

**Rainar O. M. Nitzsche, Kaiserslautern**

**Nuptial gift and immobilization of prey by *Pisaura mirabilis*, *Dolomedes fimbriatus* and *Thaumasia argenteonotata (uncata)* (Arachnida, Araneae, Pisauridae)** (translated title with new systematic terms)

Paper written in German with an English Summary see below

(Original title)

**“Brautgeschenk” und Umspinnen der Beute bei *Pisaura mirabilis*, *Dolomedes fimbriatus* und *Thaumasia uncata* (Arachnida, Araneida, Pisauridae).**  
**Von Rainar O. M. Nitzsche, Kaiserslautern**

(Original summary)

### **E. Summary**

Since 1884 males of the European nursery-web spider *Pisaura mirabilis* are known to produce nuptial gifts by post-immobilization wrapping of prey. Now it is known that even females and spiderlings of *Pisaura*, both sexes of *Dolomedes fimbriatus* (another European pisaurid) and of *Thaumasia uncata* (a pisaurid from Panama) wrap up their prey by fixing it to the Substrate. Males of *Thaumasia* probably produce nuptial gifts for their mates. Copulation has not yet been observed, but sexually excited males enwrap little flies (*Drosophila*) at night in presence of females with thick layers of silk as *Pisaura* males do.

The percentage of prey carrying *Pisaura* in nature is only 5,5%. Males, however, are met with prey/nuptial gifts more often than females and immature stages (Fig. 2). The prey includes different kinds of insects, Spiders and phalangids (Fig. 6). *Pisaura* is a polyphagous predator. Males also catch larvae of insects (a less moving prey) in a high degree, probably caused by searching behaviour in order to get object as a nucleus for their nuptial gifts (in addition to their normal sit-and-wait strategy). Comparison of prey caught by males, by females, by penultimate and by immature stages shows no significant overlap (Table 1). Usually prey of males is wrapped. These nuptial gifts contain up to 3 prey items (Figs.4,5).

Wrapping frequencies in males, penultimate males, females, and also in first instars of *Pisaura* and *Dolomedes* are compared (Fig. 7). Within 30 min after prey capture only up to 9,8% of all immature stages, females and isolated males of *Pisaura* and *Dolomedes* wrapped their prey-in contrast to more than 80% excited *Pisaura* males in female cages (81,8%) or in presence of females (86,7%). Even nuptial gifts, i.e. enwrapped prey, are wrapped again by excited males in females' presence (93,5%). Hunger suppresses prey wrapping in sexually unexcited males but not in excited ones (Fig. 8).

Surface structures of enwrapped prey were studied by scanning electron microscopy. Usually nuptial gifts of *Pisaura* (Figs. 9-12) and *Thaumasia* (Figs. 15-16) are covered by a network of threads of different diameters (0,2-2,8  $\mu\text{m}$ ) forming a dense envelop.

Contrary to *Pisaura* a package of silk or a clew of threads was found on the surface of all flies (*Drosophila*) wrapped up by *Thaumasia* males (Figs. 15b, 16). The prey of females (Fig. 13), penultimate males (Fig. 14 a, b), spiderlings of *Pisaura* as well as the prey in both sexes of *Dolomedes* (Fig. 14c) and *Thaumasia* (excited males excepted, see above) is fixed to the substrate by a few threads only. Males of *Pisaura* discard their nuptial gifts if not presented to females. Even devoured to minute remains their silk covers look (except for some holes) undamaged (Fig. 12). After grasping the gift with her chelicerae, the female starts to feed on it. The mean „holding-time" of the gift (i.e. the feeding time) was about 39 min (Fig. 17). The feeding area changes colour from white to black. For the most part silk is not damaged by her sucking but still remains in a somewhat changed appearance, without tension, and covered by a black substance, probably consisting of digestive ferments and dissolved parts of prey and silk (Figs. 18 a, b, 19 b). There are holes within the web caused by her chelicerae when chewing the gift (Figs. 18 a). However, other holes seem to be caused by dissolution of threads and silk used as additional food (Figs. 18 c, 19 a); this presumably is the single food source when dry heather-blossoms have been enwrapped (Figs. 11 c, 18c, 19) in the laboratory, they have also been used as nuptial gifts by males. In 67,5% of all separations of sexual partners, the nuptial gift retains with the female and is devoured by her (Fig. 20). The remains lack a silk cover except for some enwrapped particles (Fig. 21). Thus both parts forming the nuptial gift, prey and silk are used as food by females of *Pisaura*.

The nuptial gift of *Pisaura* is an object of mediation and enables the male to copulate. Its second and main function is additional nutrition for the female. Rarely, it forms a shelter against attacks by females. It also serves as food for males searching for females. Wrapping changes long legged prey to compact ellipsoid pieces, and thus facilitates transport in dense Vegetation; it also enables males to enlarge their „gift" by catching additional prey.

Wrapping of prey by *Pisaura* and *Thaumasia* males in order to produce „gifts" may have originated from a „post immobilization wrapping of prey" behaviour of immature and mature stages as it is present in both sexes. The function of this behaviour is fixation of large prey in order to prevent its loss during periods of rest, grooming and searching for water in order to drink. According to ROVNER & KNOST (1974) this is interpreted as an adaptation of spiders for life in an herbaceous stratum.

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