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On Some Collembola of Japan and adjacent Countries II

Riozo Yosii

This is the random notes on Japanese collembolan species investigated by the author during these five years. Stretching from the cold northern temperate zone to the subtropical southern area Japanese archipelago possesses quite a diverged fauna of collembola. Further intensive survey is necessary until the real status of the country in collembolan zoogeography is established. Herety thanks are due to my colleagues and friends, who have furnished me the precious materials for study. Their names are mentioned in each places.

1. *Willemia japonica* sp. n.

Fig. 1

Manazuru, Pref. Kanagawa (12 ex. 10.III 1970, Ys)

Body length 0.6 mm, totally white. Antennae shorter than head. Ant. I, II with a row of setae, that of ant.I are 7 in number. Ant.III-organ is two minute sensillae broadly transverse in form, not exactly definable by the minute size. They are not concealed by the integument. Of two lateral sensillae, the inner one is straight,

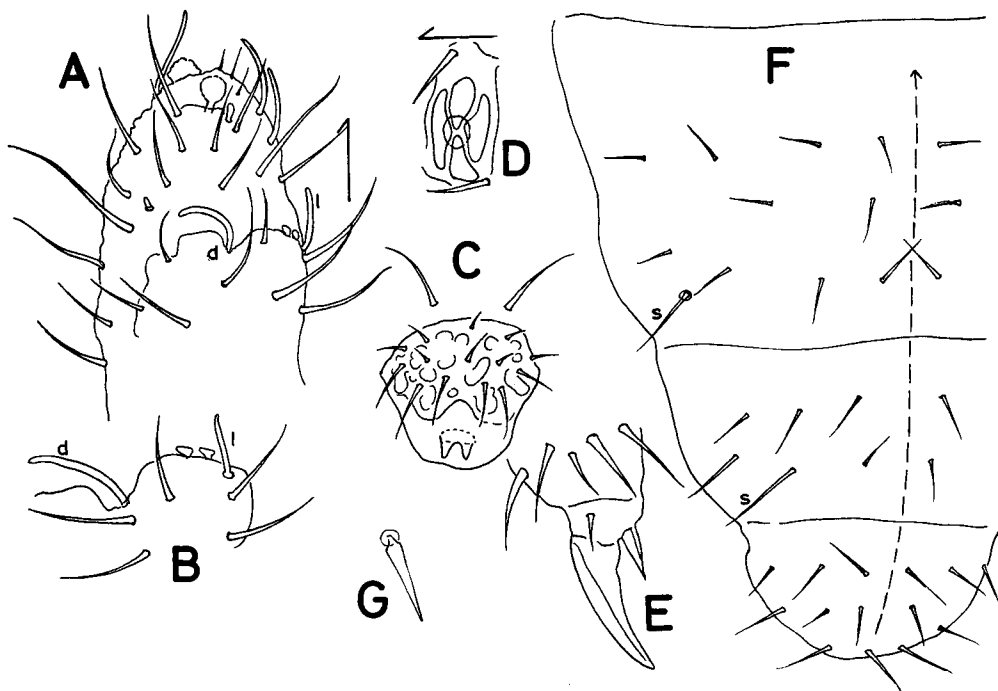


Fig. 1. *Willemia japonica* sp. n. A: distal part of antenna, B: ant.III-organ, C: labrum, D: postantennal organ, E: mid-claw, F: setae of abd.IV to VI, G: s.s. of abd.III.

dorsal one is longer and strongly inclined to the outer side. On ant.IV the subapical papilla is well developed, subspherical in appearance, but other sensillae are poorly differentiated and only two of them are to be detected on inner side. Eyes absent. Postantennal organ is always composed of 4 broad elements, they are not hidden in the fold, but bursting out from the integument. Labral setae as 2/5,5,4, the first and the second row minute, with a U-form ledge to separate the basal granular and distal smooth area as usual for *Hypogastruridae*. Labral margin has two prominent processes. Legs short, unguis untoothed, unguiculus is small, but not setaceous. Ventral tube with 4+4 setae. Furca quite absent. Abd.IV has no anal spines. Chaetal arrangement as in HÜTHER 1962, Fig. 1 and seta a-1 of th. III is located on the prozona of the segment. Abd.IV bears, however, 3 rows of setae, m-1 being present as in case of *W. intermedia* (l.c. Fig. 27). s. s. is p-4 on th.II to abd. IV and p-2 on abd.V. They are stouter than usual setae and lightly spiny, especially on abd.I,II and III.

Typus: 1 ex. from Manazuru.

The species is near *W. intermedia* MILLS, 1934 (sensu HÜTHER 1962) of Europe and USA by the form of postantennal organ and by the chaetotaxy of abd.IV. But it is readily distinguished by the absence of anal spines as well as by the form of subapical sensory element of ant. IV.

2. *Anurida* (*Aphoromma*) *okamotoi* sp. n.

Fig. 2

Rashomon-daiichi-do Cave, Pref. Okayama (1 ex. 9.VI 1968, T. OKAMOTO),
Nooraku-daini-do Cave, Pref. Okayama (6 ex. 5.V 1969, T. OKAMOTO)

Body length 3.5 mm, white. ant./head as 45/50, ant. segm. ratio as 40 : 40 : 90, the last two segments totally fused. Ant.IV with 3 large apical bulbs and ca.20 blunt, curving sensory rods, the majority of them are concentrated to the outer distal part of the segment. Ant.III-organ is two small rods without sensory groove. Postantennal organ is round, composed of 25 peripheral and ca.5 central elements. Labral setae as in other species of *Aphoromma* in number and arrangement (cf. YOSII 1966, p. 547, Fig.2B). Mandible has 2-3 obscure intermittent teeth between the apical and the basal tooth, the former is accompanied by a few toothlets. Maxilla elongate, the shaft is tridentate distally and provided with two lamellae, the outer one is long, surpassing the shaft, the inner one small, not reaching the apex of the shaft. Both of them are densely fringed. Unguis large, without dorsal nor lateral teeth, but with one inner tooth. Inner side of the unguis is uniformly granulate throughout. No tenent hairs. Ventral tube with 6+6 setae. Furcal rest is poorly developed, consisting of a pair of obscure swelling with one seta on each of them. Male genital field semicircular, with some 15 setae. In the chaetal arrangement of the body the species is alike *A. assimilis* YOSII, 1956. On the head 3+3 dorsal and 1+1 lateral setae are strongly developed and symmetrically arranged, but small setae are rather irregular. On th. I small setae of the dorsal group are irregularly situated, but distally from th.II all setae are typically arranged as in fig.J, where on abd.III p₁-seta is very strong, as large as p₁ of other abdominal segments. p₂ is small, while p₃ is moderately developed. Abd.VI is not round but rather truncate posteriorly.

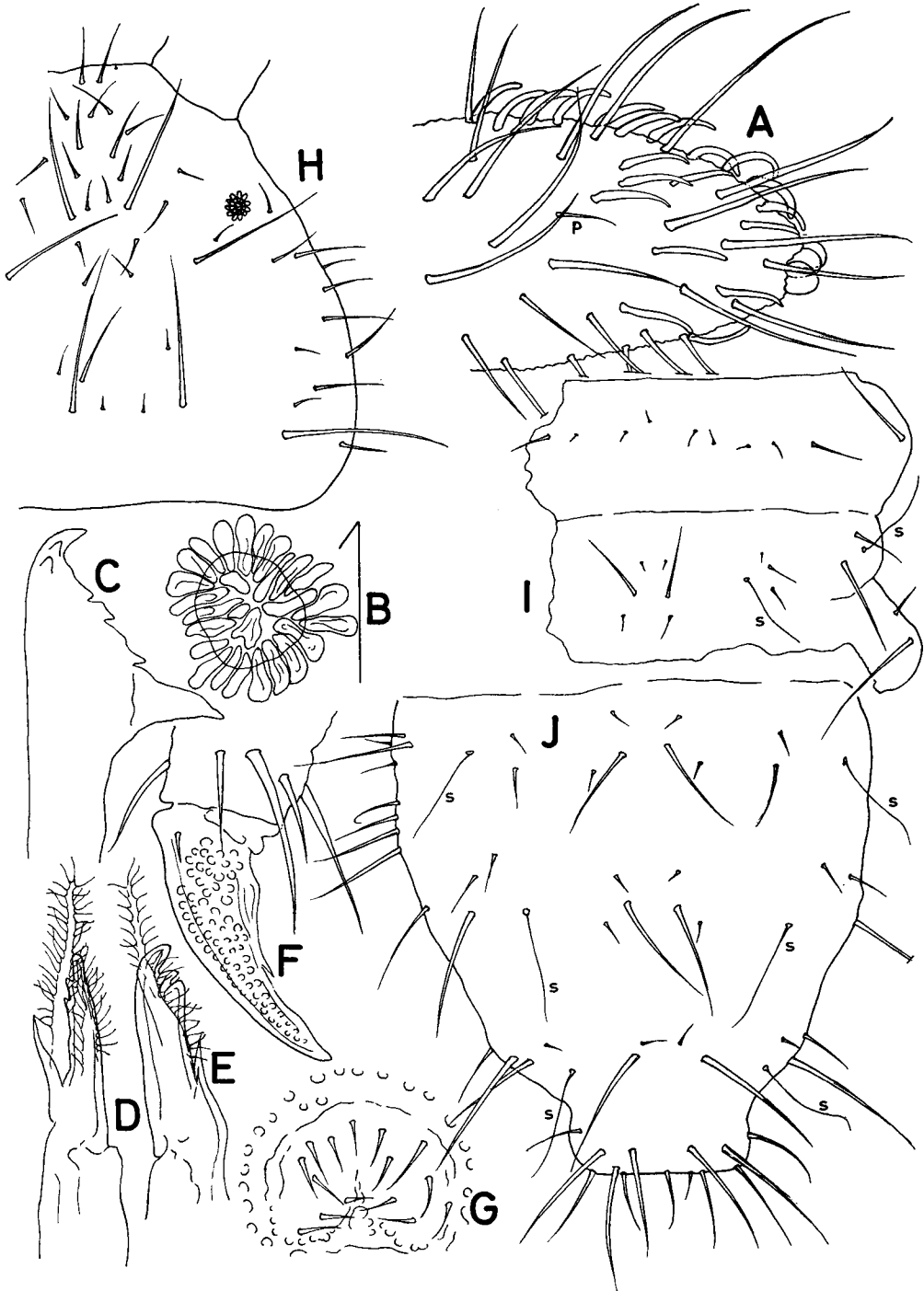


Fig. 2. *Anurida okamotoi* sp. n. A: ant. IV, B: postantennal organ, C: mandible, D, E: maxilla, F: hind-claw, G: male genital orifice, H: chaetal arrangement of head, I: ditto of th. I, II, J: ditto of abd. IV to VI.

Typus: 1 ex. from Rashomon-daiichi-do Cave.

The species is very near *A. assimilis persimilis* YOSII, 1956 in the chaetotaxy of the body. But p_1 of abd.III is more developed than in the cited form. Furthermore, the mandible bears quite a different form. The species is dedicated to Mr. T. OKAMOTO of the Niimi High School, the first discoverer of this remarkable species from the Okayama-Atetsu Karst.

3. *Anurida (Aphoromma) iriei* sp. n. Fig. 3

Yayamadake-no-tateana Cave (4 ex. 26. XI 1967, T. IRIE), Tsubaki-koana Cave, Izumimura, Yatsushirogun, Pref. Kumamoto (3 ex. 18. II 1967, T. IRIE)

Body length up to 4.0 mm. Totally white. Ant./head as 1/1. Ant. III,IV dorsally confluent. Ant. IV with 3 large apical bulbs and 7 sensory setae, latter are not much modified. Ant. III-organ is composed of two thick rods with d and v-seta. Postantennal organ is composed of ca. 30 central and 30 peripheral elements clustered in a circle. No eyes. Buccal cone low, labrum verrucose and with long setae arranged as 2/2,3,3, 2,2, labral margin without structures. Mandible with 3 apical and 3 large subsequent teeth, the third tooth is usually with fine ciliation. Maxilla elongate, the main shaft is bidentate apically, the inner lamella is short and finely fringed. From two outer lamellae the larger one is surpassing the apex by far and densely fringed, the other is very short, tail-like, poorly ciliated on one side and shorter than the shaft. This maxillar structure is almost equal with that of *A. plurichaetotica* YOSII, 1966 of Korean caves. Unguis laterally with broad lamellae, with or without a inner tooth and its basis is granular. Ventral tube with 4+4 setae. Furcal rest is a pair of small round tubercles having one seta to each. Body setae are simple. s.s. are slender. Large setae of head is 1+1 on *area frontalis* and 2+2 on *area occipitalis*, but all of them are not very long. Upon trunk p_1 of abd.I-IV are dislocated proximally, anterior to p_2 , so that setae are apparently in three rows. Chaetal arrangement of abd.V is very unique with a small a_1 located between large p_1 .

Typus: one female from Yayamadake-no-tateana Cave.

This is the first finding of cavernicolous species of *Anurida* from Kyushu. In the chaetal arrangement the new species is near *A. diabolica* YOSII, 1956 from the Ryomen-no-iwaya Cave, Pref. Gifu, but readily separated by the a_1 of abd. V being small. The species is dedicated to the speobiologist Mr. TERUO IRIE of the Seiseiko High School of Kumamoto, the discoverer of this species.

Lethemurus g. n.

Tomoceridae without eyes. Trochanteral organ present on trochanter and femur. Male genital orifice is surrounded with many minute setulae as represented in YOSII, 1968, Fig. 28, J, for *Tritomurus missus* MILLS, 1948.

