

# Notes on the genus *Mama* Belokobylskij (Hymenoptera: Braconidae: Euphorinae), and on the use of monotype taxa

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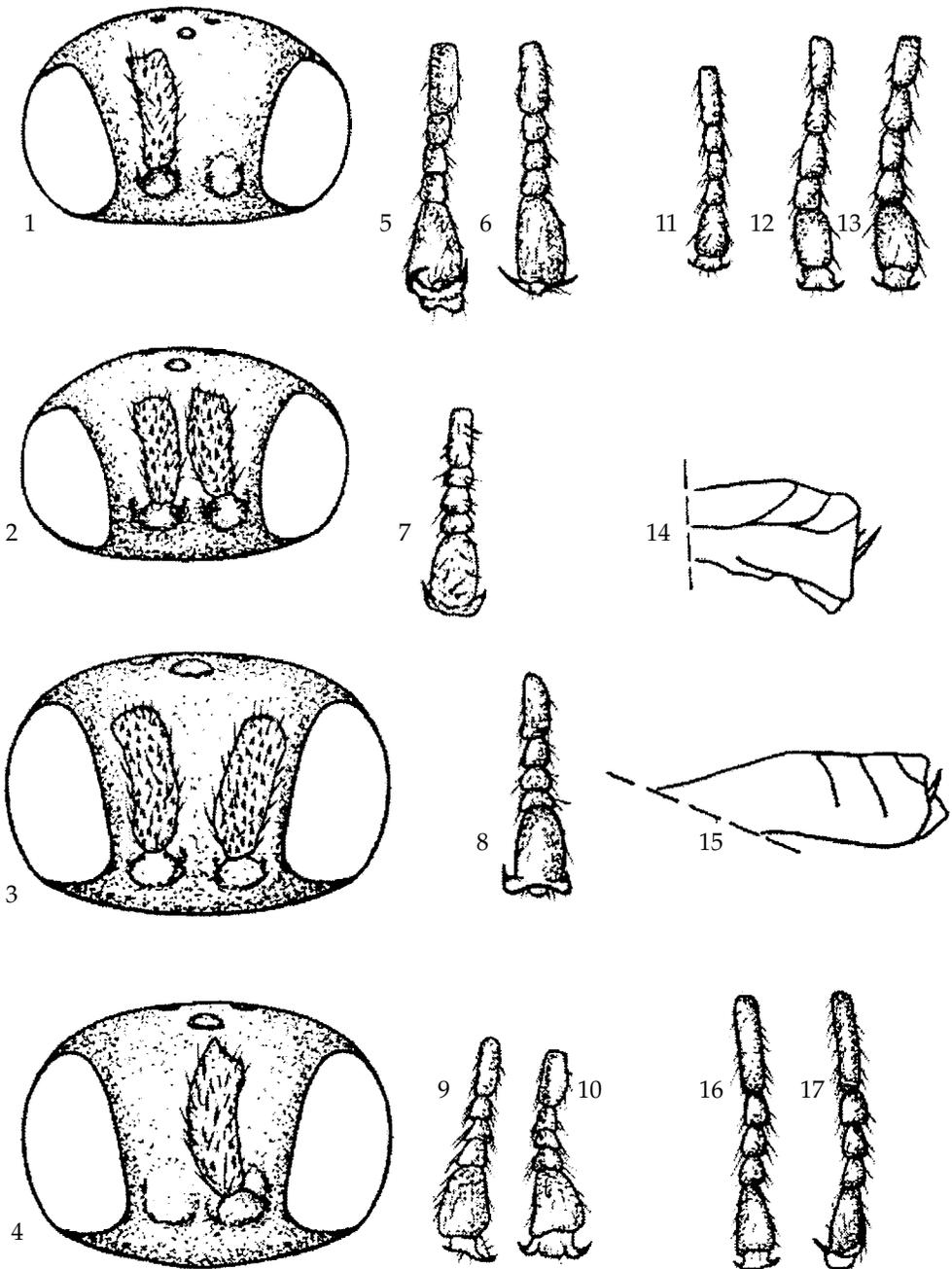
Key words: *Mama* Belokobylskij; *Microctonus cephalicus* Provancher; *Euphorus spiniscapus* Muesebeck; *Microctonus reclinator* Ruthe; monotypic genera; monotype taxa; biodiversity.

