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A new species of *Paralecanopsis* (Homoptera Coccoidea Coccidae) from Italy

Abstract - A new species of *Paralecanopsis* (Homoptera Coccoidea Coccidae) collected on *Ammophila littoralis* in north-eastern Italy (province of Venice), is described and illustrated. The description of the crawler is also given. An identification key of species of *Paralecanopsis* is provided.

Riassunto - *Una nuova specie di* Paralecanopsis *(Homoptera Coccoidea Coccidae) trovata in Italia.*

Viene descritta una nuova specie di *Paralecanopsis* (Homoptera, Coccoidea, Coccidae) raccolta al colletto di *Ammophila littoralis* vegetante su dune sabbiose prospicienti il mare, in provincia di Venezia. Viene descritta anche la neanide di 1ª età.

Viene inoltre presentata una chiave di identificazione di alcune *Paralecanopsis* note per l'Europa includendovi la nuova specie.

Key words: Homoptera Coccoidea, *Paralecanopsis clodiensis* sp. n., description.

During May 1984 some specimens of coccids were collected from the crown of plants of *Ammophila littoralis* (Beauv.) Rothm. =(*arenaria* L.) (Poaceae). The plants were growing in the sandy dunes facing the Adriatic sea (town of Chioggia, province of Venice, Italy).

The appearence of the coccids (adult females) was peculiar due to their considerable dimension, reaching a length of 8mm and 4 mm in width. The morphology of these specimens was the subject of a preliminary work (Tranfaglia et al., 1985) in which this species was referred as a Coccidae g. sp.. Later the specimens were attributed to the genus *Lecanopsis*.

In the following years (1988, 1990, 1995) several other specimens (adult females and crawlers) were collected in the same place thus providing a large amount of material from which to start a deeper study of the species.

It is known that the group of the *Lecanopsis* is not yet satisfactorily known.

The type genus, *Lecanopsis rhyzophila* Targioni Tozzetti, 1868, is unrecognizable and considered lost (Ben-Dov, 1993). Besides it seems that *L. rhizophila* Targioni Tozzetti is not congeneric with the species included in *Lecanopsis* (Hodgson, 1994). For this reason a proposal was made to transfer the species included in the genus *Lecanopsis* to the genus *Paralecanopsis* Bodenheimer, 1951 (see Hodgson, 1994, for a review). The proposal of Hodgson (1994) is accepted here and in this paper we will refer to the species previously included in the genus *Lecanopsis* as *Paralecanopsis*.

The keys of identification of the species of *Paralecanopsis* are based not only on the morphology of the adult females (Borchsenius, 1957; Kosztarab and Kozar, 1988) but also on the morphology of the last larval stage (Borchsenius, 1957). The crawlers also present characteristics useful to separate the different species.

In this paper a new species of *Paralecanopsis* (adult female and crawler) is described and illustrated. The terminology proposed by Hodgson (1994) for the family Coccidae is adopted. Numerical data and measurements are given as range, followed by the average in brackets. The holotype and seven paratypes are preserved in the collection of the Institute of Agricultural Entomology, University of Padova, Italy (IEAP); two paratypes are preserved in the collection of the Plant Protection Institute, Hungarian Academy of Sciences, Budapest (PPIB).

Paralecanopsis clodiensis sp. n.

Adult female (Fig. 1)

Living specimens yellow ochraceous, elongate, oval, moderately convex, with short anal cleft.

Mounted female broadly oval, 6-8mm long (7), 3-4.8 mm wide (4).

VENTER: Derm membranous, with signes of segmentation on thorax and venter. Dermal spinules present medially from antennae to near the genital opening. Antennae usually 7-segmented. Rarely some specimens present one antenna with 6 or 8 segments and the other one with 7 segments. The third segment slightly longer than others. Setae absent on 3th and 4th antennal segment, present on the other segments and distributed as shown in Fig. 2a. Total length of antenna 255-355μ (316μ).

