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ZYGENTOMA FROM THE ORIENTAL REGION AND INDONESIA – ON SOME NEW AND POORLY KNOWN ATELURIDAE.

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INTRODUCTION

This paper deals with the study of several samples of Ateluridae thysanurons (order ZYGENTOMA) collected in India, in Thailand, in the philippinese island of Luzon, in the malaysian Borneo and in the indonesian island of Sulawesi (or Celebes). The material from India has been collected by the author and is deposited in the entomological collection of the Centro de Zoologia of the Instituto de Investigacao Cientifica Tropical (CZ); in the same collection is the only specimen from Thailand, kindly offered by Dr. L. Deharveng, (University Paul Sabatier, Toulouse, France). The only specimen from the Sulawesi island and the sample from the Sabah area of Borneo, have been send by Dr. B. Hauser (Museum of Geneve, Swizerland) (MG). My very best thanks to Dr. Deharveng and to Dr. hauser who have offered and by the loaned the specimens. Thank is also due to Dr. A.K. Hazra of Zoological Survey of India, Calcutta for correcting the manuscript and proofs.

1. **Gastrotheus (G.) palpiseta** Silvestri, 1916

Specimens examined : INDIA, State of Karnataka, Bangalore, New Campus of the University of Agriculture, inside a mound of *Odontotermes* sp. (det. ABE), 10/VIII/1988, 1 ♀ (Reg. 4170), (CZ), col. L., Mendes.

Gastrotheus palpiseta was known only by its original description (SILVESTRI, 1916) based on a collected from a termite mound in Bahsoemboe, Sumatra. The specimen now under study is clearly larger than the holotypes (body length : 5.5 mm, thoracal length : 2.2 mm *versus* 3.8 mm and 1.6 mm) and presents minor differences mainly in the maxillary palp chaetotaxy and in the number of setae in the IIIrd urosternite.

The general aspect of the body (Fig. 1) is quite similar to what has been represented. The head is covered by a dense cloth of short spiniform acute setae as in Fig. 2. The maxillary palp, very short as it has been noticed, that in the Indian specimen with several thin setae (Fig. 3), although in the type it has been represented

(see Fig. IX. 3, SILVESTRI, 1916, p. 95) with clearly less hairy. The labial palp (Fig. 4), one of the most typical features of this species, is very similar to what has been described and figured in the original description, as it happens with the tibial chaetotaxy (Fig. 5). The macrochaetae of the hind margin of the urotergites attain 4 of the length of the sclerite. The infralateral chaetotaxy of the urotergites and that of the laterotergites have not been described. In the 1st urotergite (Fig. 6), there is no clear separation between uro and laterotergite; by comparison with the following segments, I can say that there are one long and one short macrochaetae in infralateral position (the second one longer as the hind border macrochaetae) and one thiner seta in laterotergal position. In the II and III abdominal segments (Fig. 7) there is already a clear separation between uro and laterotergite and there are two laterotergal setae. In the IV to VII abdominal segments (Fig. 8) there are 3 laterotergal setae besides the urotergal infralateral group. In the VIII urotergite (Fig. 9), the external macrochaeta is shorter than in the preceeding sclerites and there are 5 laterotergal setae, the 2 inner ones clearly stronger. The IX urotergite is provided with 6 macrochaetae only in the hind margin (20 in the 1st, 16 in the IInd and 10 in the VIII), and presents a strong acute infralateral macrochaeta, a very small inner seta and 7 stronger setae in the lateral margin (Fig. 10). Xth urotergite (Fig. 11) short, wider at base than long, with 1-2 minute cilia inner to the infralateral macrochaetae and with 5-6 lateral ventral setae.

The I and II urosternites are, as described, glabrous. The III, opposite to the SILVESTRI's description ("... *sternita 3-5 (Fig. IX.10) postice setis quator instructa...*") presents only 1+1 submedian macrochaetae (Fig. 12). The IVth and Vth urosternites have 1+1 submedian and 1+1 sublateral setae besides 1+1 minute setae (Fig. 13) and the VIth (Fig. 14) and the VIIth (Fig. 15) one only pair of submedian macrochaetae and 1+1 (the former) or 2+2 (the VIIth) infralateral thin setae. The subgenital plate is as represented by SILVESTRI (*op. cit.*), much wider than long, and the VIIIth and IXth coxites show in their stylets some strong spiniform setae (Figs. 16 and 17).

The ovipositor is extraordinarily swollen (Fig. 18) and the distal articles of the VIIIth gonapophyses show a great number of strong setae, the most apical ones almost cylindrical as there are not an acute point (Fig. 19); the IXth gonapophyses are provided with only a few thin setae, specially in the apical article, as in Fig. 20.

2. **Nipponatelura shirozui** (Uchida, 1966)

Specimens examined: PHILIPPINES, island of Luzon, Cueva Santa, in Quezon National Park, 21/II/1975, 1 ♀ (MG), col. P. Strinati.

Nipponatelura (UCHIDA, 1968) has been described to include 2 japanese species of Aterluridae, *Atelura kubotai* Uchida, 1949 from the Honchu island and *Atelurodes shirozui* Uchida, 1960 from the Riu-Kiu. Both species share four pairs of abdominal stylets, two pairs of lateral abdominal pseudovesicles (the VI and VII). besides a submedian pair of similar structures in the IInd urosternite, and present head, nota and urotergites (with the exception of the infralateral and laterotergal chaetotaxy glabrous; an unique combination. *Nipponatelura* is, so, new to the Philippines where it occurs in the northern of the big islands.

The only female from Luzon agrees well with the description of *N. shirozui*

(UCHIDA, 1960), although the pseudovesicles of the VI urosternite are impossible to locate (Fig. 29).

The original and unique description of *N. shirozui* and the generic description, are complemented by some figures of details of taxonomic interest, concerning the apical area of the maxilla (Fig. 21), the chaetotaxy of the infralateral area of the urotergites and laterotergites (Fig. 23 to 26), that of the urosternites and coxites (Figs. 27 to 32), and the shape of praetarsus (Fig. 22). The gonapophyses VIII and IX, with 8 and 10 articles, are of the classical primary type, as represented in Figs. 33 and 34.

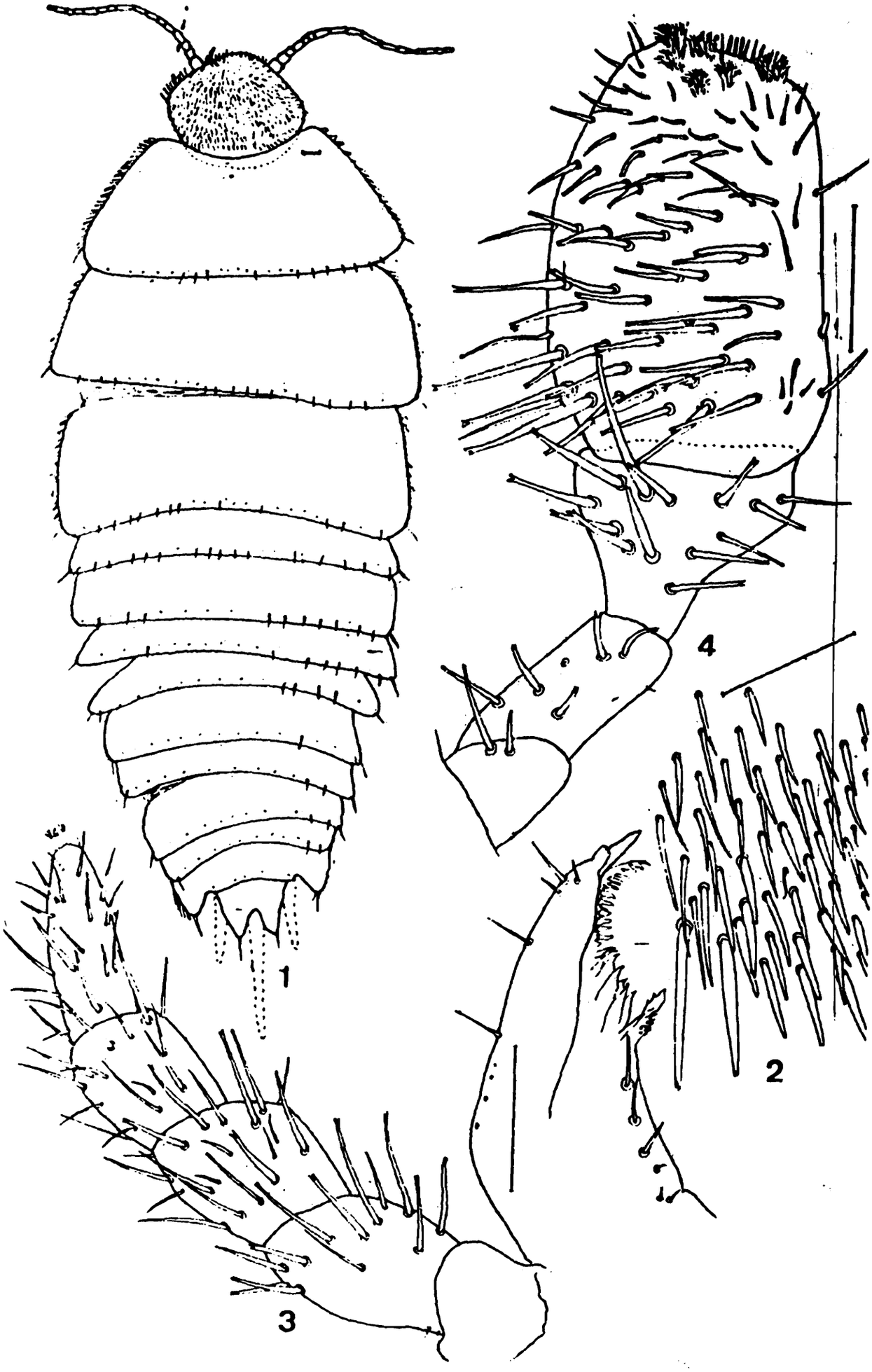
The male transformations in the X urotergite and in the posterior filaments remain undescribed, as they have been neglected by UCHIDA (1968). Accordingly to the quite possible closeness among *Nipponatelura*, *Proatelura* and *Atelurodes*, it seems probable that the transformed chaetotaxy will occur in the under surface of the X urotergite and in the upper-inner surface of cerci, but not in the base of the terminal filament.

3. **Atelurodes myrmicarius** Silvestri, 1916

Specimens examined : THAILAND, Chiang Mai/Doi Put, in forest, 22/VI/1986, 1 ♀, no. THAI 86 — CL 98, Reg. 4209 (CZ), col. L. Deharveng.

