PUERTO RICAN SPECIES OF *LEPIDOCYRTUS* AND *PSEUDOSINELLA* (COLLEMBOLA: ENTOMOBRYIDAE)

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ABSTRACT

Twelve species of *Lepidocyrtus* and two species of *Pseudosinella* are described from material collected in Puerto Rico. Eleven of the species are new to science: *L. biphasis, L. diminutus, L. dispar, L. distinctus, L. griseolus, L. ianthinus, L. lepargus, L. maldonadoi, L. ramosi, L. vireticulus* and *P. violeta.* Methods used for clearing and mounting specimens are detailed and the diagnostic importance of various morphological characters is analyzed in detail. Special emphasis is given to the head and body chaetotaxy. Szeptycki's system for naming abdominal setae is favored over that of Gisin, Three tables detail the abdominal chaetotaxy of all the species. A total of 188 figures complement the descriptions.

RESUMEN

Se describen dote especies de *Lepidocyrtus* y dos especies de *Pseudosinella* en base a ejemplares colectados en Puerto Rico. Once especies son nuevas para la ciencia: *L. biphasis, L. diminutus, L. dispar. L. distinctus, L. griseolus, L. ianthinus, L. lepargus, L. maldonadoi, L. ramosi, L. vireticulus* y *P. violeta.* Se describe la tecnica usada para aclarar y montar los ejemplares y se evalúa detalladamente la importancia de los caracteres usados en las descripciones. Se da gran valor a la quetotaxia cefálica y corporal, y para describir la quetotaxia abdominal se favorece el sistema de Szeptycki sobre el propuesto por Gisin. Tres cuadros detallan la quetotaxia abdominal de todas las especies. Ciento ochenta y echo figuras sirven de complement a las descripciones.

INTRODUCTION

The Puerto Rican fauna of springtails is depauperate when compared with that of larger islands or ecologically similar areas on continents. Fifty-nine species of Collembola had been reported from the island before the present contribution and these are distributed in 39 genera for an average of less than two species per genus (Mari Mutt, 1982).

Only two species of *Pseudosinella* have been found in Puerto Rico, but twelve species of *Lepidocyrtus* live here, making the latter by far the most diverse genus of springtails on the island. Extrapolating from this number, we can safely expect that the faunas of the other Greater Antilles, Central America and tropical areas of South America will contain dozens or hundreds of species of this genus.

The present study is based on specimens which I collected during 1973, 1974, the winters of 1975 to 1978 and in 1981. Sporadic collections were made in other years and a few specimens have been forwarded by colleagues and students. Most specimens were collected by processing leaf litter samples in Berlese-Tullgren funnels. To avoid repetition in the listing of collection

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data, I have omitted my name when the specimens were collected by me and the substrate when they were found in leaf litter. I have indicated how many specimens from each locality were mounted on slides, thus the reader will know how many specimens were studied in detail. All specimens, including types, are deposited in my collection.

Abbreviations such as Ant. 2, Th. 2, Abd. 2, etc., used in the descriptions and discussions stand for second antennal segment, second thoracic segment, second abdominal segment, etc.

METHODS

When many specimens are available, 10 individuals from the locality with the largest number of individuals and at least one or two from other localities are mounted on slides. The description is based on the original 10 specimens. If a limited number of specimens is on hand, I mount half to two-thirds, leaving some in alcohol for descriptions of the color pattern and future study.

Specimens longer than 1.5 mm are dissected by removal of the head and appendages. The parts are then placed in Nesbitt's fluid until all the pigment is dissolved. Only the head is removed from specimens measuring 1.0 to 1.5 mm and whole mounts are made for individuals smaller than 1.0 mm.

The head is mounted ventral side up. For specimens which have been in alcohol for several years it is highly recommended that the head be mounted between two coverslips, following the technique described by Christiansen and Bellinger (1980). This method permits detailed study of the ventral and dorsal sides of specimens that are not perfectly transparent. In order to observe all details of the labrum, one or two heads should be crushed by applying pressure on the coverslip.

The body is mounted dorsal side up and tilted slightly to one side in order to see clearly the insertions of the lateral setae of Abd. 2 and Abd. 3. It is difficult to fix the position of the legs and furcula but some of these appendages should be viewed dorsally and laterally.

Specimens are mounted in Marc André II or Hoyer's fluid and the slides are placed on a slide warmer at 52°C for several days. This hardens the medium and completes the clearing of the specimens.

A final comment on methods pertains to the collecting of specimens. At a given locality, a species may be more abundant on the foliage of low-lying vegetation, especially grasses, than on the litter layer. In Puerto Rico, this is frequently the case with *Lepidocyrtus biphasis* and sometimes with *L. nigrosetosus* and *L. caprilesi.* Beating vegetation over a white pan or tray is an effective method of collecting these specimens.

ANALYSIS OF CHARACTERS

Color Pattern

The distribution of pigment is a very useful diagnostic character. Most species possess a fairly constant pattern, varying only in the intensity of the pigment and the extent of various spots and bands, Three species exhibit significant variation between populations. *Lepidocyrtus biphasis* has two phenotypes (Fig. 42, 43) and *L. dispar* has five distinct color forms (Fig. 71, 75-78). *Lepidocyrtus caprilesi* exists in four slightly different forms.

Distribution of Scales

The head, dorsum of the body and ventral side of the furcula are covered with striated scales. In specimens with strongly contrasting pigment bands (e.g. *L. dispar* form E, Fig. 77) the scales on these bands are much thicker and darker and serve to emphasize the contrast in color. Scales are present on the antennae and legs of *L. caprilesi, L. nigrosetosus* and *P. violeta.*

Apical Papilla of Ant. 4

The tip of Ant. 4 has a conspicuous papilla in seven of the twelve species of *Ledipocyrtus.* Depending on the species, the papilla may be exposed (set in a very shallow depression) or partially to almost completely hidden in a deep depression. The papilla is broad and nail-like in *L. ramosi* (Fig. 103), elongated in *L. lepargus* (Fig. 124), compact and rounded in *L. biphasis* and *L. diminutus* (Fig. 39, 156), and consistently bilobed in *L. maldonadoi* (Fig. 98). Specimens of *L. maldonadoi* and *L. lepargus* have one or two conspicuous channels leading to the base of the papilla (Fig. 98, 124).

The fourth antennal segment of *L. griseolus* has a protuberance (Fig. 146) which I regard as a papilla for diagnostic purposes but which may not be homologous to the papilla of other species. Neither species of *Pseudosinella* has a papilla.

Interocular Chaetotaxy

The number and positions of setae inserted within the eyepatch is an important character. A maximum of six setae are present in the eyepatch (Fig. 1). Seta p is absent only in *L. diminutus* and *P. biunguiculata,* which lack all interocular setae. Seta v has been found only in one specimen of *L. biphasis* and one of *L. dispar* but it is always present, albeit transformed into a scale, in *L. nigrosetosus* (Fig. 1). The rest of the setae (q,r,s,t) are found in *L. biphasis, L. dispar, L. maldonadoi* (r absent in half of the specimens) and *L. nigrosetosus.* When one of these four setae has disappeared it is usually r but in *L. distinctus* seta q is missing. Seta q is transformed into a scale in *L. caprilesi* (Fig. 26). *Lepidocyrtus ianthinus* and *L. vireticulus* lack setae q and r, and in *L. griseolus* only seta t remains. Setae q to t are missing in *P. violets.*

In the descriptions, setae present occasionally are placed in parentheses and setae substituted by scales are in italics. The interocular chaetotaxy is also given in Table I but here I have omitted seta p because it is present in all the species listed except L. diminutus.

Head Macrochaetotaxy

Three species of *Lepidocyrtus* and *P. biunguiculata* possess head macrochaetae. The largest number of setae occurs in *L. vireticulus* (RO12STPo- Fig. 131) *Lepidocyrtus caprilesi* has setae RO12 and Po whereas only setae RI and R2 remain in *L. griseolus. Pseudosinella biunguiculata* has setae RO12 and Po but R2 is absent in some specimens.

Labrum

Three important characters are studied on the Iabrum: chaetotaxy, shape of the intrusion and form of the papillae.

Chaetotaxy follows the formula 4,554 normal of the Entomobryidae. The prelabral setae are ciliated except in *L. nigrosetosus.* Labral setae are smooth except for the first row of *L. caprilesi* and *L. vireticulus* and all three rows of *L. diminutus.* These three species are also the only ones with ciliated setae on the anterior labial row. The inner setae of the third row may be thicker than the outer setae (e.g. Fig. 37) or all setae may be similar in length (e.g. Fig. 62).

The Iabral intrusion is absent in *L. caprilesi* and *P. biunguiculata.* In most other species the intrusion is V-shaped (Fig. 37). In *L. ramosi* and *L. griseolus* the intrusion is narrower (Fig. 105) whereas in *L. diminutus* it is broadly rounded (Fig. 152). The intrusion is reduced to a narrow slit in *P. violeta* (Fig. 184).

All the Iabral papillae are large and conspicuous in L. caprilesi, L. nigrosetosus and *L. vireticulus* (Fig. 137). In *P. violeta* the papillae are large and end in conelike projections (Fig. 179). The inner papillae are reduced in *L. biphasis, L. dispar, L. Iepargus, L. maldonadoi* and *L. ramosi* (Fig. 105). In *L. griseolus* the inner papillae have been substituted by very small setulae (Fig. 142) and in *P. biunguiculata* no trace remains of inner papillae or setulae. In *L. diminutus* the outer papillae are absent and only setulae remain. In *L. distinctus* the Iabral papillae are minute dotlike structures.

Labial Chaetotaxy

The five setae of the anterior labial row are smooth in all species except *L. caprilesi, L. vireticulus* and *L. diminutus.* The setae of the posterior row are ciliated except in *L. nigrosetosus,* which has only smooth setae, and *L. ramosi* which has seta m smooth. Most species possess the formula Mr(very reduced)EL_1L_2. Seta r is absent in *L. ianthinus* and *L. vireticulus.* The only species with more than one m seta are *L. caprilesi (3) L. nigrosetosus (2)* and *P. vieleta (2).*

Maxillary Palp and Differentiated Seta

The maxillary palp bears a smooth apical seta and a basal (sub-apical) seta which is ciliated only in the three species of *Lepidocyrtus* with ciliated setae on the Iabrum and anterior labial row. The basal seta may be similar in length to the apical seta (Fig. 4) or it may be much longer (Fig. 117).

The differentiated seta of the outer labial papilla is generally slender and does not reach the apex of its papilla (Fig, 15). In *L. diminutus,* however, the seta is longer and surpasses the apex of the papilla (Fig. 162). The seta of *P. violeta* is thick and also surpasses the apex of its papilla (Fig. 177). In *P. biunguiculata* the seta is long and curves towards the inner side of the papilla (Fig. 172). This shape occurs also in *Metasinella subfusa* (Wray) and in *M. wrayi* Mari Mutt and Gruia 1983).

Setae along the Cephalic Groove

Both sides of the cephalic groove possess a longitudinal row of ciliated setae. Most

species possess five setae per row (Fig. 92) but in *L. diminutus* and *L. ianthinus* the posterior seta has been replaced by a scale and 4 + 4 setae remain. The fourth seta is also replaced by a scale in *L. caprilesi* (Fig. 23), *L. griseolus, L. vireticulus* and *P. biunguiculata,* and the third seta also disappears in *P. violeta.*

Body Chaetotaxy

General Remarks

The number and distribution of macro- and microchaetae on Abd. 2 to Abd. 4 and the composition of the trichobothrial complex of these segments are of great taxonomic importance because many features vary between species while remaining remarkably constant within each species. Yosii (1982), in a study of Sabahan *Lepidocyrtus,* minimized the importance of chaetotaxy while citing from Christiansen and Bellinger (1980): "...these useful characters are difficult to make out even on fresh specimens..."

I have encountered no problems in the study of the body chaetotaxy. All the elements are easily observed in properly cleared fresh material, especially if several specimens are studied to compensate for improperly mounted specimens or individuals which have lost some setae. I have successfully studied all the elements of the chaetotaxy in material preserved in alcohol for over 12 years.

Gisin (1967) introduced a system of nomenclature for the chaetotaxy of the medial part of Abd. 2. This system has been adopted, essentially unchanged, by all subsequent authors who have described species of *Lepidocyrtus* and *Pseudosinella.* Szeptycki (1979) introduced a system of nomenclature for the Entomobryidae based on extensive comparative data and studies of postembryonic development, He points out (p. 67) a number of inconsistencies made by Gisin as well as some shortcomings (p. 77) of the system proposed by Snider (1967) for the setae associated with the outer trichobothria of Abd. 3.

I have adopted Szeptycki's system because it is consistent, uses the same symbols for the various segments, and considers all the setae present on the segment, not only the handful which is generally considered important. Listed below are the setae of Abd. 2 used by Gisin and the equivalent nomenclature by Szeptycki (op. cit. p. 65).

Gisin	Szeptycki
	a2
d2	a3 (sometimes as)
d l	as (sometimes a2)
b	m3
p	a2p (sometimes a2 or m3)
q l	m3e
q2	p4

On Abd. 3, only two setae (c3 and d2, Fig. 49) have not been accounted for in Szeptycki's figures and I have used the letters applied by Snider. His macrochaetae L_1, L_2, L_3 and L_4 are equivalent to Szeptycki's pm6, p6, a7 and m7 respectively. On Abd. 4, Snider's macrochaetae P_1, M_1, M_2 M_3 are equivalent to Szeptycki's C_1, B_4, B_5 and B_6 (Fig. 5).

Body Macrochaetotaxy

The number of macrochaetae on the body is given in the descriptions following the popular system introduced by Gisin. His formula lists in succession the number of macrochaetae present on each body segment and for Abd. 4 specifies if macrochaeta C_1 is present and the number of B setae. By itself this is woefully inadequate, because which particular macrochaetae are present on each segment and their positions is also very important.

Abdominal segments 2 and 3 possess, depending on the species, 0-2 and 2-4 macrochaetae, respectively. Macrochaetae pm6 and p6 of Abd. 3 are invariably present, but the other macrochaetae of this segment are absent in some species. The second thoracic segment has a macrochaeta in *L. diminutus* and *L. vireticulus.*

Chaetotaxy of the Medial Part of Abd. 2

A maximum of 17 setae are present in this area. The two trichobothria (m2 and a5) and smooth setae a3 and m3e are always present. The other setae are absent in some species or may vary in shape.

In most Holarctic *Lepidocyrtus* and *Pseudosinella* a considerable distance separates the insertions of the trichobothria. Such separation is present among Puerto Rican species in *P, biunguiculata* (Fig. 163) and *L. diminutus* (Fig. 150). The distance between these setae decreases in *L. griseolus* (Fig. 133) and is even shorter in the rest of the *Lepidocyrtus* and in *P. violeta.* During this gradual approach of the trichobothria, seta m3e comes to lie near m3 and p4 moves to a point below m3e.

In most species, setae mi, a2, Li, Lm, Ll, and sometimes a6, are broad ciliated setae which Szeptycki calls fan-shaped setulae. In *L. vireticulus* (Fig. 133) setae mi, Lm and Ll are ciliated microchaetae whereas a2 and a6 are fan-shaped. In *L. distinctus* and *L. diminutus* (Fig. 85, 150) all the aforementioned setae are simple, not fan-shaped.

In about half of the species described in this paper seta a3 is inserted close to as, whereas in the others it is inserted far to the front and internal to the position of as. Seta a2p is found in six of the 14 species described here.

Seta m3 varies in length. In *L. caprilesi, L. diminutus, L. nigrosetosus* and *P. biunguiculata* it is a long, typical macrochaeta (Fig. 150). In *L. biphasis, L. Iepargus, L. griseolus* and *L. vireticulus* the seta is much shorter, about twice the length of neighboring fan-shaped setae (Fig. 48). In *L. dispar, L. ianthinus, L. maldonadoi* and *L. ramosi* seta m3 is further reduced and closely resembles a fan-shaped seta (Fig. 73). In his description of *L. fimetarius,* Gisin (1964a) did not consider such a reduced m3 as a macrochaeta, nor did Gruia (1983) in her description of *L. pseudofimetarius.* Seta m3 is absent only in *L. distinctus* and *P. violeta.* This last species is the only one in which seta m5 is not a macrochaeta (Fig. 175). Table 2 presents the chaetotaxy of Abd. 2 for all the species treated in this paper.

Chaetotaxy of Abd. 3

A maximum of 25 setae are present on Abd. 3 between the pseudopore and the lateral macrochaetae (Fig. 49). The trichobothria (m2, a5 and m5), smooth microchaeta m3, and macrochaetae p6 and pm6 are always present. Important diagnostic characters found on Abd. 3 are number of macrochaetae, presence or absence of d2 and m6, length of as, and the shape of the setae associated with the trichobothria. Table 3 details the chaetotaxy of all the species treated in this paper.

Trichobothrial Complex of Abd. 4

Gisin (1964b) introduced a system for naming the setae associated with the anterior trichobothrium of Abd. 4. Szeptycki (1979) considered also the setae found near the posterior trichobothrium, as well as a pair of setae inserted between the trichobothria. A total of nine setae, in addition to the trichobothria, compose the complex of Abd. 4 (Fig. 12).

Setae Dl, a and m are always present and fan-shaped except in *L. distinctus* and *L. diminutus,* which lack fan-shaped setae on all abdominal segments. When present, seta s may be inserted in the center of a triangle formed by Dl, a, and m or it may be in line with a and m (Fig. 132).

Setae Clp, T3 and Dlp are smooth or ciliated in all species except *P. biunguiculata,* where Clp is fan-shaped, and *P. violeta,* which lacks Clp and Dip. Setae Pi and Pe are fan-shaped except in *L. distinctus* and *L. diminutus.* Seta Pi is missing in *P. violeta* and Pe is absent in *L. diminutus* and *L. griseolus.* Table 4 details the composition of the trichobothrial complex for all the species described in this paper.

Trochanteral Organ

The setae of the trochanteral organ are either arranged as a quadrangle (Fig. 13) or in the shape of a letter V (Fig. 41). The organ is rectangular and has more setae in the two largest species *(L. caprilesi* and *L. nigrosetosus)* and is V-shaped with fewer setae in the other species treated here. The number of setae is variable, even between trochanters of the same specimen.

Unguis

The number of inner ungual teeth and their position is a useful diagnostic character. Most species possess a pair of subequal basal teeth and 1 or 2 unpaired teeth. In *L. diminutus* and *L. griseolus,* one of the basal teeth originates below the other (Fig. 143). The proximal unpaired tooth is missing only in *P. violeta.* The distal unpaired tooth is extremely small or may be absent in some specimens of several species.

The most remarkable modifications of the basal teeth occur in *L. dispar, L. ianthinus* and *P. biunguiculata.* In the first two species, the teeth are very small and one is frequently absent, giving the impression that the unguis has a large unpaired basal tooth with a small denticle inserted on it (Fig. 57, 72). Both basal teeth may be seen in an inner view of the unguis (Fig. 56A, 66B) of some specimens. Individuals of *P. biunguiculata* possess an enormous proximal projection with a pair of teeth (Fig. 167A). In some specimens, an inner view of the unguis reveals a third smaller tooth (Fig. 167 B).

Unguiculus

The legs of *L. biphasis, L. dispar, L. ianthi-*

nus and *P. violeta* possess conspicuously truncate unguiculi. The metathoracic unguiculi of *L. caprilesi* and *L. nigrosetosus* are slightly truncate (sometimes lanceolate in *L. nigrosetosus)* but the pro- and mesothoracic legs of these species possess clearly truncate structures (Fig. 3, 20).

Some species (e.g. *L. nigrosetosus,* Fig. 2, 3) possess distinct denticles along one outer lamella while other species consistently lack these structures. The diagnostic value of the character is limited because in some species the denticles are few, very small, and visible only from certain angles; or they are absent from some or all the legs of some specimens.

Ratio Supraempodial Sets/Unguiculus

The length of the smooth supraempodial seta (opposite seta to the tenent hair) of the third pair of legs is not very useful for separating Puerto Rican species because most possess setae of similar length, or differences between species are slight. The supraempodial seta of L. caprilesi is half as long as the unguiculus (Fig. 21). In the other species of *Lepidocyrtus* the ratio fluctuates between 0.77 and 1.07. The ratio is very different between the two species of *Pseudosinella:* 0.92 in *P. biunguiculata* (Fig. 167A) and 0.37 in *P. violeta* (Fig. 176).

Dental Tubercle

An apically rounded dental tubercle (Fig. 44) is present in most Puerto Rican *Lepidocyrtus.* The tubercle is somewhat blunt or pointed to one side in *L. nigrosetosus* (Fig. 14) and flat in *L. caprilesi* (Fig. 30). *Lepidocyrtus diminutus, L. griseolus* and *L. vireticulus* lack a dental tubercle. *Pseudosinella violeta,* contrary to the other species of the genus, has a huge spinelike tubercle (Fig. 187).

Mucronal Spine

The shape of the mucro presents no major differences among the species treated here. The mucronal spine of some species bears one or several minute denticles or spinules on its base. This character is constant within a species but the spinules may be very small or visible only in a lateral view of the mucro.

TAXONOMIC SECTION

Genus *Lepidocyrtus* Bourlet, 1839

Entomobryidae with 8 + 8 eyes, scales on the body and dens, and a bidentate mucro.

Key to Puerto Rican Species of *Lepidocyrtus*
(see also Table 1)

1. Antennae and legs scaled; trochanteral organ rectangular (Fig. 13), in adults with more than 25 setae; eyepatch with 1 scale; maximum length of specimens ≧ 2.3 2.3 mm. 2

   Antennae and legs not scaled; trochanteral organ V-shaped (Fig. 41), in adults with fewer than 18 setae; eyepatch without scales; maximum length of specimens ≦ 1.6mm. 3

2. Mesonotum very strongly projecting over head (Fig. 16); Ant. 2, Ant. 3 and tibiotarsi scaled; head macrochaetae: ROI2Po; 3 + 3 setae along cephalic groove; setae of anterior labial row ciliated . . . . . *caprilesi*

   Mesonotum not so strongly projecting over head (Fig. 8); Ant. 2, Ant. 3 and tibiotarsi not scaled; head macrochaetae absent; 5 + 5 or 6 + 6 setae along cephalic groove; setae of anterior labial row smooth . . . . . *nigrosetosus*

3. *Unguiculus truncate.* . . . . . *.4*

   Unguiculus lanceolate. *6*

4. *Ant.* 4 *with apical papilla (Fig. 39.* . . . . . *biphasis*

   Ant. 4 without apical papilla 5

5. Body uniformly violet (Fig. 52); 4+4 setae along cephalic groove; labial seta r absent; inner labral papillae setaceous; Abd. 4 seta s absent; Abd. 2 seta *as* moderately long (Fig. 63) . . . . . *ianthinus*

   Body pigmentation variable but not uniformly violet; 5 + 5 setae along cephalic groove; labial seta r present; inner labral papillae not setaceous; Abd. 4 seta s present; Abd. 2 seta *as* short (Fig. 73) . . . . . *.dispar*

6. Dental tubercle present; 5 + 5 setae along cephalic groove. 7

   Dental tubercle absent; 3 + 3 or 4 + 4 setae along cephalic groove 10

7. Pigmentation as in Fig. 79, postocular band present; Ant. 4 papilla subapical (Fig. 83); Abd. 2 seta m3 absent; setae of trichobothrial complex simple . . . . . *distinctus*

   Pigmentation not as above, postocu-

Iar band absent; Ant. 4 papilla apical; Abd. 2 seta m3 present; setae of trichobothrial complex fan-shaped .8

8. Body with distinct color bands (Fig. 90); Ant. 4 papilla bilobed (Fig. 98) . . . . . *maldonadoi*

   Body uniformly light blue-gray or pigment absent; Ant. 4 papilla l-lobed (very rarely bilobed) 9

9. Ant. 4 papilla broad, almost completely hidden in a deep depression (Fig. 103); labial seta m smooth, e finely ciliated; anterior macrochaeta of Abd. 4 inserted far above pseudopore (Fig. 111); Abd. 2 seta as long (Fig. 108) . . . . . *ramosi*

   Ant. 4 papilla elongated, partially exposed (Fig. 124); labial seta M and E conspicuously ciliated; anterior macrochaeta of Abd. 4 inserted at same level of pseudopore (Fig. 120); Abd. 2 seta as very short (Fig. 114) . . . . . *lepargus*

10. Body with distinct color bands (Fig. 128); Ant, 4 without papilla or protuberance; head macrochaetae S, T and Po present; inner Iabral papillae conspicuous (Fig. 137); Abd. 3 setae a7 and m7 are macrochaetae (Fig. 136) . . . . . *vireticulus*

    Body uniformly light blue-gray or pigment absent; Ant. 4 with distinct papilla or protuberance; head macrochaetae S, T and Po absent; inner Iabral papillae replaced by very small setae (Fig. 142, 152); Abd. 3 setae a7 and m7 are smooth microchaetae 11

11. Labral setae and setae of anterior labial row smooth; head macrochaetae RI and R2 present; setae of trichobothrial complex fan-shaped; 3 + 3 setae along cephalic groove; interocuIar setae p and t present (Fig. 145) . . . . . *griseolus*

    Labral setae and setae of anterior labial row ciliated; head macrochaetae absent; setae of trichobothrial complex simple; 4 + 4 setae along cephalic groove; interocular setae absent . . . . . *diminutus*

DESCRIPTIONS

Lepidocyrtus nigrosetosus Folsom Fig. 1-15

Lepidocyrtus nigrosetosus FoIsom 1927: 9, Figs. 55-57. Wolcott 1933: 242 (biol. notes). Wolcott 1936: 21 (mention). Wolcott 1948: 34 (mention). Metcalfe 1962:44 (new record for Jamaica). Frank and Bennett 1972(?): 2 (mention). Mari Mutt 1978: 5 (depository of types). Martorell 1976: 117, 228 (mention). Mari Mutt 1982: 33 (mention).