Labium with 8 minute setae. Legs well developed, subequal. Tibia and tarsus freely articulated, with large tibio-tarsal sclerosis. Tarsal digitules slightly longer than claw digituli. Claw digitules broad. Dimension: trochanter + femur 350-455μ (404μ); tibia 255-330μ (284μ); tarsus 110-130μ (122μ). Setae distributed as shown in fig. 2b). Spiracles normal with sclerotized peritreme cavity. Spiracular disc pores each with 6 - 11 loculi, distributed in an elongated group between either anterior spiracle and the body margin. There are 28-75 pores (58) near each ante-

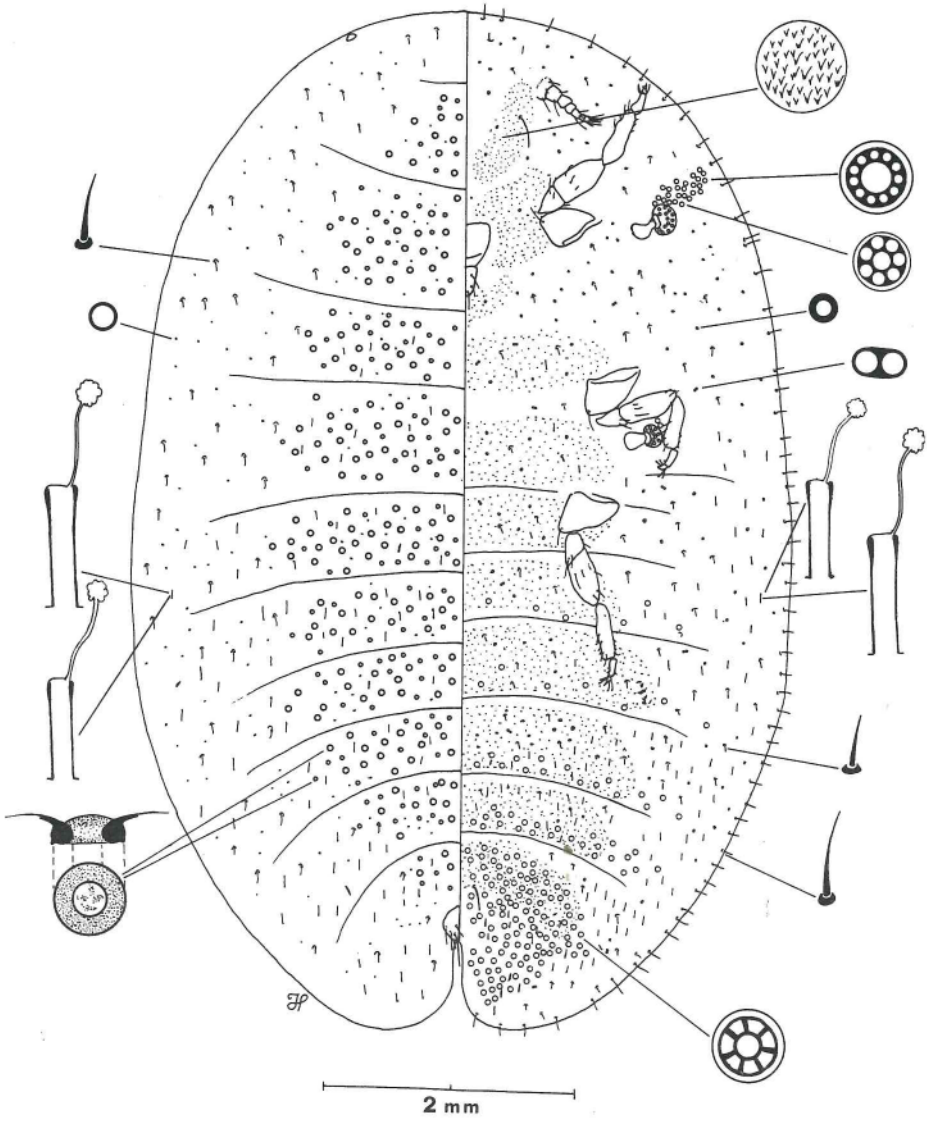

Fig. 1 - *Paralecanopsis clodiensis* sp. n., adult female.

rior spiracle. The spiracular pores are absent or few (varying from 2 to 8, average number 5) near each posterior spiracle. Spiracular disc pores are also present in the peritreme cavity. There are 30-68 pores (48) in each anterior peritreme cavity and 26-77 pores (50) in each posterior peritreme cavity.