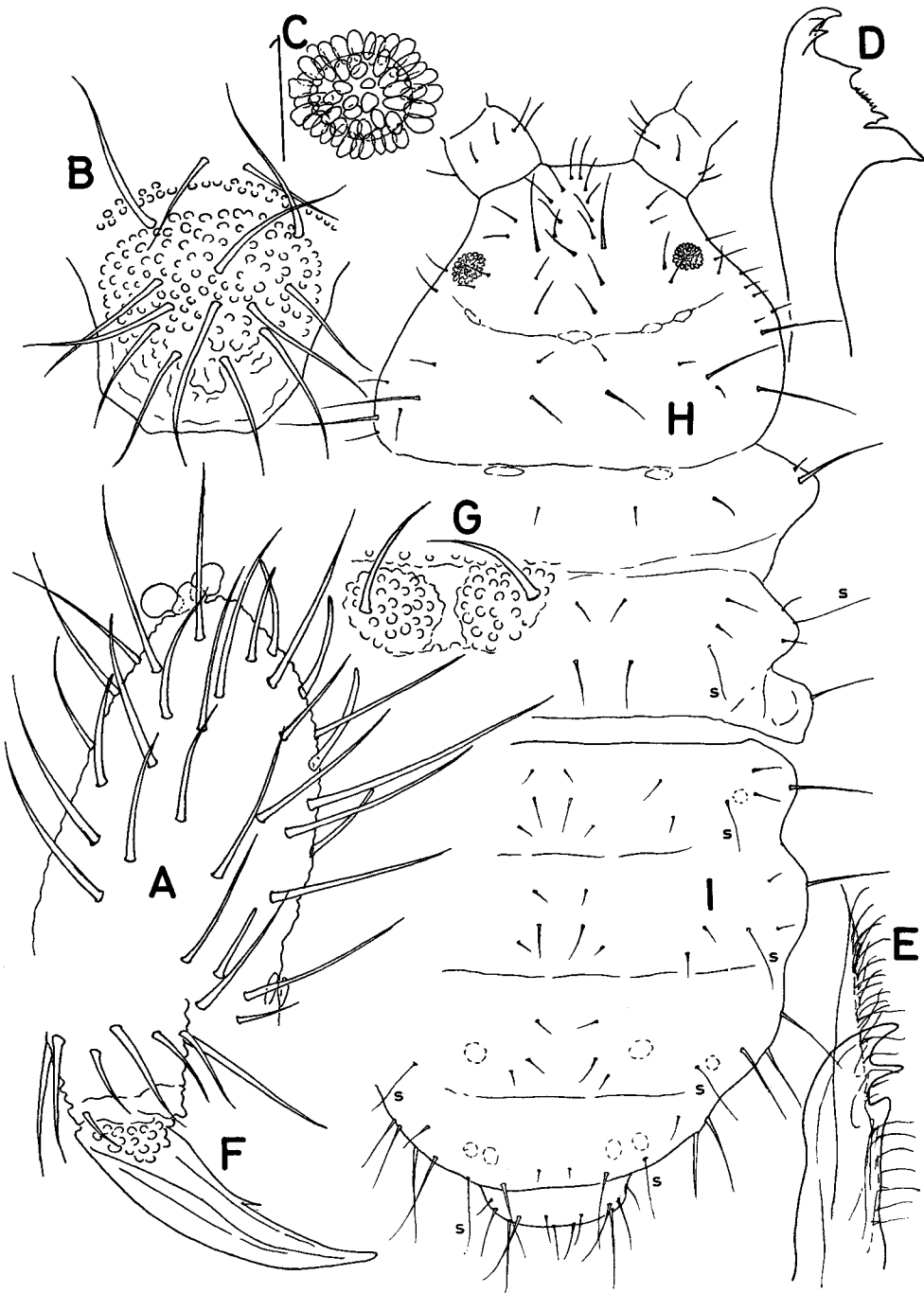


Fig. 3. *Anurida iriei* sp. n. A: ant. IV, B: labrum, C: postantennal organ, D: mandible, E: maxilla, F: mid-claw, G: furcal rest, H: chaetal arrangement of head and th. I, II, I: ditto of abd. II to VI.

Genotypical species: *Tritomurus missus* MILLS, 1948

The genus is near *Tritomurus* FRAUENFELD 1845 of Europe, but different by the feature of the male genital orifice and by the presence of trochanteral organ. It is represented by two troglobiont species of Japan and USA.

4. *Lethemurus finitimus* sp. n.

Fig. 4

Nakatonbetsu Cave, Hokkaido (1 male, 4. VI 1969, Explorer's Club of the Hokkaido University)

Body length 2.0 mm. Colour almost white, slightly gray by the punctate black pigments all over the trunk. Antennae and other extremities quite pale. Antennae are mutilated, only 3 segments on one side and 2 on the other. They are, however, seemingly not very long. Eyes and eye-pigments are quite absent. Postantennal organ is not observed. Labrum remarkably with setae as 8/5,5,4, and with 4 marginal

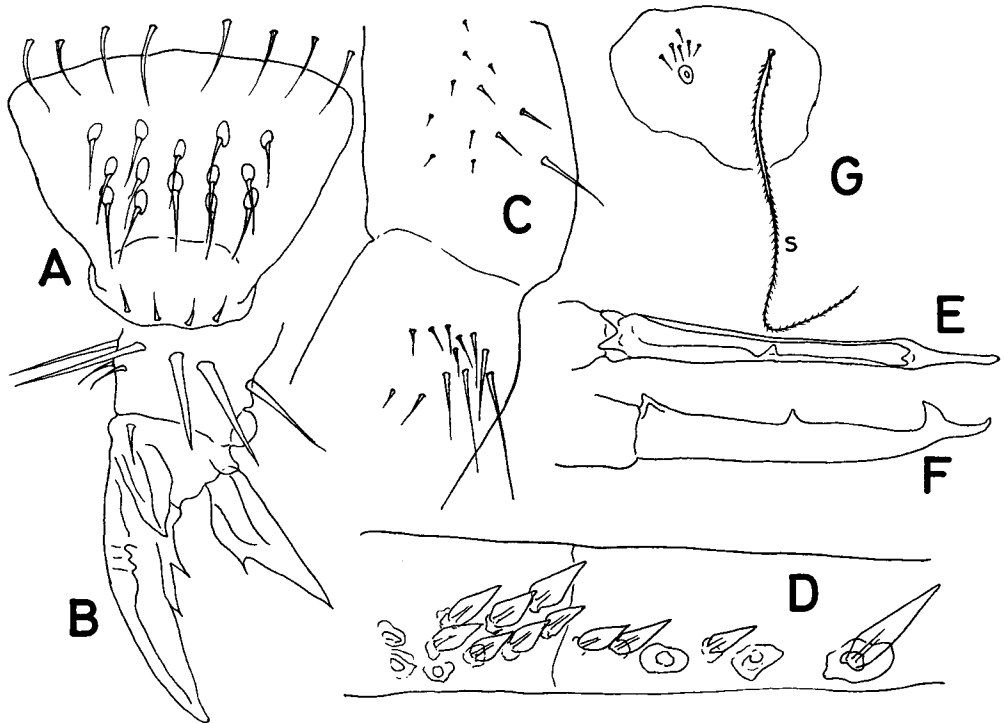


Fig. 4. *Lethemurus finitimus* g. n. sp. n. A: labrum, B: hind-claw, C: trochanteral organ, D: dental spines, E; F: mucro (dorsal and lateral view), G: s.s. and basis of a large seta laterally to abd.III.

spinules. Legs slender, unguis and unguiculus are broad, the former has 2-3 inner teeth near the basis, the latter is with one inner tooth. Pseudonychium well represented. Tenent hair is short and spiny on all legs, there seems to exist more than two such spiny tenent hairs and some small setae on each leg. Tibiotarsus bears no blunt setae, but the hind legs bear two unusually large setae on the posterior side. Trochanteral organ is present on trochanter and femur, in the former it consists of 4 spiny and some 7 minute setae, while in the latter it is an irregular assembly of about 8 setae, some of them are very long. Furca in ratio as 60 : 110 : 35. Manubrium is ventrally scaled, laterally with 6+6 lateral setae and dorsally without scales between the setaceous stripes of each side. No principal setae are observed. Dentis is without trace of large lateral setae of *Plutomurus*. Dental spines are smooth, hyaline 10/2, I, 1, I on one side and 10/2, I, 1, II on the other. Mucro elongate, with 2 slender apical, 1 intermittent and 2 basal teeth. The apical tooth elongate, the antepical one recurving, the intermittent one at about the middle and two basal teeth are subequal and without a corner toothlet. Dorsally observed, two mucronal lamellae are running from the antepical tooth to the basis, the outer lamella has an intermittent tooth and ending to the inner basal tooth, while the inner lamella is ending freely to the inner side of the basis. Integument is weakly chitinized, scales are hyaline, larger body setae are ciliate and with 3-6 minute setulae around their basis. s.s. is without such basal setulae, they are rather short and lightly thick near the basis.

Typus: 1 male of Nakatonbetsu Cave.

By the presence of trochanteral organ, by the absence of outer lateral setae of dentis as well as by its broad unguis, the species is the near relative of *Tritomurus missus* (MILLS) reviewed in YOSII, 1967, from which it is divided by the unusual number of prelabral setae. The occurrence of this genus from a Hokkaido cave is very interesting from the biogeographical point of view, because only the genus *Plutomurus* is hitherto found in the caves of Japanese main islands.

5. *Plutomurus gul* (YOSII, 1966)

Fujindo Cave (4 ex. 23.X 1966, T. IRIE), Tsubaki-daiichi-do Cave, Shimomasukigun, Pref. Kumamoto (5 ex. 19. VI 1967, T. IRIE)

The species is described from the caves of southern Korea to which Japanese examples coincide very well. In Kyushu considerable number of caves of various districts have been already exploited. In almost all of them the genus *Plutomurus* has its representatives, but it is only in the caves around the city Tomochi, southeast of Kumamoto, in which *Pl. gul* is to be found.

Distr.: Korea, Japan (nov)

6. *Oncopodura crassicornis* SHOEBOOTHAM, 1911

Fig. 5

STACH 1919, DENIS 1932

Asakawa Forest, Tokyo (13 ex. 13.VIII 1966, K. NIJIMA)

Body length 0.6 mm, white. Antennae relatively short. ant./head as 14/13. ant. segm. ratio as 2 : 3 : 4 : 5. Antennae unscaled, ant. IV without end-bulbs, but with

a longitudinal row of 4 small round sensillae. Some setae are curving and sensilla-like. Ant.III-organ is two large corrugate rods standing side by side. An another smooth rod is located proximal to them. Some slender sensory setae may be observed. Ant. II-organ is one corrugate sensilla outer-ventral in position. An another small rod may be present ventral to the segment. Eyes absent. Postantennal organ small, laterally situated, composed of 6 elements in a rosette around the round central circle. Labral setae as 4/4,1,4,5, this unusual number is caused by the distal location of the median seta of the first and second row of setae. Prelabral setae smooth. All labral setae with heavy sockets and labral margin has 1+1 small tubercles. Head capsule dorsally with feeble, smooth setae near the antennal basis, ventrally without foliaceous modified setae (cf. *O. indica* YOSII, 1966). Unguis and unguiculus broad, untoothed, without basal process. A pair of empodial setae are well developed and long. Tenent hair

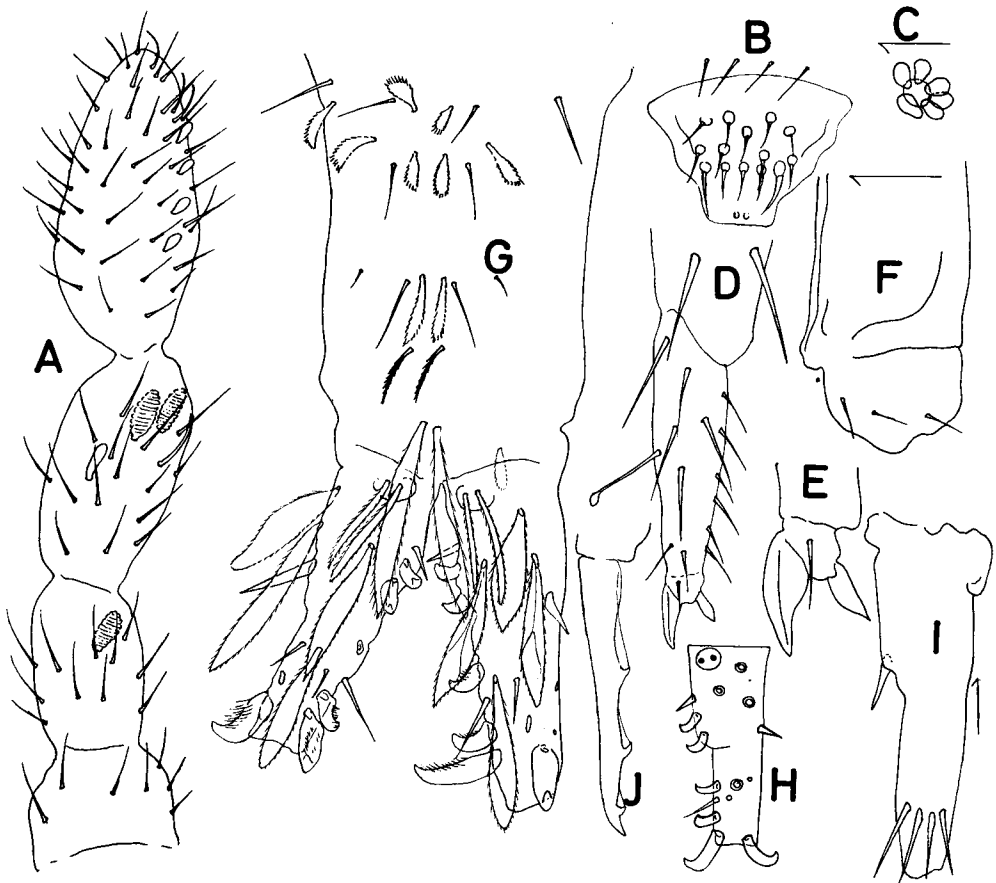


Fig. 5. *Oncopodura crassicornis* SHOEBOTHAM from Tokyo A: antenna, B: labrum, C: postantennal organ, D: mid-leg, E: mid-claw, F: ventral tube (lat. view), G: manubrium and dentes (dorsal view), H: dental chaetotaxy in diagram, I: dentes (ventral view), J: mucro (lat. view).

feebly present and blunt on apex, but in some examples it is not different from usual ones. On mid-legs tibiotarsal dorsal appendix is well developed and clubbed distally. No trochanteral organ. No smooth seta opposite to the tenent hair in hind-legs. Ventral tube without lateral swelling, both anterior and posterior faces without setae. Lateral flap bears 3 setae each. Rami tenaculi quadridentate, corpus without seta. Furca short, man.:d.:mu. as 15 : 10 : 9. Manubrium ventrally only with many hyaline scales, dorsally with small spiny and barbed scaly setae arranged symmetrically as in fig.G. A pair of terminal scaly setae are hyaline, then follows a pair of strong setae, barbed to all sides. Dentes broad, converging suddenly at the middle. Dental spines are all feebly chitinized, curving and lightly ciliate in large magnification. They are 2 on outer and 6 on inner side, the most distal one is the largest and the most proximal one is a simple straight spine. Besides the dorsal side is beset with many scaly setae: the basal swelling bears two long, scaly setae barbed to all sides. Four large scaly setae are very long and ciliate except for a hyaline broad one outer basal in position. Three smooth small setae are present on distal half. Ventrally the dentes are covered with peculiar scales, they are boat or spoon shaped, enlarged at about the basal half. There are also 4 insignificant setae in a transverse row near the distal end. Mucro is narrow, elongate, with 4 recurving teeth situated on one common dorsal ridge. With the exception of an apical tooth all of them are lamellate on proximal side. Body covered with scales and achaetotic. Upon abd.V and VI there are both smooth and strongly barbed clavate setae. Abd.III is longer than abd.IV.

