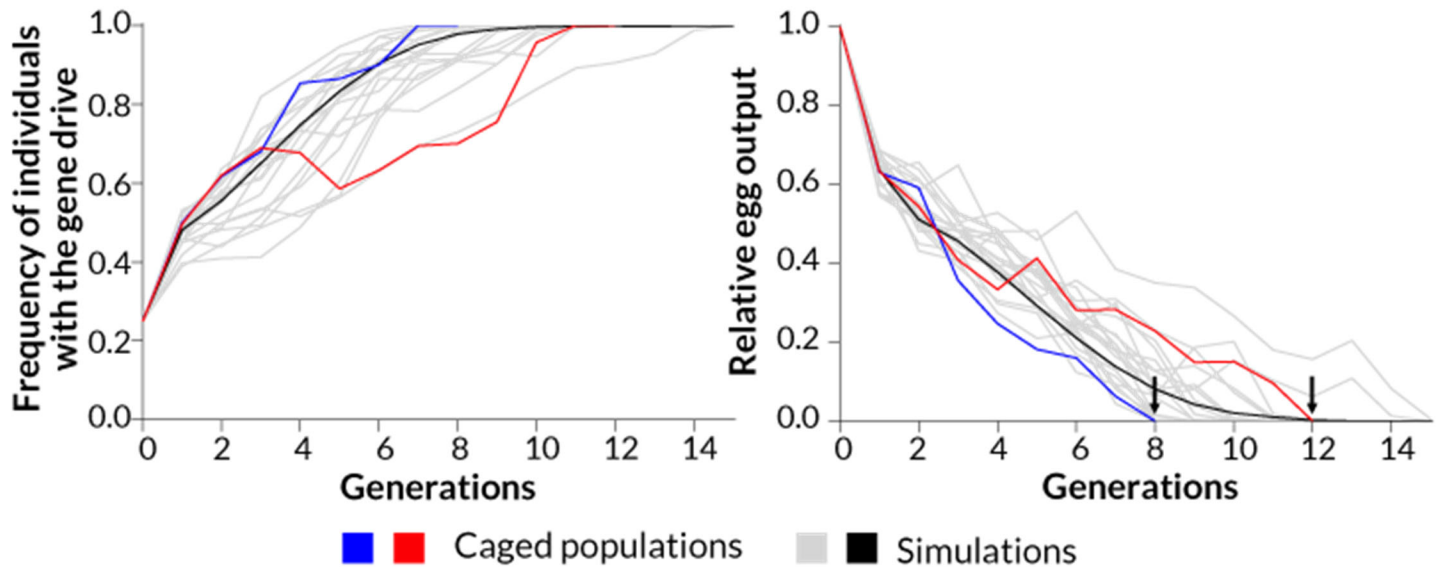November 2, 2018

Gene Drive Proves It Can Wipe Out Mosquitoes

Analyze This!: Q

Directions: Read the *Science News* article "Gene drive wipes out lab mosquitoes" on page 6 of the October 27 issue and use the graphs "Path to extinction" to answer the following questions.

Read the "Path to extinction" graphs:

Source: K. Kyrou et al/Nature Biotechnology *2018*

1. What variable is graphed on each graph's x-axis? Be as specific as possible.

2. What variable is graphed on the y-axis axis of the left graph? What variable is graphed on the y-axis of the right graph?

3. What do the red and blue lines represent? What do the gray and black lines represent?

4. For populations represented by the red, blue and black lines, what is the frequency of mosquitoes with the gene drive and relative egg output at six generations? Make sure to label your answers appropriately.

Manipulate the data:

1. About how many generations did it take for the gene drive to wipe out the entire experimental mosquito population?

2. What happens when the frequency of individuals with the gene drive reaches one? When does that occur for the red and blue lines?

3. What is the value of the relative egg output at the beginning of the experiment, and why?

4. When does the relative egg output reach zero in both of the experimental populations, and why?

5. How do the computer simulation results compare with the experimental lab results?

6. Why do you think there is variation between the simulated and experimental results?

Connect the graph to the article:

1. The gene drive wiped out the entire experimental mosquito population in how many generations?

2. How could gene drives be used outside of the lab, and why? How do you think the results would be similar to or different from those in this experiment?

3. How do these figures support the use of gene drive technology? What are some risks of gene drive technology?

Analyze beyond the article:

Bonus question: What are other useful potential applications of the gene-editing tool CRISPR/Cas9?