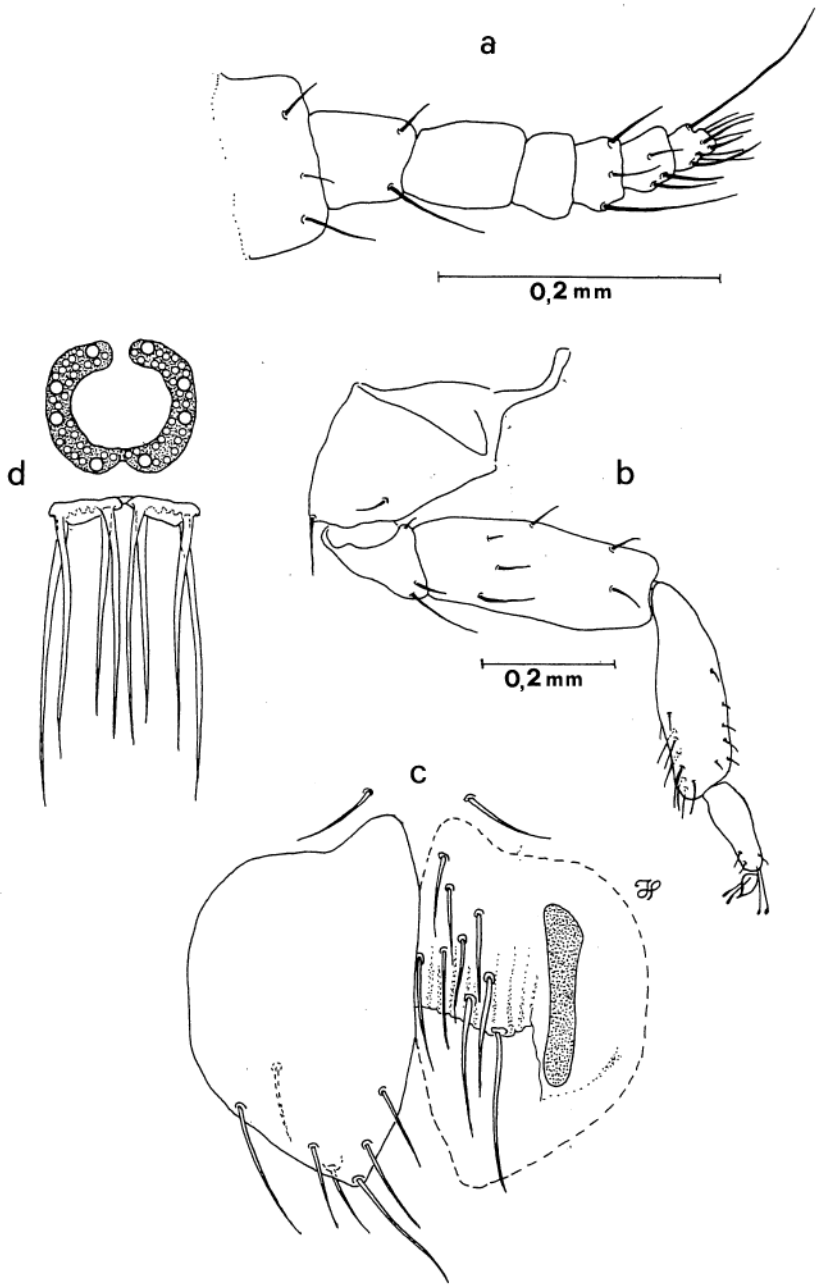

Fig. 2 - *Paralecanopsis clodiensis* sp. n., adult female: a) antenna; b) hind leg; c) anal plates; d) anal ring.

Pregenital disc-pores each with 7, rarely 8, loculi, usually absent on the first two abdominal segments, sparse on the following, forming trasverse bands on the last segments, numerous around the genital opening.

Small simple pore with sclerotized rim numerous, scattered all over venter. Small bilocular pores sparse.

Tubular ducts with thin inner filament of three length, long 20, 24 or 30, present in no pattern from metathorax to anal lobes, more numerous on the last abdominal segments.

Minute spine-setae numerous, scattered. One pair of interantennal setae; one pair of pregenital setae.

MARGIN: marginal setae hair-like, short, similar to dorsal setae, forming two uneven rows at the body margin. Setae on margin of the anal lobes distinctly longer than other marginal setae.

DORSUM: Derm membranous, with sign of segmentation on thorax and abdomen. Preopercular pores of different size, numerous, forming a large longitudinal band occupying the medial one half of the body width and extending from head to near the anal plates. The diameter of the preopercular pores varies from 4 to 10μ, the most common having 8μ diameter. Small simple pores numerous, scattered. Tubular ducts similar to the ducts of venter, with thin inner filament, distributed on thorax and abdomen. Minute hair-like setae sparse.