The genus *Mama* Belokobylskij, 2000 (Braconidae: Euphorinae) is re-assessed and the type species is compared with three similar species: *Microctonus cephalicus* Provancher, 1886, *Microctonus reclinator* Ruthe, 1856, and *Euphorus spiniscapus* Muesebeck, 1936. The results are discussed in relation to the use of taxa based on one specimen ("monotype taxa"). Problems concerning our knowledge of important groups of Euphorinae are outlined. The context of the peculiarly tangled taxonomical situation, which this paper deals with, is considered to be widespread in parasitoid taxonomy, and should be borne in mind in current studies of parasitoid biodiversity assessment.

## Introduction

The subfamily Euphorinae (Hymenoptera: Braconidae) shows an exceptionally wide adaptive radiation in terms of host-taxa and stages attacked (Shaw, 1988). Both the larval and the adult stages of Coleoptera, Orthoptera, Hemiptera, Psocoptera and Hymenoptera may be used as host. Recently, the genus *Mama* Belokobylskij, 2000, was named for the East Palaearctic *Mama mariae* Belokobylskij, 2000; the type species being the only included species (Belokobylskij, 2000). It is close to the genus *Leiofhron* Nees, 1819, but it has a rather spinose and enlarged scapus (figs 3, 19, 35), the first-fourth segments of the fore tarsus shortened (figs 8, 25, 32), the fore and middle telotarsi strongly widened (figs 32, 33) and a straight and short ovipositor (fig. 34). When the genus was described the biology and the males of the type species were unknown.

Within the Nearctic Euphorinae, two species have been described with a more or less spinose scapus: *Microctonus cephalicus* Provancher, 1886, and *Euphorus spiniscapus* Muesebeck, 1936. *M. cephalicus* is based on one male specimen; Muesebeck (1936) transferred it to the genus *Euphorus* and Shenefelt (1969) placed it in the genus *Leiofhron*. The type series of *Euphorus spiniscapus* consists of two females. Loan (1974a) synonymized the two nominal species on basis of the following argument: "...the type of *cephalicus* is a male, from the Ottawa area. I have examined a female from Ottawa in the Canadian National Collection that resembles *spiniscapus* except for absence of the spinose scape. The scape of the *cephalicus* type is not glabrous but bears spines that are not as long as those of *spiniscapus* nor as sclerotized. The tergite 1 of *cephalicus* and of *spiniscapus* is



Figs 1, 5, 6, *Leiophron cephalicus* Provancher, holotype, ♂; figs 2, 7, 14, *L. spiniscapus* Muesebeck, paratype, ♀; figs 3, 8, 15, *Mama mariae* Belokobylskij, paratype, ♀; figs 4, 9, 10, *Leiophron reclinator* Ruthe, ♀; fig. 11, *L. pallidistigma* Curtis, ♀; figs 12, 13, *L. apicalis* Curtis, ♀, (13 of holotype); figs 16, 17, *Peristenus pallipes* (Curtis), ♀. 1-4, head, anterior aspect; 5-13, 16, 17, fore tarsus; 14, 15, apex of metasoma, lateral aspect.

similar. Since these species are similar in morphology except for the scape, it is suggested that the spinose scape is a sexual character. For this reason *spiniscapus* is suppressed as a junior synonymy of *cephalicus*."

We examined the type specimens of *E. spiniscapus* and *M. cephalicus* and compared them with paratypes of the East Palaearctic *Mama mariae* Belokobylskij and with the very similar West Palaearctic *Microctonus reclinator* Ruthe, 1856.

The aim of this paper is to focus on the the status of the genus *Mama* and related taxonomic problems, partly caused by using too limited material for the description of new taxa.

### Material

The following specimens were examined and compared with each other:

*Euphorus spiniscapus* Muesebeck, 1936

Paratype, (USNM), ♀, "[U.S.A., Colo[rado], 1329", "*Euphorus spiniscapus* Mues., type, Det. Muesebeck", "Collection C.F.Baker", "Type No 49916, U.S.N.M."

*Mama mariae* Belokobylskij, 2000

Paratypes: (ZISP), 1 ♀, "[Russia], Primorskij kraj, Lasovskij Nature Reserve, 23.vii. [19]93, S. Belokobylskij"; 1 ♀, id., but from Krounovka, 3.viii.1993; 1 ♀ (RMNH), id., but 20 km SE Ussurijska, 21.vii.1996.

