THE CLASSIFICATION AND INTERRELATIONSHIPS OF THORONINI (HYMENOPTERA: PROCTOTRUPOIDEA, SCELIONIDAE)

LUBOMIR MASNER

Entomology Research Institute, Canada Department of Agriculture, Ottawa

Abstract

Can. Ent. 104: 833-849 (1972)

The tribe Thoronini Kozlov, 1970 as interpreted here in its broader sense includes also the tribes Pseudanteridini and Tiphodytini as proposed by Kozlov (1970), i.e. the following genera: *Thoron* Haliday, 1833, *Neothoron* n. gen., *Pseudanteris* Fouts, 1927, *Thoronella* n. gen., *Microthoron* n. gen., *Tanaodytes* n. gen., and *Tiphodytes* Bradley, 1902. The new taxa described are: *Neothoron lautus* n. gen. and n. sp., Ecuador; *Thoronella elegans* n. gen. and n. sp., Brazil; *Microthoron baeoides* n. gen. and n. sp., Malaya; *Tanaodytes longipes* n. gen. and n. sp., Malaya; *Tanaodytes soror* n. sp., Ceylon; *Tiphodytes godavari* n. sp., Nepal; *Tiphodytes mymar* n. sp., Malaya; *Tiphodytes selangor* n. sp., Malaya.

The genera *Thoron*, *Pseudanteris*, and *Tiphodytes* are recorded for the first time in Canada. The name *Calliscelio* Ashmead, 1893 is considered a synonym of *Calotelea* Westwood, 1837 (new synonymy).

The species of Thoronini, the biology of which is known, parasitize eggs of water Heteroptera (Gerridae, Nepidae) and it is assumed that most if not all species of this tribe either live in, or are closely associated with, aquatic or semi-aquatic habitats. This is inferred, in the case of species for which definite information is lacking, from the sites in which the adults have been collected, all of which were near water.

Classification of the Scelionidae at the tribal level is a subject that has been ignored for many years. The groups originally proposed by Ashmead (1893, 1903) were accepted by most of the subsequent students. Seventy-three years later Szabó (1966) established the new subfamily Gryoninae. Later Masner (1968) emphasized the importance of tibial spurs and palpi in the suprageneric classification of Scelioninae. Kozlov (1970) proposed a new tribal reclassification of the whole family. He also accepted the four major subfamilies of Ashmead (1903) viz. Scelioninae, Teleasinae, Baeinae, and Telenominae. At the same time he erected a number of new tribes, treating Gryoninae only as a tribe within Scelioninae. Hellén (1971), apparently unaware of Kozlov's classification, introduced a rather aberrant system of Scelionidae. The latter he divides into three subfamilies: Scelioninae, Telenominae, and Platygasterinae. The subfamily Scelioninae is subsequently divided into five tribes viz. Baeini, Teleasini, Scelionini, Anteridini, and Gryonini.

Kozlov (1970) tried to employ some new aspects in the tribal classification of Scelionidae. One of those characters used is a peculiar area situated in front of mesoscutum in some Scelioninae ("треугольное пятно"). This character was mentioned and employed first by Nixon in 1933 ('a specialized mesonotal area') and, much later, by Szabó (1958, 1969) ('dreieckiges Spezialfeld'), who misinterpreted the area for prescutum. It seems that this structure (Figs. 1, 5, 8) is quite peculiar to several genera of Scelioninae and, to my knowledge, is not encountered anywhere in the Hymenoptera. The dissection of this area shows that it is well separable from prothorax by suture, yet well fused with mesoscutum in one solid sclerite (e.g. in *Psilanteris* sp.). Usually, a well defined dorsal keel and a corresponding internal apodeme delimit this area posteriorly from the central lobe of mesoscutum. As a rule, it also differs strikingly from mesoscutum in sculpture, being usually smoother and perfectly bare. Hence it appears as a shiny mirror or a cup in front of mesoscutum. Since no special term has been applied to this

structure I suggest calling it, for the sake of brevity, skaphion (Greek σκαφίον = concave mirror, cup). The latter is intended as an auxiliary term since my previous effort to homologize this area with prescutum failed (cf. Matsuda 1970).

Skaphion is reported by Kozlov as occurring only in the tribe Psilanteridini of the Scelioninae. In fact, it is also well developed in Pseudanteridini and two other tribes classified by Kozlov outside of the Scelioninae, namely Thoronini (Baeinae) and Tiphodytini (Telenominae). A closer examination of this fact led me to conclude that Thoronini, Pseudanteridini, and Tiphodytini form a natural unit within Scelioninae with closest ties to Psilanteridini. I propose therefore to treat these as a single tribe for which I have chosen the name Thoronini and consequently suppress the names Pseudanteridini and Tiphodytini. The presence of the skaphion alone, however, is not sufficient evidence for bringing these tribes into synonymy. There are other characters, both morphological and biological, that stress the relationship. Some of these characters seem to reflect the aquatic habits of Thoronini, e.g. the strong semierect bristles on the vertex of the head and dorsum of the mesosoma, presumably used in formation of an air plastron for diving. Because of some other important characters in common the above mentioned bristles are not considered a convergence due to similar habits but true relationship within Thoronini.

The taxonomic value of skaphion as a character in classification of higher categories (tribes) presents some problems. There are several undescribed tropical species of *Opistacantha* Ashmead in which this character seems to have only a specific value, i.e. some species may have or may not have the skaphion well developed. Another problem is that skaphion is missing in some genera closely related to Psilanteridini (e.g. *Anteris* Foerster) but present in some peculiar unrelated ones (e.g. *Parascelio* Dodd). This might indicate a parallel evolution of this character in Scelioninae. With respect to facts mentioned above, skaphion is a character of problematic value.

Thoron was traditionally classified in Baeinae and *Tiphodytes* in Telenominae yet to me they represent strange elements in the respective groups. In order to learn more about the structure of the mesosoma and metasoma, individuals representing species of *Tiphodytes* and *Thoron* as well as species of various genera of Baeinae and Telenominae, were dissected. The results confirmed the original assumption that both *Thoron* and *Tiphodytes* were misclassified. The well marked skaphion of *Thoron* does not occur in *Idris* Foerster nor in any of the genera assigned to Baeinae (sensu Kieffer 1926). The metasoma of *Idris* males is composed of 7 tergites and 7 sternites whereas that of *Thoron* of 8 tergites and 7 sternites. The cylindrical flagellar segments of the male antenna in *Thoron* differ strikingly from the penicillate flagellar segments of *Idris* males and from those of allied genera. Moreover, there is no fusion between antennal segments 11 and 12 in males of *Thoron*. Finally, the smooth unsculptured body in *Thoron* is quite strange among other genera classified in Baeinae (sensu Kieffer 1926). The latter group was not recognized as an independent subfamily (Masner 1956; Muesebeck and Masner 1967; Masner and Muesebeck 1968) because it was believed that it represents but a highly apomorphic and specialized branch of the Scelioninae. Reflecting Kozlov's (1970) system of tribes I suggest treatment of Baeini and Idrini tentatively as independent tribes within Scelioninae.

