Name_____

DATA Nugget

Is it dangerous to be a showoff?

Featured scientists: Aaron Reedy and Robert Cox from the University of Virginia
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Research Background:

A male anole uses his bright, red dewlap to signal to other anoles.

Natural selection happens when differences in traits within a population give some individuals a better chance of surviving and reproducing than others. Traits that are beneficial are more likely to be passed on to future generations. However, sometimes a trait may be helpful in one context and harmful in another. For example, some animals communicate with other members of their species through visual displays. These **signals** can be used to defend territories and attract mates, which helps the animal reproduce. However, these same bright and colorful signals can draw the unwanted attention of predators.

Brown anoles are small lizards that are abundant in Florida and the Caribbean. They have an extendable red and yellow flap of skin on their throat, called a **dewlap**. To communicate with other brown anoles, they extend their dewlap and move their head and body. Males have particularly large dewlaps, which they often display in territorial defense against other males and during courtship with females. Females have much smaller dewlaps and use them less often.

Aaron sometimes has to climb up into the trees to capture brown anoles in Florida.

Aaron is a scientist interested in how natural selection might affect dewlap size in male and female brown anoles. He chose to work with anoles because they are ideal organisms for studies of natural selection; they are abundant, easy to catch, and have short life spans. Aaron

Name_____

Aaron measuring the dewlap of a male brown anole.

wanted to know whether natural selection was acting in different ways for males and females to cause the differences in dewlap size. He thought that a male with a larger dewlap may be more effective at attracting females and passing on his genes to the next generation. However, males with larger, showy dewlaps may catch the eye of more predators and have higher chances of being eaten. Aaron was curious about this tradeoff and how it affected natural selection on dewlap size. For female brown anoles, Aaron thought that this tradeoff would be less important for survival because females have smaller dewlaps and use them less frequently as a signal. In other words, there may not be selection on dewlap size in females.

Using a population of brown anoles on a small island in Florida, Aaron set up a study to determine how dewlap size is related to survival and whether there is a difference between the sexes. He worked with his advisor, Robert, and other members of the lab. They designed a study to track every brown anole on the island and see who survived. In May 2015, they caught the adult lizards on the island and recorded their sex, body length, and dewlap size before releasing them with a unique identification number. Then, the lab returned to the island in October and collected all the adults once again to determine who survived and who didn't. Aaron predicted that male anoles with larger than average dewlap size would be less likely to survive due to an increased risk of predation. He also predicted that dewlap size would not influence female survival.

Scientific Question: How does dewlap size affect survival in male and female brown anoles?

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.

Name_____

Scientific Data:

Use the data below to answer the scientific question:

Relative Dewlap Size Class	Sex	Number of Individuals Recaptured in October	Survival Rate
1	Male	15	47%
2	Male	15	40%
3	Male	31	26%
4	Male	40	23%
5	Male	43	23%
6	Male	34	24%
7	Male	16	13%
8	Male	14	21%
1	Female	18	39%
2	Female	53	40%
3	Female	86	31%
4	Female	92	37%
5	Female	78	44%
6	Female	59	40%
7	Female	41	17%
8	Female	34	41%

Data interpretation note:

- *Relative Dewlap Size - The individuals were grouped in categories by their dewlap size compared to the average.* ***A value of 1 means that the dewlap is much smaller than average, while a value of 4 means the dewlap is only slightly smaller than average. A value of 8 means the dewlap is much larger than average, while a value of 5 means the dewlap is only slightly larger than average.***
- *Survival Rate - To look at trends in survival, Aaron gave each individual that was recaptured in October a survival value of 1. If it was not recaptured Aaron assumed it had died and it was given a value of 0. He then took the average of these numbers for each size category and multiplied it by 100 to get a percent survival value.*

Name_____

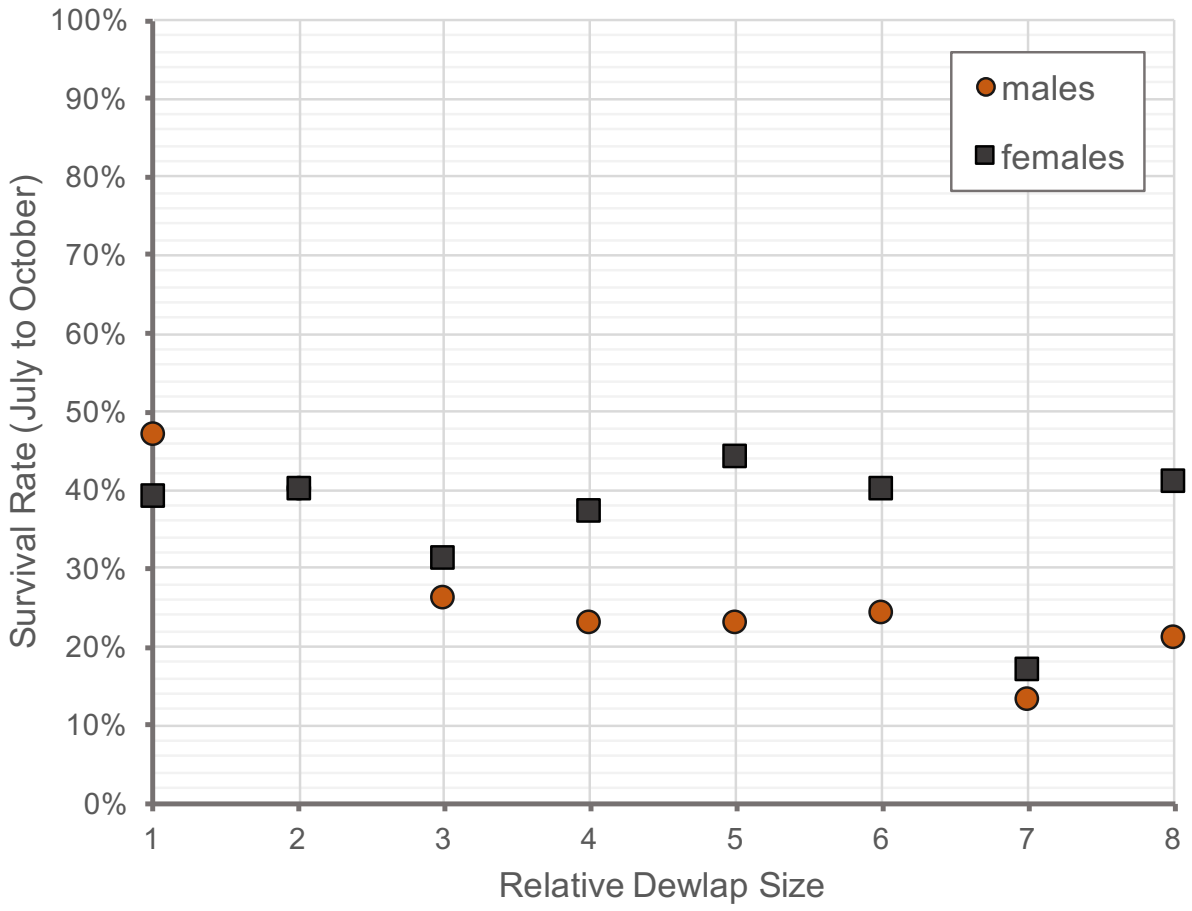
What data will you graph to answer the question?

Independent variables: _____

_____

Dependent variable: _____

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.



Name_____

Interpret the data:

Make a claim that answers the scientific question.

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 sex differences in anoles.

Name_____

Did the data support Aaron'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 Robert and Aaron's research? What future data should be collected to answer your question(s)?