SCIENTIFIC NOTE

MOVING BEHAVIOR OF LETTA MUTTALLI SAY (COLEOPTERA: MELANIDAE)

On June 20, 1994, I observed aggregations of Letta muttalli Say (Coleoptera Melanidae) on vegetation at Bl weather station on Sugarloaf Mountain, Boulder County, Colorado (ca. 8,360). On other years I did not encounter significant numbers of beetles at this site, and the aggregations appeared to have no function other than mating. The following account of their behavior is typical. At any given moment, individuals of both sexes were flying between patches of vegetation. Flight distances were as great as 10 meters, but were usually shorter. Upon landing, males clambered around until encountering another beetle. When a male encountered another male, there was a brief struggle before the interaction was terminated. If a male encountered a female, he attempted to climb onto her back. The female struggled; often, the pair fell off the vegetation and continued struggling on the ground. If a male successfully climbed onto a female, she securely clamped in her back. He could not prevent flight, though the females often succeeded in dialoguing their mates. The male frantically moved his abdomen, attempting to bring it into contact with the female's genitalia, while the female moved her abdomen vigorously, giving the appearance of resistance. I observed no females accepting males without first seeming to resist.

If the male made genital contact, the female appeared unable to separate from him. Even if she could throw him off her back, the female appeared incapable of freeing her genitalia. Other studies of Letta reveal that the male's penis has two sharp spines which evidently engage the female's vaginal wall and allow the male to control over termination of copulation (Gerber et al. 1971a, b, Cass J. Zool. 49:323-333, 1395-160; Gerber et al. 1972, Can. J. Zool. 50:649-660). Usually, copulating pairs assumed an end-to-end position, and the larger female frequently dragged the male around behind her. Mating females often climbed vegetation and attempted to fly, but with their genitalia securely engaged, males were able to prevent female flight. Sometimes, copulating females hovered in stationary position, anchored by their mates.

If mating behavior is shaped by sexual selection mediated by male-female conflicts of interest, then one conflict facing potential mates is as follows: Although males would perhaps best be served by mating immediately, perhaps by resulting male advances for as long as possible, females gather information to assess mate quality (see Tremblay and Alcock, 1983, The evolution of insect mating systems, 6th ed., Harvard University Press, Cambridge). The size differences among mates suggest that there is variation in male phenotypic quality, and if these differences sometimes have genetic bases as well as fitness consequences for offspring, it would benefit females to discriminate among males.

Duration of copulation may also be influenced by interspecific conflicts of interest. Though female Letta can be reared to mate more than once under laboratory conditions (Gerber et al. 1971, Can. J. Zool. 49:1393-1601), their opportunities to do so under natural circumstances may be diminished by males' ability to monopolize them. The male's locking and guarding give substantial control over the duration of copulation (Gerber et al. 1971, Cass J. Zool. 49:1395-1601). Extended copulation is one form of mate-guarding (see Alcock, 1994, Ann Rev. Ent. 39:1-21; male Letta muttalli may ensure exclusive paternity at the expense of both their mate's and any other male's reproductive interests.

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