Length to 2.6 mm. Mesonotum strongly projecting over head. Live specimens shinny metallic gray, specimens in alcohol white with a little pigment along lateral margin of thorax, posterolateral angle of Abd. 4 and on coxae (Fig. 8). Dorsum of Ant. 1 with scales, other antennal segments without scales. Ant. 2 and Ant. 3 with many thick ciliated setae. Legs scales to apex of femur. Ant, 4 without papilla. Head macrochaetae absent. Eyes g and h not greatly reduced (Fig. 1). lnterocular setae: pqrstv. Prelabral and all Iabral setae smooth. Setae of third Iabral row subequal. Labral intrusion V-shaped. Labral papillae large, subequal (Fig. 9). Labial chaetotaxy (Fig. 7): a_1-a_5, m_1m_2r(reduced)e$1_1 1_2$; m_1 sometimes ciliated. Setae of maxillary palp and differentiated seta of outer labial papilla as in Fig. 4, 15. 5+5 or 6+6 setae along cephalic groove, anterior 3 smooth or finely ciliated, posterior setae ciliated. Body macrochaetae: 00/0231 + 3 (Fig. 5). Chaetotaxy of Abd. 2, Abd. 3 and trichobothrial complex of Abd. 4 as in Fig. 10-12. Trochanteral organ (Fig. 13) with up to 41 setae. Claws as in Fig. 2, 3; distal unpaired ungual tooth very small or absent, proximal unpaired tooth larger than basal teeth. Unguiculus of metathoracic legs Ianceolate or slightly truncate, unguiculus of pro- and mesothoracic legs shorter and truncate. Ratio supraempodial sets/unguiculus= 0.77 (0.64-0.83, n= 19). Dental tubercle large, somewhat pointed on one side (Fig. 14). Mucronal spine with denticles (Fig. 6).

Diagnosis. The Puerto Rican species with a pigmentation most similar to that of *L. nigrosetosus* is *L. lepargus.* Specimens of the latter are smaller (up to 1.4mm), possess a papilla on Ant. 4, lack scales on the antennae and legs, and their mesonotum does not project over the head. These species also differ in labial chaetotaxy, structure of the Iabral papillae, chaetotaxy of Abd. 2, number of macrochaetae on Abd. 4, interocular chaetotaxy and shape of the unguiculus.

The Neotropical species that seem most

similar to *L. nigrosetosus* are *L. geayi* Denis, 1924 (French Guiana), *L. schmidti* Handschin, 1927 (Costa Rica) and *L. geayides* Denis, 1931 (Costa Rica). Specimens of the first species are smaller than *nigrosetosus* (up to 1.5 mm), lack pigment on the thorax, usually lack a distal unpaired ungual tooth and possess strongly truncate unguiculi on all the legs, Specimens of *L. schmidti* are also smaller (1.5 mm), lack pigment on the thorax, and the proximal unpaired ungual tooth is reduced whereas the apical tooth is fairly large. The descriptions of these two species are quite incomplete and fresh material must be obtained before a detailed comparison can be made.

Lepidocyrtus geayides is probably a synonym of *L. nigrosetosus.* Specimens of Denis' species are fairly large (2.2 mm) and his description matches in every detail that of *L. nigrosetosus.* The identification of my specimens has been verified by comparison with a syntype on loan from the Illinois State Natural History Survey. Although the specimen is over 60 years old, I have observed the labral papillae, labial chaetotaxy, distribution of macrochaetae on Abd. 4 and the shape of the dental tubercle.

Comments. The color pattern shown in Fig. 8 is that of most specimens studied. A number of individuals are even lighter and have pigment only on the antennae, eyes and lateral margin of Th. 2. In one specimen, Abd. 2 seta *as* is fan-shaped. Two specimens have an extra fan-shaped seta on Abd. 2 (Fig. 10, sup.). Two specimens possess six fan-shaped setae around the anterior trichobothrium of Abd. 4, one of them has three such setae above the posterior trichobothrium.

Lepidocyrtus nigrosetosus has been reported from sugarcane fields in Jamaica (Metcalfe, 1962) but this record needs verification. In Puerto Rico, the species has been collected in many habitats including dry or moist forest leaf litter, axils of dead banana leaves, sugarcane fields, and on stands of various species of grasses and other vegetation. Collection data indicate that this species is fairly tolerant of high temperatures and low humidities.

Material Examined. Ad juntas, Castañer coffee farm, 24.XI.1958, S. Medina Gaud, 10 in alcohol. Aguadilla, Borinquen Beach, Ramey, 23.XII.1976, 1 on slide. Barranquitas, Quebrada Grande, Rd. 749 km 1.9, 21.VI.1980, M. Colon Ferrer, 1 on slide. Caguas, Rd. 156 km 53.7, 9.I.1977, 4 in alcohol. Cayey, Rd. 1 km 69.3, 16.XII.1976, 18 (4 on slides). Cayey, Carite forest, Rd. 184 km 26.6, beating grasses and other plants, 13.VI.1981, 8 (1 on slide). Cayey, Rd. 15 km 22.4, 18.IV.1974, 2 on slides. Cayey-Salinas Rd. km 67.6, 18.IV.1974, 3 in alcohol. As preceding but km 70,3, 13.VI.1961, S. Medina Gaud; 1 on slide. Coamo, Parader Baños de Coamo, 7.I.1982, over 1000 (10 on slides). Guayama, Rd. 179km 3.7, 18.IV.1974, 22 in alcohol. Isabela, Agricultural Experiment Station, pitfall traps, 14.X.1977, E. Abreu, 6 in alcohol. Las Marías, Rd. 407 km 4.0, 11.XII.1976, 1 on slide. Manatí, on wet dead leaves of jagüey *(Ficus laevigata)* on the ground, 30.IV.1924, G. N. Wolcott, 1 syntype. Manatí, Rd. 149 km 4.2, 29.XII.1976, 9 (3 on slides). Mayagüez, 11 de Agosto 224, 26.I.1974, 13 (1 on slide). Mayaguez, Rd. 108 km 9.8, 4.I.1974, 1 on slide. Mayagüez, Rd. 349 km 1.4, XI.1977, F. Moll, 5 (1 on slide). Mayagüez, University of Puerto Rico campus, on various species of grasses, 1.II-10.V.1984, J. Panelli, 132 (5 on slides). Morovis, Rd. 155 km 46.2, 21.III.1974, 2 on slides. Orocovis, Rd. 155 km 21.8, 21.III.1974, 2 (1 on slide). Ponce, Central Mercedita, Finca La Fé, sugarcane ground litter, 2.X.1958, S. Medina Gaud, 10 in alcohol. Quebradillas, Guajataca, 8.VIII.1973, 3 on slides. Río Grande, El Verde, Rd. 186 km 17.7, pigeonpea pod litter, 30.XII.1973, 8 on slides. Río Piedras, Agricultural Experiment Station, 29.XII.1976, 3 in alcohol. San Sebastian, Rd. 111 km 14.5, 9.III.1974, 6 (1 on slide). San Sebastian, Rd. 119 km 33.7, 21.III.1981, 1 on slide.

Lepidocyrtus caprilesi Wray Fig. 16-34

Lepidocyrtus caprilesi Wray 1953: 145-147, Fig. 2A-F. Mari Mutt 1978:5 (depository of types). Mari Mutt 1982:33 (mention).

Length to 2.5 mm. Body slender in dorsal view. Mesonotum very strongly projecting over head. Sides of Th. 2 to Abd. 1, Abd. 2 and Abd. 4 with bands or spots of pigment whose extension varies within and among populations (Fig. 16, 17, 22). Legs white or with some pigment on apex of femora and tibiotarsi. Antennae long, about 4.2x length of head. Ant. 1 to Ant. 3 and all leg segments scaled on all sides. Ant. 4 with many

short setae arranged in whorls, without a papilla. Head macrochaetae: ROI2Po; R2 inserted close to midline of head (Fig. 24). Interocular setae: pqst (Fig. 26). Prelabral setae and setae of first labral row ciliated, setae of second and third rows smooth (Fig. 27); inner setae of third row long, thick, apically blunt. Labral intrusion absent. Labral papillae large, subequal, inner pair with small spinules (Fig. 29). Labial chaetotaxy (Fig. 19): A_1-A_5, $M_1M_2M_3$r(reduced)EL $_1L_2$; 2 r setae in some populations. Basal seta of maxillary palp ciliated (Fig. 28). Differentiated seta of outer labial papilla usually set in a well developed mound (Fig. 25). Apical seta of labial papillae short (cf. Fig. 15, 25). 3 + 3 setae along cephalic groove (Fig. 23). Body macrochaetae: 00/0241 + 2 (Fig. 31). Chaetotaxy of Abd. 2, Abd. 3 and trichobothrial complex of Abd. 4 as in Fig. 32-34. Trochanteral organ with up to 63 setae. Claws as in Fig. 20, 21; distal unpaired ungual tooth sometimes absent. Unguiculus truncate, one outer lamella sometimes with small denticles. Ratio supraempodial seta/unguiculus= 0.54 (0.45-0.59, n=16). Dental tubercle large, apically flat (Fig. 30). Mucronal spine without denticles (Fig. 18).

Diagnosis. Length of the antennae, the slender body, and the very large thoracic hood readily separate *L. caprilesi* from the other Puerto Rican species. It is also the only native species with scales on Ant. 2, Ant. 3 and tibiotarsi.

The only Neotropical species with habitus resembling that of *L. caprilesi* are *L. vexans* Denis, 1933 (Costa Rica), *L. summersi* MacGillivray, 1894 (Venezuela) and *L. decui* Gruia, 1984 (Cuba). Denis' species has lanceolate unguiculi, a much longer supraempodial seta, a papilla like protuberance on Ant. 4 and a smaller thoracic hood. MacGillivray's species has lanceolate unguiculi and both the proximal mucronal tooth and the mucronal spine are greatly reduced. These species also differ in various details of the color pattern.

Lepidocyrtus decui is closely related to *L. caprilesi.* Both species have the same habitus, possess scales on Ant. 1 to Ant. 3 and have identical head, labral and labial chaetotaxy. However, specimens of *L. decui* are much darker, lack Abd. 4 seta s and possess 80-90 setae on the trochanteral organ vs. up to 63 in *L. caprilesi.*

Comments: Specimens can be segregated into four groups on the basis of pigment distribution. Individuals from Arecibo, Manatí, Moca, Orocovis, Quebradillas, Utuado and Villalba possess a band of pigment that extends from the posterior margin of the eyepatch to the posterior margin of the head (Form A, Fig. 22). A syntype on loan from the Illinois State Natural History Survey belongs to this form.

Specimens from Guayama, Las Marías, Maricao, Mayagüez, and Río Grande lack the postocular band (Form B, Fig. 16). Specimens of both forms have been found together in two localities in Cayey.

Specimens from Luquillo lack the postocular band but possess a dorsal band on Abd. 3 (Form C). One specimen with this phenotype was found in Mayagüez with specimens of form B and one specimen was collected in Villalba with individuals of form A.

Specimens from one locality in Maricao resemble form C but possess more pigment on the body (Form D, Fig. 17). I have not detected consistent morphological differences between any of these forms.

Specimens of various populations possess two r setae on the labium but this variation is not correlated with variation in color pattern. In one specimen from Mayagüez the left side of Abd. 2 has seta Li and the right side of another specimen from the same locality has a fan-shaped seta between the exterior trichobothrium and seta m5. A third specimen from Mayagüez lacks Abd. 3 seta mi and another individual lacks c3 on the left side of the body.

Material Examined. (forms indicated in parentheses), Arecibo, Río Abajo forest, camping area, Rd. 621, beating vegetation, 19.IV.1981, 6 in alcohol (A). Arecibo, Rd. 682, entrance to Cambalache forest, leaf litter, 19.IV.1981, 1 in alcohol (A). Luquillo, Caribbean National Forest, Big Tree Trail, nr. Rd. 191, 8 (3 on slides) (C). As preceding but 22.IX.1984, 27 (2 on slides) (C). Cayey, Rd. 1 km 69.3, 16.XII.1976, 3 in alcohol (A). Cayey, Rd. 15 km 22.4, 18.IV.1974, 2 in alcohol (A). Cayey, Carite forest, Rd. 184 km 26.6, beating grasses and other vegetation, 13.IV.1981, 6 in alcohol (A). Cayey, Rd. 7741 km 1.8, beating vegetation, 22.IX.1984, 10 in alcohol (A). As preceding but km 2.3, 13.VI.1981, 6 (2 on slides) (A). As preceding but km 4.6, 18.IV.1974, 7 in alcohol (A,B). Cayey-

Salinas, Rd. km 70.3, 13.VI.1961, S. Medina Gaud, 9 (4 on slides) (A, B). As preceding but km 74.6, 18.VI.1974, 1 in alcohol (B). Guayama, Rd. 179, km 3.7, 18.VI.1974, 1 in alcohol (B). Las Marías, 5 km from town, 21.Vlll.1951, J. Maldonado Capriles, 1 syntype (A). Las Marías, Rd. 119, km 17.2, 23.II.1981, 6 in alcohol (B). Las Marías, Rd. 407, km 4.0, 11.XII.1976, 20 in alcohol (B). Manatí, Rd. 149, km 4.2, 20.XII.1980, 1 on slide (A). Maricao, Rd. 120, km 13.6, vocational center, 5.I.1977, 1 in alcohol (B). Maricao, Rd. 120, km 13.9, nr. stone tower, 5.I.1977, 4 (1 on slide) (D). Mayagüez, Rd. 349, km 5.9, 13.XII.1976, 3 in alcohol (B). As preceding but km 6.0, 8.VI.1974, 29 (10 on slides) (B,C). As preceding but on 17.VI.1981, 7 in alcohol (B). Moca, Rd. 110, km 2.2, 9.III.1974, 1 on slide(A). Orocovis, Rd. 155 km 21.8, 21.III.1974, 5 on slides (A). Quebradillas, Guajataca, Rd. 2 km 106.8, 9.III.1974, 2 in alcohol (A). Río Grande, El Verde, Rd. 186 km 19.3 and 21.4, 30.XII.1973, 2 on slides (B). Utuado, Rd. 111 km 12.4, Centro Ceremonial Indígena, 19.IV.1981, 4 in alcohol (A). Villalba, Toro Negro forest, Rd. 143 km 32.1, 6. XII.1981, 2 in alcohol (A, C).

Lepidocyrtus biphasis new species
Fig. 35-51

Length to 1.6 mm. Mesonotum projecting over head. Distribution of violet pigment as in Fig. 42, 43. Ant. 4 with a rounded 1- or rarely 2-lobed exposed papilla (Fig. 38, 39). Head macrochaetae absent. Interocular setae (Fig. 45): pqrst(v). Inner setae of third labral row thicker than outer setae (Fig. 37). Labral intrusion V-shaped, inner labral papillae reduced. Labial chaetotaxy: a_1-a_5, Mr(reduced)EL_1L_2(Fig. 50). Setae of maxillary palp and differentiated seta of outer labial papilla as in Fig. 35, 36. 5 + 5 setae along cephalic groove. Body macrochaetae: 00/0230+2 (Fig. 47). Chaetotaxy of Abd. 2, Abd. 3 and trichobothrial complex of Abd. 4 as in Fig. 48, 49, 51. Trochanteral organ with up to 12 setae (Fig. 41). Claws as in Fig. 46; inner pair of ungual teeth small, proximal unpaired tooth large. Unguiculus truncate, one outer lamella with denticles. Ratio supraempodial seta/unguiculus = 1.04 (0.91-1.15, n=10). Dental tubercle with rounded apex (Fig. 44). Mucronal spine with small denticles (Fig. 40).

Diagnosis. This species is similar to *L. dispar* but they differ in color pattern and in the presence of a papilla on Ant. 4 of *biphasis.* Also, in the latter species Abd. 2 seta m3 is twice as long as a fan-shaped seta while in *L. dispar* m3 is about the same length as these setae.

None of the Neotropical species described so far possess a color pattern similar to that of *L. biphasis.* The new species resembles *L. finus* Christiansen and Bellinger, 1980 (U.S.A.) but they differ in the positions of the macrochaetae of Abd. 4, presence of two M setae on the labium of *finus* and in the positions of the inner ungual teeth. The unguiculus of *finus,* like that of all Nearctic species, is lanceolate.

Comments. Specimens can be separated into two groups by their color patterns. Most specimens possess a dorsal band on Abd, 4 and a spot of pigment on Abd. 5 (Fig. 42). Individuals from Guánica and Cabo Rojo possess two irregular spots on each side of Abd. 4 (Fig, 43). The anterior spots may be reduced to mere dots or they may be much larger without touching dorsally.

Material Examined. Coamo-Aibonito, Rd. 14 km 44.1, beating grasses, 7.I.1982, holotype and 21 paratypes (9 on slides). Aguadilla, Borinquen beach, Ramey, 23.XII.1976, 2 in alcohol. Arecibo, Rd. 682, entrance to Cambalache forest, beating vegetation, 19.IV.1981, 4 in alcohol. Cabo Rojo, Punta Aguila, El Fare, 24.XII.1976, 2 (1 on slide). Cayey, Rd. 7741 km 1.8, beating vegetation, 22.IX.1984, 9 (3 on slides). Guánica, Rd. 333km 3.2, 1/2 km from road, 7.II.1974, 1 in alcohol. Guánica forest, 10.IV.1981, 43 (11 on slides). Manatí, Rd. 149 km 4.2, 29.XII.1976, 1 in alcohol. Utuado, Rd. 111 km 12.4, Centro Ceremonial Indigens, beating vegetation, 19.IV.1981, 1 on slide.

Lepidocyrtus ianthinus new species
Fig. 52-65

Length to 1.1 mm. Mesonotum projecting over head. Body almost completely covered with violet pigment (Fig. 52). Ant. 4 without papilla. Head macrochaetae absent. Eyes g and h very reduced, not visible in cleared specimens. Interocular setae: pst (Fig. 53), 2 specimens apparently possess a pair of insertions, which could belong to scales, between setae p and s-t. Prelabral setae ci-

liated. Labral setae smooth, setae of third row subequal (Fig. 62). Labral intrusion V-shaped, inner labral papillae reduced and setaceous. Labial chaetotaxy: a_1-a_5, MEL_1L_2 (Fig. 61). Setae of maxillary palp and differentiated seta of outer labial papilla as in Fig. 58, 60. 4 + 4 setae along cephalic groove. Body macrochaetae: 00/0230+2. Chaetotaxy of Abd. 2, Abd. 3 and Abd. 4 as in Fig. 63-65. Trochanteral organ with up to 12 setae. Claws as in Fig. 55-57. Inner margin of unguis with a large proximal tooth and 1-2 small teeth inserted above it. Unguiculus truncate. Ratio supraempodial seta/unguiculus= 0.78 (0.71-0.82, n=8). Dental tubercle with rounded apex (Fig. 59). Mucronal spine (Fig. 54) with or without small dentitles.

Diagnosis. This species is almost indistinguishable in color from *P. violeta* but both species differ in almost every morphological detail.

The only Neotropical *Lepidocyrtus* with a coloration resembling that of *L. ianthinus* is *L. stratus* Mari Mutt, 1983 (Venezuela). Specimens of the latter are much darker, possess labial seta r, 5 + 5 setae along the cephalic groove and also differ in the number and position of ungual teeth and macrochaetae on Abd. 4. Dark specimens of *L. mutabilis* Denis, 1931 (Costa Rica) could resemble specimens of L. ianthinus but Denis' species has lanceolate unguiculi and a well developed inner pair of ungual teeth.

Material Examined. Cayey, Rd. 7741 km 1.8, 25.IX.1984, holotype and 13 paratypes (8 on slides). As preceding but 18.IV.1974, 1 on slide.

Lepidocyrtus dispar new species Fig. 66-78

Length to 1.35 mm. Mesonotum projecting over head. Body coloration variable between populations (Fig. 71, 75-78; see comments). Ant. 4 without papilla (Fig. 70). Head macrochaetae absent. Interocular setae: pqrst(v). Inner setae of third labral row longer than outer setae (Fig. 68). Labral intrusion V-shaped, inner labral papillae reduced. Labial chaetotaxy: a_1-a_5, Mr(reduced)EL_1L_2. Setae of maxillary palp and differentiated seta of outer labial papilla as in *L. lepargus. 5 + 5* setae along cephalic groove. Body macrochaetae: 00/0230+2. Chaetotaxy of Abd. 2 and Abd. 3 as in Fig. 73, 74. Trichobothrial complex of Abd. 4 and positions of macrochaetae on this segment as in *L. biphasis.* Trochanteral organ V-shaped, with up to 11 setae. Claws as in Fig. 66, 72. Basal pair of ungual teeth very small or one tooth absent; only one tooth visible in lateral view of unguis. Proximal unpaired tooth large, distal tooth very small or absent. Unguiculus truncate. Ratio supraempodial sets/unguiculus= 1.0 (0.84-1.10, n=8). Dental tubercle with rounded apex (Fig. 69). Mucronal spine with denticles (Fig. 67).

Diagnosis. The only Puerto Rican species without head macrochaetae, a papilla on Ant. 4 and scales on the antennae and legs is *L. ianthinus,* which has a different coloration and setaceous labral papillae, 4 + 4 setae along the cephalic groove, a different number of interocular setae and a longer Abd. 2 seta as. It also lacks labial seta r and Abd, 4 seta s.

Specimens of form C (Fig. 78) could be confused with the following Neotropical species: *L. usitatus* Folsom, 1927 (Honduras, Panama), *L. pseudofimetarius* Gruia, 1983 (Cuba), *L. pearsei* Mills, 1938 (Mexico, Yucatán) and *L. schmidti* Handschin, 1927 (Costa Rica). The number and form of the inner ungual teeth distinguish L. dispar from all these species. In addition, L. usitatus lacks a projecting mesonotum and its unguiculi are lanceolate. *Lepidocyrtus pseudofimetarius* has a papilla on Ant. 4, all setae of the anterior labial row ciliated, and the unguiculus is lanceolate. Mills' species also has lanceolate unguiculi.

Lepidocyrtus balteatus Mari Mutt, 1983 (Venezuela) resembles specimens of form E (Fig. 77) but the former have a papilla on Ant. 4, setae of third labral row bifurcated, all labral papillae of similar size and only one macrochaeta on Abd. 4.

Lepidocyrtus finus Christiansen and Bellinger, 1980 (U.S.A) and *L. floridensis* Snider, 1967 (Florida) resemble form A in having a light thorax and a dorsal transverse band on Abd. 4. However, *L. finus* has a papilla on Ant. 4, 2 M labial setae, lanceolate unguiculi, and different arrangement of macrochaetae on Abd. 4 and of inner ungual teeth. *Lepidocyrtus floridensis* has lanceolate unguiculi and a different arrangement of inner ungual teeth.

Comments. This species occurs in five color forms. Specimens of form A possess scat-

tered pigment on the sides of Th. 2 to Abd. 2, a dorsal transverse band on Abd. 4 and a distinct circular spot on the posterior lateral part of the same segment (Fig. 71). This form occurs in populations from Arecibo, Cayey, Las Marías, Mayagüez, Utuado and Villalba. Specimens from a locality in Cayey have the dorsal band of Abd. 4 broken in the center of the segment. The resulting two spots are conspicuous in some individuals but reduced to mere dots in others. Specimens from various localities exhibit reduction in the extent of pigment on Th. 2 to And. 2.

Specimens of form B possess a wide band on the sides of Th. 2 to Abd, 2 with the pigment decreasing in intensity towards the midline of the segments. The fourth abdominal segment has a dorsal transverse band and an irregular spot on its posterior lateral part (Fig. 76). This form occurs in populations from Aibonito, Caguas, Cayey, Mayagüez, Moca, Morovis, Orocovis, Quebradillas, Río Grande, San Sebastian, Utuado and Villalba. Forms A and B have been collected together in Cayey and in Villalba. Several populations of this form include specimens with reduced pigmentation on Th. 3 to Abd. 2 or a reduced dorsal band on Abd. 4. In some of the latter, the band is represented by a small dot on each side of the segment or it may be absent.

