

Papéis Avulsos de Zoologia

A NEW BRAZILIAN PANOPINE SPECIES, *EXETASIS EICKSTEDTAE*, REARED FROM THE THERAPHOSID SPIDER, *LASIODORA KLUGI* (KOCH), WITH A DESCRIPTION OF ITS IMMATURE LARVAL STAGES (DIPTERA, ACRO CERIDAE)

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ABSTRACT

Three adult acrocerids and two well-preserved mature larvae, reared by Mrs. Vera Regina D. von Eickstedt of Instituto Butantan, São Paulo, Brazil, from the same spider host species were sent to me for identification at the suggestion of Dr. N. Papavero, of the Museu de Zoologia, Universidade de São Paulo.

Significant mature larval structures are noted and the following are recorded for the first time within the family Acroceridae: the peripneustic respiratory condition including 12 pairs of spiracles; the presence of a distinct pleurostomal condyle articulating the mandible.

The distinct second-instar caudal spiracular plate together with its attendant spiracular remnants is also recorded for the first time for any acrocerid larva.

The three rearings of this species resulted in the successful development of two parasitoids, thus indicating "superparasitism" may not be rare with large panopine species developing in large spider species.

INTRODUCTION

Three reared adult acrocerids and two well-preserved mature larvae, all reared from the same spider host species, were sent to me for identification by Mrs. Vera Regina D. von Eickstedt of the Instituto Butantan, São Paulo, Brazil with the help of Dr. Nelson Papavero, of the Museu de Zoologia in São Paulo.

At the time I received these specimens, I was in the process of revising several groups of Neotropical Acroceridae, including *Exetasis* and *Ocnaea*, but since Mrs. Eickstedt wished to publish her biological notes on this species, I agreed to describe this new species separately so the name could be made available for her article (see Eickstedt, 1971).

The holotype male and paratype female specimens will be deposited in the Museu de Zoologia Collection in São Paulo, while the paratype male and the two mature larvae are presently in the author's collection. I wish to thank both Mrs. Eickstedt

and Nelson Papavero for allowing me to examine and describe these specimens, and also Mrs. Eickstedt for determining the host spiders.

The genus *Exetasis* and its monotype, *tumens*, were described by Walker (1852) from Brazil. The genus was promptly synonymized by Loew (1857) and remained in synonymy until Schlinger (1968) revived it. The genus is closely related to *Ocnaea* Erichson, 1840 (= *Pialeoidea* Walker, 1876; see Schlinger, 1961), and somewhat less related to *Arrhynchus* Philippi (1871), *Apelleia* Bellardi (1861), *Pialea* Erichson (1840) and *Archipialea* Schlinger (1972). For a general review of the relationships and synonymy of these genera, the works of Aldrich (1932), Sabrosky (1946) and Schlinger (1956, 1961, 1968, 1972) should be consulted.

From *Ocnaea*, species of *Exetasis* can be separated easily by having vein R_4 absent, and by having some (usually considerable) macrotrichiae on the wing membrane. Species which can presently be assigned to *Exetasis* besides its type are: *Acrocera calida* Wiedemann (1830), *Ocnaea longicornis* Erichson (1840), *Pialeoidea brasiliensis* Carerra (1946) and the new species, *eickstedtae*, described below. All of these species are from Brazil, but I have before me another six new species of *Exetasis* from Bolivia, Brazil and Venezuela.

Exetasis eickstedtae, sp. n.

Male: Length of entire specimen 17.0 mm; wing length 12.0 mm.

Color: Yellow, brown and black; yellow are thorax, abdomen, coxae, most of tarsi, area behind ocellar tubercle and posteromedian area of head, lower margin of antenna and innerside of apical 3/4 of antenna; black are eyes, remainder of posterior surface of head, squammal rim, most of mid and hind femora and tibiae, ventrobasal spot on forefemur and tarsal claws; dark brown are remainder of antenna, ocelli, proboscis, wing veins, thin inner rim of squama, cercus, most of forefemur, apical 1/4 of foretibia (rest of foretibia mostly light brown), knees, apical 1/4 of mid and hind tibiae, pulvilli, thin line on lateral margins of sternites III-VII, and small triangular spot on posterior margin of sternites IV-VI; wing membrane hyaline, squama opaque white.