Compared with the detailed description of STACH 1919 of this species from Poland our examples have some differences in the chaetal arrangement of manubrium and dentes. However, these setae are especially brittle and the real profile is to be obtained only by the montage of many examples. Only in favourable case all of them are observed in a right position. So I regard them conspecific with the European *O. crassicornis*.

Distribution: Europe (England, France, Poland, Switzerland etc.), North Africa, Japan (nov).

7. *Sminthurides aquaticus* (BOURLET, 1843)

UCHIDA 1937, YOSHII 1954.

Midoro-ike, Kyoto (many ex. 20. III 1966 Ys), Hana-no-tera, Kyoto (many ex. 21. III 1966 Ys), Kitashirakawa, Kyoto (many ex. 18. IV 1957, Ys), Hirosawa-ike, Kyoto (many ex. 10. IV 1969 Ys), Shibu-ike and 48-ike, Shigakogen, Pref. Nagano (many ex. 6. VII 1957, Ys), Ozegahara, Pref. Gumma (5 ex. 7. IX 1952, Ys)

The species is very abundant around Kyoto in spring.

Distribution: cosmopolitan

8. *Sminthurides malmgreni* (TULLBERG, 1876)

Kumogahata, Kyoto (3 ex. 30. IV 1966, Ys)

Distribution: Europe, Siberia, Japan (nov.), USA

9. *Sminthurides potamobius* sp. n.

Fig. 6, 7

Mizoro-ike, Kyoto (1♀, 22. III 1966, Ys), do (3♂, 2♀, 25. IV 1966, Ys)

Female: Body length up to 0.6 mm. Colour pale, with a purplish patch laterally around the large abdominal part and on coxal basis. Antennae reddish violet, other extremities pale. ant./head as 8/5. ant. segm. ratio as 5 : 6 : 12 : 20. Ant.IV is composed of 4 subsegments, the basal one is about one half of the segment. Two intermittent segments have a whorl of setae and 3-4 slender sensillae. Ant.III-organ normal, composed of two rods. Eyes 8+8, black. No facial setae are modified, they are all small and simple. Labral setae 6/5,5,4, labral margin with 4 longitudinal incisions. On fore- and mid-legs unguis is very slender, with an obscure inner tooth and with a faint dorsal pseudonychium. Unguiculus is also narrow, half the length of unguis and its axial seta is surpassing the apex of unguis. On hind-legs unguis is shorter, the dorsal pseudonychium is developed and its margins are minutely ciliate, unguiculus is broadly foliaceous, rounded and its axial seta is extending beyond the unguis. Tibiotarsal organ alike to *S. aquaticus*, the principal seta is not forked, but alate on one side. Ventral tube with 1+1 setae, terminally 3+3 or 5+5 diverticulae are present. Anterior corpus of tenaculum with two long medial and one small apical seta. Rami tridentate and with a basal papilla. Furca well developed, with relative length as 10 : 20 : 8. Manubrium ventrally nude, dorsally with 8+8 setae. Dentis is minutely crenulate on distal half, dorsally with about 35 simple setae from which 4 inner distal ones are strong. Ventrally the setae are arranged in 3 longitudinal rows, with 8 median, 2 inner and 4 outer setae. Mucro is typically beset with 3 lamellae as in *aquaticus*, but the incisions are smaller and fewer in number. Ventral lamella is also incised. One small outer mucronal seta is present. Integument is finely granulate. Body setae are all slender, small and simple. Upon upper anal flap setae are arranged as 6,3,3, the second row large. Anterior to the flap there are 9 setae in one row and the median, second and the fourth seta of them are much larger than others (equal in *S. aquaticus*). Lateral flap bears 1+1 small spinose seta with a broad socket, corresponding to Fig. 2 E of *Sm. monnioti* MASSOUD et BETSCH, 1966, which is absent in *S. aquaticus*.

Male: Body length up to 0.3 mm. Colour pattern same as in female. Crasping organ of antennae conspicuous (cf. MASS, et BETSCH, 1966 for the nomenclature of each setae). Both ant.II and III are without trichobothrium, but some setae are converted to long, blunt sensory ones. On ant.II b-1, b-5, are distinctly barbed, b-2, b-3 present but b-4 and b-6 are absent. B-1 is a strong ciliate seta. On ant.III c-3 is long, striate and acute, while c-1 is capitate and apically ciliate. Small c-2 is at the basis of c-3 and smooth. Two minute setae are placed near c-3. Ant.IV is not subsegmented, with some rows of long sensory setae. No modified setae on vertex and frons. Unguis and unguiculus alike to females, but the former is without inner tooth and without pseudonychium. Tibiotarsal organ of hind legs present, but the guard seta is simple and not winged. Metanotal swelling large. All of the body setae are not modified. Furca alike to females, the mucro having no sexual difference at all.

Typus: 1 male from Mizoro-ike

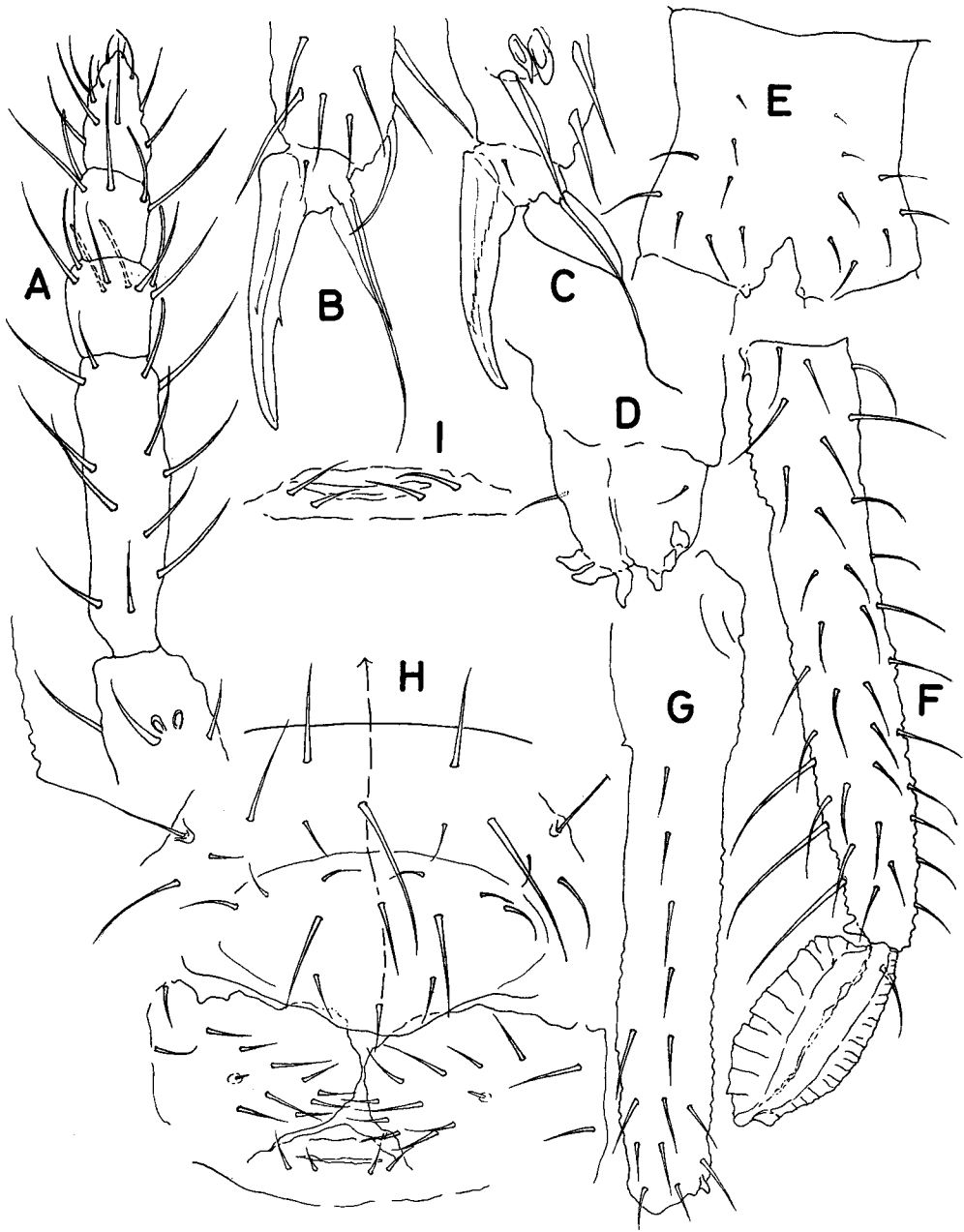


Fig. 6. *Sminthurides potamobius* sp. n. A: ant. IV and ant. III-organ, B: mid-claw, C: hind-claw, D: ventral tube, E, F: manubrium, dentes and mucro (dorsal view), G: dentes (ventral view), I: anal orifice, J: genital orifice, (all females).

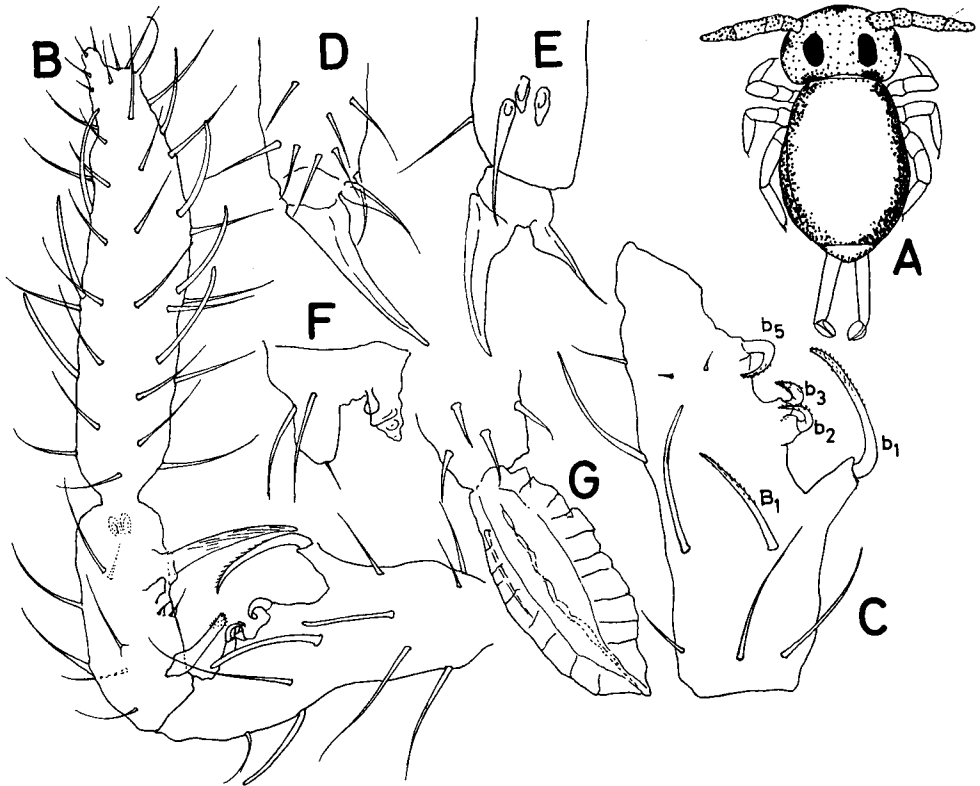


Fig. 7. *Sminthurides potamobius* sp. n. continued: A: habitus, B: antenna, C: ant. II, D: fore-claw, E: hind-claw, F: tenaculum, G: mucro (A female, B-G all males).

In the body pattern the species is alike *S. malmgreni* (TULLBERG), but ant. IV of female is distinctly divided into 4 subsegments. The presence of small diverticula of ventral tube in female is very striking. Specimens are collected from the water surface in a *Sphagnum* bog of a marshy pond together with many *S. aquaticus*.

10. *Sminthurides biwae* sp. n.