Specimens of form C (Fig. 78) are white except for some pigment on Th. 3, Abd. 2 and ventrally on Abd. 4 in the furrow that bears the furcula. This form has been found only in two adjacent localities in Maricao. One of these (stone tower) contained also two specimens of form B.

Form D consists of specimens that possess light to intense pigment all over the body except for the head and proximal portion of Abd. 4 (Fig. 75). This form has been found only in one locality in Maricao (stone tower), together with specimens of forms B and C.

Specimens of form E are yellow with two wide black (deep violet) bands (Fig. 77), the anterior extends to the femur of the third pair of legs. The intensity of the pigment is reinforced by the scales, which in these segments are thicker and darker. This form has been collected in one locality in Cayey together with specimens of form B.

Material Examined (forms indicated in parentheses). Orocovis, Rd. 155 km 21.8, 21.Ill,1974, holotype and 23 paratypes (9 on slides) (B). Aibonito, Rd. 725 km 5.9, 7.1.1982, 29 in alcohol (B). Arecibo, Río Abajo forest, camping area, beating vegetation, 19.IV.1981, 11 in alcohol (A). Caguas, Rd. 156 km 53.7, 9.I.1977, 3 in alcohol (B). Cayey, Rd. 1 km 69.3, 16.XII.1976, 8 in alcohol (A, B). Cayey, Rd. 15 km 20.2, 13.VI.1981, 2 in alcohol (A). As preceding but km 22.4, 18.VI.1974, 3 in alcohol (B). Cayey, Rd. 184 km 26.6, Carite forest, beating grasses and other vegetation, 13.VI.1981, 10 (1 on slide) (A). Cayey, Rd. 7741 km 1.8, beating vegetation along the road, 22.IX.1984, 8 (3 on slides) (B, E). As preceding but km 2.3, 13, VI.1981, 12 (3 on slides) (A). As preceding but km 4.6, 18.IV.1974, 4 in alcohol (A). Cayey-Salinas Rd. km 67.6, 18.IV.1974, 5 in alcohol (B). As preceding but km 70.3, 13.VI.1961, S. Medina Gaud, 5 (2 on slides) (B). Las Marías, Rd. 119 km 17.2, 27.II.1981, 4 in alcohol (A). Maricao, Rd. 120 km 13.6, centro vacacional, 14 in alcohol (C). Maricao, Rd. 120 km 13.9, near stone tower, 5.I.1977, 36 (4 on slides) (A, C, D). Mayagüez, Rd. 349 km 1.4, 17.VI.1981, 21 (12 on slides) (A). As preceding but XI.1977, 4 in alcohol (A), As preceding but km 5.9, 13.XII.1976, 2 in alcohol (A). Moca, Rd. 110 km 7.2, 9.III.1974, 5 on slides (B). Morovis, Rd. 155 km 46.2, 21.III.1974, 1 on slide (B). Quebradillas, Guajataca, Rd. 2 km 106.8, 9.III.1974, 1 in alcohol (B). Río Grande, El Verde, Rd. 186 km 19.3 and 21.4, 30.XII.1973, 5 on slides (B). San Sebastian, Rd. 111 km 14.5, 9.III.1974, 4 on slides (B). San Sebastian, Rd. 119 km 33.7, 21.III.1981, 5 in alcohol (B). Utuado, Rd. 111 km 12.4, Centro Ceremonial Indigens, beating vegetation, 19.IV.1981, 3 (1 on slide) (B). As preceding but in leaf litter, 14 in alcohol (A). Villalba, Toro Negro forest, Rd. 143 km 32.1, 6.XII.1981, 3 in alcohol (A, B).

Lepidocyrtus distinctus new species
Fig. 79-89

Length to 1.1 mm. Mesonotum not projecting over head. Head with postocular band of pigment and a median band that extends from area between bases of antennae to a little behind eyepatches. Th. 2 to Abd. 3 heavily pigmented, pigment decreasing in intensity towards dorsum of body. Abd. 4 with a lateral band (Fig. 79). Ant. 4 with subapical papilla placed in deep depression

(Fig. 83). Head macrochaetae absent. Interocular setae: prst. Setae of third Iabral row subequal. Labral intrusion V-shaped, Iabral papillae reduced to inconspicuous rounded projections. Labial chaetotaxy: a_1-a_5Mr(reduced)EL_1L_2. Setae of maxillary palp and differentiated seta of outer labial papilla as in Fig. 88, 81. 5+5 setae along cephalic groove. Body macrochaetae: 00/0130+2 (Fig. 84). Setae of trichobothrial complexes simple, not fan-shaped. Abd. 2 without seta m3 (Fig. 85). Chaetotaxy of Abd. 3 and trichobothrial complex of Abd. 4 as in Fig. 86, 87. Trochanteral organ with up to 11 setae. Claws as in Fig. 80, unguiculus Ianceolate. Ratio supraempodial seta/unguiculus= 0.81 (0.75-0.91, n= 10). Dental tubercle rounded (Fig. 82). Mucronal spine without denticles (Fig. 89).

Diagnosis. Coloration readily separates *L. distinctus* from all New World species except *L. helenae* Snider, 1967 (U. S. A). However, the latter has head macrochaetae RO and T, Abd. 2 seta m3, 1 + 2 macrochaetae on Abd. 4, and Abd. 3 setae d1 and d2 are of equal length. In addition, specimens of *L. helenae* lack a dental tubercle.

Material Examined. Quebradillas, Guajataca, Rd. 2 km 106.8, 9.III.1974, holotype and 5 paratypes (4 on slides). Manatí, Rd. 149 km 4.2, 29.XII.1976, 5 (2 on slides). Mayagüez, TARS, cacao litter, 14.V.1981, J. E. Correa, 1 in alcohol. Orocovis, Rd. 155 km 21.8, 21.III.1974, 1 in alcohol. San Sebastian, Rd. 111 km 14.5, 9.III.1974, 1 on slide.

Lepidocyrtus maldonadoi new species
Fig. 90-101

Length to 1.5 mm. Mesonotum not strongly projecting over head. Anterior and lateral margins of Th. 2 with wide pigment band. Th. 3 to Abd. 1 with band that decreases in intensity towards dorsum of body. Abd. 4 with wide transverse band that covers whole segment (Fig. 90). Ant. 4 with large, bilobed papilla set in a deep depression with a channel leading to its base (Fig. 98, 99). Head macrochaetae absent. Interocular setae: pq(r)st. Prelabral setae ciliated, Iabral setae smooth. Setae of third Iabral row subequal (Fig. 96). Labral intrusion V-shaped, inner papillae reduced. Labial chaetotaxy: a_1-a_5, Mr(very reduced)EL_1L_2. Setae of maxillary palp and differentiated seta of outer labial papilla as in Fig. 97, 101. 5+5 setae along cephalic groove (Fig. 92). Body macrochaetae: 00/0220 + 2. Chaetotaxy of Abd. 2 as in Fig. 93. Chaetotaxy of Abd. 3 and Abd. 4 identical to that of *L. Iepargus* except for length of Abd. 3 seta *as* (Fig. 100). Trochanteral organ with up to 17 setae. Distal inner unpaired ungual tooth distinct or very reduced, originating very far from proximal unpaired tooth (Fig. 91). Unguiculus Ianceolate, without denticles. Ratio supraempodial sets/unguiculus= 0.85 (0.78-0.93, n = 12). Dental tubercle rounded (Fig. 95). Mucronal spine long, without denticles (Fig. 94).

Diagnosis. This species may be confused with form A of *L. dispar* but the latter has a narrower band on Abd. 4, truncate unguiculi, different inner ungual teeth, and Abd. 2 seta *as* is very short. In addition, specimens of *L. dispar lack* a papilla on Ant. 4. The color pattern readily separates *L. maldonadoi* from all other New World species.

Comments. The species is named after Dr. Jenaro Maldonado Capriles, in appreciation of his encouragement and support of my first efforts in collembolan taxonomy.

Material Examined. Luquillo, Caribbean National Forest, Big Tree Trail, nr. Rd. 191, among leaves attached to the stem of a dead palm about 1 m tall, 12.VII.1984, holotype and 29 paratypes (9 on slides). Cayey, Rd. 184 km 26.6, Carite forest, beating grasses and other vegetation, 13.VI.1981, 1 on slide. Cayey-Salinas Rd. , km 70.3, 13.VI.1961, S. Medina Gaud, 1 in alcohol. Orocovis, Rd. 155 km 21.8, 21.III.1974, 2 in alcohol (1 without head), Villalba, Toro Negro forest, Rd. 143 km 32.1, 1 in alcohol.

Lepidocyrtus ramosi new species
Fig. 102-112

Length to 1.5 mm. Mesonotum not projecting over head. Head and body with evenly distributed light pigment (Fig. 107) or pigment absent. Ant, 4 with large nail-like papilla set in a deep depression (Fig. 1 03). Head macrochaetae absent. Interocular setae: pqst. Setae of third Iabral row subequal (Fig. 105). Labral intrusion narrow, inner labral papillae reduced. Labial chaetotaxy: a_1-$a_5$mr(reduced)E(lightly ciliated)L_1L_2(Fig. 110). Setae of maxillary palp and differen-

tiated seta of outer labia papilla as in Fig. 109, 102. 5+5 setae along cephalic groove. Body macrochaetae: 00/0220+2. Chaetotaxy of Abd. 2 as in Fig. 108. Chaetotaxy of Abd. 3 identical to that of *L. maldonadoi;* except for length of seta *as* (cf. Fig. 100, 104) and absence of seta d2. Chaetotaxy of Abd. 4 as in Fig. 111. Trochanteral organ with up to 11 setae. Proximal inner unpaired ungual tooth large (Fig. 112); distal unpaired tooth small, sometimes absent. Unguiculus lanceolate, outer lamela with several small denticles. Ratio supraempodial seta/unguiculus= 0.97 (n=2, 0.94, 1.0). Dental tubercle as in *L. biphasis* but cuticle thinner and tubercle almost transparent. Mucronal spine long, without denticles (Fig. 106).

Diagnosis. Unpigmented specimens resemble *L. lepargus* but labial chaetotaxy and shape of the papilla on Ant. 4 distinguish *L. ramosi* from this and all other Puerto Rican species. The positions of the macrochaetae on Abd. 4 are also unique among species from the island.

Two Neotropical species resemble *L. ramosi:* L. mutabilis Denis, 1931 (Costa Rica, Guatemala) and *L. pseudofimetarius* Gruia, 1983 (Cuba). Denis' species has a different arrangement of macrochaetae on Abd. 4, lacks Abd. 2 seta a2p, and has labial seta e smooth. Gruia's species has all the labial setae ciliated.

Comments. Specimens from the type locality (Añasco) do not exceed 1.1 mm and have labial seta L_1 ciliated. The only paratype from Arecibo is 1.5 mm long and has seta 1_1 smooth.

The species is named after Dr. Jose A. Ramos, in recognition of his valuable contributions to the taxonomy of Caribbean insects.

Material Examined. Añasco, Barrio Ovejas, Rd. 108 km 9.8, 22.XII.1976, holotype and 5 paratypes (3 on slides). Arecibo, Rd. 682, entrance to Cambalache forest, 19.IV.1981, 1 on slide. Caguas, Rd. 156 km 53.7, 9.I.1977, 1 on slide.

Lepidocyrtus lepargus new species
Fig. 113-127

Length to 1.4 mm. Mesonotum not projecting over head. Body white or with scarce pigment on sides of Th. 2 to Abd. 1 (Fig. 113). Ant. 4 with large 1-lobed papilla (bilobed in 1 antenna of 1 specimen) set in a deep depression with 1-2 channels leading to its base (Fig. 124, 125). Head macrochaetae absent. Interocular setae: pqst (Fig. 116). Setae of third labral row subequal (Fig. 119). Labral intrusion V-shaped, inner labral papillae reduced. Labial chaetotaxy: a_1-a_5Mr(reduced)EL $_1L_2$. Basal seta of maxillary palp longer than apical seta (Fig. 117). Differentiated seta of outer labial papilla as in Fig. 123. 5 + 5 setae along cephalic groove. Body macrochaetae: 00/0220 + 2 (Fig. 120). Chaetotaxy of Abd. 2 and Abd. 3 as in Fig. 114, 127. Trichobothrial complex of Abd. 4 as in Fig. 126. Trochanteral organ with up to 15 setae. Basal pair of inner ungual teeth originating near middle of claw (Fig. 121, 122). Unguiculus lanceolate, 1 outer lamella sometimes with denticles. Ratio supraempodial seta/unguiculus= 0.86 (0.63-1.0, n= 12). Dental tubercle somewhat pointed (Fig. 115). Mucronal spine without denticles (Fig. 118).

Diagnosis. Specimens with Th. 2 to Abd. 1 pigmented resemble small individuals of *L. nigrosetosus.* The latter's diagnosis details the many differences that separate these two species. Specimens of *L. lepargus* could be confused with pale specimens of *L. ramosi* but they differ in the shape of the Ant. 4 papilla and the positions of the macrochaetae of Abd. 4. In *L. ramosi,* labial seta m is smooth and Abd. 2 seta *as* is subequal to a3 (much shorter in *L. lepargus),*

Four Neotropical species possess very little pigment on the body: *L. pearsei* Mills, 1938 (México, Yucatan), *L. schmidti* Handschin, 1927 (Costa Rica), *L. usitatus* Folsom, 1927 (Panama, Honduras) and *L. pseudofimetarius* Gruia, 1983 (Cuba).

The description of the first species is so incomplete that no meaningful comparison can be made other than stating that the unguis of *L. pearsei* seems unique in possessing six inner teeth. *Lepidocyrtus schmidti* has truncate unguiculi and the basal pair of ungual teeth is very reduced. Specimens of Folsom's species lack unpaired teeth on the inner margin of the unguis and larger specimens have the head and body minutely speckled with blue pigment. *Lepidocyrtus pseudofimetarius* has ciliated setae on the anterior labial row, Abd. 2 seta *as* is almost as long as m3e (much shorter in *L. lepargus)* and the macrochaetae of Abd. 4 have a very different arrangement.

Comments. This species has been found only in two dry localities on the southern part of the island. At Cabo Rojo, the specimens were collected in abundance in litter of red mangrove *(Rhizophora mangle)* growing about 3 m from the shore.

Material Examined. Cabo Rojo, Punta Aguila, El Fare, 24.X11.1976, holotype and 42 paratypes (9 on slides). As preceding but 8.VIII.1981, 128 in alcohol. Guánica, Rd. 333km 3.2, 1/2 km from road, 7.II.1974, 1 on slide. Guánica forest, 10.VI.198I, 6 (1 on slide).

Lepidocyrtus vireticulus new species
Fig. 128-140

Length to 1.2 mm. Mesonotum not projecting over head. Th. 2 with lateral band of pigment (Fig. 128). Abd. 3 with band from anterior-lateral part to posterior-dorsal part, bands from both sides may touch dorsally along posterior margin of segment. Metacoxae pigmented. Ant. 4 without papilla (Fig. 134). Head macrochaetae: ROI2STPo (Fig. 131). Interocular chaetotaxy: pst (Fig. 129). Prelabral setae ciliated; setae of first labral row lightly ciliated, other rows smooth (Fig. 137). Inner setae of third labral row thicker than outer setae. Labral intrusion V-shaped, labral papillae subequal. Labial chaetotaxy: A_1- A_5M E L_1L_2 (Fig. 139). Basal seta of maxillary palp ciliated, longer than apical seta. Differentiated seta of outer labial papilla long but not reaching apex of papilla (Fig, 140). 3 + 3 setae along cephalic groove. Body macrochaetae: 10/0241 + 2. Chaetotaxy of Abd. 2, Abd. 3 and trichobothrial complex of Abd. 4 as in Fig. 133, 136, 132. Distribution of macrochaetae of Th. 2 and Abd. 4 as in Fig. 135, 138. Trochanteral organ with up to 18 setae. Inserted about 1/3 from outer margin of tibiotarsi a long, thin seta resembling a trichobothrium. Inner margin of unguis with small basal paired teeth (Fig. 130), unpaired teeth very small, frequently absent. Unguiculus lanceolate. Ratio supraempodial seta/unguiculus= 1.0 (0.93-1.16, n= 10). Dental tubercle absent. Mucro as in *L. maldonadoi,* spine without denticles.

Diagnosis. The color pattern will distinguish *L. ramosi* from all other New World species. This is the only Puerto Rican species with a full set of head macrochaetae.

Material Examined. Mayagüez, about 30m E of Entomological Research Laboratory, RUM, dry grass from mowed lawns, 28.VII.1984, holotype and 17 paratypes (6 on slides). As preceding but 25.V.1973, 5 on slides. As preceding but 28.II.1984, J. Panelli, 3 on slides. Mayagüez, University of Puerto Rico campus, near basketball courts and swimming pool, beating grasses, J. Panelli, 1 on slide. Isabela, Agricultural Experiment Station, pitfall traps, 14.XI.1979, E. Abreu, 1 in alcohol.

Lepidocyrtus griseolus new species
Fig. 141-149

Length to 1.1 mm. Mesonotum not projecting over head. Light violet-gray pigment over most of head and body (Fig. 141). Ant. 4 with large apical protuberance (Fig. 146). Head macrochaetae: R12, a seta along midline in extreme anterior area may be RO. Interocular setae: pt (Fig. 145). Setae of third labral row subequal. Labral intrusion V-shaped but narrower than in other species. Outer labral papillae well developed, inner papillae represented by minute setae very difficult to observe (Fig. 142). Labial chaetotaxy: a_1-a_5Mr(reduced) EL_1L_2. Setae of maxillary palp smooth, subequal. Differentiated seta of outer labial papilla as in *L. lepargus* and *L. distinctus. 3 + 3* setae along cephalic groove. Body macrochaetae: 00/0220+2. Chaetotaxy of Abd. 2, Abd. 3 and trichobothrial complex of Abd. 4 as in Fig. 147-149. Position of macrochaetae on Abd. 4 as in Fig. 144. Trochanteral organ with up to 14 setae. Inner margin of unguis with pair of well developed basal teeth not inserted at same level (Fig. 143). Unguiculus lanceolate. Ratio supraempodial sets/unguiculus= 1.0 (0.95-1.12, n= 10). Dental tubercle absent. Mucro as in *L. lepargus,* basal spine without denticles.

Diagnosis. This species closely resembles *L. diminutus* but the latter has the trichobothria of Abd. 2 inserted much farther apart and on this same segment seta m3 is a long macrochaeta and setae mi, Lm and LI are not fan-shaped. *Lepidocyrtus griseolus* has smooth labral setae (ciliated in *diminutus).* There are also differences in the shape of the labral intrusion, Ant. 4 papilla, inner ungual teeth, and number of setae along the cephalic groove.

The Neotropical species which most closely resemble *L. griseolus* are *L. mutabilis* De-

nis, 1931 (Costa Rica), Ellis 1967 (Guatemala) and *L. usitatus* Folsom, 1927 (Panama, Honduras). Unfortunately, Denis' description offers little opportunity for comparison with *griseolus* other than coloration and ungual morphology. Lepidocyrtus mutabilis seems somewhat darker and its basal pair of inner ungual teeth are not as large as those of *griseolus.*

If Ellis' specimens indeed belong to *L. mutabilis,* this species would also differ from *L. griseolus* by the positions of the macrochaetae of Abd. 4, absence of head macrochaetae and Abd. 4 seta s in *mutabilis,* and presence of 3 + 3 setae along the cephalic groove of *griseolus vs.* 5 + 5 in *mutabilis.*

The description of *L. usitatus* lacks many details, but this species apparently lacks inner unpaired ungual teeth.

Material Examined. Mayagüez, University of Puerto Rico campus, near swimming pool parking lot, beating wet grasses, 28.III.1984, J. Panelli, holotype and 43 paratypes (9 on slides). Thirty-three other specimens preserved in alcohol were collected by myself and J. Panelli by beating grasses at 11 other localities within the University campus. Utuado, Rd. 111 km 12.4, Centro Ceremonial Indigens, beating vegetation, 19.IV.1981, 3 specimens (1 on slide). Guánica, Rd. 333 km 0.5, sugarcane litter. 7.II.1974, 3 on slides.

Lepidocyrtus diminutus new species
Fig. 150-162

Length to 0.8 mm. Mesonotum not projecting over head. Light to fairly dark violet-gray pigment distributed over most of head and body (Fig. 155) or pigment restricted to antennae and eyepatches. Ant. 4 with an exposed papilla (Fig. 156-158). Head macrochaetae and interocular setae absent (Fig. 154). Prelabral and labral setae ciliated, setae of third row subequal (Fig. 152). Labral intrusion broad, rounded. Labral papillae represented by 4 very small setulae. Labial chaetotaxy: A_1-A_5Mr(reduced)EL_1L_2. Basal seta of maxillary palp ciliated, not much longer than apical seta. Differentiated seta of outer labial papilla slightly curved, surpassing apex of papilla (Fig. 162). 4 + 4 setae along cephalic groove. Body macrochaetae: 10/0220+2. Chaetotaxy of Abd. 2, Abd. 3, and trichobothrial complex of Abd. 4 as in Fig. 150, 151, 153. Macrochaeta of Th. 2 long, slender (Fig. 159), inserted in same position as in *L. vireticulus* (Fig. 135). Macrochaetae of Abd. 4 as in *L. griseolus* except that B6 is directly below B5, not displaced laterally. Trochanteral organ with up to 7 setae. Inner margin of ungues with pair of subequal basal teeth, very large proximal unpaired tooth, and small distal tooth (Fig. 160). Unguiculus lanceolate. Ratio supraempodial seta/unguiculus= 1.07 (1.00-1.08,n=9). Dental tubercle absent. Mucronal spine without denticles (Fig. 161).

Diagnosis. Typical specimens possess essentially the same pigmentation as individuals of *L. griseolus* (cf. Fig. 141, 155). The many morphological characters that distinguish both species are listed in the diagnosis of *griseolus.*

Unpigmented specimens of *L. diminutus* are very similar to individuals of *L. lepargus* but these species can be distinguished easily by various elements of the chaetotaxy of Abd. 2 (distance between trichobothria, length of m3, position of a3, absence of a2p in *diminutus),* absence of fan-shaped setae on the abdominal segments of *diminutus,* and absence of interocular setae, labral papillae and the dental tubercle also in *diminutus.*

The Neotropical species that most closely resemble *L. diminutus* are *L. mutabilis* Denis, 1931 (Costa Rica), Ellis 1967 (Guatemala) and *L. usitatus* Folsom, 1927 (Panamá, Honduras). Specimens of *L. mutabilis* are larger and more slender. Ellis' specimens are not only larger but also differ in the positions of Abd. 4 macrochaetae, length of Abd. 2 seta m3, the setae associated with their trichobothria are fan-shaped, and they possess 5 + 5 setae along cephalic groove (4+4 in *diminutus).*

Comments. Specimens from Cabo Rojo lack pigment except for the eyepatches and antennae. Specimens from Guánica are pigmented and the intensity of the pigment ranges from somewhat lighter than in Fig. 155 to almost as dark as *P. violeta* (Fig. 181). Seta m7 of Abd. 3 is missing in one specimen and am6 is present in another specimen.

Material Examined. Guánica forest, 10.VI.1981, holotype and 14 paratypes (9 on slides). Guánica, Rd. 333 km 3.2, 1/2 km from road entrance, 7.II.1984, 4 in alcohol. Cabo Rojo, El Fare, leaf litter of *Coccoloba uvifera,*

10 (2 on slides). Quebradillas, Guajataca, Rd. 2 km 106.8, 1 on slide. Mayagüez, Rd. 349 km 1.4, 28.XII.1980, 1 on slide. As preceding but km 1.5, 30.XII.1980, 9 (1 on slide).

Genus *Pseudosinella* Schäffer, 1897

Entomobryidae with 6 + 6 eyes or less, scales on the body, and bidentate mucro.

Pseudosinella biunguiculata Ellis
Fig. 163-172

Pseudosinella biunguiculata Ellis 1967: 103, Figs. 6,7. Szeptycki 1979:65 (mention). Christiansen et al. 1983: 16, 22 (taxonomic position).