Hellén (1971) classified *Thoron* in Anteridini together with *Anteris* and *Psilanteris*.

Tiphodytes resembles superficially Telenominae yet dissection of metasoma indicates a closer relationship with Scelioninae (notably Psilanteridini) than with Telenominae. *Tiphodytes* has distinct broad sternopleurites which are absent in the Telenominae, 7 tergites and 6 sternites in the female and 8 tergites and 7 sternites in the male contrasting with 7 tergites and 7 sternites in the female and 8 tergites and 8 sternites in the male of Telenominae. The most typical feature of the telenomine metasoma, the U-shaped sternite 7 in the female ('U förmiges Stück' of Oeser, 1961) and the similarly reduced sternite 8 in the male, is absent in *Tiphodytes*. Moreover, no genus of Telenominae has developed the skaphion or antennal clava with semifused segments in the female sex. The large segment 3 of the metasoma in *Tiphodytes* also points towards a relationship with Scelioninae rather than with the Telenominae. In this and other respects *Tiphodytes* seems closest in relationship to *Pseudanteris* (Masner 1964) and *Thoronella* not only in morphological but also in biological characters (see below). Marchal (1900b) compared *Tiphodytes* (as *Limnodytes*) with *Thoron* as the closest genus. Szabó (1957, 1969) classified *Tiphodytes* (as *Hungaroscelio*) correctly in Scelioninae.

I think that the lack of an impressed submarginal groove in the metasoma of a scelionid genus alone is not necessarily proof of its relationship with the Telenominae. Similarly, this character will fail to prove any relationship of some genera of platygasterid subfamily Inostemminae (*Allotropa* Foerster, *Fidiobia* Ashmead, *Amitus* Haldeman) with Telenominae. These similarities are considered to be a convergence and I do not therefore hesitate to classify *Tiphodytes* and the related genus *Tanaodytes* in Scelioninae rather than in Telenominae.

Tribe THORONINI Kozlov, 1970

Pseudanteridini Kozlov, 1970; Tiphodytini Kozlov, 1970. New synonyms.

Body perfectly smooth and glossy, with no matt microsculpture, highly polished, sometimes with slight metallic shade; numerous hard semierect bristles scattered on vertex of head and dorsum of mesosoma; skaphion well developed and sharply delimited; metasoma distinctly elongate (except in *Microthoron*), often obpyriform, segments 2 and 3 largest and broadest, tergites 1 and 2 longitudinally costate, following tergites smooth; 7 tergites and 6 sternites in female, 8 tergites and 7 sternites in male; apical tergite (♀ T7, ♂ T8) rather large, triangular, with 2 pairs of long upcurved bristles, not extrusible with ovipositor but articulating with tergite 6 in female; submarginal impressed groove of metasoma either developed or absent; antenna 12-segmented (secondarily 6-segmented in *Microthoron* ♀), with articles of club poorly differentiated in female, in male with cylindrical funicular segments; lateral ocelli very close to eyes; vertex of head bluntly rounded, not carinate or excavate; tibial spurs 1, 1, 1.

Confined to aquatic habitats, two genera known to parasitize eggs of water Heteroptera.

Genera included: *Thoron* Haliday, *Neothoron* n. gen., *Pseudanteris* Fouts, *Thoronella* n. gen., *Tiphodytes* Bradley, *Tanaodytes* n. gen., and *Microthoron* n. gen.

KEY TO GENERA OF Thoronini (World)

1. Tergopleurites narrow, tight to sternites to form the so-called submarginal groove 2
- Tergopleurites broad, not tight, i.e. submarginal groove absent 5
2. Postmarginal vein longer than stigmalis, basal vein spurious (Fig. 10); notaulices almost percurrent, abbreviated anteriorly; body with slight metallic shade; fifth antennal segment not modified in male; female unknown. Neotropic *Neothoron* n. gen. ♂
- Postmarginal vein absent or much shorter than stigmalis 3

3. Female antenna with 6 distinct flagellar segments between scape and clava; body with slight metallic shade; stigmal vein distinctly elongate (Fig. 4); hind margin of fore wing not distinctly angular at frenal gutter; male antenna with all flagellar segments distinctly elongate. Holarctic *Thoron* Haliday ♀ ♂
- Female antenna with 7 distinct flagellar segments between scape and clava (males unknown); body black, without any metallic shade 4
4. Stigmal and marginal veins fused to form a thick spot (Fig. 3); parapsidal furrows wanting; basal vein wanting; tergite 1 without horn; hind margin of fore wing distinctly angular at frenal gutter. Nearctic *Pseudanteris* Fouts ♀
- Stigmal vein distinctly elongate, not fused with marginalis; parapsidal furrows percurrent, dilated posteriorly; basal vein clearly indicated as a spurious vein; tergite 1 with distinct horn; hind margin not distinctly angular at frenal gutter. Neotropic *Thoronella* n. gen. ♀
5. First segment of metasoma much longer than wide (Fig. 8); tarsi extremely long, apical tarsal segment together with strong claws almost as long as corresponding metatarsi (Fig. 9); propodeum very elongate (Fig. 8); antennal segments 4–8 very short to transverse (Fig. 8); subcosta in its proximal four-fifths with no hard bristles (Fig. 7); male unknown. Oriental *Tanaodytes* n. gen. ♀
- First segment of metasoma at most as long as wide or shorter; apical tarsal segments with normal claws, almost twice as short as corresponding metatarsi 6
6. Metasoma distinctly elongate, at least twice as long as wide; in lateral aspect skaphion forming an acute angle with horizontal axis of mesosoma (Fig. 1); female antenna with 7 segments between scape and clava. Holarctic, Oriental *Tiphodytes* Bradley ♀ ♂
- Metasoma broad, only a little longer than wide; in lateral aspect skaphion forming an obtuse angle with horizontal axis of mesosoma (Fig. 5); female antenna with 4 segments between scape and clava (Fig. 5); male unknown. Oriental *Microthoron* n. gen. ♀

Three groups of genera comprise the tribe Thoronini. In the first group *Thoron* and *Neothoron* are closely related to each other, the latter being more plesiomorphous than the former. *Pseudanteris* and *Thoronella* may also be classified in the group above as they bridge these genera with *Tiphodytes* and *Tanaodytes*. Indeed, *Pseudanteris* and *Thoronella* are midway, combining characters of both *Thoron* and *Tiphodytes*. In the second group *Tanaodytes* represent a highly apomorphous branch of *Tiphodytes*. *Microthoron*, however, represents a rather lonely element within Thoronini and is treated as the only representative of the third group. Its superficial resemblance with Baeini is considered as a convergence and it is hoped that the biology, once known, will confirm this assumption.

