Water-Mites from Gifu Prefecture[1)]

By

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(*With* 35 *Text-figures*)

There has been no record on water-mites from Gifu Prefecture and its vicinity. Last autumn the author received from Mr. Jun Miyazaki, in Gifu Prefecture, many specimens of water-mites collected from Gifu Prefecture. This research is wholly based on the specimens collected by him from Oct. 1951 to Nov. 1952 mainly from the southern lowland regions in Gifu Prefecture. The species studied here are 42 listed as follows:

Fam. Hydrachnidae
1. *Hydrachna* (*Schizo.*) *uniscutata* var. *lita* Uchida

Fam. Eylaidae
2. *Eylais setosa japonica* n. ssp.

Fam. Protziidae
3. *Calonyx hadai* Imamura

Fam. Sperchonidae
4. *Sperchonopsis verrucosa* (Protz)
5. *Sperchon* (*Hispido.*) *plumifer* var. *danubialis* Szalay
6. *Sperchon* (*Hispido.*) *plumifer* var. *japonicus* n. var.

Fam. Atractideidae
7. *Torrenticola* (s. str.) *brevirostris* (Halbert)
8. *Torrenticola* (s. str.) *elliptica* Maglio
9. *Torrenticola* (s. str.) *gifuensis* n. sp.
10. *Torrenticola* (s. str.) *maglioi* (Koenike)

Fam. Limnesiidae
11. *Limnesia* (s. str.) *koenikei* var. *asiatica* Marshall
12. *Limnesia* (s. str.) *undulata* (Müller)

Fam. Hygrobatidae
13. *Hygrobates* (s. str.) *calliger* Piersig
14. *Hygrobates* (s. str.) *japonicus* Uchida
15. *Hygrobates* (s. str.) *longiporus* Thor
16. *Hygrobates* (s. str.) *minutus* Imamura
17. *Hygrobates* (s. str.) *papillosus* Imamura
18. *Hygrobates* (s. str.) *sinensis* Uchida & Imamura

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1) Contribution from the Biological Institute, Hokkaido Gakugei University.
Jour. Fac. Sci. Hokkaido Univ. Ser. VI, Zool., 11, 1953.

19. *Atractides* (s. str.) *nodipalpis* var. *miyazakii* n. var.
20. *Atractides* (s. str.) *nodipalpis nodipalpis* (Thor)
21. *Atractides* (s. str.) *violaceus* n. sp.
22. *Atractides* (s. str.) *gifuensis* n. sp.

Fam. Unionicolidae

23. *Unionicola* (*Peniatax*) *bonzi* (Claparède)
24. *Unionicola* (*Hexatax*) *crassipes* var. *miyazakii* n. var.
25. *Unionicola* (*Hexatax*) *crassipes minor* (Soar)
26. *Unionicola* (*Polyatax*) *japonensis* Viets
27. *Unionicola* (s. str.) *arcuata* (Wolcott)
28. *Unionicola* (s. str.) *uchidai* n. sp.
29. *Unionicola* sp.
30. *Neumania* (s. str.) *angulata* Sokolow

Fam. Feltriidae

31. *Feltria* (s. str.) *minuta* Koenike

Fam. Pionidae

32. *Tiphys* (?) sp.

Fam. Axonopsidae

33. *Brachypoda* (s. str.) *versicolor* (Müller)
34. *Axonopsis* (*Hexaxonopsis*) *fluviatilis* n. sp.
35. *Aturus* (s. str.) *duplex* Thor
36. *Aturus* (s. str.) *miyashitai* Uchida
37. *Aturus* (s. str.) *miyazakii* n. sp.
38. *Aturus* (s. str.) *japonicus* n. sp.
39. *Aturus* sp.
40. *Kongsbergia enamii* Imamura
41. *Kongsbergia rundiformis* n. sp.

