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# FEMALE SPIDERS (ARANEAE: DIPLURIDAE, DESIDAE, LINYPHIIDAE) EAT THEIR OWN EGGS

Some spiders may eat the eggs of other spiders (Hallas 1988; Willey & Adler 1989; Jackson 1990), but female spiders have rarely been reported to consume their own eggs. Shaw (1989) observed an egg-guarding female of *Clubiona reclusa* O. P.-Cambridge (Clubionidae) consume half of her eggs, and Downes (1987) observed females of the genus *Crossopriza*, presumably *C. lyoni*, (Pholcidae) consuming one or more of their eggs.

We observed females of three additional araneomorph species, *Florinda coccinea* (Hentz) (Linyphiidae), *Ixeuticus martius* (Simon) (Desidae) and *Ixeuticus robustus* (L. Koch) (Desidae), and one mygalomorph species, *Thelechoris striatipes* (Simon) (Dipluridae), consuming entire clutches of their own eggs and all egg-sac silk (Table 1). Some of these oophagous females also produced other egg sacs, both fertile and infertile, that were not consumed and, as noted in Table 1, the sequence of oviposition of these sacs was variable. All of the egg-eating females of *F. coccinea, I. martius* and *I. robustus* had mated once, but we do not know whether the *T. striatipes* females had mated.

*Florinda coccinea* females ($n = 66$) were removed from their egg sacs within 12 h of construction, and *I. martius* ($n = 21$) and *I. robustus* ($n = 13$) females were removed from their egg sacs within 72 h of construction; therefore, additional oophagous events might occur when females are allowed constant access to their sacs. *Thelechoris striatipes* ($n = 13$) females remained with their egg sacs until spiderling emergence, and emergence required 14 days and 17 days for two clutches where developmental time was calculated.

Gravid *F. coccinea* females were collected by MBW on 8 May 1989 in Clemson, South Carolina, and maintained in the laboratory (26 ± 2 °C, 65 ± 4% relative humidity, 14L:10D photoperiod) in Clemson. Spiders were held individually in plastic containers (3.7 cm deep × 5.2 cm diameter). The first female of *F. coccinea* to consume her eggs was field-collected; the second was an $F_2$ female reared and mated in the laboratory. Gravid *I. martius* and *I. robustus* females were collected by MBW in April 1991 in Christchurch, New Zealand, and maintained individually in 4.5 cm deep × 9.75 cm diameter plastic containers in the laboratory in Clemson; the five females that consumed eggs were from the $F_2$ generation. All females of the above species were given constant access to moist cotton, were fed daily, and were offered a variety of prey, including German cockroaches, house flies, and tachinid flies.

The *T. striatipes* females were collected by FAC on 15 April 1989 in Kenya, Africa (Tsavo West National Park at Kitani Lodge) and maintained in 31 cm length × 16 cm width × 8 cm deep plastic shoe boxes in the laboratory (24 ± 2 °C, 12L:12D photoperiod) in Cullowhee, North Carolina. These spiders were fed one *Tenebrio* larva every 10 days, occasionally supplemented by cricket nymphs or house flies. Spiders had constant access to moist cotton.

Because web construction and oviposition behavior of the four species were similar to these behaviors in the field, we did not add substrata to any containers. All females attached their webs to the sides of the containers.

In nature, *F. coccinea* constructs sheet webs in low vegetation and oviposits among the vegetation, rather than retaining egg sacs in the web. Spiders drop from their webs when disturbed, so females could possibly contact their sacs in the vegetation. In the laboratory, egg sacs were constructed in the bottom of the container, and females did not remain in close proximity to their egg sacs. *Ixeuticus martius* females live in funnel retreats in crevices and construct their egg sacs within the retreat (Forster 1970). *Ixeuticus robustus* females also live in funnel retreats in crevices, and it is likely that they construct egg sacs within the retreat because females in the laboratory remain in close contact with their egg sacs. Both *I. martius* and *I. robustus* females have been observed killing prey and then moving away from the prey to allow their spiderlings to feed (MBW, pers. obs.), so it is likely that females remain in contact with their spiderlings in nature.

In nature, *T. striatipes* females live in perennial funnel webs, construct their egg sacs in the wall of their tubular silken retreats, and remain with the brood through spiderling emergence and dis-

Table 1.—Oophagy by *Thelechoris striatipes* (Dipluridae), *Florinda coccinea* (Linyphiidae), *Ixeuticus martius* (Desidae) and *Ixeuticus robustus* (Desidae). *a* = unknown which day within given range the eggs were consumed, *b* = Fertile (F), Infertile (I), Consumed (*), *c* = females were sacrificed within a month after the egg sacs were consumed. Under *I. robustus,* female #2 produced and ate two sacs.

| Species and female identification | Date of oviposition of consumed sacs | Date of consumption[a] | Sequence of sacs produced[b] |
|---|---|---|---|
| *Thelechoris striatipes*[c] | | | |
| 1 | 10 July 1989 | 10–11 July 1989 | * |
| 2 | 12 July 1989 | 15–20 July 1989 | * |
| 3 | 18 July 1989 | 18–20 July 1989 | * |
| *Florinda coccinea* | | | |
| 1 | 16 May 1989 | 16–19 May 1989 | *,F,F,F,I,I,I |
| 2 | 6 Aug. 1989 | 7 Aug. 1989 | F,*,F,F |
| *Ixeuticus martius* | | | |
| 1 | 26 Nov. 1989 | 26–29 Nov. 1991 | * |
| 2 | 2 Jan. 1992 | 2–4 Jan. 1992 | F,F,I,I,F,F,*,I,I,I |
| 3 | 23 April 1992 | 24–28 April 1992 | I,I,I,* |
| *Ixeuticus robustus* | | | |
| 1 | 26 Nov. 1991 | 26–30 Nov. 1991 | F,F,*,F,F |
| 2 | 13 Dec. 1991 | 13–18 Dec. 1991 | *,*,F,F,F,I |
| 2 | 23 Dec. 1991 | 23–27 Dec. 1991 | |

persal (FAC, pers. obs.). In the laboratory, females constructed capture webs and retreats in the shoe box arenas. Spiders captured prey in these webs, and often constructed egg sacs in their retreats and spent much of their inactive time upon or near the sacs.

The egg-eating behavior we observed was possibly triggered by abnormal conditions associated with captivity and is rarely, if ever, practiced in nature. However, if oophagy were directed toward infertile, damaged, or otherwise inviable eggs, it could be an adaptive strategy to recycle nutrients and thereby decrease losses. We do not know whether the consumed eggs were fertile, and we have no evidence that females are capable of detecting whether their eggs are fertile. However, the fact that several of the infertile clutches produced by four of the oophagous females were not consumed (Table 1) suggests that oophagy has not evolved as a consistent response to clutch infertility.

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