***Thoron* Haliday, 1833**

New to Canada. Two species recorded in the Holarctic region. *Thoron pallipes* Ashmead was transferred to *Paridris* Kieffer (Muesebeck and Masner 1967) and *Thoron digiphagus* Marchal is currently synonymized with *Tiphodytes gerriphagus* (Marchal) (see below).

One species recorded from eggs of the water scorpion (*Nepa* L.).

Species included: *Thoron gibbus* Ruthe, 1859 ♀ ♂ (Europe) and *Thoron metallicus* Haliday, 1833 ♀ ♂ (Europe, U.S.A., Canada).

***Thoron gibbus* Ruthe, 1859**

Described from Germany but not since recorded. The identity of this species remains doubtful; the characters given to distinguish it from *T. metallicus* (cf. Kieffer 1926) seem to be vague. Biology unknown. The type was not seen (?location).

***Thoron metallicus* Haliday, 1833**

Fig. 4

Teleas metallicus Haliday in Curtis, 1830. *Nomen nudum*.*Thoron metallicus* Haliday, 1833.*Teleas fornicatus* Nees, 1834.*Teleas solidus* Nees, 1834.*Anteris nepae* Ferrière, 1916. **New synonymy** (Types examined).

New to Canada. A species of Holarctic distribution. Recorded from many places in Europe: Czechoslovakia (Masner 1956), Denmark (Henriksen 1918), England (Kieffer 1926; Szabó 1965; Ward 1874), Finland (Hellén 1971), Germany (Kieffer 1926), Hungary (Szabó 1965), Ireland (Curtis 1830), Italy (Zangheri 1969), Poland (Szabó 1965), Sweden (Kieffer 1926), Switzerland (Ferrière 1916), USSR (Hellén 1971; Kozlov 1971), and Yugoslavia (Szabó 1965). It has also been recently reported from Massachusetts (Muesebeck and Masner 1967) and this interesting extension in distribution is currently confirmed by the newly discovered Canadian individuals: 1 ♀ Old Chelsea, Que., 30-VIII-1961, J. R. Vockeroth; 1 ♀ Outlet Beach, Pr. Edward Co., Ont., 14-VIII-1968, J. R. Vockeroth; 1 ♀, 1 ♂ Oxford Mills, Ont., 10-IX-1971, L. Masner.

Ferrière (1916) and Henriksen (1918) reported the species being bred from eggs of the European water scorpion, *Nepa cinerea* L. (Nepidae: Heteroptera); however, Kozlov (1970) speculates that the species might be parasitic upon eggs of spiders confined to aquatic habitats.

***Neothoron* n. gen.**

MALE. Smooth, shining, with no matt microsculpture; dorsum of head and mesosoma with sparse black semierect bristles; head transverse; lateral ocelli very close to eyes yet not contiguous; eyes virtually bare; malar groove present; occiput distinctly margined by crenulate carina; mandibles tridentate; antenna 12-segmented, all segments cylindrical, distinctly elongate, covered with short hairs; fifth antennal segment not modified.

Mesosoma only slightly arched dorsally (lateral aspect); skaphion well developed, forming an acute angle with horizontal axis of mesosoma (lateral aspect); notaulices almost percurrent, abbreviated in extreme anterior part of mesoscutum; scutellum separated from mesoscutum by series of small pits, similar pits bordering its posterior margin; metanotum unarmed; propodeum rather large, at least as long as scutellum, i.e. not excavated posteromedially as in *Thoron* in which the first segment of metasoma appears to be almost touching metanotum; wing with long marginal ciliae all around; subcosta with row of strong bristles well surpassing the front margin of wing; marginalis almost triangular, slightly longer than wide, stigmalis much shorter than long postmarginalis; basalis spurious, indicated as a cloud (Fig. 10); tibial spurs 1, 1, 1.

Metasoma distinctly elongate, pedunculate, broadest in apical two-thirds, composed of 8 tergites and 7 sternites; submarginal impressed groove well developed; first three segments the longest, almost subequal in length, first segment almost twice as long as wide; tergite 8 with 2 pairs of long sensory bristles.

FEMALE. Unknown.

TYPE-SPECIES. *Neothoron lautus* n. sp. (described below).

Neothoron is closely related to *Thoron* and it is believed that this will be further substantiated by subsequent discovery of the female of the former genus. The long postmarginal vein in *Neothoron* makes this genus readily distinct from *Thoron*. The difference in mesosomal structures between the two genera discussed is somewhat more difficult to appreciate yet offers another good distinguishing character.

Using Kieffer's (1926) key this new genus may be brought under *Calliscelio* Ashmead. The examination of the type of the latter genus (*Calliscelio laticinctus*

FIG. 1. *Tiphodytes gerriphagus* (Marchal) ♂: skaphion indicated by arrow.
 FIG. 2. *Tiphodytes mymar* n. sp. ♀ holotype: fore wing.
 FIG. 3. *Pseudanteris insignis* Fouts ♀: fore wing.
 FIG. 4. *Thoron metallicus* Haliday ♀: fore wing.
 FIGS. 5-6. *Microthoron baeoides* n. sp. ♀ holotype: 5, skaphion indicated by arrow; 6, fore wing.

Ashmead, in USNM) reveals it to be congeneric with *Calotelea* Westwood, and consequently *Calliscelio* is hereby considered a junior synonym of *Calotelea* (new synonymy).

***Neothoron lautus* n. sp.**

Fig. 10

MALE. Dark chestnut brown to black, with slight copper-bronze tint; legs including coxae contrasting amber yellow, tibiae slightly darker; radicle, scape, and mandibles (except for darker tips) yellow; wings strongly infusate.

Head smooth except for a little fan of striae immediately above malar groove; antennal segments in proportions 30:7, 10:5, 18:4, 18:5, 17:5, 16:5, 15:5, 15:5, 14:5, 14:5, 14:5, 19:5, all segments covered with dense short hair.

Skaphion bare, with several transverse wrinkles; in addition to long semierect bristles mesoscutum clothed with numerous short decumbent hairs; scutellum with semierect bristles only; propodeum roughly rugose, slightly concave dorsally at meson, with few bristles medially and dense pilosity at sides; marginalis, stigmalis, and postmarginalis in fore wing in proportions 10:18:25.