Fam. Arrenuridae

42. *Arrenurus* (*Micruracarus*) *madarászi* (Daday)

Among these, *Unionicola* sp., *Tiphys* (?) sp. and *Aturus* sp. could not be decided their specific trivial names, because only the nymphs or the females were examined. As a North American form was found *Unionicola arcuata*. As new to science, counted 12 species as follows : *Eylais setosa japonica* ; *Sperchon plumifer* var. *japonicus* ; *Torrenticola gifuensis* ; *Atractides nodipalpis* var. *miyazakii* ; *Atractides violaceus* ; *Atractides gifuensis* ; *Unionicola crassipes* var. *miyazakii* ; *Unionicola uchidai* ; *Axonopsis fluviatilis* ; *Aturus miyazakii* ; *Aturus japonicus* ; *Kongsbergia rundiformis*.

In this paper the author adopted, according to the Viets' opinion (Karl Viets, 1949, pp. 292–302), the generic names, *Torrenticola*, *Atractides* and *Tiphys* in substitution for each one, *Atractides*, *Megapus* and *Acercus*, which have been used till now.

Before proceeding further it is with real pleasure that the author has to offer his most grateful thanks to Dr. Tohru Uchida, Pofessor of Zoology in Hokkaido University, through whose continual guidance and enocuragement this work has been done. His hearty thanks must be extended here to Mr. Jun

Miyazaki, in Gifu Prefecture, for his kindness in collecting materials and bringing them at the author's disposal.

1. *Hydrachna* (*Schizo.*) *uniscutata* var. *lita* Uchida

One male was captured on Oct. 3, 1951 in a pool in Kamihaguri-mura, Hajima-gun. This Japanese variety was described by Dr. Tohru Uchida in 1937 and by the author in 1952 from Kyushu.

2. *Eylais setosa japonica* n. ssp.[1]

(Fig. 1)

Female (holotype, prep. 935). Body globular in shape, dorso-ventrally flattened, 1053 μ long and 1047 μ wide in the widest portion. Skin soft, colourless,

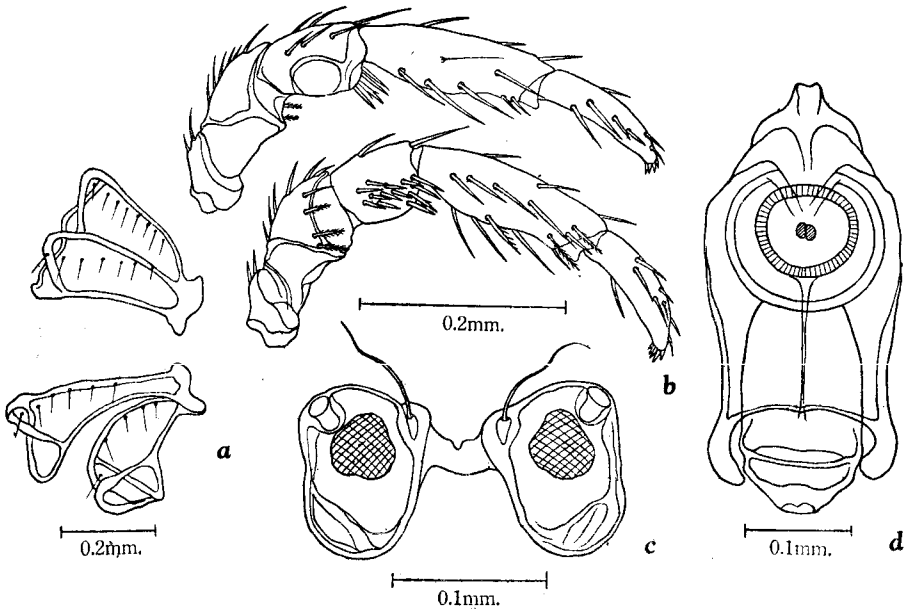

Fig. 1. *Eylais setosa japonica* n. ssp., female.
a. Epimera of right side. b. Palps. c. Ocular plates. d. Maxillar organ.

transparent and finely striated on all body surface. Ocular capsules 116 × 80 μ in diameters.

1) The subspecific trivial name has been offered in connection with the country where it was found.

