

How far will females go to avoid sexual harassment?

Harassment from boorish male guppies is so bad that long-suffering females risk their lives to escape it. Darren Croft reports.

Females of many species face sexual harassment. In some cases they go to extreme lengths to avoid it. Our research has shown that in guppies, a small, live-bearing tropical fish, females go as far as to risk their lives to escape unwanted male attention.

Across the animal kingdom males harass females for mating opportunities. This harassment is driven by the fact that females usually produce relatively few eggs in which they invest a lot of energy whereas males produce thousands of sperm, investing comparatively little energy in each. The result of this differential investment is that males usually have the potential to fertilise many more females than they have access to and thus harass females and compete with other males for mating opportunities.

Females, by contrast, are choosy and usually want to mate with a few high-quality males, leading to conflict between the sexes. This sexual conflict is a major driver of evolution with females developing strategies to avoid male harassment.

We have been working on wild populations of guppies in the Northern Mountain Range of Trinidad to understand how females may use the environment to mediate this sexual conflict.

Guppies are the ideal species for looking at sexual harassment. A male guppy spends most of its time displaying to females, but if females don't accept his courtship displays, he will often attempt to sneak a mating with her when she is not looking. We know that this harassment is costly to females in terms

of both energy and time.

As in many vertebrates, it is the males that 'dress to impress': male guppies have bright colour patterns they use to attract females, whilst females are a dull brown colour. However, the bright colours of males also attract the attention of predators. We asked the question: do females use this to their advantage? That is, do they occupy areas of high-predation risk that are too risky for males to venture into, thus risking their own lives to evade sexual harassment?

Aquatic Amazons

For more than 50 years biologists have travelled to Trinidad to study guppies. One of the main attractions is that it is possible to visit many different populations, and these populations differ in their ecological conditions, particularly predation risk. We compared habitat use across many rivers where predation risk differed to test the idea that females may use areas of high-predation risk and where males are absent.

It turns out that in rivers with high risk of predators, sexual segregation occurred with females using deep water and the males, shallow. Interestingly we also found that females using deep water were more at risk from predation, but benefited from lower levels of sexual harassment.

But does sexual harassment drive females into these areas or is it some other factor such as easier access to food? To directly test the effect of males on female habitat use we revisited one of the high predation rivers in Trinidad. But this time,

Two males harass a female guppy.



we sectioned off areas of the river so that we could control the levels of harassment that females encountered. As we predicted, we found that females only used the risky deep areas when male harassment was high. Thus female guppies trade off increased predation threat for reduced sexual harassment.

While our work is focused on guppies, sexual segregation is not restricted to fish. It occurs across species and may even occur in humans. Ancient Greek mythology tells of a nation of female warriors known as the Amazons who lived on an island. The Amazons only met with men to trade and reproduce, and kept all daughters on the island. The degree of truth in this ancient myth is open to debate, but in animals sex differences in habitat use are common.

Understanding why and how this behaviour occurs is essential if we are going to conserve and protect species and habitats. In many ecosystems predators are the first to go extinct, and our work shows that this may have many, perhaps unexpected, knock-on effects. In this case, one of the least-expected could be that long-suffering females have to put up with even more unwanted male attention. ❖

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The research discussed here was done while Darren worked in the School of Biological Sciences at the University of Wales Bangor.