

RESEARCH NOTE

COHABITATION AND COPULATION IN *IXEUTICUS MARTIUS* (ARANEAE, AMAUROBIIDAE)

Ixeuticus martius (Simon 1899) is a solitary, medium size cribellate spider. In spite of its very high abundance its biology is poorly known. However, I observed some cases of coexistence and tolerance between males and juvenile females for this species in the field. Male-juvenile female cohabitation has been long known in the Gnaphosidae and Clubionidae (Bristowe 1941), and it has shown to be common in the Salticidae and Araneidae (Jackson 1986). Austad (1984) and Jackson (1986) analysed this phenomenon and suggested it is a mating tactic among spiders. There are few reports on sexual behavior in the Amaurobiidae: precopulatory communication (Krafft 1978; Leborgne 1984), copulation (Gerhardt 1923, 1924; Gregg 1961), and cohabitation (Jackson 1986). I therefore thought it was important to communicate my observations on cohabitation and copulation in this Neotropical spider species.

Three male-subadult female pairs were observed cohabiting in their webs during 1989: pair 1 in Marindia, Canelones (December 2) and pairs 2 and 3 in Prado, Montevideo (both December 8). The web of pair 2 was contiguous with another web which contained another subadult female; the male was twice seen passing from one web to the other. No attacks were seen, but another smaller male was observed in the periphery of both webs. With the exception of this male, all individuals were captured and observed under laboratory conditions. During observations of copulation the room temperature was 27° C and relative humidity 61%.

Both spiders of pair 2 remained in contact inside the refuge built by the female in the lab. Five days after capture, at 1230 h (counted as minute zero of the observation), the female molted during a period of 11.4 min. At 23 min, the male repeatedly tapped the female and the nearby exuvia, and placed himself in various positions in relation to the female (ventral-ventral, face to face, etc.). Finally, the male placed himself on the female's side, both with the ventral zone upwards (Fig. 1). Palpal insertions started at 44.8

min, while the male vibrated his abdomen sagittally. The copulatory pattern was as follows: insertion with one palp—palpal withdrawal, and chewing-like movements on it—new insertion with the same palp and chewing-like movements (1-8 successive insertions; mean 3.7)—the male walked around the female through the silk threads up to the other side (mean delay: 1 min)—insertion with the other palp—disinsertion, chewing-like movements, reinsertion and so on. The male carried out approximately 140 palpal insertions and changed sides 38 times during a 144 min period. Mean insertion duration and mean period spent in one side were estimated to be 40 s and 3.3 min, respectively. Three times the male appeared disoriented when walking around the female (total delay: 18 min). The male also adopted atypical positions (ventral - ventral, ventral - dorsal, face to face).

After copulation the male immediately made a sperm induction. The palps alternated four times in contacting the sperm, during 10.5 min. At 216.7 min the female placed herself in contact with the male, and both remained immobile until the following day. During days 2 and 4 the female ate the male, and after some time after she had offspring.

Females of pairs 2 and 3 molted during the night (at days 1 and 9, respectively) and consequently copulations were not seen. Thereafter, both males and females of each pair remained in contact 4 and 3 days, respectively. Female attacks were later observed in both pairs. Afterwards, the male of pair 2 was taken out and placed with the female captured beside pair 2. This female had molted five days before (9 days after capture). Copulation occurred on the first day; although observation was incomplete, it proved to be similar to the copulation of pair 1. The male and female remained in contact during 4 days following copulation. All the observed females produced young.

Cohabitation in *Ixeuticus martius* would be determined both by the male's capacity to recognize subadult females and by tolerance toward

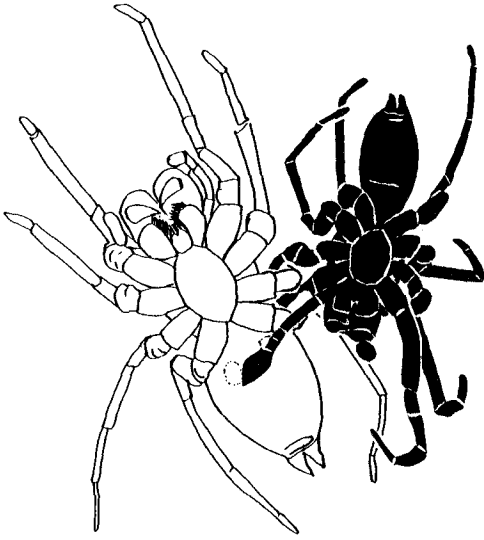


Figure 1.—Copulatory position of *Ixeuticus martius*, pair 1, ventral view. The male (shaded spider) inserts its left palp on the epigynum of the female (white spider). The web's silk threads are omitted.

males shown by females. Resident males probably keep other males away from females (female guarding)—based on field observation of the behavior shown by the two males (pair 2), and the presence of a single male in the other webs. The end result of copulation suggests that cohabitation is a mating tactic: the male safeguards his first insemination and prevents the female from copulations with other males. Austad (1984) analyzed mating tactics and sperm priority patterns in spiders. He hypothesized that males inseminating first (“first male sperm priority”) should have greater success than subsequent males in spiders with “conduit spermathecae”. Supporting this prediction, Jackson (1986) reported 161 spider species showing precopulatory cohabitation, including six Amaurobiidae species (*sensu* Lehtinen 1967). Only seven of these 161 species had “cul de sac spermathecae”. On the other hand, postcopulatory cohabitation is rare and it has not been reported previously in Amaurobiidae, in spite of observations of this sort in Dictynidae (Montgomery 1903; Starr 1988). A female that copulated five days after molting suggested that the 2–4 day tolerance period would be more related to copulation than to adult female age.

The copulatory position of *Ixeuticus martius* is similar to that of *Metaltella simoni* (Prandipers. comm.) but differs from the typical Amau-

robiidae position: the male placed ventrally to female, following a face-to-face encounter (Gerhardt 1923, 1924; Gregg 1961; Leech 1972). The copulatory pattern of *I. martius* (both numerous brief insertions and side changes) is also unusual for the Amaurobiidae's pattern (few and prolonged insertions, multiple ejaculations for each insertion). These differences may not be attributed to the immediate postmolting female state because the copulation with a mature female was similar. The Australian amaurobiid spider *Ixeuticus longinus* makes an intermediate number of palpal insertions with long pauses (Gregg 1961) and would be the most similar to that of *I. martius*. The literature was revised bearing in mind the controversial placement of several species among the families Amaurobiidae, Dictynidae and Desidae (Lehtinen 1967; Forster 1970; Forster & Wilton 1973), and it showed similar position and general copulatory pattern in Dictynidae (Jackson 1979; Starr 1988) as compared to Amaurobiidae. Singularities showed by *I. martius* could be useful in future (and urgently needed) studies on the systematics of these families.

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