Anal ring with an irregular row of circular pores and 8 setae (fig 2c). Anal plates subtriangular, with rounded angles and seven setae (fig. 2d).

HOLOTYPE FEMALE: Italy, Isola Verde - Chioggia (Venezia), on *Ammophila littoralis,* 2.V.1990, leg. G.Pellizzari , slide n.283 (IEAP).

PARATYPE FEMALES: 9 females collected on the same host plant and locality. Slides n.120/1-2-3-5-6-7-8, 30.V.1984, leg. G.Pellizzari (IEAP); slide n.122/2, 6.V.1988, leg. G. Pellizzari; slide n. 612, 22.III.1995, leg. G.Pellizzari (PPIB).

DERIVATIO NOMINIS: This species is named after the latin name, Clodia, of the town Chioggia in which district it was found.

Crawler (Fig. 3)

Body yellowish, elongate, oval, 0.60-0.83 mm long (0.7), 0.24-0.33 mm wide (0.26), Eyes large, situated marginally. Antennae 6-segmented, 0.128-0.160 mm long (0.146), third and last segments the longest.

Anal ring with 6 setae. Without anal plates. Anal lobes well developed, each with 3 setae (2 dorsal and 1 ventral) and a long apical seta. Apical seta 0.275-0.200 mm long (0.253).

Loop of the mouth stylets 240-280μ long (258μ), reaching the third (sometimes the fourth) abdominal segment.

Legs subequal, tarsal digitules distinctly longer (0.036-0.030mm) than claws digitules.

Marginal setae minaret-like, as typical to *Paralecanopsis* crawlers, with broad base and thin terminal filament (onion-shaped), present on margin of head and abdomen. There are 7 setae on either side of abdomen and 5 setae on either side of head (4 anterior to the eye spot and 1 posterior to the eye spot). 8-9 marginal hair-like setae present on margin of thorax.

Spiracular disc-pores with 7 loculi (rarely with 5-9 loculi) forming a group between each spiracle and body margin. There is a group of 6-12 pores (8) near each anterior spiracle and a group of 7-12 pores (9) near each posterior spiracle. 2, rarely 3, pores in each peritreme cavity.

Minute hair-like setae distributed in rows on venter as shown in fig. 3; 1 pair of short dorsal setae on each thorax segment. 1 pair of pregenital setae, 1 pair of interantennal setae.

Microducts not seen. Ventral tubular ducts not seen.

Key to species of Paralecanopsis

A key to the adult females of six species of *Paralecanopsis* known in Europe is presented, in order to insert the new species. *P. taurica* Borchsenius, known so far in Ukraine (Crimea), has been included in the key because of its similarity to *P. clodiensis* and *P. formicarum* (Newstead). The characters used in this key are based on description or redescription of *Paralecanopsis* species as given by Borchsenius (1957), Boratynski et al. (1982), Kosztarab and Kozar (1988), Hodgson (1994). Data on length or width of the specimens have not been included in this key since, in our experience, they appear to be highly variable within the same species.

A key to crawlers of *Paralecanopsis* species whose description is available, namely *P. festucae* (Borchsenius) (Tereznikova, 1981), *P. formicarum* (Newstead) (Boratynski et al., 1982), *P. turcica* Bodenheimer, (Hodgson, 1994) and *P. clodiensis,* is also presented. The use of crawlers to determine the *Paralecanopsis* is suggested because their morphological charachters appear to be more stable and easier to detect than the morphological characters of adult females.

Key to adult females

1 Group of spiracular pores (except 1-2) absent in front of anterior spiracles ..... *festucae* (Borchsenius, 1952)
– A large, elongate group of spiracular pores present in front of anterior spiracle 2
2 Antennae with 8 segments 3
– Antennae with 6 -7 segments 4

