

For crickets, parasitic flies can stop the music

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Love hurts — really bad, for some unlucky crickets, anyway. Male crickets draw not only females with their songs but also parasitic flies. The uninvited guests then deposit larvae that burrow into their amorous hosts, grow for about a week and then tear their way out in "Alien" fashion, killing the cricket as they emerge.

Now, University of Florida zoologists have found that the danger posed by the flies has apparently affected when crickets sing. In experiments with Southeastern U.S. field crickets, known scientifically as *Gryllus rubens*, they discovered that considerably fewer male crickets sing in the autumn when the parasitic flies are abundant. They also found that female crickets are reluctant to approach singing males in the fall, perhaps unknowingly avoiding becoming the target of the flies themselves.

The findings, reported in a pair of recent papers in the journals *Ethology and Animal Behavior*, are of interest because they shed light on the interplay between the powerful evolutionary forces of sexual selection and natural selection, said UF zoology professor Jane Brockmann.

On the one hand, singing and finding mates increases a male's reproductive success; on the other, it also carries high potential costs, Brockmann said. "The interesting question is how exactly do these conflicting pressures play out in evolution"

Scientists have known for some time that parasitic flies, known scientifically as *Ormia ochracea*, deposit larvae on, or near, singing

crickets. The larvae burrow into the insects, then feed on nonessential organs within the cricket while they grow. After they emerge from the dying cricket, they pupate and metamorphose into mature flies.

Brockmann and co-author Manuel Vélez, a former UF student who earned his doctorate in 2004, hypothesized that the presence of flies would affect how male crickets sing and how females respond. Examining wild crickets native to North Florida, they devised two sets of experiments to test this hypothesis.

In experiments involving male crickets, they gauged differences in male singing in part by capturing males, placing them in containers in the field, then recording them during spring and fall. They also surveyed free singing males in a pasture during the two seasons.

In North Florida, the parasitic flies are present only in fall, never in spring. The researchers' findings seemed to agree with this schedule. More of the males sang in the spring than in fall, with 75 percent of the captured males, for example, singing in spring and 43 percent in fall.

To test how female crickets respond to the flies, the scientists captured and placed spring and fall females in cages, then played recordings of male songs and observed their reactions. Paralleling the result with the males, more of the spring females approached the speaker quickly and more closely than the fall females.

"The spring females are extremely eager. The minute they hear a male singing, they race over to the speaker," Brockmann said. "The fall females are much more hesitant. They take longer and seem reluctant to approach the speaker."

Brockmann said although scientists have examined similar phenomena in other species such as guppies, it is rare to observe obvious female

courtship behaviors. Female crickets, by contrast, actually mount the males, so it is easy to know what they are choosing. Also, she said, the complete absence of parasitic flies in spring allows the researchers to examine the role of flies as a selective pressure on male singing and female mate choice behavior.

That said, not all of the findings were clear-cut. Although fewer males sing in the fall, for example, the ones that sing do so far longer, placing themselves at even greater jeopardy of being parasitized by the flies. Brockmann said this may reflect the presence of many more females in the fall, enabling male singers to mate many more times.

Also, many male crickets never sing, apparently finding mates by simply walking around until they encounter females. That raises the question, why sing in the first place" Brockmann said the answer may have to do with the subtle interplay between the density of flies, the density of crickets and the presence of other predators that prey on walking crickets.

Walkers may do better when mates are abundant and other predators are few, while singers may have better luck when mates are relatively rare and fly populations are low. "It might be quite a dynamic thing," she said. "Some years, there's selection against one, some years there's selection against the other."

Source: University of Florida

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