Pile: Dense, yellow on thorax and abdomen, brown on eyes and whitish-yellow on legs; that on eyes short mediolaterally, absent medially under antennal bases, but twice as long dorsally and ventrally and about as long as height of antennal segment I; that on antenna present only dorsally on antennal segment II, slightly shorter than on eyes dorsally; that on proboscis yellowish-brown, about as long as on eyes ventrally; that on mesonotum and scutellum about as long as that on eyes dorsally, mostly appressed; that on pleural areas and coxae longer and more erect; that on squama only on rim except dorsally also on membrane, about as long as on mesonotum; that on dorsum of abdomen mostly as on mesonotum only somewhat shorter except that on tergite I around spiracle and that on apex of abdomen twice as long and more erect; that on venter sparser than on dorsum, mostly erect and about as long as that on tergite I; that on legs thick,

appressed, whitish-yellow on femora and tibiae, particularly thick on hind tibia; that on tarsi shorter, sparser and yellow.

Head: Nearly round in front view, slightly higher than wide as 13:12; about twice as high as wide laterally as 13:6; antenna (measured as straight line from tip to base of ocelli) much longer than head height as 20:13; only lateral ocellus distinct, directed anterolaterally; antennal tubercle distinct, higher than ocellar tubercle when viewed laterally; lengths of antennal segments I, II, III as 5:2:43; segment III broad ventrally, deeply incised on outside laterally, narrow dorsally, with distinct vertical ridges along inner lateral margin becoming reduced then absent at apex (Fig. 1); proboscis distinct, short, that part protruding about as long as height of antennal segment I; maxillary palpus not evident.

Thorax: Mesonotum unicolorous yellow but with large indistinct concolorous vittae represented by slightly depressed areas on frontomedian and lateroposterior areas; scutellum nearly three times as wide as long as 8:3; squama large, slightly higher than head height; apical spine on tibiae I to III present but minute, that on tibia III reduced and indistinct; all tibiae subequal in length and all femora subequal in length, but each tibia about 1/4 longer than each femur; three pulvilli present but indistinct, about 1/2 as long as tarsal claw; prothoracic spiracle large, the forward edge enlarged and hood-like and apilose, about 1/2 as long as high; wing venation as in Fig. 2; wing membrane hyaline except for slight infuscation at base of costal cell; few indistinct macrotrichiae present in costal and marginal cells as shown in Fig. 2.

Abdomen: Measured dorsally, about as long as wide at widest point, tergite II; dorsum about same length as mesonotum plus scutellum; spiracle I in tergite I, large and nearly round; spiracles II-IV in intersegmental membrane; spiracle V-VII not discernable.

Female: Length of entire specimen 15.0 mm; wing length 13.0 mm. As described for male except as follows:

Color: In general darker than male, head with antennal tubercle dull black behind, light brown on apical 1/3; occiput dull yellow with dark brown margin; mesonotum yellow with three distinct wide shiny black vittae, median vitta runs from head to about 3/4 length of mesonotum, lateral vitta starting just forward of wing insertion; abdominal dorsum orangish-brown laterally with large broad dark brown areas medially as follows; fascia occupies 3/4 of tergite II, 2/3 of tergite III, 1/2 of tergite IV and thin longitudinal line on tergite V; tergite VI and genitalia are covered with black extraneous material; tergite I (around spiracle) and sternites II-V mostly dull black, only narrow apical fasciae of sternites II-V and small lateral spot enclosing the spiracles, orangish-brown; wing membrane with light brown infuscation; coxae with both light and dark brown areas; femora and tibiae dark brown almost black, only knees and apical portion of tibiae light brown; tarsi (missing on legs II-III) dark brown; tarsal claws black, pulvilli dark brown; most of humerus and mesopleura and lower pleural area light and dark brown.

Pile: That on eyes all about equal length and present medially; that on tibiae, particularly on hind tibia, dark brown and matted.

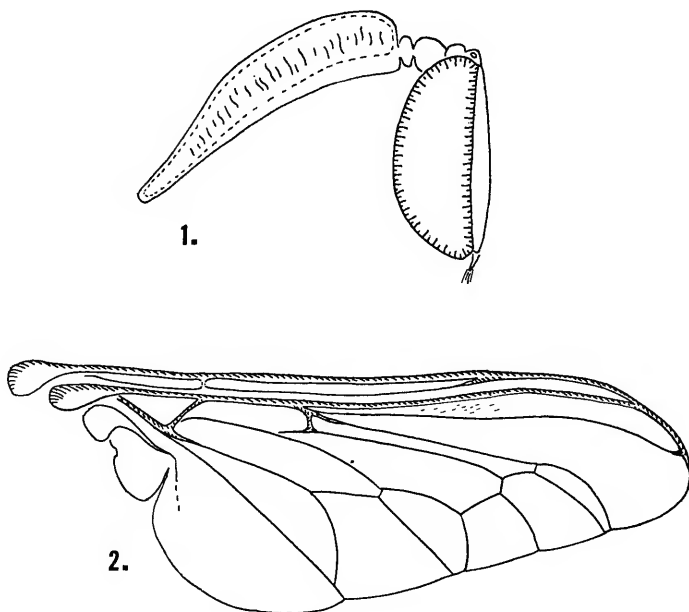
Head: As high as wide frontally, nearly $1/2$ as wide as high laterally; smaller in female than male head height as 23:30; antennal segment I longer than II as 7:4.