Fig. 8

Shore of Lake Biwa, Fujigasaki, Pref. Shiga (many ex. in copula, 23.VIII 1967, Ys)

Female: Body length 0.5 mm, Colour uniformly pale violet, dorsally deeper pigmented and lightly mottled without forming bands. Antennae and legs lighter. ant./head as 32/23. ant. segm. ratio as 7 : 9 : 18 : 30. Ant. IV is divided into 4 subsegments, the basal one is about a half of all of them. Eyes black, without vertical tubercles. Labral margin with 4 incisions. Unguis is slender in fore- and mid-legs, not much so on hind-legs, without inner tooth and without tunica. Unguiculus is narrow on fore- and mid-legs and broadly foliaceous on hind-legs, the axial seta is long, surpassing the unguis. Tibiotarsal organ of hind-legs conspicuous, the guard seta is winged on one side, with

one or rarely two teeth. Distal part of the ventral tube is bifurcate, each arm is provided with 4 round tubercles. Rami tenaculi tridentate, with one basal papilla. Corpus anteriores with 3 setae of equal length. Furca well developed and in ratio as 15 : 35 : 15. Distal end of manubrium with 1+1 small tubercles dorsally on inner side. Dentes with many setae dorsally, ventral setae as outer 4, median 7 and inner 2. Mucro with 3 broad wings, all of them are lamellate, with ca. 10 teeth. One outer seta is present.

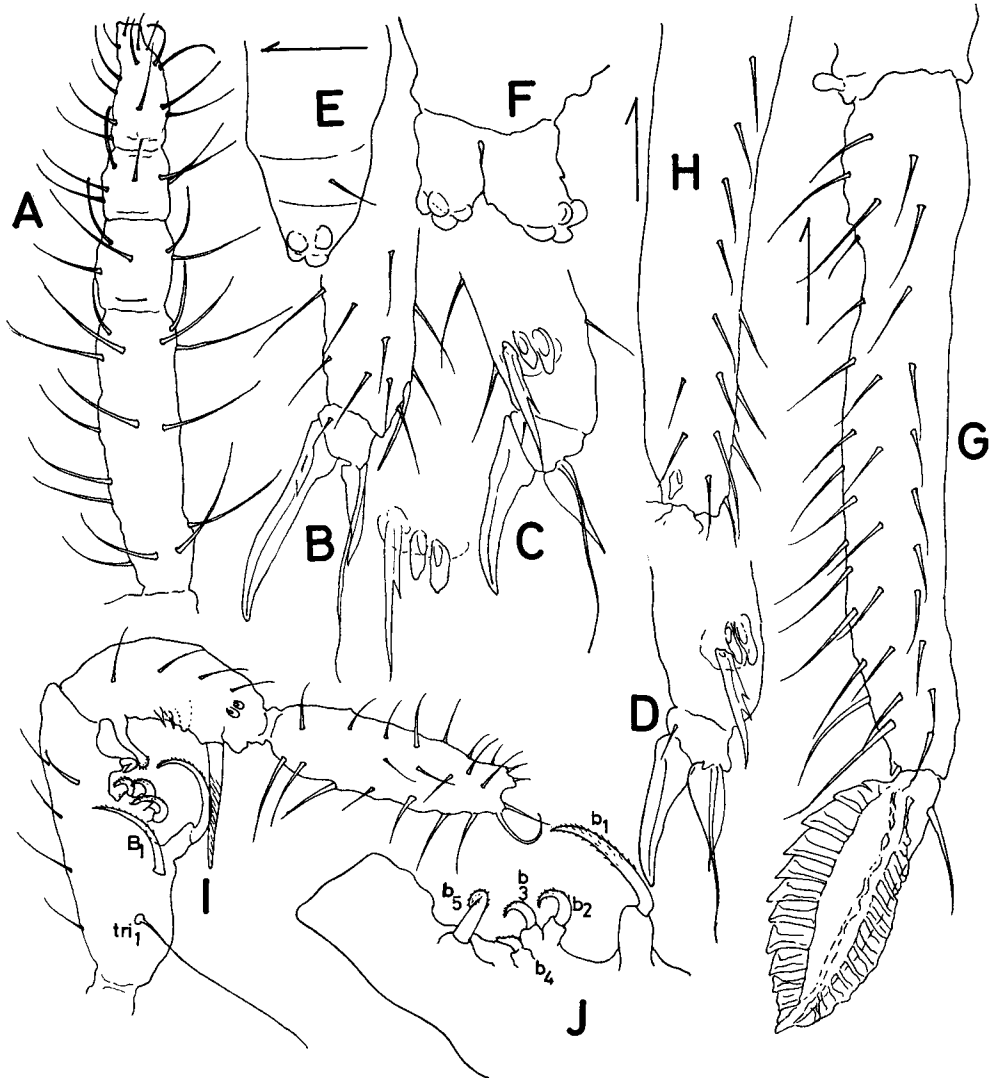


Fig. 8. *Sminthurides biwae* sp. n. A: ant. IV, B: fore-claw, C, D: hind-claw, E, F: ventral tube (lateral and posterior view), G: dentes and mucro (dorsal), H: dentes (ventral view), I: ant. II to IV, J: ant. II, (A-H females, I, J males).

All of the cephalic and dorsal setae of the trunk are not modified. s.s. are 3+3 anteriorly and 1+1 on genital segment. Besides a pair of small s.s with broad socket is present lateral to the upper anal flap.

Male: Body length ca. 0.3 mm. Colour pale, more or less brownish than in female. Antennae with prominent crasping organ. On ant.II b-1 and b-5 are large, b-2, b-3 and b-4 are well represented. B-1 ciliate. Tri-1 present. On ant.III c-1 and c-3 well developed. c-1 ciliate on apex. c-3 striate. c-2 is accompanied by some 3 minute setae and smooth. Ant.IV with a subapical swelling. Some of the setae are recurving. Ventral tube without diverticles. Guard seta of tibiotarsal organ is forked as in females. Mucro equal to females.

Typus: one male from Fujigasaki

The species is, without doubt, a member of the *assimilis*-group and characterized by the tubercles of the ventral tube as well as by the guard seta of the tibiotarsal organ. The female in copula with male is, as already known, not yet full mature. In such a juvenile female ant.IV is not subsegmented. In the structure of ventral tube it is near *S. potamobius* sp. n., but different in body pattern, form of guard seta of hind-legs and by the absence of sensillate setae on ant.II of male.

11. *Arrhopalites octacanthus* sp. n.

Fig. 9

Yoshino, Pref. Nara (2 ex. 7.VIII 1962, G. IMADATE), Seto, Pref. Wakayama (3 ex. 14.IV 1970, K. SAWADA), Daimonji, Kyoto (4 ex. 17. II 1966, Ys), Zenzyokutsu Cave, Pref. Tokushima (1 ex. 10.VI 1967, M. YOSHIDA), Shigakogen, Pref. Nagano (4 ex. 14.VIII 1964, Ys).

Body length 0.8 mm. in female. Colour brownish all over, strongly mottled. Extremities are pale. ant./head as 17/10. ant. segm. ratio as 2 : 4 : 6 : 13. Ant.IV is divided into 7 subsegments. Ant.III-organ is two short rods. Basal tubercle of the segment is rounded and conspicuous. Labrum with setae as 6/5,5,4, without marginal structures. Eyes 1+1, poorly reddish brown. 4+4 setae of the vertex are spiny, very prominent, but other vertical setae are normal or only slightly thick. 3+3 setae from the anterior dorsum of the trunk are also thicker. In fore-legs unguis is slender, not tunicate and without inner tooth, but with a pair of faint dorsal teeth. Its unguiculus is slender, surpassing the unguis by the elongate axial seta. On mid- and hind-legs the unguis is broad, with one inner tooth and with a prominent dorsal tunica. Their unguiculus is also shorter, broader and the axial seta is as long as the unguis. Rami tenaculi tridentate, with a digital basal process. Furca in ratio as 10 : 11 : 4, manubrium dorsally with 4+4 feeble setae and ventrally without setae. Dentes with setae as in Fig. F. The distal 3 setae of the outer row (e_{1-3}) and all 3 setae of the inner row are all converted to spines. Ventral setae as 3,2,1.....1. Mucro elongate, apically with a round robe and both sides are irregularly denticulate with about 20 teeth. Basal pseudonychium present. Anal segment as in fig.I, anal setae are not forked nor feathered. Appendix analis is relatively short, broadly flattened and finely fringed distally.

Typus: 1 female from Yoshino, Pref. Nara.

The species is characteristic by the spiny setae on vertex. It is this species which I have once reported as *A. binoculatus* from Ozè, Pref. Gumma in 1954 (cf. STACH, 1956, p.82). The species is near *A. principalis* STACH, 1945 of Europe, but appendix analis is not split in two branches and all three distal setae of the outer side of dentes are spiny. According to GISTIN 1947, p.88, Fig.2, *A. principalis* has the median anal seta (a_0) distally forked. If it is really so, then the cited species is more nearly related to *A. habei* YOSHII, 1956 than to this species.

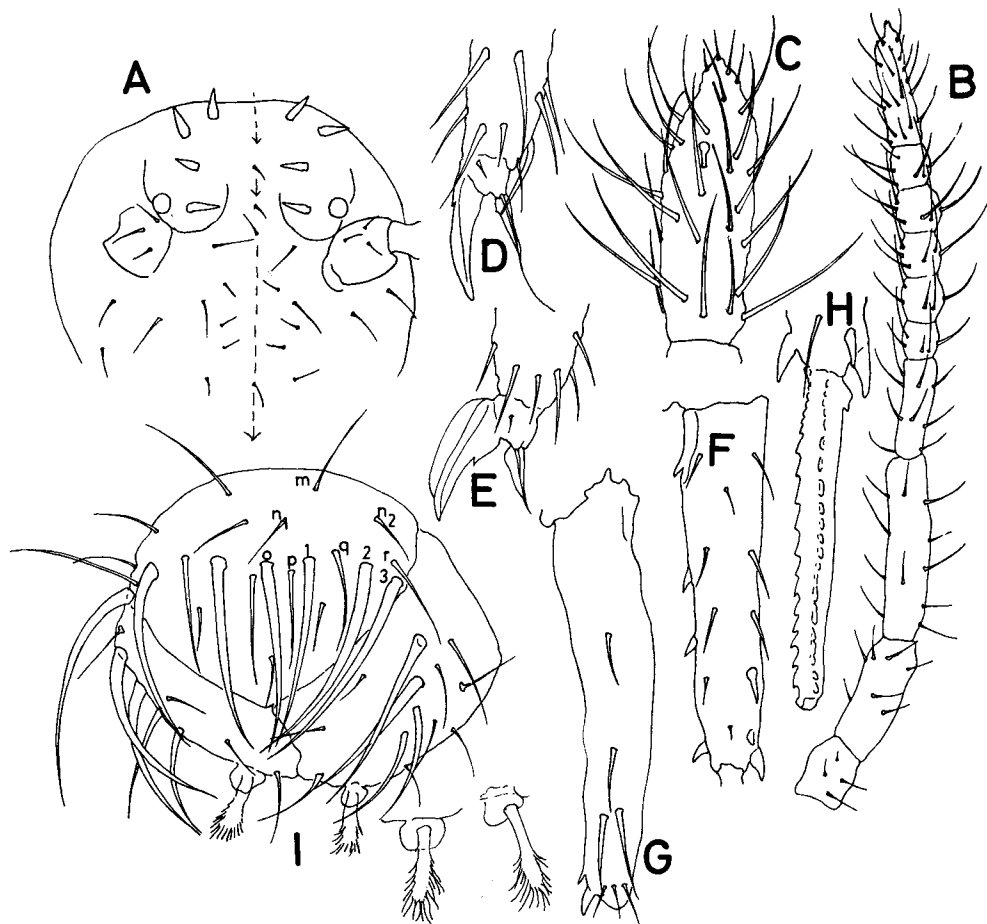


Fig. 9. *Arrhopalites octacanthus* sp. n. A: head, B: antenna, C: ant. IV, D: fore-claw, E: hind-claw, F, G: dentes (dorsal and ventral view), H: mucro, I: anal orifice and app. anaes.

12. *Arrhopalites alticolus* sp. n.