First three metasomatic segments in proportions 32:17, 45:37, 45:47; first tergite longitudinally costate all over, second with costae extending back $\frac{2}{3}$, third and following tergites perfectly smooth, with numerous semidecumbent hair, tergite 8 bluntly triangular.

Length 2.4 mm.

HOLOTYPE. 1 ♂ glued on pin (CNC, Cat. No. 12,539); ECUADOR, Napo and Coca rivers, Napo, May 1965, 250 m, L. Peña collr.

PARATYPE. 1 ♂, same data (coll. H. K. Townes).

***Pseudanteris* Fouts, 1927**

New to Canada. A monotypic Nearctic genus. The close relationship with *Tiphodytes* was emphasized by Masner (1964) and mentioned also by Kozlov (1970). The morphological similarity of *Pseudanteris* with *Tiphodytes* is so great that some biological observations of American authors (e.g. Matheson and Crosby 1912) of the latter could also refer accidentally to the former genus. The chance of misinterpretation of one genus for another is increased by the same habits, same niche as well as minute dimensions of the adult wasps (approx. 1 mm).

Species included: *Pseudanteris insignis* Fouts, 1927 ♀ (U.S.A., Canada).

***Pseudanteris insignis* Fouts, 1927**

Fig. 3

New to Canada. The first Canadian record extends the range of distribution further to the north (Oxford Mills, Little Rideau River, Ont., 20-IX-1970, 1 ♀, L. Masner collr.). In fact, the above mentioned record is the first recovery of the species since the description. The male remains unknown.

The biology is not known but the Canadian specimen was taken on a lily pad (*Nymphaea* sp.) approximately 3 ft from the bank, in community of several males of *Tiphodytes gerriphagus*. Kozlov's (1970) assumption that water striders (eggs) are potential hosts of *Pseudanteris* is thus strongly supported.

***Thoronella* n. gen.**

FEMALE. Head semiglobose, slightly transverse, shining, covered with sparse semierect bristles; frons without depression; vertex reaching bluntly into occiput; occipital carina distinct, finely crenulate along its outer margin; eyes with very short, sparsely scattered hairs; lateral ocelli very close yet not contiguous to inner orbit; mandibles tridentate; antenna 12-segmented, segments 2-8 slender, longer than wide or nearly so, clearly separated from each

other; club semiabrupt, 4-segmented, segments closely adpressed, with sutures less distinct than between funicular segments.

Mesosoma shining, with scattered bristles, moderately arched when viewed from side, rather slender when seen dorsally; skaphion well marked, trisinate posteriorly; parapsidal furrows percurrent, dilated posteriorly; mesoscutum shining yet with very delicate net-like microsculpture; scutellum with strong, scattered bristles, perfectly smooth, unarmed, margined posteriorly with crenulate rim; metanotum unarmed, not particularly protruding at meson; propodeum unarmed, sculptured at sides, perfectly smooth and shining medially where its sloping central part forms opposite side to metasomatic horn; wings rather slender, with very long marginal fringes throughout; submarginal vein in fore wing with long bristles along its whole length, not "broken" in distal two-thirds, attaining almost half of wing length; marginalis almost punctiform, stigmalis relatively short, knobbed apically, postmarginalis very short almost rudimentary, shorter than stigmalis; basalis clearly indicated as a spurious vein; hind margin of fore wing without angular process; hind wing with complete submarginal vein dilated apically; tarsi 5, 5, 5; tibial spurs 1, 1, 1.

Metasoma slender, spindle-like, sharply pointed apically; laterotergites very short, tight to sternites to form a very distinct submarginal groove; 7 visible tergites and 6 sternites; tergite 1 clearly elongate, with a moderate horn, leaning towards propodeum, striate throughout; tergite 2 trapezoidal, transverse, striate in basal three-quarters; tergites 3-5 smooth, shining, transverse, tergite 3 the largest; tergite 6 roughly sculptured; tergite 7 longer than wide, triangular, sharply pointed apically, supposedly not extruded with ovipositor.

TYPE-SPECIES. *Thoronella elegans* n. sp.

Thoronella combines many characters of *Tiphodytes*, *Pseudanteris*, and *Thoron*. Habitually it reminds one much of *Pseudanteris* yet has entirely different wing venation. It is also reminiscent of *Tiphodytes* but the metasoma in the latter genus has no submarginal groove due to broad laterotergites. So in metasomatic structure *Thoronella* is very close to *Thoron* yet in antennal formula refers back to some species of *Tiphodytes*. It may therefore be concluded that *Thoronella* (together with *Pseudanteris*) bridge the seemingly wide gap between *Thoron* and *Neothoron* on one side and *Tiphodytes* and *Tanaodytes* on the other. In my assessment *Thoronella* demonstrates the subordinate role of submarginal groove of the metasoma as a character in the higher classification of Scelioninae.

Thoronella elegans n. sp.

FEMALE. Black, smooth, and shining; legs including coxae, mandibles, palpi, and scape dirty yellowish-brown, funicle and particularly club dirty brownish; wings slightly infusate.

Head moderately transverse (30:20); cheeks fan-like striate; eyes white; scape as long as three following segments together, segments 2-5 slightly yet distinctly elongate (5:3), covered with rather dense hairs; segments 6, 7, and particularly 8 gradually shortened, sixth slightly longer than wide, seventh as long as wide, eighth cup-like, transverse; segments 9-12 forming a club, segments 10-12 distinctly larger than segment 9.

Net-like sculpture of mesoscutum consisting of very fine elongate polygonal cells; scutellum virtually mirror-like, shining; submarginal, marginal, stigmal, and postmarginal veins in proportions 50:3:8:2; longest marginal cilia about $\frac{1}{3}$ of maximal wing width (12:32).

Metasomatic segments in proportions 17:13, 18:28, 20:30, 10:26, 6:20, 6:10, 7:4; tergite 6 and sternite 6 roughly rugose-punctate, tergite 7 almost smooth, apical bristles obscured by surrounding pilosity.

Length 1.3 mm.

HOLOTYPE. 1 ♀ on a card, well preserved (CNC, Cat. No. 12,682); BRAZIL, Nova Teutonia, 27°11' S. and 52°23' W., September 1971, 300-500 m, Fritz Plaumann collr.

MALE. Unknown.

BIOLOGY. Unknown, but of presumed aquatic habits.

***Tiphodytes* Bradley, 1902**

Limnodytes Marchal, 1900b (preoccupied).

Hungaroscilio Szabó, 1957 (synonymized by Masner and Kozlov, 1965).