Thorax: Prothoracic spiracular shield area greatly enlarged, nearly as long as high; front femur shorter than hind femur as 3:4; tibia of each leg nearly subequal to femur of each leg; most of mid and hind tarsi broken off.

Abdomen: Slightly wider than long, widest at tergite II.

The paratype male agrees well with that described for the holotype except: a small dark brown spot is present on mesonotum at a position apparently representing the anterior part of the otherwise obscured lateral vitta, and vein M_2 does not reach the wing margin. The specimen is also somewhat smaller being 13.5 mm. in length and with a wing length of 10.0 mm.

Mature larva; Both specimens were examined in alcohol and yet differed markedly in color, the larger one being mostly dark brown and the smaller one being mostly white. The larva consists of a head segment, three thoracic segments and nine abdominal tergites and eight sternites (see Figs. 3 and 8); the integument is smooth and asetate except for the several rows of tiny setae situated on setal platelets placed ventrally on abdominal sternites 1 through 8 (Fig. 3); the head capsule consists of a fleshy lobe around the mouth parts, a dorsal curved labrum, a pair of man-



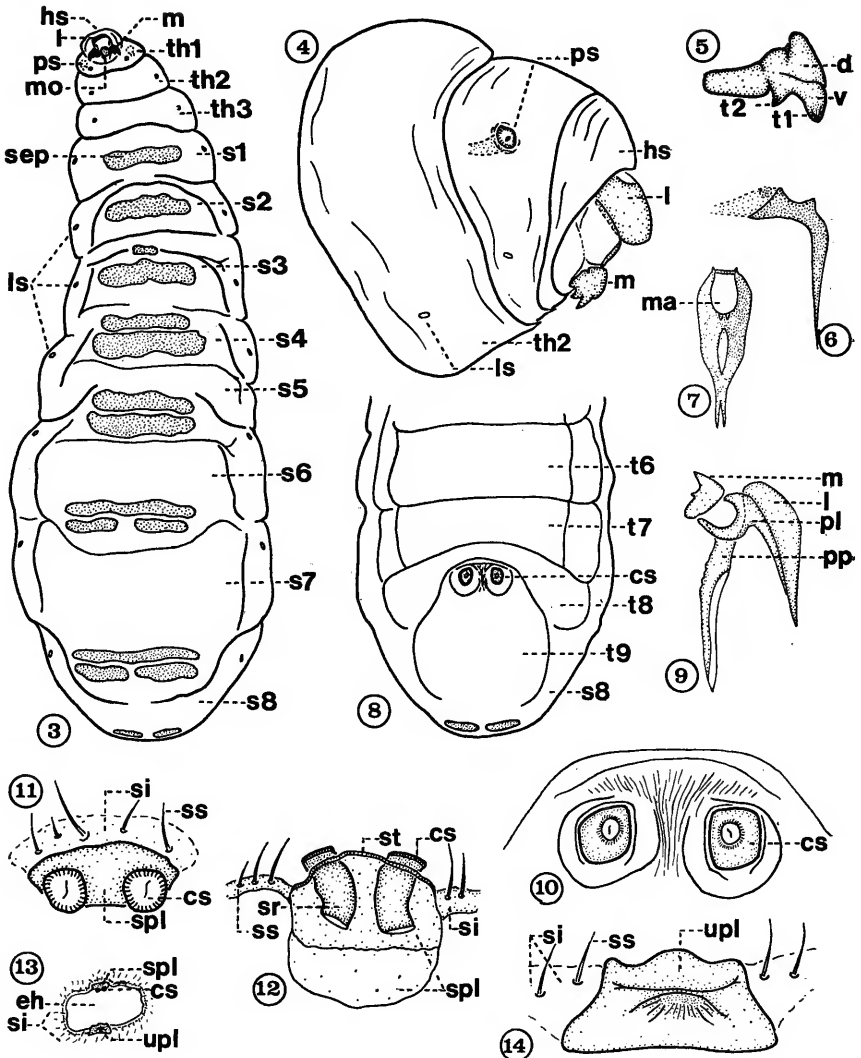
Exetasis eickstedtae, sp. n. 1, head and antenna in lateral view (holotype male). 2, wing, showing macrotrichiae in marginal cell (holotype male).

