Average rating:

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16 Jan 2013 | Good for Teaching, Interesting Hypothesis, New Finding

DOI: 10.3410/f.717970180.793468918

Mating with multiple males can have both direct (material) benefits and indirect (genetic) benefits. However, in species with limited cognitive ability, identifying previous mates can be difficult. Recently, Weddle and colleagues demonstrated that female crickets (Gryllodes sigillatus) could use self-referencing based on their hydrocarbon signatures, passed on to their mates during copulation to discriminate them from previous mates. This finding reveals how some insects can gain important genetic benefits from mating multiply without investing in cognitive capacity to otherwise remember past mates.

Polyandry has fascinated biologists ever since Bateman {1} showed asymmetrical benefits to multiple mating among the sexes in Drosophila. He found that whereas males increase their reproductive output by mating with multiple individuals, females do not. Biologists now have a host of explanations for multiple-mating behaviour in females, and these benefits include direct benefits such as resources to help raise their young, or indirect benefits such as good or compatible genes for their offspring. But to get some of these benefits, it is important that a female knows who she has mated with previously. In species with such limited cognitive abilities that remembering other individuals is impossible, identifying previous mates can be difficult. In Weddle and colleagues' latest work, the authors showed that female crickets (Gryllodes sigillatus) had unique cuticular hydrocarbon (CHC) signatures, and passed these on to their male mates during copulation. The CHC profile of mated males was intermediate to that of females and virgin males for 11 out of 17 hydrocarbons studied. However, the experimental design revealed that females did not simply discriminate between mated and unmated males: in a two-choice trial, females were given the choice of copulating with a male scented with CHC extracts from their highly inbred sister (thus, highly similar to their own CHC profile), or with a 'novel' male scented with CHC extracts from an unrelated female. Females preferred to mate with the novel male. Important to this experiment, the authors showed a strong genetic basis for these signatures and found that the hydrocarbon chains used were much longer than those found on most other insects. These longer-chained hydrocarbons are apparently less volatile and more stable, making them reliable long-term 'stamps' of previous sexual conquests. This novel mate-scenting mechanism allows female crickets to avoid previous mates without needing to remember a single thing about them. Instead, females can simply compare the scent of the male to themselves in a nice example of self-referencing.

References

1.

Intra-sexual selection in Drosophila.

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PMID: 18103134