Name_____

DATA Nugget

How the cricket lost its song, Part I

Featured scientist: Robin Tinghitella from the University of Denver

Research Background:

Some of the most vibrant and elaborate traits in the animal kingdom are signals used to attract mates. These **mating signals** include the bright feathers and loud calls of birds or the swimming dances performed by fish. Most of the time the males of the species perform the mating signals, and females use those signals to choose a mate. While mating signals help attract females, they may also attract unwanted attention from other species, like predators.

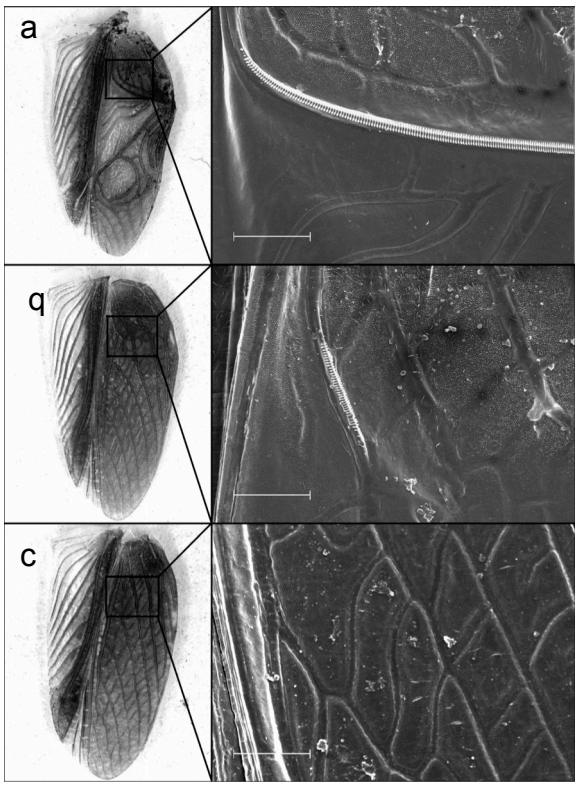


Figure 1: (a) Male wing with normal calling structures. (b) Male wing with the flatwing mutation. (c) Female wing.

Robin is a scientist who studies the mating signals of Pacific field crickets. These crickets live on several of the Hawaiian Islands. Male field crickets make a loud, long-distance song to help females find them and then switch to a quiet courtship song once a female comes in close. Males use specialized structures on the wings to produce songs (Figure 1a).

One summer, Robin noticed that the crickets on one of the islands, Kauai, were unusually quiet. Only a couple of years before, Kauai had been a very loud place to work; however, that year Robin heard no males singing! After taking the crickets back to the lab, she noticed that there was something different about the males' wings on Kauai. Most (95%) of males were missing all of the structures that are used to produce the calling and courtship songs (Figure 1b)—they had completely lost the ability to produce song! She decided to call this new type of male a **flatwing male**. But why did these males have flat wings?

On Kauai, songs of the male crickets attract female crickets, but they are also overheard by a deadly parasitoid fly (Figure 2). The fly sprays its larvae on the backs of the crickets. The larvae then burrow into the crickets' body cavity and eat them from the inside out! Robin thought that maybe the flat wings and lack of a song helped the male

Name_____

crickets remain unnoticed by the parasitoid flies. To test this idea, Robin dissected the males to look for fly larvae. She compared infection levels for 67 normal males—collected before the flatwing mutation appeared in the population—to 122 flatwing males that she collected after the flatwing mutation appeared. She expected fewer males to be infected by the parasitoid fly after the appearance of the flatwing mutation in the cricket population.

Figure 2: A parasitoid fly, *Ormia ochracea,* sitting on top of its cricket host, *Teleogryllus oceanicus.*

Scientific Questions: Why do most male crickets on Kauai have flat wings? Could parasitoid flies have contributed to the loss of song for male crickets?

What is the hypothesis? Find the hypothesis in the text and underline it. A hypothesis is a proposed explanation for an observation, which can then be tested with experimentation or other types of studies.

Scientific Data:

Use the data below to answer the scientific questions:

	Number of males	
	Before Flatwing Mutation	**After Flatwing Mutation**
Parasitized	25	1
Not Parasitized	42	121
Percent Parasitized		

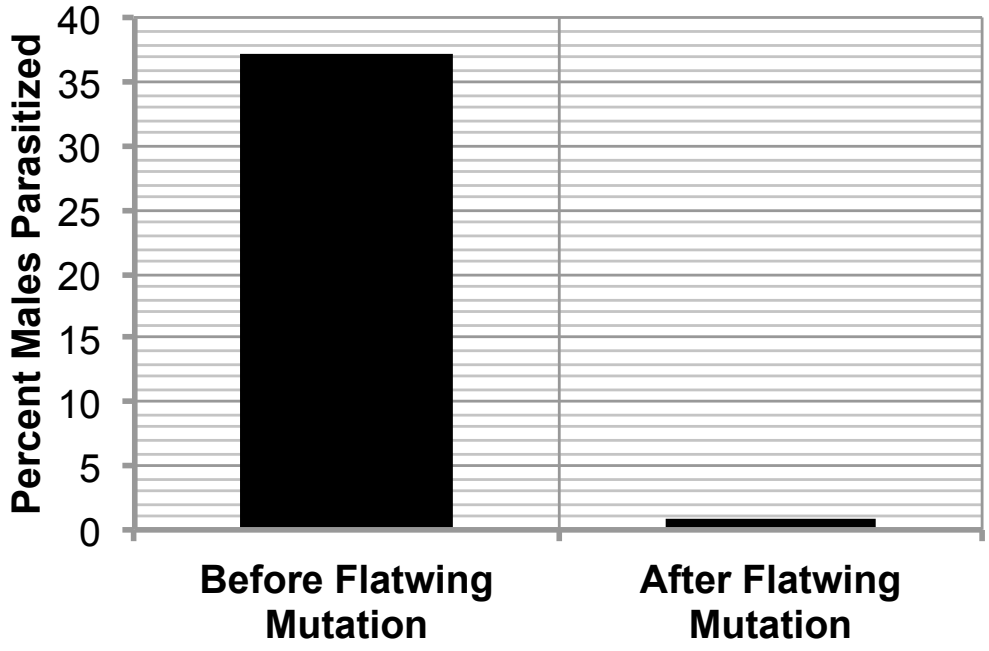
What data will you graph to answer the scientific questions?

Independent variable: _____

Dependent variable: _____

Name_____

Below is a graph of the data: Identify any changes, trends, or differences you see in your graph. Draw arrows pointing out what you see, and write one sentence describing what you see next to each arrow.



Interpret the data:

Make a claim that answers each of the scientific questions.

What evidence was used to write your claim? Reference specific parts of the table or graph.

Name_____

Explain your reasoning and why the evidence supports your claim. Connect the data back to what you learned about the flatwing mutation and the parasitoid flies

Did the data support Robin's hypothesis? Use evidence to explain why or why not. If you feel the data were inconclusive, explain why.

Your next steps as a scientist: Science is an ongoing process. What new question(s) should be investigated to build on Robin's research? What future data should be collected to answer your question(s)?