

Remembrance of Things Past Influences How Female Field Crickets Select Mates

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(PhysOrg.com) -- UC Riverside biologists researching the behavior of field crickets have found for the first time that female crickets remember attractive males based on the latter's song, and use this information when choosing mates.

The researchers found that female [crickets](#) compare the information about the attractiveness of available males around them with other incoming signals when selecting [attractive](#) males for mating.

The finding shows that social learning - the ability to learn information from other individuals of the same species - has profound impacts on insect behavior and may act as a linchpin in evolution.

Study results appear today in the latest online issue of the Royal Society journal *Biology Letters*.

"Most people would never have imagined that insects could remember characteristics about other individuals around them," said Nathan W. Bailey, the first author of the research paper and a postdoctoral researcher in the lab of Marlene Zuk, a professor of biology at UCR. "The vast majority of studies of insect learning focus on foraging behavior, and in non-social insects - like field crickets - it is truly a surprise to find that they can change their behavior based on remembered social information.

"Usually, we think of evolutionary pressure, or selection, as a force in

the physical environment - like climate or food availability. But our research shows that the [social environment](#) animals experience is an important force, too. Social effects should therefore be given greater attention in models of evolution in species ranging from insects to humans.”

Among field crickets, males use song as a long-range signal to attract females for mating. The females hear the males’ song before they respond to a potential mate.

“We found that females that heard attractive males beforehand were less attracted to average males than females that heard unattractive males beforehand,” Bailey said. “In non-social invertebrates the outcome of male ornament evolution may depend much more on the ability of females to remember information about social encounters than was previously thought.

“Our research shows that insects can learn about each other. They are a lot cleverer than we thought they were. In the past, people have thought of insects somewhat as mindless automatons that just follow certain decision rules. But it is becoming increasingly clear that they have complex cognitive capacities that play an important role.”

Zuk, the research paper’s only coauthor, and Bailey performed their research in the lab using several hundred field crickets. In their experiments, they exposed all females to an 'average' male song, and assessed the females’ responses to it. If the females responded, the researchers inferred that the females found the song attractive.

Then, they manipulated a different set of females’ experience beforehand, with some having heard attractive songs, and some having heard unattractive songs. Bailey and Zuk found that those females that heard unattractive songs responded more strongly to the ‘average’ male

than those females that heard the attractive song, showing that prior experience affected perception of attractiveness.

Next in their research, Bailey and Zuk plan to focus on male field crickets.

“Can male crickets learn, too, about other males around them?” Bailey said. “Does it affect their willingness to sing? Or their tendency to engage in aggressive encounters with other males? And does the social environment they experience influence their evaluations of females? We would like to explore these questions.”

More information: rsbl.royalsocietypublishing.org/

Provided by UC Riverside

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