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## ON SOME TRICHOPTERA FROM NORTHERN VENEZUELA AND ECUADOR (INSECTA)

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### ABSTRACT

Three new species (*Smicridea* (*S.*) *meridensis* and *Helicopsyche merida* both from Venezuela and *H. cotopaxi* from Ecuador), previously undescribed females of two species (*Synoestropsis furcata* Flint, 1974, and *S. grisoli* Navas, 1924), the immature stages of *Smicridea meridensis* nov. sp., *Leptonema insulanum* Banks, 1924, *Nectopsyche gemmoides* Flint, 1981, *Triplectides* species, *Atanatolica* spec., *Phylloicus angustior* Ulmer, 1905, and the cases of *Phylloicus* spec., *Helicopsyche merida* nov. spec. and *H. cotopaxi* nov. spec. are described. The cases of *Ochrotrichia* Mosely, 1934 (*Me-trichia* Ross, 1938) are described, especially in relation to the development in certain species of a pair of dorsal "chimneys", and their relationship to the similar cases of *Dicaminus* Müller, 1879, is discussed.

### INTRODUCTION

In 1976, the first author received for determination, through the kindness of Dr. R. Sowa of the University of Kraków (Poland), a small collection of Trichoptera, mainly their immature stages, collected during the previous year in Venezuela and Ecuador. The collector was Mr. W. Bzibziak (who later changed his name to Krzeminski), a member of the expedition organized by a "circle of the naturalist students of the University of Kraków" under the leadership of Dr. J. Rafinski.

The preliminary determinations of the material were made by the first author, but difficult circumstances prevented him from completing this work. A joint study was decided upon and the collection was sent to the second author who confirmed the identifications and described and illustrated the adults of the three new species,

using for this, in two of these cases, additional material from his collection. The other descriptions and illustrations were prepared by Botosaneanu. Unless otherwise mentioned, the material collected by Bzibziak (Krzeminski) is kept in the Zoological Museum of the University of Amsterdam (ZMA) together with some specimens originally belonging to the Smithsonian (USNM).

This study enabled us not only to describe two new species of *Helicopsyche* von Siebold, 1856, and one of *Smicridea* MacLachlan, 1871, but also to describe a few previously unknown and interesting larvae and cases, some securely associated by the study of metamorphotypes. Moreover, a certain contribution was possible towards the elucidation of the true nature of one of the more or less controversial South American genera described by Fritz Müller, viz. *Dicaminus*. Records

of generic determinations of larval material without special interest will be omitted from this paper. In the descriptions of larvae and pupae we have limited ourselves to those elements enabling (or supposedly enabling in the future!) workers to distinguish them from related species.

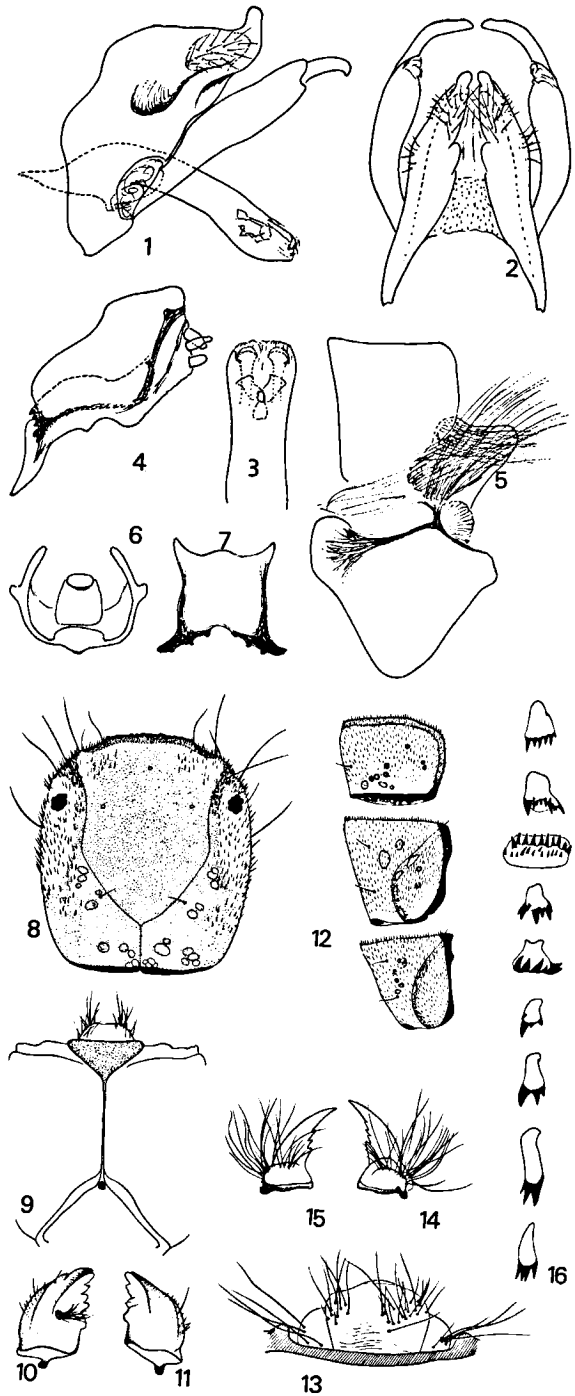
## SYSTEMATIC DESCRIPTIONS

### *Smicridea* (*S.*) *meridensis* nov. spec.

Figs. 1-16

Material. — Holotype, male: Venezuela, Edo. Mérida, 11 km southeast of Apartaderos, 23-II-1976, C. M. & O. S. Flint, Jr., USNM Type 100, 205. Paratypes: Same data, 127 ♂ 7 ♀ (6 ♂ 3 ♀ in coll. ZMA). Stream, 4 km south of Santo Domingo, 19/23-II-1976, C. M. & O. S. Flint, Jr., 2 ♂ 2 ♀. Stream, 2 km northwest of Santo Domingo, 19-II-1976, C. M. & O. S. Flint, Jr., 1 ♂. Río Santo Domingo, 5 km northwest of Santo Domingo, 19-II-1976, C. M. & O. S. Flint, Jr., 2 ♂ 1 ♀. Río Montalban, Rt. 4, 19 km west of Mérida, 20-II-1976, C. M. & O. S. Flint, Jr., 15 ♂ 14 ♀. 13 km east of Apartaderos, 24-II-1976, P. M. & P. J. Spangler, 5 ♂ 1 ♀. Río Santo Domingo, Puente de El Baho, 2500 m, 5-III-1973, F. H. Weibezahn, 1 ♂ 1 ♀. Río Santo Domingo, exit Presa La Victoria, 3170 m, 4-III-1966, F. H. Weibezahn, 6 ♂. Río Santo Domingo, outlet of Laguna Mucubají (3 km east of Apartaderos), 3550 m, 4-III-1966, F. H. Weibezahn, 1 ♂ 2 ♀; same, but 14-VIII-1969, 1 ♀.

