

DATA *Nugget*

How the cricket lost its song, Part II

Featured scientist: Robin Tinghitella from the University of Denver

In Part 1 you determined that the Kauai flatwing mutation led to a decrease in parasitism rates for male crickets. Today, most of the male crickets on Kauai have evolved flat wings and can no longer produce songs that were previously used to attract female crickets. Without their songs, how do males attract females?

Research Background:

Without their song, how are flatwing crickets able to attract females? In some other animal species, like birds, males use an alternative to singing, called **satellite behavior**. Satellite males hang out near a singing male and attempt to mate with females who have been attracted by the song. This helps satellite males in two ways: they don't use energy to make a song, and they avoid attracting enemies like the fly. Perhaps the satellite behavior gives flatwing males the opportunity to mate with females who were attracted to the few singing males left on Kauai.



Robin (left) with her advisor (right), counting the number of crickets that entered a circle while the song was playing.

To test this idea, Robin set up a speaker playing cricket songs in the fields where the

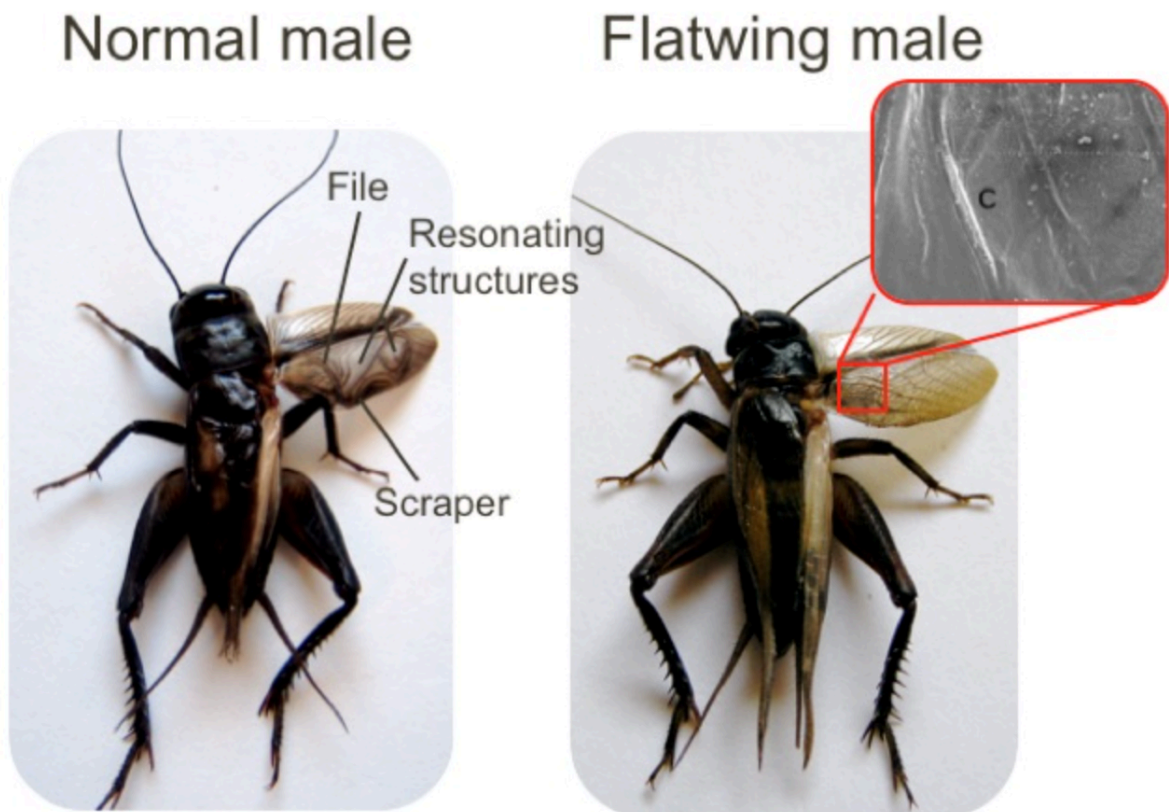


Robin and her advisor setting up speakers for their experiment. The speakers mimic the song of male crickets and are used to attract females and satellite males to the area.

crickets live on Kauai, Oahu, and the Island of Hawaii. The speaker tricks male and female crickets into thinking there is a male cricket in the area making songs. Before the start of the experiment, Robin removed all the males found within a 2-meter circle around the speaker. She then broadcast cricket songs from the speaker for 20 minutes. She returned and counted the number of males in the 2-meter circle, measured the distance from male to the speaker, and noted whether each male was normal or flatwing. Robin expected that flatwing males would be more likely to use satellite behavior and, therefore, would be on average closer to the speaker than normal males.