*Microctonus cephalicus* Provancher, 1886

Lectotype, (Laval University, Montreal), ♂, "[Canada,] *Microctonus cephalicus* Provancher, 1118, Gahan & Rohwer 15, Barron 71", "*Euphorus cephalicus* Prov.", "17", "118", "*Microctonus cephalicus* Provancher, P.M. Marsh, Feb. [19]75".

*Microctonus reclinator* Ruthe, 1856

Lectotype, (BMNH), ♀, "[Germany,] Ruthe Coll. 59.101, 21.22"; 1 ♀ (BMNH), Germany, Ruthe Collection.

As noted by Loan (1974a) the lectotype male of *M. cephalicus* possesses some spines on the scapus (fig. 1). However, the spines are not as long and dense as in the female paratypes of *E. spiniscapus* and *M. mariae* (figs 2, 3).

The spines on the scapus of *M. reclinator* are almost absent, although a few are discernable; this observation, however, does not come from the examination of the lectotype. In fact, Loan (1974b) designated for *M. reclinator* Ruthe a female lectotype and two specimens (one female and one male) became paralectotypes, all from the Ruthe Collection (BMNH). We examined the lectotype, which is in a very poor condition; its entire head and the apical half of the hind wing are missing. In addition, a female labelled "*reclinator*", "Germany", "Ruthe" was found; it is entirely similar to the lectotype and rather well preserved, and its scapus is shown in fig. 4. Presumably this is one of the paralectotypes which remained unlabelled; a common practice of the reviser.

All the examined specimens are similar: all have the remarkable triangular profile of the head (figs 18-21), the enlarged scapus (figs 1-4), the very prominent eyes (which are rather wide and usually distinctly convergent in anterior view: figs 22, 23) and the telotarsus of the fore leg is enlarged (figs 5-10). No remarkable differences exist between the ovipositor shape of the examined types of *E. spiniscapus* (fig. 14) and *M. mariae* (fig. 15). In both type specimens of *M. reclinator*, however, the bad condition prevents comparison, but non-type specimens have the same shape of the ovipositor (van Achterberg, personal observation).