Fig. 10

Shigakogen, Pref. Nagano (5 ex. 14.VIII 1967, Ys)

In female body length 0.7 mm. Colour light gray, slightly dark on posterior half of abdomen leaving the pale median stripe of the dorsum. Eyes intensely black.

ant./head as 2/1. ant. segm. ratio as 2 : 4 : 6 : 13. Ant.III has a slight swelling on distal half. Ant.III-organ is two rods. Ant.IV is divided into 5 subsegments, with verticillating long setae and some slender sensory ones. The distal subsegment is beset with one long, incurving seta and one short, blunt seta. On the head no vertical seta is modified, all of them are small. Eyes 1+1, intensely pigmented and its black colour retains long in alcohol. Labral setae as 6/5,5,4, lateral pair of the second row is distally dislocated, near the third row. Labral margin without structures. Unguis with one inner tooth, usually without tunica in fore-legs and with a slight tunica on other legs. Unguiculus setaceous, surpassing unguis on fore- and mid-legs, shorter than that on

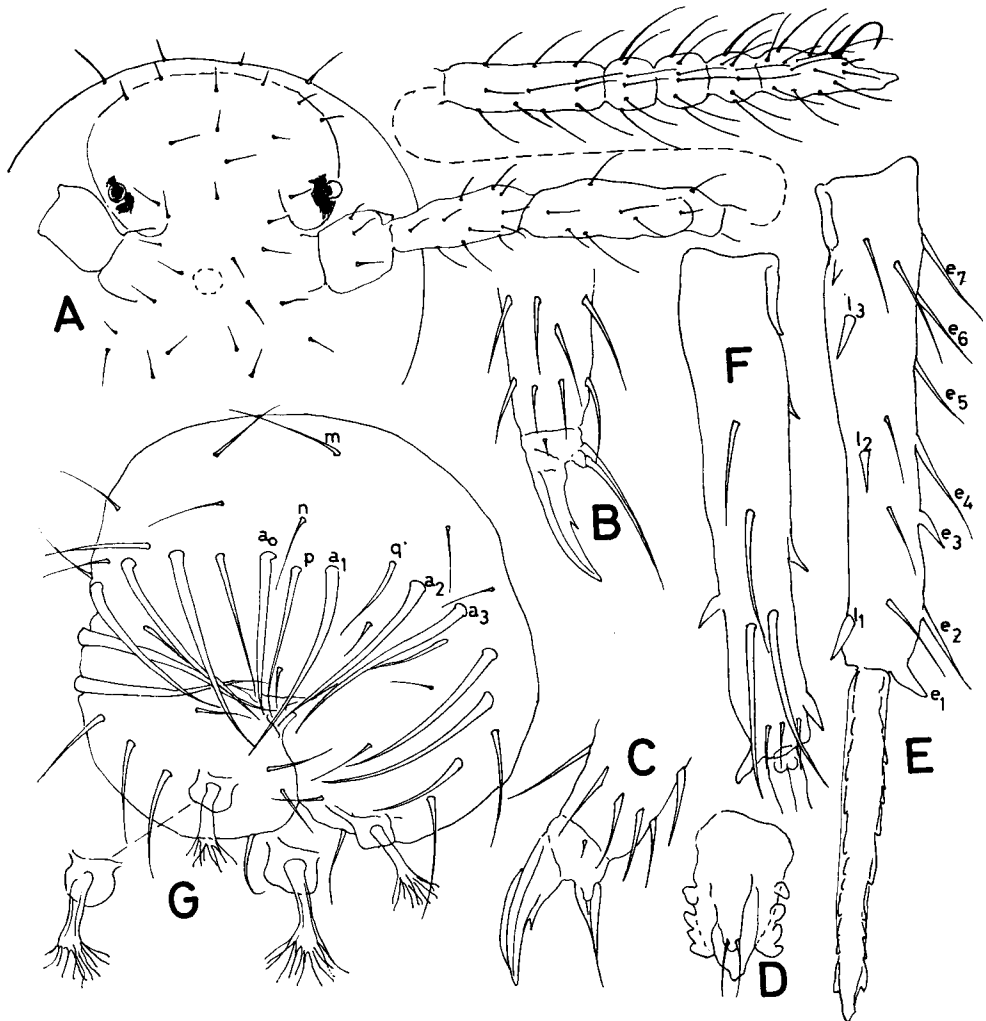


Fig. 10. *Arrhopalites alticolus* sp. n. A: head and antenna, B: fore-claw, C: hind-claw, D: tenaculum, E: dentes and mucro (dorsal), F: dentes (ventral), G: anal orifice.

hind-legs. In the formers it is narrow basally, while in the latter it is broadly lamellate at the basis. Ventral tube with 1+1 small apical setae. Rami tenaculi quadridentate, corpus anteriores with 2 apical setae. Furca in ratio as 15 : 28 : 18. Manubrium dorsally with 6+6 setae. Dentes as in Fig.E, where the absence of d-1 (nomenclature after CHRISTIANSEN 1966) is characteristic. Other setae as E_1 e_2 E_3 e_{4-7} id_{1-4} L_{1-3} . Ventral setae as 3,2,1,1, where the second and the third rows of setae are very long, surpassing the basis of the subsequent setae. Mucro narrow, irregularly serrate on both sides and ending in a blunt apex. Body setae of the trunk smooth, not modified. Anogenital segment dorsally with 2+2 feeble setae. From the upper anal flap a_0 is not forked, a_1 and a_3 are smaller. Especially the latter is very short in contrast to other setae. On lateral flaps $a_{1,2}$ are large. These larger setae are faintly winged on basal half. Appendix analis is short, barbed apically, but not serrate on the side. Typus: 1 ex. from Shigakogen.

The species is nearly located to *A. pygmaeus* (WANKEL, 1960, sensu STACH 1945) of Europe. But appendix analis is quite different. STACH (l.c.) and CHRISTIANSEN 1966 have observed the variable nature of this organ in this holarctic species, but it never takes a form of the Japanese examples. Short a_3 of upper anal flap, absence of d_1 of dentes would be also specific. The black eye pigment retains long in alcohol and is very characteristic.

13. *Arrhopalites minutus* sp. n.

Fig. 11

Shigakogen, Pref. Nagano (2 ex. 12.VIII 1967, Ys)

Body length 0.5 mm, very small. Totally white in alcohol. ant./head as 25/13. ant. segm. ratio as 15 : 40 : 55 : 120. Ant.IV is undivided. Ant.III-organ normal. Ant.III is without swelling and not modified. Setae of vertex are thick, almost spiny with the exception of some setae of the median row. Eyes 1+1, unpigmented. No modified facial setae. Unguis carinate, with one minute inner tooth and a pair of lateral teeth situated near the basis, the latter is not observed on fore-legs. Unguiculus is elongate and with a basal inner tooth on fore-legs, while it is short, untoothed and with broad margins on other legs. Only on hind-legs the dorsal tunica of unguis is to be observed. Furca in ratio as 20 : 25 : 17. Manubrium dorsally with ca. 4+4 setae. Dentes lightly converging, the arrangement of setae and spines as in Fig,D,E, where all of the inner and outer row are converted to small spines. Mucro is elongate, with a slight notch ventrally at the middle, apically rounded and heavily serrate on both margins. Body setae are simple and feeble on anterior half of large abdomen, becoming longer posteriorly. s.s. are very long, slender. Anal setae are heavily winged, their arrangement is normal, not different from *A. nivalis* YOSHI (1966, Fig.51 H). Digital process are 2+2 on upper anal flap and 2 to each lateral ones. Appendix analis is on large papilla, spatulate and truncate on apex, its margin is finely ciliated and barbed.

Typus: 1 ex. from Shigakogen

The species is near the holarctic species: *A. coecus* (TULLBERG, 1871), but in contrast

to this species appendix analis is very broad. According to STACH 1945 and CHRISTIANSEN 1966 inner lateral setae of dentes are slender with the exception of the distal one in the cited species, while all of them are spiny in this new species. From *A. nivalis* YOSII, 1966 of Nepal it is different in the form of ant.III.

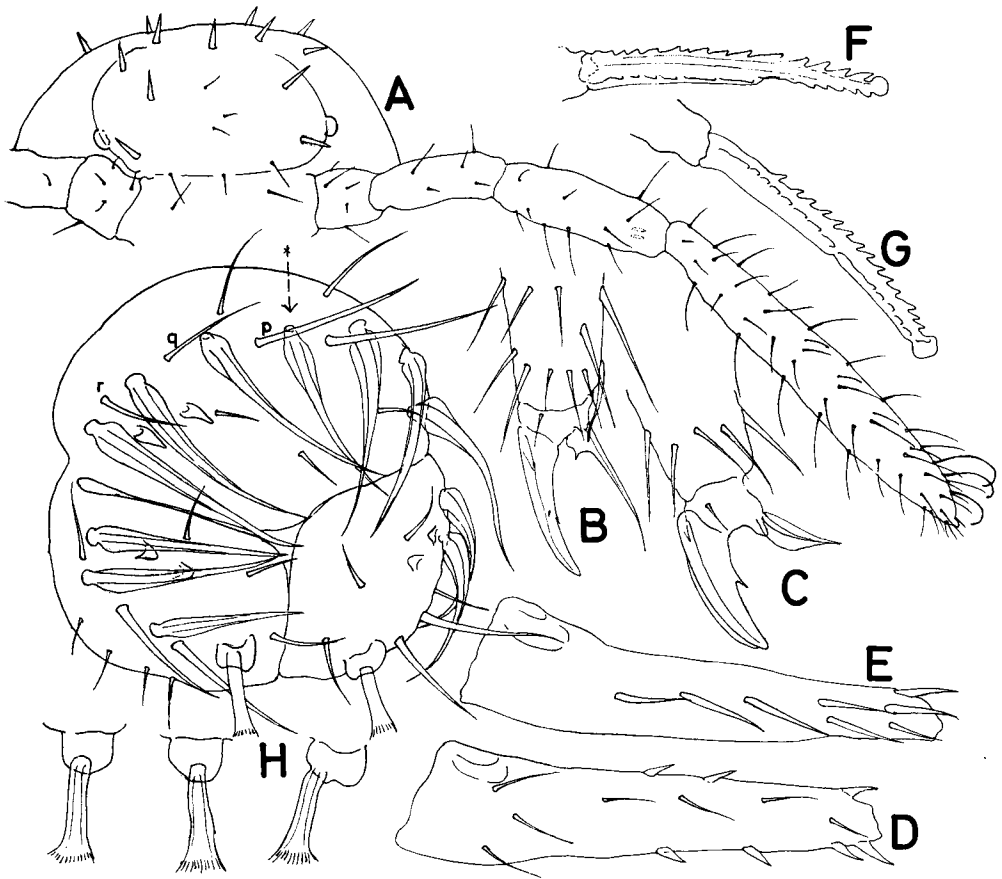


Fig. 11. *Arrhopalites minutus* sp. n. A: antenna and vertex, B: fore-claw, C: hind-claw, D,E: dentes (dorsal and ventral view), F,G: mucro, H: anal orifice and app. analis.

Sminthurinus BÖRNER, 1901

The critical review of the genus is given by GISIN 1963, who has shown the chaetal arrangement of the dentes to be a crucial character to divide each European species. Following descriptive notes indicate the same result on Japanese species.

14. *Sminthurinus* (niger-group) *igniceps* (REUTER, 1881, sensu GISIN 1963)

Shuchi, Tambacho, Pref. Kyoto (20 ex. 1.XII 1969, Ys), Shimogamo, Kyoto (18 ex. 10. IV 1970 Ys), Shirahama, Pref. Wakayama (3 ex. 14. IV 1970, K. SAWADA)

With its characteristic pattern of the body it is easily to be separated from other species. Number of dental setae corresponds with the description of GISIN rather than of STACH. *Sminthurinus pekinensis* STACH, 1964 is very near the present species, but different in the smooth mucronal outer lamella as well as by the number of proximal setae on dentes.

Distribution: Europe, USA and Japan (nov.)

15. *Sminthurinus* (niger-group) *trinotatus* (AXELSON, 1905)

S'nus fenestratus: BÖRNER 1909

S'nus igniceps var. *trinotatus*: AXELSON 1905

S'nus igniceps f. *trinotata*: UCHIDA 1952

S'nus trinotatus: STACH 1956, GISIN 1963

Shigakogen, Pref. Nagano (3 ex. 14.VIII 1968, Ys)

In Japanese examples rami tenaculi is tridentate and corpus is with 1 seta. Manubrium is dorsally with 6+6 setae. Dental setae dorsally and ventrally the same with *S. igniceps*. As the form is morphologically concordant with *S'nus igniceps* (REUTER), it may become a forma of it by further researches.

Distribution: Japan, Europe (introduced?).

16. *Sminthurinus* (niger-group) *speciosus* sp. n.

Fig. 12

Tambacho, Pref. Kyoto (many ex. 1.XII 1968, Ys), Daimonji, Kyoto (2 ex. 20.XII 1955, Ys)

Body length ca.0.6 mm. Ground colour light brown. Antennae deeply pigmented blue, other extremities pale. Head with a broad stripe between eyes, which extends posteriorly the whole lateral part of the trunk. Dorsal side and abd. V, VI brownish in colour. On vertex and on the postero-lateral part of the trunk there exists large white spots 3 in number. They are conspicuous under binocular lens, but disappear by conservation in alcohol. ant./head as 71/50. ant. segm. ratio as 6 : 12 : 20 : 33. The papilla of the ant. III is large, swollen and not divided. Vertical setae are very small and ocular tubercles are low and insignificant. Labral setae 6/5,5,4, labral margin with 4 incisions. Tibiotarsal segment of all legs is remarkably without clavate setae. Unguis of all legs rather elongate, untoothed and with conspicuous dorsal tunica, the pseudonychium is feeble and ciliate. Unguiculus triangular and its axial seta is surpassing it on fore- and mid-legs, as long as it on hind-legs. Corpus tenaculi with 2 setae. Furca in ratio as 15 : 20 : 10. Manubrium dorsally with 1+1, 1+1, 4+4 setae. Dentes tapering, ventrally as 4,2.....1. Mucro is apically blunt, its outer side is smooth and inner side is very obscurely crenulate or serrulate. Abd.V is decidedly separated from the precedent segment. Anal setae are slender, not winged. a_0 is forked. Appendix analis is palmate or penicillate, sa_3 is lying on a low papilla.

Typus: 1 ex. from Tambacho, Pref. Kyoto

This is very unique species having the dorsal tunica of unguis and no clavate setae on all legs. Colour pattern is fairly constant in all examples at hand.