New to Canada. Two species were known in the Holarctic region but the present paper extends the distribution of the genus to the Oriental region. *Dissolcus flavipes* Ashmead, classified in *Tiphodytes* by Kieffer (1926), belongs to *Trimorus* Foerster (Masner and Kozlov 1965; Masner and Muesebeck 1968). *Notilena* Brèthes, reportedly similar to *Tiphodytes* (cf. Brèthes 1913), was shown to be a synonym of *Gryon* Haliday (De Santis 1967).

Biological data available indicate that the species parasitize eggs of water striders (Gerridae).

Species included: *Tiphodytes gerriphagus* (Marchal 1900b) ♂ ♀ (Europe, U.S.A., Canada); *Tiphodytes godavari* n. sp. ♂ ♀ (Nepal); *Tiphodytes mymar* n. sp. ♀ (Malaya); *Tiphodytes selangor* n. sp. ♀ (Malaya); *Tiphodytes setosus* (de Stefani 1902) ♀ (Europe).

KEY TO SPECIES OF *Tiphodytes* (World)

1. Hind margin of fore wing straight, without an angular process; legs yellow; wings clear. Sicily *T. setosus* (de Stefani) ♀
- Hind margin of fore wing with an angular process enabling better coupling of the two pairs of wings (Fig. 2) 2
2. The longest ciliae of fore wing distinctly longer than the maximal width of the wing (Fig. 2); fore and hind wings very narrow, almost strip-like; legs and antennae uniformly dark brown; eyes white; first segment of metasoma rather broad. Malaya *T. mymar* n. sp. ♀
- The longest marginal cilia of fore wing distinctly shorter than maximal width of the wing 3
3. Legs and antennae uniformly dark brown to black; eyes black; postmarginal vein absent; notaulices indicated posteriorly. Europe, U.S.A., Canada *T. gerriphagus* (Marchal) ♀ ♂
- Legs including coxae bright yellow, scape and pedicel yellow; eyes white 4
4. Postmarginal vein distinct, shorter than stigmalis, the latter distinctly elongate, much longer than marginalis; notaulices well impressed posteriorly; longest marginal ciliae as long as 1/3 of maximal width of fore wing. Nepal *T. godavari* n. sp. ♀ ♂
- Postmarginal vein vestigial (unpigmented), stigmalis shortened, only a little longer than marginalis; notaulices almost wanting; longest marginal ciliae as long as 1/2 of maximal width of fore wing. Malaya *T. selangor* n. sp. ♀

***Tiphodytes gerriphagus* (Marchal, 1900)**

Fig. 1

Toron (!) *digiphagus* Marchal, 1900a. *Nomen nudum*. New synonymy.

Limnodytes gerriphagus Marchal, 1900b.

Tiphodytes gerriphagus; Bradley, 1902.

Hungaroscilio kaszabi Szabó, 1957. Synonymized by Masner and Kozlov, 1965.

New to Canada. A widely distributed Holarctic species. Recorded from: Belgium (Debauche 1947), Czechoslovakia (Masner 1956), Denmark (Henriksen 1918), Hungary (Szabó 1957), France (Kieffer 1909, 1926; Marchal 1900a, b), U.S.S.R. (Kozlov 1971) but also New York, Michigan (Hoffmann 1932; Muesebeck and Walkley 1951), and California (Muesebeck in Krombein, 1958). Clausen (1940) and Hagen (in Usinger, 1956) pointed out the differences in larvae as

described by Marchal (1900b) and Martin (1928) but the adults of both Palearctic and Nearctic populations seem to show no differences at all. The Canadian specimens are recorded from Ontario only (1 ♀, 1 ♂, Marmora, 7-VIII-1952, J. F. McAlpine; 1 ♂, Oxford Mills, aquatic plants in Little Rideau River, 25-VIII-1961, W. and E. Mason; 1 ♀, 3 ♂, Oxford Mills, 20-IX-1970, L. Masner; 72 ♀, 3 ♂, Oxford Mills, 17-VIII-1971, 2-IX-1971, L. Masner and F. Bin).

Several authors have described the biology and habits of this species (Marchal 1900b; Rousseau 1907; Henriksen 1918; Matheson and Crosby 1912; Martin 1928).

Hosts include *Gerris* and *Trepobates* spp. (eggs). The wasp is confined to aquatic habitats; it dives and swims actively under water, walks on water plants (e.g. upper and lower side of lily pads), or flies around the edges of water. The specimens from Ontario were picked from lily pads (*Nymphaea* sp.) and other plants growing near muddy river banks.

It remains problematic that Metschnikoff's (1866) and Ganin's (1869) papers on postembryonic development really refer to *T. gerriphagus* (cf. Bradley 1902).

***Tiphodytes setosus* (de Stefani, 1902)**

Described from Sicily from eggs of *Gerris* sp. but not recorded or studied since, as de Stefani's collection is feared lost or destroyed (Bin, pers. comm.). There are some doubts that the species really belongs to *Tiphodytes*. Several characters of the laconic description both support (bristles on apical tergite) and contradict (hind margin of fore wing not angulate) the placement of this species in *Tiphodytes*.

***Tiphodytes godavari* n. sp.**

FEMALE. Body dark; head black; mesosoma, funicle, and clava dark brown; radicle, scape, pedicel, mandibles, and legs including coxae bright yellow; wings very slightly infusate, with little dark patch under knob of stigmalis and a darker band indicating basalis.

Head transverse (20:35), entirely smooth, with sparse semierect bristles on vertex, malar groove deep; eyes white, very hairy, large, as seen dorsally eye as wide as interocular space or even larger; antennal segments in proportions 20:3, 6:2.5, 5:2, 5:2, 3.5:2, 2:2, 2:2, 17:6 (clava).

Notaulices abbreviated, indicated posteriorly as short impressions; metanotum with a bunch of decumbent hairs at meson; marginalis, stigmalis, and postmarginalis in proportions 4:12:6; longest marginal ciliae only as long as $\frac{1}{3}$ of maximal width of fore wing.

Metasoma twice as long as wide (63:30), widest at about the middle; first tergite only very slightly transverse (10:12), second trapezoid (20:27), third transverse (20:23), following tergites narrow, very hairy; apical tergite triangular (6:8).

Length 1.2 mm.

HOLOTYPE. 1 ♀ on card point, well preserved (CNC, Cat. No. 12,542); NEPAL, Godavari near Kathmandu, 6000 ft, 3-VIII-1967, Canadian Nepal Expedition (Malaise trap).

MALE. Like female but antenna thread-like, 12-segmented, flagellar segments with long bristles; fifth segment modified, with an acute tooth inwardly, all segments of flagellum distinctly elongate, 4-5 times as long as wide, apical segment even longer.

ALLOTYPE. 1 ♂, same data as holotype (CNC, Cat. No. 12,542).

