Study shows starving mantis females attract more males

December 17 2014, by Bob Yirka

Pseudomantis albofimbriata. Credit: Donald Hobern/Wikipedia

A study done by Katherine Barry an evolutionary biologist with Macquarie University in Australia has led to the discovery that a certain species of female mantis attracts more males when starving, then do those who are well fed. In her paper published in *Proceedings of the Royal Society B*, she describes experiments she carried out that

contradicted conventional thinking.

Scientists have known for quite some time that female false garden mantises attract males using pheromones—they've also known that the females quite often eat the male before it has a chance to mate with her. Up until now, however, it has been assumed that the better fed females, which produce more eggs, attract more males. This new study suggests such thinking has been in error.

Barry had a hunch that the hungriest of the females likely produced more pheromones than did others, because they had more at stake. Attracting more males meant attracting more meals, thereby solving the hunger problem. To test her idea, she captured several females and placed them in mesh cages that kept them separate and hidden from males that were introduced later. First, she fed the females differing amounts over a period of time, causing them to have four different levels of nourishment: good, medium, poor and very poor. When the males were introduced she counted how many were attracted to those in the various groups.

In studying the data, she found that the males were more attracted to the females that were graded as good verses medium or poor, but those that were labeled as very poor attracted over twice as many as those that were labeled as good. Thus, starving the female clearly led to a stronger attraction in males, which is impressive considering that such females tend to produce very few eggs and thus offspring. Instead of producing eggs, the females produce more pheromones to attract more males which are eaten to reduce hunger, and thereafter, more eggs.

As an added note, Barry pointed out that starving females are quite adept at avoiding copulation—she bites off the head and forelegs, to prevent being mounted, but still must wrangle with the male, as he has an additional brain in his abdomen. It's only after he dies that she eats him.

More information: Sexual deception in a cannibalistic mating system? Testing the Femme Fatale hypothesis, *Proceedings of the Royal Society B*, rspb.royalsocietypublishing.or … nt/282/1800/20141428

ABSTRACT

Animal communication theory holds that in order to be evolutionarily stable, signals must be honest on average, but significant dishonesty (i.e. deception) by a subset of the population may also evolve. A typical praying mantid mating system involves active mate searching by males, which is guided by airborne sex pheromones in most species for which mate-searching cues have been studied. The Femme Fatale hypothesis suggests that female mantids may be selected to exploit conspecific males as prey if they benefit nutritionally from cannibalism. Such a benefit exists in the false garden mantid Pseudomantis albofimbriata—females use the resources gained from male consumption to significantly increase their body condition and reproductive output. This study aimed to examine the potential for chemical deception among the subset of females most likely to benefit from cannibalism (poorly fed females). Females were placed into one of four feeding treatments ('Very Poor', 'Poor', 'Medium' and 'Good'), and males were given the opportunity to choose between visually obscured females in each of the treatments. Female body condition and fecundity varied linearly with food quantity; however, female attractiveness did not. That is, Very Poor females attracted significantly more males than any of the other female treatments, even though these females were in significantly poorer condition, less fecund (in this study) and more likely to cannibalise (in a previous study). In addition, there was a positive correlation between fecundity and attractiveness if Very Poor females were removed from the analysis, suggesting an inherently honest signalling system with a subset of dishonest individuals. This is the first empirical study to provide evidence of sexual deception via chemical cues, and the first to provide support for the Femme Fatale hypothesis.