Length to 0.9 mm. Mesonotum not projecting over head. Eyeless and unpigmented. Ant. 4 without papilla, with an apically rounded sensilla (Fig. 170). Head macrochaetae: ROI2Po (Fig. 165), R2 absent in some specimens. Setae of third labral row subequal. Labial chaetotaxy: a_1-a_5Mr(reduced) EL_1L_2. Setae of maxillary palp smooth and subequal in length. Differentiated seta of outer labial papilla curving inwards, surpassing apex of papilia (Fig. 172). 3+3 ciliated setae along cephalic groove. Body macrochaetae: 00/0321 + 1 (Fig. 165). Chaetotaxy of Abd. 2, Abd. 3 and trichobothrial complex of Abd. 4 as in Fig. 163, 164, 166. Trochanteral organ with up to 9 setae. Midway along inner margin of tibiotarsi a ciliated, thick, apically blunt seta (Fig. 169). Unguis with huge basal inner tooth that bears a pair of small lateral teeth and a large or small proximal unpaired tooth (Fig. 167). Unguiculus lanceolate, with large outer tooth. Tenent hair lanceolate or clavate. Ratio supraempodial seta/unguiculus= 0.92 (0.80-1.0, n= 5). Dorsum of manubrium with 2 parallel rows of 4 smooth seta each, 1 such seta on proximal portion of dens (Fig. 168). Dental tubercle absent. Mucronal spine long, without denticles (Fig. 171).

Diagnosis. Christiansen et al. (1983) published a catalog of the world species of *Pseudosinella* in which they proposed a code for listing a number of key characters for each species. The formula for *P. biunguiculata* (012112) is shared with no other species. The last digit of the formula indicates that Abd. 4 lacks macrochaeta C_1 and has two B macrochaetae. However, the original description and the Puerto Rican specimens show that C_1 is present and that there is only one B seta (Fig. 165).

The huge basal inner ungual tooth and the peculiar clublike seta on the tibiotarsi are additional characters unique to *P. biunguiculata.*

Comments. The specimens under study may be divided into two groups. Two specimens from Mayagüez and the specimen from Manatí lack head macrochaetae R2 and possess clavate tenent hairs and a large proximal unpaired ungual tooth. Four specimens from Mayagüez and the specimens from Caguas possess R2, lanceolate tenent hairs and a small ungual tooth. I have not considered these groups as separate species because only small samples have been studied and the specimen from Utuado is intermediate in lacking R2 but possessing lanceolate tenent hairs and a small ungual tooth.

I have some doubts about placing my specimens in *P. biunguiculata* because the original description does not mention the presence of head macrochaetae, and its Fig. 6g indicates that seta a2p is present, Dr. Ellis has kindly lent me the types of this species but only the holotype is in fairly good condition. This specimen has macrochaeta RO and lacks a2p. Since only the absence of head macrochaetae RI , R2 and Po distinguish my specimens from the holotype, and since R2 is variable in the Puerto Rican material, I have decided to temporarily assign my specimens to Ellis' species.

Material Examined. Caguas, Rd. 156 km 53.7, 9.I.1977, 8 (5 on slides). Manatí, Rd. 149 km 4.2, 29.XII.1976, 1 on slide. Mayagüez, Rd. 349 km 1.4, 22.XII.1980, 4 on slides. Mayagüez, TARS, cacao litter, J. E. Correa, 2 on slides. Utuado, Rd. 111 km 12.4, Centro Ceremonial Indigens, 9.lV.1981, 1 on slide.

Pseudosinella violets new species
Fig. 173-188

Length to 1.2 mm. Mesonotum projecting over head. Ant. 1 and Ant. 2 scaled dorsally, Ant. 3 with few scales dorsolaterally near base of segment, Ant. 4 without scales. All leg segments scaled. Body and appendages almost completely covered by violet pigment (Fig. 181). Ant. 4 without papilla, with an apically rounded sensilla (Fig. 173). Ant. 3 sense organ composed of 2 slender rods (Fig. 174). Head macrochaetae absent. Eyes

6 + 6 but sometimes eye E or F apparently absent. Only interocular seta p present, 3 large scales inserted near eyes C and F (Fig. 182). Setae of third Iabral row thick, subequal (Fig. 184). Labral intrusion very narrow. Labral papillae with apical conelike projections (Fig. 179). Labial chaetotaxy: a_1-$a_5M_1M_2$(small)EL $_1L_2$ (Fig. 186), Setae of maxillary palp as in Fig. 178. Differentiated seta of outer labial papilla surpassing apex of its papilla (Fig. 177). 2+ 2 setae along cephalic groove, Body macrochaetae: 00/0040 + 3 (Fig. 183). Chaetotaxy of Abd, 2, Abd. 3 and trichobothrial complex of Abd. 4 as in Fig. 175, 185, 188; note considerable reduction in number of setae. Trochanteral organ with up to 15 setae. Unguis with pair of inner basal teeth and no unpaired teeth (Fig. 176). Unguiculus truncate, especially on first and second pair of legs, without outer tooth. Tenent hair slender, apically dilated. Ratio supraempodial seta/unguiculus= 0.37 (0.32-0.42, n= 8). Dorsum of manubrium and dentes without smooth setae. Dental tubercle long, spinelike (Fig 187). Mucronal spine without denticles (Fig. 180).

Diagnosis. This species has a number of unique features that isolate it from all other members of the genus. The chaetotaxy of Abd. 2 is greatly reduced (Fig. 175, Table 2), with seta m3 absent and m5 is a smooth microchaeta instead of a macrochaeta. The chaetotaxy of Abd. 3 is also reduced (Fig, 185, Table 3) and Abd. 4 setae Dip and pi are absent (Fig. 188). Other unusual characters are the absence of head macrochaetae, 2 + 2 setae along the cephalic groove and the large spinelike dental tubercle.

The formula 6221214 can be assigned to *P. violeta* according to the system proposed by Christiansen et al. (1983). The only other member of the genus with this formula is the cavernicolous *P. dodecophthalma* Gisin and Gama (France). However, this species is unpigmented, has head macrochaetae (R1 , R2 and Po) and macrochaetae on Abd. 2. Both species also differ in the number of ungual teeth, shape of the unguiculus, positions of macrochaetae on Abd, 4 and absence of scales on the antennae of *P. dodecophthalma.*

Pseudosinella violeta is almost indistinguishable in color from *L. ianthinus* but they differ in almost every morphological detail.

Material Examined. Orocovis, Rd. 155 km 21.8, 21.Ill,1974, holotype and 18 paratypes (9 on slides). Arecibo, Río Abajo forest, camping area, 19.IV.1981, 3 (1 on slide). Cayey, Rd. 15km 20.2, 13.VI.1981, 17 in alcohol. As preceding but km 22.4, 18.IV.1974, 9 in alcohol, Cayey, Rd. 7741 km 4.6, 18.IV.1974, 4 in alcohol. As preceding but km 1.8, 25.IX.1984, 1 on slide. Cayey - Salinas, Rd. km 70,3, 13.VI.1961, S. Medina Gaud, 1 on slide. Las Marías, Rd. 119 km 17.2, 23,11,1981, 4 in alcohol. Las Marías, Rd. 407 km 4,0, 11.XII.1976, 13 in alcohol. Maricao, Rd. 120 km 13,9, near stone tower, 5.1, 1977, 4 in alcohol. Mayagüez, Rd. 349 km 1,4, 17.VI.1981, 1 in alcohol, As preceding but km 1,5, 30.XII.1980, 2 in alcohol, As preceding but km 6,1, 17.VI. 1981, 1 on slide, Río Grande, El Verde, Rd. 186 km 13,3, 30.XII.1973, 2 on slides. Villalba, Toro Negro forest, Rd. 143 km 32,1, 6.XII.1981, 14 (1 on slide).

Literature Cited

Christiansen , K. and P. Bellinger 1980. The Collembola of North America north of the Rio Grande, a taxonomic analysts, Part I (p. 1-386), part II (p. 785-1042). Grinell College, Iowa.

———, M, M, da Gama and P. Bellinger. 1983, A catalogue of the species of the genus *Pseudosinella,* Cienc. Biol. Syst, Ecol. (Portugal), 5: 13-31,

Denis, J. R. 1924, Sur les Collemboles du museum de Paris (1re Partie). Ann. Sot, Entomol, Fr., 93: 211-260.

——— 1931. Contribute alla conoscenza del "microgenton" di Costa Rica, Il. Collemboles de Costa Rica avec une contribution au species de l'ordre. Boll. Lab, Zool. Portici, 25: 69-170.

——— 1933. Contribute alla conoscenza del "microgenton" di Costa Rica, Ill. Collemboles de Costa Rica avec une contribution au species de l'ordre. Boll. Lab. Zool. Portici, 27:222-322.

Ellis, W. N. 1967, Studies on Neotropical Collembola, 1. Some Collembola from Guatemala. Beaufortia, Zool, Mus, Univ. Amsterdam, 14:93-107,

Folsom, J. W. 1927. Insects of the Subclass Apterygota from Central America and the West Indies, Proc, U.S. Nat. Mus., 72: 1-25,

Frank, J. H. and F. D. Bennet 1972(?), List of sugarcane arthropods from Jamaica, Tech, Bull. SRD 1/70, Sugar Res. Dep., Mandeville, Jamaica, pp. 1-24.

Gisin, H. 1964a. Collemboles d'Europe, VI. Rev. Suisse Zool., 71: 383-400.

——— 1964b, Collemboles d'Europe, VII. Rev. Suisse Zool., 71:648-678.

——— 1967, Especes nouvelles et lignées évolutives de *Pseudosinella* endogés (Collembola). Mere. Estud. Mus, Zool. Univ. Coimbra, 301:6-25

Gruia, M. 1983. Collemboles arthropléones de Cuba récoltés par les expéditions cubano-roumaines en 1969-1973, Il. Res. exped, cubano-roumaines à Cuba, 4: 191-205.

_____ 1984. Collemboles arthropléones de Cuba récoltés par les expeditions cubano-roumaines en 1969-1973, Ill. Trav. Inst. Spéol. Emil Racovitza, 23: 19-25.

HANDSCHIN, E. 1927. Collemboles aus Costa Rica. Entomol. Mitt. Berlin, 16: 110-118.

MACGILLIVRAY, A. D. 1984. North America Thysanura, V. Can. Entomol., 36: 105-110.

MARI MUTT, J. A. 1978. The types of Collembola (Insects) at the Illinois Natural History Survey. Ill. Nat. Hist. Surv. Biol, Notes, 103: 1-7.

_____ 1982, Observaciones preliminaries sobre la distribución geográfica de los colémbolos de Puerto Rico. Carib. J. SCI., 18: 29-34.

_____ 1983. Two new species of *Lepicfocyrtus* from Paramo de Mucubaji, Mérida, Venezuela (Collembola: Entomobryidae). Carib. J. Sci., 19:53-59.

MARTORELL, L. F. 1976. Annotated food plant catalog of the resects of Puerto Rico. Dep. Entomol, Agric, Exp. Stn. Univ. P.R. Río Piedras, 303 pp.

METCALFE, J. R. 1962. Annual Report of the Research Department. Sugar Manufacturer's Association of Jamaica, 1961, p. 44.

MILLS, H. B. 1938. Collembola from Yucatán caves. *In:* Pearse, A. S., ed, Fauna of Yucatán caves. Carnegie Inst. Wash, Publ, 491: 183-190.

SNIDER, R. J. 1967. The chaetotaxy of North American *Lepidocyrrus s.* str. (Collembola: Entomobryidae). Contr. Amer. Biol, Inst. 2: 1-28,

SZEPTYCKI, A. 1979. Chaetotaxy of the Entomobryidae and its phylogenetical significance. Morph o-systematic studies on Collembola, IV. Polska Acad. Nauk, Zaklad Zool. Syst, Doswiadczalnej, pp. 1-219.

WOLCOTT, G. N. 1933. An economic entomology of the West Indies. Entomol, Sot. P. R., San Juan. 688 pp.

_____ 1936, Insectae Borinquenses, a revised annotated check-list of the insects of Puerto Rico, J. Agric. Univ. P. R., 20: 1-600.

_____ 1948, The insects of Puerto Rico, J. Agric. Univ. P. R., 32: 1-975.

WRAY, D. L. 1953. New Collembola from Puerto Rico, J. Agric. Univ. P. R., 37: 140-150.

YOSII, R. 1982. Lepidocyrtid Collembola of Sabah. Entomol. Rep. Sabah Forest Res. Centre, 47 pp.

TABLE 1.—Key Diagnostic Characters for Puerto Rican Species of *Lepidocyrtus,* a dash means absent.

species	Max. Length	Th. 2 Hood	Ant. 4 Papilla	Head Macro.	Interoc. Chaeto.	Labial Chaeto.	Inner Labral Papillae	Setae along Chephal. Gro.	Unguiculus	Dental Tubercle	Main Color Pattern
biphasis	1.6	+	exposed	___	qrst(v)	a_1-a_5MrEL_1L_2	reduced	5 + 5	truncate	rounded	band on Abd. 4
caprilesi	2.5	+ + +	___	RO12Po	*q*st	A_1-A_5M_{1-3}rEL_1L_2	large	3 + 3	truncate	flat	bands on various segs.
diminutus	0.8	___	exposed	___	___	A_1-A_5MrEL_1L_2	= setulae	4 + 4	lanceolate	___	gray uniform
dispar	1.3	+	___	___	qrst(v)	a_1-a_5MrEL_1L_2	reduced	5 + 5	truncate	rounded	varies bet. populations
distinctus	1.0	___	hidden	___	rst	a_1-a_5MrEL_1L_2	very reduced	5 + 5	lanceolate	rounded	Th.2-Abd. 3 violet
griseolus	1.1	___	exposed	R12	t	a_1-a_5MrEL_1L_2	= setulae	3 + 3	lanceolate	___	gray uniform
ianthinus	1.1	+	___	___	st	a_1-a_5MEL_1L_2	reduced	4 + 4	truncate	rounded	violet uniform
lepargus	1.4	___	hidden	___	qst	a_1-a_5MrEL_1L_2	reduced	5 + 5	lanceolate	rounded	almost unpigmented
maldonadoi	1.5	+	hidden	___	qrst*v*	a_1-a_5MrEL_1L_2	reduced	5 + 5	lanceolate	rounded	bands Th.2-Abd.1, Abd.4
nigrosetosus	2.6	+ +	___	___	qrstv	a_1-$a_5m_1m_2$rel_1l_2	large	5 + 5-6 + 6	truncate	semi-flat	almost unpigmented
ramosi	1.5	___	hidden	___	qst	a_1-a_5MrEL_1L_2	reduced	5 + 5	lanceolate	rounded	light violet uniform
vireticulus	1.2	___	___	RO12STPo	st	A_1-A_5MeL_1L_2	large	3 + 3	lanceolate	___	bands Th.2, Abd. 3 coxa3

TABLE 2.– Chaetotaxy in the medial part of Abd. 2. Setae identical in all species are omitted. M = macrochaeta, cm= ciliated microchaeta, sm = smooth microchaeta, f = fan-shaped seta, (vl) = very long, (1) = long, (m) = medium, (s) = short. 1. *L. nigrosetosus,* 2. *L. caprilesi,* 3. *L. biphasis,* 4. *L. ianthinus,* 5. *L, dispar,* 6. *L. distinctus,* 7. *L. maldonadoi,* 8. *L. ramosi,* 9. L. lepargus, 10. *L. vireticulus,* 11. *L. griseolus,* 12. *L. diminutus,* 13. *Pseudosinella biunouiculata. 14. P. violeta,* A dash means absent.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ml	f	f	f	f	f	cm	f	f	f	cm	f	sm	f	f
a2	f	f	f	f	f	cm	f	f	f	f	cm	sm	M	f
a2p	—	—	sm	sm	sm	—	sm	sm	sm	—	—	—	—	—
as	sm(l)	sm(l)	sm(m)	sm(m)	sm(s)	sm(s)	sm(l)	sm(l)	sm(s)	sm(m)	sm(m)	sm(l)	sm(l)	sm(l)
m3	M(1)	M(1)	M(m)	f	f	—	f	f	M(m)	M(s)	M(m)	M(1)	M(1)	—
p4	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	—
Li	—	—	f	f	f	—	—	—	—	—	—	sm	—	—
Lm	f	f	f	f	f	sm	f	f	f	cm	f	sm	f	f
Ll	f	f	f	f	f	sm	f	f	f	cm	f	sm	f	f
a6	sm	f	sm	sm	sm	sm	sm	cm	sm	f	sm	sm	sm	—
m4	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	—
m5	M	M	M	M	M	M	M	M	M	M	M	M	M	sm
p5	sm	sm	sm	sm	sm	sm	sm	sm	sm	—	sm	sm	sm	—
Fig.	10	32	48	63	73	85	93	108	114	133	147	150	163	175

TABLE 3.– Chaetotaxy in the medial part of Abd. 3. Setae identical in all species are omitted. M = macrochaeta, cm= ciliated microchaeta, sm= smooth mlcrochaeta, f = fan-shaped sets, (vl) = very long, (1) = long, (m) = medium, (s)= short. 1. *L. nigrosetosus,* 2. *L. caprilesi,* 3. *L. biphasis,* 4. *L. ianthinus,* 5. *L. dispar,* 6. *L. distinctus,* 7. *L. maldonadoi,* 8. *L. ramosi,* 9. L. lepargus, 10. *L. vireticulus,* 11. *L. griseolus,* 12. *L. diminutus,* 13. *Pseudosinella biunguiculata,* 14. *P. violeta.* A dash means absent

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
mi	f	f	f	f	f	sm	f	f	f	f	f	sm	f	—
ml	f	f	f	f	f	—	f	f	f	—	f	sm	f	f
a2	f	f	f	f	f	sm	f	f	f	f	f	sm	f	f
a3	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	—
as	sin(l)	sin(m)	sin(m)	sin(m)	sin(s)	sin(s)	sin(m)	sin(l)	sin(s)	sin(l)	sin(m)	sin(l)	sm(vl)	sm(vl)
p3	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm
m4	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm
Li	f	f	f	f	f	sm	f	f	f	f(l)	f	sm	(—)	f
Lm	f	f	f	f	f	sm	f	f	f	f	f	sm	f	f
Ll	f	f	f	f	f	sm	f	f	f	f	f	—	—	—
a6	f	f	f	f.	f	sm	f	f	f	f	f	sm	f	f
im	f	f	f	f	f	sm	f	f	f	cm	sm	sm	sm	—
lm	f	f	f	f	f	sm	f	f	f	cm	sm	sm	f	f
am6	f	f	f	f	f	sm	f	f	f	f	sm	(sin)	f	sm
C3	—	f	f	f	f	—	f	f	f	—	—	—	—	—
p5	sm(l)	sm(l)	sm(l)	sm(l)	sm(l)	sm(s)	sm(l)	sm(l)	—	sm(l)	sm(l)	sm(m)	sm(l)	sm(s)
d2	sm(s)	—	sm(s)	sm(s)	sm(s)	sm(l)	sm(s)	—	sm(s)	sm(s)	—	—	—	sm(l)
a7	sm	M	sm	sm	sm	sm	sm	sm	sm	M	sm	sm	sm	M
m7	M	M	M	M	M	M	sm	sm	sm	M	sm	sm (—)	sm	M
Fig.	11	33	49	64	74	86	—	—	127	136	148	151	164	185

TABLE 4.– Macrochaetae and trichobothrial complex of Abd. 4. + = present, -= absent, cm= ciliated microchaeta, sm = smooth microchaeta, f = fan-shaped seta, (c) = in center of triangle formed by Dl, a and m, (1) = in line with DI and a. 1. *Lepidocyrtus nigrosetosus,* 2. *L. caprilesi,* 3. *L. biphasis,* 4. *L. ianthinus,* 5. *L. dispar,* 6. *L. distinctus,* 7. *L. maldonadoi,* 8. *L. ramosi,* 9. L. Iapargus, 10. *L. vireticulus,* 11. *L. griseolus,* 12. *L. diminutus,* 13. *Pseudosinella biunguiculata,* 14. *P. violeta.* A dash means absent.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Cl	+	+	-	-	-	-	-	-	-	+	-	-	+	-
B4	+	-	-	-	-	+	-	+	-	-	-	-	-	+
B5	+	+	+	+	+	+	+	+	+	+	+	+	+	+
B6	+	+	+	+	+	-	+	-	+	+	+	+	-	+
Dl	f	f	f	f	f	sm	f	f	f	f	f	sm	f	f
a	f	f	f	f	f	sm	f	f	f	f	f	sm	f	f
m	f	f	f	f	f	sm	f	f	f	f	f	sm	f	f
s	f(c)	f(c)	f(c)	-	f(c)	-	-	-	-	f(i)	f(1)	-	-	f(1)
Clp	sm	cm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	f	-
T3	sm	cm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm
Dlp	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	sm	-
Pi	f	f	f	f	f	sm	f	f	f	f	f	sm	f	-
Pe	f	f	f	f	f	sm	f	f	f	f	-	-	f	f
Fig.	12	34	51	65	——	87	——	111	126	132	149	153	166	188

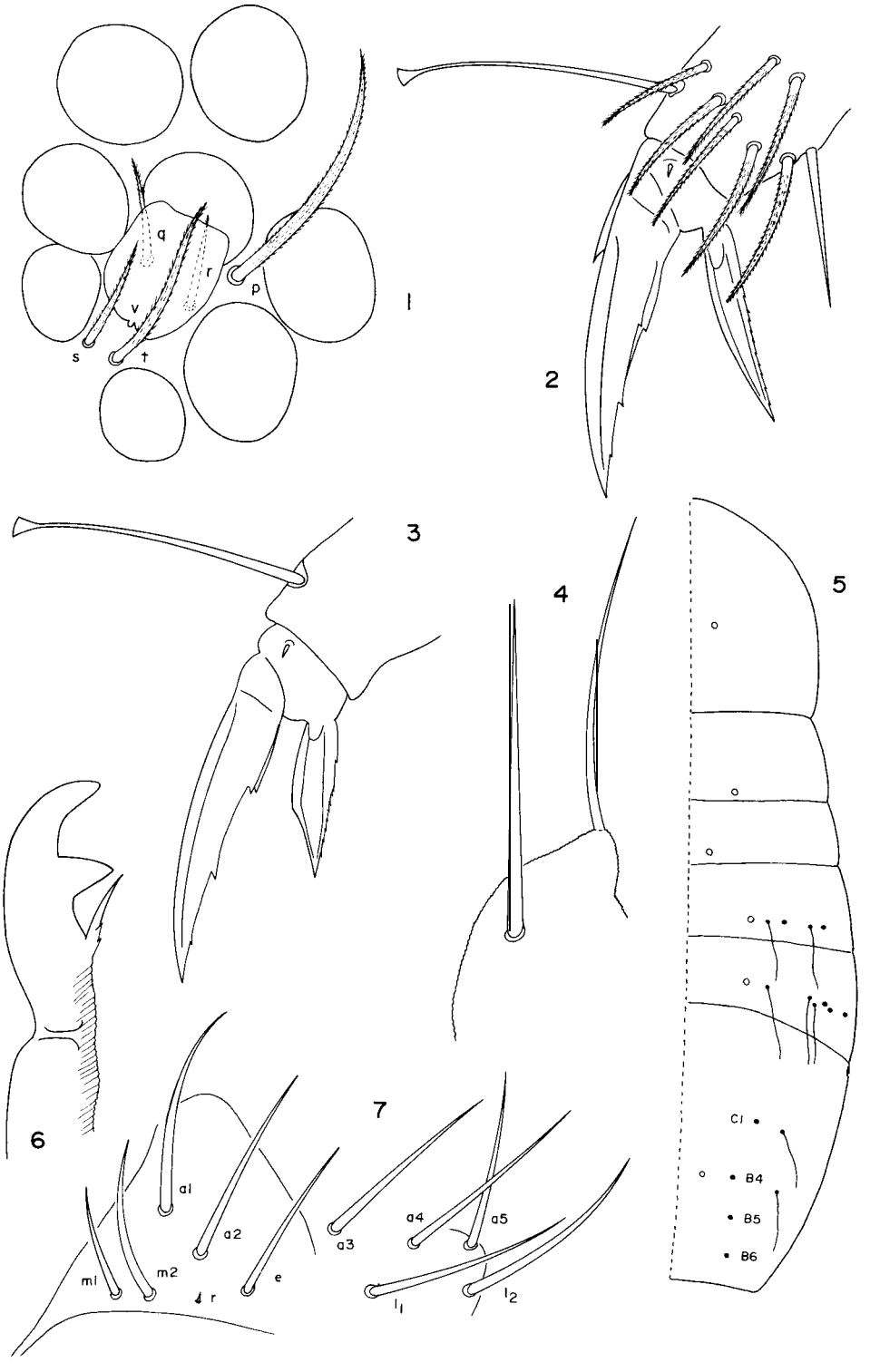

FIG. 1-7.– *L. nigrosetosus.* 1. Eyes and interocular setae. 2-3. Metathoracic and prothoracic claws. 4. Maxillary palp. 5. Body macrochaetotaxy, circles = pseudopores. 6. Mucro. 7. Labial chaetotaxy.