PARATYPES. 1 ♀, same data as holotype but caught 12-VIII-1967 (CNC, Cat. No. 12,542); 1 ♂, same data as holotype but caught 23-VII-1967 (CNC, Cat. No. 12,542).

At first I hesitated to include this and the following species (*T. selangor*) in *Tiphodytes* because of the postmarginal vein in the fore wing. This vein is much better developed in *T. godavari* than in *T. selangor*. *T. godavari* seems to be the most generalized and least specialized species of *Tiphodytes*.

***Tiphodytes selangor* n. sp.**

FEMALE. In colour, sculpture, and pilosity extremely like preceding species but differs as follows: Head slightly less transverse (18:28); antennal segment 6 twice as long as wide (3:1.5), so that there are only two short segments before clava; notaulices almost entirely wanting; wings narrower, angular process more prominent, stigmal vein shortened, considerably closer to wing margin (i.e. smaller angle) than in *T. godavari*; longest marginal ciliae in fore wing as long as $\frac{1}{2}$ of the maximal width of the wing.

Length 0.9 mm.

HOLOTYPE. 1 ♀, on card point, well preserved (CNC, Cat. No. 12,544); MALAYA, Selangor, Grombak Field Station, 3-19.VII.1970, Chua Tock Hing collr. (Malaise trap).

MALE. Unknown.

PARATYPE. 1 ♀, same data as holotype (CNC, Cat. No. 12,544).

VARIABILITY. The very small paratype (0.6 mm) differs in having sixth antennal segment only a little longer than wide.

***Tiphodytes mymar* n. sp.**

Fig. 2

FEMALE. Body black, shining; legs and antennae uniformly brown; wings slightly infusate.

Head only slightly transverse (14:20), the interocular space much larger than the width of eye (11:4); eyes hairy, white but not so contrasting as in the two preceding species; antennal segments in proportions 10:2, 4:2, 3:1.5, 3.5:1, 3.5:1, 2:1, 1.5:1, 1.5:1, 11:3.5 (clava).

Notaulices wanting, replaced by shallow impressions posteriorly; fore wing extremely attenuate, strip-like, with long marginal ciliae, the longest ones slightly longer than maximal width of the wing (12:10); marginal vein thick, almost as long as short marginalis; hind wings virtually strip-like, longest ciliae 4 times as long as the maximal width of wing (12:3).

Metasoma elongate (30:17), first tergite costate, strongly transverse (2:10), second costate in anterior half, transverse (7:16), third the widest (9:17), smooth and polished.

Length 0.6 mm.

HOLOTYPE. 1 ♀ on card point, well preserved (CNC, Cat. No. 12,543); MALAYA, Selangor, Grombak Field Station, 3-19.VII.1970, Chua Tock Hing collr. (Malaise trap).

MALE. Unknown.

This is the most remarkable species of *Tiphodytes* because of its narrow strip-like wings that are reminiscent of some minute Mymaridae.

***Tanaodytes* n. gen.**

FEMALE. Head transverse; vertex with numerous semierect bristles; ocelli very close to eyes yet not contiguous; eyes very large with dense, minute hairs; malar groove very deep; antenna seemingly 9- but actually 12-segmented, very stout, short, clavate, segments of funicle and particularly of clava very closely adpressed and difficult to distinguish (Fig. 8).

Sides of prothorax partly sculptured but with a smooth field in the middle; skaphion well developed, smooth, forming angle slightly less than 90° with the horizontal axis of mesosoma (Fig. 8); mesoscutum arched, smooth, with numerous semierect bristles, notaulices abbreviated anteriorly, reaching about halfway; scutellum smooth, with scattered bristles; in lateral aspect metanotum bluntly bulging at meson, with few bristles; propodeum very long,

rugose, with no pilosity, margined by sharp lateral carinae and two keels medially forming an inverted V-shaped field; wings remarkably attenuate, heavily infusate, with long marginal ciliae; subcosta running close to front margin to form its edge, with no bristles but a few minute hairs in anterior $\frac{1}{2}$; marginal vein short, almost point-like, stigmalis short and knobbed apically, postmarginalis absent (Fig. 7); legs extremely long, coxae and femora thickened, tarsal segments 1 and 5 extremely long, claws strong (Fig. 9); tibial spurs 1, 1, 1, the middle and hind ones very short and diminished.

Metasoma distinctly pedunculate, obpyriform in shape, with no impressed submarginal groove, composed of 7 tergites and 6 sternites, first three segments the longest, subequal in length, the first without projection dorsally (Fig. 8).

TYPE-SPECIES. *Tanaodytes longipes* n. sp. (described below).

Tanaodytes is closely related to *Tiphodytes* but seems to be more specialized than the latter. The bionomics of the genus are probably similar to those of *Tiphodytes*. The elongate propodeum and first segment of metasoma together with the peculiar structure of antennae and legs and the lack of bristles on the subcosta readily distinguish this genus from *Tiphodytes*. The male is unknown.

Species included: *Tanaodytes longipes* n. sp. ♀ (Malaya) and *Tanaodytes soror* n. sp. ♀ (Ceylon?).

***Tanaodytes longipes* n. sp.**

Figs. 7, 8, 9

FEMALE. Ebony black, shining, highly polished; legs including coxae, radicle, scapae and funicle contrasting whitish yellow, clava dark brown; apical tarsal segments slightly darkened; wings strongly infusate.

Head transverse (24:40); eye as wide as vertex measured between lateral ocelli (15:15); occiput margined posteriorly by a sharp carina; antennal segments in proportions 25:7, 7:3, 7:2.5, 2:3, 2:3, 1.5:3, 1.5:3, 1.5:3; clava inconspicuously segmented, longer than wide (14:7).

Sides of prothorax (under scutal suture) with several rough longitudinal wrinkles but with a smooth field medially; skaphion almost in 85° angle with horizontal axis of mesosoma, trisinuate posteriorly.

Metasoma twice as long as wide (88:42); first tergite elongate (25:16), longitudinally costate all over; second tergite trapezoidal (23:38), with longitudinal costae extending almost to posterior margin; third tergite transverse (20:40), smooth; following tergites narrow, in proportions 10:5:2:3; apical one bluntly triangular, with short bristles.

Length 1.8 mm.

HOLOTYPE. 1 ♀, on card point, well preserved (CNC, Cat. No. 12,541); MALAYA, Selangor, Grombak Field Station, 3-19.VII.1970, Chua Tock Hing collr. (Malaise trap).

MALE. Unknown.

HOST. Unknown.