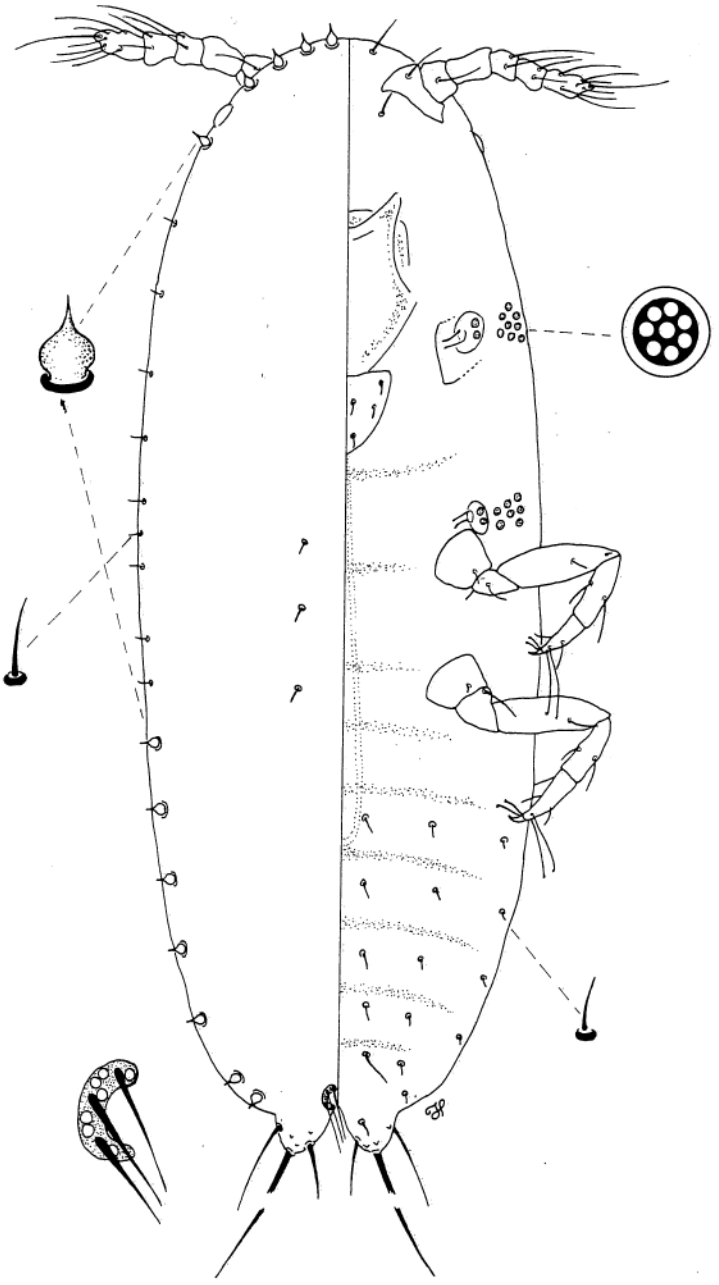

Fig. 3 - *Paralecanopsis clodiensis* sp. n., 1st instar crawler.

3 Preopercular pores with diameter of 5-6μ distributed in a narrow longitudinal band in medial area of dorsum from metathorax to anal plates ... *terrestris* (Borchsenius,1952)
– Preopercular pores with diameter of 8-12 form a narrow longitudinal band in median area of dorsum from prothorax to anal plates 5
4 Antennae with 6 segments; last segment of antennae slightly longer than others and with 17 setae; with 3 pairs of interantennal setae ..... *turcica* (Bodenheimer, 1951)
– Antennae with 7 segments; third segment slightly longer than others; last segment with 9-10 setae; with 1 pair of interantennal setae ..... *clodiensis* sp. n.
5 Preopercular pores with diameter of 8-9 , distributed in a narrow longitudinal band in median area of dorsum from prothorax to anal plates .. *formicarum* (Newstead, 1893)
– Preopercular pores with diameter of 10-12 distributed in a narrow longitudinal band in median area of dorsum, from mesothorax to anal plates .. *taurica* (Borchsenius, 1952)

Key to crawlers

1 Spiracular pores form groups each situated between anterior and posterior spiracles and body margin 2
– Spiracular pores form groups near each spiracles and along the body margin of thorax 3
2 Marginal minaret-like setae distributed along the body margin. There are 15 marginal setae on either side ..... *turcica* Bodenheimer, 1951
– Marginal minaret-like setae present on margin of head (5 on either side) and on margin of abdomen (7 on either side) ..... *clodiensis* sp. n.
3 Three marginal minaret-like setae on either side of head (anterior the eye spot); five marginal setae on margin of abdomen ..... *festucae* (Borchsenius, 1952)
– Five marginal minaret-like setae on either side of head (4 anterior the eye spot, 1 posterior the eye spot); seven marginal setae on margin of abdomen .... *formicarum* (Newstead, 1893)

Comments

The adult female of *P. clodiensis* comes close to *P. formicarum* (Newstead), *P. taurica* (Borchsenius), and *P. turcica* Bodenheimer.