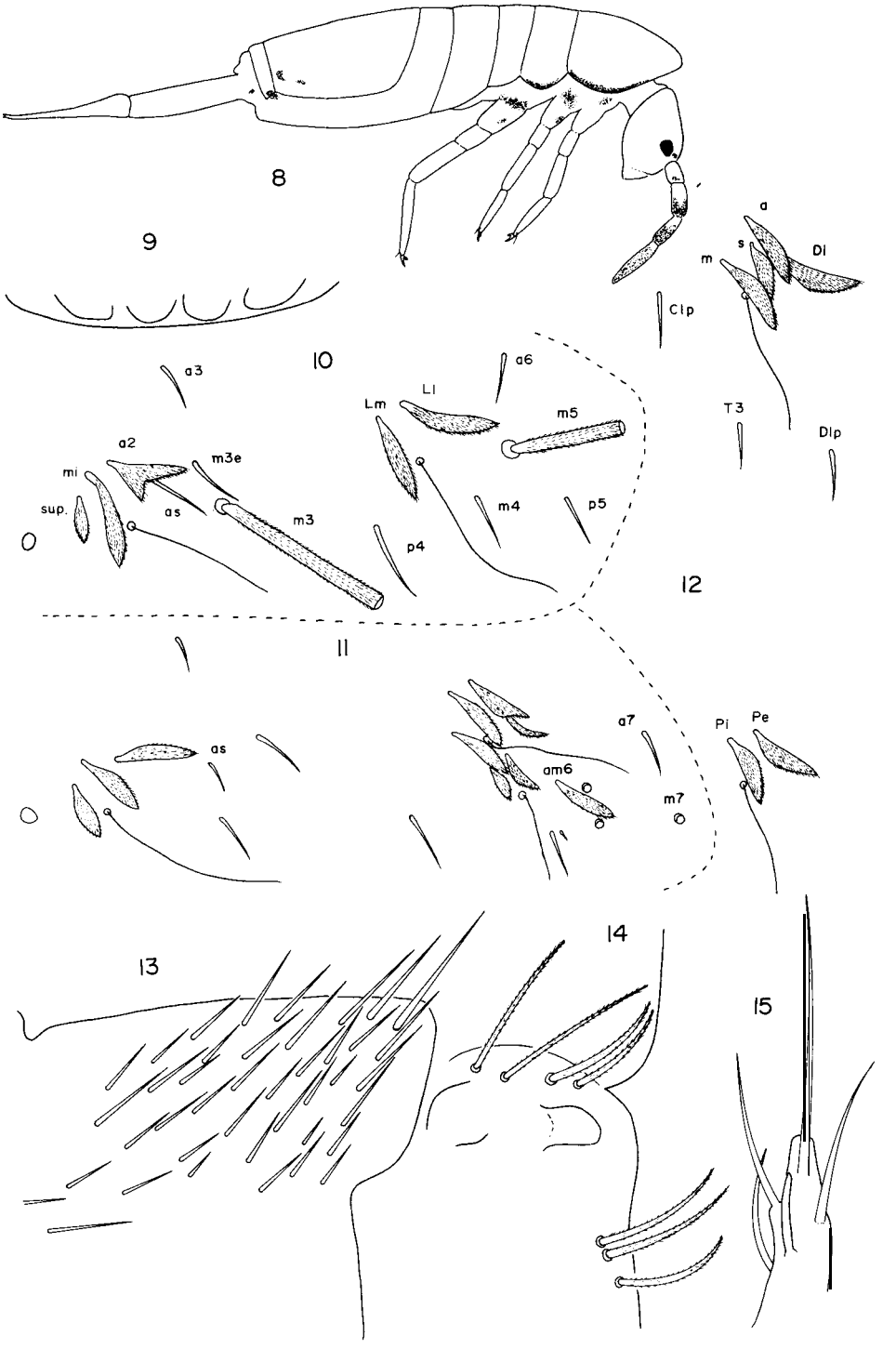

FIG.8-15.– *L. nigrosetosus.* 8. Habitus. 9. Labral papillae. 10-11. Chaetotaxy of Abd. 2 and Abd. 3. 12. Trichobothrial complex of Abd. 4. 13. Trochanteral organ. 14. Dental tubercle and some neighboring setae. 15. Outer labial papilla.

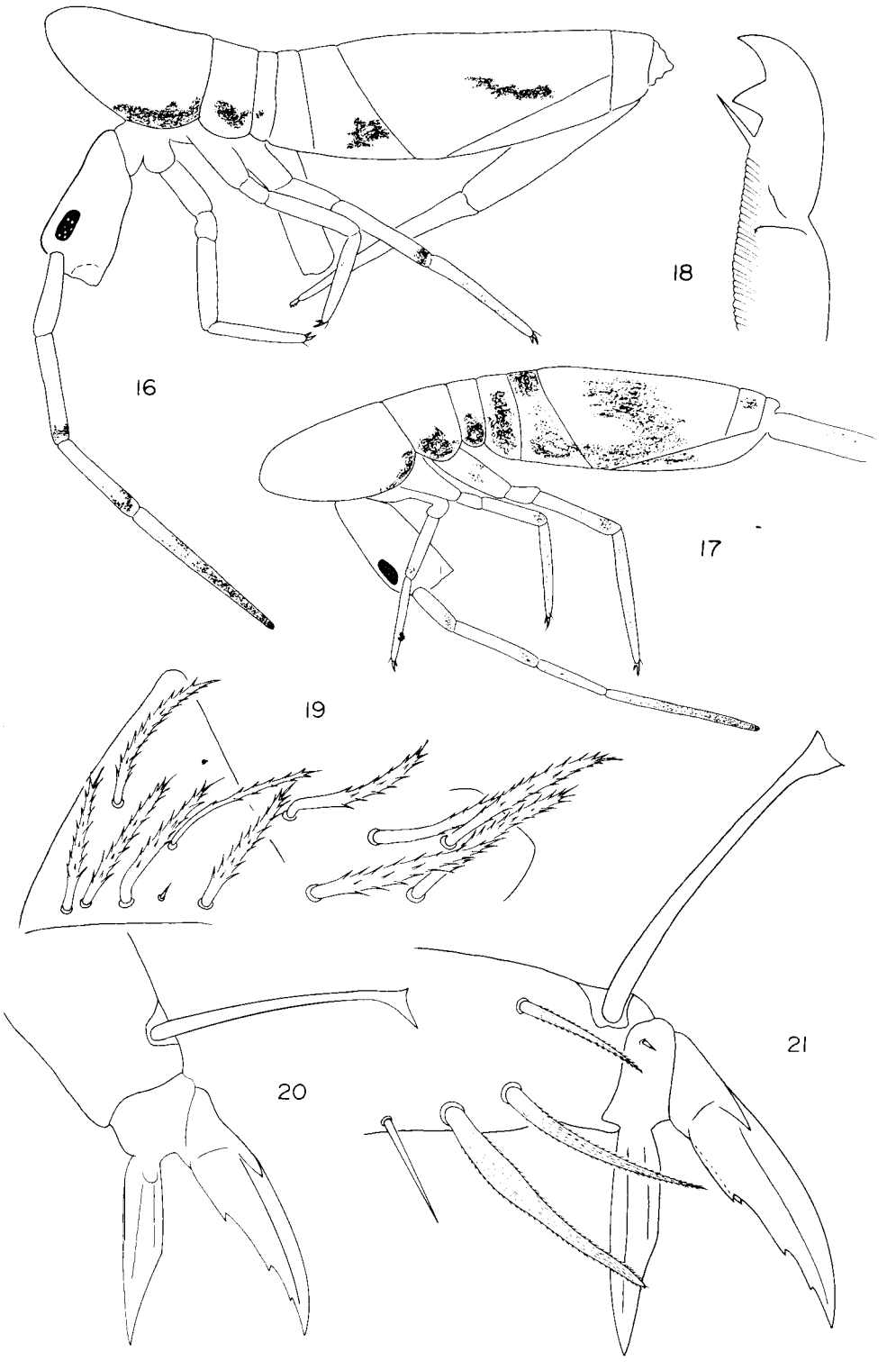

FIG. 16-21.– *L. caprilesi.* 16-17. Habitus of forms B and D. 18. Mucro. 19. Labial chaetotaxy. 20-21. Prothoracic and metathoracic claws.

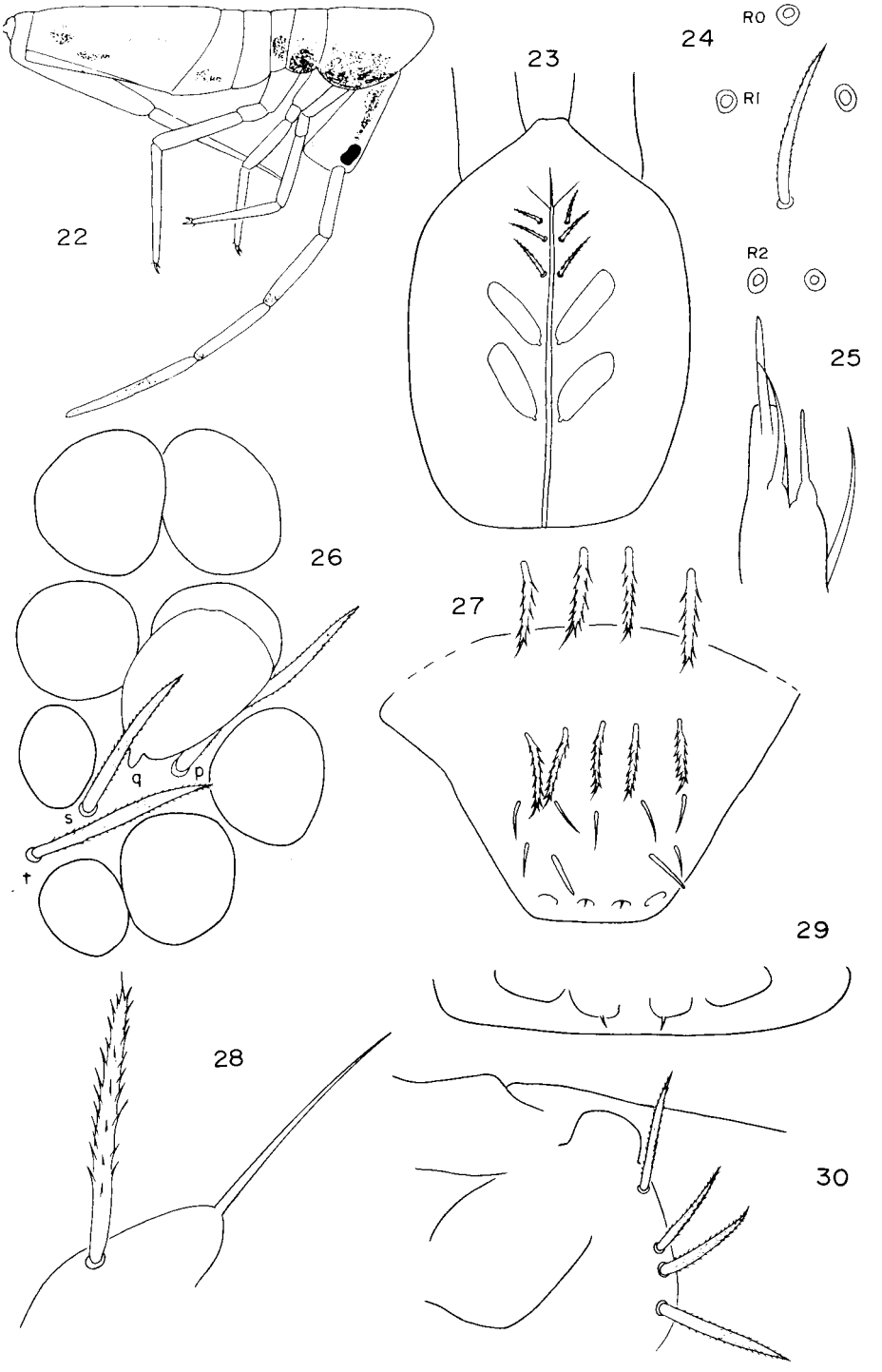

FIG.22-30.– *L. caprilesi.* 22. Habitus of form A. 23. Setae and scales along ventral groove. 24. Anterior head macrochaetae. 25. Outer labial papilla. 26. Eyes and interocular setae. 27. Labrum. 28. Maxillary palp. 29. Labral papillae. 30. Dental tubercle and some neighboring setae.

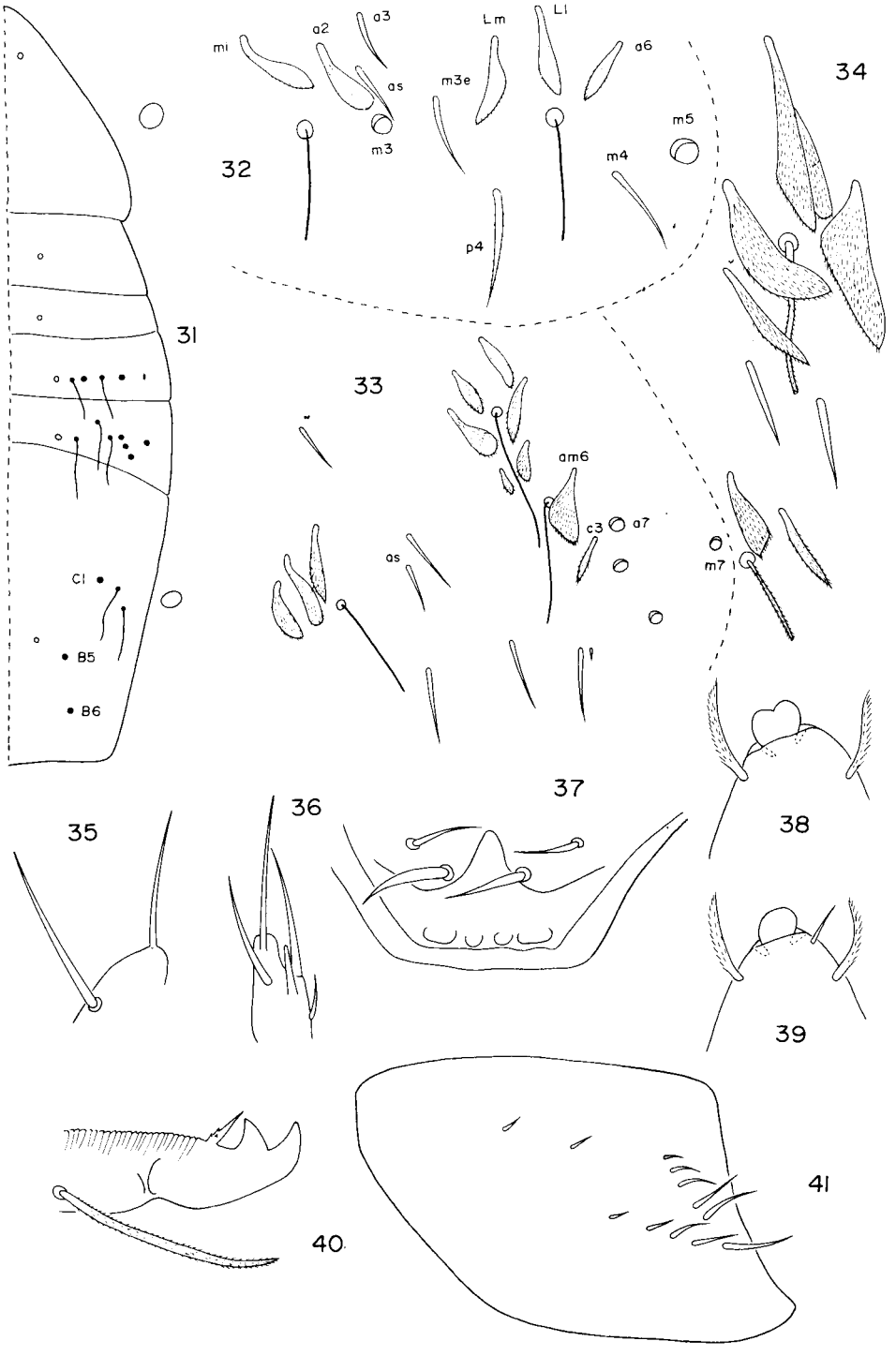

FIG 31-34.– *L. caprilesi.* 31. Body macrochaetotaxy, circles = pseudopores. 32-33. Chaetotaxy of Abd, 2 and Abd. 3. 34. Trichobothrial complex of Abd, 4.

FIG 35-41.– *L. biphasis.* 35. Maxillary palp. 36. Outer labial papilla. 37. Distal area of labrum. 38-39. Ant. 4 papilla. 40. Mucro. 41. Trochanteral organ.

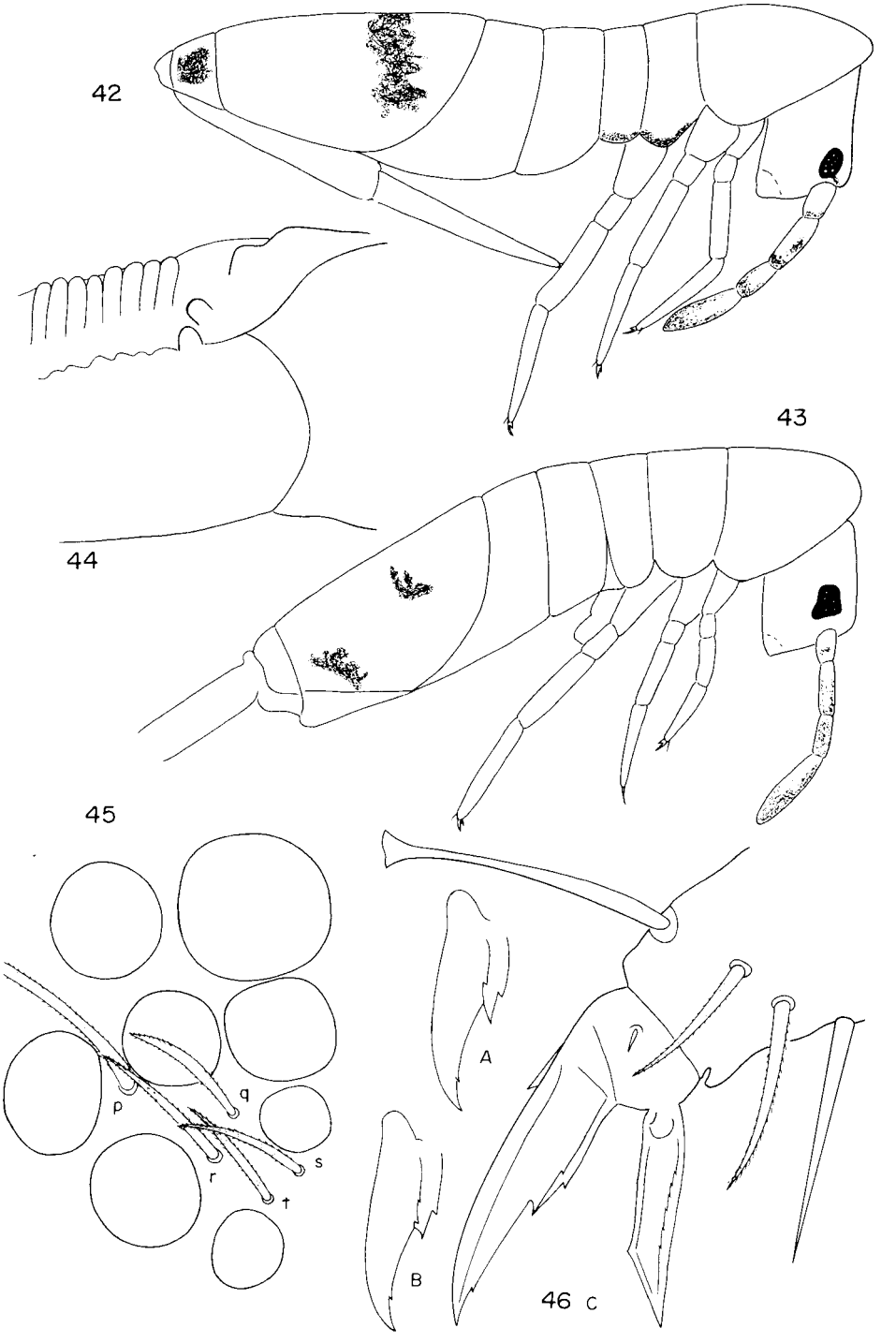

FIG42-46.– *L. biphasis.* 42-43. Habitus, 44. Proximal portion of dentes with dental tubercle. 45. Eyes and interocular setae. 46A,B. Interviews of unguis. 46C. Metathoracic claws.

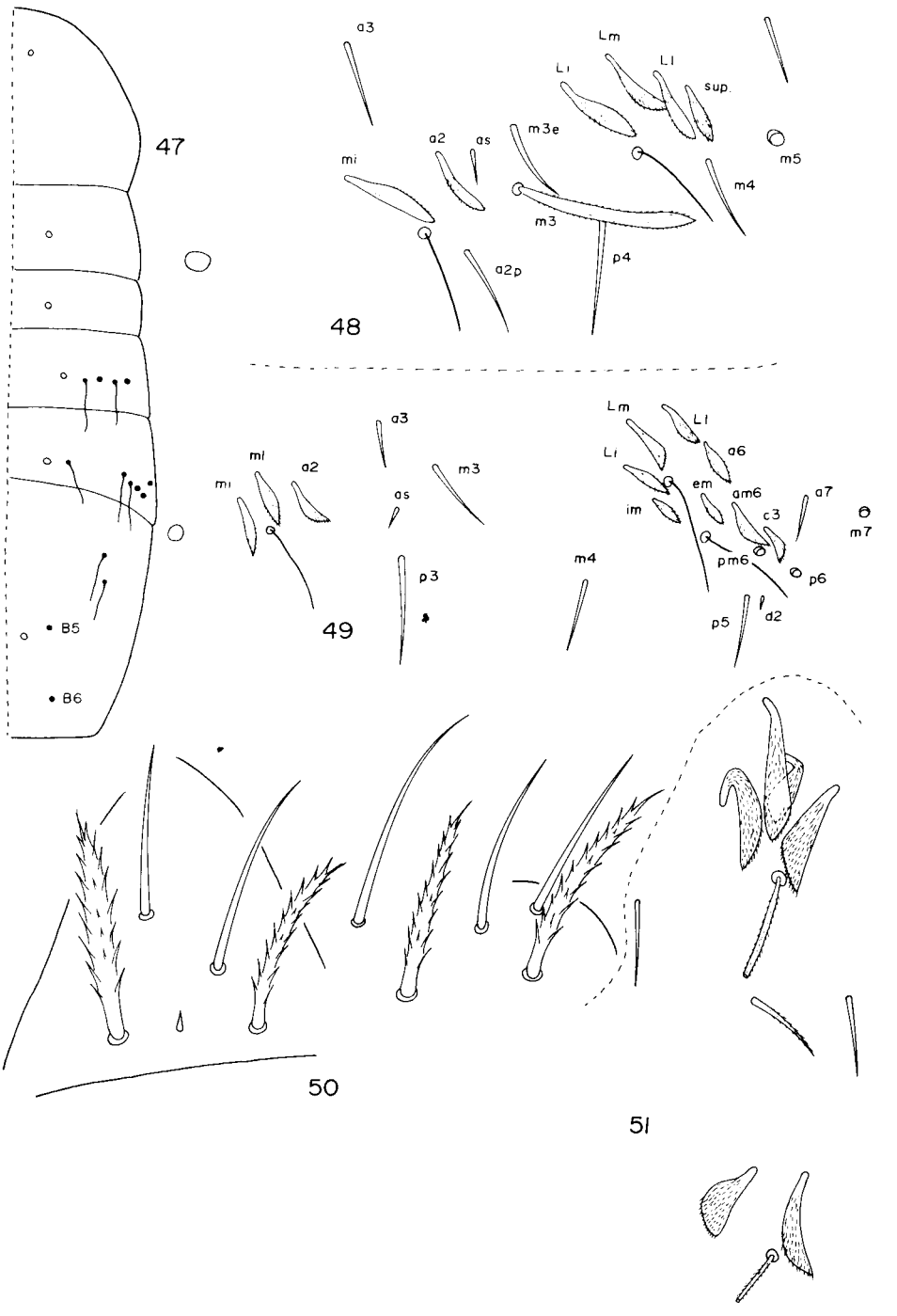

FIG.47-51.– *L. biphasis.* 47. Body macrochaetotaxy, circles = pseudopores. 48-49. Chaetotaxy of Abd. 2 and Abd. 3. 50. Labial chaetotaxy. 51. Trichobothrial complex of Abd. 4.

