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## TWO NEW SPECIES OF PROTURA FROM JAPAN

By G. IMADATÉ<sup>1)</sup> and R. YOSII<sup>2)</sup>

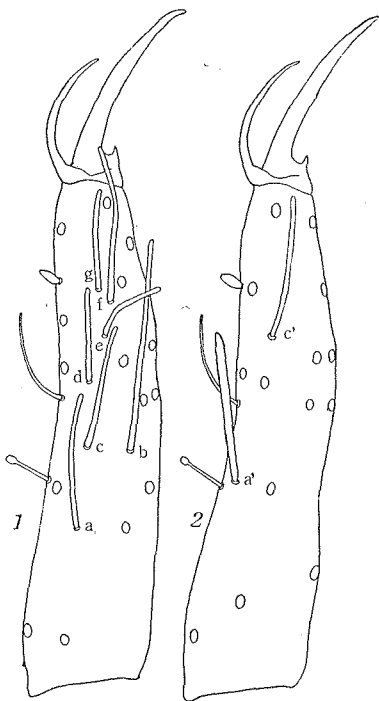
Since there has been reported a first Japanese species of the order Protura; *Acerentomon nippon* YOSII, 1938, whose specific characters are to be revised, the authors have succeeded to find a second and a third form of a different genus, *Acerentulus* BERLESE, 1908, which permit us to establish two new species. Their diagnoses are given below. The authors' hearty thanks are directed to Dr. S. L. TUXEN (Copenhagen) and Sr. A. X. DA CUNHA (Coimbra) for their kind assistance to us in resuming the taxonomic study of this interesting order, which has exhibited a remarkable progress during these ten years.

*Acerentulus yamato* IMADATÉ  
et YOSII (sp. nov.)

Total length of the body 1,400~1,600  $\mu$  in adults, in an extended condition. Integument well chitinised and yellowish pigmented all over the body.

Head:—Length 180  $\mu$ . Breadth 110  $\mu$ . Pseudoculi ovate and bilocular with a transverse bar as usual. Rostrum quite absent. "Filamento di Sostegno" of maxilla (Fig. 6) unbranched and surpasses the maxillary branch of tentorium with its proximal end. Maxillary palpus 3 segmented and typically built for the genus.

Legs:—Length of fore-tarsus 110  $\mu$ , that of claw 35  $\mu$ . TR=3.1. The position of sensillae upon the fore-tarsus as shown in Fig. 1, 2.  $t_1$  is shorter than  $t_2$  and clavate apically.  $t_2$  is delicately thinner and longer than  $t_1$ .  $t_3$  is distinctly lanceolate and very short. On the outer side of fore-tarsus, a and c equal in length, b extremely long and its apex attains the base of setae  $\beta_6$ . Length of



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Fig. 1. Fore tarsus Anterior (face)

Fig. 2. Fore tarsus Posterior (face)

1) Kōriyama, Nara.

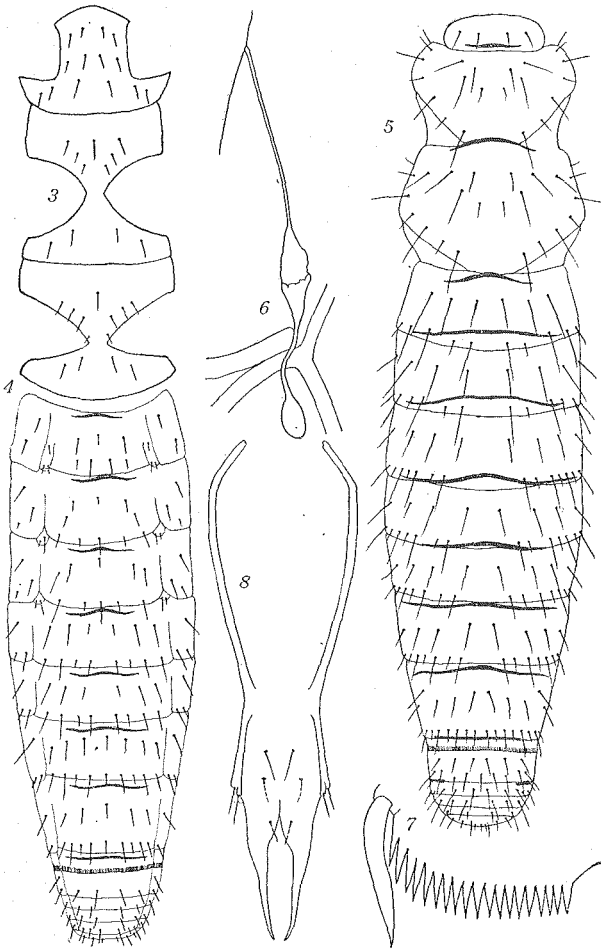
2) Yoshida College, Kyoto University.

d, e and g subequal, that of f slightly greater than d and e, and surpasses with its apex the distal end of tarsus. From the inner side of fore-tarsus a' distinctly broad and very long. C' thin, and b' lacking. Claw has no inner tooth. Hind tarsus a little longer than the middle one, the former being  $55\mu$  and the latter  $45\mu$  in length respectively. Claw upon them subequal in length, (c.  $20\mu$ ) and each provided with one distinct tooth at about the middle. Lateral tooth is not found.

