Male black widows look for well-fed mates

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female black widow spider. Image: Wikipedia.

(PhysOrg.com) -- According to a new study published in *Animal Behaviour*, a male black widow spider is able to identify a female spider that has eaten well by simply taking a few steps on the web she spins. Finding a well-fed female seems to minimize their risk of being eaten after mating, a behavior that gave the spider its name.

James Chadwick Johnson from Arizona State University led the study and it is the first to reveal a spider's ability to sense chemical cues from another spider's spun silk.

The team of researchers began with the female spiders and broke them down into two groups. The first group was fed one cricket per week so they were very well-fed. The other females were on a crash diet and were not fed for several weeks. While this lack of food did not put their

lives in danger, it did result in a decrease in size.

The test began by placing male spiders onto the webs of these differently fed spiders to see how they would react. They also placed male spiders on bundles of clean silk taken from the webs of the female spider. This second option was to insure whatever cues the spiders were receiving was from the web and not some other source. In the final placement, the researchers switched the well-fed female spiders to the webs of the starved spiders.

The courtship process of the male black widow spider is a long process of walking, plucking and tapping on the web. What the researchers found was that the male spiders were much more active in their courtship when they were on the webs of the female spiders that had eaten a full diet of crickets.

The goal of this study is to better understand the behavior of the spiders. Researchers have found that the cannibalism rate among black widows seems to be higher in urban settings than the desert populations and are hoping to find reasoning behind this different behavior.

More information: Male black widows court well-fed females more than starved females: silken cues indicate sexual cannibalism risk, *Animal Behaviour*, Article in Press, doi:10.1016/j.anbehav.2011.05.018

Abstract
Male mate choice is predicted to evolve as male investment in mating increases. Thus, taxa in which males pay a high cost for mating offer researchers an ideal system to test traditional sex roles. Males courting potentially sexually cannibalistic females may be under strong selection to bias their courtship efforts away from hungry females that may be more likely to attack. Here we tested the prediction that web-based chemotactile cues of recent female foraging success influence male

courtship in the black widow spider, Latrodectus hesperus. In addition, we tested the underlying assumption that previous female foraging success reduces precopulatory sexually cannibalistic attacks. We found that males courted well-fed females significantly more than they did starved females, and that this bias was maintained in the absence of the female when males encountered only (1) cues from female webs and (2) cues from female silk after web architecture had been eliminated. A nonsignificant courtship bias in favour of well-fed females was also evident when these females were transplanted to the webs of starved females. Male courtship biases in favour of well-fed females appear adaptive, as starved females were significantly more likely to attack males before mating. We conclude by noting that sexual cannibalism offers a model system wherein the exploitation of cues of predation risk have unique implications such as the effects on male courtship preferences seen here.

via BBC