Scientific Questions: How do flatwing males find mates without song? In what ways do their methods differ from those used by males that can produce song?

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



The male cricket on the left has a normal wing with all calling structures. The male cricket on the right has the flatwing mutation and a wing without any of the calling structures. When we zoom in on the wing we can see how flat it is.

Scientific Data:

Use the data below to answer the scientific questions:

Island	Male Wing Type	Distance to speaker (cm)
Kauai	Flatwing	105
Kauai	Flatwing	135
Kauai	Flatwing	65
Kauai	Flatwing	40
Kauai	Flatwing	55
Kauai	Flatwing	25
Kauai	Flatwing	80
Kauai	Flatwing	65
Kauai	Flatwing	10
Kauai	Flatwing	35
Oahu	Normal	145
Oahu	Normal	30
Oahu	Normal	115
Oahu	Normal	200
Oahu	Normal	195
Oahu	Normal	155
Oahu	Normal	115
Oahu	Normal	135
Oahu	Normal	180
Oahu	Normal	165
Hawaii	Normal	130
Hawaii	Normal	175
Hawaii	Normal	150
Hawaii	Normal	175
Hawaii	Normal	185
Hawaii	Normal	200
Hawaii	Normal	135
Hawaii	Normal	195
Hawaii	Normal	15
Hawaii	Normal	180

Mean Flatwing Male Distance to Speaker	
Mean Normal Male Distance to Speaker	

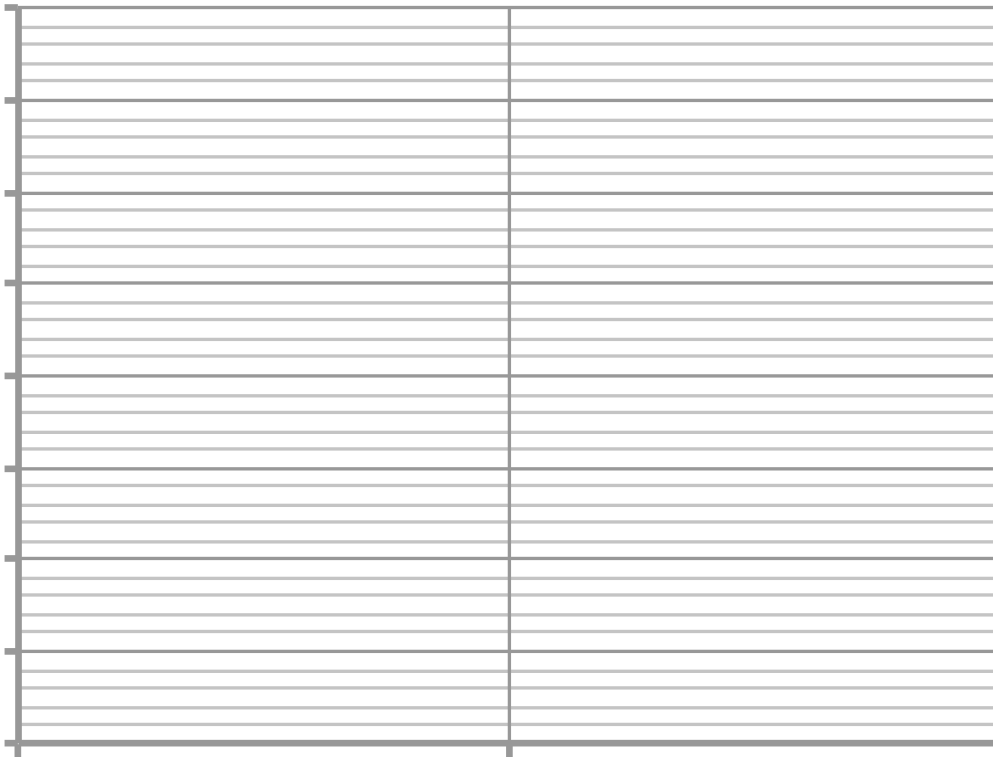
Name _____

What data will you graph to answer the questions?

Independent variable: _____

Dependent variable: _____

Draw your graph below: 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.

Name_____

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

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

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)?