

When evolution isn't so slow and gradual

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What's the secret to surviving during times of environmental change? Evolve...quickly. A new report in the scientific journal *American Naturalist* says guppy populations introduced into new habitats developed new and advantageous traits in just a few years.



Wild guppies. A new report says guppy populations introduced into new habitats developed new and advantageous traits in just a few years. (Image courtesy Hawaii DAR)

Evolution occurs when a population changes genetically because its environment is more favorable to some genes than to others. The advantageous genes therefore spread through the population because those who have them are able to outlive and out-reproduce their peers.

Scientists led by Swanne Pamela Gordon of the University of California, Riverside, studied 200 guppies that had been taken from the Yarra River in Trinidad and introduced into two different environments in the nearby Damier River, which previously had no guppies. One Damier environment was predator-free. The other contained fish that occasionally snack on guppies.

Eight years after their introduction, the team revisited the Damier guppies to see what adaptive changes they might have picked up in their new environments.

The researchers found that the females had altered their reproductive effort to match their surroundings. In the environment where predators were present, females produced more embryos each reproductive cycle. This makes sense because where predators abound, one might not get a second chance to reproduce, Gordon and colleagues argued. In less dangerous waters, females produced fewer embryos each time, thus expending fewer resources on reproduction.

Finally, the researchers wanted to see if these adaptive changes actually helped the new population to survive. So they took more guppies from the Yarra, marked them, and put them in the Damier alongside the ones that had been there for eight years. They found that the adapted guppies had a significant survival advantage over the more recently introduced group.

In particular, juveniles from the adapted population had a 54 to 59 percent increase in survival rate over those from the newly introduced group. In the long run, survival of juveniles is crucial to the survival of the population, the researchers say.

The fact that fitness differences were found after only eight years shows just how fast evolution can work—for short-lived species anyway. “The changes in survival in our study may initially seem encouraging from a conservation perspective,” the authors write. “But it is important to remember that the elapsed time frame was 13-26 guppy generations. The current results may

therefore provide little solace for biologists and managers concerned with longer-lived species.”