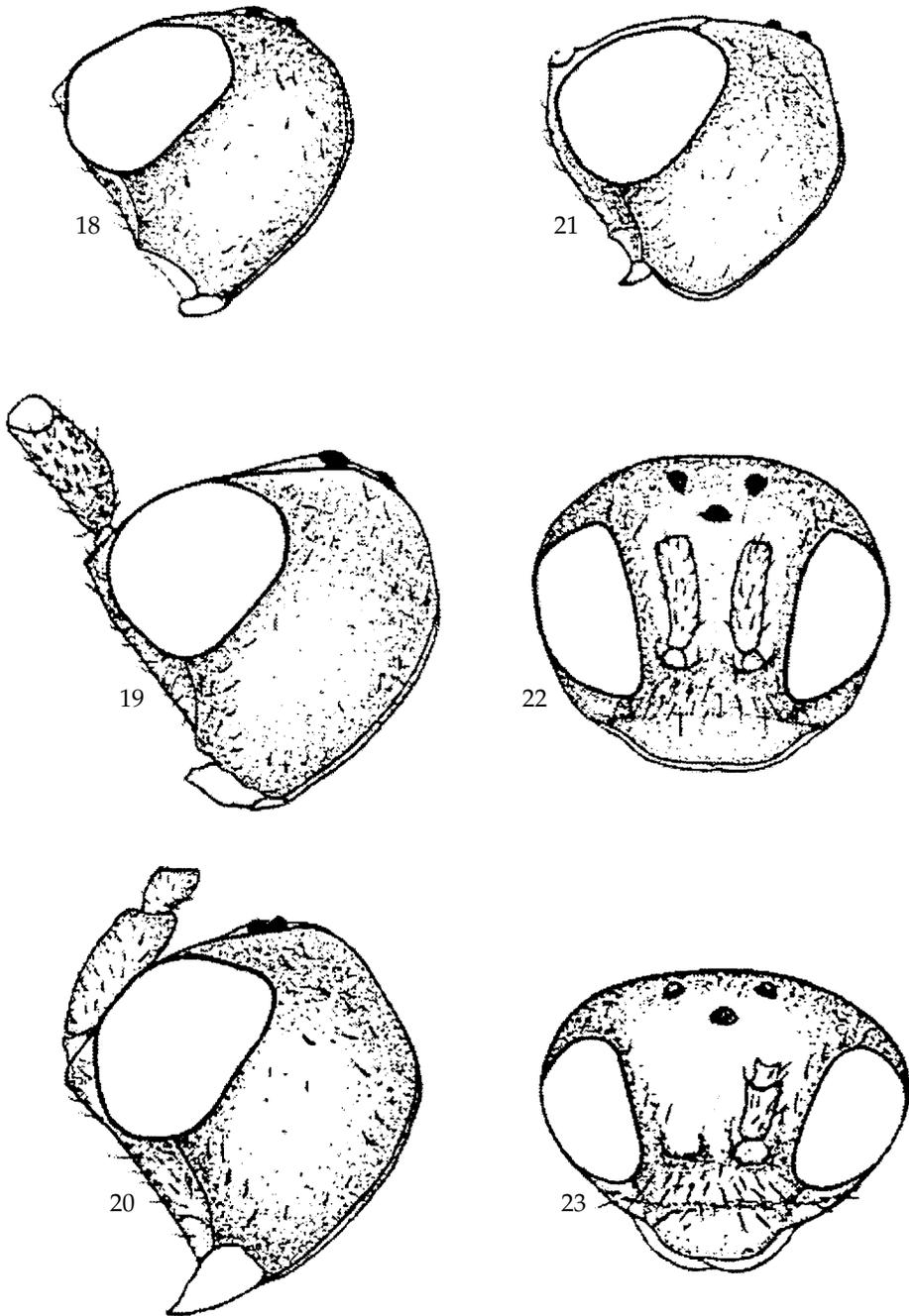


Fig. 18, *Leiophron spiniscapus* Muesebeck, paratype, ♀; figs 19, 23, *Mama mariae* Belokobylskij, paratype; figs 20, 22, *Leiophron reclinator* Ruthe; fig. 21, *L. cephalicus* Provancher, holotype, ♂. 18-21, head, lateral aspect; 22, 23, head, anterior aspect.

Examination of the remaining general morphology did not allow us to establish any diagnostic differences between *E. spiniscapus* and *M. mariae*. Between the types of *M. cephalicus* and *E. spiniscapus* there are differences in the development of the notauli (in *E. spiniscapus* the notauli are distinctly impressed anteriorly (cf. fig. 29) and in *M. cephalicus* they are nearly completely absent), the colour of the mesopleuron (black in *E. spiniscapus* and yellowish-red in *M. cephalicus*), and the anterior angle of the stemmaticum (90-100° and about 120°, respectively). In addition the distribution is different: *E. spiniscapus* occurs in the Rocky Mts. and Colorado and *M. cephalicus* in temperate eastern N America (H. Goulet, personal observation).