Other: Same data as holotype, 48 larvae, 4 praepupae, 5 pupae, 1 ♂ 1 ♀ metamorphotypes. Cacuta, 10 km east of Tabay, 22-II-1976, C. M. & O. S. Flint, Jr., 11 larvae, 5 praepupae, 11 pupae, 1 ♂ 2 ♀ metamorphotypes. Río Albarregas, 1800 m, 11-VI-1974, A. L. Edgar, 3 larvae, 1 pupa. Mucujún Valley, 15 km north of Mérida, 21-II-1976, C. M. & O. S. Flint, Jr., 1 ♂ metamorphotype. Río Santo Domingo, exit Presa La Victoria, 3170 m, 4-III-1966, F. H. Weibezahn, 26 larvae, 1 praepupa, 4 pupae. Río Santo Domingo, Puente de El Baho, 2500 m, 5-III-1973, F. H. Weibezahn, 7 larvae, 1 praepupa, 2 pupae, 1 ♂ metamorphotype. Río Santo Domingo, outlet of Laguna Mucubají (3 km east of Apartaderos), 3550 m, 22-II-1976, C. M. & O. S. Flint, Jr., 27



Figs. 1-16. *Smicridea meridensis* nov. spec. 1. ♂ genitalia, lateral. 2. ♂ genitalia, dorsal. 3. Tip of phallus, dorsal. 4. ♀ ninth tergum, lateral. 5. ♀ eighth segment, lateral. 6. ♀ vaginal sclerite, ventral. 7. ♀ internal plate, dorsal. 8. Head of larva. 9. Submentum and gular sclerites, larva. 10-11. Left and right mandibles, larva. 12. Lateral view of thoracic segments, larva. 13. Pupal labrum. 14-15. Left and right pupal mandibles, ventral. 16. Abdominal hook-plates, pupa.

larvae, 9 praepupae, 9 pupae, 1 ♂ 4 ♀ metamorphotypes; same, but 24-II-1969, P. M. & P. J. Spangler, 23 larvae, 3 praepupae, 6 pupae, 2 ♂ 4 ♀ metamorphotypes; same, but 4-III-1966, F. H. Weibezahn, 86 larvae, 2 praepupae, 6 pupae, 2 ♀ metamorphotypes; same, but 14-VIII-1969, 200 larvae, 1 ♂ 2 ♀ metamorphotypes. Stream, 4 km south of Santo Domingo, 19/23-II-1976, C. M. & O. S. Flint, Jr., 29 larvae, 2 pupae. Stream, 2 km northwest of Santo Domingo, 19-II-1976, C. M. & O. S. Flint, Jr., 19 larvae, 1 praepupa, 1 pupa, 3 ♂ metamorphotypes. Mucujún Valley, 11 km northeast of Mérida, 21-II-1976, C. M. & O. S. Flint, Jr., 2 larvae. Río Montalban, Rt. 4, 19 km west of Mérida, 20-II-1976, C. M. & O. S. Flint, Jr., 60 larvae. Páramo Laguna Negra, torrent, 500 m from source, 3500 m, 4-X-1975, W. Bzibziak, 2 larvae; same, but 1100 m from source, 3150 m, 1 larva, 1 pupa. La Carbonera, torrent, 2200 m, X-1975, W. Bzibziak, larvae, praepupae, pupae.

Adult. — Length of forewing male, 8.5-12 mm; female, 9.5-13.5 mm. Color brown; antennae, legs, and body pubescence brown, head, thorax and abdomen usually fuscous; forewing in male, dark brown, in female, fuscous, with an indistinct, wavy, transverse white band from stigma. Anterolateral process of fifth abdominal sternum  $3/4$  length of sternum in male and female; male abdomen with 2 pairs of reticulate internal sacs apically. Male genitalia: Ninth segment slightly sinuous anteriorly. Tenth tergite in lateral aspect short and broad, tip produced into a dorsal lobe, with a low, ventrolateral ridge; in dorsal aspect with tip produced into a short mesal lobe, lateral margin slightly produced. Clasper with basal segment long, nearly parallel-sided; apical segment angled mesad, rather short, tip blunt. Aedeagus curving directly from basal region, tip slightly inflated; with a pair of apicodorsal sclerites, and a small, ribbonlike internal structure. Female genitalia: Eighth sternite with posterior margin produced and often reflexed; posterior margin between tergum and sternum produced into a large, dark lobe bearing a large, dense brush of setae. Ninth segment with anterior margin sinuate dorso-laterally, vertical anteriorly with anterolateral angle produced into a slender process, venter

sinuate; with a shallow posteroventral clasper receptacle. Internal plate large, rectangular, slightly domed mesally, with anterolateral angles slightly produced. Vagina semicircular in ventral aspect, with narrow lateral and anterior supports, with a central support and opening.

Larva. — For comparisons, see especially Flint (1974a). This distinctive larva can attain a length of about 18 mm. Pattern of head rather characteristic: frontoclypeus uniformly dark brown, as are the genae behind the frontoclypeus (however with some spots) and two narrow zones anteriorly separating the frontoclypeus from the very elongate eyespots. Anterior border of the frontoclypeus symmetrical, median part slightly prominent and granulate; no conspicuous ornamentation on the dorsal parts of the head; dorsal black spinules distributed as in fig. 8 (those anterolateral to the eye are mostly yellow). Submentum with anterior margin slightly sinuous. There is a minute, quadrangular, posterior gular sclerite, the anterior gular sclerite is large and triangular. A seemingly distinctive character (though it was figured by Wiggins, 1977, for *S. fasciatella* MacLachlan, 1871) is the following: lateral parts of the meso- and metanota separated from the rest by rather deep, dark, arched, grooves (not ecdysial lines!) starting from anterior angles and devoid of spinules; the lateral zones delimited in this manner are convex. Behind prosternal plate, a pair of minute, oblique, and very narrow sclerites. Branchial trunks with very numerous filaments; on each  $1/2$  of the segments there are: on mesoventer 1 trunk at base of coxa, on metaventer 1 near base of coxa and 1 paired near median line; on abdominal segments no branchiae near lateral line; ventrally on segment I, 1 trunk more laterally and 1 more medially; on segments II-VI, 1 paired trunk more laterally and 1 single trunk more medially (on VII this last one lacking). It was impossible to distinguish the anal gills.

Pupa. — Length, 11 mm. Labrum with anterior border slightly trilobate and with long hairs on its main part and on the lateral lobes (the asymmetry in the distribution of these hairs shown in fig. 13 is probably particular to the specimen figured). The mandibles seemingly very distinctive with their very long hairs, many of these

reaching — or almost reaching — the mandibular tip.

Affinities. — This species is a member of the South American *albosignata* group, and is easily

distinguished from all other known species of the group by its size, which is virtually twice that of any other species. It is one of the few species of the group that is basically brown rather than jet black. The tenth tergum is proportionately shorter and possesses a low lateroventral ridge which is lacking in the other species.

All the details of larval — and pupal — morphology clearly show that the erection of a distinct tribe for *Smicridea* MacLachlan, 1871, within the limits of the subfamily Hydropsychinae (Flint, 1974a) was definitely justified.

**Leptonema insulanum** Banks, 1924

syn. *Leptonema ulmeri* Mosely, 1933

Figs. 17-18

Material. — Venezuela, Edo. Aragua, Rancho Grande, stream in the Cordillera de la Costa (Dist. Girardot), tributary of Lago de Valencia, about 1100 m, 19-VIII-1975, W. Bzibziak, many larvae, 1 ♂ metamorphotype.