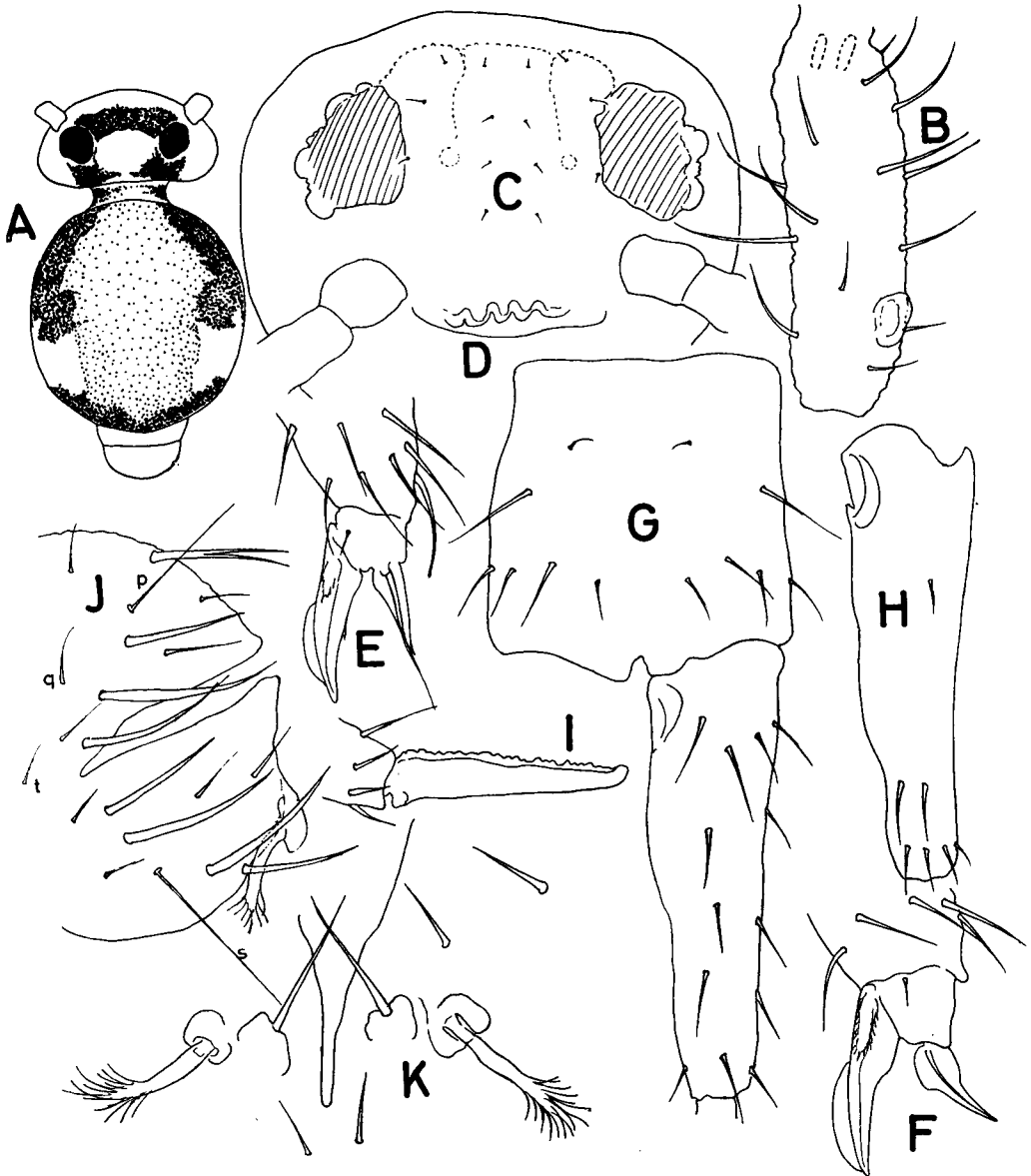


Fig. 12. *Sminthurinus speciosus* sp. n. A: dorsal view, B: ant. III, C: vertex, D: labral margin, E: fore-claw, F: hind-claw, G: manubrium and dentes (dorsal), H: dentes (ventral view), I: mucro (outer lateral view), J: anal segment, K: appendices anales.

17. *Sminthurinus* (niger-group) *modestus* sp. n. (Fig. 13)

Tambacho, Pref. Kyoto (8 ex. 1.XII 1968, Ys), Daimonji, Kyoto (6 ex. 21.XII 1955, Ys), Manazuru, Pref. Kanagawa (4 ex. 10. III 1970, Ys)

Body length 0.8 mm. Ground colour brownish yellow, black patches are beginning from the eye-field posteriorly as lateral stripes round the large abdominal part and united transversely on genital segment. Anal segment is free from patches. This black patches are accompanied by the brownish pigment forming a transverse band between eyes and occupying the dorsal side of the trunk. Antennae violet in distal two segments and brown on basal segments. Legs are brown on tibiotarsus and furca is pale. ant./head as 15/10. ant. segm. ratio as 10 : 20 : 25 : 70. Ant.IV not subdivided, but with many whorls of setae. Papillar swelling of ant.III is very insignificant, almost

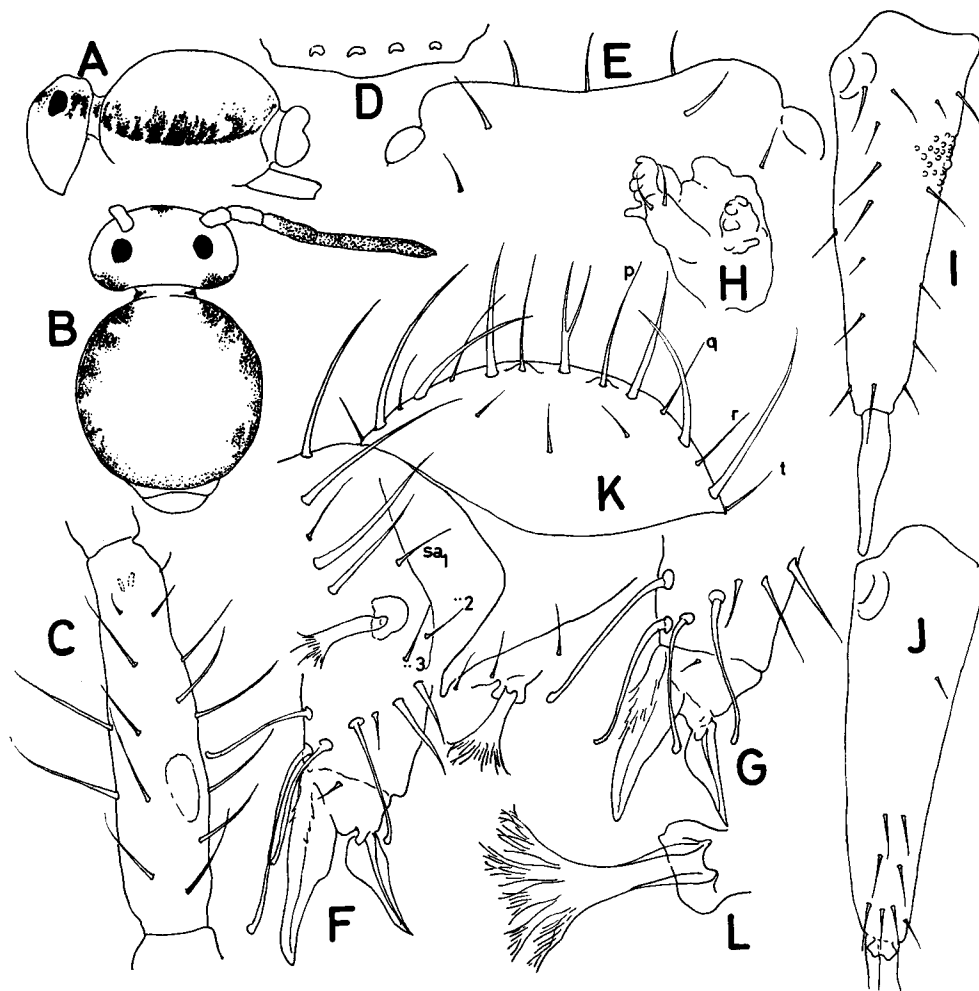


Fig. 13. *Sminthurinus modestus* sp. n. A, B: habitus, C: ant. III, D: labral margin, E: vertex, F: mid-claw, G: hind-claw, H: tenaculum, I, J: dentes and mucro (dorsal and ventral view), K: anal orifice, L: appendix analis.

reduced. Ant.III-organ is two short rods without groove. Eyes black, vertical swelling is low, but distinctly present and vertical setae are moderately long. Labral setae 6/5,5,4, in usual arrangement, labral margin with 4 minute, miliary tubercles. Tibiotarsus with spiny setae along posterior face and with 4-5 clavate tenent setae. Unguis with 1,0,0 inner tooth and pseudonychium is faintly barbed. Unguiculus triangular, broader posteriorly, the axial seta is surpassing it on fore-legs, as long as it on others. Furca short, manubrial setae dorsally as 6+6. Dental setae are ventrally as 4,2,2.....1. Dorsal dental setae as in Fig. I, where the outer setae are 5 in number. There is a small area distinctly granulate near the basis of the outer side. Mucro is elongate, apically blunt and smooth on both sides. On upper anal flap a_0 is forked, others slender and not winged. p-seta is on the low swelling and as long as a_0 . Appendix analis is short, penicillate intensely and upon high papilla. Abd.V is separated from the precedent large mass of the trunk.

Typus: 1 ex. from Tambacho, Pref. Kyoto

The species is very remarkable by the number of ventral setae of dentes and by smooth mucronal margins.

18. *Sminthurinus* (niger-group) *pallescens* sp. n.

Fig. 14

Shimogamo, Kyoto (many ex. 10.IV 1970, Ys), Yoshidayama, Kyoto (10 ex. 12. IV 1970, Ys)

Body length 0.8 mm. in female. Colour uniformly brownish yellow, dorsal side sometimes lightly pigmented. Antennae bluish, eyes intensely black, other parts pale. Antennae short, ant. IV not subdivided. Ant.III-organ is two short rods freely placed. Lateral tubercle of the segment is a high swelling not or faintly divided into lobes. The vertex is divided into 3 parts by a pair of smooth groove and all setae are minute. Setae of the frontal part also minute, those of the facial part are a little larger. Labral setae as 6/5,5,4, the median 3 of the first row small, lateral pair of the second row dislocated. Labral margin with 4 incisions. Legs normal for the genus, each tibiotarsus bears up to 5 clavate distal setae. Unguis with one inner tooth, without pseudonychia nor tunica. Unguiculus broad, the axial seta is surpassing it in fore-legs, as long as it in others. Ventral tube well developed. Rami tenaculi quadridentate, corpus anteriores with one apical seta. Furca short, manubrial dorsal setae as 2+2, 4+4. Dentes with setae as dorsal 13, ventral as 4,2.....1, as in Fig H,I, where the presence of 5 setae of the basal group is characteristic. Mucro elongate, apically blunt and its outer margin is smooth or almost so, while the inner margin is with irregular serration. Abd.V is incompletely separated from the precedent segment so that it is intermittent of *S. niger* and *S. aureus* group. Abd.VI bears typical arrangement of anal setae, a_0 is deeply forked, a_{1-3} are thicker, but not winged. Appendix analis is broad, finely penicillate distally and on large papilla. Integument is minutely granular, body setae are smooth, small and feebler than in other species of the genus.

Typus: 1 female from Shimogamo.

This species is characteristic by the presence of 5 setae of the basal group dorsally on

dentesc. It is near *S. concolor* (MEINERT, 1896, sensu GISIN 1963), but in the cited species both edges of mucro are serrate. From *S. modestus* sp. n., which has the alike colouration of the body, it is different in the arrangement of the dental ventral setae.

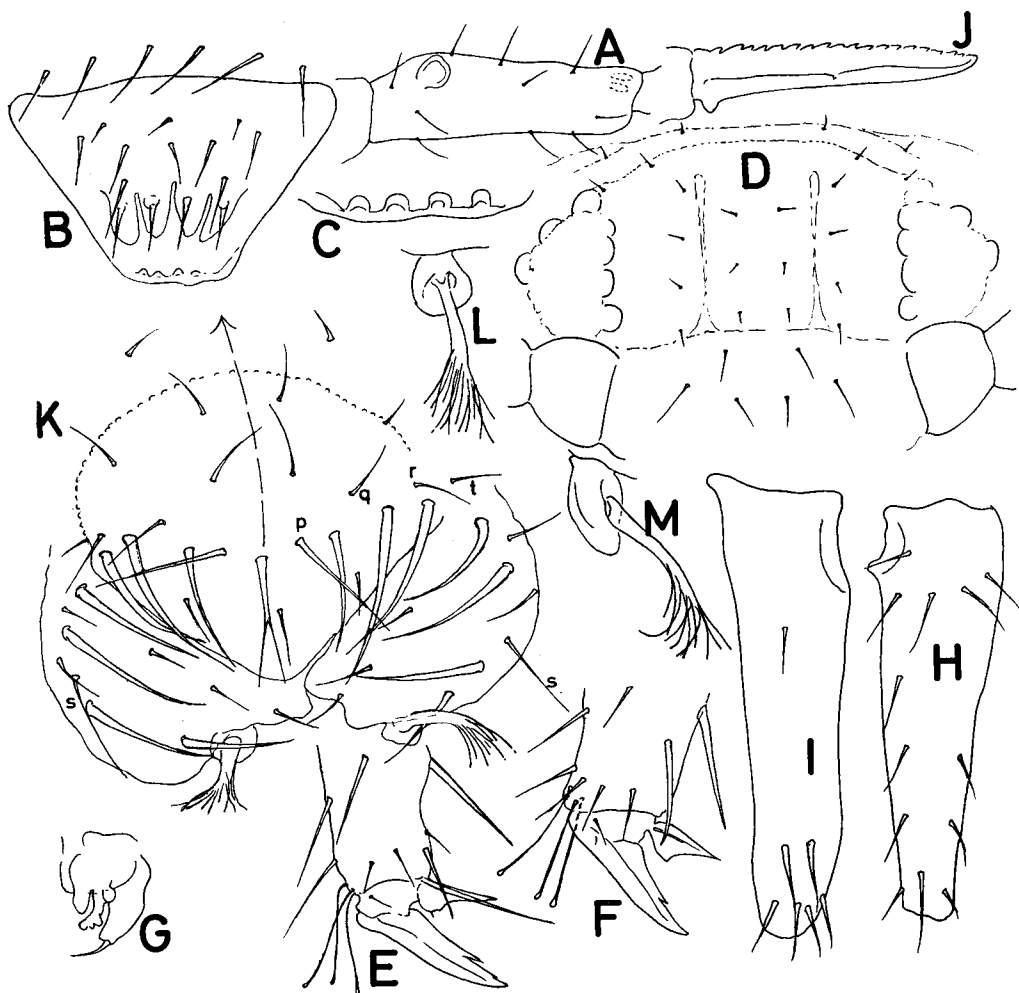


Fig. 14. *Sminthurinus pallescens* sp. n. A: ant. III, B: labrum, C: labral margin, D: vertex, E: fore-claw, F: hind-claw, G: tenaculum, H, I: dentes (dorsal and ventral view), J: mucro, K: anal orifice, L, M: appendix analis.

