

**Internal and External Parasites of the Spider
Pardosa hortensis (Thorell).
(Araneae: Lycosidae)**

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Records of the parasites of spiders and their egg sacs are not infrequent and many authors have described occurrences of parasitisation by hymenopterous, dipterous and neuropterous insects. Mites, both as adults and in the heteromorphic nymphal stage, are frequently found on spiders when they are using the arachnid phoretically as a means of dispersal and not as a host upon which they are actively feeding. Records of spiders as hosts to mites as true external parasites are uncommon and those of nematode worms as internal parasites are very rare.

Kaston (1945) has described seven instances of nematodes as parasites of the Thomisidae, Lycosidae and Salticidae when worms of the family Mermithidae were seen to be occupying the abdomen of the spider, and in one of these cases the worm had also extended into the cephalothorax of the host via the pedicel. In another instance two worms simultaneously occupied a species of *Phidippus* and had also extended into the cephalothorax.

The purpose of the present paper is to describe parasitisation by both mites and a worm on the spider *Pardosa hortensis* (Thorell).

In June and July of 1972, as part of the Royal Society's European Programme and at the invitation of the Consejo Superior de Investigaciones Cientificas, Dr Eric Duffey led a party of five to study the Arachnida and Hemiptera of the Spanish Pyrenees. The party was based in Jaca (Huesca) at the Centro Pirenaico de Biología Experimental under the direction of Dr E. Balcells.

One of the habitats visited on 21 June 1972 was part of the dry eroded bed of the River Estarrún, a tributary of the Rio Aragon at Las Tiasas below the village of Sinués (altitude approx. 900 m). From this area of water-worn stones and boulders embedded in

sand, where there was scattered scrub with grasses in the open areas, spiders were collected by turning over stones and by sweeping the vegetation with a net. Some of the catch was later identified by the collector (J.R.P.) in the laboratory at Jaca when it was noticed that several females of *Pardosa hortensis* (Thorell) were present and that one of these specimens was parasitised by a worm which had burst through the cuticle of the abdomen. In addition two other spiders of this species were parasitised by mites.

Back in England the parasitised spiders were sent to the co-author of this paper (M.J.R.) who agreed to make drawings and comment upon the parasites. We concluded that the endoparasitic worm was either a nematode or a nematomorph and that the mites were ectoparasites feeding through the abdominal cuticle of the spiders.

The endoparasite

The drawing (Fig. 1) shows the state of the spider at the time of collection and preservation in alcohol. After carefully dissecting away the surface of the abdomen on the dorsal side the worm was revealed in situ (Fig. 2). After removal it was noticed that each end of the worm terminated in a blunt point, one of which was more rounded at its termination than the other.

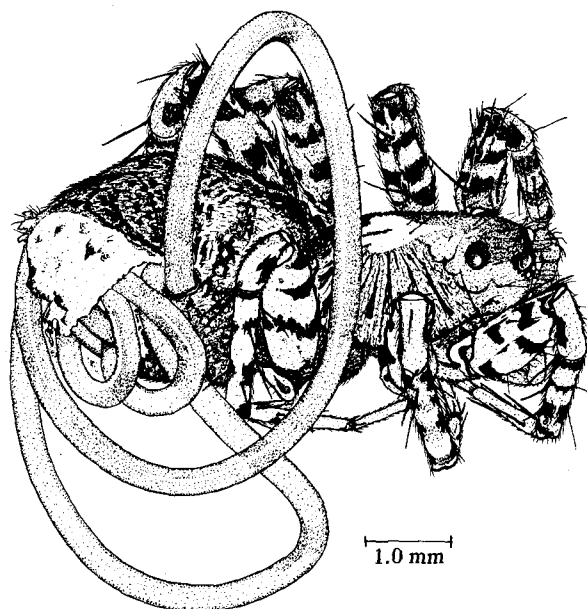


Fig. 1. *Pardosa hortensis* ♀ parasitized by *Mermis* sp.

The endoparasite had its head positioned on the dorsal side of the host's abdomen, in the mid-line just below the surface and pointing to the front of the spider and about half-way between the anterior and posterior of the abdomen. The tail of the organism was found lying ventrally in the region of the vulva and seminal vesicles. The worm was both coiled and knotted to form a neat ball almost exactly filling the abdominal cavity and the viscera of the spider were completely involved in the loops.

The heart of the spider was found to be compressed between the body wall and a loop of the parasite, in the mid-line dorsally. The aggregate and cylindrical silk glands which lead to the spinnerets of the spider were not apparently affected.

The spider was normally developed (with a typical epigyne) and of typical size, which is remarkable when one realises that the parasite was as thick as a tibia of one of the spider's legs. The right fourth leg of the spider was missing and this *might* have been shed owing to the extruding coils of the worm incapacitating its use.