Ocular bridge measuring 44 μ in length and the anterior margin is posteriorly a little dented in its middle portion. Palps with several spines, some of which feathered, on each segment as indicated in Fig. 1, b. Terminal segment with several spine-like claws in its terminal end. The measurements of palps are given in Table 1, in μ.

Table 1.

Segment	1	2	3	4	5
Extensor surface	64	116	88	184	124
Flexor surface	32	6	48	160	116

Epimera yellowish in colour, indicating finely meshed appearance. The first, second and the third legs are densely provided with many spines in the terminal ends of the sixth segments besides two claws. Third legs with many swimming hairs in the third to fifth segments mostly in each terminal portion. The measurement of the pedal segments is given in Table 2, in μ.

Table 2.

Leg \ Segment	1	2	3	4	5	6
I	68	116	144	148	196	208
II	72	136	160	176	224	208
III	68	160	200	208	256	240
IV	104	184	236	240	292	256

The body colour is probably red, though it is not determined in preservative.

Locality. One female was captured on May 14, 1951 in a pond in Shimohaguri-mura, Hajima-gun.

Remarks. The ocular plate of this subspecies resembles those of *E. setosa tantilla* (Koen.) in Europe and East-Siberia, and *E. tantilliformis* Sokolow in Ussuri-Regions, it is somewhat different in the shape of eye bridge.

3. *Calonyx hadai* Imamura

One male of this endemic species was captured on Oct. 20, 1952 in the River Kayu, Takada-mura, Gunjo-gun. The present speices was first recorded by the author in 1953 as a new species from Sandan-kyo torrent in Hiroshima Prefecture.

4. *Sperchonopsis verrucosa* (Protz)

(Fig. 2)

Male. Body oval in shape, 425 μ wide, 588 μ long in dorsum and 650 μ

long in venter. Skin thick and covered with small conical papillae which are thickly set near the periphery and are sparsely distributed both in dorsum and venter in the median portion. Many glandular warts, with papillae as in the other parts of skin are found both in dorsum and venter as shown in Figs. 2, a &b. Fine striations present besides small papillae in all the skin. Eyes projecting a little over the body surface, measuring interval 300 μ. Maxillar organ 228 μ long and 103 μ wide in the widest portion, making a long proboscis. Palps stout and moderately curved, measuring the segments as in Table 3, in μ.

Table 3.

Segment	1	2	3	4	5
Extensor surface	27	108	93	84	27
Flexor surface	18	78	63	66	15

Second segment with a stout conical process in the flexor terminal end. Third segment with a feathered bristle on the extensor surface in middle portion and a bristle in the terminal end. Fourth segment slender and long, courving extensorly

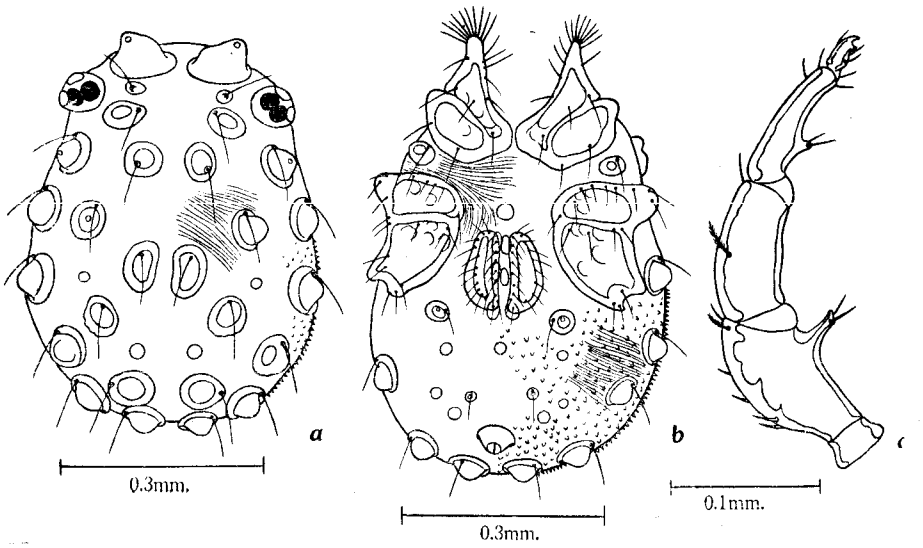

Fig. 2. *Sperchonopsis verrucosa*, male.
a. Dorsal view. b. Ventral view. c. Left palp.

