

HOMOSEXUAL MATING BEHAVIOR IN MALE *DORYONYCHUS RAPTOR* (ARANEAE, TETRAGNATHIDAE)

Homosexual behavior has been documented in a large number of vertebrates, particularly primates, in which it plays an important function in establishing dominance (Crook 1972). In birds, homosexual behavior appears to be quite common (Armstrong 1942), and, in certain monogamous species, may lead to the establishment of lesbian relationships (Hunt et al. 1984). Among invertebrates, homosexual mounting behavior is found in a number of insects (Kaneshiro & Giddings 1987; Juberthie-Jupeau & Cazals 1989), as well as phalangids (Bristowe 1929). Male-male courtship display has been observed in several spiders in the families Salticidae and Lycosidae (Bristowe 1929). Homosexual mounting or mating behaviors, however, have, to my knowledge, never been documented in spiders.

An elaborate mutual courtship is usually a necessary component of sexual interactions between spiders, and serves one or a number of functions (Robinson & Robinson 1980; Suter 1990): (1) reduce the risk of predation; (2) mutual arousal; (3) species recognition; and (4) assessment of virginity. Prior to mating, therefore, courtship will generally have resulted in mutual communication between the sexes. This would preclude the likelihood of attempted copulation between individuals of the same sex.

One exception in this regard are tetragnathid spiders, which lack any form of apparent courtship (Levi 1981). On encountering each other, both the male and female tetragnathid appear to interact combatively, with their chelicerae and fangs outstretched. If the sexual encounter is successful, the fangs of the female become locked against the spur (apophysis) on the dorsal surface of the male's chelicerae. The fangs of the male are then closed over those of the female, and the pair are thus securely locked together (the cheliceral teeth themselves are not involved in this locking mechanism). At this point the female generally curls her abdomen anteroventrally, so that her seminal receptacles are rotated forward, thereby facilitating palpal insertion by the male. The male moves one palp under the abdomen of the female, then over the surface until it comes in contact with the seminal receptacles. The oth-

er palp is held almost vertically up above the carapace (palps are alternated during mating).

On 29th July 1990 I captured several *Doryonychus raptor* Simon in Waiahuakua Valley (1100 ft.) on the Hawaiian island of Kauai. These spiders, endemic to Kauai, are robust (female 12-15 mm, male 10 mm) and readily recognized by the extremely long claws on the tarsi of the first two pairs of legs (Simon 1900). Two penultimate males were maintained together in a glass container (22.5 cm x 22.5 cm x 25.0 cm) and fed on laboratory-reared *Drosophila grimshawi*, molted to maturity after 5 and 11 days respectively. Twenty five days after capture (23rd August), I observed these male spiders with their chelicerae locked together (I did not witness the initial coupling), one male with its fangs locked against the dorsal apophysis of the other. The abdomens were paraxial, neither curled under. The only movement observed was that of the palps of both males. These were used alternately to "search" the underside of the abdomen of the respective partner for 30-210 s before switching to the alternate palp. This behavior continued for 17 minutes, although, because I did not observe the initial encounter of the pair, the exact duration of the interaction is unknown. After this time the spiders disengaged naturally in a manner similar to disengagement in normal inter-sexual encounters in tetragnathids. Neither appeared harmed by the interaction.

The behavior observed was considered sexual rather than aggressive. Aggression between individual tetragnathids (within or between sexes) involves extension of the fangs and chelicerae, followed by violent lunging, usually culminating in the death or retreat of one, and sometimes both, of the combatants (pers. obs.). Sexual behavior between male and female *D. raptor* is similar to that of other tetragnathids (pers. obs.). Neither participant struggles during a sexual interaction, the only movement being alternation of the palps and minor adjustments in position. At the end, separation occurs by release of the jaws without any lunging.

The observation of homosexual mating behavior in *D. raptor* argues for the absence of

powers of sexual discrimination by males of this species. In insects the exhibition of this type of behavior among males appears to be a consequence of mistaken identity. Among the Hawaiian drosophilids, this behavior has been associated with the absence of powers of sexual discrimination in males, with female choice playing the critical role in mating success (Kaneshiro & Giddings 1987). Male acceptance is based on his performance during a complex courtship display, which involves visual, tactile, chemical and/or acoustic stimulation.

Among spiders, mistaken identity may explain the observation of males courting other males (Bristowe 1929). The potentially lethal effects of allowing this behavior to continue on to attempted copulation is likely to have selected for some form of sexual discrimination among male spiders. It may be, however, that the unique coupling behavior of tetragnathids, where the chelicerae and fangs are securely locked, has allowed the loss of male sexual discrimination.

As yet there is no information on female sexual discrimination in tetragnathids. It may well occur, however, through the action of either pheromones (Tietjen & Rovner 1982), or mechanical stimulation (Eberhard 1985).

This study was supported by grants from the Hawaii Bishop Research Institute, the Hawaii Natural Area Reserves System and the Nature Conservancy of Hawaii. I am deeply indebted to C. Parrish for helping me to collect specimens and to K. Kaneshiro for use of his environmentally controlled facilities to maintain live specimens.

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Manuscript received December 1990, revised February 1991.