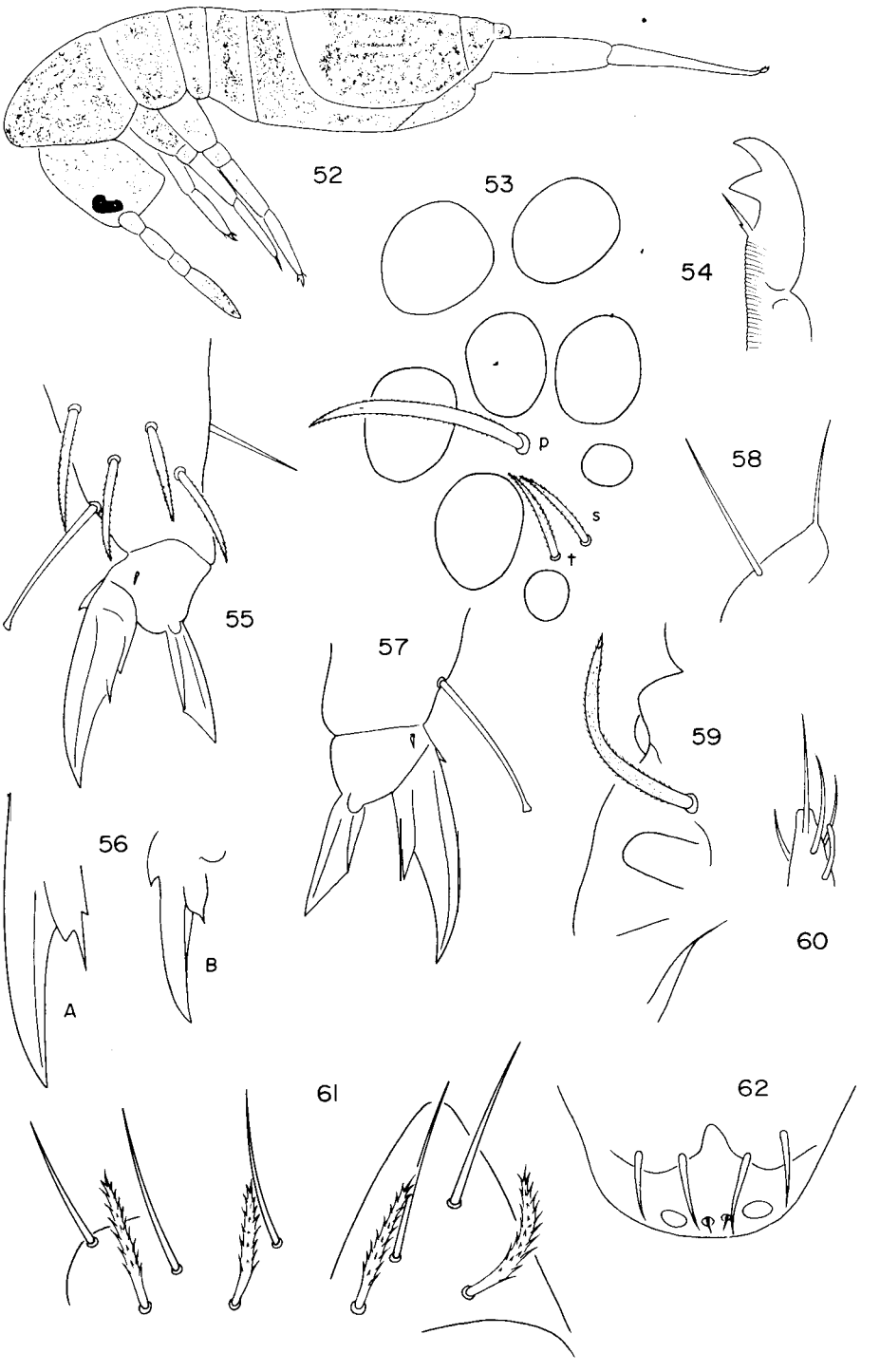

FIG.52-62.– *L. ianthinus.* 52. Habitus. 53. Eyes and interocular setae. 54. Mucro. 55. Metathoracic claws. 56A,B. Inner views of unguis. 57. Prothoracic claws. 58. Maxillary palp. 59. Dental tubercle. 60. Outer labial papilla. 61. Labial chaetotaxy. 62. Distal area of labrum.

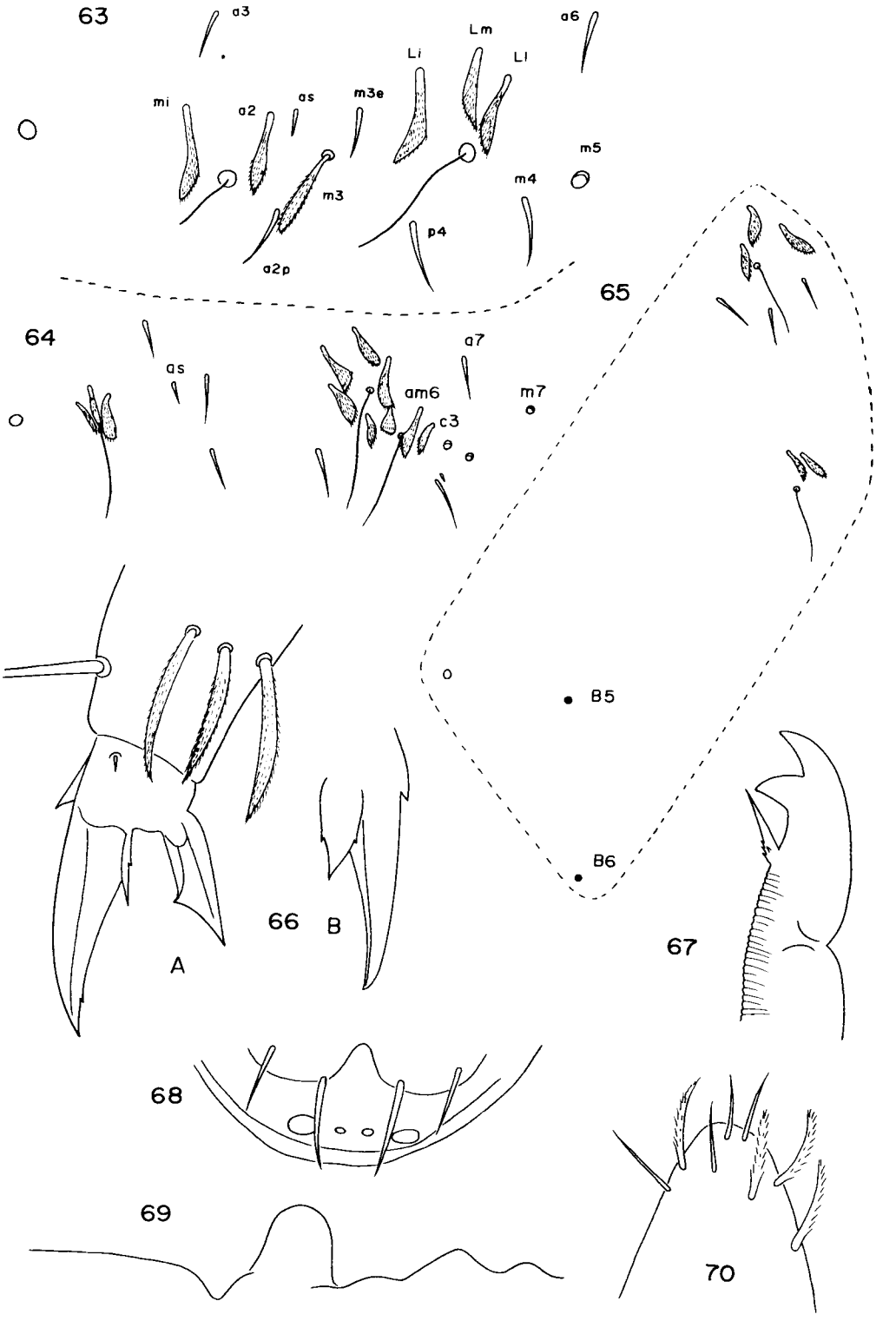

FIG.63-65.– *L. ianthinus.* 63-64. Chaetotaxy of Abd. 2 and Abd. 3. 65. Trichobothrial complex and macrochaetae of Abd. 4, circles= pseudopores, FIG.66-70.– *L. dispar.* 66A. Prothoracic claws, 668. Inner views of unguis. 67. Mucro. 68. Distal area of labrum. 69. Dental tubercle. 70. Apex of Ant. 4.

FIG.66-70.– *L. dispar.* 66A. Prothoracic claws, 66B. Inner views of unguis. 67. Mucro. 68. Distal area of labrum. 69. Dental tubercle. 70. Apex of Ant. 4.

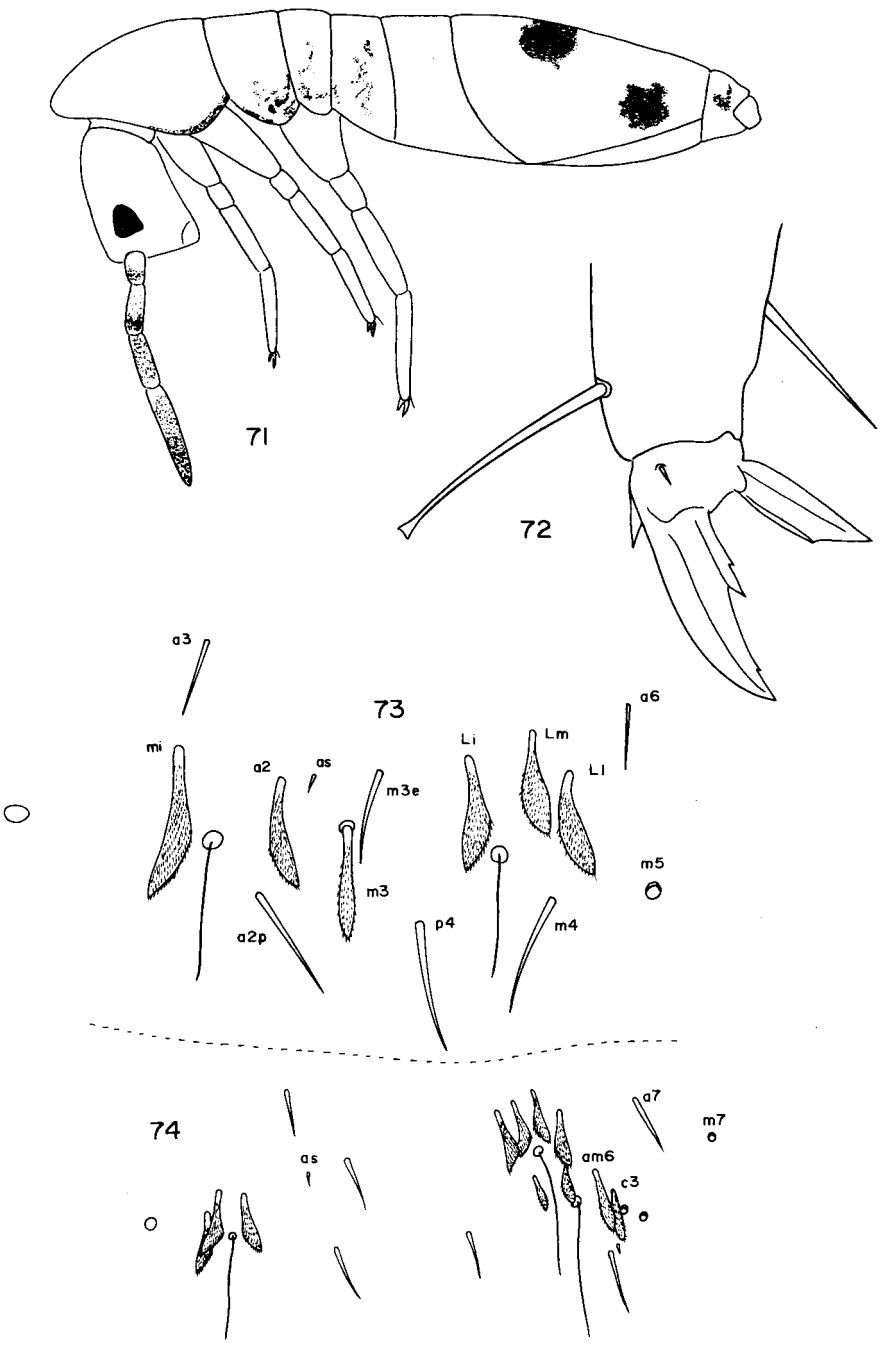

FIG.71-74. –*L dispar.* 71. Habitus of form A. 72. Metathoracic claws. 73-74. Chaetotaxy of Abd. 2 and Abd. 3.

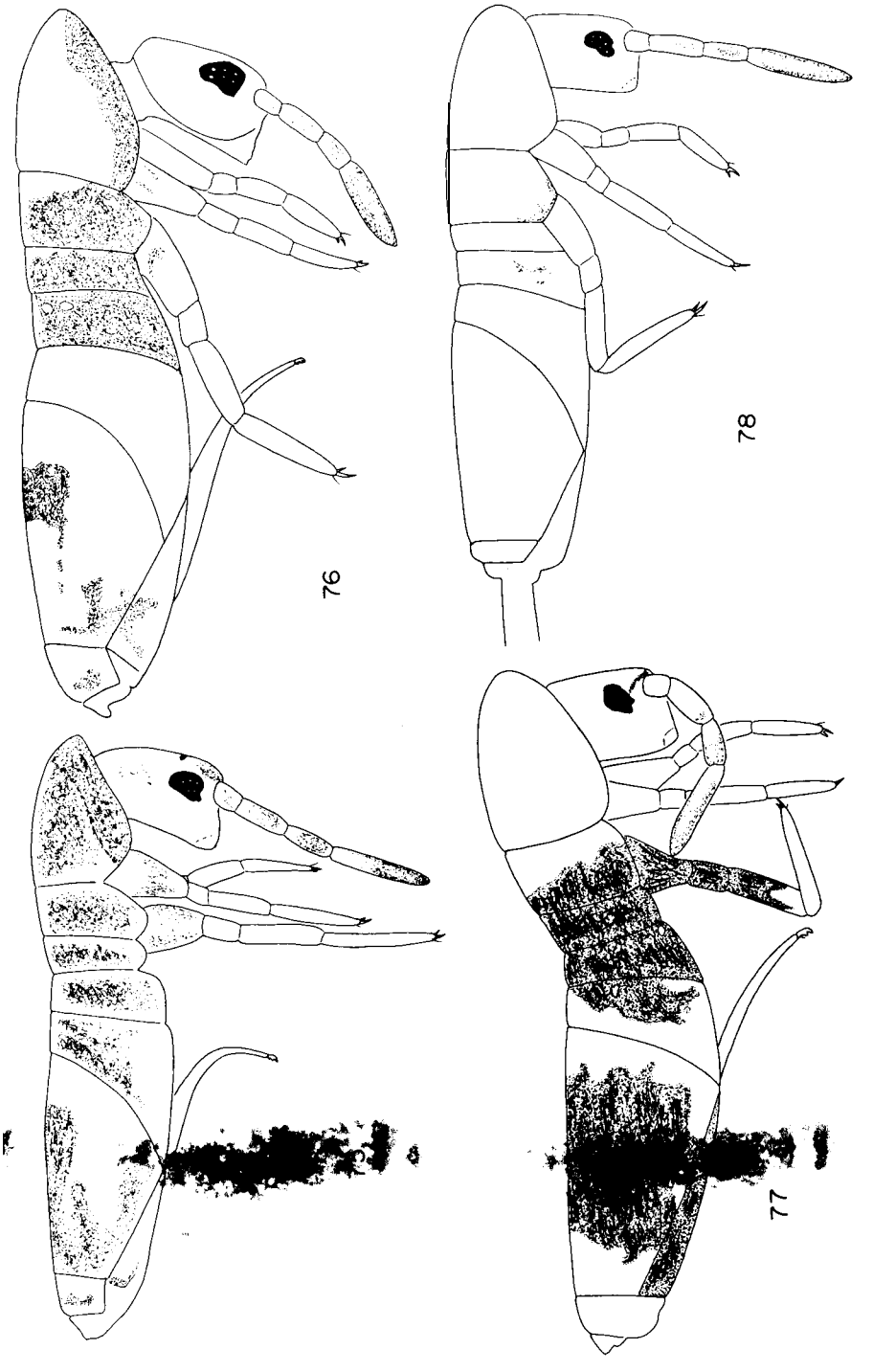

FIG.75-78.– *L. dispar.* Habitus of forms D, B, E and C respectively.

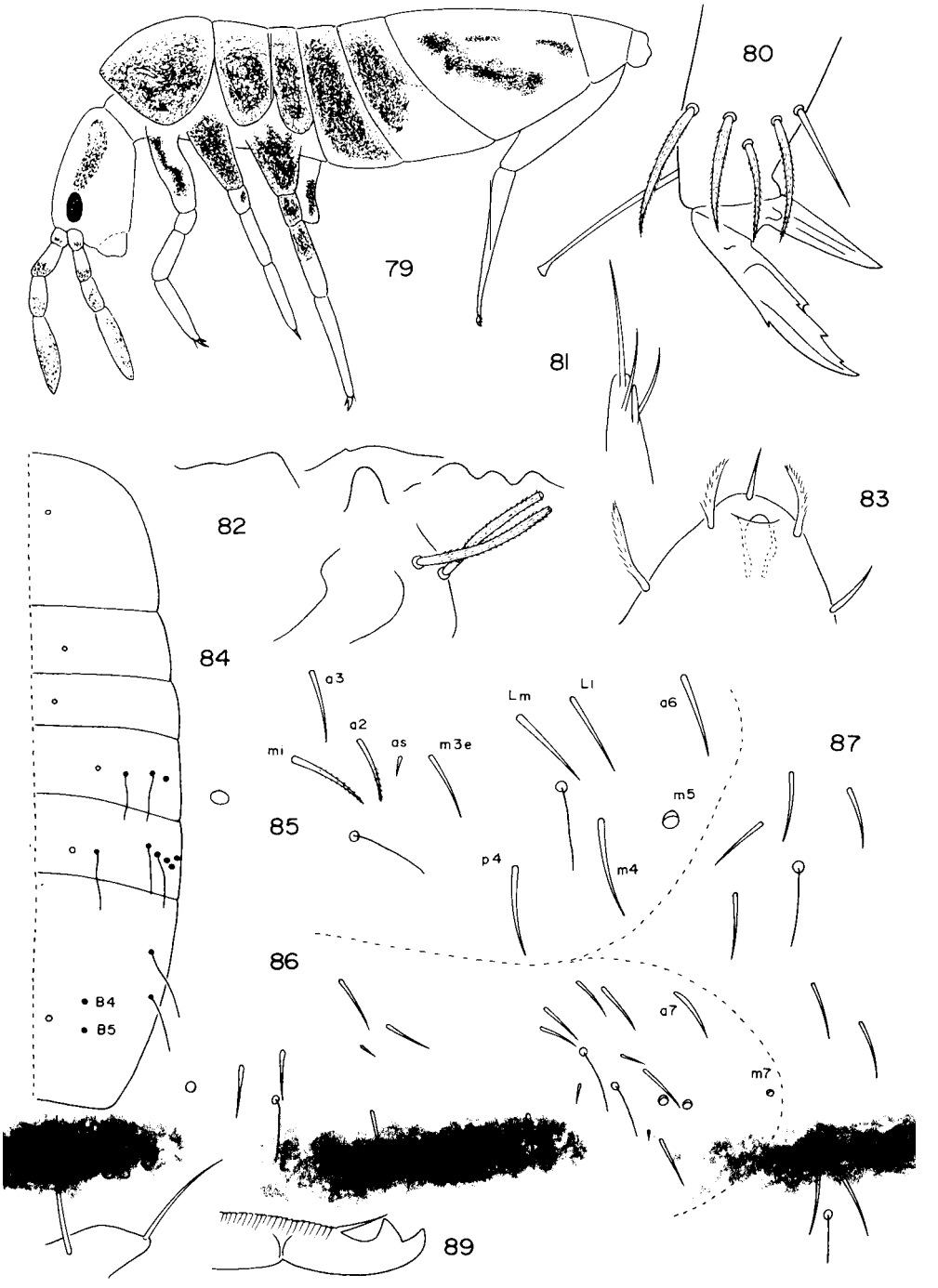

FIG79-89.– *L. distinctus.* 79. Habitus. 80. Metathoracic claws. 81. Outer labial papilla. 82. Dental tubercle. 83. Ant. 4 papilla. 84. Body macrochaetotaxy, circles= pseudopores. 85-86. Chaetotaxy of Abd. 2 and Abd. 3. 87. Trichobothrial complex of Abd. 4. 88. Maxillary palp. 89. Mucro.

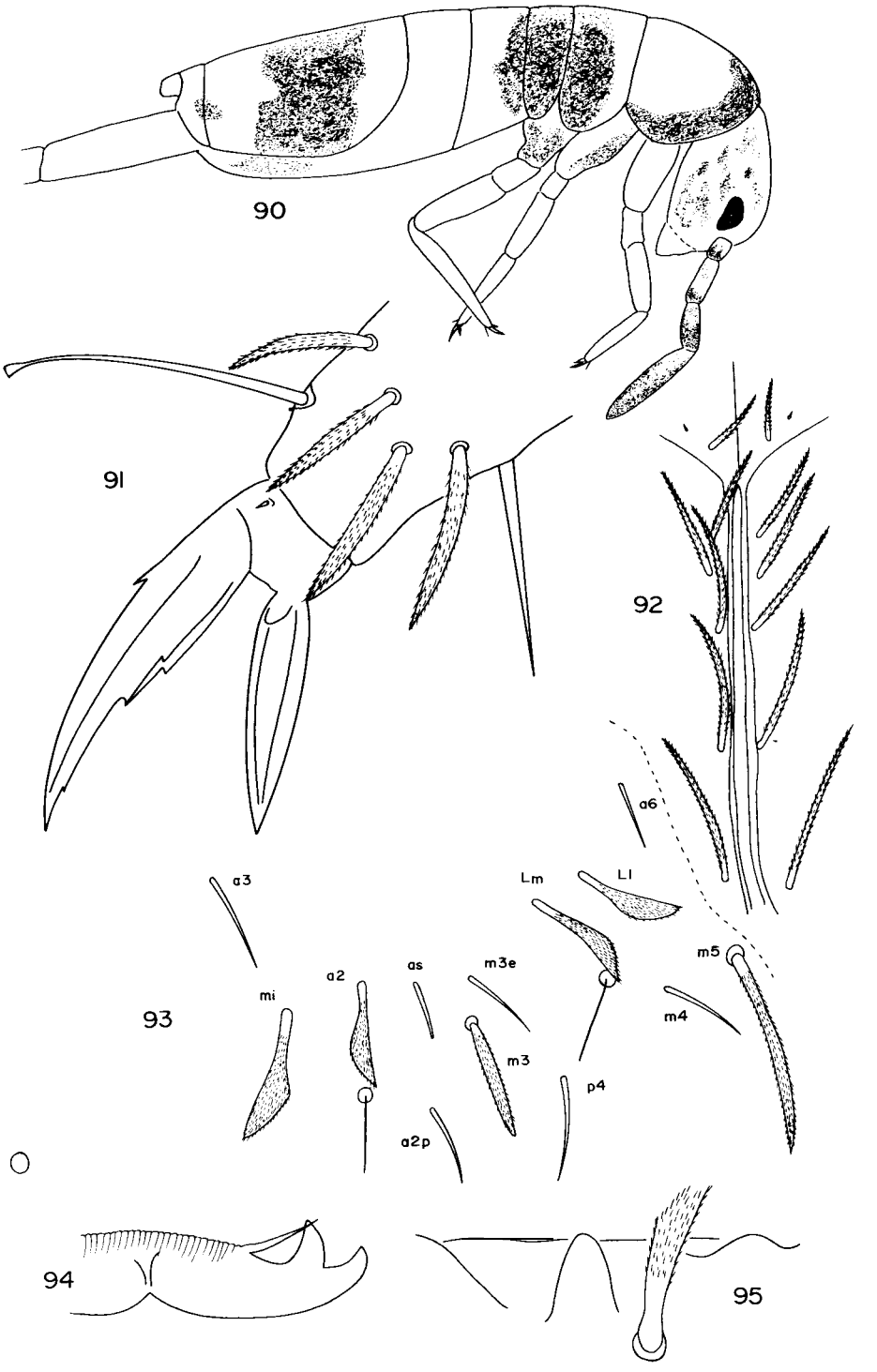

FIG.90-95.– *L. maldonadoi.* 90. Habitus. 91. Metathoracic claws. 92. Setae along cephalic groove. 93. Chaetotaxy of Abd. 2. 94. Mucro. 95. Dental tubercle.