a little, with a conical rising in flexor surface near the basal portion. Epimera region 388 μ long, 400 μ wide and figured as in Fig. 2, b. Legs destitute of

swimming hairs and the dimensions of the segments are as in Table 4, in μ.

Table 4.

Leg \ Segment	1	2	3	4	5	6
I	40	52	72	108	120	112
II	52	64	80	124	140	132
III	40	68	84	148	164	160
IV	92	96	104	204	200	172

Genital plates half-moon in shapes and measured 124 μ long and 40 μ wide in the largest dimensions, enclosing six acetabula between them. Excretory pore opening in venter near the posterior margin on the summit of a conical wart. Colour reddish brown.

Locality. One male was captured on Nov. 9, 1951 in a brook in Akasaka-machi, Fuha-gun.

Remarks. A variety of this cosmopolitan species was recorded by Dr. Tohru Uchida in 1934 from Hyogo Prefecture. The present specimen consulted in this paper is wholly coincided with the species found in all Europe, Caucasus, Ussuri Regions, Siberia, Canada and North America.

5. *Sperchon* (*Hispido.*) *plumifer* var. *danubialis* Szalay

(Figs. 3 & 4)

Male (Fig. 3). Body globular in shape, 564 μ long and 537 μ wide in the widest portion in dorsum. Skin marked with the figures of hexagonal network, bearing innumerable minute hairs and besides them, indicated finely striated figures on all body surface, except epimera, genital plates and glandular plates. Body contour, glandular plates, epimera and genital organ all illustrated in Figs. 3, a & b. So there are only given measurements as follows. Interval between eyes 300 μ. Maxillar organ 165 μ long and 115 μ wide in the widest portion. Mandibles 56 μ high and 220 μ long, including a claw which is curved like a sickle. Palps long as compared with the body, measuring as in Table 5, in μ.

Table 5.

Segment	1	2	3	4	5
Extensor surface	28	124	160	196	38
Flexor surface	20	68	104	156	—
Height	62	112	96	32	20

First segment short and spineless. Second segment most thick with eight fea-

thered short bristles, several spines mostly on the extensor surface and a concical long protrusion in the flexor terminal end. Third segment with several spines. Fourth segment long, slender and curved a little extensorly. The measurements of the pedal segments are given in Table 6, in μ.

Table 6.

Leg \ Segment	1	2	3	4	5	6
I	48	64	80	152	144	128
II	56	64	96	168	168	172
III	56	56	96	180	192	192
IV	120	104	116	224	220	204

Legs all devoid of swimming hairs. Fourth legs with several feathered fine hairs in the third to fifth segments as illustrated in Fig. 3, c. Genital plates 130μ long. Nephridial pore opening in venter near the posterior margin.

