# Effect of Predation on Natural Selection of Color Patterns in Guppies

Consider the wild guppies (*Poecilia reticulata*) that live in pools connected by streams on the Caribbean island of Trinidad. Male guppies have highly varied color patterns, which are controlled by genes that are only expressed in adult males. Female guppies choose males with bright color patterns as mates more often than they choose males with drab coloring. The bright colors that attract females also make the males more conspicuous to predators. Researchers observed that in pools with few predator species, the benefits of bright colors appear to "win out," and males are more brightly colored than in pools where predation is intense.

One guppy predator, the killifish, preys on juvenile guppies that have not yet displayed their adult coloration. Researchers predicted that if guppies with drab colors were transferred to a pool with only killifish, eventually the descendants of these guppies would be more brightly colored (because of the female preference for brightly colored males).
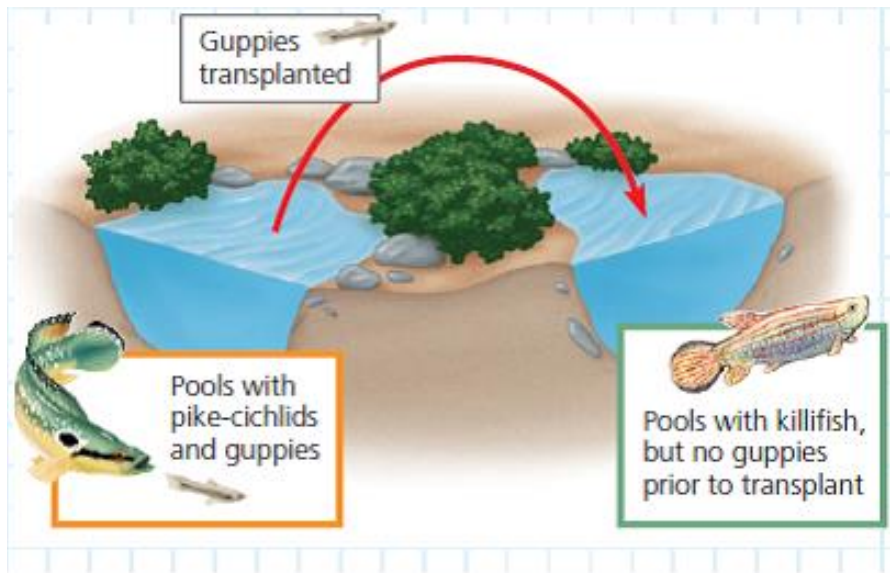

To test this prediction, researchers transplanted 200 guppies from pools containing pike-cichlid fish, intense predators of adult guppies, to pools containing killifish, less active predators that prey mainly on juvenile guppies. (Figure 1)

They tracked the number of bright-colored spots and the total area of those spots on male guppies in each generation.

Figure 1 Transplanting of guppies

1. [SP3] Identify the question researchers might have asked.
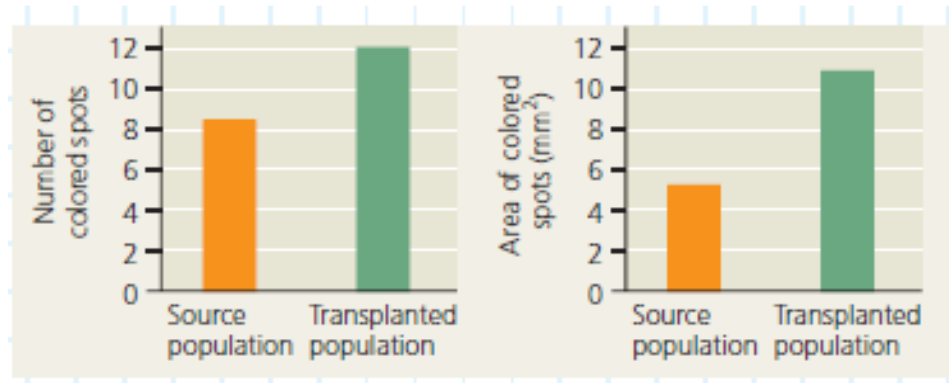
After 22 months (15 generations), researchers compared the color pattern data for the source and transplanted populations. Their data are shown in Figure 2.

Figure 2 Colored spots and area of color for two populations of guppies

2. [SP3] a) State the researchers' hypothesis.

b) Based on this hypothesis, identify the prediction the researchers tested in this experiment.

c) Identify the control group in this study.

d) Identify the experimental group in this study.

3. [SP3,6] Describe how the types of data the researchers collected enabled them to test their prediction.

4. a) [SP6] Make a claim based on the data presented.

b) [SP6] Justify your claim.

c) [SP4,6] Do the results support the researchers' hypothesis? Justify your response.

5. [SP6] Suppose that after 22 months, guppies from the transplanted population were returned to the source pool.

a) Predict what is most likely to happen to those guppies.

b) Justify your prediction.

6. [SP3,6] Describe the data you should collect in order to test your prediction.