dibles and a distinct mouth opening (see Figs. 3 and 8); mouth parts apparent by dissection include distinct solid wide pharyngeal plate, a long labrum and a distinct condylic pleurostomal ridge (see Fig. 9); mandible has one large (outer) and one small (inner) tooth (see Fig. 5); mandible not much higher than long (viewed exterolaterally), but twice as long as high when viewed interolaterally (see Figs. 4 and 5); the larva has a peripneustic respiratory condition consisting of twelve pairs of spiracles; a large yellowish-brown prothoracic pair, a larger dark brown caudal pair situated ventrally on tergite nine, and ten pairs of faint brown lateral spiracles (see Figs. 3, 4, 8 and 10); these lateral spiracles may not be functional, but they appear to be spiracles, including the pair placed ventrally to the larger prothoracic spiracle (Fig. 4); the caudal spiracles are quite asymmetrical in shape and are placed on the well-swollen ninth tergite (Figs. 3 and 10).

Other immature larval structures: Upon dissection of one dead host spider's carcass, I found only the following larval structures, although I tried in vain to recover the first-instar planidial skin: A second-instar spiracular plate with attached spiracular remnants embedded in the spider's integument adjacent to the hole made by the emerging mature larva (Fig. 13); the spiracles and their internal remnants are shown in Figs. 11 and 12; another plate, without spiracles, was located embedded in the same integument on the other side of the emergence hole (Figs. 13 and 14), but since this plate is almost identical in size to the second-instar spiracular plate above, it can not be an earlier or later instar remnant and has been termed the "unknown larval plate" (Fig. 14); the second-instar mouth parts (Figs. 6 and 7) were located embedded in some non-digested fatty tissue near the spider's spinnerettes; these mouthparts consist of a black pharyngeal plate with two pairs of tooth-like structures on each side surrounding the mouth opening.

Measurements of certain larval structures: Lengths of the two mature larvae, 32 and 35 mm., their widths were 10 and 13 mm.; diameter of a mature larval caudal spiracle, 0.55 mm.; length of a mature larval mandible measured exterolaterally, 0.36 mm.; diameter of a second-instar larval caudal spiracle, 0.20 mm.; width of a second-instar spiracular plate, 0.95 mm.; width of "unknown larval plate", 1.0 mm.

Specimens examined: Holotype male, and paratype female, Brazil, Espírito Santo, Colatina, both reared from the same specimen of an immature theraphosid spider, *Lasiadora klugi* (Koch) determined by Mrs. Vera Eickstedt. These larvae emerged from the spider on July 5, 1968 and became adults on Sept. 2, 1968. Their collection number is No. 1B,28. Another paratype male was reared from the same species of spider, from Brazil (locality unknown). The spider was received in the laboratory on December 11, 1967 and died on July 10, 1969 with the emergence of two larvae; one of which died and the other completed its development to become an adult in August 12, 1969. Their collection number is No. 3955 1B. The two mature larvae described above were reared from the same specimen of the host species but came from Bahia, Brazil. Their collection number is No. 310, 1B. These larvae emerged from the same host specimen on June 26, 1968 and were



Larval structures of *Exetasis eickstedtae*, sp. n. 3, mature larva, ventral view: *hs*, head segment; *mo*, mouth opening; *m*, mandible; *l*, labrum; *ps*, prothoracic spiracles; *ls*, lateral spiracles; *th 1, 2, 3*, thoracic segments; *s1, s2*, etc., abdominal sternites; *sep*, setal platelets. 4, head and partial thorax of mature larva from inside, showing apparent fused dorsal (*d*) and ventral (*v*) parts, and the primary (*t1*) and secondary (*t2*) teeth. 5, mandible of mature larva, lateral view, as extracted from inside of dead host spider's abdomen; this represents the pharyngeal plate with anterior

preserved in alcohol. The three adult specimens were preserved in alcohol, but I have mounted them on separate pins and the above descriptions were drawn from the dried specimens.

This species is not related to any described species of *Exetasis*, and is most closely related to a new species before me from Brazil. It can be easily separated from all the described species by both wing venational features (for both sexes) and by possessing few macrotrichiae only in the marginal cell, as well as by the all yellow thorax of the male in *E. eickstedtae*.