### Discussion and conclusions

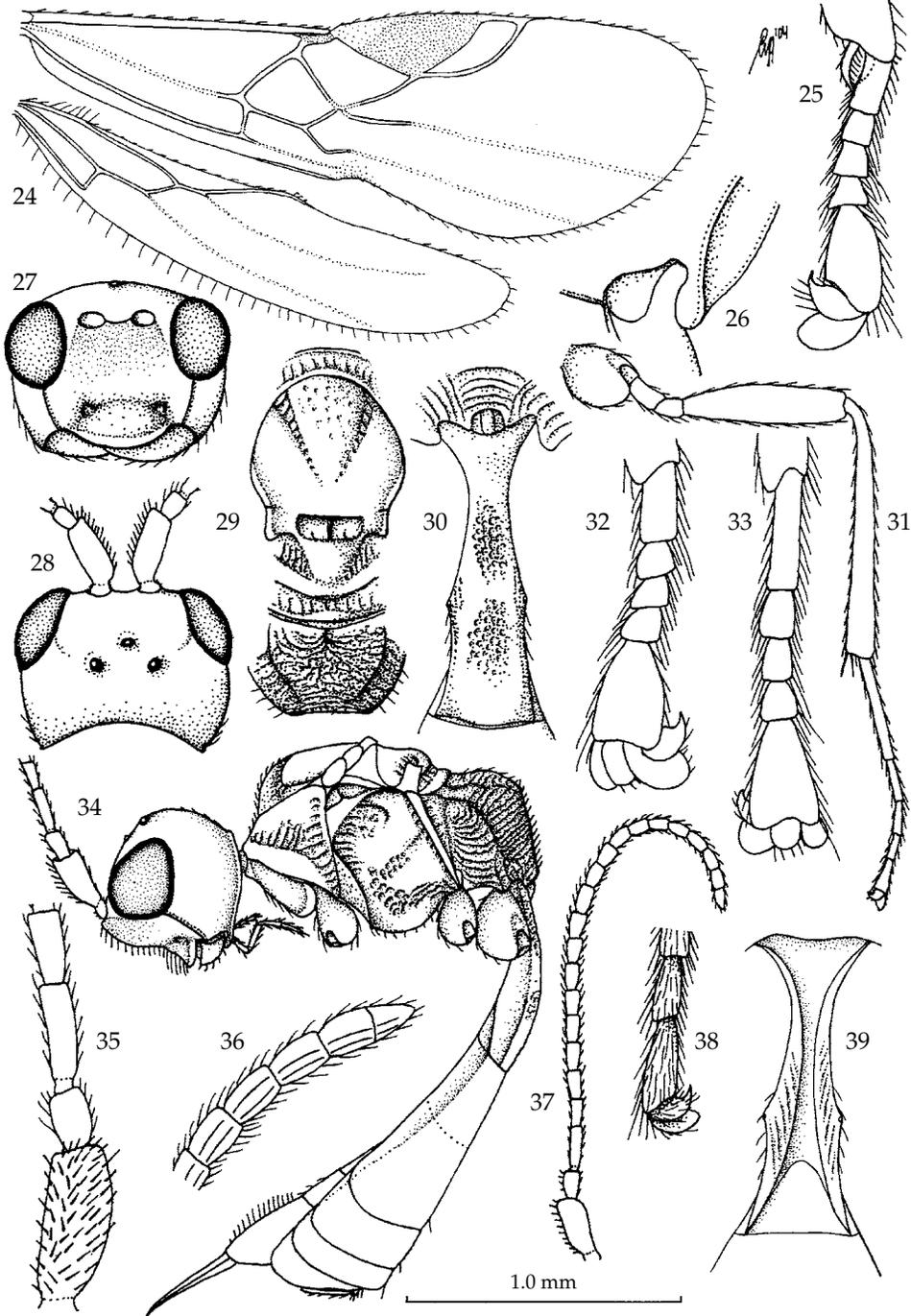
Some preliminary remarks ought to be made before to reach some conclusions about the validity of the nominal taxa:

– Genera of the subfamily Euphorinae such as *Leiophron* Nees, *Microctonus* Wesmael, 1835, *Euphorus* Nees, 1834, *Euphoriana* Gahan, 1913, and *Euphoriella* Ashmead, 1900, contain several species based on one specimen (so-called “monotype taxa”). For example, one fifth of the Palaearctic species and half of the Nearctic species of the genus *Leiophron* s.l. are monotype and known from one specimen. The type series of others often consist of a few specimens, rarely more. The type series of *Mama mariae* is fairly large, but in most other species of the group this is usually not the case. Good evaluation of the intra- and interspecific variability is only possible when more than one specimen per taxon is available. Considering the state of current taxonomy of the group and the ecological information about Euphorinae much caution is required in the interpretation of the available data. It is obvious that students of Euphorinae should refrain as much as possible from describing monotype taxa. Taxonomic confusion for years is usually the effect of repeated descriptions of monotype taxa (or nearly monotype taxa, based on only males), combined with differences in opinion among taxonomists and given the natural biological complexity of the group.

– The validity of these genera is still a matter of debate (Bilewicz-Pawinska, 1969; Loan, 1974a, b; Shaw, 1985; Chen & van Achterberg 1997; Simbolotti et al., 2002). In particular the relation to the genus *Peristenus* Foerster (in combination with the status of similar genera) needs to be clarified.