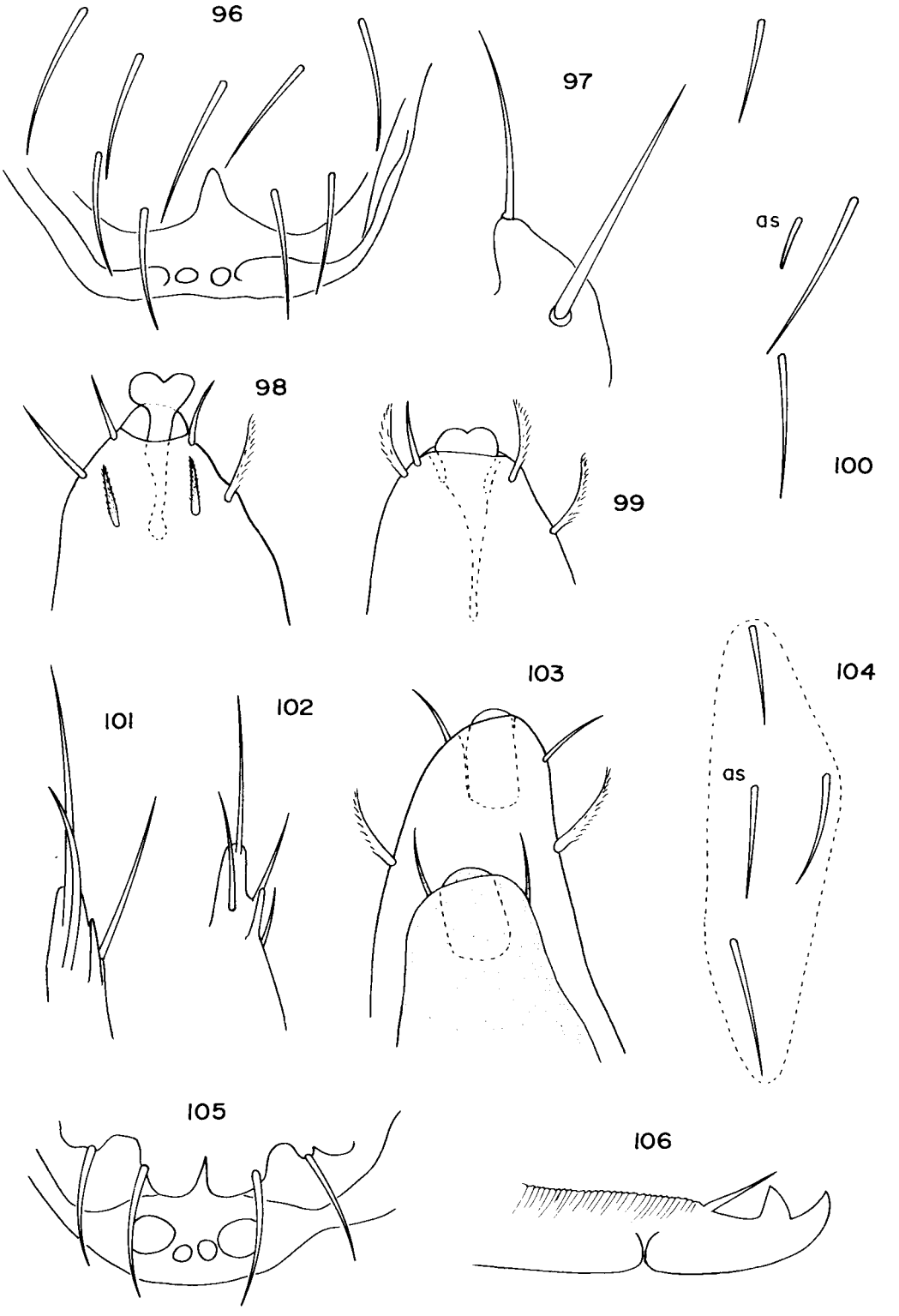

FIG.96-101.– *L. maldonadoi.* 96. Distal area of labrum. 97. Maxillary palp. 98-99. Ant. 4 papilla. 100, Inner setae of Abd. 3. 101. Outer labial papilla. FIG. 102- 106. – *L. ramosi.* 102. Outer labial papilla. 103. Ant, 4. papilla, molting specimen. 104. Inner setae of Abd. 3. 105. Distal area of labrum. 106, Mucro.

FIG.102-106.– *L. ramosi.* 102. Outer labial papilla. 103. Ant. 4. papilla, molting specimen. 104. Inner setae of Abd. 3. 105. Distal area of labrum. 106. Mucro.

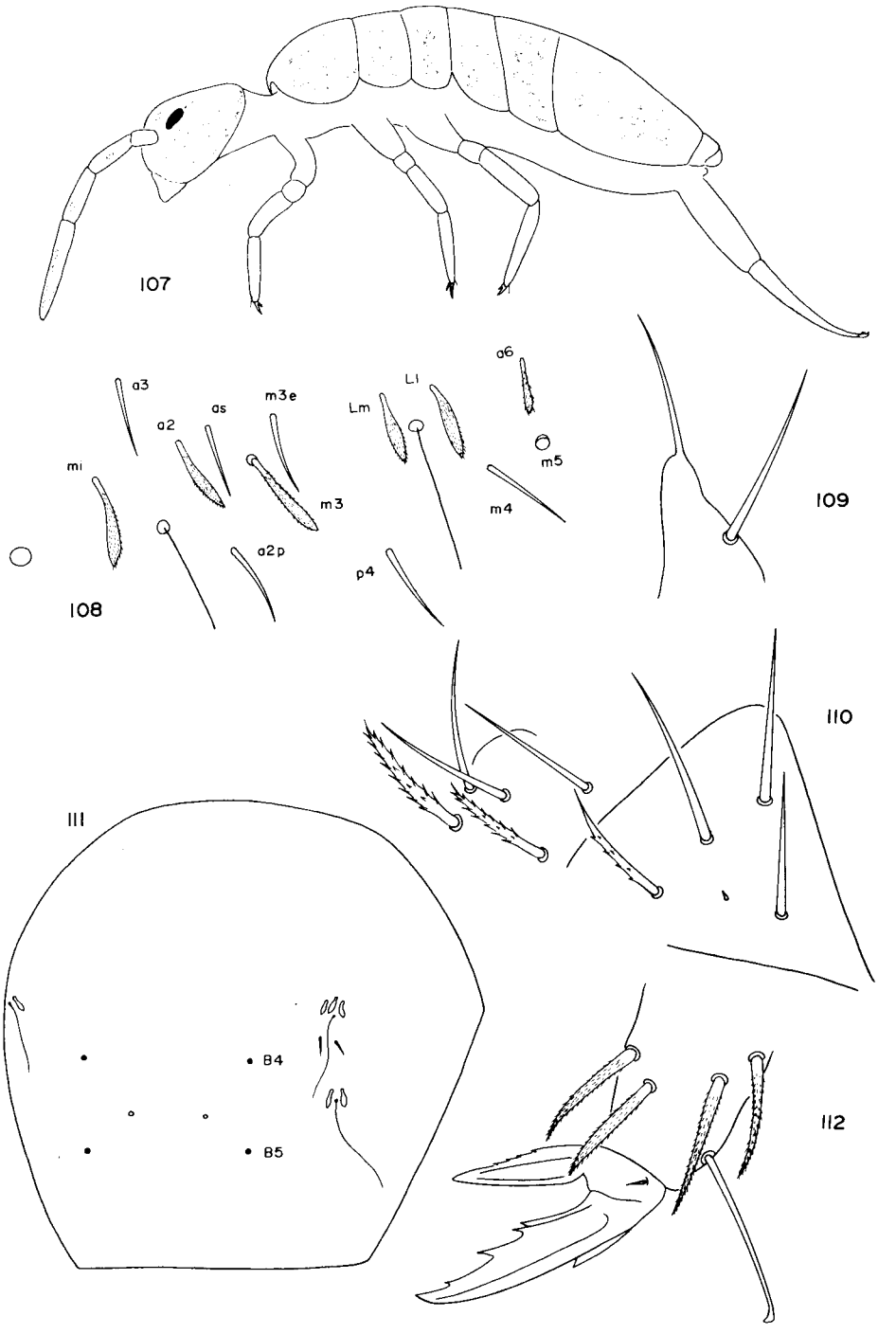

FIG 107-112.– *L. ramosi.* 107. Habitus. 108. Chaetotaxy of Abd. 2. 109. Maxillary palp. 110. Labial chaetotaxy. 111. Trichobothrial complex and macrochaetae of Abd. 4, circles= pseudopores. 112. Metathoracic claws.

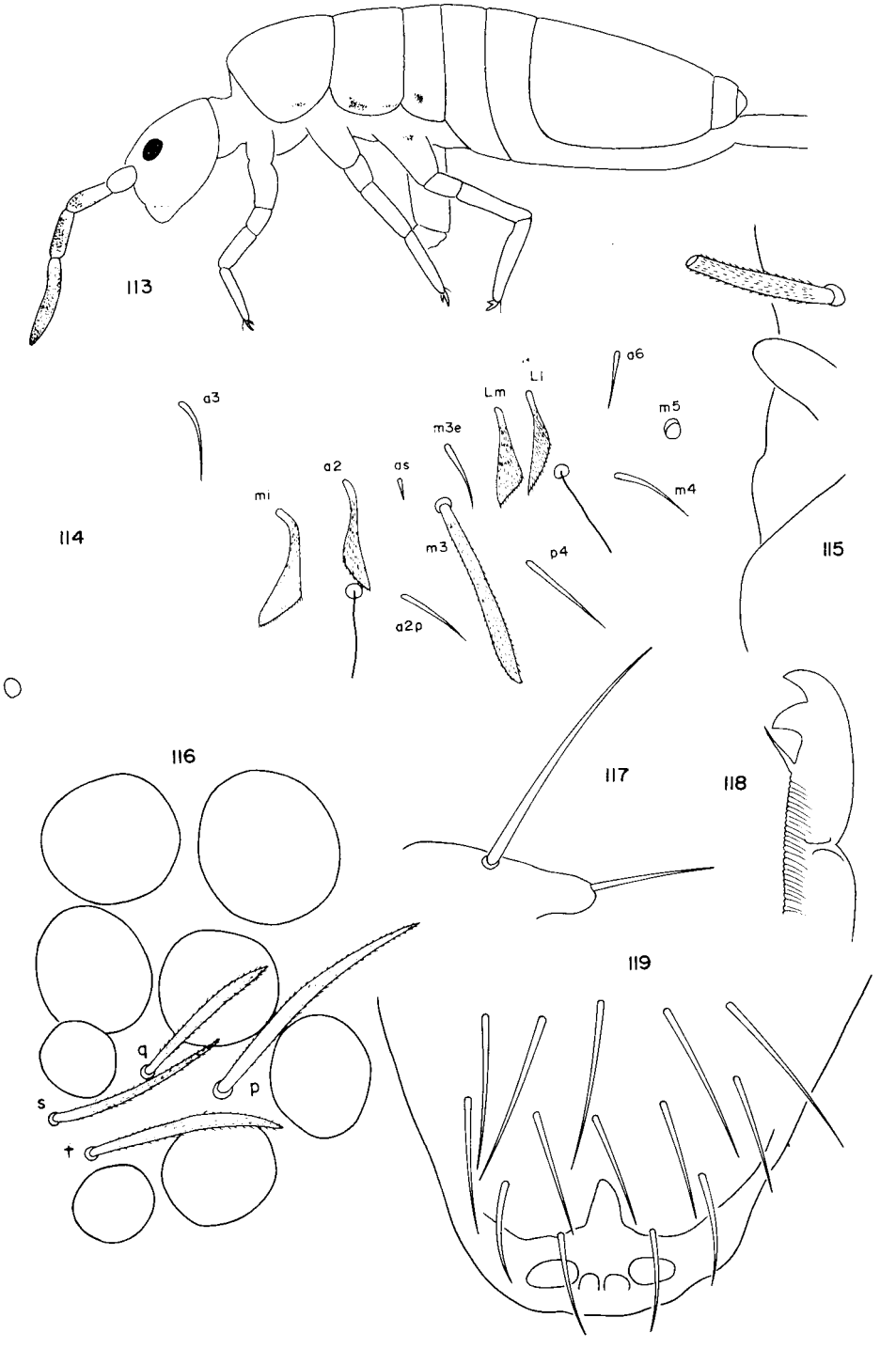

FIG.113-119.– *L. lepargus.* 113. Habitus. 114. Chaetotaxy of Abd. 2. 115. Dental tubercle. 116. Eyes and interocular setae. 117. Maxillary palp. 118. Mucro. 119. Labrum.

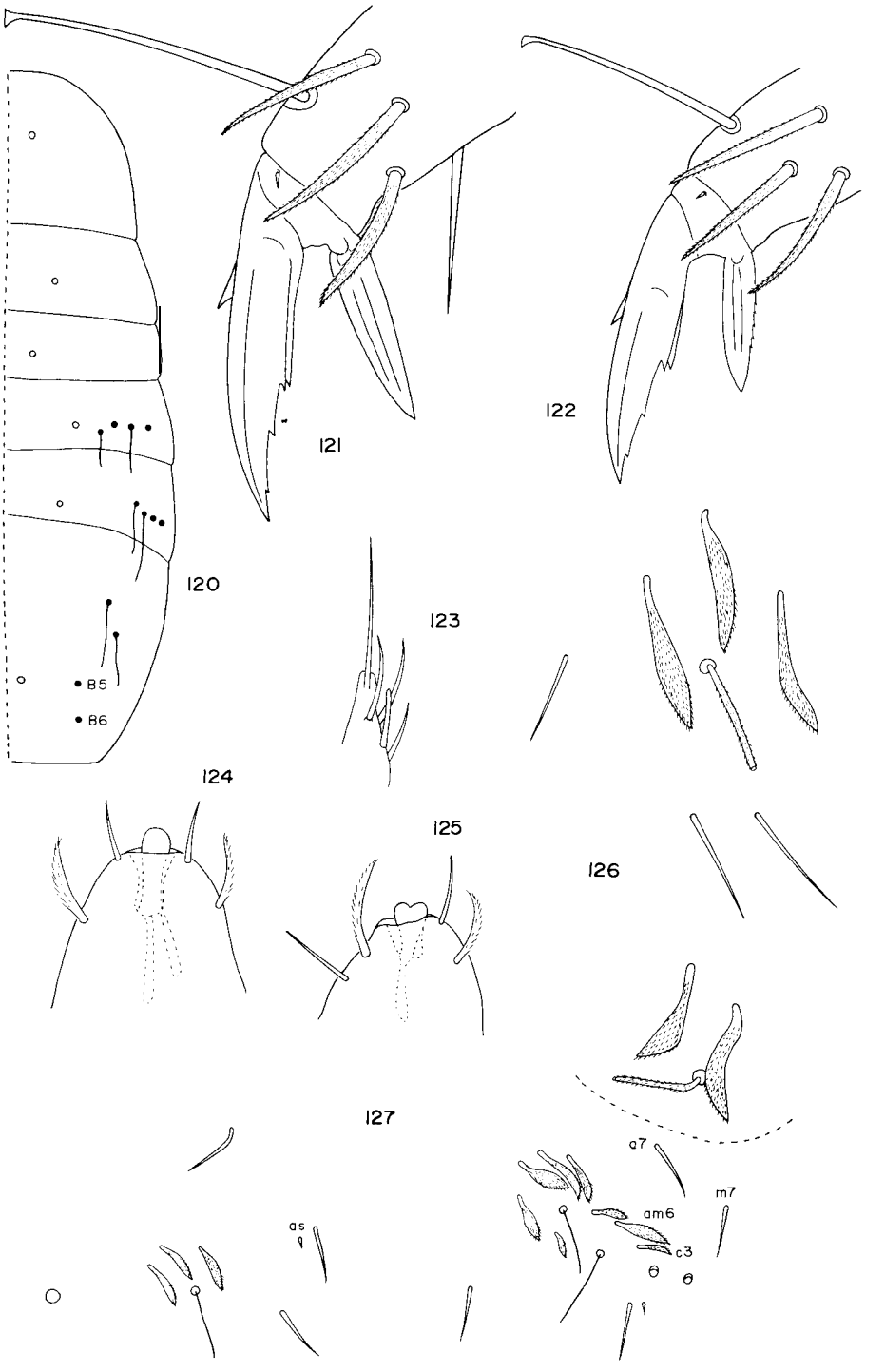

FIG 120-127.– *L. lepargus.* 120. Body macrochaetotaxy, circles= pseudopores. 121-122. Metathoracic and prothoracic claws. 123. Outer labial papilla. 124-125. Ant. 4 papilla. 126. Trichobothrial complex of Abd. 4. 127. Chaetotaxy of Abd. 3.

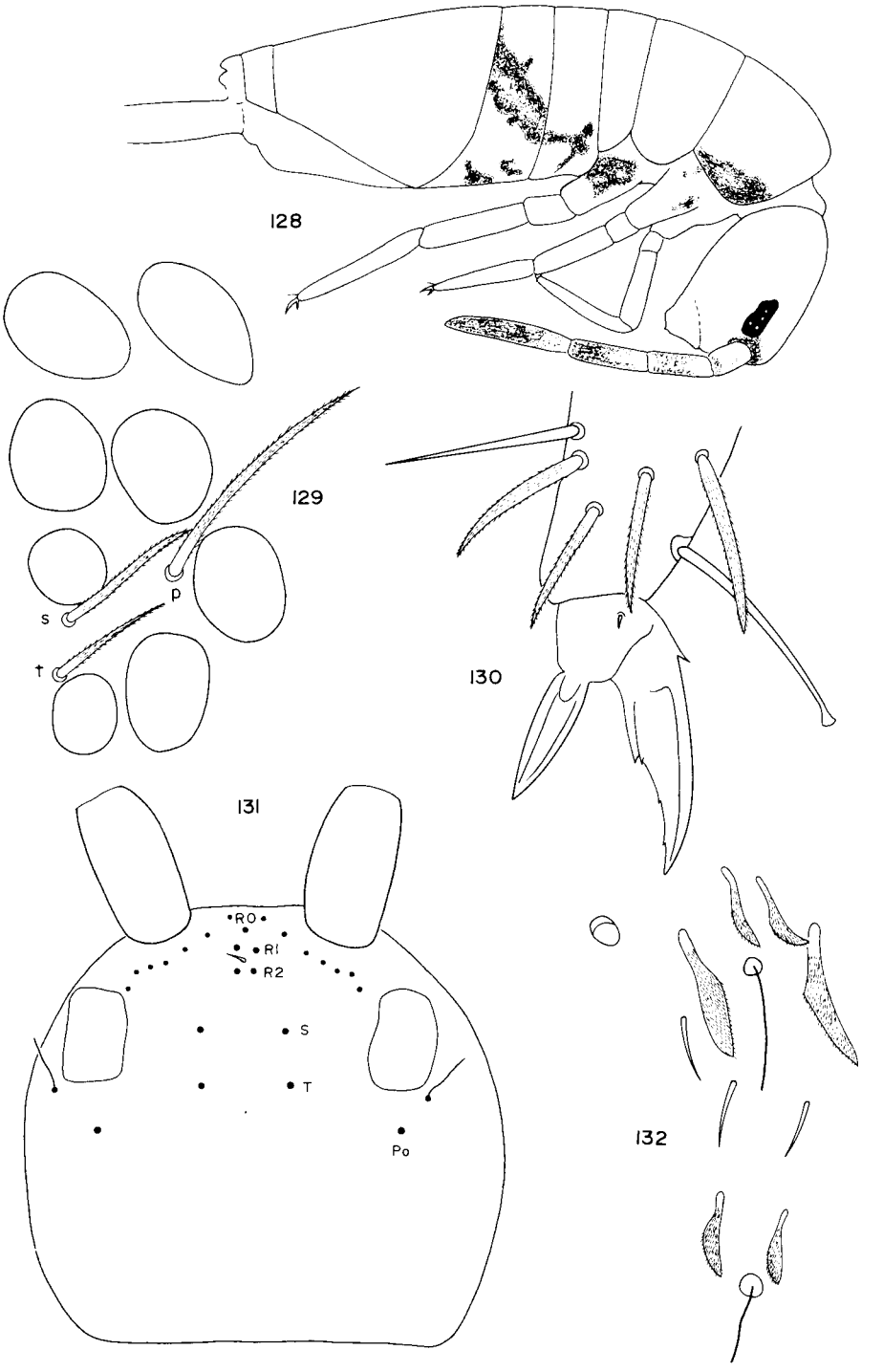

FIG.128-132.– *L. vireticulus.* 128. Habitus. 129. Eyes and interocular setae. 130. Metathoracic claws. 131. Head macrochaetotaxy. 132. Trichobothrial complex of Abd. 4.

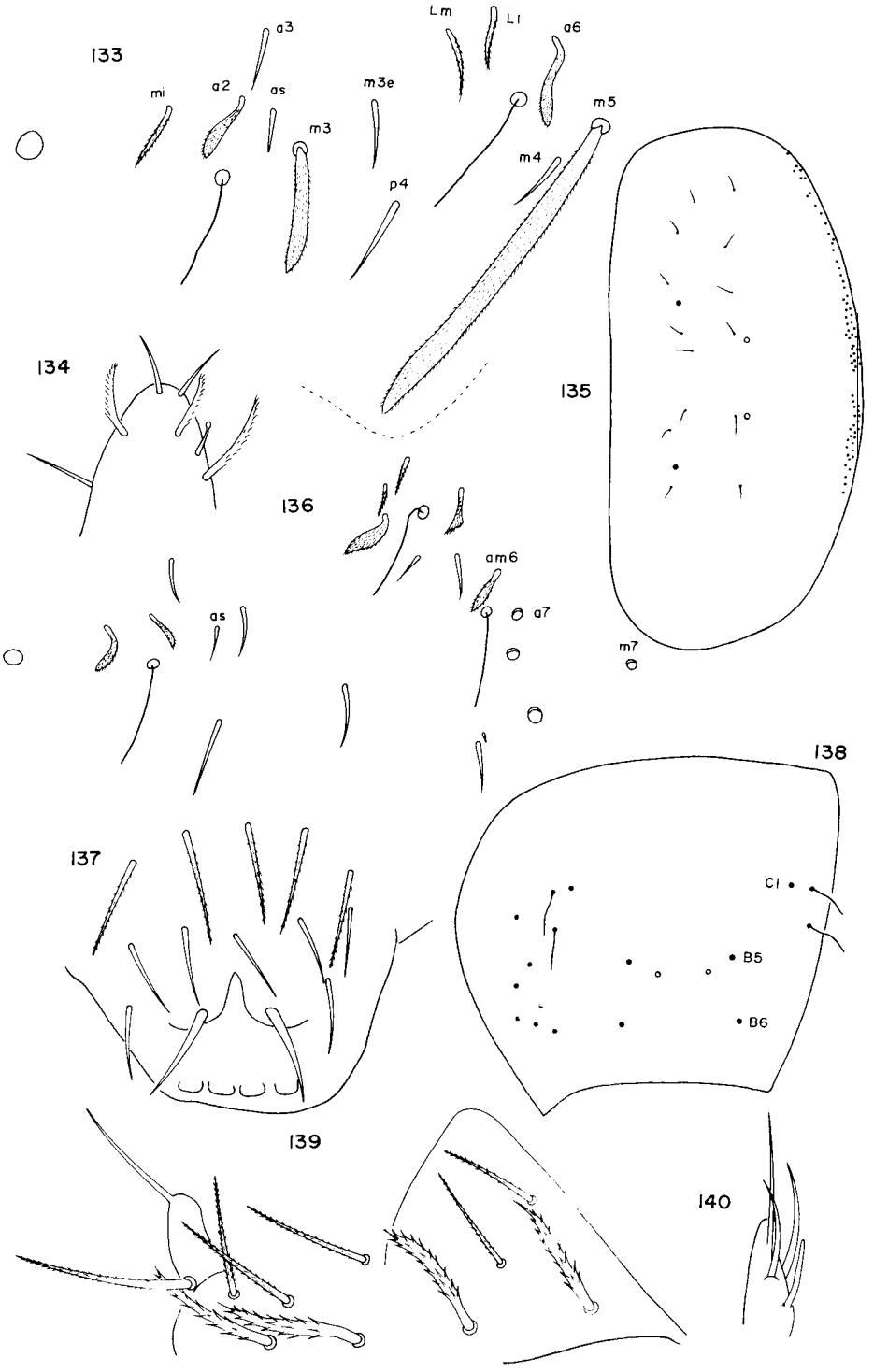

FIG.133-140.– *L. vireticulus* 133. Chaetotaxy of Abd. 2. 134. Apex of Ant. 4. 135. Th. 2; small dots= setae of collarette, open circles = pseudopodic. large dots = macrochaetae. 136. Chaetotaxy of Abd 3. 137. Labrum. 138. Macrochaetotaxy of Abd 4. circles = pseudopores. 139. Labial chaetotaxy. 140. Outer labial papilla.