Biological notes: Very little is known about the immature stages of members of the acrocerid subfamily Panopinae and their host relationships. Species we know something about are summarized here to aid in the interpretation of some peculiar immature structures noted in *E. eickstedtae*.

The mature larva and pupa of *Astomella hispaniae* Lamarck were described by Brauer (1869) and reared from *Cteniza ariana* Koch from Corfu. King (1916) described the first and third larval instar and pupa of *Pterodontia flavipes* Gray which was reared from *Epeira sericata* Clerk and from a species presumed to be *Lycosa pretensis* Emerton, both from Ohio. Jenks (1940) photographed the developing stages for *Ocnaea smithi* Sabrosky, reared from *Bothriocyrtum californicum* Cambridge, in southern California.

In 1968, Schlinger reported rearing *Arrhynchus maculatus* Schlinger from *Phrixotrichus roseus* (Guérin) from Chile. More recently Coyle (1971) reported rearing *Eulonchus marialiciae* Brimley from *Antrodiaetus unicolor* (Hentz) from North Carolina.

Although the article on *Ocnaea smithi* by Jenks (1940) presented excellent photographs of the mature larvae and pupae, details of the mature larva were not evident. Hence, only the papers by King (1916) and Brauer (1869 and 1883) have been useful in aiding the comparison of panopine larvae with *Exetasis*

portion facing upwards and ventral portion facing right. 7, same as 6, except ventral view showing ring-like mouth area (*ma*). 8, mature larva's caudal portion in dorsal view, showing caudal spiracles (*cs*), tergites (*t6*, etc.) and sternite 8 (*s8*). 9, mouth parts of mature larva, lateral view, showing the following structures: mandible (*m*), labrum (*l*), pleurostomal ridge (*pl*), and pharyngeal plate (*pp*). 10, mature larva, showing caudal spiracles (*cs*), enlarged. 11, second instar larval caudal spiracles (*cs*) attached to spiracular plate (*spl*), which are both attached to the spider's integument (*si*). Also shown are the spider's setae (*ss*); this is an exterior view. 12, same structure as in 11, but also showing spiracular remnants (*sr*), tough spiracular plate tissue ridge (*st*), surrounding the caudal spiracles (*cs*), and larger area of spiracular plate (*spl*) situated beneath spider's integument (*si*); this is a cross-sectional view with dorsum of spider's integument indicated by presence of spider's setae (*ss*). 13, mature larva's emergence hole (*eh*) with the second instar larval structures attached to margin of hole, showing caudal spiracles (*cs*), spiracular plate (*spl*) and spider's integument (*si*) with spider's setae surrounding emergence hole; also indicated is the "unknown larval plate" (*upl*), as illustrated in fig. 14. 14, "unknown larval plate" (*upl*), enlarged.

eickstedtae. Features of the mature larva of *E. eickstedtae* which distinguish it from other described panopine larvae are the following: 1) its enormous size (32-35 mm. in length); 2) the presence of a strong pleurostomal condylic ridge showing distinct articulation areas with the mandible; 3) its peripneustic respiratory condition including 10 pairs of spiracles plus the enlarged prothoracic and caudal pairs; 4) the presence of both complete and broken setal platelets on abdominal sternites; 5) the presence of three distinct thoracic segments plus a membranous head-like segment; 6) the presence of a large complete (not excavated) pharyngeal plate; 7) the presence of both a pair of prothoracic spiracles and a pair of smaller lateral spiracles on thoracic segment I; 8) the more anteroventral positioning of the caudal spiracles, and 9) the somewhat rectangular rather than the more normal round shape of the caudal spiracles.

The second-instar larva of *E. eickstedtae* appears to be unique among those described for other panopine larvae by having one (or more?) spiracular plates, one of which contains distinct spiracular remnants embedded in the integument of the host spider. The presence of another structure termed the "unknown larval plate" (see Fig. 14) may indicate that an additional larval instar is present, yet its size is so similar to the spiracular plate that I am unable to determine the true relationship of this structure to the immature larva. Furthermore, after completing a thorough dissection of the host spider's abdomen, I found only one set of mouth parts, and these were interpreted as those of a second instar larva (see Figs. 6 and 7).

Most records of acrocerid flies reared from spiders indicate that most species are solitary internal parasitoids. Jenks (1940) first observed "twins" in this family and he photographed the successful development of two parasitoids from a single spider.

In *E. eickstedtae*, successful "superparasitism" may be the rule rather than the exception, since the three rearings for this species included the emergence of two larvae from each host spider. It may well be that other groups of panopine parasitoids that develop in large spiders, such as Theraphosidae and Ctenizidae, will also display this "superparasitism" trait.

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