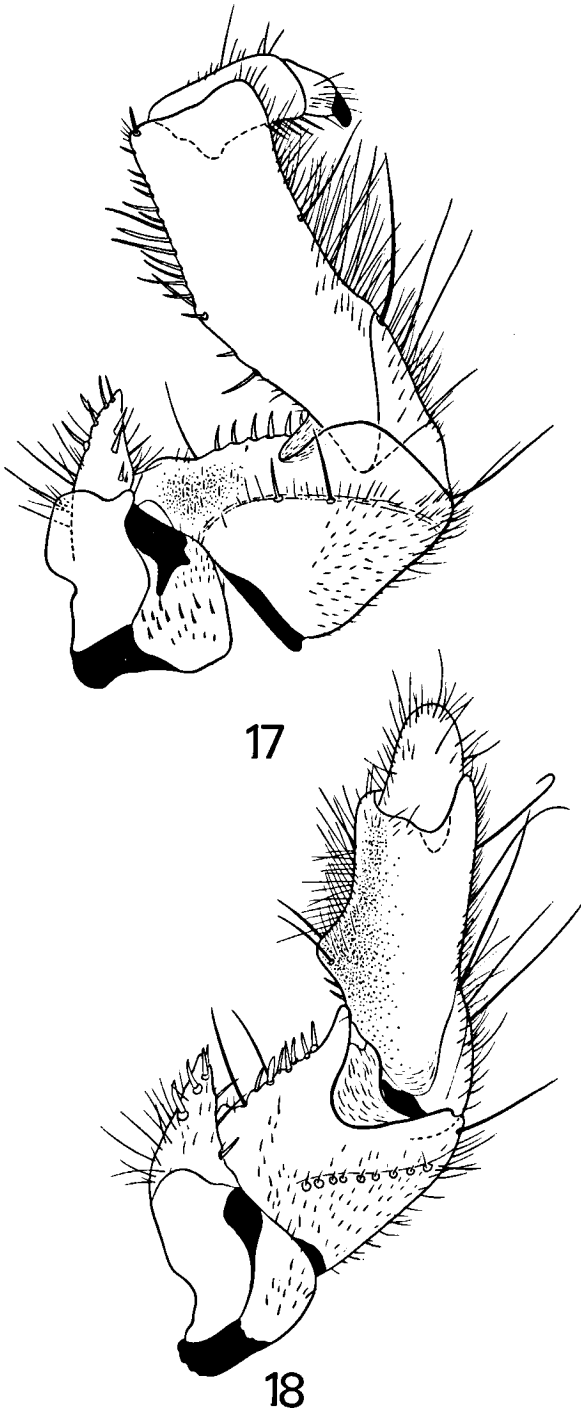
Larva. — Length of the longest larva, 20 mm; the ♂ pupa is 19 mm. This is in all respects a typical larva of *Leptonema* Guérin-Méneville, 1843, as is shown by comparison with all the characteristics enumerated by Ulmer (1957, pp. 346-348) under “Übersicht über besonders auffällige Unterschiede im Körperbau der Larven” (of Macronematinae). It is possible that the structures of the strongly modified forelegs will supply good diagnostic characters enabling the separation of the larvae of the different species of *Leptonema*. We give, therefore, two detailed drawings of the foreleg; on the median surface, the femur is very hairy, the hairs leaving nevertheless the longitudinal-median area free.

**Synoestropsis furcata** Flint, 1974

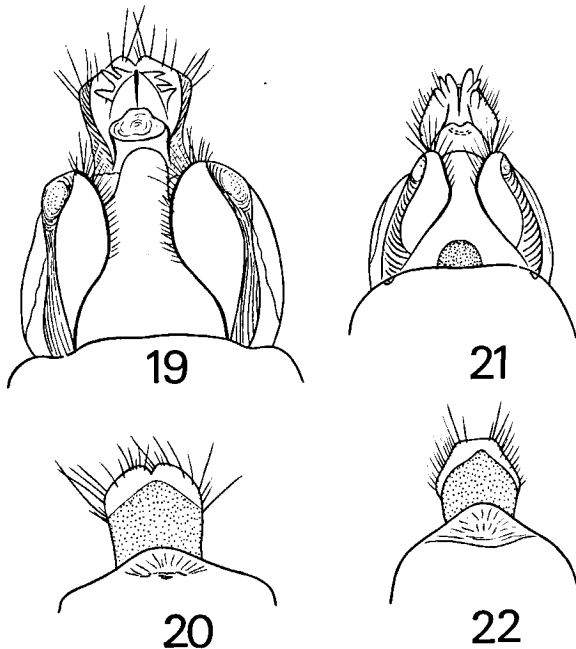
Figs. 19-20

Material. — Venezuela, Edo. Bolivar, large stream at foot of Mt. Agua Negra, a tributary of the Río Guaniamo (Basin of the Orinoco), 4/5-IX-1975, W. Bzibziak, 5 ♀. Venezuela, Edo. Bolivar, Río Guagualito at about 100 km south of Caicara, 7-IX-1975, W. Bzibziak, 1 ♀.

This species was described by Flint (1974b) from Surinam, and is recorded from Brazil, Guy-



Figs. 17-18. *Leptonema insulanum* Banks, larva. 17. Foreleg, lateral view. 18. Same, almost dorsal view.



Figs. 19-20. *Synoestropsis furcata* Flint, ♀. 19. ♀ genitalia, ventral. 20. Apical part of ♀ genitalia, dorsal.

Figs. 21-22. *Synoestropsis grisoli* Navás, ♀. 21. ♀ genitalia, ventral. 22. Apical part of ♀ genitalia, dorsal.

ana and Venezuela. The female genitalia not having been figured previously, are here illustrated.

### *Synoestropsis grisoli* Navás, 1924

Figs. 21-22

Material. — Three females of this species were caught together with the preceding species by the large stream at the foot of Mt. Agua Negra.

The species has a recorded distribution similar to *furcata* Flint, 1974, and was, similarly, not figured in the female sex. It is here illustrated.