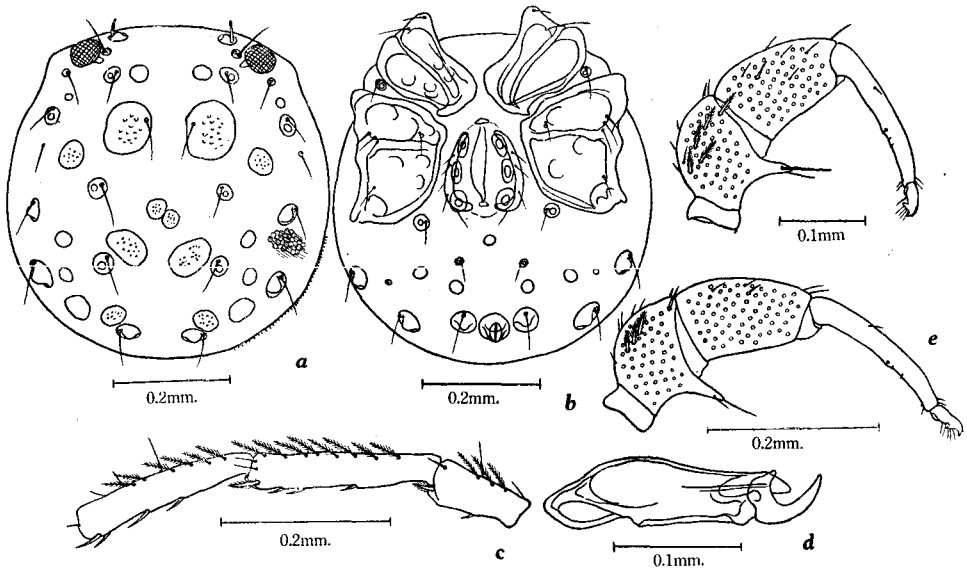

Fig. 3. *Sperchon plumifer* var. *danubialis*, male.
a. Dorsal view. b. Ventral view. c. Third to fifth segments of left IVth leg.
d. Mandible. e. Palps.

Female (Fig. 4). Body larger than that of the male, measuring 972 μ

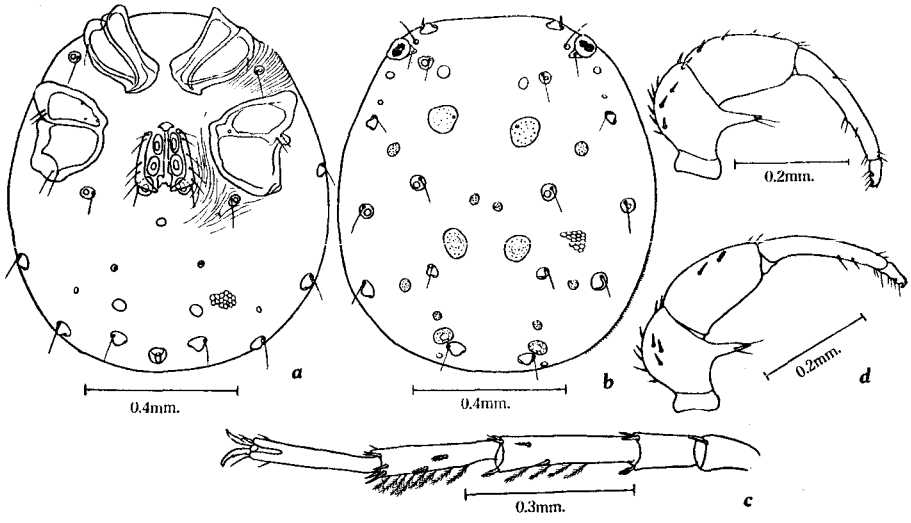

Fig. 4. *Sperchon plumifer* var *danubialis*, female.
a. Venter. b. Dorsum. c. Right IVth leg. d. Palps.

long and 875 μ wide. Skin same as that of male. Interval between eyes 486 μ. Mandibles 70 μ high and 290 μ long, including a claw in each. Body contour, glandular plates, epimera and genital organ shown in Figs. 4, a & b. Palpal segments given in Table 7, in μ.

Table 7.

Segment	1	2	3	4	5
Extensor surface	32	156	200	248	44
Flexor surface	28	88	132	184	—
Height	80	128	108	44	—

The dimensions of the pedal segments are given in Table 8, in μ.
Fourth legs with several feathered hairs in third to fifth segments as shown in Fig. 4, c. Genital plates 163 μ long.

Localities. Three males and two females were collected on Aug. 20, 1951 in the River Nagara, Gifu City and a male was captured on Oct. 20, 1952 in the River Kayu, Takada-mura, Gunjo-gun.