It was not easy to uncoil and unknot the worm and its springy resilience made measurement difficult. The diameter was 0.34 mm and its length approximately 93.00 mm. The worm was creamy

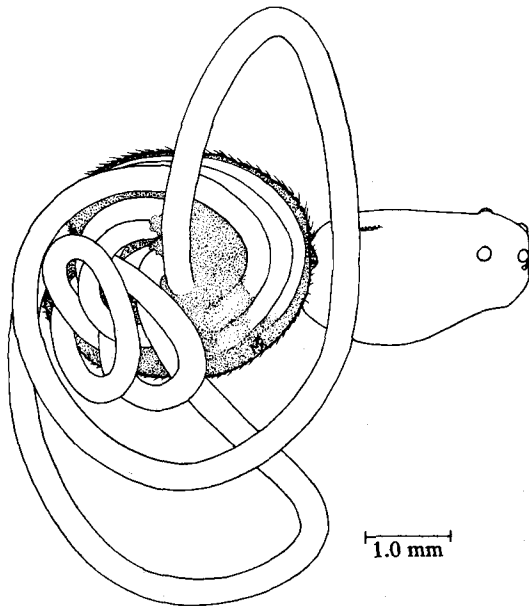


Fig. 2. Position of the parasite within the abdomen of the spider.

white in colour, its integument smooth and shiny and apparently completely characterless, though firm and tough.

After dissection, the spider and its parasite were sent to the Department of Zoology at the British Museum (Natural History) where Miss E. A. Mitchell of the Parasitic Worms Section expressed the opinion that the worm appeared to be an immature female mermithid and stated that there is a species: *Mermis lycosae* Haldeman 1874 recorded from wolf spiders, but it is a *species inquirenda*.

The spider from Spain probably became parasitised by eating an insect which had already eaten an egg of the worm. In support of this view Miss Mitchell kindly provided the following note on the biology and life history of another species of Nematode: *Mermis nigrescens* Dujardin 1842 which we quote as follows:

"The worm is one of the Nematoda or 'Round Worms' and is found on the surface of the soil or climbing on the foliage and stems of plants after heavy showers of rain, generally in the months of June and July. The young or larval stage is spent as a parasite in certain insects, particularly earwigs, which are infected by eating the eggs laid by the female worms on the leaves of plants. When nearly full grown the worm ruptures the body-wall of its host and burrows into the soil, where it may live for up to two years before reaching sexual maturity. The mature females then come to the surface, after rain, to lay their eggs. The males, however, are rarely found since they generally remain underground. This worm is perfectly harmless to man, plants and domestic animals".

From this account one can understand how difficult it is to identify such worms during that part of their life history when they are parasitic and how equally difficult it is to determine what their life history has been when they are collected above ground as adult.

It is not possible to state with certainty whether the infected spider taken in Spain was alive, or not, when it was collected. Most probably it was alive. If it was dead, then death must have been very recent as the specimen had the fresh appearance of a living spider, and, apart from the parasite, was quite similar to the other females of the same species collected at the same time.

The ectoparasites

Two of the other female specimens of *P. hortensis* were infested by mites. One spider carried five mites and the other three of these parasites. These varied in size from 0.05 mm to 0.25 mm in length and were all attached to the cuticle at the anterior end of the abdomen with the exception of one mite which was attached close to the spinnerets. Attachment was entirely by the mouth parts of the mites to and through the abdominal surface and feeding on the lymph of the host. The mites were tick-like in appearance, entirely white with almost circular or egg-shaped distended abdomens. Their legs were minute and extremely short.

Following his inspection of the spiders and these parasites, Mr K. H. Hyatt of the Arachnida Section of the British Museum (Natural History) writes as follows:

"The mites are the parasitic larvae of the genus *Trombidium*. The nymphal and adult stages are predatory. Water mites are similarly parasitic in only the larval stage, but other groups have representatives that are ectoparasitic in all the post-embryonic

stages".

Again the parasites of this spider were in the immature stage and identification to species level has not been possible. No other lycosids, salticids and drassids collected in the habitat were parasitised. However one adult male specimen of *Phrurolithus minimus* C. L. Koch (Clubionidae) did have one relatively small mite, identical to those above, attached to the abdomen.

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Reference

- KASTON, B. J., 1945: Notes on nematode parasites of Spiders. *Trans. Conn. Acad. Arts Sci.* **36** 241-244.

Errata

- Vol. 2 (8) p. 162, line 3. "Tib. I length" to read "Length I"
- Vol. 3 (1) pp. 11-27. This paper was published with the aid of a grant from the Parliamentary Grant-in-aid for Scientific Publications administered by the Royal Society