19. *Heterosminthurus nymphes* sp. n.

Fig. 15

Suiren-numa, Mt. Hakkoda, Pref. Aomori (many ex. taken by sweeping of the grass, 16.VIII 1967, T. NAKANE)

Female: Body length up to 1.0 mm. Colour uniformly pale in alcohol excepting black eye-patches and violet distal half of antennae. ant./head as 2/1. ant. segm. ratio

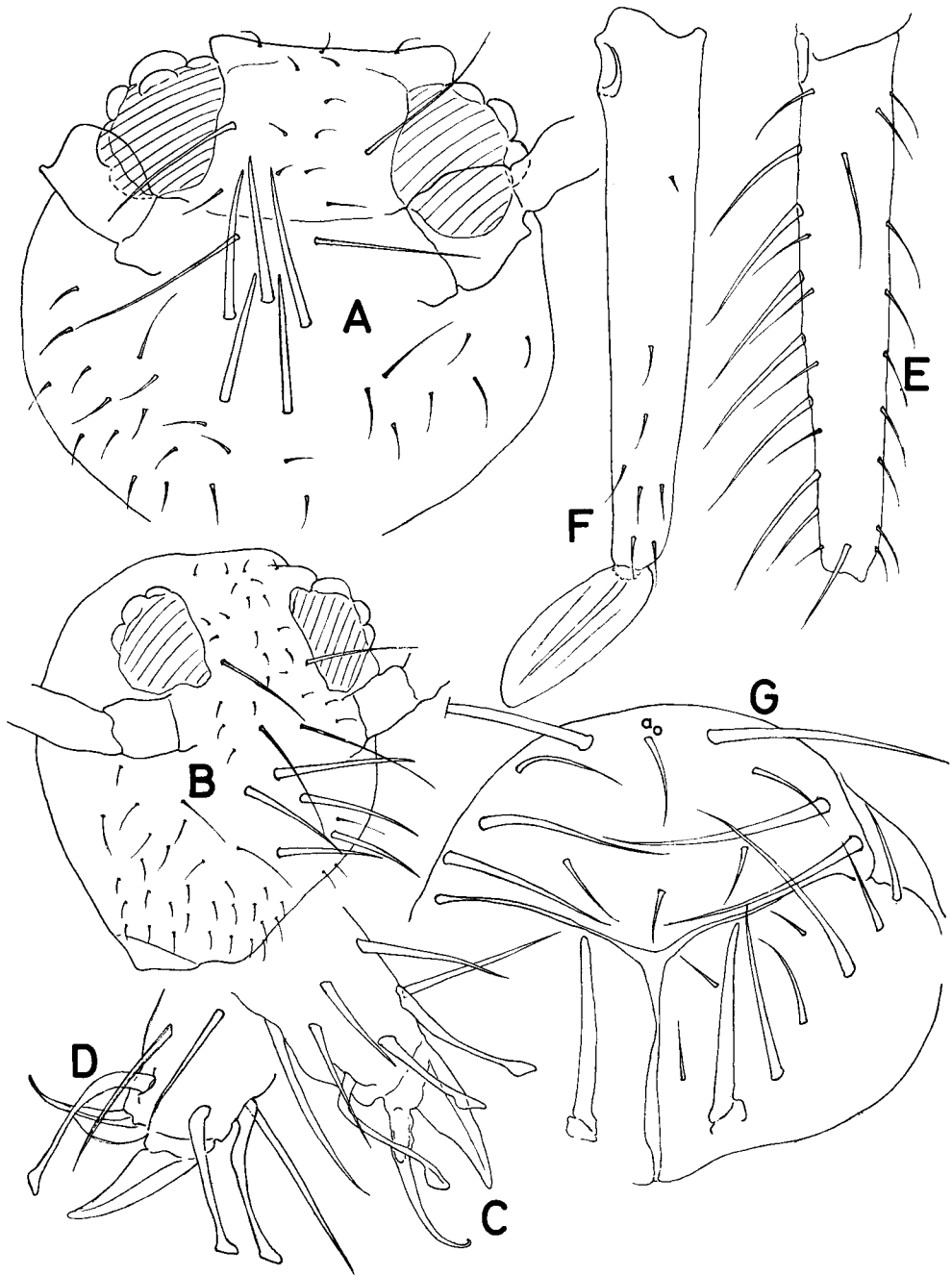


Fig. 15. *Heterosminthurus nymphes* sp. n. A, B: head (frontal view), C: fore-claw, D: hind-claw, E: denticles (dorsal), F: denticles and mucro (ventral view), G: anal orifice, (A, B males, C-G females).

as 12 : 22 : 42 : 70. Ant.III-organ is a pair of small rods each in a groove. Ant IV is distinctly divided into 9 subsegments and each subsegment has a quirl of ca.8 setae and some slender sensory setae. An apical bulb is obscurely present. Eyes intensely black. No cephalic setae modified, but clypeal ones are smaller than the facial setae. Labral setae as 6/3,5,4, the first row small and marginally with 4 transverse ridges. Legs bearing a spiny, erecting seta at the position of tenent hair and, besides, 3,3,2-3 heavily clavate setae are located on the inner side of each legs. Unguis robust, carinate dorsally and untoothed. Unguiculus with an axial seta surpassing the unguis and almost without lamella on fore-legs and with a broad, round lamella on each side on mid- and hind-legs. Often the axial seta is apically curving and blunt. Ventral tube elongate, terminal filament very long and with warty walls. Rami tenaculi tridentate, corpus anteriores with 3 apical setae. Furca well extended, in ratio as 3 : 5 : 2. Manubrium short, with 8+8 dorsal setae. Dentes not much converging, with setae as in fig.E,F, where the inner setae are in two rows and the ventral row is very strongly developed. Their arrangement is approximately as in *H. undulans* YOSII et LEE, 1965. Mucro is with broad outer and inner lamellae, quite untoothed and rounded on apex. Integument is finely granular, abd.V and VI are separated from the trunk to form a saddle-like appearance. All the body setae are slender, smooth and not modified. s.s. are 2+2 laterally on large abdomen and 2+2 on a small papilla laterally on abd.V. Abd.VI is not modified, without special setae dorsally. Appendix analis is blunt, slightly curving and smooth. Anal flaps (Fig.G) approximately the same with *H. undulans* and a_0 and a_2 of the upper anal flap are smaller, a_3 , a_5 of the lateral flap are longer than others. Genital orifice is with many short setae anteriorly.

Male: Body length up to 0.7 mm. Same colour as females. Antennae are longer, being 3 times the head in length. Ant.IV subdivided. In many morphological details it is almost the same with females, but head bears a prominent secondary sexual character. Namely 2+2 setae of the vertical region are much longer than others and, besides, 5 setae of the facial region are prominently developed, stout and almost spiny. Typus: 1 male from Mt. Hakkoda

Specific nature of the facial setae in the male of *Heterosminthurus* is already cited in STACH 1956 and YOSII et LEE 1965. This is an another example. Actually it is impossible to divide the species of *H. insignis* group by the female example alone. The report of *H. insignis* from Manchuria (KINOSHITA 1941), Mongolia (YOSII 1949) and Japan (Ozè, YOSII 1956) must be revised.

20. ***Papirinus prodigiosus*** YOSII, 1954 nom. amend.

Fig. 16

Papirinus prodigiosum YOSII, 1954

The species is relatively well known. However, following additional notes must be annexed: Labral setae 6/5,5,4, lateral two pairs of the first row not foliaceous, but blunt on apex. Labral margin without structures. Ventral tube very short and broad, practically in form of a pair of tubercles representing the terminal tubule of the usual *Sminthuridae*. Furca short, manubrium ventrally nude, dorsally with setae as in Fig.C,

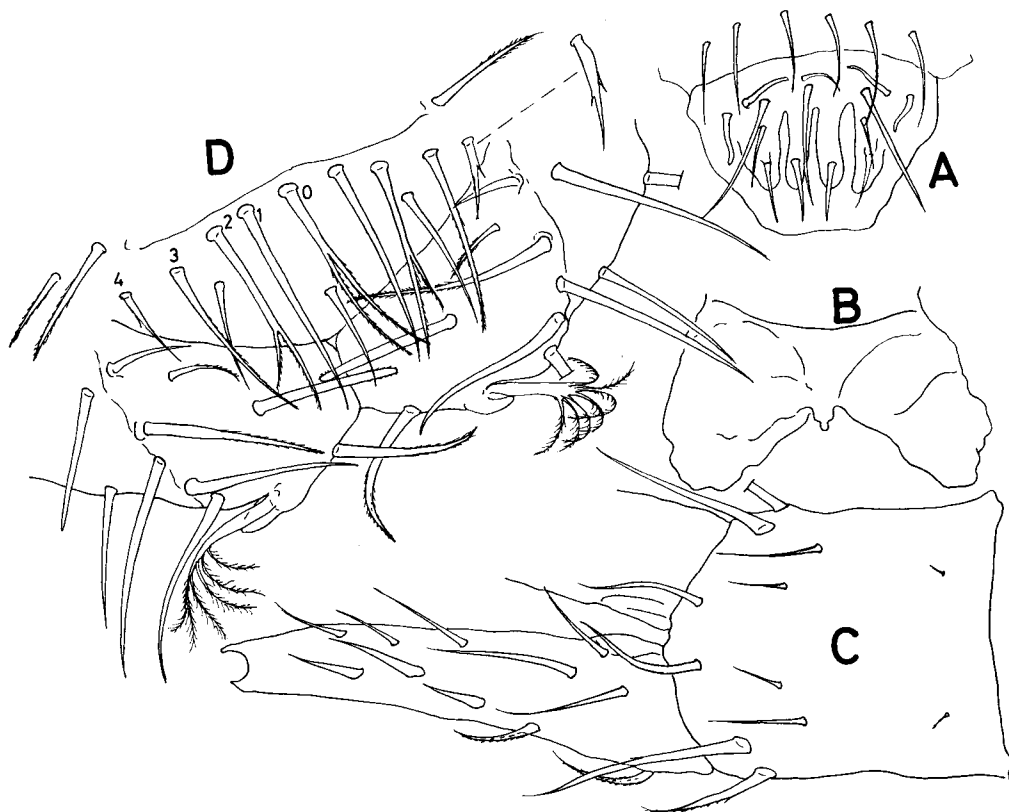


Fig. 16. *Papirinus prodigiosus* YOSHI from Tambacho A: labrum, B: ventral tube (posterior view), C: manubrium and dentes (dorsal view), D: anal orifice.

where a pair of lateral distal setae are finely ciliate. Dental setae ventrally none, dorsally as Fig. C, the proximal outer two setae are ciliate, others smooth. Mucro as stated before. Abd.V is separate from abd.IV. Of the anal setae of the upper flap a_0 is forked equally, a_1 is smooth, a_2 unequally forked, a_3 is not branched, a_4 is short and somewhat alate, with 1-2 lateral teeth or serration. a_0 , a_2 and a_3 are distally ciliate. sa and sa' are rather long, the former is smooth, the latter is ciliate. On the lateral flap a_1 is short, a_2 long and ciliate distally, while a_3 and a_4 are smooth. Appendix analis is palmate and each ramus is distinctly ciliate. sa_1 is short and ciliate, sa_2 is long, blunt and lightly rugose apically. sa_3 is large, ciliate and on a low papilla. From two sorts of body setae the blunt seta is not ciliate, but rugose.

The present commentary note is derived from the example collected in Tambacho, Pref. Kyoto (4 ex. I.XII 1967, Ys). There are two other species of *Papirinus* reported from Africa (*P. leleupi*) and Nepal (*P. ieti*), from both of which *P. prodigiosus* is distinguished by the unbranched a_3 of the upper anal flap. In other details they are very near to each other.



Fig. 17. *Sminthurus serrulatus* BÖRNER from Mt. Hiei, Kyoto A: dorsal view, B: vertex, C: fore-claw, D: unguiculus of hind-leg, E: tenaculum, F, G: anal opening, H, I: dentes (dorsal and ventral view), J: mucro (dorsal), K: chaetal arrangement of anal opening in diagram.

21. *Sminthurus* (s. str.) *serrulatus* BÖRNER, 1909

Fig. 17

Hieizan, Kyoto (2 ex. 10.III 1968, Ys)

Body length 2.0 mm. Ground colour white, with light and dark brown patches. Head with a broad median streak of light brown on vertex. Trunk has a narrow median longitudinal line on anterior half. On both sides of the line two pairs of broad, irregular patches are present. Posteriorly there are two median patches of deep brown. Laterally the trunk is irregularly mottled. Anogenital segment dorsally patched. Antennae are light brown throughout, other extremities pale. ant./head as 27 : 14. ant. segm. ratio as 2 : 4 : 6 : 15. The last segment has ca. 15 annules, each provided with a quirl of verticillating setae. Ant.III-organ is two blunt rods in a common groove. On head no setae are differentiated. Eyes 8+8, black. Postantennal organ is a small seta, finely ciliate on all sides. Labral setae 6/5,5,4, lateral pair of the first row larger than other three setae. Labral margin without structures. Between eye-field there is a pair of large, obscure tubercle having 4 setae on it. Unguis carinate, with a conspicuous dorsal tunica, which is constricted near the apex. A pair of narrow pseudonychia is obscurely fringed. Inner tooth distinct. Unguiculus broad basally, it is without inner tooth and with a long axial seta on fore-legs and with an inner tooth and short axial seta on other legs. Tenent hair absent. Seta of the posterior face of tibiotarsus are rather spiny. Ventral tube long, with a few longitudinal rows of faint granules on outer side. Rami tenaculi tridentate, with a basal swelling. Corpus anteriores with 4 small apical setae. Corpus posteriores smaller and shorter. Furca in ratio as 60 : 80 : 23. Manubrium with 7+7 setae dorsally. Dentes bearing many simple setae arranged as in fig.H,I. Mucro is boat shaped, both margins are with up to 13 round serration, the inner ones are more or less obscure. A strong mucronal seta is just reaching the mucronal apex. Basal pseudonychium present. Body setae are rather long, curving and pointed. Larger ones of the dorsum are rugose on distal part, others are quite smooth. Anogenital segment is distinctly divided and saddle-like, without modified setae. Chaetal arrangement is diagrammatically as in Fig. K, which is concordant with the chaetal arrangement studied in *S. viridis*. Appendix analis is short, horn-like and curving. Integument is minutely reticulate.