Abdomen:—Appendices II and III unisegmented and provided each with 2 minute setae. Pectinated comb on both sides of the 8-th abdominal segment (Fig. 7) consists of about 20 teeth of equal size. Male genitalia as shown in Fig. 8.

Chaetotaxy:—The distribution and relative length of setae on each segment are as illustrated and tabulated, but there are some notes to be added. The tergites of meso- and metathorax bend laterally toward the underside of the body, where 4 extra setae are found. These 4+4 setae, especially 1+1 of them, are quite weakly developed that they are invisible in dorsal view. So far as individual variations of the chaetotaxy has been observed in specimens at hand, no deviated cases are yet found with respect to abdominal tergites. All abnormalities are, therefore, confined to abdominal sternites. In one specimen, the anterior row of abd. stern. II is provided with 7 setae, there having 1+1 extra setae. In another specimen, there have been found 9 setae on the posterior row of the abd. stern. V, with one extra weak central seta. In another two specimens, the posterior

	Terg.			Pl.	Stern.		
	a.	m.	p.		a.	m.	p.
Th. I	—	—	4	—	4	4	6
II	6	2	16	—	7	—	4
III	8	2	16	—	7	2	4
Abd. I	6	—	10	2	3	—	4
II	8	—	10	3	5	—	5
III	8	—	12	3	5	—	5
IV, V	8	—	12	3	6	—	8
VI	8	—	12	3	7	—	9
VII	10	—	16	2	5	—	9
VIII	6	7	4	2	—	4	—
IX	—	—	10	1	—	—	4
X	—	—	6	1	—	—	4
XI	—	—	4	1	2	—	4
Telson	—	9	—	—	—	6	—



*Acerentulus yamato* IMADATÉ et YOSH (sp. nov.)

Fig. 3. Chaetotaxy of thoracal sternites.

4. Ditto of abdominal sternites.

5. Ditto of tergites.

6. "Filamento de Sostegno" of maxilla.

7. Pectinate comb of the Abd. VIII.

8. Male genitalia.

row of the abd. stern. VII is deprived of the central seta and instead of it, there are 1+1 short and weak setae at that place. In one other example, there has been found 5 setae on the abd. stern. VIII, having one additional central seta. In this last mentioned example, the chaetotaxy of the other parts of the body coincides quite well with the normal one (CF. TUXEN 1955 p. 121).

The most remarkable feature which characterizes the present species is the number of setae in the anterior row of abdominal sternites. Generally, in all species hitherto known to *Acerentulus*, there are only 3 setae on each anterior row of the 1-7 abdominal sternites inclusive.

In the present species, however, they are 3, 5, 5, 6, 6, 7, 5, so that the case is like those in the genus *Acerentomon*.

Holotype:—1 ♂. Nava Park Garden, Japan, Feb. 21. 1955, G. IMADATÉ leg.

Locality:—About 80 specimens were found in the type locality during the period from May 1954 to Apr. 1955. This place is located at about 100 m. above sea level. Most of them were collected by G. IMADATÉ and others by R. YOSHII, S. UÉNO and K. MIZUTA among the decaying leaves in the forest composed mainly of *Quercus* and *Acer*.

Affinity:—With the absence of the sensilla b' from the fore-tarsus, the species is akin to *A. caldarius* CONDÉ from France, *A. seabrai* DA CUNHA and *A. populeus* DA CUNHA from Portugal. The slender and elongated sensilla b is characteristic and no other known species of the genus are to be compared with. Although the species belongs without doubt to the genus *Acerentulus* by the absence of the protruded rostrum, it still resembles closely the genus *Acerentomon* with respect to the chaetotaxy of the abdominal sternites. It is, therefore, easily to be distinguished from other members of the genus.

*Acerentulus morikawai* IMADATÉ et YOSHII (sp. nov.)