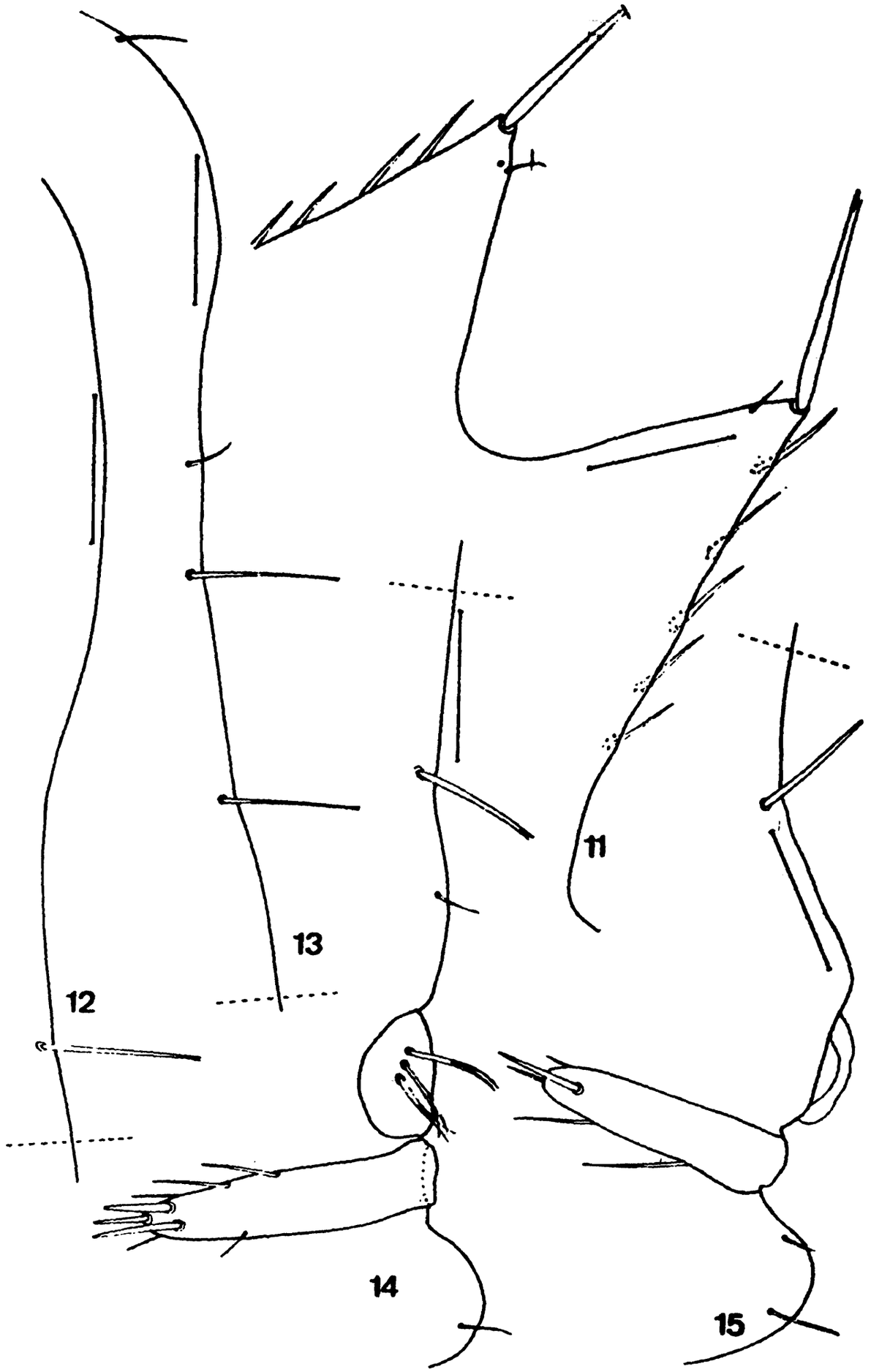
Only two species are known in the genus *Atelurodes*, *A. typhloponis* (Silvestri), from Northern India (SILVESTRI, 1913) and *A. myrmicarius* Silvestri, described from Sumatra (SILVESTRI, 1916) and also found in the Bismark island of New Britain (PACLT, 1971) and in the Solomon island of Guadalcanal (PACLT 1982), both from Melanesia. Thailand is, so, a new locality for *Atelurodes* and for *A. myrmicarius*.

The unique female collected in Doi Put, long as 3.2 mm, agrees well with the original description, mainly in the strongly emarginated Xth urotergite (Fig. 41) and also by the setae around the IInd urosternite pseudovesicles Fig. 42, but shows a more elongated subgenital plate (Fig. 43). The setal arrangement in the infralateral groups of the urosternites and in the laterotergites is similar in the IInd and IIIrd (Fig. 37) — 2 setae in the laterotergite — and in the IVth to VIIth (Fig. 38) — 4 setae in the laterotergite; in the VIIIth, there are 3 setae in the laterotergite (Fig. 39) and the IXth presents a strong posterolateral macrochaeta with 2 inner thin setae and 3 outer similar setae (Fig. 40). The Xth urotergite (Fig. 41), shows double row of thin setae along the under surface of each one of the lateral margins, character that has never been mentioned to the species. In the apex of the galea these is one only sensorial cone (Fig. 35); the morphology of the praetarsal empodium (Fig. 36), already noticed by SILVESTRI (1913 and 1916), is strongly similar to that presented by *Proatelura* and by *Nipponatelura* but quite different, however, from what has been drawn by PCLT (see Fig. 2, PACLT, 1971, p. 160). The VIIIth coxites are almost glabrous (2 setae only) (Fig. 44) but the IXth coxites present a sublongitudinal row of setae (Fig. 45). The anterior and posterior gonapophyses, with 8-9 articles, are as in Figs. 46 and 47.

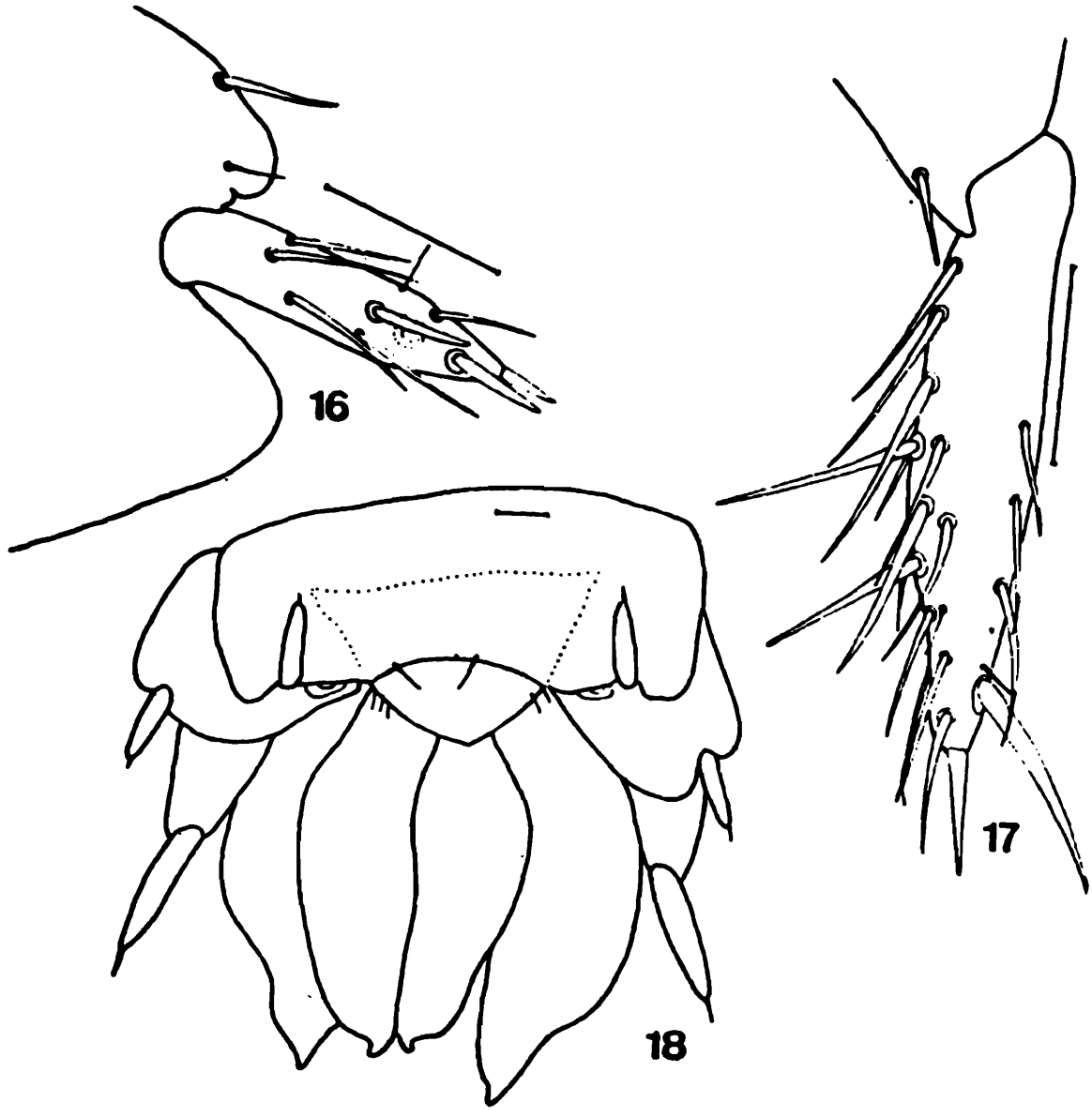


Figs. 1-4. *Gastrotheus (G.) palpiseta* Silvestri ♀. Fig. 1 - General dorsal aspect of body; Fig. 2 Detail of the cephalic chaetotaxy, posterolateral angle; Fig. 3 - Maxillary palp and maxilla; Fig. 4 Labial palp. Scales : 0.1 mm

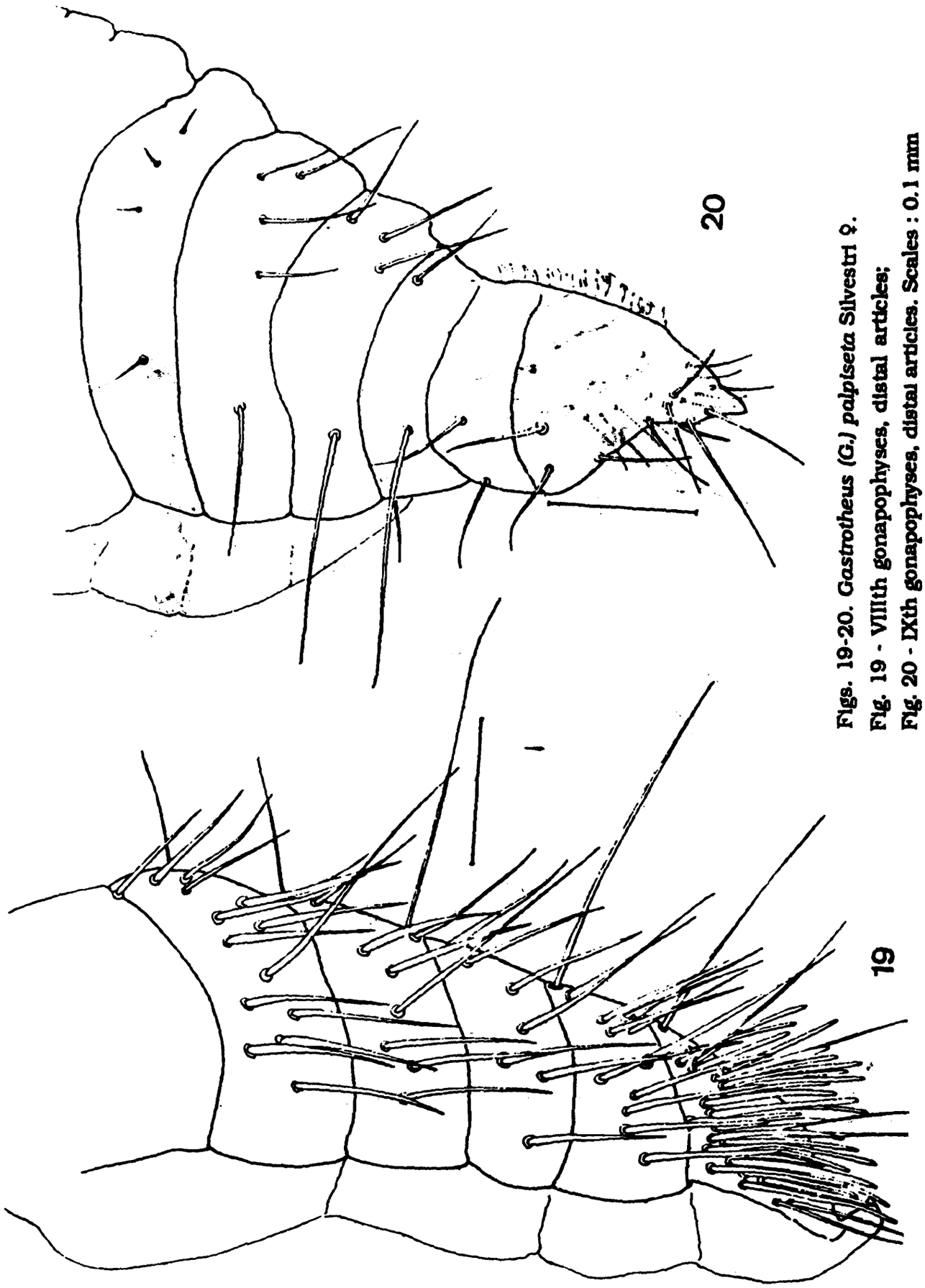
Figs. 5-10. *Gastrotheus (G.) palpiseta* Silvestri ♀. Fig. 5 - P II, tibia and tarsus; Fig 6 - Chaetotaxy of the laterotergite and of the infralateral group of 1st urotergite; Fig. 7 - Ibid., of the IIIrd urotergite; Fig. 8 Ibid., of the VIth urotergite; Fig. 9 - Ibid., of the VIIIth urotergite; Fig. 10 posterolateral angle of the IXth urotergite. Scales : 0.1 mm



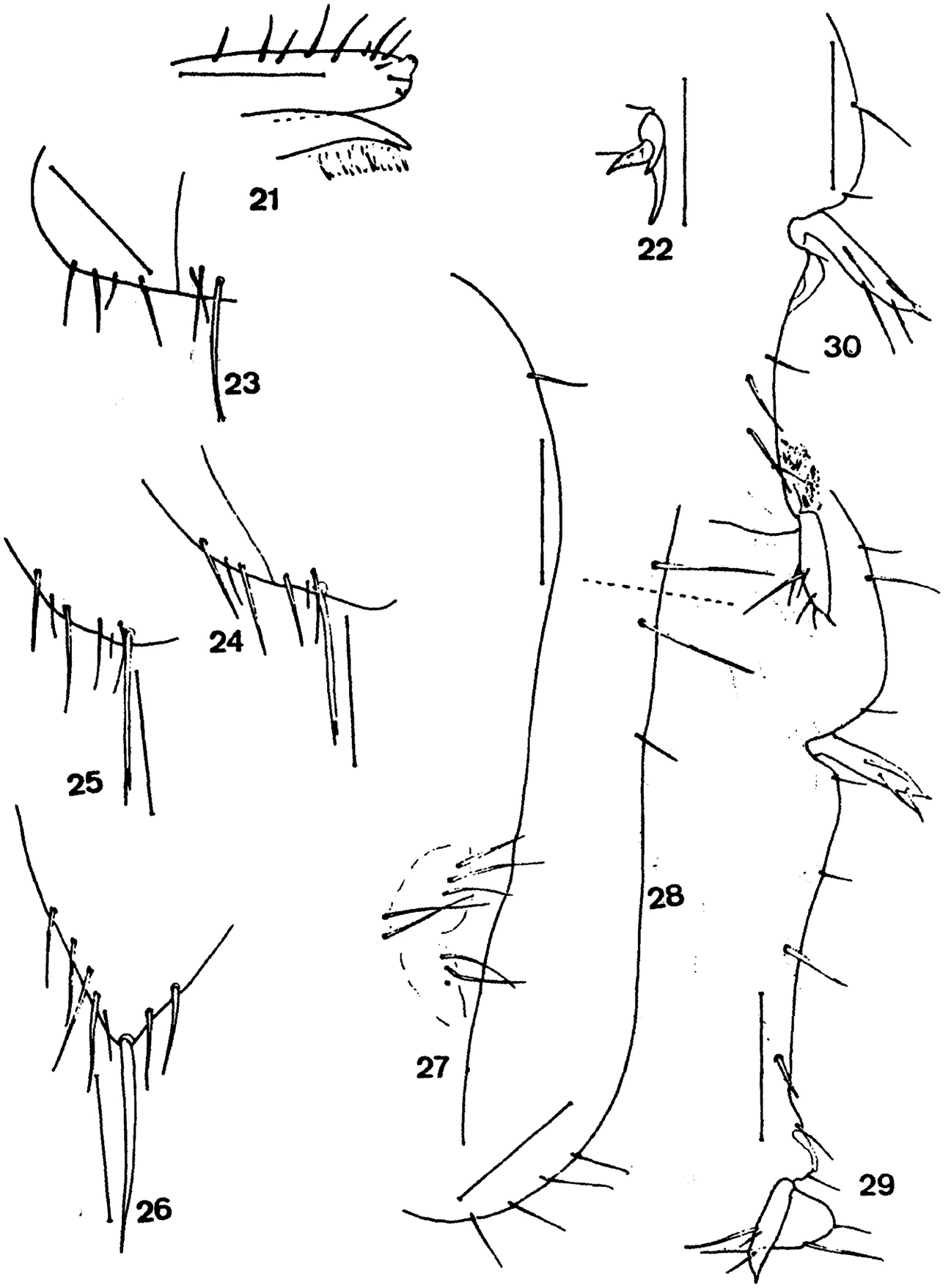
Figs. 11-15. *Gastrotheus (G.) palpiseta* Silvestri ♀. Fig. 11 - Urotergite X; Fig. 12 - Urosternite III; Fig. 13 - Urosternite V; Fig. 14 - Urosternite VI; Fig. 15 - Urosternite VII. Scale : 0.1 mm



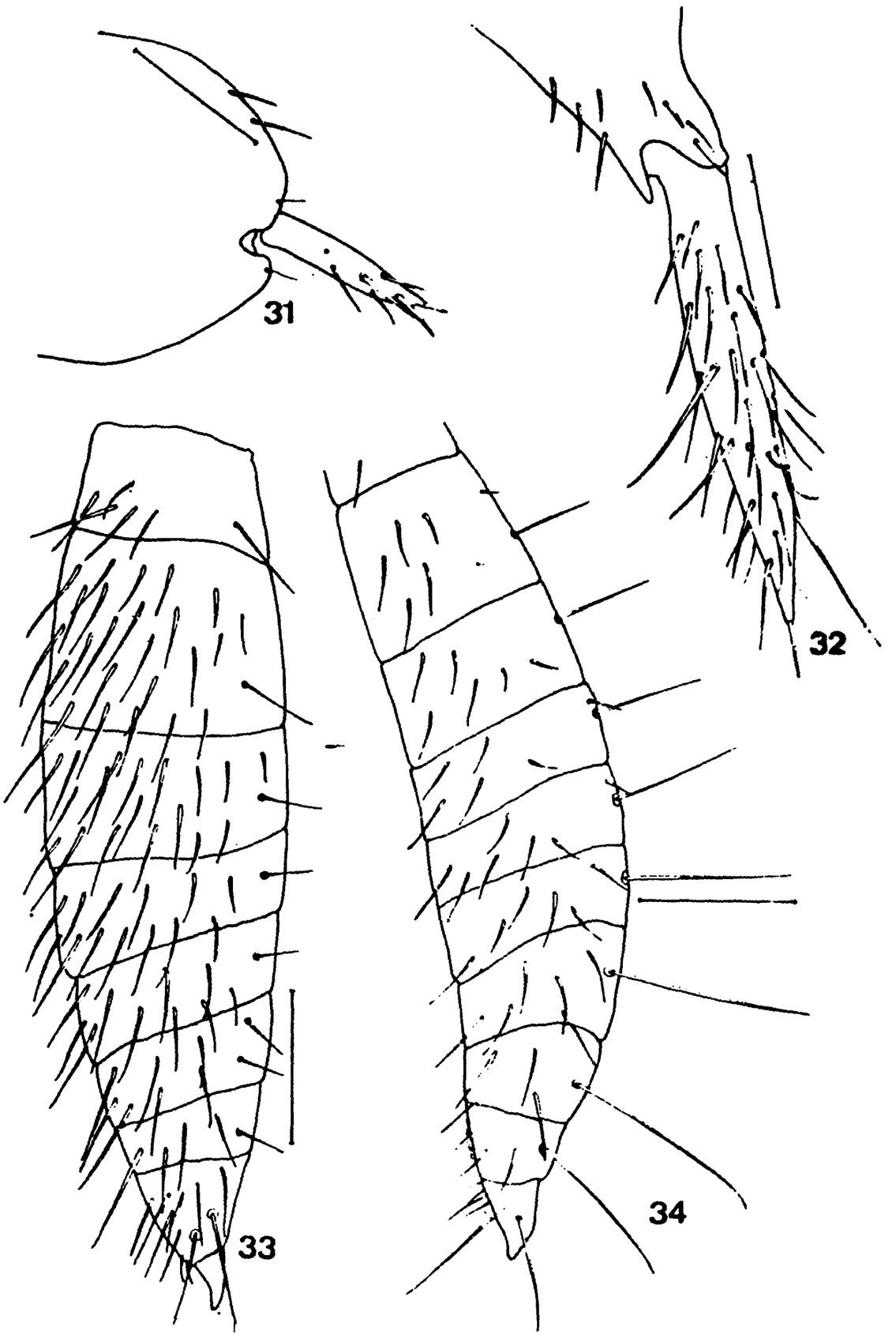
Figs. 16-18. ***Gastrotheus (G.) palpiseta*** **Silvestri ♀. Fig. 16 - VIIth coxite; Fig. 17 - Apica area and stylus of IXth coxite; Fig. 18 - General aspect of ventral abdominal area. Scales 0.1 mm**



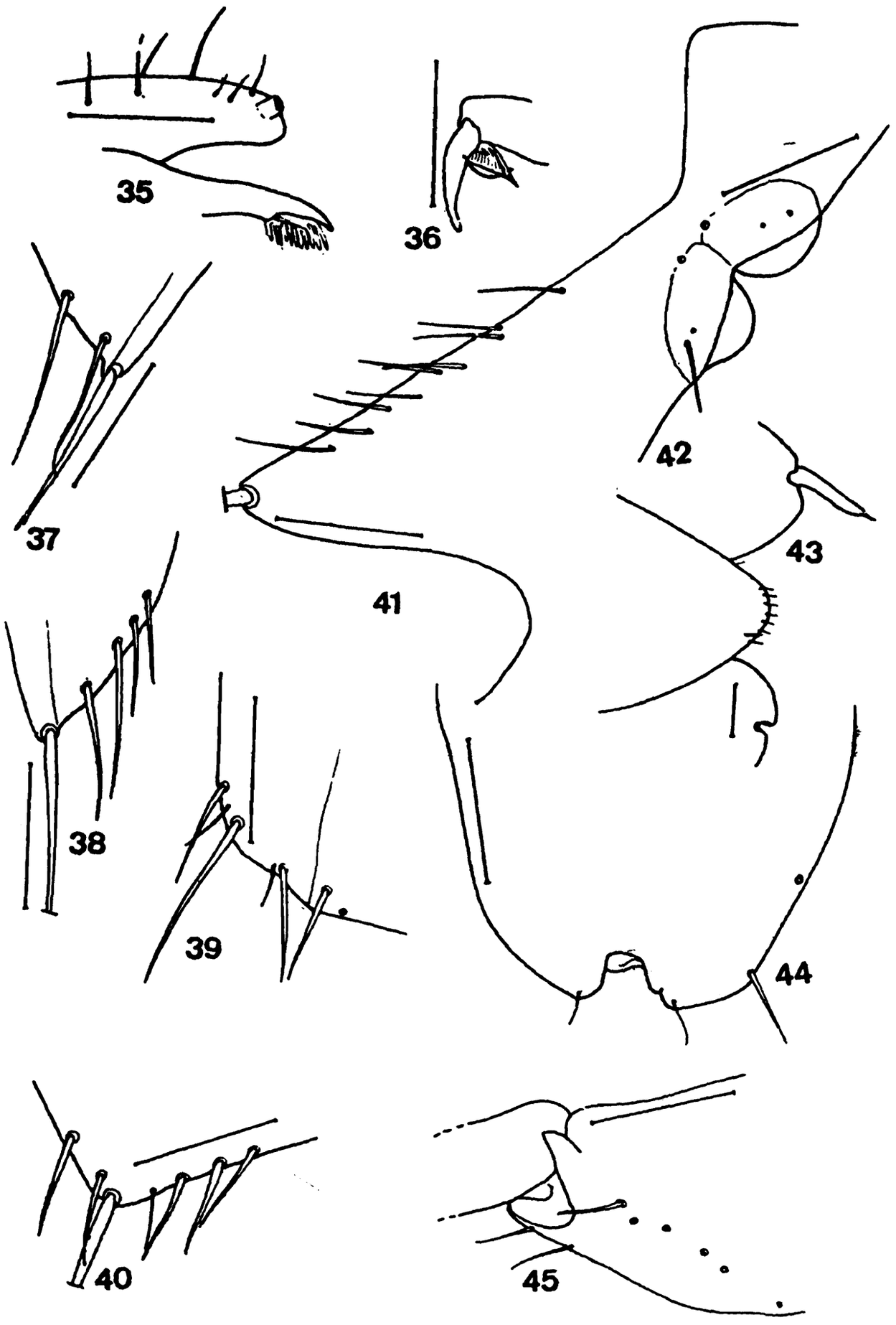
Figs. 19-20. *Gastrotheus (G.) palpiseta* Silvestri ♀.
Fig. 19 - VIIIth gonapophyses, distal article;
Fig. 20 - IXth gonapophyses, distal articles. Scales : 0.1 mm



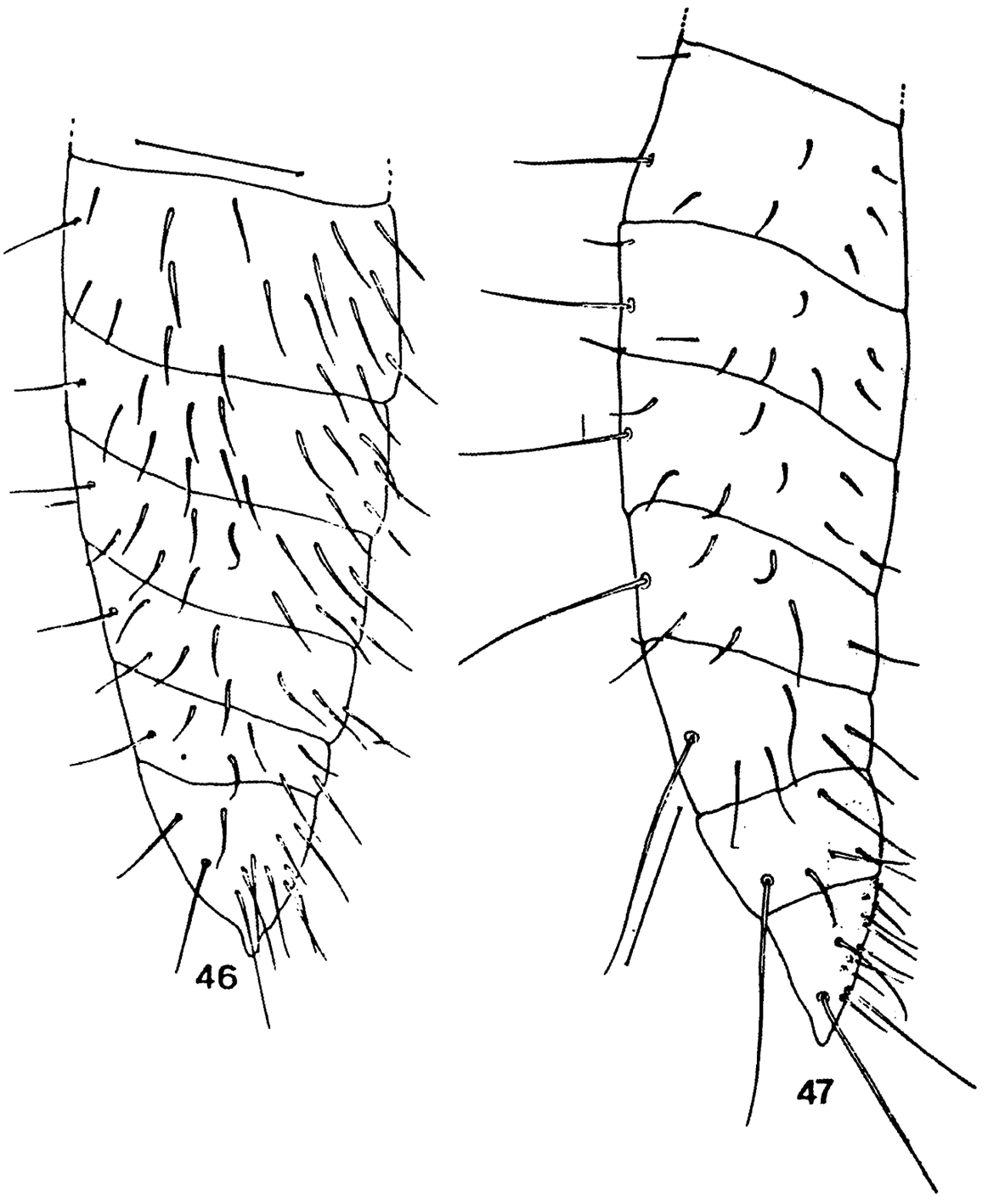
Figs. 21-30. *Nipponatelura shirozui* (Uchida) ♀. Fig. 21 - Apical area of maxilla; Fig. 22 Praetarsus of P II; Fig. 23 - Posterolateral area of Vth urotergite and laterotergite; Fig. 24 Ibid., VIIth urotergite; Fig. 25 Ibid., VIIIth urotergite; Fig. 26 Posterolateral angle of IXth urotergite; Fig. 27 IInd urosternite; Fig. 28 IIIrd urosternite; Fig. 29 VIth urosternite; Fig. 30 VIIth urosternite. Scales : 0.1 mm



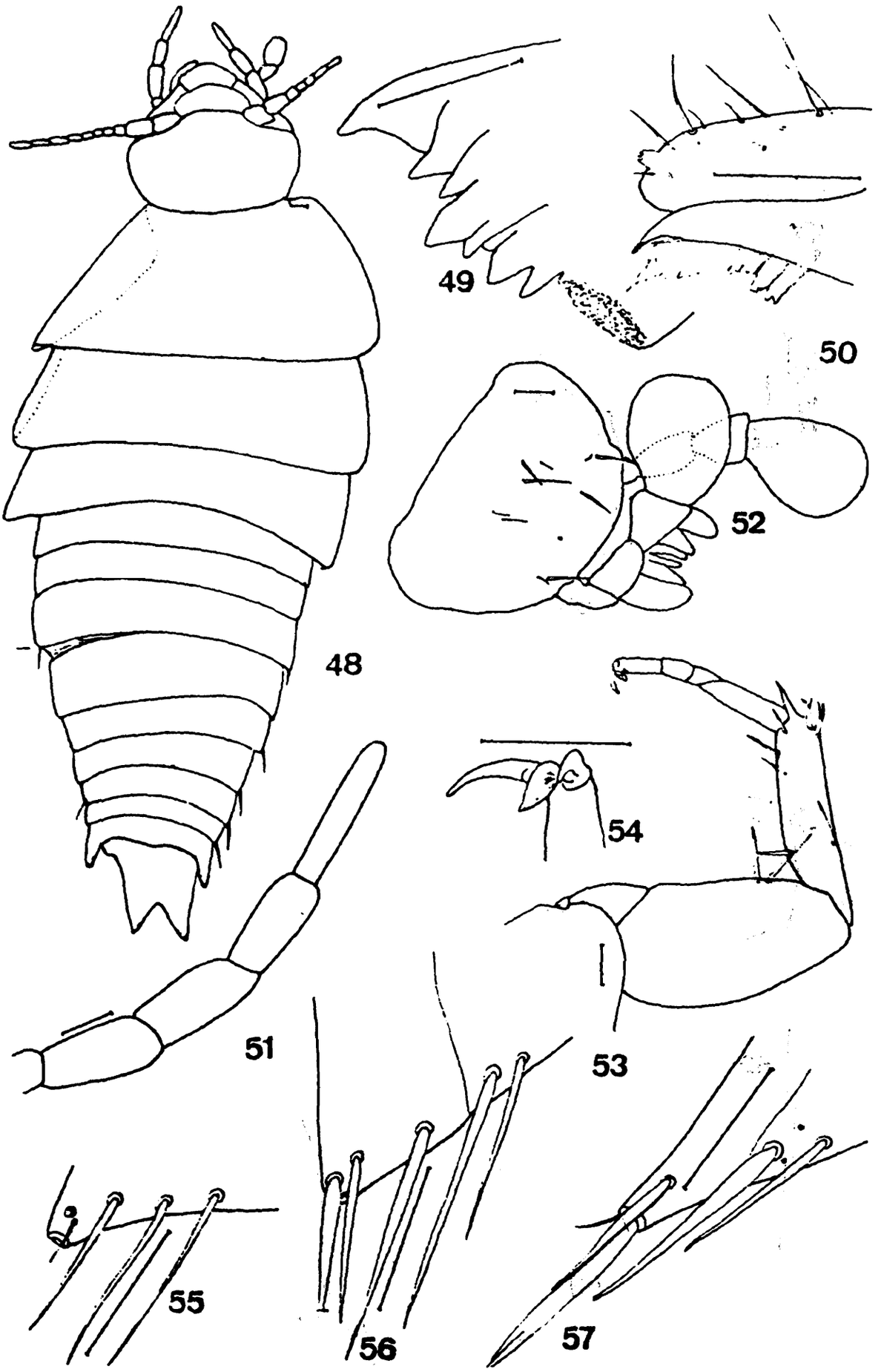
Figs. 31-34. *Nipponatelura shirozui* (Uchida) ♀. Fig. 31 VIIIth coxite and stylus; Fig. 32 - IXth coxite and stylus; Fig. 33 VIIIth gonapophyses, distal articles; Fig. 34 - IXth gonapophyses, distal articles. Scales : 0.1 mm



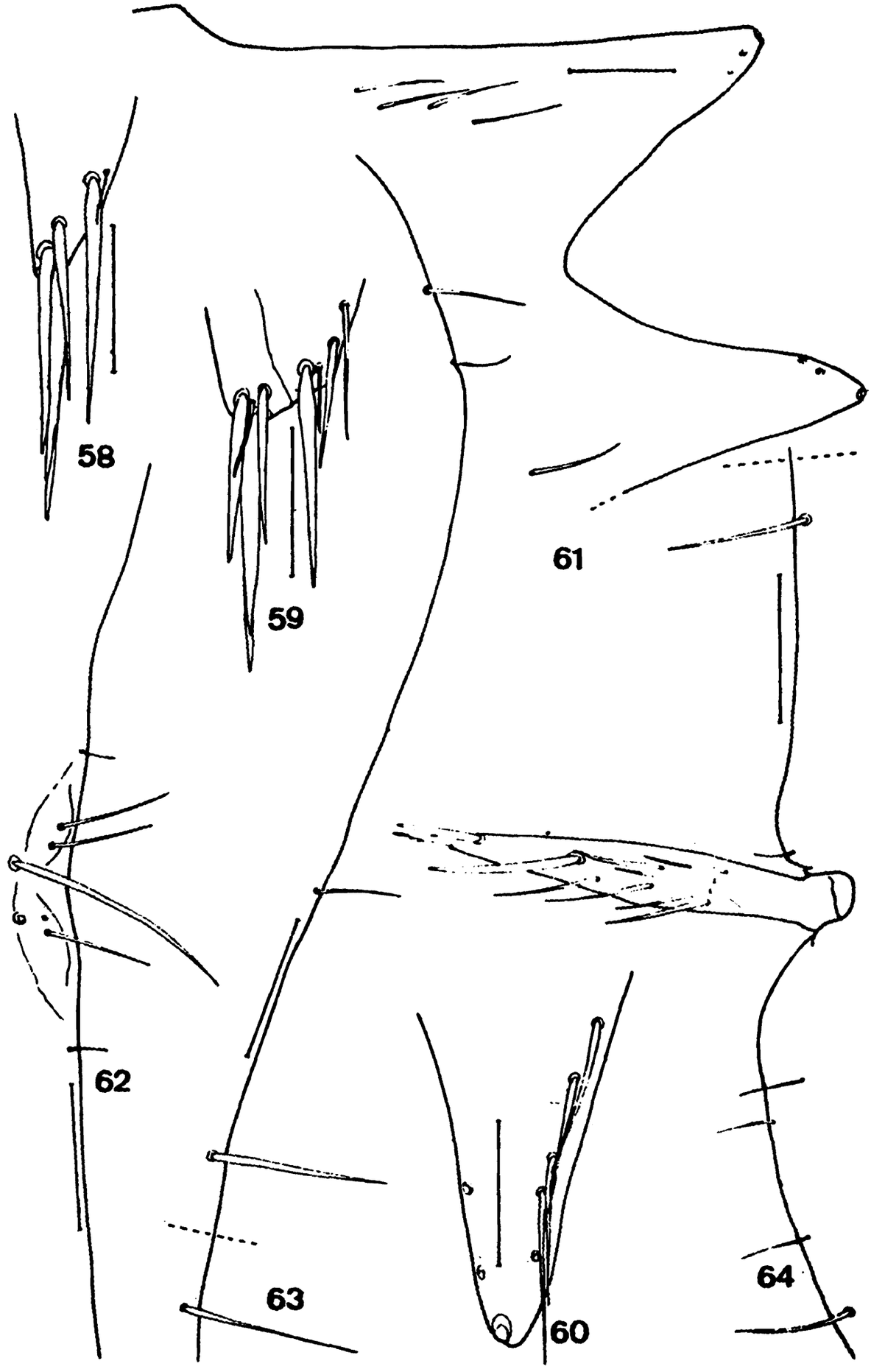
Figs. 35-45. *Atelurodes myrmicarius* Silvestri ♀. Fig. 35 Apical area of maxilla; Fig. 36 Praetarsus of P III; Fig. 37 - Laterotergite and infralateral area of IInd urotergite; Fig. 38 Ibid., of VIIth urotergite; Fig. 39 Ibid., of VIIIth urotergite; Fig. 40 - posterolateral angle of IXth urotergite; Fig. 41 - Xth urotergite; Fig. 42 IInd urosternite; Fig. 43 Subgential plate and VIIIth coxites; Fig. 44 - VIIIth coxite; Fig. 45 IXth coxite, distal area. Scales : 0.1 mm



Figs. 46-47. *Atelurodes myrmicarius* Silvestri ♀. Fig. 46 VIIIth gonapophyses, distal articles; Fig. 47 IXth gonapophyses, distal articles. Scales : 0.1 mm

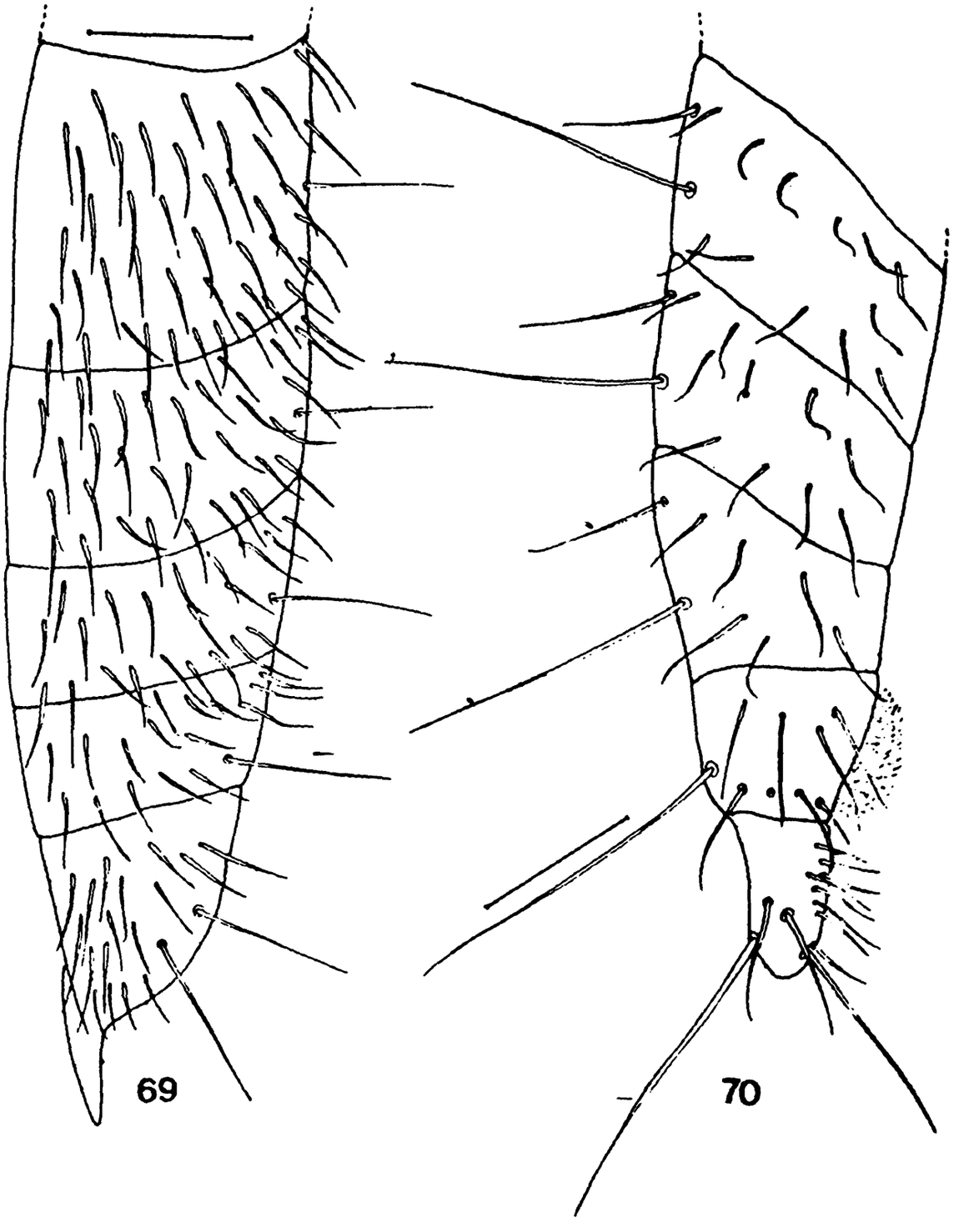


Figs. 48-57. *Pseudatelurodes celebensis* gen. n. sp.n.. Fig. 48 General dorsal aspect of the body; Fig. 49 Mandibula; Fig. 50 - Apical area of maxilla; Fig. 51 - Maxillary palp; Fig. 52 - labium and labial palp; Fig. 53 - Chaetotaxy of P II; Fig. 54 Ibid., detail of the praetarsus; Fig. 55 -Laterotergite and infralateral area of the 1st urotergite; Fig. 56 - Ibid., of the IIIrd urotergite; Fig. 57 Ibid., of the Vth urotergirte. Scales : 0.1 mm

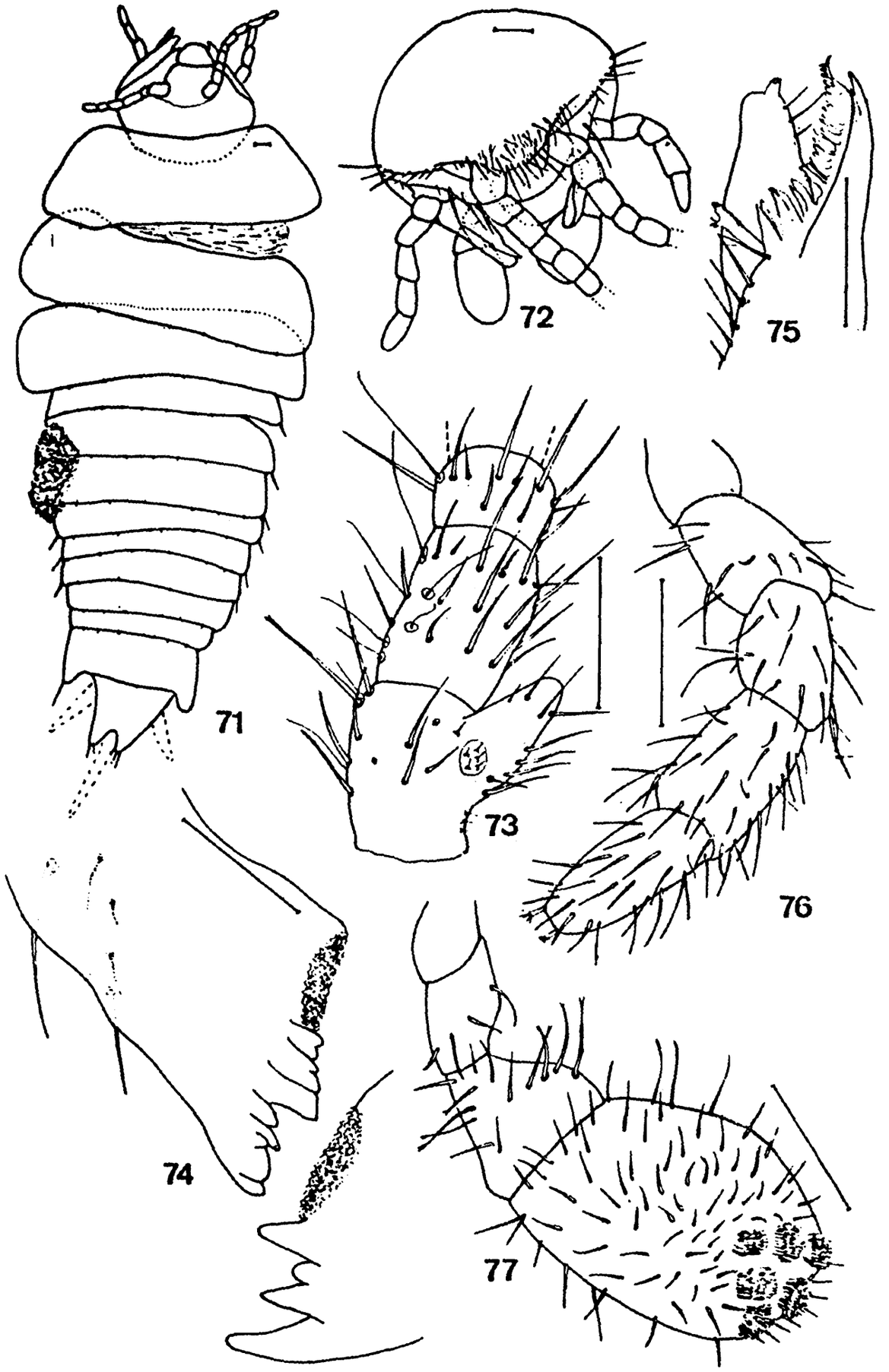


Figs. 58-64. *Pseudatelurodes celebensis* gen. n. sp. n., Fig. 58 - Laterotergite and infralateral area of the VIIth urotergite; Fig. 59 - Ibid., of the VIIIth urotergite; Fig. 60 - Posterolateral angle of the IXth urotergite; Fig. 61 - Xth urotergite; Fig. 62 - IInd urosternite; Fig. 63 - IIIrd urosternite; Fig. 64 - IVth urosternite. Scales : 0.1 mm

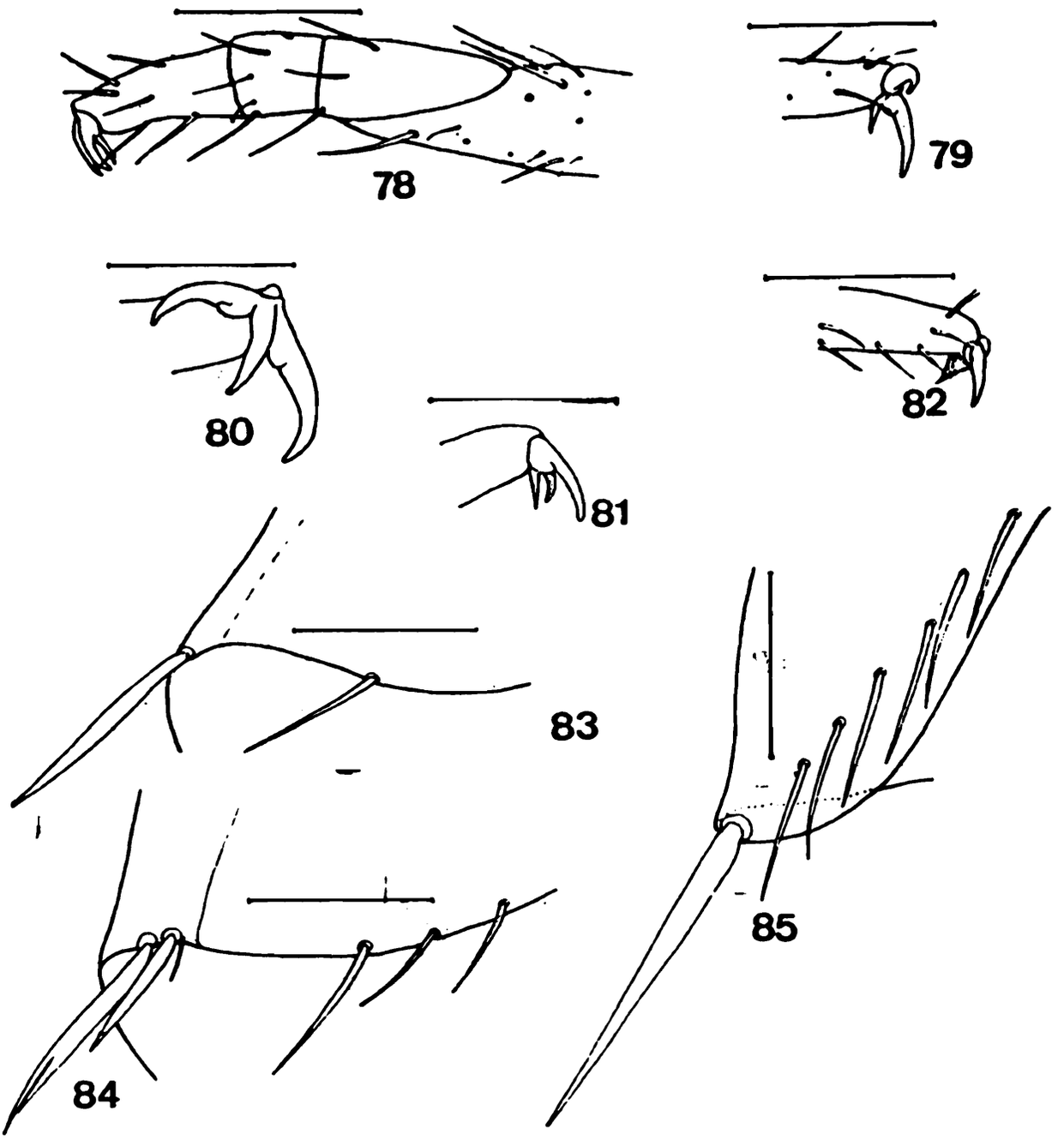
Figs. 65-68. ***Pseudatelurodes celebensis*** **gen. n. sp. n.. Fig. 65 - Vth urosternite; Fig. 66 - VIIth urosternite and subgenital plate; Fig. 67 - VIIIth coxite; Fig. 68 - IXth coxite, apical area. Scales : 0.1 mm**



Figs. 69-70. *Pseudatelurodes celebensis* gen. n. sp. n.. Fig. 69 VIIIth gonapophyses, distal articles; Fig. 70 IXth gonapophyses, distal articlles. Scales : 0.1 mm



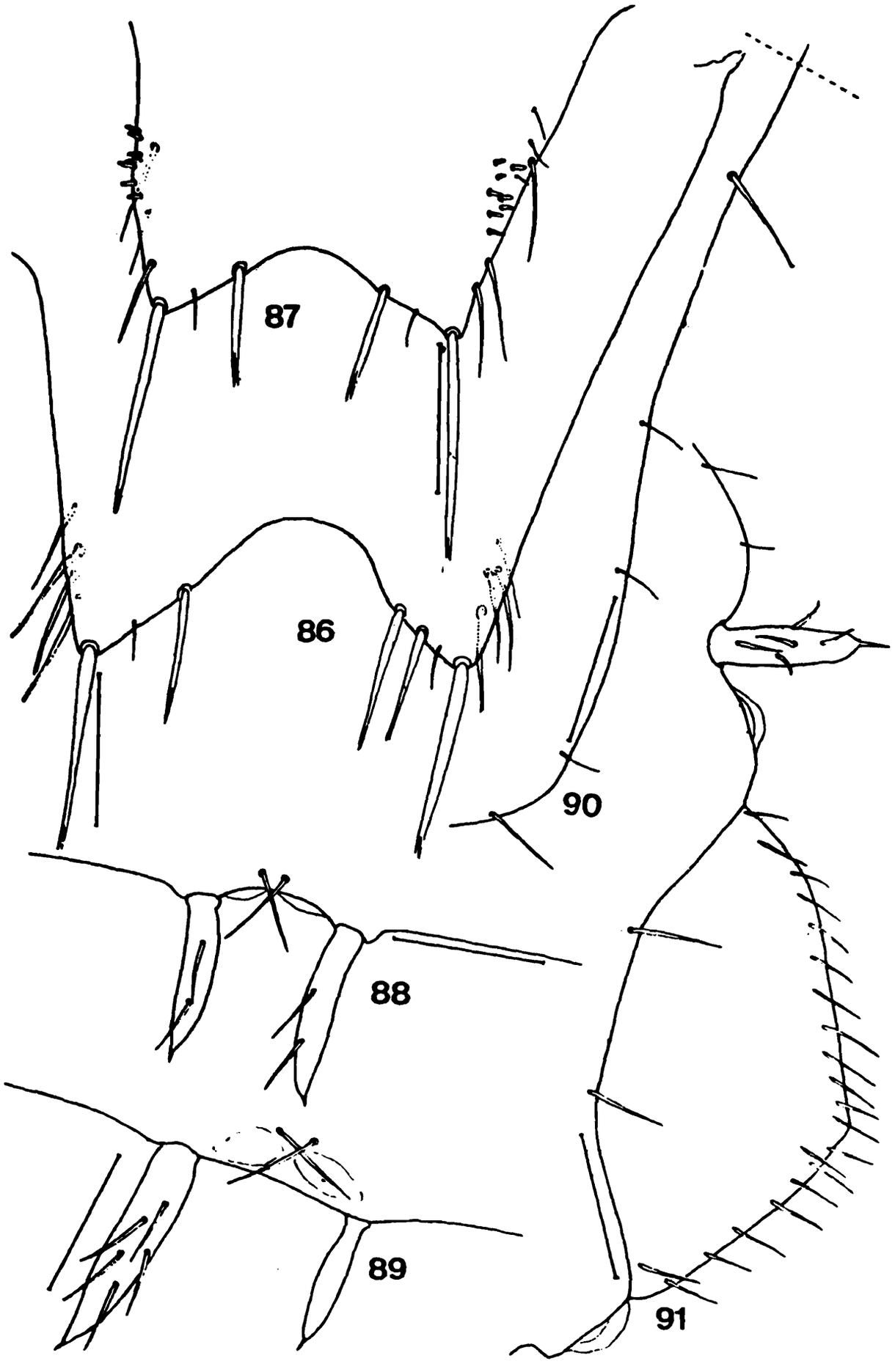
Figs. 71-77. *Bharatatelura malabarica* gen. n. sp. n.. Fig. 71 General dorsal aspect of body; Fig. 72 Anterior view of the head; Fig. 73 Male antenna, pedicellum and base of flagellum; Fig. 74 Mandibulae; Fig. 75 apical area of maxilla; Fig. 76 Maxillary palp; Fig. 77 Labial palp. Scales : 0.1 mm



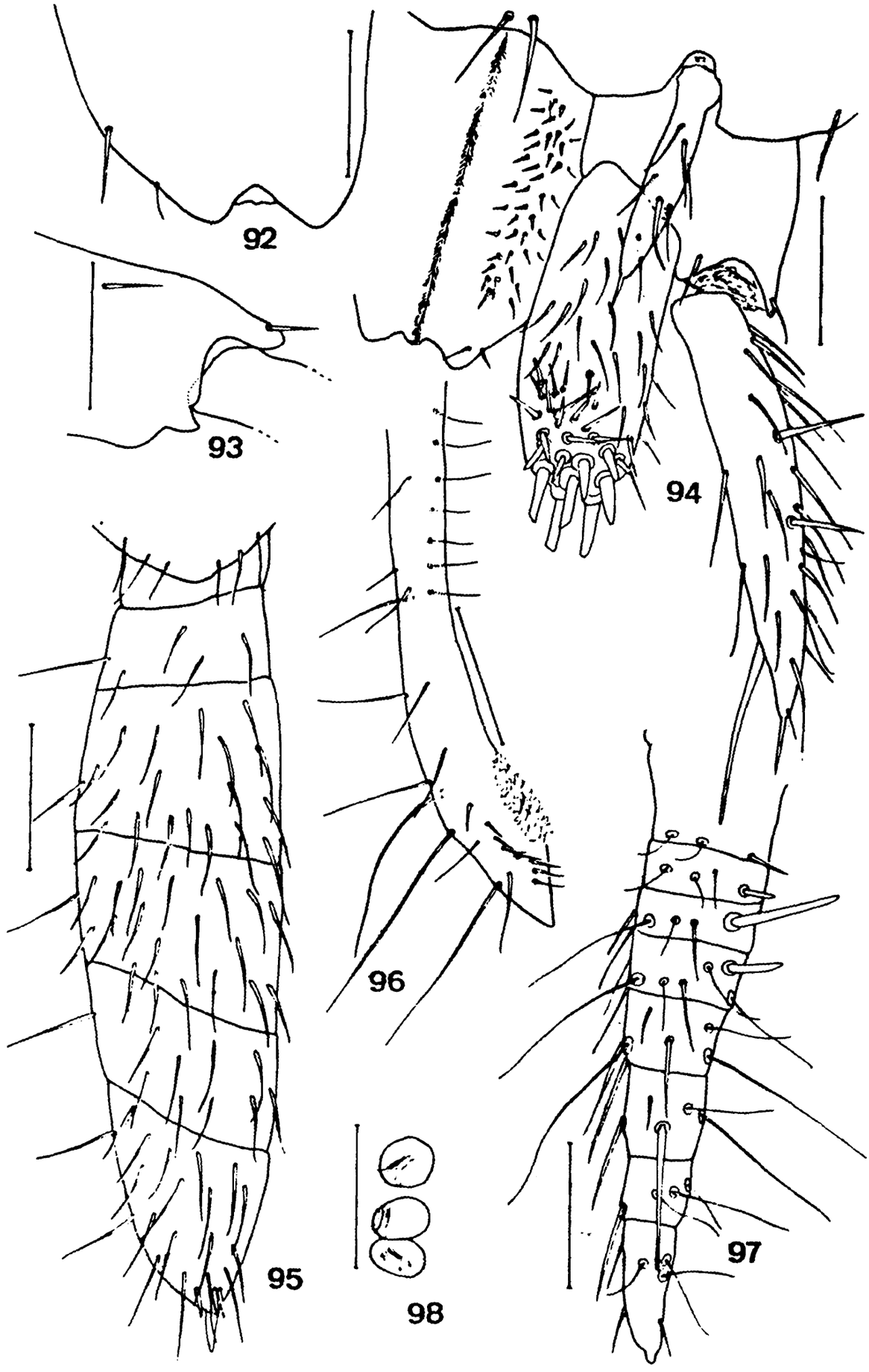
Figs. 78-79. *Bharatatelura malabarica* gen. n. sp. n. Fig. 78 - Tarsus of P I; Fig. 79 - Praetarsus of P III.

Figs. 80-81. *Proatelurina pseudolepisma* (for comparison). Fig. 80 Praetarsus of P III, specimen from Madeira island, Portugal; Fig. 81 - Ibid., specimen from Sintra, Portugal. Fig. 82. *Proatelura jacobsoni* (for comparison), praetarsus of P III, specimen from the Philippines.

Figs. 83-85. *Bharatatelura malabarica* gen. n. sp. n. Fig. 83 - Laterotergite and infralateral area of the IInd urotergite; Fig. 84 Ibid., of the IIIrd urotergite; Fig. 85 Posterolateral area of the IXth urotergite. Scales : 0.1 mm



Figs. 86-91. *Bharatatelura malabarica* gen. n. sp. n.. Fig. 86 Xth urotergite of the ♀; Fig. 87 - Ibid of the ♂; Fig. 88 IInd urosternite of the holotypus; Fig. 89 Ibid., of the allotypus; Fig. 90 IVth urosternite; Fig. 91 - VIIth urosternite of ♀ and subgenital plate. Scales : 0.1 mm



Figs. 92-98. *Bharatatelura malabarica* gen. n. sp. n.. Fig. 92 VIIIth coxite of ♀. Fig. 93 IXth coxite of ♀. Fig. 94 Hind border of VIIIth coxite, IXth coxites and styli, and genitalia of ♂. Fig. 95 VIIIth gonapophyses and border of subgenital plate; Fig. 96 IXth gonapophyses; Fig. 97 Cercus of ♂. Fig. 98 IXth gonapophyses; Fig. 97 Cercus of ♂. Fig. 98 Spermatolophids. Scales : 0.1 mm

Pseudatelurodes gen. n.

(♂ unknown)

Ateluridae : medium to small size insects (ca. 4 mm), weakly sclerotized; body limuloid, the thorax wider than long with ca. 2/3 of the length of abdomen; hypodermal pigment absent, the body and appendages whitish or yellowish.

Scales with abundant thin rays which surpass very slightly their free border, present on the head, body and coxae of the legs.

Head dorsally visible, only the proximal area covered by the anterior border of pronotum, the setae and macrochaetae restricted to the anterior area, the cephalic capsule covered by scales and not emarginated at the level of the antennae. Antennae not intact but almost certainly shorter than the thorax, without special characteristics. Mandibles apically with very strong sclerotized teeth, the molar area well developed; 2-3 very strong setae in the outer proximal area. Maxillae elongated, the lacinia with one strong and dark apical tooth and one inner hyalin thin tooth, the pectinated process hardly longer than the main outer tooth; galea more or less of the same length of the lacinia, with one only short apical cone. Maxillary palp without special feathures, provided with thin setae and with a few stronger and darker macrochaetae in the proximal articles. Labium with rounded posterolateral angles, with a few scattered setae; the labial palp without special characteristics.

Nota with long and short setae in their lateral borders only. Legs without special features, with some isolated macrochaetae; tarsus four-articulated; praetarsus with strong lateral claws, very slightly enlarged at their bases; empodium leaf-like and striated.

Urotergites completely covered by scales, the macrochaetae only in the posterolateral area and in the laterotergites. Xth urotergite strongly emarginated in the hind margin, with some thin setae in the posterolateral inner margin. Urosternites scaly, with 1+1 submedian macrochaetae and several thiner setae. Pseudovesicles in the IInd urosternite (in submedian position) and in the VIIth (in typical sublateral position). 6 pairs of abdominal stylets, from the VIth to the IXth segments. Subgenital plate large, parabolic. Ovipositor long, the gonapophyses with abundant thin setae only and clearly pseudarticulated. Posterior filaments without special charactristics.

Type-species : *Pseudatelurodes celebensis* sp.n.

Derivatio nominis : The new genus is named on account to its quite probable closeness to *Atelurodes* Silvestri, 1916.

Discussion : Only three Ateluridae genera are known to present 6 pairs of abdominal stylets, from the IVth to the IXth segment : *Dodecastyla* Paclt (PACLT, 1974) from Chile, *Mesonychographis* Silvestri (SILVESTRI, 1908) from Central Africa, and *Grassiella* Silvestri (SILVESTRI, 1912), with an amphi-atlantic distribution; none of these genera present a medial pair of pseudovesicles in the IInd urosternite and probably all of them (nothing is stated about *Dodecastyla*) show two sensorial cones in the apex of galea; furthermore, urotergal setae are present in the two former taxa and the number of abdominal vesicles is clearly different in the later.

The chaetotaxy, the shape of empodium, the occurrence of two closely located pseudovesicles in the IInd urosternite and the presence of only one short sensorial cone in the apical galea, are very similar to those shown by *Atelurodes* (SILVESTRI, 1916), a quite comparable genus that presents, however, only five pairs of abdominal stylets (IInd to the IXth segments). Only a future study of the male sex will allow, almost certainly, new distinctive characteristics between these two genera.

4. **Pseudatelurodes celebensis** sp.n.

Specimens examined : INDONESIA, Sulawesi (or Celebes) island, Bantimurung, Maros, in forest, 11/VII/1986, 1 ♀ holotypus, no. INDO-130, Reg. 4210 (CZ), col L. Deharveng.

Body length : 4.0 mm. General shape of body as in the generic description and in Fig. 48. Head, body and appendages light, yellowish, the hypodermal pigment absent. Scales very light, yellowish, golden or ivory, more or less uniform and with abundant thin rays which hardly surpass the free border of the scale. Head partially covered in its base by the anterior border of pronotum (Fig. 48 drawn after microscopical preparation); cephalic capsule covered by numerous scales, with a few scattered minute setae (mainly in the anterior area) not clearly emarginated at the level of the antennae; macrochaetae not specially abundant, only in the frontal area, clypeus and labrum. Antennae dammaged, short (maximum observed of 10 articles), devoided of special features; the two most distally preserved articles are longer than wider and composed of 3-4 sub-articles. Mandibles as in Fig. 49, clearly asymetrical, the incisive area with strong and acute sclerotized teeth, the molar area more reduced though well developed; proximal area of the outer body of mandibles with 2-3 very strong and long macrochaetae. Maxillae as in Fig. 50, the lacinia with one only developed apical sclerotized tooth followed by a further hyaline and tiny tooth; lamelated hyline process long, surpassing a little the apex of the apical tooth; galea not longer than the lacinia, with one only apical cone. Maxillary palp without special characteristics (Fig. 51), covered by thin setae and with a few stronger and darker setae in the apical area of the two proximal articles; distal article clearly longer (almost 1.5 times) and thiner than the penultimate, 5 times longer than wide. Labium and labial palp as in Fig. 52, the labium with posterolateral rounded corners and provided with a few isolated macrochaetae. Labial palp without special features, its apical article avoid, 1.5 times longer than wide and with the typical chaetotaxy.

Nota as in the generic description, with setae in the lateral margins only, their hind border almost straight. Legs without special characteristics, the scales in the coxae only; distribution of macrochaetae as in Fig. 53; tarsi four-articulated, the praetarsus as in the generic description and in Fig. 54.

Urotergites I-IX with scales only, the macrochaetae reduced to the infralateral group and to the neighbouring area of the laterotergite. Infralateral group of the Ist and IInd urotergites with two outer setae and one inner macrochaeta; outer seta the only preserved, shorter than the laterotergal setae (Fig. 55). IIIrd urotergite (Fig. 56) with four infralateral and two lateral setae, the inner macrochaeta of the infralateral group lost. IVth urotergite like the IInd, only the outer seta of the laterotergite preserved and similar to the correspondent one of the IIIrd segment.

Laterotergite and infralateral group of the Vth urotergite as in Fig. 57, similar to those of the VIth; macrochaeta short but strong, the outer seta clearly shorter and thiner; in the laterotergite, the outer seta is much shorter than the inner one. Urotergite VII with only one laterotergal seta (Fig. 58), the infralateral group with one strong macrochaeta and two thiner outer setae. Urotergite VIII as in Fig. 59, the infralateral group as in the preceeding sclerite, the laterotergite with one strong acute-pointed seta and two shorter and more delicate outer setae. IXth urotergite prolonged by an infralateral lobe, its chaetotaxy as in Fig. 60. Xth urotergite shorter than wide at base (Figs. 48 and 61), the apical notch deep; 1+1 infralateral macrochaetae (both lost) accompanied by 2+2 inner little setae (also lost); in the undersurface, 3-4 pairs of delicate paramarginal setae.

First urosternite glabrous, covered with scales. Urosternite II as in Fig. 62, with 1+1 submedian macrochaetae and 1+1 submedian pseudovesicles, each one provided with two thin setae. Urosternite III (Fig. 63) with 1+1 submedian macrochaetae, 1+1 clearly shorter (1/2 of the length of the former) sublateral macrochaetae, 1+1 infralateral setae and a pair of tiny cilia. Urosternites IV to IX provided with stylets those of the IVth the only preserved (Fig. 64) and with 1+1 submedian macrochaetae. Urosternite IV with 1+1 infralateral setae and 4+4 thin hairs between these and the insertion of the stylets. Vth urosternite (Fig. 65) similar, the infralateral setae stronger, though with only 2+2 cilia in the posterolateral border, one pair inner to the setae, the other close to the outer area of the stylet insertion. VIIth urosternite and subgenital plate as in Fig. 66; urosternite with 1+1 pseudovesicles; subgenital plate parabolic, wider than long and with several thin apical setae. VIIIth coxites well developed and provided of several marginal short setae as in Fig. 67. Coxite IX with two apical strong setae only (Fig. 68), one internal, the other external to the stylet insertion. Ovipositor ovoid, elongate, the gonapophyses VIII (Fig. 69) with 7 articles and provided of abundant thin setae and a few trichbothria, the IXth ones (Fig. 70) with 8 articles and much more scarcely setated.

Derivatio nominis : The new species is named after its geographical origin, the Celebes (or Sulawesi) island.

Bharatatelura gen.n.

Ateluridae : little insects (ca. 3 mm), weekly sclerotized; body limuloid, the thorax almost as long as wide and with ca. 2/3 of the abdominal length; hypodermal pigment absent, the body and appendages whitish or yellowish.

Scales with numerous rays that hardly surpass their free border, covering the body, head and coxae of legs.

Head dorsally exposed, free, the cephalic capsule covered only by scales, the setae restricted to the frontoclypeal and labral areas. Antennae short, not attaining the border of thorax; pedicelle of male with a distal process and a fovea. Mandibles strong, the teeth of the incisive area acute and well sclerotized, the molar area more reduced but conspicuous; external area of the body of mandibles with 2-3 very strong long setae and a few cilia. Maxillae elongate, the lacinia and the galea almost of the same length, the former with two well sclerotized apical teeth (the most distal the most developed) and with the lamellated process extending a little beyond its tip; galea with only one apical cone. Maxillary palp typical, provided with thin setae

only. Labium with posterolateral rounded corners, the labial palp without special features.

Nota covered by scales, the setae only in the lateral margins, their hind borders with a few isolated minute cilia. Legs without special characteristics, with some isolated macrochaetae; tarsus four-articulated, the praetarsus with two lateral claws with a minute basal pulvillium and an acicular empodium, much more delicate than the claws and curved in the opposite direction of these ones.

Urotergites covered by scales, their hind margin (with the exception of the IXth) with minute scattered cilia like those of the nota, the macrochaetae and big setae present only in the posterolateral angles and in the laterotergites. Xth urotergite wider than long, the apical notch much more pronounced in the female than in the male, this one provided with sensory cones in the under surface. Urosternites scaly, the first one glabrous, the IInd with 1+1 pseudovesicles very close each other, 1+1 macrochaetae in submedian position and 1+1 abdominal stylets, close to the pseudovesicles. urosternites from the IIIrd to the VIIth (VIIIth in the male), with 1+1 submedian macrochaetae and several pairs of minor setae. VIIth urosternite with 1+1 pseudovesicles in lateral (typical) position. Abdominal stylets, beside those on the IInd urosternite, in the segments VII to IX. Paramera well developed, cylindrical, apically provided with strong (probably secretory) points. Penis of the classical type, ovoid, its opening long and narrow, longitudinal. Subgenital plate wide, parabolic, with marginal setae. Ovipositor ovoid, the gonapophyses elongate and clearly articulated, with thin setae; in the apical area of the VIIIth gonapophyses a few minute spiniforms straight setae.

Cerci short, those of the male provided in the proximal articles of specialised chaetotaxy, one of the modified seta changed in a long stout dark spine. Terminal median filament damaged in the apical region, almost certainly clearly shorter than the abdomen (probably not much longer than the cerci), devoid of transformed chaetotaxy even in the male.

Spermatolophids globular, their diameter ca. 0.04 mm; heads of the spermatozoon thin and elongate, with ca. half of the diameter of the spermatolophid; aproximate number of spermatozoon per spermatolophid: 6-7.

Type-species : *Bharatatelura malabarica* sp.n.

Derivatio nominis : From Bharat, the Indian name for India, and *Atelura,* the former genus described inside the Ateluridae.

Discussion : The new genus is the only one inside the Ateluridae to present one pair of submedian stylets in the IInd; urosternite and three further pairs of stylets in the VII to IX abdominal segments. The presence of 1+1 submedian pseudovesicles in the IInd urosternite, the non-transformed terminal median filament in the male, sex that shows, however, sclerotized conules in the under surface of the Xth urotergite and specialized chaetotaxy in the inner surface of the cerci (particularly the long and stout spiniform seta), the galea with one only apical cone and the presence of stylets in the three last abdominal segments, seem to approach the new *Bharatatelura* to a group of quite interesting Oriental genera already signalized as probably monophyletic and that has been named the "*Metriotelura* group" (MENDES, 1989) : *Acanthinonychia* (PACLT, 1963), *Allomorphura* (SILVESTRI, 1916), *Allomorphuroides* (MENDES, 1989), *Assmuthia* (ESCHERICH, 1906); *Comphotrura*

(PACLT, 1963), *Heteromorphura* (PACLT, 1963) and, quite probably also (as it is known only by the female), *Trichodimeria* (PACLT, 1963). Among these genera, *Bharatatelura* gen.n. presents a lot of plesiomorphic characteristics as are the non morphologically transformed Xth urotergite of the male, the absence of exceptionally developed pulvilli or crests in the lateral claws, the normal (non-reduced) median filament in the male, the typical paramera and the absence of sexual dimorphism in what the abdominal stylets and the general body shape are concerned; furthermore, there are three pairs of abdominal stylets (excluding the submedian pair of the IInd urosternite), the maximum number known to occur in the genera of this "group" The almost typical praetarsus and the absence of drastic transformations in the genital and perigenital areas, seem to point to a primitive genus inside the "*Metriotelura* group", not very far, perhaps, from a common ancestror that could had been shared also by *Heteromorphura, Allomorphura, Allomorphuroides* and, may be, *Comphotriura* and *Platystylea.*

The new genus seems also close to *Proatelura* (SILVESTRI, 1916) and *Proatelurina* (PACLT, 1963); it is, however, easily distinguishable from both by the shape of the empodia and, in the male, by the long spine in the inner basal cerci; besides, it is also different from *Proatelura* by the presence of a pedicellar apophyses in the male (character shared with *Proatelurina*).

5. **Bharatatelura malabarica** sp.n.

Specimens examined : INDIA, State of Goa, near Forte Aguada, under stones in a nest of Formicidae *s.str.* ants, 16/VIII/1988, 1 ♂ holotypus, Reg. 4172 (CZ) col. L. Mendes; State of Haryana, Dehli, in a non cultivated green area inside the town (around Purana Qila), under stones in a nest of Myrmicidae ants, 23/VIII/1988, 1 ♀ allotypus, Reg. 4174 (CZ), col. L. Mendes; State of Maharashtra, Bombay, in the periphery of a garden under stones, in a nest of a Myrmicidae ant, 5/VIII/1988, 1 ♀ paratype, Reg. 4169 (CZ), col. L. Mendes.

Body length : 3.1 mm (♂) 3.6-3.7 mm (♀); length of thorax : 1.3 mm (♂) 1.4 mm (♀) ; width of thorax : 1.3 mm (♂) 1.4 mm (♀). General shape of body as in the generic description and in Fig. 71. Head, body and appendages, whitish, without hypodermal pigment. Alive specimens yellowish golden, the scales more or less uniform and with abundant rays hardly surpassing the free border of the scale. Head almost completely free, the macrochaetae restricted to the anterior area, as in Fig. 72. Antennae short, with 15 articles; pedicelle of male (Fig. 73) provided with an inner distal apophyses and, in its base, with a circular pit; distal articles clearly longer than wide, the praedistal divided in 2 or 3 subarticles. Mandibles as in Fig. 74, strongly asymetrical, the incisive area with numerous sclerotized teeth, the molar area well developed; in the outer margin of the body of mandibles, 2-3 very strong long setae. Maxillae as in Fig. 75, the lamelated hyalin process of the lacinia longer than the sclerotized teeth; these are two, the external one stronger; galea almost of the same length of the lacinia, with one only apical cone. Maxillary palp (Fig. 76) typical, covered only by thin setae, its distal article longer than the preceeding and 2.5 times longer than wide. Labium with rounded posterolateral corners, the labial palp as in the Fig. 77, its distal article ovoid and clearly longer than wide.

Nota as in the generic description and in Fig. 68, the setae restricted to the lateral margins; 6-8 minute and enconspicuous cilia in the hind margin of each notum; posterior borders of nota almost straight. Legs without special characteristics, the praetarsus as in the generic description and in Figs. 78 and 79 (for comparison, see Fig. 80 and 81 of the praetarsus of *Proatelurina pseudolepisma* and Fig. 82 for the praetarsus of *Proatelura jacobsoni).*

Urotergites I to IX covered by scales, the setae restricted to the infralateral group and to the laterotergites. Infralateral area of the Ist and IInd urotergites with one macrochaeta, the corresponding laterotergites also with one only (although minor) seta, as in Fig. 83. III to VIIth urotergites (Fig. 84) with 2 infralateral macrochaetae, the innermost clearly shorter (1/2 to 2/3 of the outer one); in the laterotergite, 3 setae, the inner one stronger and longer than the remaining. Infralateral area of the VIII dorsal sclerite, similar but with only 2 seate in the laterotergite, the inner one clearly stouter. Urotergite IX (Fig. 85) with the posterolateral lobe not specially (though clearly) produced, the posterolateral angle with a strong macrochaeta, the outer margin with a longitudinal row of 6 setae. urotergite X in the female (Fig. 86) much more deeply concave posteriorly than in the male (Fig. 87); in both sexes 1+1 stout posterolateral macrochaetae and (1−2) + (1−2) inner shorter and more delicate macrochaetae; in the lateral margins (3−4) + (3−4) short setae inserted only in the distal half (male) or in the distal third (female); under surface of this scelrite in the male provided with 1+1 fields in the mediolateral area, each one with less than 10 short cilyndrical dark cones.

Urosternite I glabrous. Urosternite II (Figs. 88 and 89) with 1+1 submedian pseudovesicles, 1+1 submedian macrochaetae and 1+1 submedian (external to the pseudovesicles) stylets. III urosternite with 1+1 submedian macrochaetae, 1+1 short cilia close to the macrochaetae and with 1+1 infralateral short setae. IVth urosternite (Fig. 90), similar to the V and VI , but with 2+2 short cilia in sublateral and lateral position. urosternite VII with 1+1 abdominal stylets and 1+1 lateral pseudovesicles besides the 1+1 submedian macrochaetae, its hind margin clearly (although not strongly) concave in the female (Fig. 91). Subgenital plate (Fig. 91) parabolic, much wider than long, with a fringe of marginal thin setae. Coxites VIII of female (Fig. 92) with only one or two setae in the outer margin, the IXth coxites (Fig. 93) with a much stronger stylet, provided in their inner margin of only two setae and an apical short and delicate spine. Coxites VIII and IX of male as in Fig. 94, the submedian macrochaetae of the VIIIth very close each other, the stylets of the IXth much more developed than the remaining. paramera subcilyndrical, as in Fig. 94, covered with not particularly dense thin setae, the apical transformed hairs exceptionally long and strong; penis without special characteristics, its opening longitudinal and narrow. Ovipositor elongate, ovoid, the gonapophyses VIII with 6 articles, the apical one with a few (3 to 4) very thin straight spiniform setae, shorter than the remaining, besides the typical setae (Fig. 95). IXth gonapophyses (Fig. 96) with some very long thin setae, the number of articles (and so, the pseudosegmentation), impossible to see clearly.

Terminal filament without special features, with some strong setae and a few trichobothria, similar in both sexes. Cerci provided in the male (Fig. 97) not transformed in the female—of specialized chaetotaxy; the innermost of the thin hairs is changed in a dark, spiniform seta in the second, third and fourth basal

articles; the spine of the second basal article is the less transformed, the thiner and the less elongate of all, that of the third, the stronger, the longest and the darker, attaining almost four times the length of the former.

Spermatolophids as in Fig. 98, rounded or ovoid and with ca. 0.04 mm; medium average of spermatozoon by spermatolophid : 6-7; heads of spermatozoon filiform, ca. half of the length of the spermatolophid, as in generic description.

Derivatio nominis : The new species is named *B. malabarica* as it is known only from the Western half of India, two fo the specimens were collected from the places in the Malabar coast.

6. **Allomorphuroides dicuspiditermina** Mendes, 1987

Specimens examined : MALAYSIA, Sabah area of Borneo (East Malaysia), Sepilok, Sandakan, in a termite mound, 1/XI/1979, 2 ♂♂ 3 ♀♀ (MG), leg. R. Yoshii.

The species (and the genus) have been recently described (MENDES, 1989); the studied specimens agree well with what has been noticed. The present material has been collected in the same place and in the same day than the type-material.

SUMMARY

Several samples of Ateluridae (Zygentoma) from the Oriental Region and from the Sulawesi island are studied. *Gastrotheus* (*G.*) *palpiseta, Nipponatelura shirozui* and *Atelurodes myrmicarius* are signalized for the first time in India (the former), in the Philippines (the second) and in Thailand (the later) and some notes are added to their original descriptions. *Allomorphuroides dicuspiditermina* is noticed for the second time, again to the Sabah area of Borneo. Two new species belonging to two new genera are described : *Pseudatelurodes celebensis* gen.n. sp.n. from Sulawesi and *Bharatatelura malabarica* gen.n. sp.n. from India.

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