It differs from *P. formicarum* in having usually 7-segmented antennae (*P. formicarum* has 8-segmented antennae); furthermore the preopercular pores form, in *P. clodiensis* ,a wide median band from head to anal plates; in *P. formicarum* the preopercular pores form a narrow medial band from prothorax to anal plates (Boratynski et al., 1982).

It differs from *P. taurica* in having usually 2-8 spiracular pores near the posterior spiracle, while *P. taurica* has 10-19; furthermore *P. taurica* has a lower number of spiracular pores near the anterior spiracle (18-27), 8-segmented antennae and preopercular pores distributed in a narrow medial band (Borchsenius, 1957).

According to the description of Boratynski et al. (1982) and Borchsenius (1957) *P. formicarum* and *P. taurica* appear to be very similar, the major difference being the diameter of the preopercular dorsal pores. A comparison between

the morphology of all the developmental stages of these two species is required, in order to highlight more reliable differences, if any.

P. clodiensis differs from *P. turcica* in having 7-segmented antennae (*P. turcica* has 6-segmented antennae) and 1 pair of interantennal setae, while *P. turcica* has 3 pairs (Hodgson, 1994).

The adult females of *P. clodiensis* are unusually large (reaching an average length of 7 mm and a width of 4 mm) in comparison with other species of *Paralecanopsis*. *P. turcica* is 3 mm long and 1,5 wide (Hodgson, 1994); *P. formicarum* is 3,8 mm long (2-5,4) and 2,4 mm wide (1,2-3,2) (Boratynski et al., 1982); *P. taurica* is 3,8 mm long and 2,2 mm wide (Borchsenius, 1957); *P.terrestris* is about 3mm long (Borchsenius,1957); *P. festucae* is up 4,2 mm long, according to Borchsenius (1957), 3 mm long according to Terznikova (1981). Nevertheless we do not consider the dimensions of *P. clodiensis* as a morphological character useful in the identification of the species, it can only be kept in consideration together with other morphological characters. The dimensions of the adult females of *P.clodiensis* are clearly influenced by the position of the feeding site of the larval stages and by the possibility that the third larval stage has to feed before moulting. Six third-instar larvae of *P. clodiensis* of different sizes, collected in January 26th 1995 and kept in lab without any possibility to feed, moult to adult females during March 1995. Three of them were undersized with respect to adult females collected in the field, reaching the length of 5.5 mm x 3.5 width; mm 4.5x3; mm 3.8x1.7. They were of the same size as they were in the third larval stage, when they were collected, but had, of course, the morphological characters of adult females. The other three adult females had the standard dimension. Similar observation on the different sizes of the adult females of *P. formicarum* are reported by Boratynski et al., 1982.

Some numerical data, often considered in the identification of the Coccidae (f.i. the presence or absence of spiracular pores near the spiracle or the number of spiracular pores), appear to be highly variable in *Paralecanopsis*. In *P. clodiensis* the number of spiracular pores near the anterior spiracle varies from 28 to 75. The spiracular pores near the posterior spiracle are usually few (2-8), but rarely they may reach a number of 13-16. This variability makes it more difficult to compile an identification key, which must take into account stable and costant morphological characters. For this reason it appears more reliable to use crawlers, when possible; their morphological characters are stable probably because they have not yet been influenced by environmental factors .

Biological notes

Adult females of *P. clodiensis* were collected in the field in May, near the roots and the rootcrown of plants of *Ammophila littoralis*. Soon after, the females started to form a loose waxy ovisac. In lab the crawlers emerged from eggs during

June. Some adult females were parasitized by two species of gregarious Hymenoptera Encyrtidae, namely *Choreia inepta* (Dalman) and *Hoplopsis minuta* Fabricius. The parasites emerged during the first days of June 1988 from females collected on May, 6th 1988. *Choreia inepta* was also recorded by Boratynski et al. (1982) as a parasite of *P. formicarum*.

During winter (January 1995) several third instar larvae (males and females) were collected on the basal part of the stems of the host plant, covered by the leaf sheats and enclosed in a thin glassy test.

The study of the biology of this species will be the subject of a further paper.

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