***Tanaodytes soror* n. sp.**

FEMALE. Extremely similar to *T. longipes* but differs in the few following characters. Tibiae and scape infusate, antennal segments 3-8 light brown so that the colour contrast with dark clava is less distinct; sides of prothorax with very large central smooth field, no longitudinal wrinkles under the scutal suture, fine granulate sculpture along the anterior edge and in the upper corner in front of tegula; skaphion not trisinuate posteriorly; first segment of metasoma slightly shorter (25:18).

Length 1.8 mm.

HOLOTYPE. 1 ♀, on card point, well preserved (USNM, Cat. No. 71,980), Ceylon, Colombo (intercepted at New York, N.Y.).

MALE. Unknown.

HOST. Unknown.

FIGS. 7-9. *Tanaodytes longipes* n. sp. ♀ holotype: 7, fore wing; 8, skaphion indicated by arrow; 9, fore leg.

Fig. 10. *Neothorax lautus* n. sp. ♂ holotype: fore wing.

***Microthoron* n. gen.**

FEMALE. Head broadly transverse, wider than mesosoma, with short decumbent bristles on frons; vertex not carinate, bluntly rounded to occiput; eyes large, with dense minute hairs; lateral ocelli touching the inner orbit; malar groove developed, yet fine and shallow; antenna 6-segmented, clava solid with weak traces of sutures (Fig. 5).

Mesosoma short, as long as high, arched dorsally, with numerous adpressed hairs but no distinct bristles (Fig. 5); skaphion clearly cut, forming an obtuse angle with horizontal axis of mesosoma; notaulices wanting; scutellum semicircular, unarmed; metanotum bluntly projecting medially; propodeum widely excavated medially, only the lateral corners visible and protruding; wings with long marginal ciliae; subcosta with long bristles along its entire length, slightly broken in distal three-quarters (Fig. 6); marginal vein moderately elongate, slightly shorter than stigmalis and as long as postmarginalis; basalis indicated as a shadow, other veins absent; legs short, tibial spurs 1, 1, 1.

Metasoma composed of 7 tergites, very short, almost sessile, slightly longer than wide, all segments transverse, first without projection dorsally; laterotergites broad, not tight to sternites; submarginal impressed groove absent; third segment the largest; apical tergite with two pairs of long bristles curved upwards.

TYPE-SPECIES. *Microthoron baeoides* n. sp. (described below).

The higher classification of *Microthoron* presents a problem. Superficially it reminds one very much of *Idris* and related genera of Idrini (antenna, ocelli, shape of body) but differs from them on the basis of the distinct skaphion, lack of impressed submarginal groove on the metasoma, presence of a postmarginal vein, etc. I would prefer to classify it in Thoronini yet it lacks some features of this tribe (no distinct bristles on vertex of head and dorsum of mesosoma, gaster not distinctly elongate, antennal clava with sutures almost completely obliterate). The genus *Microthoron* points up again the problematic value of the submarginal groove of the metasoma as a character in the classification of the higher categories of Scelionidae. On the basis of this character alone *Microthoron* should be classified in Telenominae. The resemblance to Bacini can be explained as convergence. In the latter group there is no skaphion and the subcosta is never broken in its distal part. In wing venation *Microthoron* reminds me of *Opistacantha* Ashmead and some other genera of Psilanteridini, yet it cannot be classified in the latter because of the fused segments of the antennal clava. The 6-segmented antennae distinguish *Microthoron* from all genera of Scelionidae; the mesosomal and metasomal characters are also different from the Ethiopian *Paraneurobaeus* Risbec, the only other genus in which the antenna is 6-segmented. The male of *Microthoron* is unknown.

***Microthoron baeoides* n. sp.**

Figs. 5, 6

FEMALE. Black, shining; legs and antennae brown, clava darker; wings very slightly infuscate, basalis indicated by weak brownish strip.

Head strongly transverse (15:32), interocular space (across vertex) equal to width of eye; eyes white, with dense short hair; lateral ocelli touching the orbit; frons with scattered minute bristles entirely smooth except for two little fans of striae flanking malar groove near mandibles; antennal segments in proportions 14:2.5, 5:3, 4.5:2.5, 1:1.5, 1:2, 15:8 (clava).

Skaphion entirely bare and highly shining; mesoscutum rather hairy, hairs decumbent and almost adpressed; scutellum less hairy; subcosta with 10 long bristles, marginal vein with 2 and postmarginal with 3 bristles; marginal, stigmal, and postmarginal veins in proportions 4:6:5.

Metasoma only a little longer than wide (33:25); first tergite broadly transverse (5:15), costate, and with 2 long bristles at each side; second tergite transverse (7:22), with strong costae extending back three-quarters; third tergite the largest, transverse (17:25), smooth, and polished; following tergites narrow, smooth, with a few scattered bristles at sides; apical tergite bluntly triangular, with 2 pairs of long upcurved bristles.

Length 0.6 mm.

HOLOTYPE. 1 ♀, on card point, well preserved (CNC, Cat. No. 12,540); MALAYA, Selangor, Grombak Field Station, 3-19.VII.1970, Chua Tock Hing collr. (Malaise trap).

PARATYPES. 2 ♀ (CNC, Cat. No. 12,540), same data as holotype (fore wing on a slide).

MALE. Unknown.

BIOLOGY. Unknown.