The form corresponds well with BÖRNER's description. It is a very noteworthy species with serrate mucro, tunicate unguis but without tenent hairs. It must not be confounded with *S. serratus* SCHÄFFER, 1897 of Tierra del Fuego.

Distribution: Japan

22. *Dicyrtomina* (s.str.) *tsugarensis* (UCHIDA, 1952)

Fig. 18, 19

Aoni, Pref. Aomori (2 ex. paratype, gift of Prof. UCHIDA)

Body length ca. 1.8 mm. Ground colour dirty white, with paired markings of light violet on head and on anterior dorsum. Posterior dorsum has intensive black median patch at the highest place of the hump and directly before the anogenital segment. Antennae diffusely violet distally, other extremities pale. ant./head as 23/16. ant. segm. ratio as 20 : 90 : 90 : 30, all of them not subsegmented. Ant.III-organ is

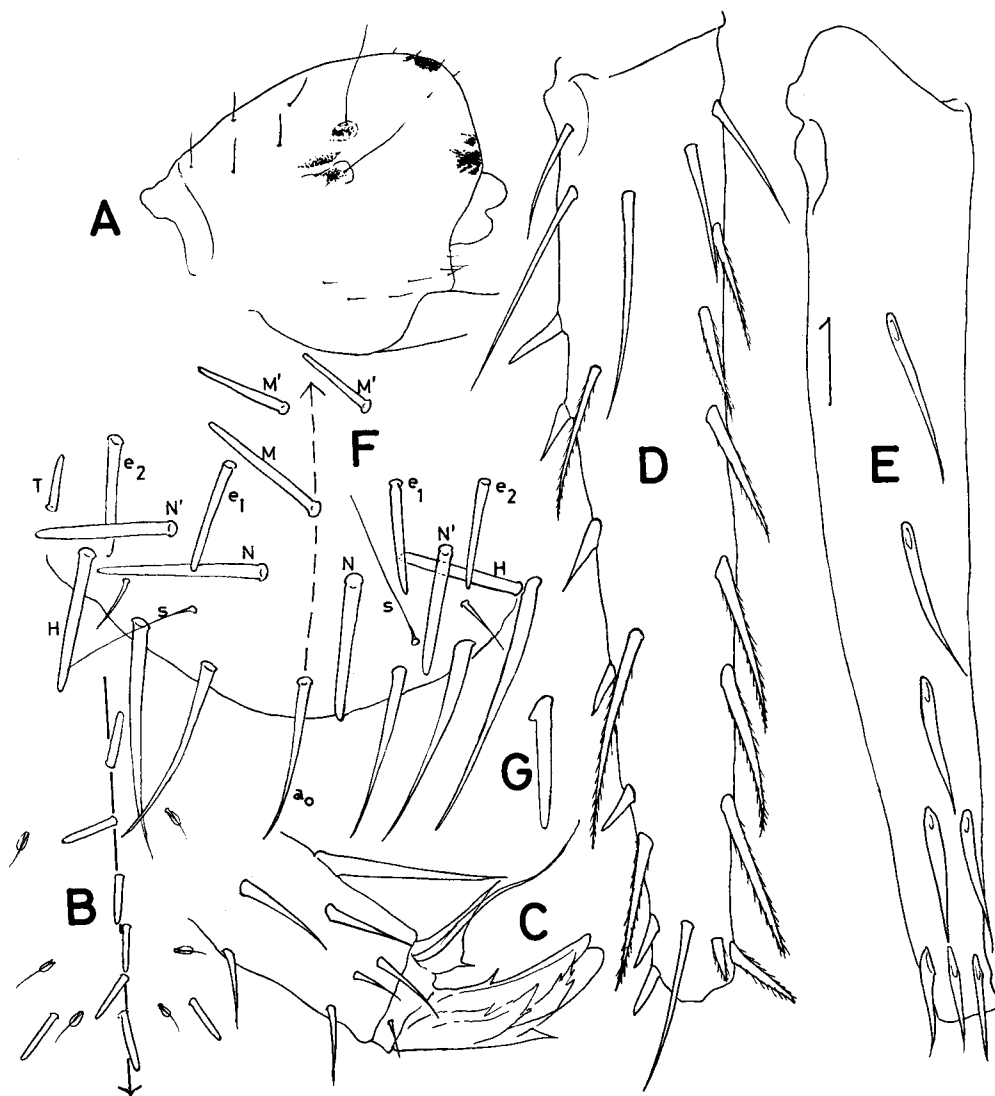


Fig. 18. *Dicyrtomina tsugarensis* (UCHIDA), paratype A: dorsal view, B: distal end of ant. III, C: ant. III-organ, D: vertex (lateral view), E, F: tenaculum, G: ventral tube (anterior view), H: mucro, I: anogenital segment (lateral view).

two short rods encircled by a round deepening. Distal to the organ at the end of the segment there is a small digital process and at the opposite side of the process there is another thin, flap-like process, obscurely tricuspidate on apex. Such a peculiar structure is not yet described in any of the species of *Dicyrtominae*. Upon head all of the vertical setae are spiny and blunt, even h and i are as long as others and strongly developed. Facial setae 1,1,1,1,3, all of them are blunt apically. Labral setae probably

as 6/5,5,4, inner three of the first row very small. Labral margin without structures. Unguis vesicular, the dorsal pseudonychium being strongly developed, its apex is cuspidate in two pairs and dorsal tunica is also very prominent. Inner tooth as 1,1,1. Unguiculus acute apically, with 0,1,1 inner tooth and its axial seta is very long on fore- and mid-legs, but not so on hind-legs. Modified tibiotarsal setae short, blunt apically and 3 in number. Ventral tube very long, distal part with processes and swellings. Tenaculum peculiar, rami is bicuspidate and with a basal papilla. Between these papillae a pair of median swelling is present, each of which is divided in two lobes. Corpus anteriores bears 4 setae. Setae of the furcal basis are not much differentiated,

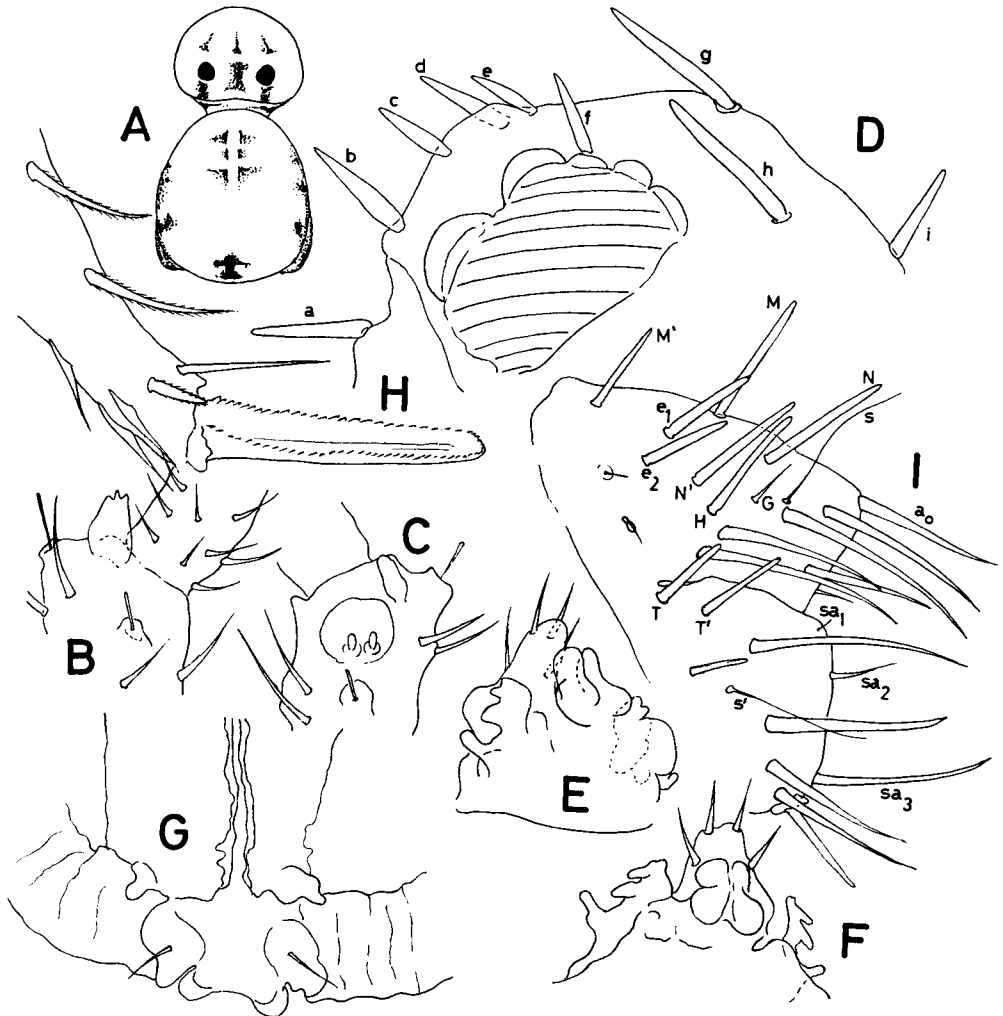


Fig. 19. *Dicrytomyia tsugarensis* (UCHIDA), continued A: lateral view, B: facial setae, C: fore-claw, D, E: dentes (dorsal and ventral view), F: anogenital segment (dorsal view), G: modified seta of hind-legs.

composed of 6 setae, 4 among them are ciliate. Furca in ratio as 5 : 11 : 4. Dental setae are peculiar; the outer lateral setae are 10, from which ex-1 to ex-8 are densely ciliate. ex-1 is long, but ex-2 is very short. Setae of the inner lateral row are turned to short spines, int-1 to int-7 are spinose and int-8,9 are smooth setae. From 5 setae of the dorsal row, d-1 and d-5 are smooth, situated median on dorsal side, while d-2,3,4 are ciliate and placed nearer to the inner row. Thus d-2 is placed almost between int-2 and int-3. Ventral setae relatively large and 3,2,1,1....1 in number. Mucro is elongate, both sides are minutely and equally serrate and without an apical notch. Anogenital setae are almost equal to *D. minuta* (cf. Yosii 1965); Namely M' is setaceous, others blunt. E-1,2 present. N,N' present etc. In one example at hand, however, a-3 is subequal to a-4, while the former is shorter than the latter in the cited species. Appendix analis is setaceous and sa-3 is enormously large, much larger than ap. an. itself.

Distribution: Japan

Notwithstanding its queer appearance caused by the swelling of dorsum, the species is not much different from *D. minuta* in the chaetal nature of vertex and anogenital segment. In males almost all of the mentioned characters are common with females including ant.III, dorsal hump, genital setae etc. But g-seta is absent and anal setae are reduced just as in other species of the genus.

References

- BÖRNER, C. 1909. Japans Collembolenfauna. Sb. Ges. naturf. Fr. 1909: 99-135.
- CHRISTIANSEN, K. 1966. The genus *Arrhopalites* in the United States and Canada. Int. J. Speleol. 2: 43-73.
- GISIN, H. 1947. Sur les Insectes Apterygotes du Parc National Suisse. Erg. Wiss. Unters. schweiz. Nationalparks, 2: 77-91-
- 1963. Collemboles d'Europe. V. Rev. suisse Zool. 70: 77-101.
- HÜTHER, W. 1962. Beitrag zur Gattung *Willemia* BÖRNER. Beitr. Entom. 12: 511-526.
- KINOSHITA, S. 1941. A new Sminthurid newly recorded from Manchuria. Kontyu 15: 4-6.
- MASSOUD, Z. et J. M. BETSCH, 1966. Considérations sur l'Antenne des *Sminthuridinae* et Description des deux nouvelles Espèces etc. Bull. Mus. Nat. Hist Nat. 38: 574-585.
- STACH, J. 1919. Collembolen aus den Höhlen von Ojcov in Polen. Bull Acad. Sci. Cracovie B, 1919: 204-211.
- 1945. The Species of the Genus *Arrhopalites* occurring in European Caves. Polska Akad. Umiej. 1945, 47 pp. 10 pls.
- 1964. Materials to the Knowledge of Chinese Collembolan Fauna. Acta Zool. Cracoviensia 9: 1-26, 13 pls.
- 1965. On some Collembola of North Vietnam. Acta Zool. Cracoviensia 10: 345-372, 38 pls.
- UCHIDA, H. 1937. Notes on a Collembola: *Sminthurides aquaticus* (BOURL.) Zool. Mag. Tokyo, 49: 286-289.
- 1952. A new Genus of *Sminthuridae* from Japan. Mushi 24: 1-4.
- YOSII, R. 1954. Springschwänze des Ozé Naturschutzgebietes. (in) Sci. Res. Ozegahara Moor: 777-830.
- 1956. Monographic zur Höhlencollembolen Japans. Contr. Biol. Lab. Kyoto Univ. No. 3, 108 pp.
- 1967. Studies on the Collembolan Family *Tomoceridae*, with special Reference to Japanese Forms. Contr. Biol. Lab. Kyoto Univ. No. 20, 54 pp.

YOSHII, R. et C. E. LEE, 1963. On some Collembola of Korea etc. Contr. Biol. Lab. Kyoto Univ.
No. 15, 37pp.