— For a future revision of the group, extensive ecological work (including rearing) should be done. For instance, parasitoid reproductive isolation in the field may be mediated through host-association (Claridge & den Hollander, 1983; Pungertl, 1986; Dawah, 1988a, b, 1989; Holler, 1991; Claridge et al., 1997a, b). Potential isolation of closely related and sympatric species of parasitoids through microhabitat specialisation of its host only, has been shown to occur in various Braconidae (Vet et al., 1984; Vet & Janse, 1984; Kenis & Mills, 1998). Waloff (1967) after rearing three species of the *Leiophron* group on various host-species, concluded that, in these parasitoids, host acceptance and specificity depended to some extent on the date of emergence of the parasitoid and the presence of the right nymphal stage of the host. With exception of Waloff (1967), Bilewicz-Pawinska (1969) and Varis & van Achterberg (2001) results of ecological work and rearing of Palaearctic species of *Peristenus* and *Leiophron* s.l. has been hardly published.

It is obvious that all examined species belong to the same genus *Mama* Belokobylskij.



The enlarged fore and middle telotarsi of the examined species seems to be an important character (among the other characters mentioned above) to unite them (figs 5-10, 25, 32, 33), being a character typical for the genus *Mama*. This character was not considered in the revision of the Nearctic *Leiophron* species (Loan, 1974a), but he did recognise the lineage without naming it by the shape of the head and the eye direction in his key. In N America are three recognised species: *L. fuscipennis* Loan, 1975, *L. cephalicus* (only females) and *L. grohi* Loan, 1975 (only males), with five more undescribed species from the prairie region, southern British Columbia and southern Quebec (H. Goulet, personal observation). According to Chen & van Achterberg (1997) and Simbolotti et al. (2002) Palaearctic *Leiophron* species have the fore telotarsi less enlarged (figs 12, 13). This applies also to species of the genus *Peristenus* Foerster, 1862 (figs 16, 17) - a genus once considered to be synonymous with *Leiophron* (Richards, 1967). In Euphorinae the shape of the fore leg is probably biologically important and somehow related to its behaviour. Females have the fore telotarsus more enlarged than males and it is, therefore, likely that it is related to seizing the host by its fore legs during the oviposition, as noted by Waloff (1967).

Considering the morphology of the examined East Palaearctic and Nearctic specimens, *Mama mariae* and *M. spiniscapus* are very closely related and its relationship needs further examination. The differences in development of the notauli between *M. cephalica* and *M. spiniscapus* may be less important; the degree of development of the notauli seems very variable in several other Euphorinae (Loan, 1974b; Shaw, 1985; Chen & van Achterberg, 1997), but additional differences (this paper) indicate that it are separate species. At the generic level the presence or absence of the notauli should not be the subject of disagreement in the formulation of the diagnosis of genera, like *Mama* and *Leiophron*.

The ovipositor shape is another useful diagnostic character in Euphorinae. In fact, a decidedly curved short ovipositor seems to be typical of the genus *Leiophron* (Chen & van Achterberg, 1997), while a straight ovipositor (a plesiomorphous character-state) characterizes *Mama* (Belokobylskij, 2000). The similar, rather straight ovipositor of *Mama mariae* and *M. spiniscapus* (figs 14, 15, 34) does not contradict a possible synonymy of the two species (figs 14, 15). *M. reclinator* also has a nearly straight ovipositor (van Achterberg, personal observation), as has *M. cephalica* (Goulet, personal observation); Loan (1974a) did not mention the shape of its ovipositor.

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Figs 24-39, *Mama mariae* Belokobylskij, ♀, paratype. 24, wings; 25, fore tarsus, lateral aspect; 26, ventral part of occipital carina, latero-posterior aspect; 27, head, frontal aspect; 28, head, dorsal aspect; 29, mesosoma, dorsal aspect; 30, first metasomal tergite, dorsal aspect; 31, hind leg; 32, fore tarsus, dorsal aspect; 33, middle tarsus, dorsal aspect; 34, habitus, lateral aspect; 35, basal segments of antenna, inner aspect; 36, apical segments of antenna; 37, antenna; 38, outer hind claw; 39, first tergite, ventral aspect. 24, 31, 34, 37: 1.0 × scale-line; 25, 32, 33, 35, 36, 38: 2.5 ×; 26: 2.7 ×; 27-29: 1.2 ×; 30, 39: 1.5 ×.

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