### *Ochrotrichia* Mosely, 1934

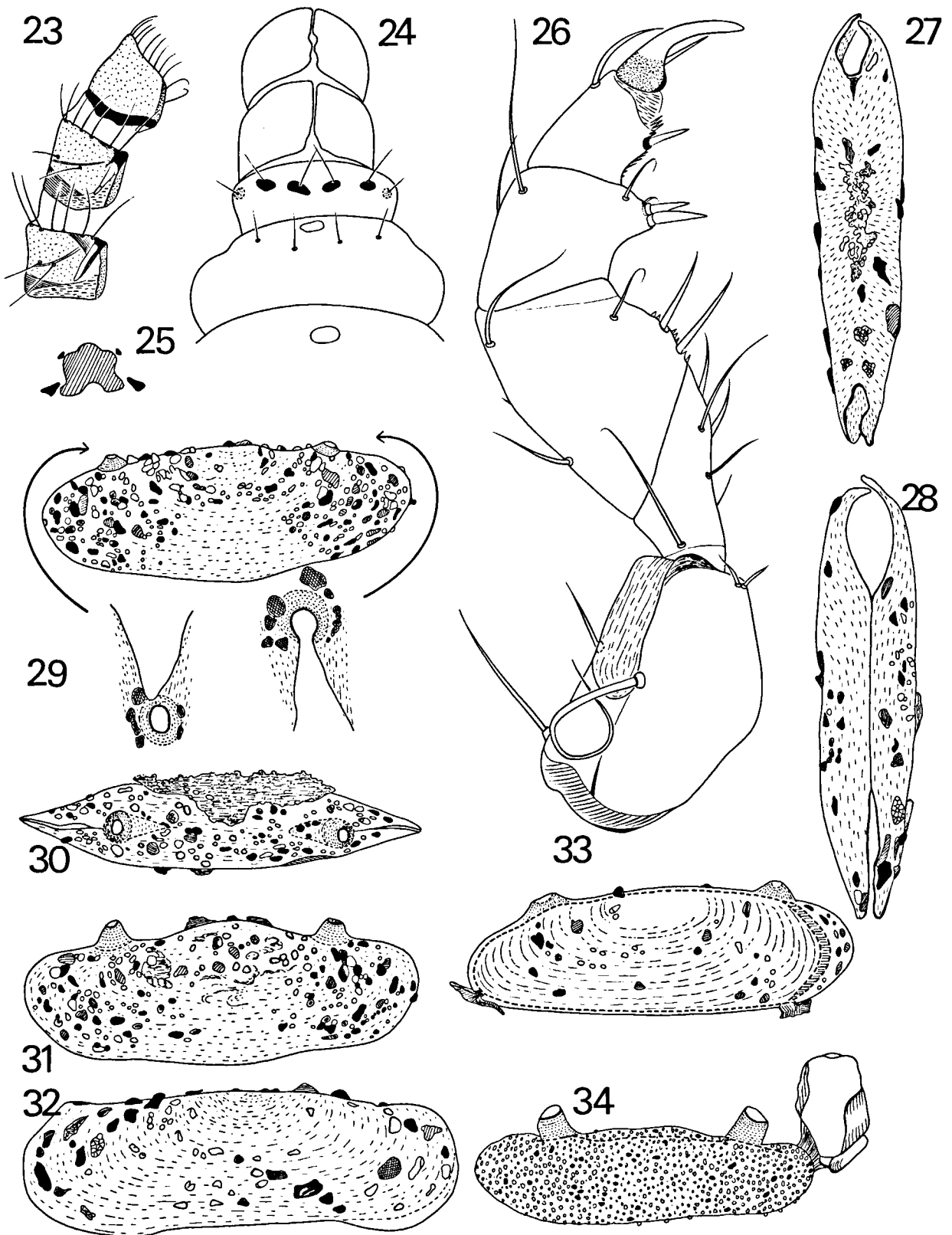
(Subgenus *Metrichia* Ross, 1938, ssp.); being also a contribution to the elucidation of the true nature of *Dicaminus* (= *Diaulus*) F. Müller, 1879).

Figs. 23-24

Examined material. — Venezuela, Edo. Mérida, Cordillera de Mérida, Páramo Mucubají, small

mountain stream near Mérida, at 300 m from the source, 4300 m elevation, 5-X-1975, W. Bzibziak, many larvae, praepupae and pupae (but no metamorphotypes). Mucujún Valley, 15 km northeast of Mérida, 21-II-1976, C. M. & O. S. Flint, Jr., many larvae and pupae (this is an undescribed species of *Metrichia*). Ecuador, Río Papallacta, 1mi east of Papallacta, 30-I-1958, R. W. Hodges, several larvae and pupae.

Preliminary discussion. — Examination by Botosaneanu of the cases built by the larvae from Páramo Mucubají revealed that they are of exactly the same type as the famous hydroptilid cases described by F. Müller (see Ulmer, 1957: 173) under the names of *Dicaminus* or *Diaulus*, which are characterized by two "chimneys" arising from the middorsal ridge of the purselike case. Unfortunately this sample contained no metamorphotypes, but Flint had about 12 other samples containing cases of the same type from Panama, Ecuador, Bolivia, Argentina, and (mostly) Venezuela. Three of the Venezuelan collections contained male metamorphotypes belonging to three different, undescribed, species of *Ochrotrichia*, subgenus *Metrichia*. Moreover, Flint had examined one adult specimen from the collection of the Museum of Comparative Zoology, Harvard University, from F. Müller himself. Unfortunately the abdomen of this specimen is missing, but examination of the rest of the specimen revealed characteristics that are typical of *Metrichia*: 3 ocelli, spurs: 1, 3, 4 (inner spurs very small), mesoscutellum transversely divided, metascutellum triangular. However, this specimen — apparently a male — has some secondary sexual characters never seen in other *Ochrotrichia* species: hind wings with a large patch of modified hairs in the center, maxillary palpi short with segment 3, and especially 4, broad and bearing enlarged setae, and all legs, especially their tibiae and tarsi, bearing enlarged setae. Thus *Dicaminus* is probably at least related to — if not synonymous with — *Ochrotrichia* (*Metrichia*). However, there is at present no proof of this identity. In fact there are no species known of *Ochrotrichia* s.l. in the region of Brazil which supplied Müller's material — a region which has, in general, a very different fauna from the rest of South America.



Figs. 23-34. *Ochrotrichia* (Sg. *Metrichia* Ross) specierum, larva. 23-26. Morphology of the larva from Venezuela, Páramo Mucubaji. 23. Thorax, lateral. 24. Meso- and metanotum, and first 3 abdominal segments, dorsal. 25. Dorsal sclerites of the abdominal segment VIII. 26. Foreleg. 27-33. Cases of larva and praepupa from Venezuela, Páramo Mucubaji. 27-28. Smallest case (1.9 mm), dorsal and ventral. 29. Case 3.3 mm, with aspect of the two dorsal slits and incipient "chimneys". 30,31. Largest larval case (3.6 mm), dorsal and lateral. 32-33. Two different praepupal cases. 34. Pupal case, Ecuador, Río Papallacta.

Larva from Venezuela, Páramo Mucubají. — Excepting the eye-spots, the head is uniformly brown. Thorax, in general, like several other described *Ochrotrichia* larvae. The median suture of the mesonotum shows a foramen in the middle and there is also a distinct “bay” behind the foramen (no foramen on the suture of the metanotum, but there also a distinct posterior “bay”, fig. 24). The proventer has two rather large, transverse sclerites and the mesoventer two much smaller such sclerites. The legs are typical for *Ochrotrichia* larvae (see, for instance, the foreleg in Wiggins, 1977, fig. 7.9D). Dorsally on the first abdominal segment there are three pairs of small sclerites, and there seems to be no “chloride epithelium”; the “chloride epithelia” present on terga II-VII are surrounded by a simple chitinous ring; tergum VIII with a rather curious complex of sclerites (fig. 25).

Cases. — The available material makes possible some observations on the origin and development of the remarkable “chimneys”. In the smallest available cases (length 1.9 and 2.2 mm, respectively; figs. 27-28 made from the 1.9 mm case), there is not even the slightest indication of the “chimneys”, but at the dorsal ends of the apical slits there is already a round incision (evidently lacking at the ventral ends of the slits). Later the round incision becomes isolated from the rest of the slit, and it is around these enlarged terminal parts of the apical slits that the larva spins the “chimneys”, which are a little bit oblique (fig. 29 shows a case of 3.3 mm with one of the round incisions and incipient “chimney” already isolated, whereas the second one is still connected to the slit; figs. 30-31, case of 3.6 mm). Before pupation, a strong inner lining of the case is spun, the “chimneys” lose their communication with the case’s inside (fig. 33) and they may also become almost obsolete (fig. 32, a praepupal case of 3.7 mm). There is, of course, some intraspecific variability in the building of the cases, and there are certainly some differences between cases built by different species: see, for instance, fig. 34 representing a praepupal case of a specimen from Ecuador, Río Papallacta (case more regularly built from extremely fine sand grains, “chimneys” longer).

