance you'll find aphids.

Aphids reproduce quickly. A mother can have around 80 nymphs (young offspring) in a week. The nymphs take about a week to grow up, then they have offspring of their own.

Most aphids don't have wings. They tend to live on the plant where they were born. It gets crowded fast. Sometimes there are so many that they literally suck the life out of the plant. Not surprisingly, gardeners have watched aphids closely. And they noticed something. When the aphids got crowded, some developed wings as they grew up. The winged aphids could fly away to new plants.



### Is the winged trait helpful, harmful, or neutral?

Circle the most likely answer for each environment.

1. Before a plant gets crowded, the winged trait is (**helpful** / harmful / neutral) to an aphid.
2. When a plant gets crowded, the winged trait is (**helpful** / harmful / neutral) to an aphid.

### Prediction

Write a sentence about how **crowding** may affect the **winged trait** in aphid populations:

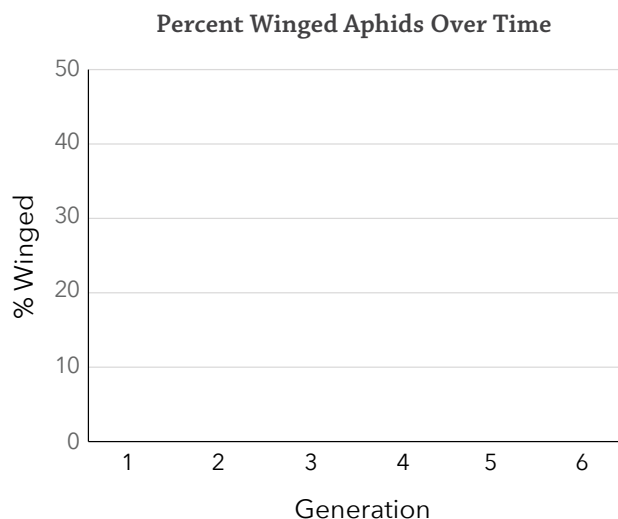
## Have aphid populations changed over time?

To test if the winged trait in aphids can change, you collect some wingless adults. You spread them out on healthy plants then watch for six generations as the aphids reproduce and become more crowded. For every generation, you count the number of insects with wings.

*Let's analyze your data!*

Fill in the table and make a bar graph of your findings.

Generation	Total Aphids	Winged Aphids	Percent (%) Winged Aphids
1	15	0	
2	54	0	
3	63	0	
4	124	7	
5	150	44	
6	208	89	



**Summarize the evidence.** Complete the summaries by circling the correct words:

- The percent of winged aphids is (**lower / higher**) as insects become more crowded.
- The winged trait has become (**more common / less common / stayed the same**).

## Observation

While doing your experiment, you also tracked what happened when the winged aphids flew away to non-crowded plants. The winged aphids had only wingless nymphs! In fact, you didn't see any more winged aphids until a few generations later when the insects were crowded once again.

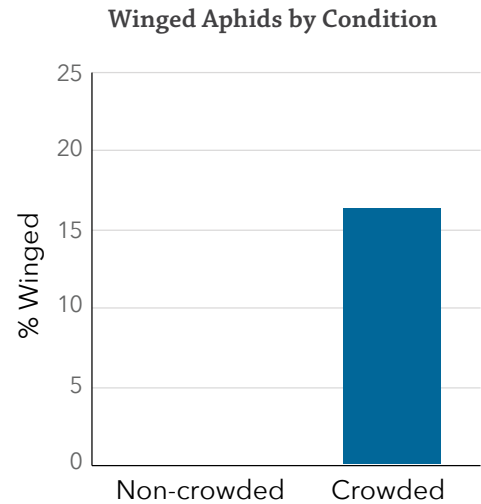
**Interpretation:** Write a sentence that may explain your observation:

## Are aphid wings inherited?

To find out if wings are inherited, you let nymphs from wingless mothers grow up in either crowded or non-crowded conditions. After lots of counting, you make this graph of your data:

**Summarize the evidence.** Complete the summaries by circling the correct words:

5. Aphids grow wings in non-crowded conditions (**often** / **sometimes** / **never**).
6. Aphids grow wings in crowded conditions (**often** / **sometimes** / **never**).
7. The evidence suggests wings are (**heritable** / **acquired**).



## Is it natural selection?

Write 2-3 sentences to explain your thinking: