Studies on the Collembolan Family *Tomoceridae*, with special Reference to Japanese Forms.

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Since Börner's monumental finding of prostheca in some species of *Tomoceridae* in 1908, many achievements have been made in the taxonomy of this group of collembola. Not only many new forms have been detected from various parts of the world, but also our knowledge about each species have made good advance. From the primitive state of systematics in which all blind forms of cavernicolous origin have been included in *Tritomurus* and many collembolists have lamented the polyphyletic nature of the genus (Denis 1929, Gisin 1944), we are now well informed with regard to the systematic relations of each species. In revising Japanese forms of the family for which the present work is primarily directed, some new knowledges are found, the specific names are changed and new conceptions of each group have been adopted. The studies are by no means complete, there must be added many findings especially about the European forms and of the species conception. It is my sincere hope that the present report would bring light to the problem and more precise knowledge would be acquired so that the family may be a model of all the collembolan taxonomy.

The difficulty of the taxonomic work in *Tomoceridae* consists in the fact that each species has a wide range of variability with regard to many characters (cf. Christiansen 1964), thus we must be always aware to evaluate what is the essential and what is the trivial character of the given form. Sometimes one character appears quite in an unexpectcd place. So the number of prelabral setae are 4 in the majority of species, while it is suddenly raised to 6 or 8 in some cave forms of western Japan and southern Korea. In *Tomocerus cuspidatus* dorsal scales of manubrium is suddenly vanishing. Indeed, we have no one fixed character or element, which would indicate the specific difference in every cases. Only by comparing each character one by one, the general trend of a given species may be formed. In the present report following characters have been especially noticed.

Antennae: Antennal length is not trustworthy, being mutilated or on the

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way of regeneration. But in an intact specimen with 4 antennal segments they are either very long (*P. longicornis*) or very short (*T. kinoshitai*) with all intermediates between them. Sense organs have been cited by Denis 1932 in *T. baudoti*, but this character is not applied in this report, being very difficult to observe in preserved specimens.

Colouration: In living state or directly after conservation in alcohol, the body colour shows specific difference in some cases. *T. cuspidatus* is very beautiful with the alternative pattern of silver white and deep purple, but it is not always constant in nature, the same species emerge on snow surface are almost black in colour. *T. kinoshitai* is light castaneous in living, the colour disappear in alcohol to change to dusky gray. Often, but not always, *T. ocreatus* has the head caspule browner than the body and thoracal margin may have black narrow stripe laterally. In *T. asahinai* the basis of s.s. are with black spots as in case of *Isotomurus punctatus* Yosii, 1963, but such spots may appear also in *T. cuapidatus* and *T. punctatus*. In *T. viridis* the body is greenish all over, the colour is retained for a while in alcohol. In general the body colour is of relative importance as the indicator of each species.

Mouth parts: Labrum is unique in structure among all springtails. Generally the setae are 4/5, 5, 4, each setae are with large socket, the distal margin is ciliated and with 4 strong, recurving spines. This state is unchanged in almost all *Tomoceridae*, but some *Plutomurus* species have additional number of prelabral setae as mentioned. From the time of Börner, we are well aware of the presence of prostheca or a beard-like appendix to the inner side of maxilla in some species and *Pogonognathellus* (=*Pogonognatus*) has been established for them. This is, however, rather dubious character in some species (*P. celsus*) and may be better substituted by another characters of dentes and mucro.

Eyes, Postantennal organ: The genus *Tritomurus* is established chiefly by the absence of eyes. But it is to be regarded not of generic character from our present knowledge. An another genus *Tomolonus* is characterized by the presence of small postantennal organ. This genus has been denied by Christiansen l.c., it being a juvenil organ. Still I retain the genus name from various reasons. In fact the organ is retained in fully mature examples and it is combined with other peculiarities.

Legs: Unguis, unguiculus and tenent hair have been already noted by previous authors. Often they are variable within one species, but often characteristic. So in *T. cuspidatus* the unguiculus has constantly one outer tooth. Unguis in *T. kinoshitai* has only one inner tooth etc. Tibiotarsus bears many setae and some of them along the posterior face are stronger, spiny and often blunt on

apex. Such setae have been described by CHRISTIANSEN l.c. for the first time and they have proved to be effective for dividing species. They are 0, 0, 2 in all forms of *Plutomurus* and *Pogonognathellus* with the exception of *P. longicornis* In *Tomocerus* (s.str.) the number is variable. In *Tomocerina* no such spiny setae are present and, instead, one large seta is located at about the middle of the hind-tibiotarus. Trochanteral organ is recently detected (YOSII 1966). When full developed, there are assembly of about 40/40 long and short setae upon inner side of hind trochanter and proximal part of femur. In *Aphaenomurus*, *Tomolonus* and perhaps in *Tritomurus* those of the trochanteral part are reduced or represented by 1 seta, thus the organ is restricted to the femoral part only. In all species of *Tomocerus*. *Pogonognathellus* this organ is reduced, reprented by 1, 1 seta upon each places, hence it has not been detected for long time.

VENTRAL TUBE, TENACULUM: Ventral tube is always multisetaceous, it is either scaled or unscaled. Number of setae upon *corpus tenaculi* is sometimes specific as in case of *P. beckeri* to *flavescens*, but there is a wide range variation especially among cave forms of *Plutomurus*.

MANUBRIUM: Fig. 1, B is the transverse section of manubrium in diagram. The ventral (=posterior) side is equally scaled, with a median furrow up to the middle of the length. Such median furrow is to be observed in *Sminthuridae*, but nowhere in *Arthropleona*. Laterally a longitudinal row of ca. 10+10 setae are usually present, either well developed or weakly so. In rare cases they are vestigial or concealed among scales. Dorsally (=anteriorly) a pair of broad stripe with long and short setae are present. In some edaphic species some of these setae may be longer and blunt on apex. In such cases one seta on dorsal side of dentes is also of the same form. They conform the "*principal setae*" and may be specific in character (cf. CHRISTIANSEN, 1964 for *P. elongatus*). Inner side of the setaceous stripes is either with scales or without them. This character is specific in some cases (*T. cuspidatus* to *ocreatus*).

DENTES: Dentes may be divided into three parts, proximal, medial and distal (fig. 1A). Each of them are articulated by a faint suture of subsegment. Proximal and medial part are bearing strong dental spines along inner dorsal side and their form and arrangement is specific as already known. Ventral to these spines the proximal part is with many setae and scales. In *Pogonognathellus* one scale is very large and in *Plutomurus* a low of small scales are present. Outer laterally the proximal part may have 1−4 especially large setae (*Plutomurus*, *Aphaenomurus*, *Tomolonus*) as has been described in YOSII 1956 etc. Upon distal part, which extend from the ultimate dental spine to the mucronal end, the dorsal side is furnished with peculiar form of setae. They are short, thick, strongly

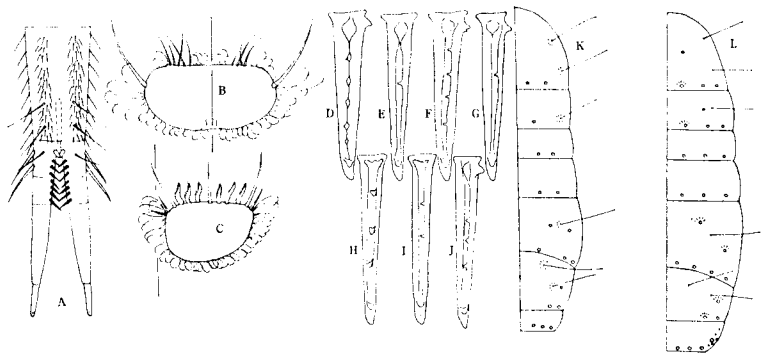

Fig. 1. Furca of *Tomoceridae (diagramatic)*,
A : Dorsal view, B, C : Section of manubrium and distal part of dentes, D–J : Dorsal view of mucro, D–*Pogonognathellus*, E–*Monodontocerus*, FE–*Tomocerus* (s.str.), G–*Tomocerina*, H–*Plutomurus*, I–*Tritomurus* and *Tomolonus*, J–*Aphaenomurus*. (all examples outside right), K, L : Chaetotaxy of body, K–*Plutomurus ryugadoensis*, L–*Tomocerus cuspidatus*.

curving and heavily feathered to two sides (fig. 1, C). Both sides of this dorsal area have a few rows of long, smoothy setae and ventral to them there are only scales. Among the dorsal feathered setae of distal part some smoothy, simple setae are present. They are as large as the lateral setae, but often larger than the latter. Upon medial part the short feathered setae may be present along the inner side.

Mucro: Mucro shows generic character as already mentioned in Yosii 1956. The resume is diagramatically shown in figs 1 D–J. Dorsal lamella is either one (*Pogonognathellus*) or two (others), the basal teeth either one (*Monodontocerus*) or in pairs (others). The outer basal tooth with a small toothlet (*Tomocerus* s.str.) or without it (others). Intermittent teeth are usually located on the outer dorsal lamella, but in *Plutomurus* they are, if present, between these two dorsal lamellae, although nearly associated to the outer one in some forms. The lateral view is also characteristic, sometimes it is converging distally (*P. borealis*) or elongate and parallel-sided (*P. beckeri* etc.). Shape of mucronal teeth are also specific (*T. kinoshitai*). Thus in every cases we have to describe the mucro both in dorsal and lateral view.

Chaetotaxy. Head: Head capsule may be divided into the anterior *area frontalis* and posterior *area occipitalis*. Very often the former is darker (*Plutomurus* spp.) in colour. Its anterior margin has a row of many setae along the *basis antennalis* connecting the eye-field of each side. Within the area some blunt setae are located either 2,4 (fig. 11) or 2, 2 (figs. 6, 7) anteriorly. Those of the *area*

occipitalis are also different according to species. Posterior margin of head is in two types, either with a row of numerous setae closely located side by side or with fewer satae arranged remote to each other (cf. fig. 7, 10).

TRUNK: Chaetotaxy of *Tomoceridae* has been treated in YOSII 1956 and CHRISTIANSEN 1964. The serial studies has revealed that there is not a great difference of chaetal arrangement among each species. In fig. 1, K and L two types of them are compared. All species of *Plutomurus* are of K-type, while majority of *Tomocerus* are of L-type. In *Tomocerina* the reduction of setae occurs. In *Pogonognathellus* the arrangement is not different from *Tomocerus*.

In my previous paper I have discussed the presence of microsetae around the base of large body setae and of *setae sensuales*. This character I have suggested to be genus specific, while CHRISTIANSEN has proved it being a specific character. I realize his conclusion to be wright. So *T. cuspidatus* has some such microsetae around large body setae. However, this tendence is not to be quite denied. So I have never seen microsetae around the basis of s.s. in all *Tomocerus* and *Pogenognathellus*, although they are abundant around the large body setae of the last genus.

Some large setae are present upon coxal basis, coxa and on the lateral part of abd. III, but their meaning in taxonomy is yet unclear.

SEXUAL DIMORPHISM: WILLEM 1900 and FOLSOM 1913 have already described the sexual dimorphism in some species of *Tomoceridae*. Accoding to the last author the male of *P. flavescens* has abd. V posteriorly elongate, moves telescopically. Also "cerci" or the terminal elongation of anal flaps are short in male than in female (FOLSOM, l.c. p. 455).

According to my experience the case is by no means so simple as observed by provious authors. As in all other collembolan group, sexes are primarily to be discerned by the genital orifice. It is split longitudinally in males and transversely in females. In the females of *Pogonognathellus* (fig. 3, J, L, M) the upper anal flap bears 2 rows of heavy setae arranged as 4,3=7 and some smaller ones along the posterior margin of the flap. In *Tomocerus* and *Plutomurus*, however, these two rows are almost in one row, composing of 7 large setae in a transverse row and some marginal setae may become large enough to be comparable with these primary setae. In *Pogonognathelllus* these primary setae are extremely long, attaining almost half of the body length, although they are very easily to fall off. In other genera they are moderate in size, either pointed (*P. riugadoensis*), blunt (*T. ocreatus, cuspidatus* etc.) or minutely ciliated (*T. kinoshitai*), thus showing specific difference. In the male the sexual dimorphism is markedly different according to the species. In all *Plutomurus* no sexual difference is observed and

sexes may be detected only by the genital orifice. In *T. asahinai* etc. abd. V is elongate posteriorly in males, the elongate portion is unscaled and without setae and probably retractile telescopically and abd. VI itself is smaller than in females. In *Pog. bockeri* abd. VI is longer in the male than in the female. Thus the dimorphism is quite different from one species to the other. Further studies of this respect is to be expected.

Key to the genera of *Tomoceridae*

A1: Dentes without large outer setae.
  B1: Mucro with one dorsal lamella. Dentes proximally with scaly appendix. ..... *Pogonognathellus* PACLT
  B2: Mucro with two dorsal lamellae. Dentes without scaly appendix.
    C1: Eyes present ..... *Tomocerus* NICOLET
    C2: Eyes absent ..... *Tritomurus* FRAUENFELD
A2: Dentes with large outer setae on proximal part. Trochanteral organ well represented.
  B1: Trochanteral organ both on trochanter and femur ..... *Plutomurus* YOSII
  B2: Trochanteral organ developed on fermur.
    C1: Postantensal organ absent ..... *Aphaenomurus* YOSII
    C2: Postantennal organ present in late stages ..... *Tomolonus* MILLS
(the position of *Tritomurus* FRAUENFELD is uncertain)

Pogonognathellus PACLT, 1944

Typus: *Macrotoma longicornis* MÜLLER, 1776

The genus is well established by the presence of a scale appendix to the inner side of dentes. Furthermore the structure of mucro with only one dorsal lamella, beard-like appendix of maxillar head and, probably, the crown of setulae at the basis of large body setae, but not at the basis of s.s. are the good available characters to separate it from other groups of *Tomoceridae*.

However, the distinction of each species is the matter of considerable difficulty since the speciation is going on not very far to establish the firm ground to separate each species. Dental spines, inner tooth of unguis etc. vary in wide range (cf. CHRISTIANSEN 1964 for *flavescens*). What may be crucial characters are summarized as follows: Nummer of blunt spiny setae along the posterior margin of tibiotarsus is, as pointed by CHRISTIANSEN 1964, fairly constant and reliable. It is up to 6, 8, 8 in *P. longicornis* (fig. 2) and up to 0, 0, 2 in other known species. Principal dorsal setae of furcula are ending blunt on apex in *P. longicornis* and *elongatus*, while they are pointed and setaceous in *flavescens*, *beckeri* and *borealis*.

Tenaculum has always quadridentate rami, but corpus is either unscaled or scaled and with very few setae or with many setae. Outline and form of mucro is considerably variable within one species. Yet there are some specific characters: so in *bidentatus* and *borealis* the dorsal basal tooth has one extra toothlet. In *beckeri* the anteapical tooth is larger than the apical. In some species the basal teeth are dislocated distally, while in others they are in usual locus.

Key to Japanese and related species are as follows:

A1: Large spiny setae of tibiotarsus up to 6, 8, 8, unguiculus elongate ..... *P. longicornis* (MÜLLER), not Japanese

A2: Large spiny setae of tibiotarsus 0, 0, 2

B1: Corpus tenaculi scaled, with 6–9 setae. Anteapical tooth of mucro larger than the apical one ..... *P. beckeri* BÖRNER

B2: Corpus tenaculi unscaled, with 1–4 setae. Anteapical tooth of mucro as large as the apical one.

C1: Mucro converging, dorsal one of two basal mucronal teeth usually with a small toothlet ..... *P. borealis* sp. n.

C2: Mucro elongate, mucronal basal teeth without toothlet. ..... *P. flavescens* (TULLBERG), not Japanese

Pogonognathellus longicornis (**MÜLLER**, 1776) fig. 2

Specimens examined: Starnberg near Munich, Germay (VIII 1940, R. YOSII, 2 ex.)

Body length 3.5 mm. Antennae mutilated, but probably very long. Ground colour dusky gray, when denuded of scales. Eyes 6+6, intensely pigmented. Labral setae 4/5, 5, 4, the margin with 4 recurving small spinules. Maxillae with long, beard-like appendix. Unguis stout, inner tooth as 2, 3, 3. A pair of pseudonychium well represented. Unguiculus as long as unguis, without inner tooth and extended apically almost needle-like. Each tibiotarsus bearing, beside many usual setae, up to 8 prominently thick, blunt, spiny setae. They are placed along the posterior margin in two longitudinal rows alternatively as in fig. B. Tenent hair thick, prominently spathulate on apex. Trochanteral organ reduced, composed of 1, 1 setae on each places. Ventral tube multisetaceous, lateral flap bearing many small and ca. 6 strong setae. Rami tenaculi quadridentate, corpus scaled and with ca. 8 setae. Furca in ratio as 7 : 10 : 1. Manubrium with strong lateral row of setae. Dorsal side as in *flavescens*. Principal dorsal setae as 2+2, 1, large and blunt on apex. Dentes tapering, dental spines as 0/5–7, 2, so that the basal subsegment is without spines and the place is beset with many slender setae, but some 3 setae among them are so short, to behave a transient form of spines and setae. All these dental spines are simple, hyaline and uncoloured. Inner basal dental

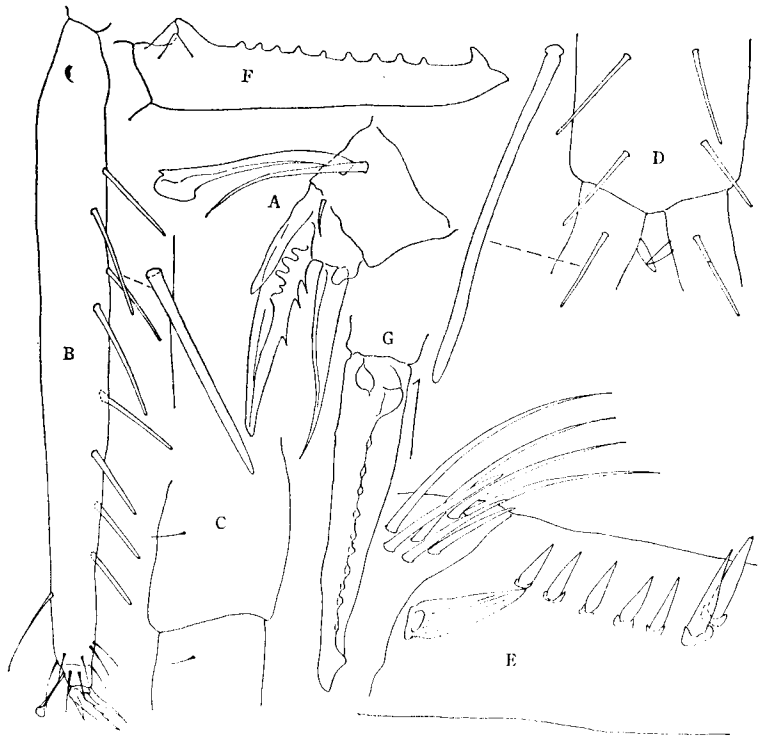

Fig. 2. *Pogonognathellus longicornis* (Müller) from Munich.
A: Hind claw, B: Hind tibiotarsus, C: Trochanteral organ D: Principal setae of furca, E: Dental spines, F, G: Mucro (outer and dorsal view).

scale large. No outer dental setae. Mucro elongate, apical and anteapical teeth broad, basal teeth subequally large. One dorsal lamella is running from the anteapical to the inner basal tooth and with 8–9 small intermittent teeth. Chaetal arrengement not observed.

This well known European species have a remarkable form of unguiculus and unusual arrangement of dental spines. The former character is, however, not always clear in some examples. The presence of many blunt spiny setae of tibiotarsus and a special form of mucro is more constant in nature.

Pogonognathellus beckeri Börner, 1909 fig. 3

syn.: *Pog. flavescens* (nec Tullberg): Yosii, 1954, 1956

Specimens examined: Pref. Kyoto (Kibune, Daimonji, Ashiu, Hieizan), Pref. Nagano (Shirouma, Ontake, Hinaguratoge), Pref. Niigata (Sado), Pref. Gumma (Oze), Pref. Kagoshima (Yakushima).

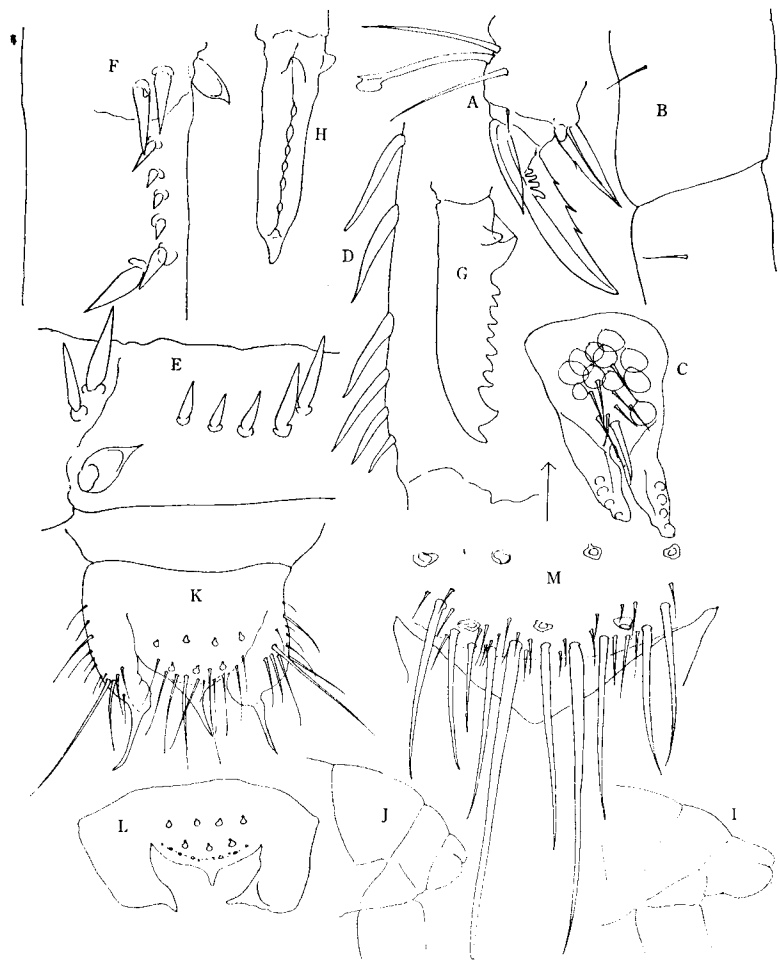

Fig. 3. *Pogonognathellus beckeri* BÖRNER from Kibune, Kyoto.
A: Fore claw, B: Trochanteral organ, C: Tenaculum, D: Lateral setae of manubrium, E, F: Dental spines (inner and dorsal view), G, H: Mucro (outer and dorsal view), I, J: Abdominal end of male and female, K, L: Upper anal flap of male, M: Ditto of female.

Body length up to 3.2 mm. Antennae up to 2.2 mm. Ground colour pale white, without pattern. Antennae violet gray. Head with a small median patch between antennae. Eyes 6+6, intensely black. Labral setae 4/5, 5, 4, distal margin with 4 recurving spinules. Maxillar head with a long, beard-like appendage. Unguis stout, with 3, 3, 3 inner teeth and a pair of pseudonychia well developed. Unguiculus with 1, 1, 1 inner tooth. Its apex is acute, but not extended as in case of *P. logicornis*. Tenent hair short and distally spathulate,

rather spiny. Blunt spiny setae of tibiotarsus 0, 0, 2. Ventral tube multisetaceous, lateral flap with many small and some 6 large setae. Rami tenaculi quadridentate, corpus scaled and with ca. 6–9 setae, a median distal one strong. Furca in ratio as 60 : 70 : 7. Lateral setae of manubrium very strong and ciliated. Dorsal principal setae 2+2, 1, all of them setaceous and pointed on apex. Dentes with a broad basal scale. Dental spines as 2/3–6, 2, all of them deeply brownish and with faint longitudinal striae. Mucro typical for the genus in structure and not convergent in outline, having two basal teeth and one dorsal lamella, which bears 7–9 intermittent teeth. Anteapical tooth is larger than the apical one. Large body setae brownish, with a crown of small setulae at the basis. s.s. filiform, without basal setulae. Body scales intensely dark.

All Japanese materials hitherto regarded as *P. flavescens* must be included in this species. It is a intermittent form between *flavescens* and *longicornis*. In the number of blunt setae of tibiotarsus, in the form of dorsal principal setae of furca and in form of unguiculus it is alike *flavescens*, while in corpus tenaculi it is as in *longicornis*. The form of broad mucro with a large anteapical tooth is characteristic to his species.

Distribution: endemic to Honshu, Japan

Pogonognathellus flavescens (TULLBERG, 1871) fig. 4

Specimens examined: Austria (Patscherkofel near Innsbruck), Belgium (Liège), Germany (Munich) and USA (North Carolina)

Body length 2.3 mm. Antennae 2.0 mm. Ground colour dull yellow-gray, antennae intensively black, with a small median patch between antennae. Trunk uncoloured, legs diffusely dark. Eyes 6+6, black. Labrum with normal 4/5, 5, 4 setae, labral margin with 4 recurving spinules. Maxilla with beard-like appendix. Unguis stout with 3–4 inner teeth and a pair of broad pseudonychia. Unguiculus lanceolate, shorter than unguis, with or without inner tooth. Tenent hair short, but broad and apically spathulate. Tibiotarsus bearing 0, 0, 1–2 blunt, spiny setae along the posterior margin. Trochanteral organ reduced to 1, 1 seta upon each place. Ventral tube multisetaceous, lateral flap bearing, beside usual setae, ca. 6 larger ones. Rami tenaculi quadridentate, corpus unscaled and with 1–2 setae. Furca in ratio as 40 : 50 : 8. Manubrium with well developed lateral row of setae. Principal dorsal setae 2+2, 1, all of them never blunt and rather setaceous, with pointed apex. Dental spines 2–3/4–5, 2, all simple, hyaline and only larger ones are sometimes yellowish. Scaly appendix well represented. Mucro typical for the genus, apical tooth upwrightly directed, subequal to anteapical. A pair of basal teeth subequal, not dislocated. One dorsal lamella bear-

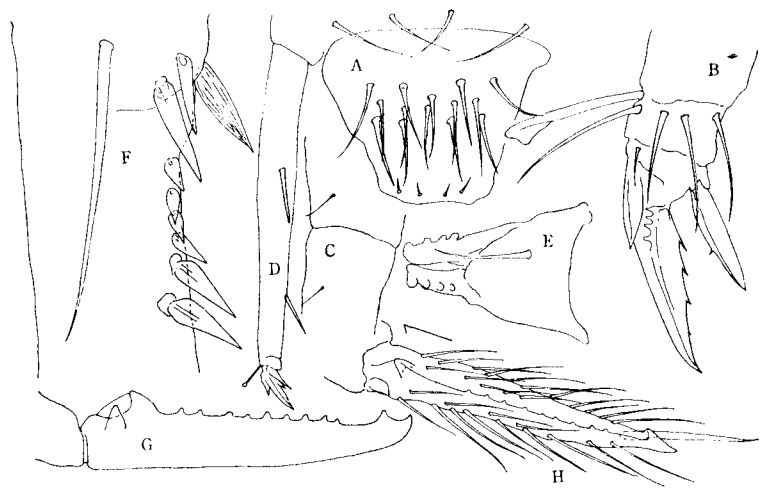

Fig. 4. *Pogonognthellus flavescens* TULLBERG from USA
A: Labrum, B: Hind claw, C: Trochanteral organ, D: Hind tibiotarsus, E: Tenaculum, F: Dental spines (dorsal), G, H: Mucro (outer and dorsal view).

ing 8–10 small intermittent teeth. From many mucronal setae the terminal one is larger than others.

This species differs from *P. longicornis*, in many details, the number of tibiotarsal spiny setae, corpus tenaculi and principal dorsal setae of furca. For the moment the species is not to be found from Japan.

Pogonognathellus borealis sp. n. fig. 5

syn.: *Tomocerus flavescens* var. *arcticus* (nec SCHÖTT): YOSII 1940

Specimens examined: Hokkaido, Kitami, Sipiutan (5 ex. 2. IX 1939, T. Umesao leg.), Sapporo, Maruyama (5 ex. 24. VI 1959, G. Imadatè leg.)

Body length up to 2.8 mm. Colour pale yellow, when denuded of scales. No pattern of the body except a broad transverse patch between eyes. Antennae violet gray distally, relatively short, being 2.0 mm in length. Eyes 6+6, intensely pigmented to form a common eye patch. Labrum nornal, with setae 4/5, 5, 4 and with 4 recurving marginal spinules. Maxilla with a beard-like appendix. Unguis straight, inner tooth up to 4, 4, 4, unguiculus lanceolate, shorter than unguis and with a inner tooth. Tenent hair slender as long as the inner margin of unguis and distally spathulate, but not so strikingly as in *P. beckeri*. Trochanteral organ reduced to 1, 1 seta upon each places. Ventral tube multisetaceous as usual. Rami tenaculi quadridentate, corpus unscaled, with 1 seta. Fur-

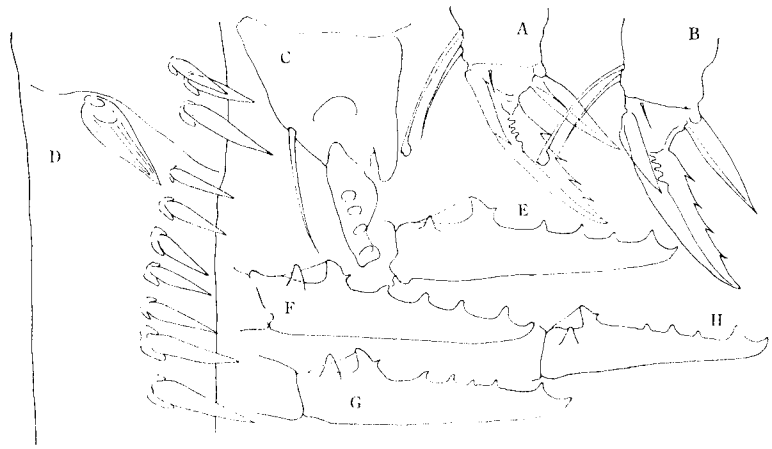

Fig. 5. *Pogonognathellus borealis* sp. n.
A, B: Hind claw, C: Tenaculum, D: Dental spines, E–H: Mucro in outer view.

cula in ratio as 40 : 70 : 10. Manubrium with well developed lateral row of setae. Dorsal side with some pairs of stronger setae, but not especially modified. Inner side of the setiferous stripes with scales. Dentes converging, dental spines as 3/7–8, all of them simple, transparent and uncoloured. There is no large difference of size among them and distal ones are gradually larger. Scaly appendix of inner side well represented. Mucro strikingly converging. From a pair of basal teeth the dorsal one is distally dislocated and with a small additional toothlet on fore-margin. Lateral tooth is small and directed upwards. One dorsal lamella bearing 3 (rarely 4) intermittent teeth.

Typus: one female from Sipiutan.

This species is well established by the form of mucro, it is alike to *P. dubius* Christiansen, 1964 of USA, but different in the number of inner teeth of unguis. The species might have some relation to *P. arcticus* Schött, 1893 from the Tschukutsch Peninsula in Siberia.

Distribution: Endemic to Hokkaido, Japan

Tomocerus (s.str.) **Nicolet**, 1842 sensu nov.

Typus: *Macrotoma minor* Lubbock, 1862

Maxillar head without beard-like appendix. Trochanteral organ reduced to 1, 1 setae upon trochanter and femur of hind-legs. Blunt spiny setae of tibiotarsus present (*Tomocerus*, *Monodontocerus*) or absent (*Tomocerina*). Ventral tube scaled or unscaled and with many setae. Rami tenaculi quadridentate, corpus either

scaled or unscaled, with various number os setae. Manubrium dorsally with or without scales between setiferous stripes (fig. 1). Lateral row of setae well represented. Dentes without outer large setae and without inner basal scaly appendix. Mucro with two dorsal lamellae and the outer lamella bears some intermittent teeth. Sexual dimorphism sometimes well devoped in subgenus *Tomocerus*, but never in subgenus *Tomocerina*. From the mucronal form the genus is divided into three subgenera:

Key to Japanese and related species of *Tomocerus*.

A1: Outer basal tooth of mucro absent (subgenus *Monodontocerus* Yosii)
..... *T.* (*M.*) *modificatus* (Yosii)

A2: Outer basal tooth of mucro without toothlet. (*subgenus Tomocerina* Yosii). Tibiotarsus without blunt spiny setae. Sexual dimorphism absent.

B1: Dental spines as 3-4/1, **2** ..... *T. liliputanus* sp. n.

B2: Dental spines as 3-4/3-4, **1** ..... *T. varius* Folsom

B3: Dental spines as 3-4/2-3, (1), **1** ..... *T. minutus* Tullberg, not Japanese

A3: Outer basal tooth of mucro normally with a small toothlet. Tibiotarsus with spiny setae (subgenus *Tomocerus* s.str.)

B1: All dental spines compound

C1: Dental spines minutely compound, 4/3-4, **2** ..... *T. ocreatus* Denis

C2: Dental spines roughly compound.

D1: Unguis with one inner tooth. Mucro with one intermittent tooth. 3-4/1, **2** ..... *T. kinoshitai* Yosii

D2: Unguis and mucro with many teeth

E1: Plication of dental spines directed distally. 4-5/4-5, **1**, 1, **1**.
..... *T. minor* (Lubbock), not Japanese

E2: Plication directed to the side.

F1: 4-6/4-5, **1**, 1, **1**. Unguiculus with an outer tooth.
..... *T. cuspidatus* Börner

F2: 4-5/3-5, **2**. Unguiculus without outer tooth
..... *T. ishibashii* Yosii

B2: Only large spines are compound, others simple.

C1: Dental spines 5-6/3-6, **1**, 1, **1**, body with pigmented patches upon abd. III-V ..... *T. asahinai* Yosii

C2: Dental spines 4-5/5, **1**. body uniformly greenish ..... *T. viridis* sp. n.

C3: Dental spines 4-5/5, **1**, body with violet patches and stripes.
..... *T. punctatus* sp. n.

B3: All dental spines simple.

C1: Corpus with many setae.

D1: Blunt setae of tibiotarsus as 4, 4, 4-5. Dental spines smooth.
..... *T. vulgaris* Tullberg, not Japanese

D2: Blunt setae up to 2, 4, 4. Dental spines rugose.
..... *T. jesonicus* sp. n.

C2: Corpus with 1-2 setae ..... *T. violaceus* Yosii

subgeuus **Monodontocerus Yosii**, 1955

Subgenotypus: *Monodontocerus modificatus* Yosii, 1955

This subgenus is easily to be separate from *Tomocerus* (s.str.) by the presence of only one tooth at the basis of mucro. As the structure is so peculiar it is easily to be separated from others.

Tomocerus (*Monodotocerus*) **modificatus** (**Yosii** 1955) fig. 6.

syn: *Monodontocerus modificatus*: Yosii 1955, 1956

M. mod. satsumensis: Yosii 1956, syn. nov.

Specimens examined: see below.

Body length up to 3.5 mm. Antennae shorter, about 1.8 mm. Ground colour pale yellow, without pattern, but anterior margin of thorax often with a black stripe. Antennae violet, other extremities pale. Eyes 6+6, intensely black. Labral setae and maxillar head as usual. Posterior margin of head with many short setae, they are absent at the median part. Frontal area anteriorly with 2, 2 setae. Unguis very slender, with inner basal teeth as 2, 2, 2 and with faint inner distal teeth up to 3, 3, 3. The latters are very obscure and often absent at all. Unguiculus narrow, acuminate and with one innér tooth. Tenent hair one, poorly developed, shorter than inner side of unguis and faintly spathulate apically. Very often this tenent hair is substituted by a simple seta (cf. *satsumensis* Yosii, 1956). Trochanteral organ reduced to 1, 1 setae. Blunt spiny setae of tibiotarsus are 0, 0, 2, where those of hind-legs are located distally near the basis of unguiculus. In some examples (Ryu-no-iwaya cave, Tokushima etc.) those two spiny setae are quite missing. Rami tenaculi quadridentate, corpus unscaled and with only one seta. Furca in ratio as 4:8:1. Manubrium with strong lateral row of setae, dorsally scaled and principal setae not differentiated. Dental spines as 5-6/2-5, 1, 1-3, 1. All of them are compound and brownish in colour. Mucro converging, with one basal tooth. Outer lamella of two dorsal lamellae bears 1-6 intermittent teeth. The number is largely variable, but usually 2-4. Body scales brown, no crown of setulae neither to s.s. nor to large setae. Male with extended abd. V and setae of abd. VI is in famale

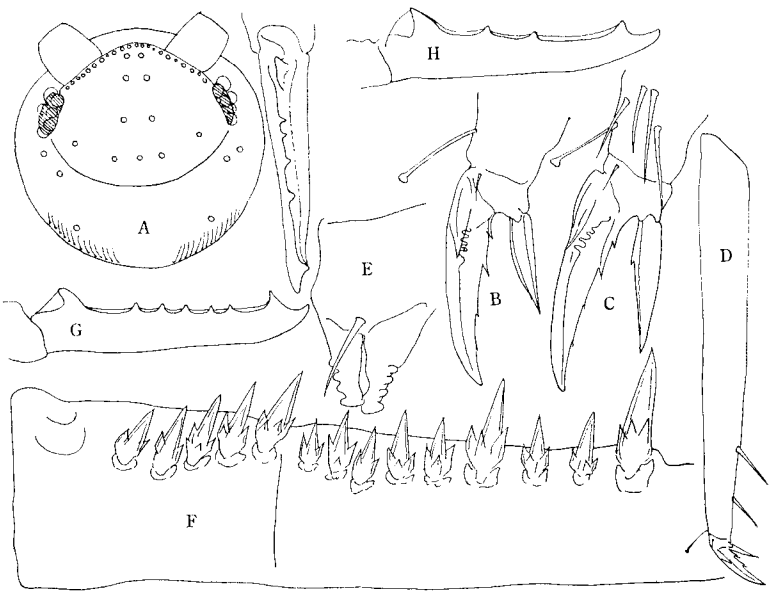

Fig. 6. *Tomocerus (Monodontocerus) mocificatus* Yosii from Ryu-no-iwaya, Pref. Tokushima.

A: Head, B, C: Mid- and hind claw, D: Hind tibiotarsus, E: Trochanteral organ, F: Dental spines, G, H, I: Mucro in lateral and dorsal view.

blunt, alike to those of *T. ocreatus*.

This is the remarkable species having only one basal tooth of mucro for which I have propcsed a genus *Monodontocerus*. The presence of dental basal scale (Yosi 1956) is erroneous, it is nothing but a usual body scales attached to the place. *M. mod. satsumensis* has no merit of subspecies, it is an aberrant form without clavate tenent hair. The large variation of the number of intermittent mucronal teeth and the presence or absence of two blunt spiny setae of hind-tibiotarsus are not connected with other morphological characters and they must be regarded as variation within one species.

Mon. modificatus has not yet been found out of caves. It is, however, chasmatophilous in habitat never penetrating deep in the darkness. It is described from Kiku-no-iwaya, Kashiwagi, Pref. Nara and distributed in various caves of Pref. Kagoshima (incl. Tokara), Kumamoto, Fukuoka, Oita, Ehime, Kochi, Tokushima, Yamaguchi, Hiroshima, Kyoto, Nara, Aichi. Sume-no-dja-ana Cave near Toyohashi, Pref. Aichi is the most eastern cave known to me. Thus it is endemic to the caves of the western Japan.

subgenus **Tomocerina Yosii**, 1956

Subgenotypus: *Tomocerus minutus* Tullberg, 1876

Very near *Tomocerus* (s.str.), but without sexual dimorphism. The male has a typical genital orifice of multisetaceous type and abd. VI is not different from females (fig. 7, I, J). Tibiotarsus without blunt setae and a pair of basal teeth of mucro is without corner toothlet.

All Japanese species have been regarded *T. minutus* Tullberg. But after exact studies of Gisin 1961, this species is known to be confined to the northern part of Europe. Japanese materials include two species.

Tomocerus (*Tomocerina*) **varius Folsom**, 1899 fig. 7

Specimens examined: Hokkaido (Otoineppu), Gumma (Ozé), Nagano (Mt. Ontake, 2,000 m.alt.), Toyama (Mt. Kurobe-Goro, 2,800 m.alt.), Kyoto (Kumogahata, Ashiu, Kyoto City, Uji), Osaka (Kongosan), Nara (Kasuga), Hyogo (Hyonosen), Tokushima (Tsurugisan), Ehime (Matsuyama, Isizuchi).

Body length up to 1.8 mm. Ground colour light gray, caused by diffuse scatter of black pigments all over the body. Antennae light violet throughout. Head dark. Legs, furca gray. Antennae shorter than half of the body. Eyes 6+6, intensely black. Labral setae 4/5, 5, 4, with 4 marginal spinules. Maxilla without appendix. Posterior margin of head with many spiny setae. Unguis with 2, 2, 2 inner teeth. Unguiculus broad, with or without inner tooth. Tenent hair slender, longer than inner side of unguis and apically broad. Trochanteral organ reduced to 1, 1 setae. Tibiotarsal spiny setae absent, but with large seta as 0, 0, 1. Ventral tube unscaled, multisetaceous. Rami tenaculi quadridentate, corpus unscaled, with 1 seta. Furca in ratio as 55 : 70 : 25. Manubrium with lateral row of ciliated setae, but dorsally without scales and principal setae not differentiated. Dental spines simple, light brown and arraged as 4–5/4, 1. The ultimate spine very large, the penultimate one small. Mucro elongate, with one intermittent tooth on the outer lamella of two dorsal lamellae and proximal from the middle. Outer tooth of two basal teeth without toothlet. Body scales pale brown. No crown of setulae at the basis of s.s. and of large body setae.

The species differs from *liliputanus* sp. n. by the number of dental spines and by the number of eyes. Tenent hair is longer. From *T. minutus* Tullberg, 1876, it differs not much. According to Gisin 1961 (p. 349, fig. 20) *minutus* and *mixtus* has in the proximal part of dentes 4 spines in irregular arrangement, while they are in a longitudinal row in this species. In Folsom's work the penultimate dental spine is not much shorter than others and unguis has 2–5 inner teeth. In other respects they are concordant. Uchida, H. et S. Chiba 1958, 1959

have studied the postembryonal development of "*Tomocerus minutus*" collected at Hirosaki, Pref. Aomori. According to them the insect attains its full length of 3.42 mm. when mature, mucro with 4 intermittent teeth and dental spines are

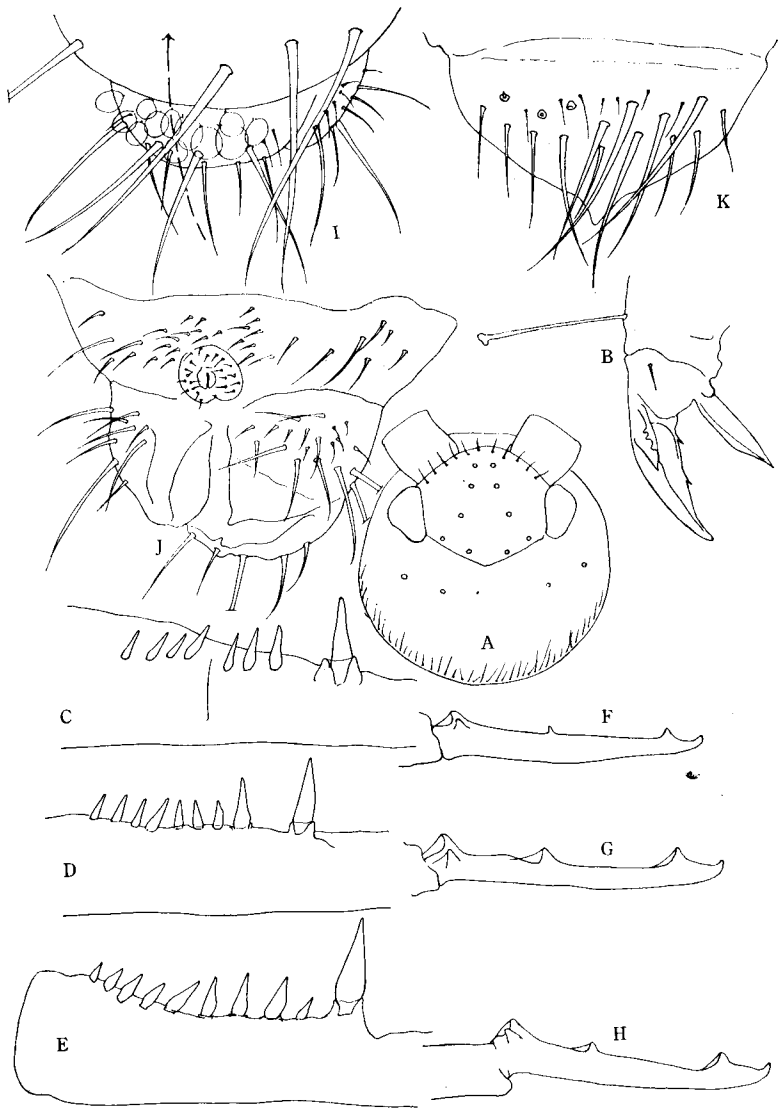

Fig. 7. *Tomocerus* (*Tomocerina*) *varius* FOLSOM

A : Head, B : Hind claw, C, D, E : Dental spines, F, G, H : Mucro, I, J : Abdominal end of male (dorsal and ventral view), K : Upper anal flap of female. A, K–Matsuyama, Pref. Ehime, B, E, H–Kongosan, Pref. Osaka, C, F–Otoineppu, Hokkaido, D, G–Tsurugisan, Pref. Tokushima, I, J–Ohara, Kyoto.

5–6/8–9 or 6/3, **2**, 2, **2** (fig. 3, p. 202). The form cultured by them would not be *T. minutus* or *varius*.
Distribution: endemic to Japan.

Tomocerus (*Tomocerina*) **liliputanus** sp. n. fig. 8
Specimens examined: Pref. Nagano (Hirogawara, Gokuraku-ana, 20. X 1952 S. Uéno leg. 2 ex.), Pref. Fukushima (Oni ana Cave, 28, VIII 1954, R. Yosii 10 ex.), Pref. Kyoto (Daimonji, 20. XII 1955, R. Yosii, 33 ex.)

Body length up to 1.5 mm, antennae short, up to 0.6 mm. Ground colour pale yellow, antennae uncoloured or light gray. No pattern of the body, but fore-margin of head often slightly dark. Extremities pale. Eyes 5+5, intensely black, no postantennal organ. Labral setae 4/5. 5, 4, margin with 4 recurving spinules. Maxillar head without appendix. Hind margin of head with a row of many spiny setae. Unguis with 2, 2, 2–3 inner teeth. Unguiculus broad, without tooth. Tenent hair feebly developed, as long as inner side of unguis

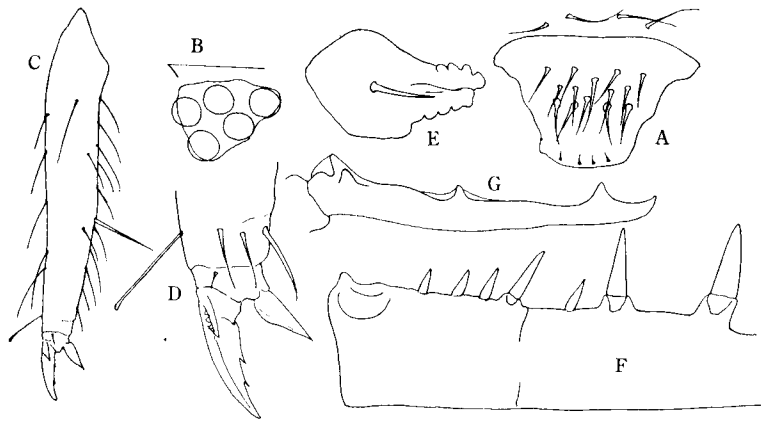

Fig. 8. *Tomocerus* (*Tomocerina*) *liliputanus* sp. n.
A: Labrum, B: Eyes, C: Hind tibiotarsus, D: Hind claw, E: Tenaculum, F: Dental spines, G: Mucro.

and obscurely clubbed distally. Tibiotarsi without blunt spiny setae, but with 0, 0, 1 strong, upwright seta of posterior side. Trochanteral organ reduced to 1, 1 seta. Rami tenaculi quadridentate, corpus unscaled and with 1 seta. Furca in ratio as 55:70:27, so the mucro is relatively long. Manubrium with lateral row of ciliated setae, dorsally unscaled and principal seta not differentiated. Dental spines smooth, large, brownish and arranged almost constantly as 3–4/1, **2**. No outer dental setae. Mucro elongate, slender, one intermittent tooth is

lying on the outer one of two dorsal lamellae at about the middle. An outer basal tooth without corner toothlet as usual for *Tomocerina*. Body scales feeble. No crown of setulae at the basis of s.s. and of large body setae.

Typus: one male from Hirogawara, Gokuraku-ana, Pref. Nagano.

With its peculiar arrangement of dental spines the species is near *T. teres* CHRISTIANSEN, 1964 of USA, but his species has no intermittent tooth of mucro.

Distrtbution: endemic to Japan

subgenus **Tomocerus** (s.str.)

subgenotypus : *Macrotoma minor* LUBBOCK, 1862

The subgenus includes the majority of *Tomoceridae* known to us. All members of the group show small toothlet to the outer one of the pair of basal mucronal teeth. Sexual dimorphism is very conspicuous.

Tomocerus (s.str.) **ocreatus DENIS**, 1948 fig. 9

syn: *T. kawamurai*: YOSII 1954

T. kawamurai f. *depicta*: YOSII 1955

T. ochreatus f. *kawamurai*: YOSII 1956

Specimens examined: Japan (various materials from Honshu, Shikoku and Kyushu), Okinawa (Main island, Ishigaki Is.), Korea (Taegu, 3. VIII 1961, C. E. LEE, 6 ex.), Formosa (Uh Lai, 24. X 1960, R. YOSII, 30 ex.), Hongkong (Victoria Peak, 20, X 1960, R. YOSII, 5 ex.)

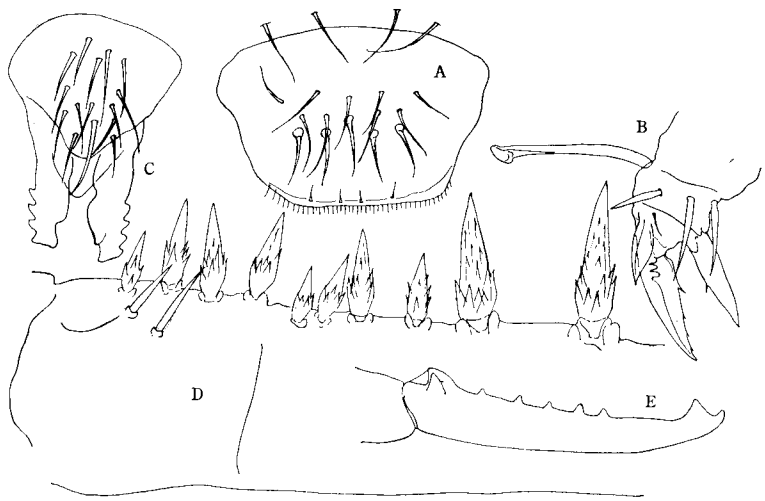

Fig. 9. *Tomocerus (s.str.) ocreatus* DENIS from Shuri, Okinawa.
A: Labrum, B: Hind claw, C: Tenaculum, D: Dental spines, E: Mucro.

Body length up to 3.5 mm. Antennae up to 4.0 mm. Ground colour brownish, head capsule sometimes more brownish than the trunk, thorax often with violet markings along the margin. Leg, furca pale, but tibiotarsus often diffusely violet (expl. Hongkong, Formasa, Okinawa). Antennae violet distally. Eyes 6+6, intensely black. Labrum rather broad, labral setae normal. Unguis with a distinct basal and 3-4 obscure distal inner teeth. Unguiculus lanceolate, with or without inner tooth. Tenent hair longer than unguis, thick and spathulate distally. Blunt spiny setae of tibiotarsus up to 5, 5, 6. Trochanteral organ reduced to 1, 1 setae. Rami tenaculi quadridentate, corpus unscaled, with up to 15 setae. Furca in ratio as 30:45:12. Manubrium with well developed lateral setae. Dorsal scales present. Principal setae as 2+2, 1, all of them are ending blunt and often brownish. Dental spines constantly as 4/3-4, **2**. They are compound and plicated all over especially near the basis. 2-3 small, slender spiny setae are present on inner basal portion, they are either ciliated or rugose. Mucro elongate, with two dorsal lamellae, the outer one with 4-6 intermittent teeth. Outer basal tooth with a corner toothlet. Scales of the body are brownish, never black. Sexual dimorphism of adb. V, VI distinct, female upper anal flap with some blunt setae.

This is the commonest species of *Tomoceridae* in Japan. The species is first described from Vietnam and now extends its distribution to Japan, Korea, Okinawa, Taiwan, Hongkong. It is also known from India.

Tomocerus (s.str.) **kinoshitai YOSII**, 1954 fig. 10

syn: *T. kinoshitai*: Yosii, 1954, 1956

T. kinoshitai dentiferus: Yosii 1956

Specimens examined: Pref. Kyoto (Kibune, Hieizan), Pref. Gifu (Kugo cave) and others from Pref. Iwate, Tokyo, Gumma, Nagano, Toyama, Ishikawa, Aichi, Osaka, Yamaguchi, Tokushima, Kochi, Fukuoka, Kumamoto, Miyazaki and Kagoshima (incl. Yakushima).

Body length up to 3.5 mm. Antennae very short, half the length of body. Ground colour stramineous gray with light brownish pattern all over the tergites in living state. Long preserved examples are never patterned except the fore-margin of the head, which is usually black. Antennae violet. Eyes 6+6, intensely pigmented. Labral setae 4/5, 5, 4, marginally with 4 recurving spinules. Unguis stout, with 1, 1, 1 large inner tooth. Unguiculus untoothed. Tenent hair slender, shorter than inner side of unguis and moderately expanded at the end. Trochanteral organ reduced to 1, 1 setae. Blunt tibiotarsal spiny setae up to 0, 0, 2. Ventral tube normal, multisetaceous. Rami tenaculi quadridentate,

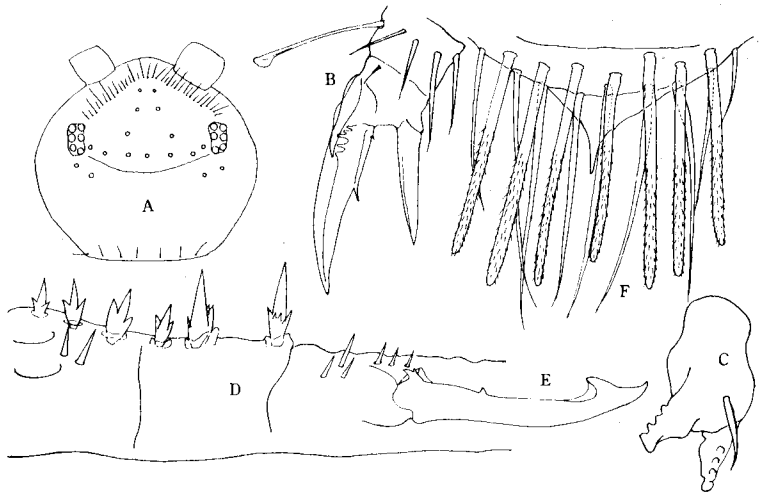

Fig. 10. *Tomocerus* (s.str.) *kinoshitai* Yosii from Kurama, Kyoto.
A: Head, B: Hind claw, D: Tenaculum, D: Dental spines, E: Mucro, F: Upper anal flap of female.

corpus unscaled and always with 1 seta. Furcal ratio as 40: 50: 15, the dentes being relatively short. Manubrium bearing lateral row of strong, ciliated setae. Principal dorsal setae 2+2, 1, but they are pointed on apex and not modified. Dental spines 3/1, 2, almost constant in arrangement, Each of them brownish black and with some 3–5 spikes near tha basis. 1–2 small, spiny setae are present on inner side of the row and some 5–8 small spiny setae dorsally as the extension of dental spines. Mucro typical in structure, but remarkably arcuate on distal half and with 1 (rarely 2) intermittent tooth dorsally upon outer lamella. Outer basal tooth with a corner toothlet. Body scales are lightly brownish, never dark. Body setae well represented, both large setae and s.s. without crown of setulae. Chaetotaxy of head capsule as in fig. A, they differ from those of *T. cuspidatus* and *ocreatus* considerably and constantly in all examples examined. Sexual dimorphism is conspicuous, blunt setae of upper anal flap of female are, in contrast to other species, minutely feathered.

In many details the species is characteristic and no alike species occur in Japan. Mucronal form vary considerably, so one example from Gongen-ana Cave, Pref. Oita has no intermittent tooth and some examples from various caves have 3–4 of them (*T. k. dentiferus* Yosii, 1954), but they are occational aberration and they have no subspecific significance.

The species is endemic to Japan for the moment, where it is collected from

various localities both as epigeic and cavernicolous. Honshu, Shikoku, Kyushu (incl, Yakushima).

Tomocerus (s.str.) **minor** (**LUBBOCK**, 1862)

Specimens examined: Germany (Munich, R. YOSII, 3 ex.)

Little may be added to this well known species. Only some details are noted to compare it with other related forms: Labral setae 4/5, 5, 4, with 4 recurving marginal spinules. Head capsule anteriorly with 2, 4 setae, posterior margin with a row of many simple setae. Unguis slender, with up to 4, 4, 5 inner teeth. Unguiculus short, broad and with an inner tooth. Tenent hair thick, as long as inner side of unguis and apically enlarged. Trochanteral organ reduced to 1, 1 setae. Blunt spiny setae of tibiotarsus up to 5, 5, 5 (usually 4, 4, 4). Rami tenaculi quadridentate, corpus with ca 7 setae. Furca in ratio as 10:14:4. Manubrium with heavy lateral setae 9+9 in number. Scaled dorsally. Principal setae undetermined. Dental spines 3-4/2-3, **1**, 1, **1**, brownish pigmented and all of them tricuspidate. To the inner basal part of the series of spines there are 2-3 short, hyaline and ciliated spiny setae in addition. Only larger ones with some additional plications. Mucro elongate, with 3-4 (usually 4) intermittent teeth on the outer lamella of two dorsal lamellae. Outer basal tooth with a toothlet. Body scales dark. Larger body setae and s.s. without crown of setulae. Sexual dimorphism unknown.

The species is seemingly abundant in Europe and in N. America. CHRISTIANSEN suspects it an invader from outer world. In Japan this species is reported two times (UCHIDA, 1954), but probably it is either *T. ocreatus* or *cuspidatus*.

Tomocerus (s.str.) **cuspidatus BÖRNER**, 1909 fig. 11.

syn. nov. *T. kumei*: YOSII 1954

T. uenoi: YOSII 1954

Specimens examined: Pref. Nagano (Shigakogen) and others from Pref. Nagano, Niigata, Gumma, Fukushima and Kyoto.

Body length up to 6.0 mm. Colour in typical examples with purplish pigments diffusely scattered to form a fixed pattern. Antennae coloured upon ant. I, III and IV, ant. II remains uncoloured. Head intensively purplish dorsally, so is the anterior and posterior part of the trunk, the other parts difiusely pigmented. Legs are also dark on distal segments, coxae coloured, trochanter and femur paler. Ventral tube and furcula almost pale. Antennae as long as body, labral setae 4/5, 5, 4, with 4 recurving spinules marginally. Head capsule anteriorly with 2, 4 large setae, posterior margin with a row of numerous simple setae.

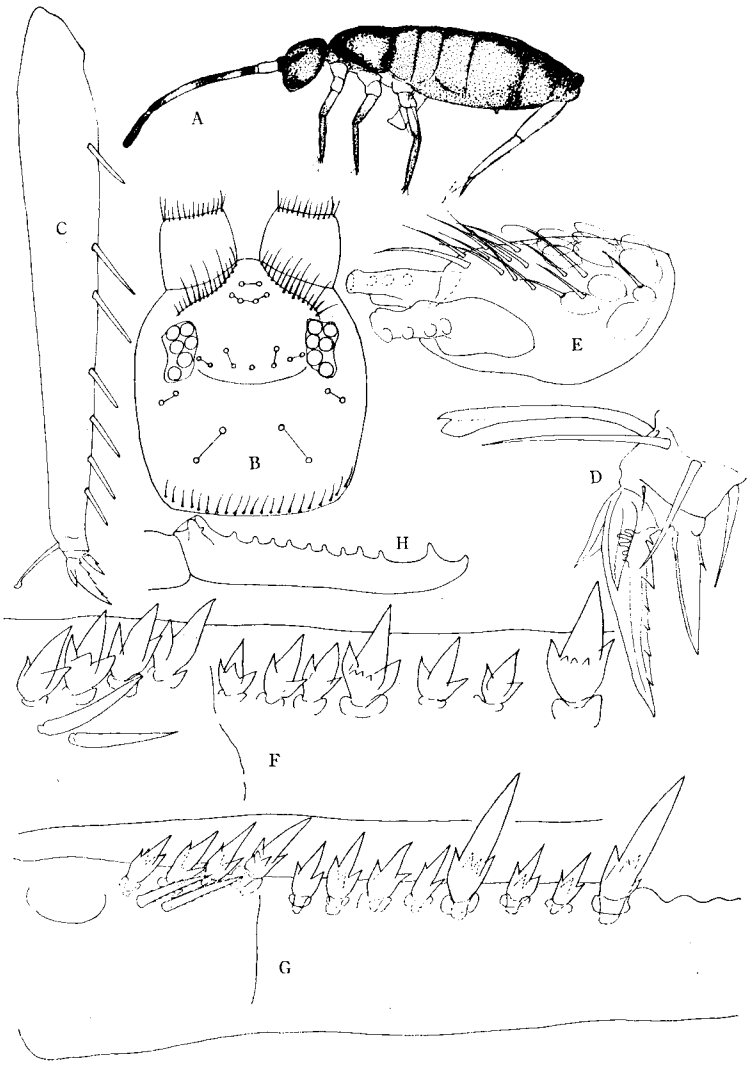

Fig. 11. *Tomocerus* (s.str.) *cuspidatus* BÖRNER.
A : Habitus, B : Hind tibiotarsus, D : Hind claw, E : Tenaculum, F, G : Dental spines, H : Mucro, A,B,C,G—Shigakogen, Pref. Nagano, D,E,F,H—Mt. Ontake, Pref. Nagano.

Unguis slender, with 2 large proximal and 3–4 faint distal inner teeth. Unguiculus lanceolate, pointed and with an inner and an outer tooth, the latter is peculiar for this species and constantly present. Tenent hair very large, longer than inner side of unguis and apically enflated. Blunt spiny setae numerous up to 6, 6, 8, lightly brownish on apex. Rami tenaculi quadridentate, corpus with few

scales and more than 15 setae. Furcal ratio as 30 : 40 : 7. Manubrium with large lateral row of setae. Dorsal principal setae 2+2, 1, well developed and blunt on apex. Often the setae are brownish distally. No scales between dorsal setaceous stripes. Dental spines as 4/4, 1, 2, 1, heavy chesthut brown, compound with 3–6 plications near the basis. They are around the spine on its dorsal side, the other side (inner) is almost without them. 2–3 small setae along the inner basal part of spines are short, ciliated and alike to spines. Mucro not converging, anteapical tooth larger than the apical, with 5–10 intermittent teeth upon outer lamella of two dorsal lamellae, outer basal tooth with a small toothlet. Body scales black, heavily striated. s.s. without crown of setulae, but larger body setae are with up to 5 such setulae around the basis. Large body setae of abd. V are elongate, rugose and pointed on apex. Those of abd. VI are thick, short and blunt apically in females. Sexual dimorphism conspicucus.

The great difficulty for identification of Börner's *cuspidatus* is his statement of 3/3–4 dental spines. It corresponds to *T. kinoshitai*, while 5 inner teeth of unguis, 6 dorsal teeth of mucro and colouration is referable to the present species. For this reason I have once abandoned *cuspidatus* as being mixture of two species or an another unknown form and created *uenoi* and *kumei* for it. Börner's material have come from various places of middle and west Japan and it must be a common species and, with some hesitation, I neglect his dental formula and place *cuspidatus* in the present state. *T. kumei* and *uenoi* become synonym of *T. cuspidatus*,

The species is a typical winter form in the middle Japan. It emerges often in large numbers upon snow surface in spring, together with *Dicyrtomina leptothrix* and *Granisotoma kisoana*. In morphological details the dental spine is intermittent of *T. ocreatus* · and *minor*, there being 4–7 plications near the basis, but the presence of an outer tooth of unguiculus is confined to this species. The absence of scaled area between setaceous stripes dorsally upon manubrium is also characteristic. The examples collected in other hot seasons of the year from the forest litter are paler, often the posterior part of the trunk is unpigmented (ex. Mt. Ontake) or even quite pale for which I have once attached the name *T. kumei*. Dental spines often show considerable variation of arrangement among large examples.

Tomocerus (s.str.) **ishibashi** YOSII, 1954 fig. 12.
syn.: *T. ishibashii*: Yosii 1954, Yosii et Lee 1963.
Specimens examined: Pref. Gumma (Ozè), Nagano (Kamurikiyama, Ontake), Toyama (Unazuki)

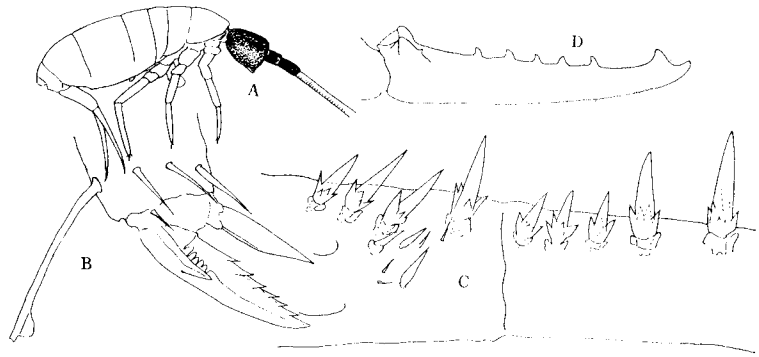

Fig. 12. *Tomocerus* (s.str.) *ishibashii* Yosii from Unazuki, Pref. Toyama.
A : Habitus,B : Hind claw, C : Dental spines, D : Mucro.

Body length up to 3.5 mm. Ground colour yellowish white, but head and ant. I, II are intensely pigmented to purple. Antennae violet distally. Mouth pale. No pigment upon other places. Antennae subequal to body in length. Anterior setae of head capsule as 2, 4, posterior margin with a row of dense setae. Eyes 6+6, well pigmented. Labral setae 4/5, 5, 4, with 4 recurving marginal spinules. Unguis rather slender, with up to 6, 6, 6 teeth. Unguiculus broadly lanceolate, without inner nor outer teeth. Tenent hair thick, longer than inner side of unguis and spathulate. Blunt spiny setae of tibiotarsus 2, 2, 6 or more. Trochanteral organ reduced. Rami tenaculi quadridentate, corpus with ca. 4 setae and unscaled. Furca in ratio as 32 : 50 : 10. Manubrium with heavy lateral setae, dorsally unscaled between setaceous stripes. Principal setae not differentiated usually. Dentes with compound spines, each in form as *T. cuspidatus*, but arranged as 4–5/3–5, **2**. 2–3 small small spinose setae inner basal to the spines are present. Mucro elongate, with 5–8 intermittent teeth on the outer lamella of two dorsal lamellae. Outer basal tooth of mucro with a corner toothlet. Body setae arranged as in *cuspidatus*, with some modification upon th. II and III. Large body setae and s.s. without crown of microsetae. Scales brownish, not heavy in pigmentation.

The species is near *T. cuspidatus*, but different by the absence of outer tooth of unguiculus, crown of microsetae of large body setae, dental spines and particularly, by the coloured ant. II. From *T. ocreatus* Denis it is different in body colour and form of dental spines etc.

Distribution: Japan, Korea

Tomocerus (s.str.) **asahinai** Yosii, 1954 fig. 13.

syn.: *T. asahinai*: Yosii 1954

Specimens examined: Pref. Gumma (Ozè), Pref. Nagano (Ontake).

Body length up to 3.0 mm, usually smaller. Ground colour yellowish, antennae dark. Head with black markings on antennal basis and between them. Coxal basis of all legs diffusely dark. As the most characteristic of this species abd. III has a pair of small lateral patch at about the middle of the segment and abd. IV has two pairs of black spots laterally, the latter may fuse to one in some examples. Abd. V obscurely dark. Antennae subequal to body in length. Eyes 6+6, intensely black. Labral setae 4/5, 5, 4, marginal recurving spines 4. Maxilla

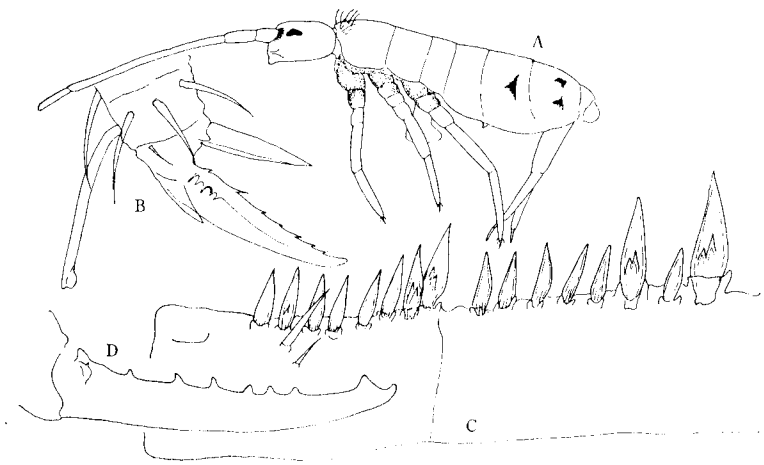

Fig. 13. *Tomocerus asahinai* Yosii from Mt. Ontake, Pref. Nagano.
A: Habitus, B: Hind claw, C: Dental spines, D: Mucro.

has no appendix. Unguis slender, with up to 7, 7, 7 inner teeth. Unguiculus small, with or without inner tooth. Tenent hair as long as or longer than unguis, thick, but moderately spathulate distally. Blunt spiny setae of tibiotarsus up to 4, 6, 7, trochanteral organ reduced. Ventral tube scaled, multisetaceous. Rami tenaculi quadridentate, corpus unscaled and with ca. 20 setae including a large median one. Furca well extended, man: d: mu as 50: 62: 13. Manubrium with long, ciliate lateral setae. Principal dorsal setae 2+2, 1, pointed apically and not modified. Dental spines 5-6/3-6, **1**, 1, **1**, larger ones with some plications, smaller spines simple. All of them with longitudinel striae. 2-3 small spiny setae basally to the inner side of the spines. Mucro normal for the genus, 5-7 intermittent teeth are upon outer one of two dorsal lamellae. Outer basal tooth with a corner toothlet. Chaetal arrangement of head as in *ocreatus*, i.e. with, 2, 4

large setae proximally. Cervical setae long. The male has abd. V elongate posteriory to the considerable degree and abd. VI with anal flaps are attached to it. Ventrally the male genital orifice is at about the basis of the elongation.

The species is easy to recognize with its peculiar pattern of the body. The dental spines with its mixture of simple and compound types are very unique.
Distribution: endemic to Japan

Tomocerus (s.str.) **viridis** sp. n. fig. 14

Specimens examined: Pref. Niigata (Sasagamine, 30. VII 1952, Y. WADA, 4 ex.)

Body length up to 2.0 mm. Ground colour uniformly beautiful green to olivaceous, without black patches. This colour ir retained for the first few years when preserved in alcohol and in darknenss, but becoming paler afterwards. Antennae short, about half of the body and violet in colour. Eyes 6+6, intensely black. Labral setae 4/5, 5, 4, with 4 marginal recurving spinules. Maxilla without appendix. Head capsule anteriorly with 2, 4 setae, posteriorly with a row of many simple setae. Unguis slender, with up to 5, 5, 5 inner teeth. Unguiculus broad, usually with an inner tooth. Tenent hair thick, as long as inner

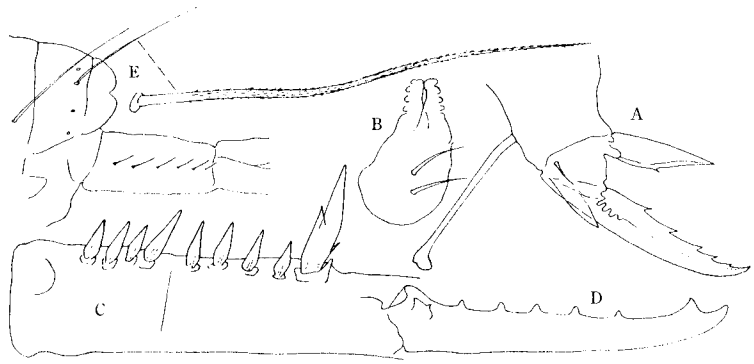

Fig. 14. *Tomocerus* (s.str.) *viridis* sp. n.
A: Hind claw, B: Tenaculum, C: Dental spines, D: Mucro,
E: Abdominal end of female.

side of unguis and distally broad. Blunt spiny setae of tibiotarsus up to 5, 5, 5 well differentiated. Trochanteral organ reduced to 1, 1 setae. Ventral tube with relatively few number of setae, dental spinese as 4–5/4–5, 1, brownish and only the last spine has 1–2 plications. Other spines are simple. Mucro elongate, with 5 intermittent teeth upon outer lamella of two dorsal lamellae. Outer basal tooth with a toothlet.; Body scales hyaline, both s.s. and large body setae without crown of small setulae. Large setae of abd. V are very long, ciliate and

pointed apically.

Typus: One example from Sasagamine, Pref. Niigata.

With its peculiar body colour and dental spines it is easily to be separated from *T. asahinai* and others. It is a rare species confined to the mountains of middle Japan.

Tomocerus (s.str.) **punctatus** sp. n. fig. 15

Specimens examined : Pref. Nara (Kasuga, 15. III 1957, R. Yosii, 2 ex.), Pref. Kyoto (Kamigamo, 31. III 1957, R. Yosii, 3 ex.)

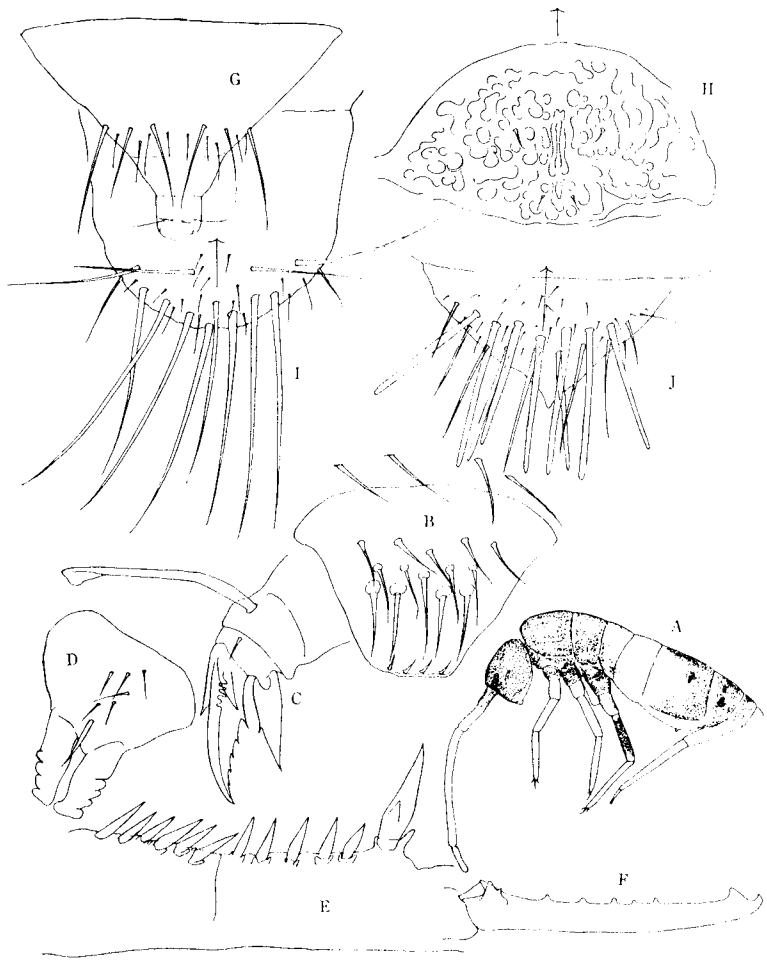

Fig. 15. *Tomocerus* (s.str.) *puncutatus* sp. n.
A: Habitus, B: Labrum, C: Hind claw, D: Tenaclum, E. Dental spines, F: Mucro, G: Abdominal end of male, H: Male genital orifice, I, J: Upper anal flap of male and female.

Body length un to 3.5 mm. Ground colour whitish gray, head, anterior and posterior part of the trunk more or less dark, often intensely. Th. II with pattern of pale stripes. Legs dark upon coxae, femur of hind-legs deeply pigmented. Ant. III, IV with dark patches around s.s. as in *asahinai*. Abd. V with a dark band. Abd. VI pale. Antennae half of the body in length, with relative lengths as 10 : 15 : 70 : 20. Eyes 6 + 6, intensely pigmented. Labral setae 4/5, 5, 4, with 4 marginal spinules. In contrast to other species the third row of labral setae are very long, much longer than others. Unguis broad, with many inner teeth up to 6, 6, 6, of which the proximal one larger and distally situated. Unguiculus lanceolate, with one inner tooth. Tenent hair thick, as long as unguis and moderately broad apically. Blunt spiny setae of tibiotarsus conspicuous and 4, 7, 7. Trochanteral organ represented by 1, 1 setae. Tubus ventralis scaled and with many setae. Furca in ratio as 12 : 17 : 4. Manubrium dorsally scaled, with a row of large lateral setae. Principal setae not modified. Dental spines as 6/6, 1, arranged in a row, almost uncoloured in preserved state and only the last large spine has one plication, others are simple. Mucro elongate, with two dorsal lamellae, the outer one bearing up to 7 intermittent teeth. From a pair of basal teeth the outer one has a small toothlet. In female abd. V and VI are usual in shape, the latter with many long, blunt setae. In males abd. V is elongate, abd. VI is small, all perianal setae are slender and never blunt, so that the sexual dimorphism is very conspicuous.

Typus : one example from Kasuga, Pref. Nara.

This species is very near *T. asahinai* Yosii in body pattern and sexual dimorphism, but dental spines are different, much simpler and more alike to *T. viridis* sp. n., but in the last species corpus tenaculli has smaller number of setae.

Distribution : endemic to Japan

Tomocerus (s.str.) **vulgaris** (TULLBERG, 1871) fig. 16

By length up to 2.8 mm, ground colour uniformly dark without pattern. Antennae shorter than body, dark violet. Eyes 6+6, intensely black. Labral setae 4/5, 5, 4, with 4 recurving spinules. Maxilla without appendix. Setal arrangement of head capsule same to *T. ocreatus* and anteriorly with 2, 4 setae. Posterior margin with many spiny setae. Unguis rather slender, with many inner teeth in equal distances. They are up to 8, 9, 9, but usually 5, 5, 5. Unguiculus broad, usually without inner tooth. Tenent hair well developed, thick, as long as inner side of unguis and apically spathulate. Trochanteral organ reduced to 1, 1 seta. Blunt spiny setae of tibiotarsus well differentiated and 4, 4, 4-5 in number. Ventral tube multisetaceous. Rami

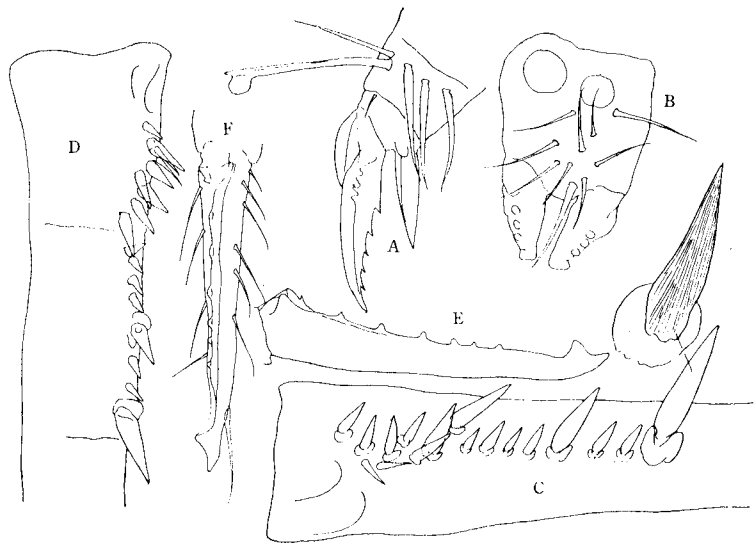

Fig. 16. *Tomocerus* (s.str.) *vulgaris* Tullberg from Belgium
A: Hind claw, B: Tenaculum, C, D: Dental spines (inner and dorsal view), E, F: Mucro (inner and dorsal view).

tenaculi quadridetate, corpus with very few scales and with 8–10 large setae (cf. Palissa 1964, p. 233 as 12–13). Furca in ratio as 13 : 18 : 4. Manubrium with heavy lateral setae well represented, dorsally scaled and principal setae blunt on apex. But the latters are not much different from usual setae. Dental spines simple, intensely browish and with fine, longitudinal striae. Their arrangement is normally as 5–6/3–4. 1, 2, 1. 3–4 small, hyaline setae at the inner basal side of dental spines are spiny in form. No outer lateral setae of dentes. Mucro elongate, not converging, with 5–9 intermittent teeth upon outer lamellae. From the two basal teeth the outer one is beset with a toothlet. Terminal seta of mucro larger than others. Body scales are dark, both s.s. and large body setae without crown of setulae basally.

The diagnosis above is derived from many examples of Belgium (Liège, F. Chapentier leg.). Christiansen's record of one outer lateral dental seta has not been observed in many examples at hand (cf. l.c. p. 666, fig. 72). Dentes bears many strong setae dorsally and laterally, but they must not be mixed with the large lateral setae of *Plutomurus* spp.

The species is seemingly abundant in Europe and North America (northern part), but all records of this species outside of these regions are doubtful. The report from Himalaya (Imms, 1912 etc.) must be retained. One example from

Karakoram in my collection is quite near this species, but different by the form of mucro strongly converging to the end. From Japan no example is referable to this species.

Distribution: Europe, N. America and Australia (introduced?).

Tomocerus (s.str.) **jesonicus** sp. n. fig. 17

syn.: *T. vulgaris* var. *jesonicus*: Yosii 1940

Tomocerus vulgaris: Yosii 1954

? *Tomocerus vulgaris* var. *kurilensis*: Uchida 1964

Specimens examined: Hokkaido (Sounkyo, 28. VIII 1939, T. Umesao, 2 ex.), Pref. Gumma (Shibutsu, 8. IX 1952, R. Yosii. 1 ex.), Pref. Kyoto (Kibune, 7. IX 1966, R. Yosii, 24 ex.), Pref. Kochi (Ohtochi, 23. III 1953, R. Yosii, 1 ex.), Korea (Taegu. 11. VIII 1961, C.E. Lee, 1 ex.)

Body length up to 3.5 mm. Antennae up to 4.0 mm. Ground colour uniformly yellowish white, quite unpigmented. Antenna lightly dark violet, other extremities pale. Eyes 6+6, intensely black. Labral setae 4/5, 5, 4, labral margin with 4 recurving spinules. Head with chaetal arrangement of *vulgaris* type, hind margin with a row of numerous spiny setae. Unguis broad, with a pair of lateral and up to 4, 5, 5, inner teeth, the basal two stronger than others. Unguiculus lanceolate, usually untoothed. Tenent hair larger than unguis, thick and apically spathulate. Trochanteral organ reduced to 1, 1 setae. Blunt spiny

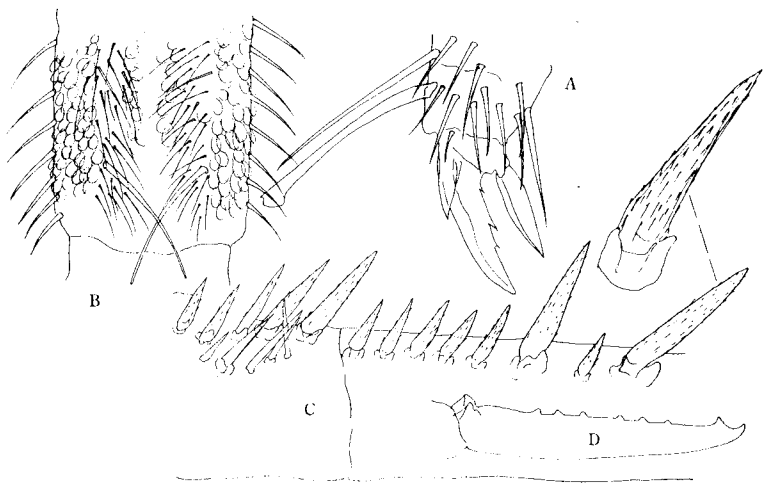

Fig. 17. *Tomocerus* (s.str.) *jesonicns* sp. n.
A: Hind claw, B: Distal half of manubrium in dorsal view,
C: Dental spines, D: Mucro.

setae of tibiotarsus up to 2, 2, 4, well represented. Ventral tube scaled, hirsute on all parts, posterior face with some 5–5 larger setae on median part. Rami tenaculi quadridentae, corpus unscaled, with up to 15 setae. Furca, in ratio as: 50: 70: 12. Manubrium with 12 pairs of ciliated lateral setae. Dorsal side has 1+1 large principal setae usually brownish, faintly rugose and apically blunt. Inner scaled area present. Dentes elongate, dental spines as 5–6/5–6, 1, 1, 1, distal one the largest, all of them fainly plicated all over and brownish in colour. Along inner side of the proximal spines there is a row 4–5 small, uncoloured, ciliate spines, which may or may not be reckoned to spines. Mucro elongate, almost parallel-sided in lateral view. All the mucronal structures typical for *Tomocerus*, intermittent teeth 3–7, upon outer lamella of two dorsal lamellae. All of the body setae without accessory setulae and body scales are small, rather hyaline and uncoloured.

Typus: one example from Sounkyo, Hokkaido.

This new species is very nearly related to *T. vulgaris* in many respects, but dental spines are without striae, but with faint plication all over the surface. Their arrangement is usually —1, 2, 1 in the cited species and —1, 1, 1 in *jesonicus*. It is near *T. folsomi* Denis, 1929 of Yunnan in the arrangement of dental spines. But each spine is compound. with 12–15 subspines in the cited species. All forms hitherto reported as *T. vulgaris* from Japan is to be included either to this species or to *T. violaceus*.

Distribution: Japan (Hokkaido, Honshu, Shikoku), Korea.

Tomocerus (s.str.) **violaceus YOSII**, 1956 fig. 18

syn. *T. violaceus*: Yosii 1956, 1963

Specimens examined: Pref. Nagano (Masaka-no-ana Cava, 27. X 1952, S. Uèno, 3 ex.), Pref. Gumma (Ozè, 7. IX 1952, R. Yosii, 1 ex.), Pref. Kagoshima (Nagata, 26. X 1955, R. Yosii, 4 ex.), Korea (Taegu, 7 ex.)

Body length up to 2.4 mm. Colour light gray, sometimes dark violet, with pale stripes upon each tergites. Antennae 1.3 mm, shorter than body and dark violet all over. Other extremities pale. Eyes 6+6, intensely black. Labral setae 4/5, 5, 4 with 4 marginal spinules. Maxillar head without appendix. Head capsule with many spiny setae along the hind margin. Unguis rather slender, with up to 5, 5, 5, obscure inner teeth. Unguiculus broad, distally truncate to inner side, without inner tooth. Tenent hair moderately developed, as long as inner side of unguis and distally spathulate. Trochanteral organ reduced to 1, 1 setae. Blunt spiny setae of tibiotarsus seemingly 0, 0, 2, but some other setae are very thick and alike to blunt ones, their number may attain 2, 2, 6 all together.

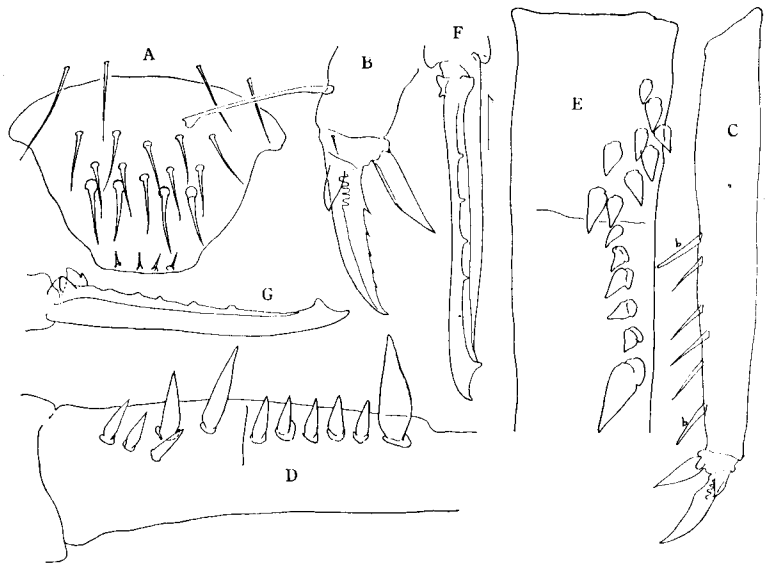

Fig. 18. *Tomocerus* (s.str.) *violaceus* Yosii from Yakushima, Pref. Kagoshima.
A : Labrum, B : Hind claw, C : Hind tibiotarsus, D, E : Dental spines (inner and dorsal view), F : Mucro.

Ventral tube multisetaceous. Rami tenaculi quadridentate corpus unscaled and with 1-2 setae. Furca in ratio as 6 : 10 : 3. Manubrium with lateral row of setae, dorsally unscaled ? and principal setae not modified. Dentes without trace of lateral setae. Dental spines simple, weakly chitinized and uncoloured. Their arrangement is as 5-9/4-5, **1**, where the proximal ones are in two irregular rows and only the terminal spine is large. Mucro elongate, with 4-7 intermittent teeth on the outer lamella of two dorsal lamellae. Outer tooth of the basal pair with a corner toothlet. Body scales are weak, never brownish, both large setae and s.s, without crown of setulae of the basis.

This species is near *T. vulgaris* Tullberg in appearance, but the arrangement ment of dental spines are different. Only the terminal spine is large, proximal ones are in two rows. These characters seems to be constant within all mateaials available to me. It is alike to T. *curtus* Christiansen, 1964 of USA but the cited species has no manubrial lateral setae. It is rather rare species to be found in the mountain region of Japan.

Distribution : Japan, Korea.

Aphaenomurus YOSII, 1956

Typus : *Aphaenomurus interpositus* Yosii, 1956

The genus is very near *Plutomurus* by the presence of outer dental setae, but separable from it by the reduction of trochanteral organ upon trochanter, although it is well developed upon femur. Presence of a crown of setulae at the basis of s.s. and on large body setae are characteristic for Japanese species, but not worthy of generic merit in Nearctic forms (Christiansen, 1964). Only one species is present.

Aphaenomurus interpositus YOSII, 1954 fig. 19. A–G

syn.: *Aph. interpositus*: Yosii 1954, 1956

Aphaenomurus vicinus: Yosii 1966, syn. nov.

Specimens examined: edaphic, pref. Gumma (Ozè), Nagano (Kamikochi), Shiga (Shizugadake), Kyoto (Daimonji, Kumogahata), Nara (Ohdaigahara), Hokkaido (Daisetsu). caves, Various caves from pref. Aichi, Kochi, Oita, Kumamoto and Kagoshima.

Body length up to 3.0 mm, ground colour whitish, head often brownish, with diffuse pigments over the body. Scales often very dark. Antennae light violet, legs also sometimes violet. No pattern except a black patch between antennal basis. Antennae shorter than body, ca. 2.0 mm. Eyes 6+6, intensely black. Labrum normal, 4/5, 5, 4 and with 4 recurving spinules. Maxillar head without appendix. Unguis slender, with a pair of lateral and up to 3, 3, 4 inner teeth. Unguiculus lanceolate, elongate and with or without inner tooth. Tenent hair thin, as long as inner side of unguis and feebly spathulate on apex. Blunt spiny setae of tibiotarsus as 0, 0, 2. Trochanteral organ is represented by 1/25 setae and those upon proximal part of femur are in a quadrangle. Ventral tube multisetaceous, with scales posteriorly and without scales anteriorly. Rami tenaculi quadridentate, corpus unscaled and with 4–10 (rarely 2) setae. Furca in ratio as 30 : 50 : 6, so that mucro is relatively short. Manubrium without lateral rows of setae and they are restituted by 5–6 pairs of small setulae. Dorsally no scales between setaceous stripes. Dentes with 2–3 conspicuous outer lateral setae, they are densely ciliated. Dental spines 6–9/8, **1**, the ultimate one the largest, but not extremely. All of them uncoloured, simple and those of the proximal part are in 2–3 irregular rows. No special setae or scales to the inner side of the spines. Principal setae not differentiated. Some of the dental dorsal setae are extremely long. Mucro lightly converging, with 3–5 (rerely 1–2) intermittent teeth on the outer lamella of two dorsal lamellae.* From the pair of basal

* The outer lamella is connected to the basal tooth and inner lamella is freely ending in contrast to *Tomocerus*, where outer lamella is ending free.

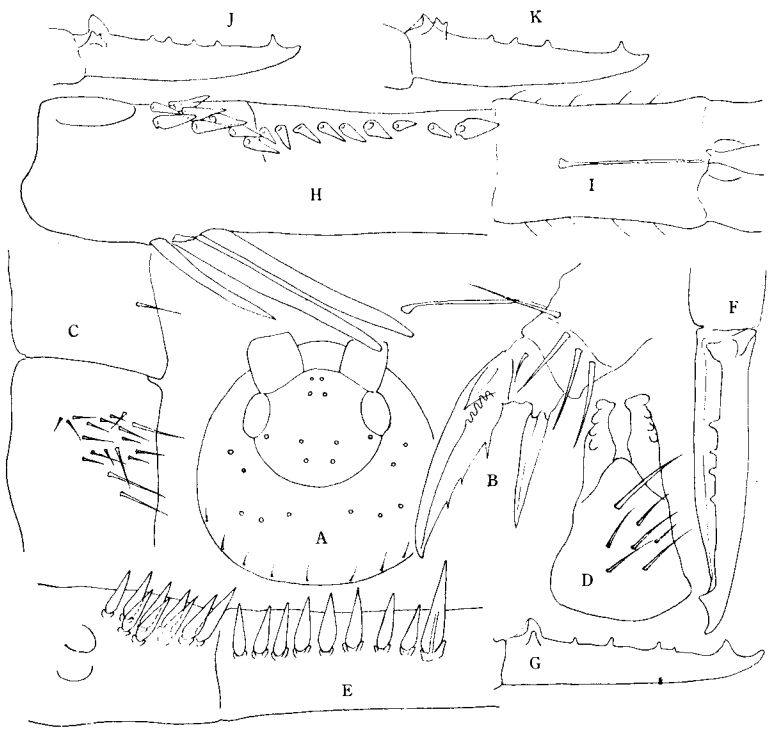

Fig. 19, A–G: *Aphaenomurus interpositus* Yosii from Ohtani Mine, Pref. Oita.
A: Head, B: Hind claw, C: Trochanteral organ, D: Tenaculum,
E: Dental spines, F, G: Mucro in dorsal and lateral view.
H–K: *Aph. interp. dentiferus* Yosii from Amabitai Cave, Pref. Iwate.
H: Dental spines (dorsal), I: Ventral view of manubrium, J, K: Mucro.

teeth, the outer one is without corner toothlet. Body scales brown, light dark. Larger setae are as 2,2 on anterior part of head capsule. Very few ciliated setae along the hind margin of the head capsule. Upon trunk both the basis of s.s. and of large setae are with a crown of many setulae.

After reviewing Japanese examples the wide range of the variability of this species is witnessed and the Korean species: *A. vicinus* Yosii, 1966 must fall in synonym of this species. It is usually to be found from the interior of caves, but often from edaphic localities.

Distribution: Japan, Korea.

Aphaenomurus intespositus denticulatus Yosii, 1956 fig. 19, H-K

syn.: *A. int. denticulatus*: Yosii 1956

The subspecies is characterized by the presence of a corner toothlet to the outer basal tooth of mucro. Examples of this type are restricted to the north-eastern part of Japan. As they are concordant in other details with the principal form, they represent probably a local race of *interpositus*.

Thus it is found from following localities: Pref. Tokyo (Yozawa-do Cave), Pref. Iwate (Inarikutsu Cave, Mituishi-no-ana Cave, Amabitai-no-ana Cave).

Plutomurus Yosii, 1956

Typus: *Tritomurus riugadoensis* Yosii, 1939

The genus includes many cave forms of Japan, Korea and western part of USA. At first these species were included in *Tritomurus* by the absence of eyes and the spiny form of tenent hairs. After finding the presence of large outer setae at the basis of dentes ard by the structure of mucro, they were transfered to the new genus *Plutomurus*. Afterwards the generic merit was doubted by some authors until recently there had been found the peculiar trochanteral organ to assure the sound basis of this natural group. At the same time some edaphic specics with well developed eyes have been included. It may be assumed that three genera: *Pogonognathellus, Tomocerus* and *Plutomurus* have evolved independent and parallel to each other in recent times. Asiatic species may be keyed as follows :

A1: Prelabral setae 2+2

B1: Edaphic species with 6+6 eyes. Tenent hair spathulate···*P. edaphicus* sp. n.

B2: Cave species with reduced eyes. Tenent hair pointed.

C1: Eyes 5+5, mucro with 3–4 dorsal teeth ····· *P. riugadoensis* (Yosii)

C2 Eyes 3+3, all dental spines subequal in form ····· *P. leei* (Yosii)

C3: Eyes 2+2, large and small dental spines ····· *P. diversispinus* (Yosii)

C4: Eyes reduced, with pigmented spots, mucro with one intermittent tooth ····· *P. suzukaensis* (Yosii)

C5: Eyes reduced, mucro without intermittent tooth. Unguis and unguiculus elongate ····· *P. yamatensis* Yosii

A2: Prelabral setae 3+3

B1: Mucro with one intermittent tooth.

C1: Basal tooth of mucro normal ····· *P. gul* (Yosii)

C2: Basal tooth of mucro very large ····· *P. ehimensis* Yosii

B2: Mucro without intermittent tooth.

C1: Mucro short, basal mucronal tooth large ..... *P. kawasawai* Yosii

C2: Mucro with small basal tooth ..... *P. kawasawai kyushuensis* Yosii

A3: Prelabral setae 4+4 ..... *P. marmorarius* sp. n.

Plutomurus edaphicus sp. n. fig. 20

specimens examined: Kyoto (Kamigamo, 12. XI 1966, R. Yosii, 10 ex.), Pref. Niigata (Tochio, 21. III 1961, R. Yosii, 20 ex.), Pref. Nagano (Ontake, 18. VIII 1952, S. Uéno, 1 ex.)

Body length up to 2.3 mm. Colour dirty gray. Ground colour is white, upon which black pigments are scattered sparcely to form a diffuse pattern. Antennae and head capsule darker than elswhere, other extremities pale. Antennae rather short, being 6 times the head in length. Eyes 6+6, intensely black and upon common eye-patch. Labral setae 4/5, 5, 4, labral margin with 4 recurving spinules. Unguis small, with a pair of broad pseudonychia and 3, 3, 3 distinct inner teeth. Unguiculus lanceolate, untoothed. Tenent hair rather short and distinctly spathulate on apex. Tibiotarsus with 0, 0, 1 spiny seta posteriorly, without blunt ones. Trochanteral organ of hind-legs composed of ca. 10/15 setae. Ventral tube multisetaceous, 2-3 medinn setae of posterior face larger than others. Rami tenaculi quadridentate, corpus unscaled and with 2 setae. Furca in ratio as 4:5:1. Manubrium dorsally with a pair of hirsute stripes and unscaled between them. Manubrial lateral setae small, but distinctly present. Dentes converging, with two prominent outer basal setae. Dental spines are simple, uncoloured and arranged as 5–8/5, **1**, 2, **1**. No thick scales ventrally. Mucro typical for the genus, the two dorsal lamellae stretching from the anteapical to the basal teeth. the latters are 2 in number and the outer one is smaller, without corner toothlet. One small intermittent tooth is located between two dorsal lamellae at about the middle of mucro. Body covered with small, hyaline scales. Body setae feeble, without accessary setae. s.s. are slender and with a crown of small setulae at the basis.

Typus: One example from Kyoto, Kamigamo.

P. edaphicus is a common winter form of the mesophytic forest near Kyoto. It differs from *P. riugadoensis* (Yosii) in smaller body length, full number of eyes, clavate tenent hairs and less number of dental spines. The species is near the description of *T. varius* Folsom. However, body length is smaller, ground colour never yellowish and dental spinese are more than 10.

Distribution: Japan.

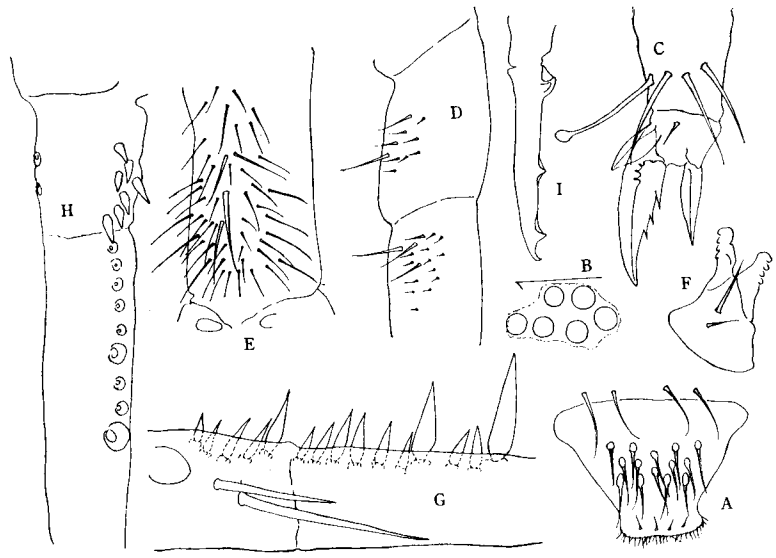

Fig. 20. *Plutomurus edaphicus* s. n.
A: Labrum, B: Eyes, C: Hind claw, D: Trochanteral organ, E: Posterior face of ventral tube, F: Tenaculum, G, H: Dental spines (outer and dorsal view), I: Mucro.

Plutomurus riugadoensis (YOSII, 1939) fig. 21

syn.: *Tritomurus riugadoensis*: Yosii 1939
Plutomurus riugadoensis: Yosii 1956
Tritomurus ishikawai: Uchida 1940

The species is already well established in Yosii 1956, p. 78, but some additional notes are given herewith. Ground colour white, dark gray by minute cluster of pigments. The colour is especially intense upon frontal region of head and upon dorsal side of the trunk, where pale longitudinal striae (place of incertion of muscles?) are to be seen. Legs and furca proximally dusky and distally pale. Labral setae 4/5, 5, 4, with 4 recurving marginal spinules. Maxillar head without prostheca. Eyes 5+5, either poorly pigmented or intensely black. Area frontalis with anterior group of 2, 2 setae. Posterior margin of head with relatively few setae. Unguis with up to 4, 4, 5 inner teeth. Unguiculus lanceolate, with one inner tooth. Tenent hair setaceous and pointed on apex. Trochanteral organ well developed, with more than 40/40 small setae. Tibiotarsal spiny setae 0, 0, 2. One additional seta near the basis of unguiculus may be also spiny upon hindlegs. Ventral tube scaled, multisetaceous. Rami tenaculi quadridentate, corpus unscaled, with up to 5 setae in one longitudinal row. Manubrium dorsally un-

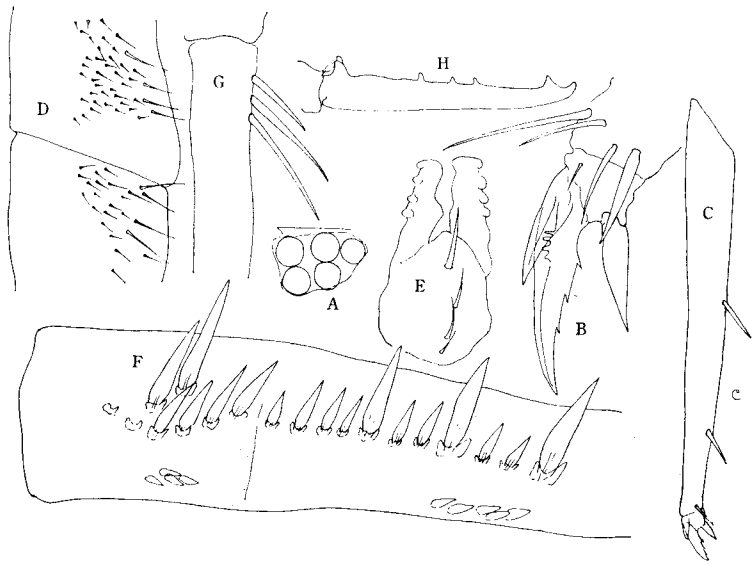

Fig. 21. *Plutomurus riugadoensis* (Yosii) from Shuhodo Cave, Pref. Yamaguchi

A: Eyes, B: Hind claw, C: Hind tibiotarsus, D: Trochanteral organ, E: Tenaculum, F: Dental spines (inner view), G: Outer dental setae, H: Mucro.

scaled, lateral setae well represented, 9 in number. No principal setae. Dental outer setae 3, very large and almost smooth. Dental spines simple, hyaline and arranged as 8–10/4–5, **1**, 2, **1**, 2, **1**, but considerable variability must be admitted. Mucro with 3–4 intermittent teeth between two dorsal lamellae, annected to the outer one. Two basal teeth are without corner toothlet. Sexual demorphism is not acknowledged. Large setae upon upper anal flap are pointed on apex.

The species is prevalent in many caves of Japan from Pref. Iwate in the north to Pref. Kumamoto and Miyazaki in the south. It occurs also from the edaphic locality in rare cases.

Plutomurus suzukaensis (**Yosii**, 1939) fig. 22

syn.: *Tritomurus suzukaensis*: Yosii, 1939

Plutomurus suzukaensis: Yosii, 1956

Pl. suz. ohminensis: Yosii, 1956, syn. nov.

Pl. suz. naikaiensis: Yosii, 1956, syn. nov.

Body length up to 3.5 mm, antennae up to 2.5 mm. Ground colour white, dif-

fusely pigmented with seattering spots of black pigments. Antennae pale. Head capsule dark on anterior half. Legs dark, furca pigmented on proximal half. Labral setae 4/5, 5, 4, with 4 recurving marginal spinules. Eyes absent, but a cluster of intensely black pigments are present at the position. Fore margin of head with 2, 2 setae. Hind margin with few spiny setae. Unguis carinate, inner tooth up to 3, 3, 3, unguiculus broad, untoothed. Tenent hair always pointed apically. Blunt spiny setae of tibiotarsus 0, 0, 2, a distal one seta near the unguiculus is also spiny. Trochanteral organ well developed, composed of 35/40 setae. Ventral tube unscaled, posterior face with about 5 larger setae in a row. Anterior face uni-

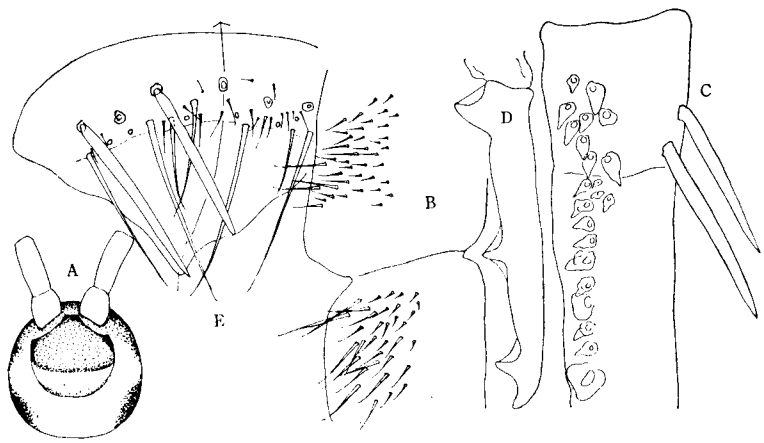

Fig. 22. *Plutomurus suzukaensis* (Yosii) from Same-no-komori-ana Cave, Pref. Shiga.
A: Head, B: Trochanteral organ, C: Basal part of dentes (dorsal view), D: Mucro, E: Upper anal flap of female.

formly with smaller setae. Lateral flap multisetaceous. Rami tenaculi quadridentate, corpus unscaled, with variable number of 4–7 setae, the distal one the largest. Furca in ratio as 40 : 70 : 13. Manubrium with a lateral row of 9 almost smooth setae. Principal setae not differentiated. No scales between the dorsal setaceous stripes. Dental outer setae usually 2, very large. Dental spines simple, uncoloured and arranged as 10/3, **1**, 2, **1**, 2, **1**. Ventral to the spines there are many small scales. Mucro not converging, apical, anteapical and basal teeth subequally large, with one smaller intermittent tooth at about the middle. Two dorsal lamellae are running from the anteapical to a pair of basal teeth and the intermittent one is lying just between them. s.s. with a crown of setulae, but large body setae are without them. Sexual dimorphism not prevalent. In females the large setae of the

upper and flap are blunt, faintly ciliated, in contrast to *P. riugadoensis*.

As may be seen from foregoing descriptions the species differs from *riugadoensis* in some characters. The eyes, form of unguis and mucro as well as the shape of setae upon anal flap may be cited.

The species is prevalent in many caves of central Japan. Two subspecies proposed in my previous paper must be retained. In cave species of *Tomoceridae* materials from a given cave show some characters peculiar for the given cave. So the body is intensery pigmented or quite pale, eyes are deeply black or not. number of setae upon corpus tenaculi, form and location of intermittent mucronal teeth etc. They represent by no means the specific or subspecific difference, but each cave seems to have a endemic strain of its own. An effort to divide them into local forms is not possible for the moment.

Plutomurus yamatensis YOSII, 1956 fig. 23

syn.: *Pl. yamatensis*: Yosii 1956

Body length up to 3.5 mm, antennal length up to 3.0 mm. Ground colour white, sccattered with black pigments to give a dusky gray colouration. Antennal basis and area frontalis darker. Eyes absent, represented by the assembly of

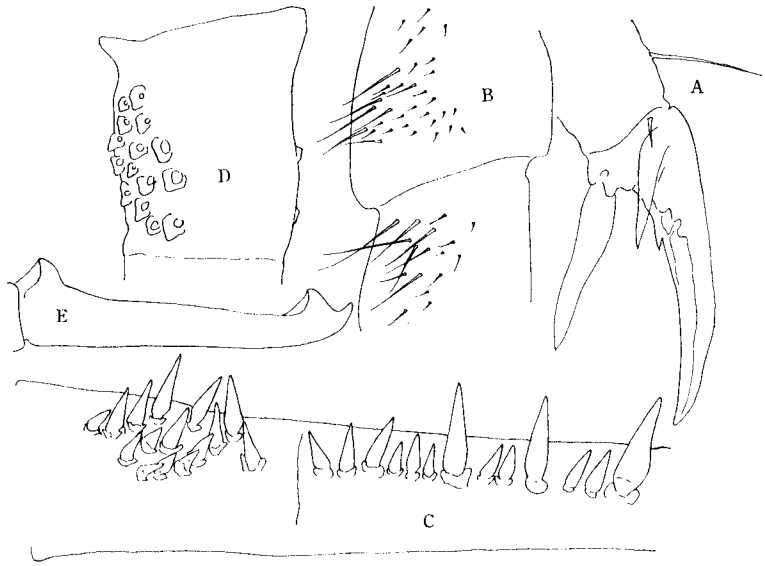

Fig. 23. *Plutomurus yamatensis* Yosii from Nanatsugama Cave, Pref. Nagasaki.
A: Hind claw, B: Trochanteral organ, C, D: Dental spines. E: Mucro.

of black pigments. Labral setae 4/5, 5, 4, with 4 recurving spinules marginally. Posterior margin of head capsule with fewer number of setae. Unguis elongate, with 1, 1, 1, inner tooth near the basis. Pseudonychia and unguiculus also longer than usual. Tenent hair short, pointed. Tibiotarsus with spiny setae 0, 0, 2. Trochanteral organ well developed, composed of more than 20/35 setae. Ventral tube unscaled, multisetaceous, a median seta of the posterior face larger than others. Rami tenaculi quadridentate, corpus unscaled and with one seta. Furcal ratio as 35 : 45 : 10. Manubrium dorsally without scaled area, laterally with a row of 9 moderate setae. Principal setae absent. Dental spines simple, uncoloured and as 8–14/4–6, **1**, 2–3, **1**, 2–3, **1**, where those of the proximal part are in three irregular rows. Outer lateral setae of dentes smooth, 2 in number. Mucro elongate, without intermittent tooth, two dorsal lamellae running from the anteapical to the basal teeth, the latter never with a corner toothlet. Body chaetotaxy as in *P. suzukaensis*.

The speciens is near *P. suzukaensis* in many respects, the absence of an intermittent mucronal tooth, elongate form of unguis with only one inner tooth may be cited as specific. *P. yamatensis* is found from various caves relatively remote to each other as Pref. Shizuoka, Gifu, Nara, Aichi, Yamaguchi and Nagasaki. Some characters are fixed to one cave, but they may not be regarded specific as in case of *P. suzukaensis*.

Plutomurus ehimensis Yosii, 1956 comb. nov. fig. 24

syn.: *Plutomurus suzukaensis ehimensis*: Yosii 1956

Body length up to 3.0 mm, white, scattered with small black pigments to give the dusky colouration to the body. Antennae white, 1.8 mm and, therefore, relatively short. Eyes represented by a cluster of black pigments and without cornea. Labral setae 6/5, 5, 4, the number of prelabral setae constant. Labral margin with 4 recurving spinules. Unguis broad, stout, with 1, 1, 1 or 2, 2, 2 inner teeth. Unguiculus without inner tooth. Tenent hair spiny and relatively short. Spiny setae of tibiotarsus as 0, 0, 2. Trochanteral organ composed of many long and short setae, both upon trochanter and femur of hind-leg. Rami tenaculi quadridentate, corpus with 1–4 setae. Furca in ratio as 3 : 5 : 1. Manubrium with a lateral row of 9 setae. Dental spines hyaline, smooth and arranged as 8/3, **1**, 1–2, **1**, 2, **1**, the proximal ones in two rows and the most distal one the largest. Outer dental setae 2, large and almost smooth. Inner ventral scales numerous, aggregated proximally and 5–6 distally. Mucro rather short, with one intermittent tooth, the basal tooth is strongly developed as stated in the original description. Clothing of body segments as in others.

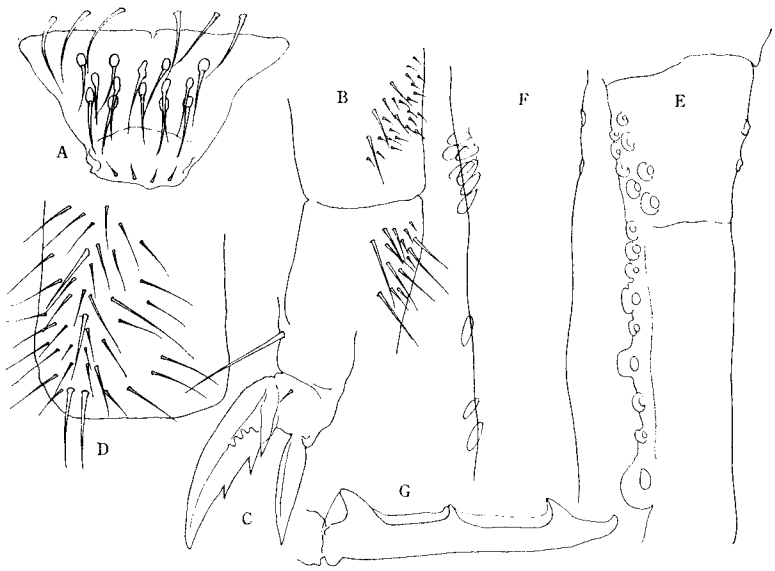

Fig. 24. *Plutomurus ehimensis* Yosii, from Anatorido Cave, Pref. Ehime. A: Labrum, B: Trochanteral organ, C: Hind claw, D: Ventral tube (posterior face), E, F: Dentes in dorsal and ventral view, G: Mucro.

The form is first regarded a subspecies of *P. suzukaensis* by the mucronal form. After investigating labral setae it has proved to be an independent species nearly related to *P. gul*, but in the cited species all mucronal teeth are small. *P. ehimensis* is restricted to the caves of the western Shikoku, Japan.

Plutomurus kawasawai Yosii, 1956 comb. nov. fig. 25

syn. *Plutomurus yamatensis kawasawai*: Yosii 1956

Body length ca. 3.0 mm. Antennae 2.5 mm. Ground colour white, uniformly gray by the scattered black pigments. Antennae white, legs and furcula dark proximally and pale distally. Upon head area frontalis is darker. Labral setae constantly as 6/5, 5, 4, with 4 marginal spines. Eyes reduced, only an assembly of black pigments is present. Unguis carinate, with 1, 1, 1 or 2, 2, 2 inner teeth. Unguiculus lanceolate, untoothed. Tenent hair is simple, spiny and pointed. Trochanteral organ composed of 20/20 setae in a quadrangle Spiny setae of tibiotarsus 0, 0, 2 and one seta near the unguiculus is also thick. Rami tenaculi quadridentate, corpus unscaled and with 1–3 setae. Furcal ratio as usual. Manubrium dorsally unscaled, laterally with a row of 9 large, ciliated setae. Principal seta undifferentiated. Large outer setae of dentes 2, almost smooth. Dental spines

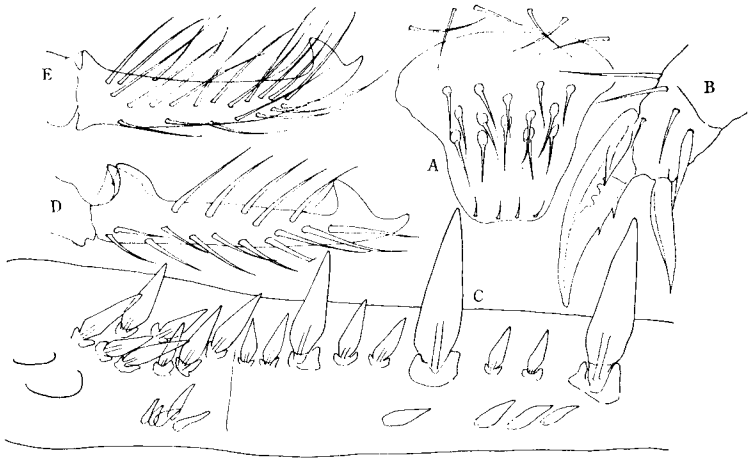

Fig. 25. A–D: *Plutomurus kawasawai* Yosii from Amagirido Cave, Pref. Ehime. E: *Plutomurus kawasawai kyushuensis* Yosii from Nanaoredo Cave, Pref. Miyazaki.
A: Labrum, B: Hind claw, C: Dental spines, D: Mucro, E: Mucro.

simple, hyaline and arranged as 8/2–3, **1**, 2, **1**, 2, **1**, the proximal ones is in two rows. Inner ventral small scales preset. Mucro rather short, an anteapical and a pair of basal teeth well developed, without intermittent tooth. Two dorsal lamellae prominent. Body setae as in other species of the genus. s.s. with a crown of setulae, large body setae without them.

The species in so near *P. yamatensis*, differing in the form of mucro and number of prelabral setae. The species is endemic to the caves of western Shikoku, in Pref. Kochi and Ehime. Again in this species the endemism of racial form in each cave is prevalent.

Plutomurus kawasawai kyushuensis YOSII, 1956 comb. nov. fig. 25
syn.: *Plutomurus yamatensis kyushuensis*: Yosii 1956

In this subspecies the mucronal form is peculiar, the anteapical tooth is larger than the apical as in case of *kawasawai*, but basal teeth are smaller and never so large as anteapical. The prelabral setae are always 6 in number.

This subspecies is distributed in caves of Kyushu, southward from the Aso Trench, namely in the Pref. Oita, Kumamoto and Miyazaki. Also in this subspecies the endemic variation to each caves are predominant.

Plutomurus marmorarius sp. n. fig. 26

specimens examined: Marble-do Cave, near Niimi, Pref. Okayama, 19. VIII 1951 G. IMADATÉ, 6 ex.

Body length ca. 3.0 mm. Colour gray, black pigment speckles are scattered all over the body. Head between antennal bases, on clypeal region more or less deeply pigmented. Antennae totaly uncoloured. Eyes absent, but pigments are concentrated at the place, no cornea is observed. Labral setae peculiarly as 8/5, 5, 4, labral margin with 4 recurving spinules. Unguis more or less elongate, 1, 1, 1 inner tooth. Unguiculus untoothed, broad. Tenent hair spiny. Trochanteral

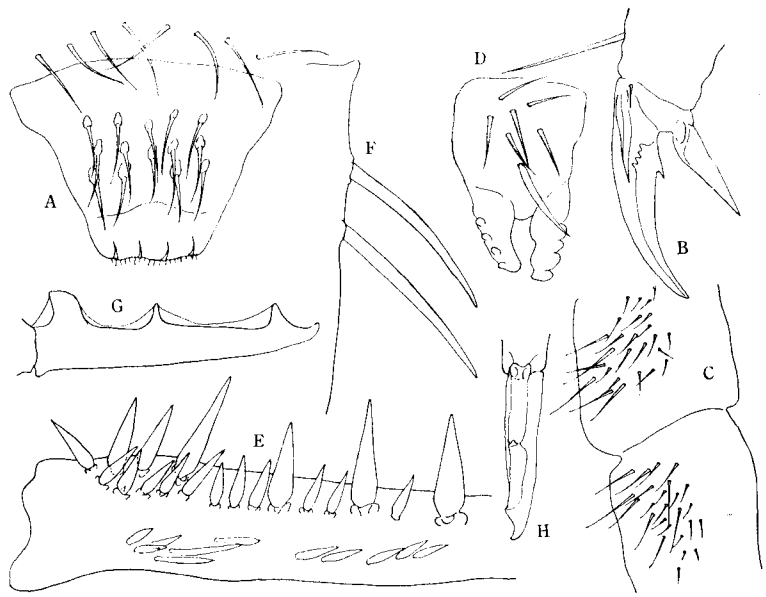

Fig. 26. *Plutomurus marmorarius* sp. n.
A: Labrum, B: Fore claw, C: Trochanteral organ, D: Tenaculum, E: Dental spines, F: Outer dental setae, G, H: Mucro (outer and dorsal view).

organ of hind-legs composed of ca 30/25 setae. Ventral tube hirsute, rami tenaculi quadridentate, corpus unscaled, with 5–6 setae, the distal one the largest. Furca in ratio as 30 : 50 : 8. Manubrium dorsally unscaled, laterally with a row of 9 setae. Dentes converging, with 2 large outer setae. Dental spines simple, uncoloued and arranged as 10/3, **1**, 2–3, **1**, 1, **1**, proximal ones are in two rows. Ventral to the dental spines there are some 10 small scales in a row, their form is longer than usual. Mucro rather short, with one intermittent teeth located between two dorsal

lamellae running from the anteapical to the basal teeth. All of them strong and well developed. Body setae typical for the genus, long s.s. are bearing some setulae around the basis and large body setae without them.

Typus: one example from the location above.

The species is allied to *P. ehimensis* and *gul* in many details, but different in the number of prelabral setae. Mucronal form is also different.

Addendum A.

Through kindness of Prof. K. CHRISTIANSEN I was able to investigate the Tomocerid collembola of North America. As may be seen from later pages, there are some difference of opinion between us with regard to the conception of genera. The result of my observation would be, therefore, of interest for further researchers. I admit to give some commentary notes on these forms with sincere thanks to him for his benevolence. Besides his laborious works on nearctic forms were very inspiring and instructive for the pursuit of the present study.

Pogonognathellus celsus (**CHRISTIANSEN**, 1964)

syn.: *Tomocerus* (*Pogonognathellus*) *celsus*: CHRISTIANSEN 1964

Of this interesting species following characters are noted from 4 examples of Calaveras Co., California: Labral structure normal. Trochanteral organ reduced to 1, 1 setae. Tibiotarsal spiny setae 0, 0, 2, but they are poorly differentiated. Rami tenaculi quadridentate, corpus unscaled and with 1 seta. Manubrium with lateral row of setae well developed. Principal setae 2+2, 1, all poorly developed and pointed. Body colour and pattern is astonishingly alike to *Plutomurus* spp.

In this species the beard-like appedix of maxilla (prostheca) is almost absent as figured in CHRISTIANSEN (l.c. p. 665, fig. 75). It is impossible to place the species in *Pogonognathellus* in the primary conception of BÖRNER.

Tomocerus (*Tomocerina*) **lamelliferus MILLS**, 1934

syn.: *Tomocerus lamelliferus*: MILLS 1934, CHRISTIANSEN 1964

To CHRISTIANSEN's diagnosis there may be added following points: Labral setae 4/5, 5, 4, with 4 recurving spinules marginally. Hind tibiotarsus without spiny setae, but with one large seta at about the middle. Trochanteral organ reduced. Manubrium dorsally unscaled, principal setae not differentiated. Manubrial lateral row of setae are not retained, but there are a row of small sockets to accomodate them.

Three examples are all mutilated and without dentes and mucro, so the mucronal structure is uncertain. Most probably the species may be placed in *Tomcerina* to judge from the setae upon hind-tibiotarsus.

Plutomurus californicus (**FOLSOM**, 1913) fig. 27, A.

syn.: *Tritomurus californicus*: FOLSOM 1913

Tomocerus cilifornicus: CHRISTIANSEN 1964

Four examples determined by Prof. CHRISTIANSEN have been examined. There are well developed trochanteral organ and it is assumed the species belong to *Plutomurus*. Other characters as stated in his monograph, but tibiotarsal spiny setae are 0, 0, 2 instead of 0, 0, 1. Labral setae 4/5, 5, 4, with 4 recurving spinules marginally. Body chaetotaxy is not different from Japanese representatives of the genus. From *P. riugadoensis* it differs in the number of eyes and in inner tooth of unguis. The nearest species would be *P. diversispinus* YOSII, 1966 from Korean caves.

Plutomulus brevimucronatus (**DENSIS**, 1928) fig. 27, B, C.

syn.: *Tomocerus brevimucronatus*: DENIS 1928, CHRISTIANSEN 1964

Three examples have been examined. Trochanteral organ is not fully developed, still there are 11/16 setae at the position. Together with the presence of outer dental setae the species may be regarded a kind of *Plutomurus*. In contrast to his diagnosis of this species, s.s. has 3–6 microsetae around the basis. Labral setae 4/5, 5, 4, with 4 recurving marginal spinules.

Plutomurus wilkeyi (**CHRISTIANSEN**, 1964) fig. 27, D–F.

syn.: *Tomocerus wilkeyi*: CHRISTIANSEN 1964

Two slides no. 1171, 1192 of Prof. K. CHRISTIANSEN are investigated. Commentary notes to his detailed diagnosis are as follows: Labral setae as 4/5, 5, 4, with 4 recurving marginal spinules. Tenent hair heavily clavate, shorter than the inner side of unguis, the latter is slender and with 5 very distinct inner teeth. Spiny setae of tibiotarsus as 0, 0, 2. Trochanteral organ well developed, composed of 25/23 long and short setae. Manubrial lateral setae almost absent, represented by a row of 7 feeble setae. Dental outer setae 2–4. Mucro with two basal teeth, the intermittent teeth 4 in number. His fig. 32 would be normal form of this species.

By the presence of trochanteral organ and dental outer setae the species is to be included within *Plutomurus*. But the reduction of manubrial lateral setae indicates a special grop within this genus. Their presence or absence is, as wrightly mentioned by CHRISTIANSEN, witnessed to be not of generic, but rather of specific character.

Tomolonus reductus MILLS, 1948 fig. 27, G–L.

syn.: *Tomolonus reductus*: MILLS 1948, WILKEY 1960

Tomocerus reductus: CHRISTIANSEN 1964

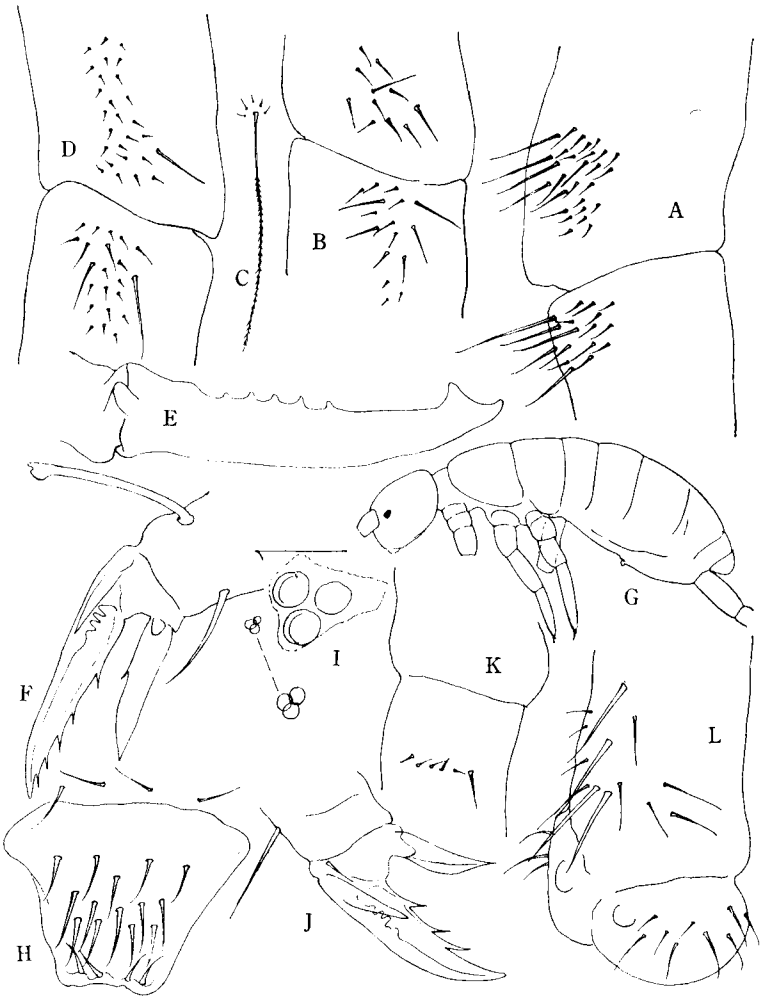

Fig. 27. A: *Plutomurus californicus* (Folsom), B, C: *Plutomurus brevimucronatus* (Denis), D–F: *Plutomurus wilkeyi* (Christiansen), G–L: *Tomolonus reductus* Mills.
A: Trochanteral organ, B: Trochanteral organ, C: s.s. from abd. IV, D: Trochanteral organ, E: Mucro, F: Hind claw, G: Habitus, H: Labrum, I: Eyes and postantennal organ, J: Hind claw, K: Trochanteral organ, L: Ventral tube.

4 examples from Oakland, California are investigated. The results are as follows: Eyes 3+3, the posterior one with poorly developed cornea. Small postantennal organ is composed of 3–4 minute elements in a rosette, whether it is

a juvenil organ (CHRITIANSEN, l.c.) or a secondary sexual character is not certain. In 4 examples of nearly the same body size of 2.3 mm, it is observed in 3 individuals. Labral setae 4/5, 5, 4, with 4 marginal spinules. Maxilla without prostheca. Large spiny setae of tibiotarsus (observed in one leg of one example) as 0, 0, 2. Trochanteral organ is observed in one leg and assured to be as 0/7. Ventral tube unscaled ?. Rami tenaculi quadridentate, corpus with one seta. As furca is mutillated ditally, dental spines and mucro are not observed. Manubrium has a lateral row of 7 moderate setae. On the proximal part of dentes a socket of one outer seta and 3 dental spines are surely present, the latter is simple, thin and hyaline.

I am inclined to preserve the genus *Tomolonus* MILLS, 1948 for this species. The presence of postantennal organ up th the later period of development, only one outer basal seta of dentes and the presence of trochanteral organ upon hind-femur sharply characterize the genus, which is monotypic at present. Surey it is related to *Aphaenomurus* by the state of trochanteral organ, but in this genus I have never met with the postantennal organ.

Tritomurus missus (**MILLS**, 1948) fig. 28

syn.: *Tomocerus* (*Tritomurus*) *missus*: MILLS 1948

Tomocerus missus: CHRISTIANSEN 1964

Three examples are investigated. The species is peculiar in many respects. My observations are as follows: Body length ca. 2.5 mm, diffusely dark all over the trunk. Antennae short and uncoloured. Labral setae 4/5, 5, 4, with 4 recurving marginal spinules. Maxillar head without prostheca. Eyes and postantennal organ quite absent, even the black eye-pigment is not observed. Area frontalis anteriorly with 2, 2 setae. Posterior margin of the head sparcely with setae. Unguis and unguiculus unusually broad, both with one inner tooth. The basis of the inner side of unguis is rounded. Tenent hair setaceous, often with a small blunt seta near by. Spiny setae of tibiotarsus 0, 0, 2. Trochanteral organ composed of 1/10 setae. The former is accompanied by 3–4 minute spiny setae and the latter is almost L-shaped in arrangement. Ventral tube unscaled, the median distal pair of posterior face slightly larger than others. Rami tenaculi quadridentate, corpus with 1 seta and unscaled. Furca in ratio as 8 : 15 : 3. Manubrium dorsally unscaled, laterally with a row of ca. 10 minute or moderately large setae. Dentes without outer lateral setae. Dental spines simple, hyaline and arranged as 4–6/3–5, **1**, the proximal ones are in two rows and the distal one larger than others. Some small special scales are present ventral to the spines, but their arrangement is not sure. Mucro slender, peculiar in form, the apical tooth is elon-

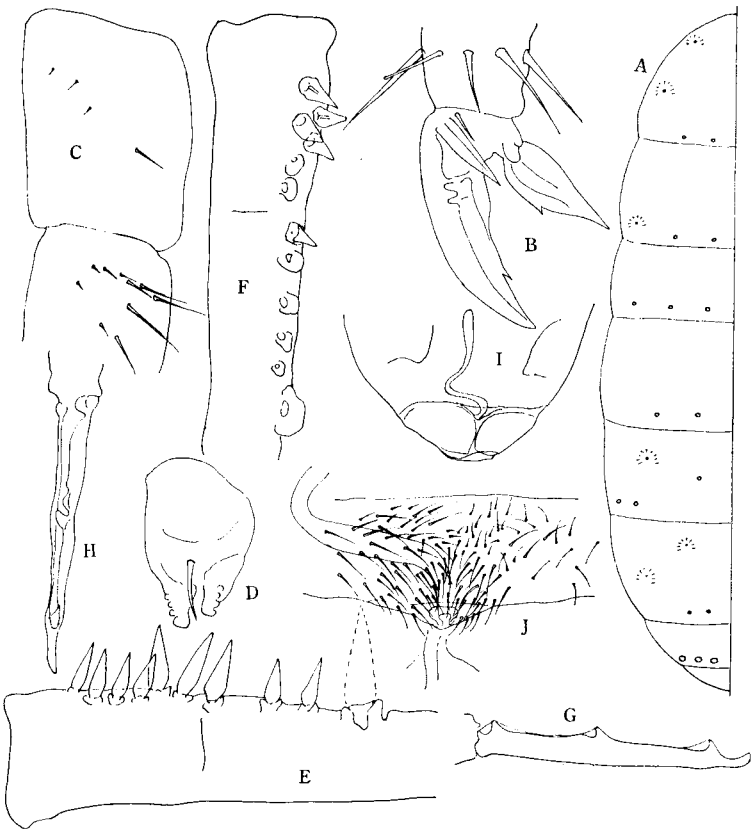

Fig. 28. *Tritomurus missus* (MILLS)

A: Chaetal arrangement, B: Hind claw, C: Trochanteral organ, D: Tenaculum, E, F: Dental spines, G, H: Mucro, I: Ventral view of male abdominal end showing the sperm duct, J: Male genital orifice.

gate, basal teeth in pairs, without toothlet and one intermittent tooth is lying on the outer lamella of two dorsal lamellae. The outer lamella is thick near these teeth and the inner lamella is reducted, hardly visible at the middle. Arrangement of body setae as in fig. A, s.s. with crown of setulae, but large body setae are without them. Sexual dimorphism unconspicuous, abd.V is not modified in males, the genital orifice is lowly conical, surrounded with number of small setae and the sperm duct, visible in transparence, is S-shaped.

By the presence of trochanteral organ it is surely apart from *Tomocerus* (s.str.), but the absence of outer basal setae of dentes is so peculiar to this species that it is impossible to find a precise position to accomodate it for the moment.

In Europe there is an old genus *Tritomurus* FRAUENFELD, 1845, revised by ABSOLON 1903. According to the illustration of the last author it has no lateral setae of dentes and I provide to place *missus* to this proup. It would have near relative in *Tritomurus falcifer* CASSAGNAU, 1958 of France.

In resume the nearctic species of *Tomoceridae* mentioned in Prof. CHRISTIANSEN's monograph may be regarded as follows:

Pogonognathellus: *bidentatus, celsus, dubius, elongatus, flavescens*
Tomocerus (s.str.): *minor, vulgaris*
Tomocerus (*Tomocerina*): *teres*?, *lamelliferus, curtus*
Plutomurus: *californicus, brevimucronatus, wilkeyi*
Tomolonus: *reductus*
Tritomurus: *missus*

Addendum B

Through frienship of Dr. G. F. GROSS of the South Australian Museum I was able to investigate four slides of *Tomocerus tasmanicus* WOMERSLEY, 1935 preserved in the Museum. To my great astonishment it is a good species not comparable to any forms of the northern hemisphere. Close studies indicate it to be included in the genus *Novacerus* SALMON, hitherto known only from New Zealand. The detailed description follows:

Novacerus tasmanicus (**WOMERSLEY**, 1935) comb. nov. fig. 29

Body length ca. 5 mm. Colour in mounted examples brownish yellow, it is "brownish, denuded of scales yellowish" according to WOMERSLEY. Antennae rather short, being 3.5 times the head in length and antennal ratio is as 25 : 40 : 60 : 35, so that ant. I and II are longer than usual. Ant. III and IV are described as annulated, but they are slightly corrugated in the preserved material. Heavy brownish scales of Tomocerid-type, but smaller in form are covering antennae from ant. I until a short before apex. Ant. I has two short hors dorsally at the distal end, while ant. II has two slender setae proximally (fig. B). These structures are visible in one example at hand and absent in an another one, so that they may be sexual characters. Eyes black, number of cornea not determined. Postantennal organ absent. Labral setae 4/5, 5, 4, with heavy sockets and labral margin with 4 recurving spinules. Maxillar head without prostheca. Legs elongate, large setae along hind margin of each tibiotarsus approximately as 6, 8, 8. Unguis very slender, a pair of basal pseudonychia almost lanceolate, with 1, 1, 1 cuspidate inner tooth. Unguiculus is also slender, acutely acuminate to a needle, not surpassing

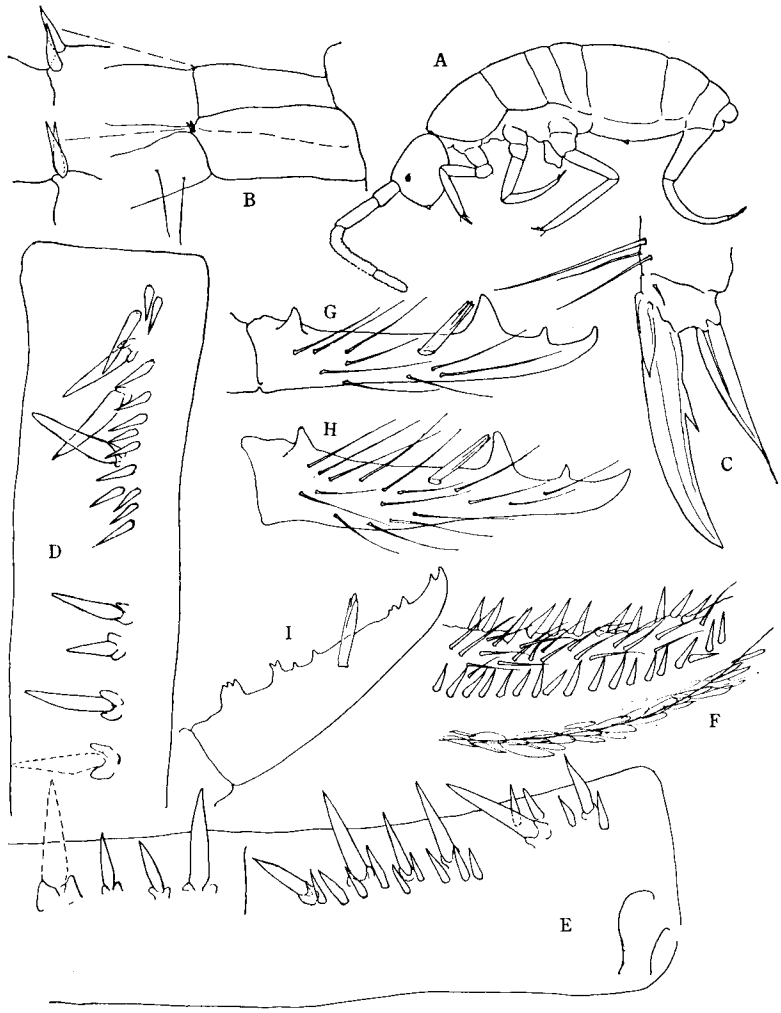

Fig. 29. *Novacerus tasmanicus* (Womersley)

A: Habitus, B: Spines upon ant. I, C: Hind-claw, D, D: Dental spines (dorsal and lateral view), F: Lateral rows of spiny setae from distal part of dentes, G, H: Mucro, I: Aberrant form of mucro corresponding to Fig. 57–I of Womersley.

unguis and untoothed. Tenent hair always pointed, slender and accompanied by two smaller setae. Trochanteral organ reduced to 1, 1 setae. Ventral tube scaled and multisetaceous upon all parts. Lateral flap bearing some 3–4 thick, spiny setae beside usual small setae. Rami tenaculi quadridentate, corpus with more tha 4 feeble setae. Furca well developed, with ratio as 60 : 100 : 15. Manubrium

ventrally scaled, with a median furrow on distal two thirds. Lateral row of setae present. Dorsally it is scaled and with many long setae, none of which are, however, blunt on apex. Dentes tapering, ventrally scaled, dorsally without the pubescent, plumose setae, characteristic to other *Tomoceridae*. Instead, there are many straight, slightly ciliate and pointed setae. Both sides of the dentes are beset with many (more than 100 each) blunt, spiny setae (fig. F), stretching from the manubrial basal part to the mucronal end of the segment, becomming larger proximally on inner side. Dental spines simple, hyaline and arranged irregularly as **5**+12/**1**, 1–2, **2**, where smaller spines of the proximal part are inner lateral in position. These dental spines are seemingly not much different from the blunt spiny setae of distal parts. Dental lateral basal setae absent. Mucro is highly interesting in structure, although they are sometimes variable in details. Typically it has two distal teeth representing apical and anteapical tooth of *Entombrya*, but very often with the third tooth between them. Proximal lateral (outer) to the anteapical tooth there is a blunt, minutely compound spiny seta, corresponding to the basal spine of the Entomobryid mucro. One dorsal ledge is present and one unpaired basal tooth is situated upon it. Some additional intermittent teeth are often observed. Mucronal setae numerous. Chaetal arrangement unknown.

The species is so peculiar that it can not be included within *Tomocerus*. It may be comparable only to *Novacerus* SALMON 1942 (=*Neocerus* SALMON 1941) from New Zealand. His figure in *N. spinosus* (pl. 55, fig. 271–272) indicates clearly the affinity of *N. tasmanicus* with the typical form, which differs in having compound type of dental spines. It is thus assured that *Tomoceridae* is not restricted to the holarctic region.

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