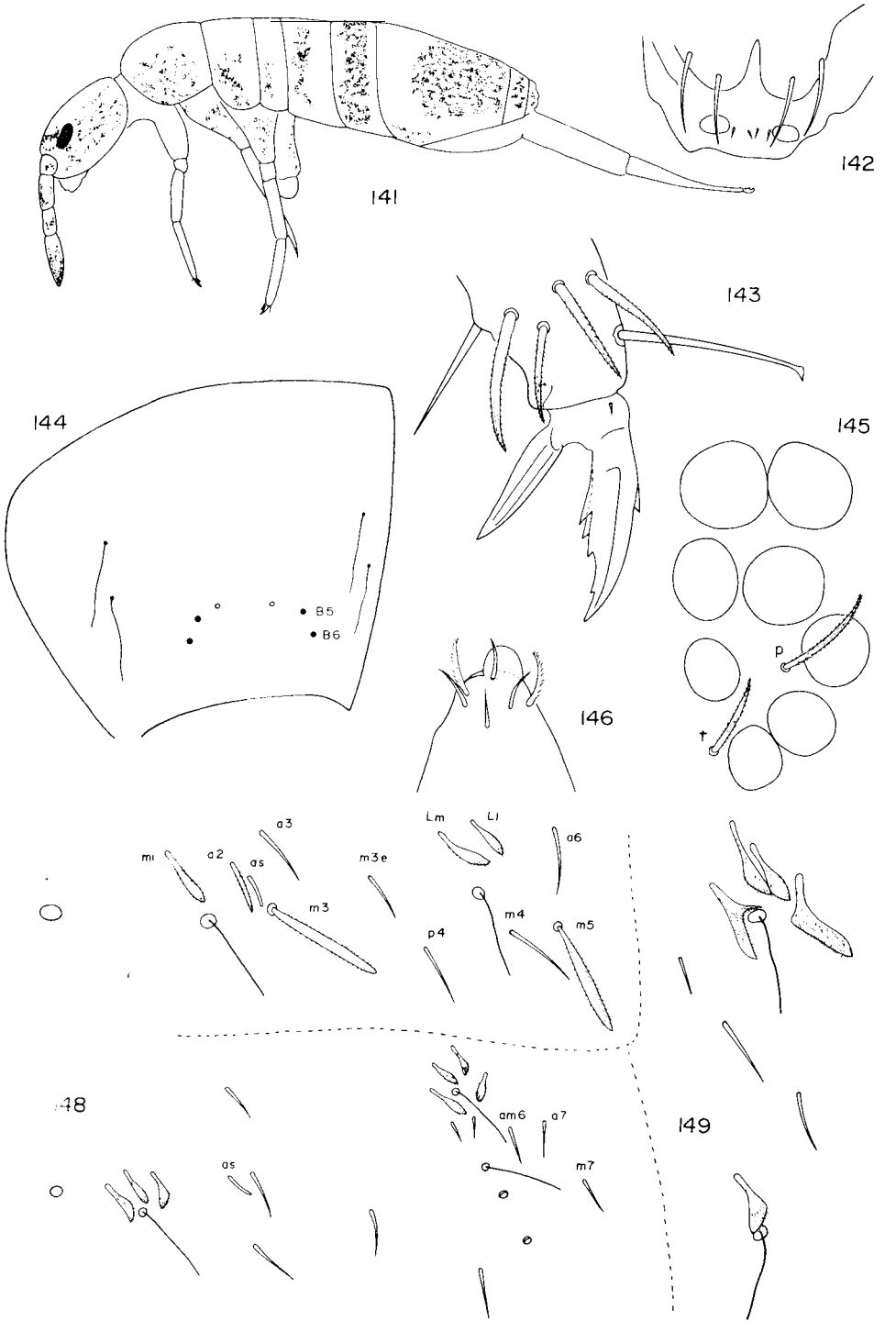

FIG.141-149.– *L. griseolus.* 141. Habitus. 142. Distal area of labrum. 143. Metathoracic claws. 144. Macrochaetotaxy of Abd. 4, circles= pseudopores. 145. Eyes and interocular setae. 146. Apex of Ant. 4. 147-148. Chaetotaxy of Abd. 2 and Abd. 3. 149. Trichobothrial complex of Abd. 4.

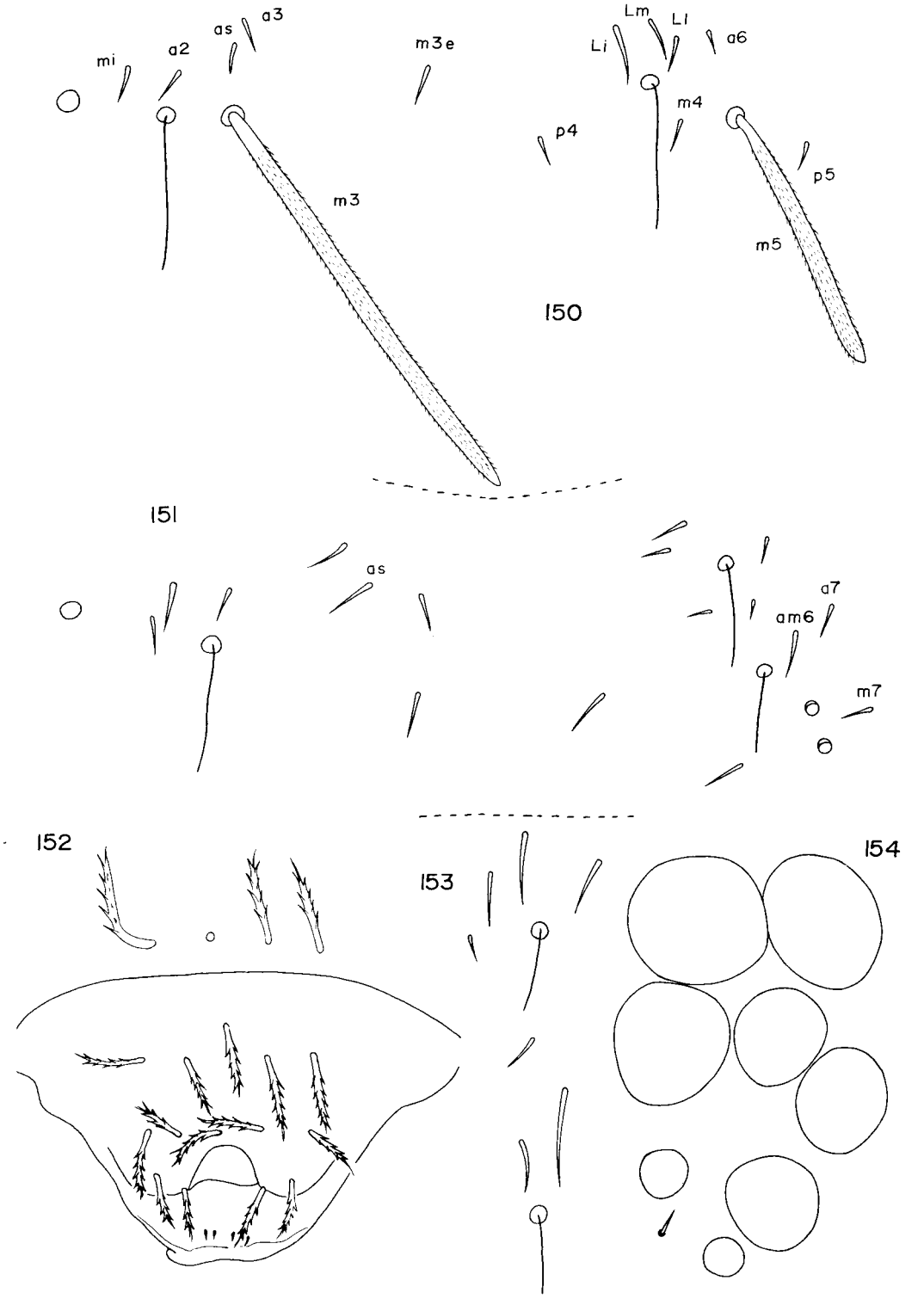

FIG.150-154.– *L. diminutus.* 150-151. Chaetataxy of Abd. 2 and Abd. 3. 152. Labrum. 153. Trichobothrial complex of Abd. 4. 154. Eyes.

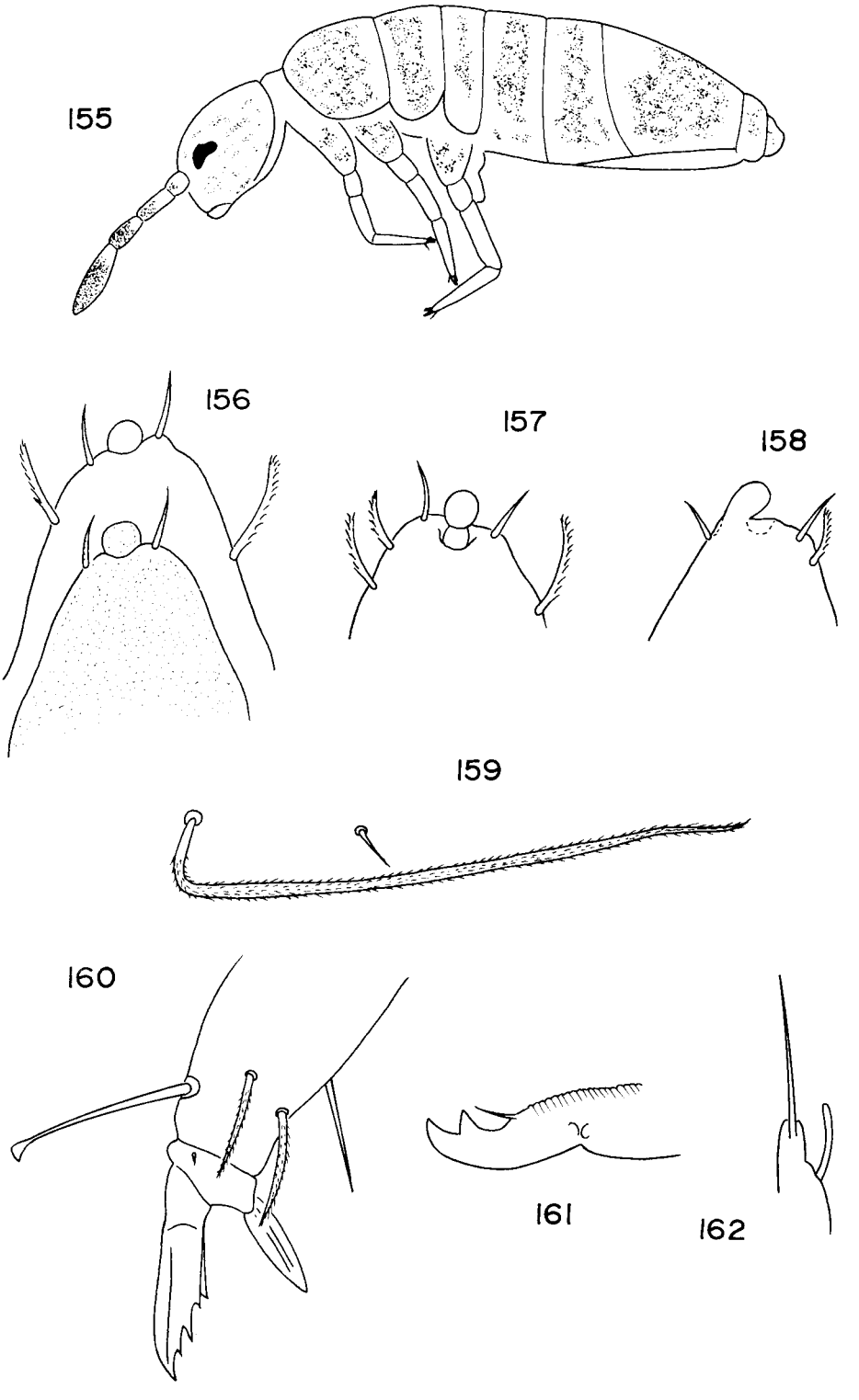

FIG.155-162.– *L. diminutus.* 155. Habitus. 156-158. Papilla of Ant. 4; dorsal, ventral and lateral views respectively. 159. Macrochaeta of Th. 2 and neighboring microchaeta. 160. Metathoracic claws. 161. Mucro. 162. Outer labial papilla.

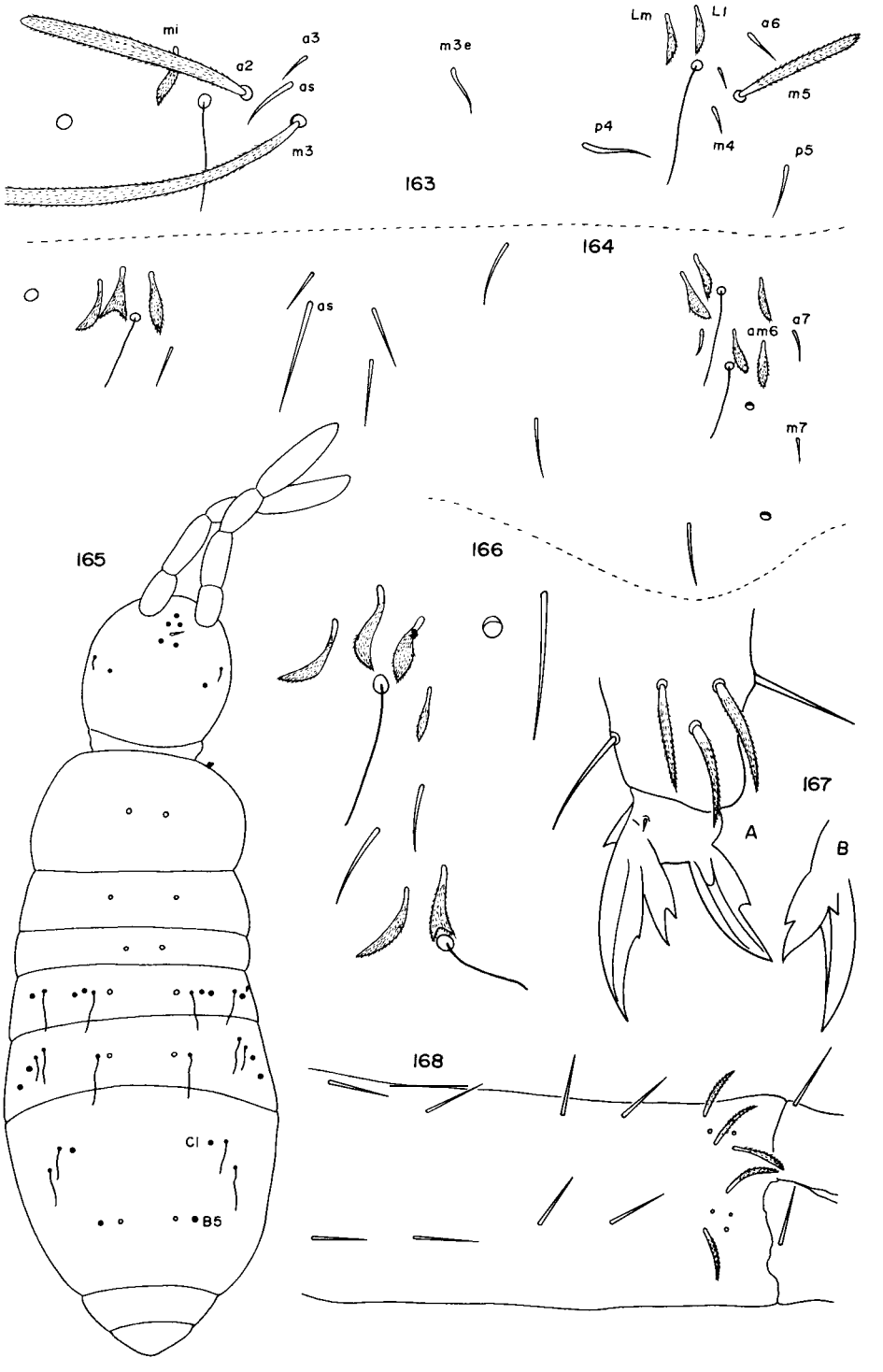

FIG.163-168.– *P. biunguiculata.* 163-164. Chaetotaxy of Abd. 2 and Abd. 3. 165. Head and body macrochaetotaxy, open circles= pseudopores. 166. Trichobothrial complex of Abd. 4. 167A. Metathoracic claws, 167B. Inner view of unguis. 168. Distribution of smooth setae along dorsum of manubrium and proximal portion of dentes.

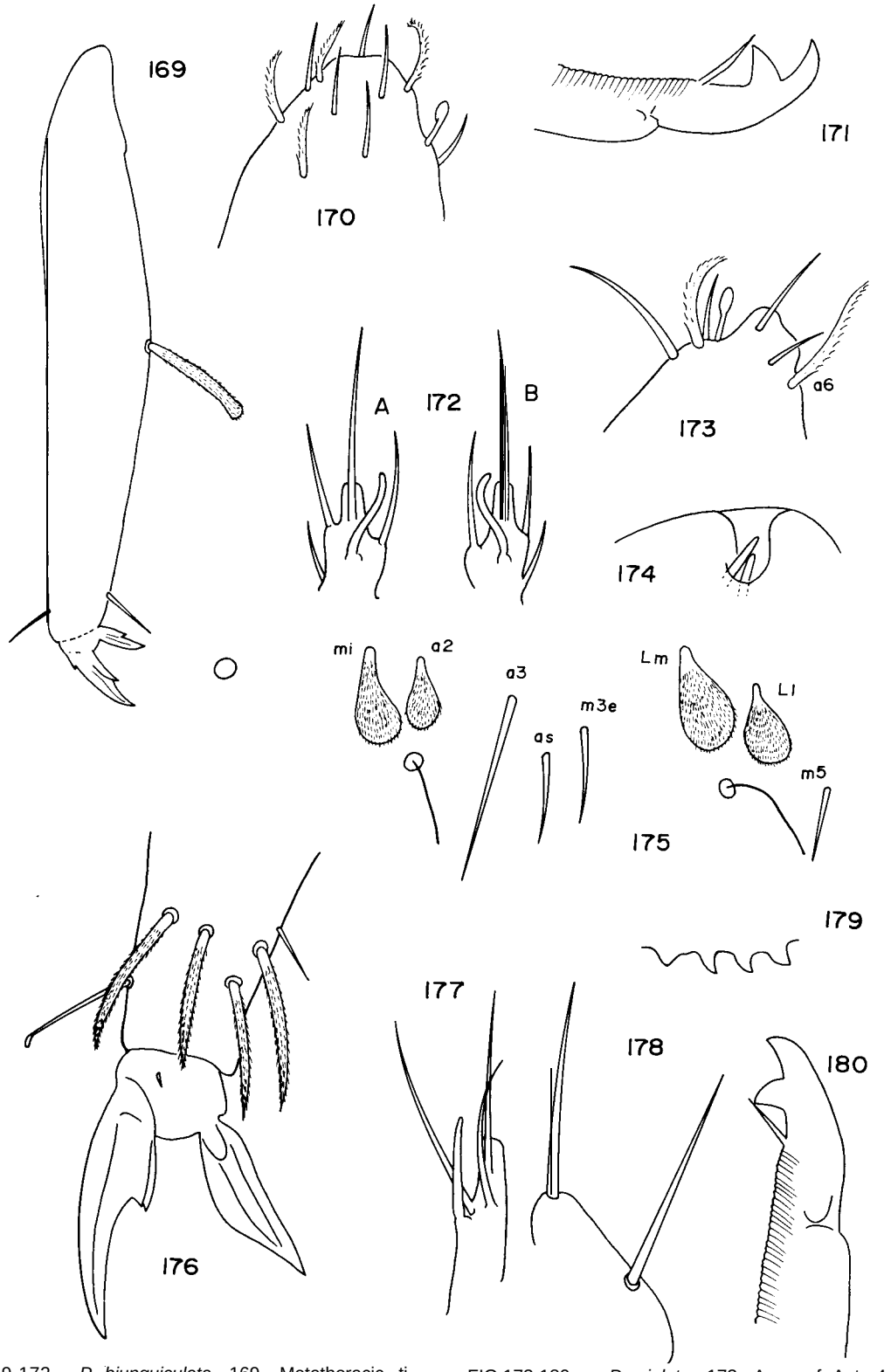

FIG.169-172.– *P biunguiculata.* 169. Metathoracic tibiotarsi and claws. 170. Apex of Ant. 4. 171. Mucro. 172A,B. Outer labial papillae. FIG. 173-180.– *P violeta.* 173. Apex of Ant. 4. 174. Ant. 3 sense organ. 175. Chaetotaxy of Abd. 2. 176. Metathoracic claws. 177. Outer labial papilla. 178. Maxillary palp. 179. Labral papillae. 180. Mucro.

FIG.173-180.– *P. violeta.* 173. Apex of Ant. 4. 174. Ant. 3 sense organ. 175. Chaetotaxy of Abd. 2. 176. Metathoracic claws. 177. Outer labial papilla. 178. Maxillary palp. 179. Labral papillae. 180. Mucro.

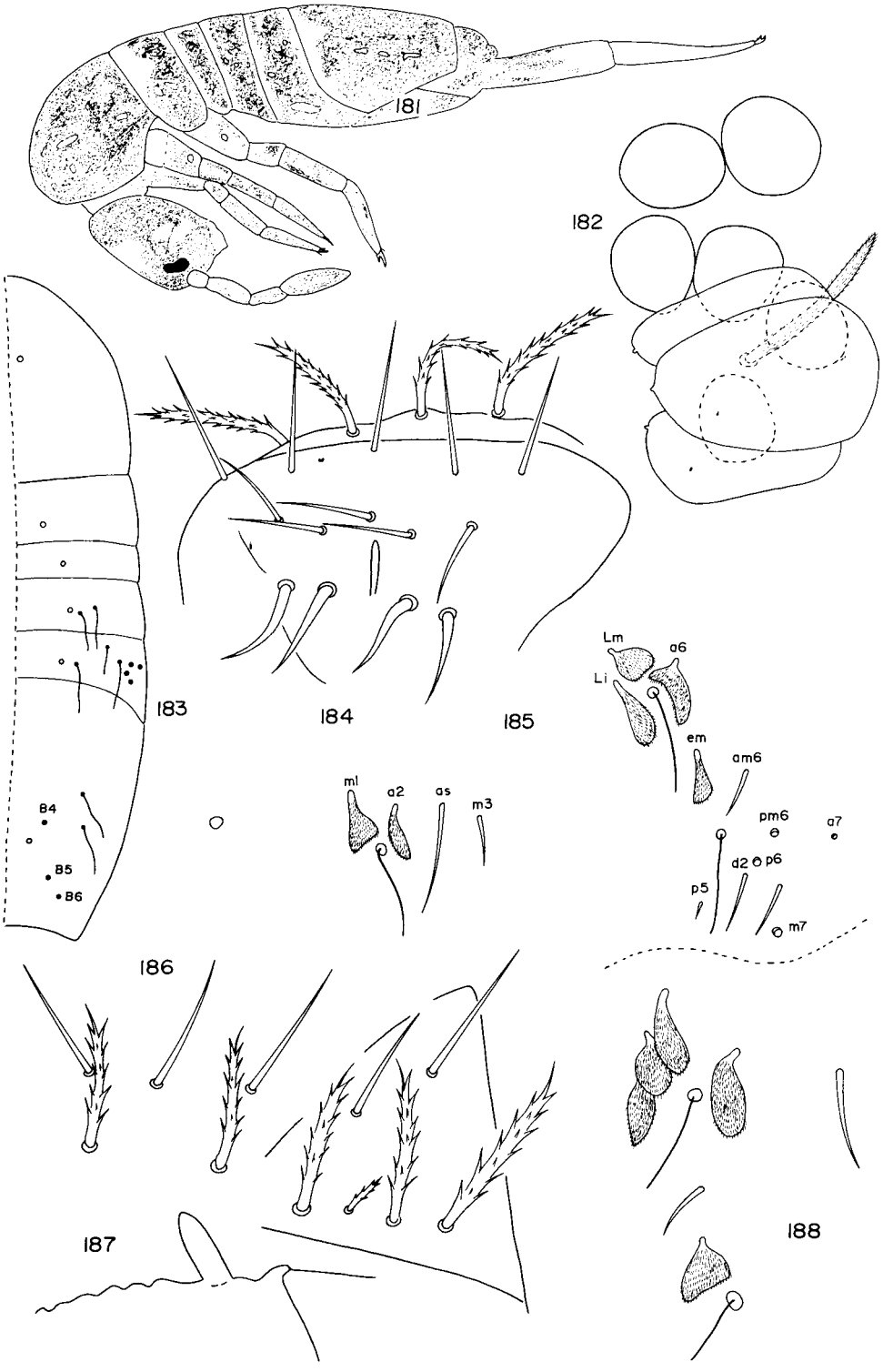

FIG.181-188.– *P. violeta.* 181. Habitus. 182. Eyes, interocular seta p and neighboring scales. 183. Body chaetotaxy, circles= pseudopores. 184. Labrum. 185. Chaetotaxy of Abd. 3. 186. Labial chaetotaxy. 187. Dental tubercle. 188. Trichobothrial complex of Abd. 4.