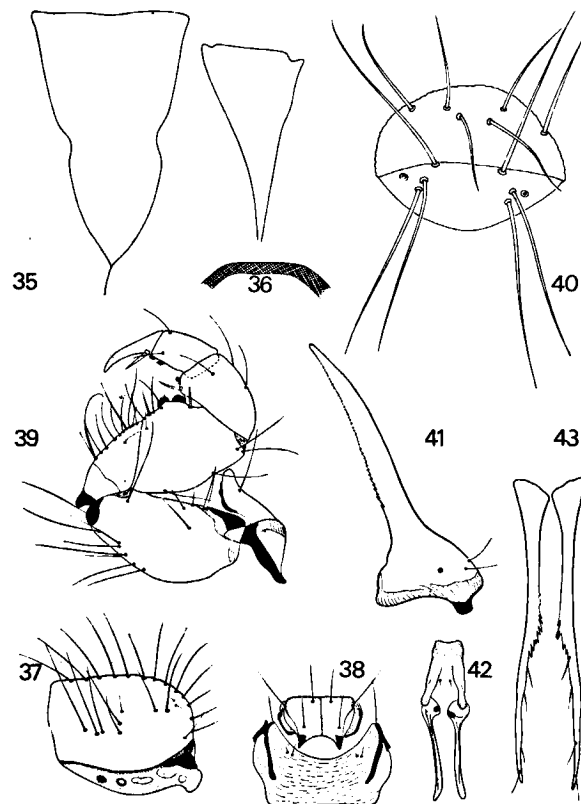
**Anomalocosmoecus illiesi** (Marlier, 1962)

Many larvae, 2 praepupae, and 1 ♀ pupa were present in a single sample from Ecuador (stream 1.5 m broad, at 3500 m elevation, on the Volcan Cotopaxi, XI-1975, W. Bzibziak). The larvae of this species — the northernmost species of limnephilid in South America — were described by Marlier (1963), but not before recorded from Ecuador.

**Nectopsyche gemmoides** Flint, 1981

Figs. 35-43

Material. — Venezuela, Edo. Mérida, Cordillera de Mérida, stream near Páramo Laguna Negra, 500 m from the source, about 3500 m elevation, 4-X-1975, W. Bzibziak, 4 young larvae, numerous



Figs. 35-43. *Nectopsyche gemmoides* Flint, immature stages. 35. Frontoclypeus, larva. 36. Gula, larva. 37. Right half of pronotum, larva. 38. Meso- and metanotum, larva (including what is dorsally visible of the pleurae). 39. Foreleg, larva. 40. Labrum, pupa. 41. Mandible, pupa. 42. “Haftapparatus” of abdominal segments I and II, pupa. 43. Anal appendages, pupa.

pupae including a series of metamorphotypes, and empty pupal cases.

This species is widespread in South and Central America, but was only described recently (Flint, 1981). Many larvae of *Nectopsyche* Müller, 1879, are described (Ross 1944, Haddock 1977, Wiggins 1977, and especially Marlier 1964, where no less than 19 larval forms are described but none are associated with their respective adults).

Larva. — Only young larvae were available (cases 4.7 mm long). Head apparently light-brown, without distinct pattern; frontoclypeus as in fig. 35; gula an elongate triangle, very narrow posteriorly where the sutures become indistinct, but certainly not reaching the border of the cephalic capsule. Pronotum with a slightly undulating anterior border and a very broad, dark posterior margin; curiously enough, there is not the faintest indication of the "secondary suture" present on each half of the pronotum of almost all the described larvae — but that of *albida* (Walker, 1852) is, according to the drawing of Ross, 1944, also devoid of this "secondary suture". The mesodorsum bears a characteristically shaped, single, trapezoidal sclerite, with its posterior (smaller) border deeply and roundly emarginate, and with a distinct median suture. Metadorsum without sclerites, deeply excavated anteriorly to accept the mesodorsum. Foreleg: near internal angle of the femur there are two small combs of well-developed spinules; internal angle of tibia very prominent and angular, followed distally by a small comb of spinules. Midlegs visibly shorter than hindlegs, all of them devoid of swimming hairs.

Pupa. — Extremely few documents are available on pupae of *Nectopsyche*. We give here drawings of the labrum, mandibles, and anal appendages. Also figured are the structures of the first and second abdominal segments (part of the "Haftapparat"), and the plates presegmentally on segments III-VI and also on V postsegmentally (presegmental plates elongate-ovoidal, with 2 teeth directed posteriad; postsegmental plate irregularly quadrangular, with 3 teeth directed anteriad).

Case. — Maximal length, 11.5 mm. Of a common type: narrow, conical, slightly curved, from very fine and regularly disposed sand, flexible. Posterior end of pupal case closed by a thick im-

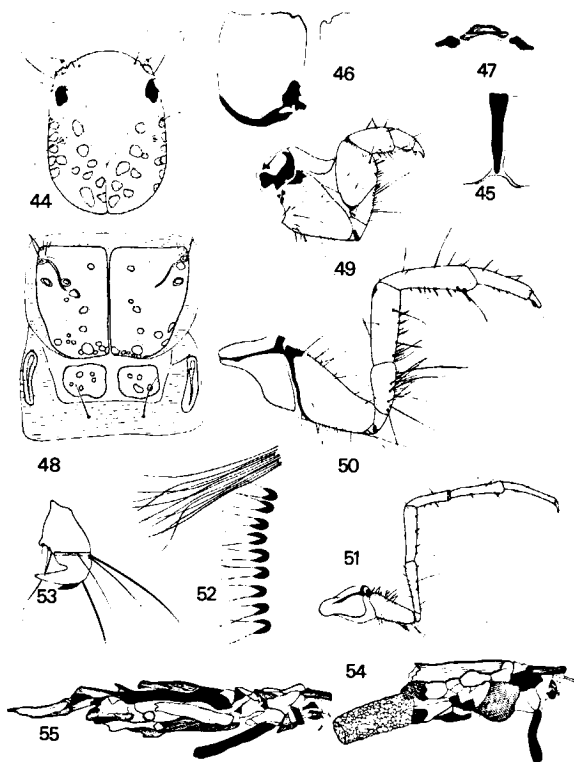
movable lid (central area with a rather regular slit, sometimes less thick); anterior end with a thick lid, very convex anteriorly.

### *Triplectides* spec.

Figs. 44-55

Material. — Venezuela, Edo. Mérida, Cordillera de Mérida, stream at La Carbonera, 1.5 m wide, in tropical forest near San Eusebio, 2200m elevation, X-1975, W. Bzibziak, 4 larvae (2 small, 2 mature).

Larva. — Length of the mature larva, 12.5 m. Body cylindrical, uniformly wide between the metathorax and abdominal segment VII. Head dorsally rather dark chestnut-brown; anterior and middle parts of the frontoclypeus somewhat darker; pale eyespots very distinct, as are the round spots around the alveoli of two of the hairs (fig.



Figs. 44-55. *Triplectides* spec., larva. 44. Head, incompletely represented. 45. Gula. 46. Right half of pronotum and anterolateral angle of left half. 47. Prosternal sclerites. 48. Meso- and metanotum. 49-51. Fore-, mid-, and hindlegs (51 less enlarged than others). 52. Lateral line on abdominal segment VIII. 53. Anal claw. 54. Case, 9 mm long. 55. Case, 18 mm long.