References

- Ashmead, W. H. 1893. A monograph of the North American Proctotrypidae. *Bull. U.S. nat. Mus.*, No. 45, 472 p.
- 1903. Classification of the pointed-tailed wasps, or the superfamily Proctotrupeoidea. III. *Jl N.Y. ent. Soc.* **11**: 86-99.
- Bradley, J. C. 1902. A recently discovered genus and species of aquatic Hymenoptera. *Can. Ent.* **34**: 179-180.
- Brèthes, J. 1913. Himenópteros de la América Meridional. *An. Mus. Hist. Nat. B. Aires* **24**: 35-166.
- Clausen, C. P. 1940. Entomophagous insects. VI + 688 p. 1st ed. McGraw-Hill, New York and London.
- Curtis, J. 1830. British entomology. Vol. 3, p. 329. London.
- Debauche, R. H. 1947. Scelionidae de la faune belge. *Bull. Annls Soc. r. ent. Belg.* **83**: 255-285.
- Ferrière, Ch. 1916. Description d'un Hymenoptère nouveau (*Anteris nepae*) parasite des oeufs de la Nepe. *Arch. Zool. exp. gén.* **55**: 75-80.
- Ganin, M. 1869. Beiträge zur Kenntniss der Entwicklungsgeschichte bei den Insekten. *Z. wiss. Zool.* **19**: 381-451, pls. 30-33.
- Hagen, K. S. 1956. Chap. 12, Aquatic Hymenoptera, p. 289-292. In R. L. Usinger, Aquatic insects of California. Univ. Calif. Press, Berkeley and Los Angeles.
- Hellén, W. 1971. Die Scelioninen Finnlands (Hymenoptera: Proctotrupeoidea). *Fauna fenn.* **23**: 1-25.
- Henriksen, K. L. 1918. De europæiske Vandsnyltehvepse og deres Biologi. (The aquatic Hymenoptera of Europe and their biology.) *Ent. Meddr* **12**: 137-251.
- Hoffmann, C. H. 1932. Hymenopterous parasites from eggs of aquatic and semi-aquatic insects. *J. Kans. ent. Soc.* **5**(2): 33-37.
- Kieffer, J. J. 1909. Description de quelques nouveaux Scelionides d'Europe (Hym.). *Bull. Soc. ent. Fr.* 1909: 268-271.
- 1926. Scelionidae. *Das Tierreich* **48**: 885 p. Gruyter, Berlin and Leipzig.
- Kozlov, M. A. 1970. Supergeneric groupings of Proctotrupeoidea (Hymenoptera). *Rev. Ent. U.S.S.R.* **49**: 203-226. (In Russian.)
- 1971. Proctotrupoids (Hymenoptera, Proctotrupeoidea) of the USSR. *Horae Soc. ent. U. Soviet.* **54**: 3-67. (In Russian.)
- Marchal, P. 1900a. Communiqué à la séance du 23 octobre 1900 de la Société zoologique de France. *Bull. Soc. zool. Fr.* **25**: 167.
- 1900b. Sur un nouvel Hymenoptère aquatique le *Limnodytes gerriphagus* n. gen., n. sp. *Ann. Soc. ent. Fr.* **69**: 171-176.
- Martin, Ch. H. 1928. Biological studies of two hymenopterous parasites of aquatic insect eggs. *Entomologica am.* **8**: 105-151, 5 pls.
- Masner, L. 1956. First preliminary report on the occurrence of genera of the group Proctotrupeoidea (Hym.) in ČSR. (First part — family Scelionidae). *Acta faun. ent. mus. nat. Pragae* **1**: 99-126.
- 1964. A comparison of some Nearctic and Palearctic genera of Proctotrupeoidea (Hymenoptera) with revisional notes. *Acta Soc. ent. Čechosl.* **61**: 123-155.
- 1965. The types of Proctotrupeoidea (Hymenoptera) in the British Museum (Natural History) and in the Hope Department of Entomology, Oxford. *Bull. Br. Mus. (Nat. Hist.), Suppl.* **1**, 154 p.
- 1968. A new genus of Scelionidae (Hymenoptera) with austral disjunctive distribution. *N.Z. J. Sci.* **11**: 652-663.

- Masner, L. and M. A. Kozlov. 1965. Four remarkable egg parasites in Europe (Hymenoptera, Scelionidae, Telenominae). *Acta ent. bohemosl.* **62**: 287-293.
- Masner, L. and C. F. W. Muesebeck. 1968. The types of Proctotrupoidea (Hymenoptera) in the United States National Museum. *Smithson. Inst. Bull.* 270, 143 p. U.S. Natl. Museum.
- Matheson, R. and C. R. Crosby. 1912. Aquatic Hymenoptera of America. *Ann. ent. Soc. Am.* **5**: 65-71.
- Matsuda, R. 1970. Morphology and evolution of the insect thorax. *Mem. ent. Soc. Can.*, No. 76, 431 p.
- Metschnikoff, E. 1866. Embryologische Studien an Insekten. *Z. wiss. Zool.* **16**: 389-500, pls. 23-32.
- Muesebeck, C. F. W. 1958. Proctotrupoidea, p. 88-94. In K. V. Krombein (Ed.), Hymenoptera of America north of Mexico. Synoptic catalog. *Agriculture Monogr.* 2 (Suppl. 1).
- Muesebeck, C. F. W. and L. Masner. 1967. Proctotrupoidea, p. 285-305. In Krombein, K. V. and B. D. Burks (Eds.), Hymenoptera of America north of Mexico. Synoptic catalog. *Agriculture Monogr.* 2 (Suppl. 2).
- Muesebeck, C. F. W. and L. M. Walkley. 1951. Hymenoptera of America north of Mexico. Synoptic catalog. *Agriculture Monogr.* 2, 1420 p.
- Nixon, G. E. J. 1933. A further contribution to the study of South African Scelionidae (Insecta, Hymenoptera, Proctotrupoidea). *Ann. Mag. nat. Hist.* **12**: 288-304.
- Oeser, R. 1961. Vergleichend-morphologische Untersuchungen über den Ovipositor der Hymenopteren. *Mitt. zool. Mus. Berl.* **37**: 3-119, 105 figs.
- Rousseau, E. 1907. Les Hyménoptères aquatiques, avec description de deux espèces nouvelles par W. A. Schulz. *Annls Biol. lacustre* **2**: 388.
- de Santis, L. 1967. Catalogo de los Himenópteros Argentinos de la serie Parasítica, incluyendo Bethyloidea. *Provincia de Buenos Aires Gobernación, Comisión de Investigación Científica*. 1967, 337 p.
- de Stefani Perez, T. 1902. Osservazioni biologiche sopra un Braconide aquatico, Giardinaria urinator, e descrizione di due altri Imenotteri nuovi. *Zool. Jahrb. Syst.* **15**: 625-634, 1 pl.
- Szabó, J. B. 1957. Description of a new genus and some new species of the family Scelionidae from Hungary. (Hym. Proctotrupoidea). *Rovar. Közlem.* **10**: 289-300.
- 1958. Notizen ueber die verkannte Gattung Paratrimorus Kieffer 1908 (Hymenoptera, Proctotrupoidea). *Annls hist.-nat. Mus. natn. hung.* **50**: 271-279.
- 1965. Ökologische, ethologische und zoogeographische Angaben zur Kenntnis der palaearktischen Scelioniden (Hym.). *Rovar. Közlem.* **18**: 185-197.
- 1966. Ökologische, ethologische, tiergeographische und systematische Untersuchungen an paläarktischen Gryoninen (Hymenoptera: Proctotrupoidea, Scelionidae). *Acta Zool. Acad. Sci. Hung.* **12**: 419-449.
- 1969. Neue Arten der Gattung Apegus Förster, 1856 aus Europa (Hymenoptera, Proctotrupoidea, Scelionidae). *Annls hist.-nat. Mus. natn. hung.* **61**: 351-357.
- Ward, A. O. 1874. Notes on Oxyura and other Hymenoptera. *Entomologist's mon. Mag.* **11**: 39.
- Zantheri, P. 1969. Repertorio della flora e fauna della Romagna. Vol. 4, Proctotrupoidea p. 1653-1670. *Mus. civ. stor. nat. Verona, Mem.* 1.

(Received 30 November 1971)