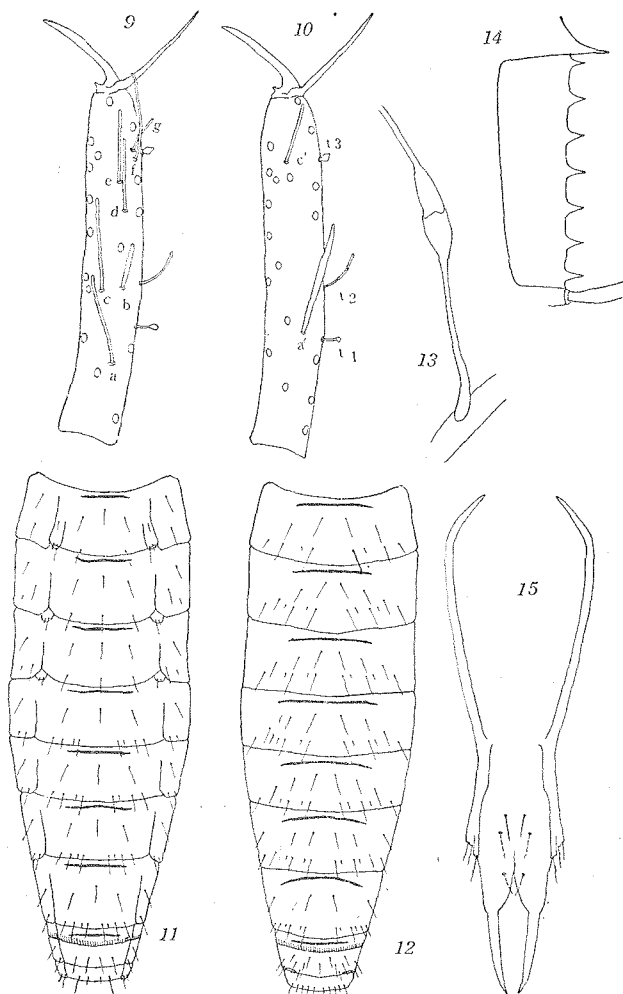
Total length of the body 900-1,000  $\mu$  in an extended condition. Integument yellow in colour and well chitinised.

Head:—Length 100  $\mu$ , Breadth 65  $\mu$ . Pseudoculi oval. Rostrum absent. "Filamento di Sostegno" of maxilla (Fig. 13) unbranched and does not surpass the maxillary branch of tentorium with its proximal end.

Legs:—Length of fore-tarsus 80  $\mu$ , that of claw 20  $\mu$ . TR being 4.0. The position and shape of fore-tarsal sensillae (Fig. 9, 10) are similar to that of *A. yamato* sp. nov. But b is distinctly shorter and broader than in the cited species. Claw has no inner tooth. S-shaped seta is remarkably long. Length of middle and hind tarsus are 45  $\mu$  and the claw on it 20  $\mu$ . A prominent inner tooth is present.

Abdomen:—Appendices II and III unisegmental and provided each with 2 minute setae. Pectinated comb on 8th abdominal segment consists of 7 small teeth of equal size. Male genitalia as in Fig. 15.

Chaetotaxy:—Arrangement of the setae on each thoracal segment is equal to the precedent form and, therefore, omitted from the table. The number and arrangement of the setae on stern. I-VII are typical of the genus, since there



*Acerentulus morikawai* IMADATÉ et YOSHII (sp. nov.)

- Fig. 9. Fore tarsus (Anterior face).  
 10. Fore tarsus (Posterior face).  
 11. Chaetotaxy of abdominal sternites.  
 12. Ditto of abdominal tergites.  
 13. "Filamento de Sostegno".  
 14. Pectinate comb of Abd. VIII.  
 15. Male genitalia.

	Terg.			Pl.	Stern.		
	a.	m.	p.		a.	m.	p.
Abd. I	4	—	8	2	3	—	2
II, III	6	—	10	3	3	—	3
IV, V	6	—	10	3	3	—	8
VI	6	—	12	3	3	—	8
VII	4	—	12	2	3	—	8
VIII	4	7	4	2	—	4	—
IX	—	—	10	2	—	—	4
X	—	—	10	1	—	—	4
XI	—	—	4	1	2	—	4
XII	—	9	—	—	—	6	—

are only 3 setae on each anterior row.

From the chaetotaxy,  $P_3$  on abd. terg. VI is probably equivalent to  $a_2$  of the abd. terg. II-V, and what seems to be  $a_3$  is in reality  $a_4$ . Analogically, there are only  $a_2$  and  $a_1$  on the abd. terg. VII, the other  $a_2$  and  $a_3$  being absent. The species has remarkably 2 pleural setae on abd. IX.

Holotype:—1♂, Wakugafuchi, Ehime, Japan, Nov. 3, 1954, K. MORIKAWA, leg., to whom the species is dedicated.

Localities:—1♂, Wakugafuchi, Ehime, (3. XI, 1954, K. MORIKAWA), 2♂, Mt. Saragamine, Ehime (30. XI, 1954, K. MORIKAWA and K. OCHI), 2♂, Omogo-Kei, Ehime (23. X, 1954, K. MORIKAWA), 1♀, Mt. Takanawa, Ehime (23. X, 1954, K. MORIKAWA et T. YANO).

Affinity:—With the absence of the sensilla  $b'$  and presence of broad and short  $b$  on the fore-tarsus, the species is nearly related to *A. populeus* DA CUNHA of Portugal, from which our species is to be distinguished by the number of teeth of the comb on Abd. VIII and by the chaetotaxy of abdominal sternites

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