44); darker spots regularly disposed on genae. Gula long, narrow and narrowing posteriorly, no distinction possible between prae- and postgula. Anterior border of pronotum very slightly concave; each half of pronotum with a rather slight indentation of anterior border just before the anterolateral angle. Proventer with a row of three sclerites near its posterior border (it is possible to consider them as being the most sclerotized and darkened points of a narrow and rather continuous chitinous ring, see fig. 47). Mesonotum: the very large, rather pale sclerite, is somewhat trapezoidal (large side anteriad), with oblique, rather faint ridges rising from near the anterolateral angles. Mesoventer with a pair of narrow, arched, transverse sclerites near posterior border. Metanotum with a large, very lightly sclerotized, anteromesal zone (white in fig. 48), bearing a pair of very pale, but distinct, quadrangular sclerites; laterally on each side another, oblong and narrow sclerite. Legs pale brown, with no other dark zones than those in figures 49-51; all their spines are yellow, the hairs are black; there is a very distinct limit between the episternum and epimeron of all the legs, including the foreleg. On the abdomen a well developed system of "chloride epithelia" is visible as longitudinal straight or arched strips in 2 parallel series on each half of the dorsa and ventra of I-VIII; dorsal hump on segment I well developed, lateral humps very flat, with a very large, pale brown, ovoid sclerite entirely covered by delicate "Haardorne"; gills with 2-3 filaments (rarely also single?) dorsally on segments II-VI and ventrally on II-VII; lateral line of dark, dense, long setae on III-VII, well developed also on VIII but the "Haardorne" are sparser, and replaced on the proximal 1/8 by (about) 9 bifid processes (fig. 52); on dorsum IX a large, perfectly ovoid, light brown plate with black hairs, of which 3 pairs are especially prominent (the central pair the longest). Anal prolegs with an enormous sclerite "b" \*), divided by a distinct fold into a dorsally larger and a laterally smaller part — this last one touching sclerite "c" \*); this last sclerite with a longitudinal dark band through its middle for more than half its

\*) Terminology of A. Nielsen (1942).

length; accessory hook from the anal claw rather large, somewhat distally situated from the claw's curve, and slightly ventrally placed.

Case. — Length about 18 mm; built from irregularly placed plant fragments; in one young larval case (9 mm long) the posterior part is simply a fragment of a *Nectopsyche* case.

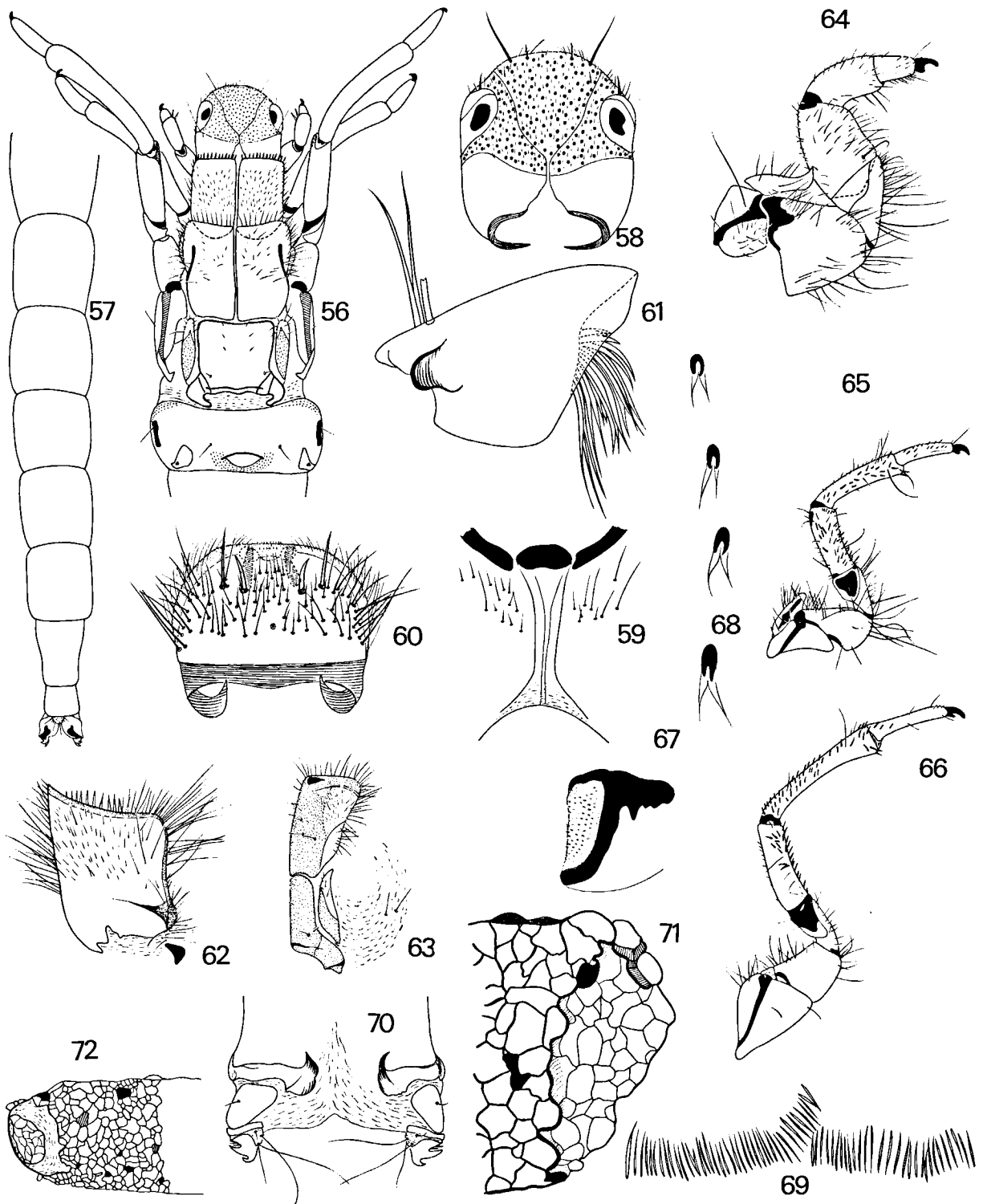
Affinities. — The presently described larva resembles in many respects that described by Marlier (1964) as *Atanatolica* sp. 1; it is obvious that this is nothing else than a *Triplectides* Kolenati, 1859, and the same is very probably true for *Atanatolica* sp. 2 described in the same publication.

#### **Atanatolica spec.**

Figs. 56-72

Material. — Venezuela, Dto. Federal, forest stream near village La Sabana (50 km from La Guaira, or 100 km east of Caracas), about 300 m elevation, 13-IX-1975, W. Bzibziak, numerous larvae (some in USNM).

Larva. — First abdominal segment broadest, width of segments II-VII decreasing only very slightly, segment VIII elongate and much narrower, especially in its distal half, segment IX very short, quadrate. Head proportionally very small, clearly triangular (= prismatic) in lateral view; coronal suture characteristic: starting with a short, normal portion, it becomes very widely "open" towards the foramen occipitalis; dorsally only the anterior 2/3, laterally only the anterior 1/2 of the head is granulate and beset with minute hairs. The apotomal sclerite (praegula) is set far anteriad, perfectly delimited, polygonal, dark; but the situation *behind* this sclerite is difficult to describe (see fig. 59): there is probably no true ecdysial line but merely a lightly colored longitudinal region completely separating the darker genae. Labrum with a very large part of its surface covered with secondary hairs, some of them even as proximal as, or a little bit more proximal than, the median sensory pit; anterior median lobe bordered by two rather conspicuous internal (sensory?) organs. Mandibles almost symmetrical, short, triangular, without teeth on cutting edges, with rather noticeable penicillia; interestingly, both



Figs. 56-72. *Atanotolica spec.*, larva. 56. Dorsal view of head, thorax and abdominal segment I. 57. Dorsal view of rest of abdomen (enlargement half that of 56). 58. Head. 59. Gular zone. 60. Labrum. 61. Left mandible, dorsal. 62. Right half of pronotum, with prosternal sclerite, lateral. 63. Lateral view of meso- and metanotum (and metasternum). 64-66. Fore-, mid-, and hindleg (65-66 less enlarged than 64). 67. Sclerite on lateral hump of abdominal segment I. 68. The 4 bifid processes laterally on abdominal segment VIII. 69. The fine striations on the tegument of the abdominal segments (greatly enlarged). 70. Abdominal apex, ventral. 71-72. Anterior and posterior opening of larval case.

have *three* lateral hairs at base. Pronotum completely sclerotized; on proventer there is on each side, laterally, a small sclerite (shown in fig. 62). Mesonotum completely sclerotized, visibly more developed anteriorly than posteriorly; no sclerites on mesoventer. Metanotum with a distinct central sclerite, square, without median suture, with the posterior angles produced into large lobes, directed first laterad then posteromedially; narrow sutures separate this central sclerite from two lateral, very oblong ones; on metaventer, on each side, a pair of conspicuous hairs. Legs generally very hairy, on the femora, tibiae and tarsi most of the hairs are extremely short, spiniform; tibia of mid- and, especially, hindlegs broadened apically, but not exaggerated; foretrochantin typically triplectidine, horn-shaped; mesotrochantin present, somewhat ovoidal, lateral parts pale and slightly sclerotized, only central part dark; metatrochantin obsolete. First abdominal segment with a characteristic set of 5 sclerites shown in fig. 56; lateral sclerites placed on the flat lateral humps, shaped as in fig. 67, with the largest part of their surface covered with minute spines forming pairs; other sclerites very pale brown; median sclerite — on median hump — transversely ovoidal; intermediate sclerites irregular, with a small proximolateral projection. No gills; no peculiar structures on abdominal ventra; no true lateral line; laterally on segment VIII a series of 4 bifid tubercles; on many parts of the abdomen there is an ornamentation of fine "striations" (in fact, zones covered with microscopical ridges forming series — fig. 69) and these are particularly well developed around the median sclerite of segment I and anterolaterally on segments IV-VIII. There is an anal plate just at the end of segment IX. Dorsal part of sclerite "b" of anal proleg without peculiar ornamentation, but with a large, irregular and distinctive dark pattern (fig. 57); the conspicuous ventral prolongation of this sclerite has a characteristic shape (fig. 70) with a median hook directed mainly antierad.

Case. — Maximal length about 14 mm. Conical, rather strongly curved; it is a solid and carefully built case of fine sand grains.

Discussion. — *Atanatolica* Mosely, 1936, is certainly quite an interesting genus of the Triplectidinae. The adults of only 3 species are described

at present: *A. brasiliiana* (Brauer, 1865) from Brazil, Rio de Janeiro, *A. dominicana* Flint, 1968, from Dominica (Lesser Antilles), and *A. botosaneanui* Flint, 1981, from Venezuela. The only described, associated larva is that of *A. dominicana* (Flint, 1968), however, a very distinctive, unassociated larva was described from Venezuela (Rancho Grande) by Botosaneanu (1974). We describe now another distinct larva from northern Venezuela. The immature stages of *A. botosaneanui* are known, but undescribed, and they are different from either of the other two Venezuelan forms. In addition more unassociated larvae from Costa Rica, Panama, Colombia, and Ecuador are in the collection of the USNM. It is, on the other hand, certain that the larvae described by Marlier (1964) as *Atanatolica* sp. 1 and *Atanatolica* sp. 2, do not belong here, the first one, at least, being surely a *Triplectides* Kolenati, 1859.

All the known larvae of *Atanatolica* are quite similar morphologically, and agree in general with the larvae described by Müller or by Thienemann under the name "*Grumichinha-Grumichella*" Müller, 1879 (see Ulmer, 1955: 496-500 for a full discussion). However, the cases are distinctly different in the two genera, and all of the collections

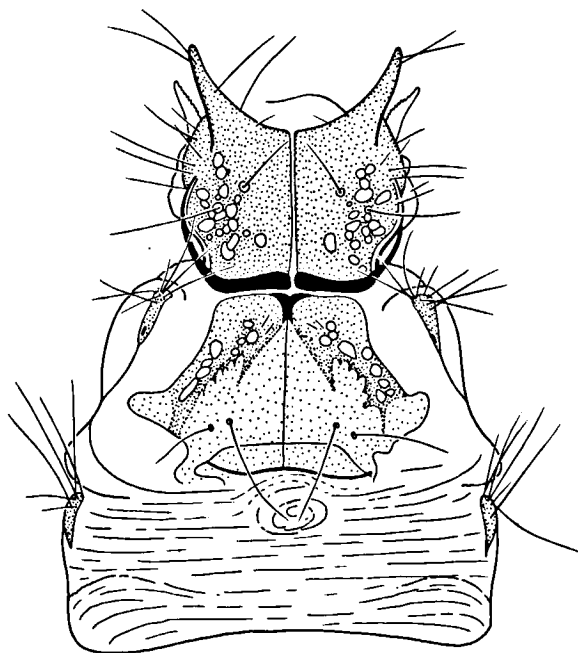


Fig. 73. *Phylloicus angustior* Ulmer. Larval thorax, dorsal.

(in the USNM) containing metamorphotypes in the *Grumichella* type cases are species of *Leptocellodes* Ulmer, 1911. As of yet, virtually no material is available from the type locality of *Grumichella*, so the possibility of this being a valid genus can not be discounted. In any case, *Atanatolica*, *Leptocellodes*, and *Grumichella* represent two, or possibly three, valid genera, that are very closely related on the basis of their distinctive larval morphology. At this point it is not possible to settle the problem of possible synonymies.

The genus *Atanatolica* contains, at the present state of our knowledge, three species in northern Venezuela, one in Brazil, one on Dominica and an unknown number from between Costa Rica and Ecuador.

### **Phylloicus angustior** Ulmer, 1905

Fig. 73

Material. — Venezuela, Edo. Aragua, Rancho Grande, stream in the Cordillera de la Costa (Dist. Girardot), tributary of the Laguna de Valencia, about 700 m elevation, 17-VIII-1975, W. Bzibziak, numerous larvae, praepupae, pupae, several ♀ and 1 ♂ metamorphotypes.

The larva and pupa of this species were described by Thienemann (1909) from "Caracas". We can give here some supplementary information on the larva. In the transverse row on the labrum there are about 34 hairs, on the mesonotum there is — besides the pair of small anterolateral hairy sclerite — a very large, median, more or less trapezoidal chitinous zone, with the median suture present, though indistinct (certainly an ecdysial line!), and whose different parts are more or less chitinized (= more or less darkly colored), as in fig. 73. The number of gill filaments on the abdomen of the last instar larva is as follows:

Segment	Dorsal	Latero-ventral	Ventral
I	— 4	— —	— —
II	4 —	4 —	4 —
III	4 —	4 —	4 —

Segment	Dorsal	Latero-ventral	Ventral
IV	4 —	3 —	4 —
V	4 —	3 —	4 —
VI	4 —	3 —	3 —
VII	4 —	3 —	3 —
VIII	— —	— —	3 —

### **Phylloicus** spec.

Material. — Venezuela, Edo. Mérida, Cordillera de Mérida, stream near Páramo Laguna Negra, 200 m, 750 m, and 1400 m respectively from the source (elevations respectively about 3600 m, 3350 m, and 3200 m), 4-X-1975, W. Bzibziak, 1 larva in each of the three samples.

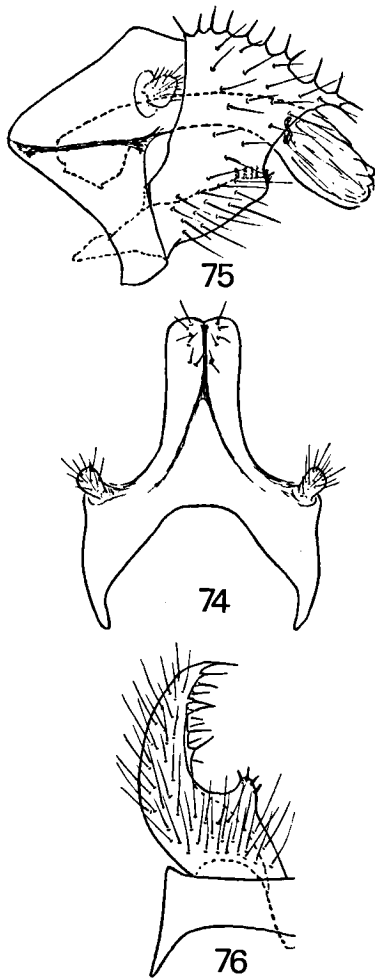
This is morphologically a typical *Phylloicus* larva. We mention it here because of its rather unusual case, which is not flattened, but distinctly cylindrical (the larval body being perfectly cylindrical). The case corresponds very well to the description given by Ulmer (1955: 427) for that of *P. bromeliarum* F. Müller, 1878, known from Brazil and Argentina: "Gehäuse aus kleinen, schuppenartig aneinander liegenden gewölbten Blattstücken bestehend, welche einen fast zylindrischen Innenraum einschliessen und dessen Seiten nur ganz wenig überragen".

### **Helicopsyche merida** nov. spec.

Figs. 74-76

Material. — Holotype, male: Venezuela, Edo. Mérida, 11 km southeast of Apartaderos, 23-II-1976, C. M. & O. S. Flint, Jr., USNM Type 100,206. Paratypes: Same data 2 ♂, 1 ♂ 2 ♀ metamorphotypes. Páramo Laguna Negra, Cordillera Mérida, near Mérida, 3500 m elevation, brook 500 m from source, 4-X-1975, W. Bzibziak, 3 ♂ 2 ♀ metamorphotypes (in coll. ZMA). Other: Same data as holotype, 7 larvae and pupae. Same data as Páramo Laguna Negra, 40 larvae, pupae and cases.

Adult. — Length of forewing 4 mm. Color



Figs. 74-76. *Helicopsyche merida* nov. spec. 74. ♂ ninth and tenth terga, dorsal. 75. ♂ genitalia, lateral. 76. ♂ clasper and ninth sternum, posteroventral.

uniformly dark brown, wigs with golden reflections. Third and fourth sterna of male coarsely reticulate, fifth sternum virtually lacking reticulations; sixth sternum with a pointed mesal process about 1/4 length of sternum (only 1 paratype has processes, all other paratypes lack processes). Male genitalia: Ninth segment with anterior margin produced and angulate laterally, narrow ventrally; lateral brace prominent. Tenth tergum elongate; in dorsal aspect with tip bilobate, with a few spiniform setae apically. Cercus short and broad. Clasper with dorsal lobe large, anterior margin vertical, dorsal margin irregularly produced into short, seta-tipped processes, apex narrowly produced, without apicomeral tooth; baso-

mesal lobe scarcely apparent in lateral aspect, in posterior aspect small, with a few spiniform setae. Aedeagus long, arched, slightly enlarged basally and apically.

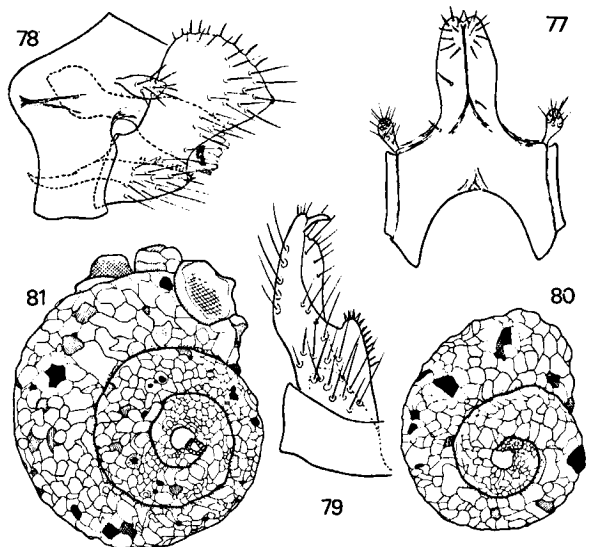
Case. — Typically helicelliform; diameter of largest specimen slightly exceeding 3 mm; rather delicate and fragile in construction; umbilicus sometimes closed, sometimes perforated, but perforation small.

Affinities. — Although this species is probably best placed in the *borealis* complex, it is not wholly typical of the group. The dorsal margin of the clasper is much more irregular than usual and the apical angle is developed into a narrow process that is not directed mesad. The mesobasal lobe of the clasper is also unusually small with very few spiniform setae, somewhat similar to *H. peruana* Banks, 1920.

***Helicopsyche cotopaxi* nov. spec.**

Figs. 77-81

Material. — Holotype, pharate male: Ecuador, Volcan Cotopaxi, torrent 3500 m elevation, XI.1975, W. Bzibziak. USNM Type 100,207. Paratypes: Same data, 2 ♂ metamorphotypes (in coll. ZMA). Other: Same data, 18 larvae and pupae.



Figs. 77-81. *Helicopsyche cotopaxi* nov. spec. 77. ♂ ninth and tenth terga, dorsal. 78. ♂ genitalia, lateral. 79. ♂ clasper and ninth sternum, posteroventral. 80. Larval case. 81. Pupal case.

Adult. — Length of forewing unknown; probably about 5-6 mm. Color of pupal wingpad dark reddish-brown. Third through fifth abdominal sterna of male reticulate; lacking sternal processes. Male genitalia: Ninth segment with anterior margin produced and rounded anteriorly, broad ventrally; lateral brace bifurcate, short and incomplete. Tenth tergum elongate; in dorsal aspect with tip bilobate, with a short row of spiniform setae apically. Cercus slightly elongate, enlarged apically. Clasper with dorsal lobe large, dorsal margin evenly rounded, with a large apicomeral tooth; basomesal lobe scarcely apparent in lateral aspect, in posterior aspect only slightly separated from dorsal lobe, with many short, spiniform setae. Aedeagus short, straight, enlarged basally and apically.

Case. — Typically helicelliform; diameter of largest specimen about 4 mm; rather rough construction; the umbilicus is extremely characteristic, very widely open (this peculiarity being easily observed also with the naked eye).

Affinities. — This species is a member of the *borealis* complex, probably most closely related to *H. planata* Ross, 1956. From *planata* it differs in having a broader ninth segment with a poorly developed lateral brace, a shorter row of setae on the tenth tergum, and a less arched mesobasal lobe of the clasper in lateral aspect, that is longer and more closely appressed to the dorsal lobe in posterior aspect.

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The inked drawings of the immature stages

were prepared by Mr. Young T. Sohn of the Smithsonian Institution from the pencil sketches by Botosaneanu.

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