Remarks. The species *Sperchon plumifer* being divided into several subspecies or varieties from various localities. The present specimens captured from Gifu Prefecture resemble most *S. plumifer* var. *danubialis* Szalay (1932) from the River Danube.

Table 8.

Leg \ Segment	1	2	3	4	5	6
I	48	72	92	172	168	160
II	64	88	116	200	196	196
III	68	80	116	216	220	216
IV	120	132	136	260	256	236

6. *Sperchon (Hispido.) plumifer* var. *japonicus* n. var.[1]

(Fig. 5)

Male (holotype, prep. 971). Body globular in shape, 567 μ long and 534 μ wide. Skin soft with hexagonal patterns besides the figures of fine striations and covered with many minute hairs on all body surface. Chitinous plates developed well in dorsum and venter as illustrated in Figs. 5a & b. Interval between eyes 308 μ. Maxillar organ 172 μ long and 128 μ wide in widest part. Palps shown in Fig. 5, f, measuring the segments as in Table 9, in μ.

Table 9.

Segment	1	2	3	4	5
Extensor surface	24	112	152	208	40
Flexor surface	20	68	100	168	—

Epimera region 333 μ long and 444 μ wide in widest dimensions. The measurements of pedal segments are given in Table 10, in μ.

Table 10.

Leg \ Segment	1	2	3	4	5	6
I	52	56	72	136	132	128
II	56	60	84	156	152	152
III	56	60	88	168	180	180
IV	104	88	108	208	200	184

Fourth legs with several feathered fine hairs in the third to fifth segments as illustrated in Fig. 5, c. Genital plates 140 μ long. Nephridial pore opening in

1) The new variety has been named associated with the country from where the specimens were captured.

venter near the posterior margin.

Locality. Three males were captured on Aug. 20, 1951 in the River Nagara, Gifu City.

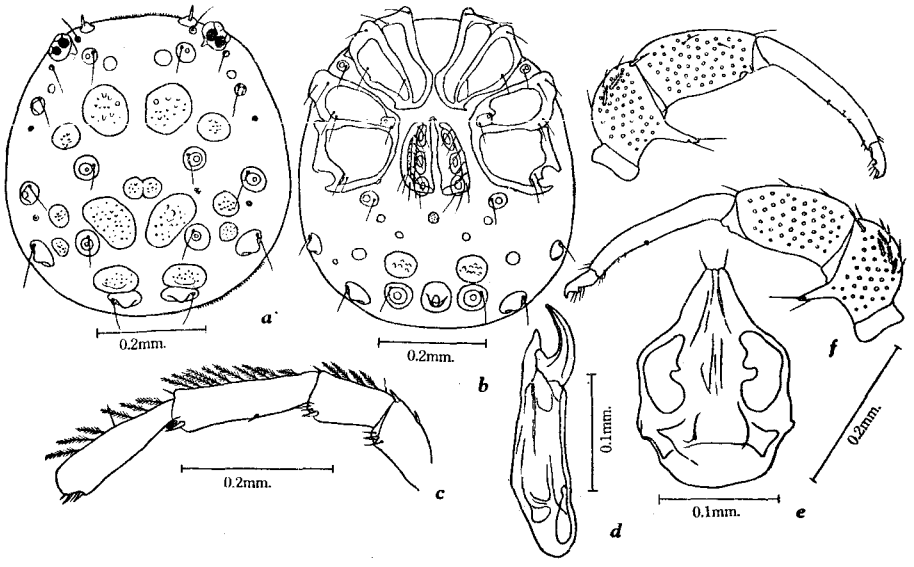

Fig. 5. *Sperchon plumifer* var. *japonicus* n. var., male.
a. Dorsal view. b. Ventral view. c. Second to fifth segments of right IVth leg.
d. Mandible. e. Maxillar organ. f. Palps.

Remarks. Though the present variety resembles *S. plumifer* s. str. ; *S. plumifer westfalicus* Viests ; *S. elegans* Thor ; *S. plumifer danubialis* Szalay, it is different in details of the chitious plates on the skin from those species. Present species seems to be a new veriety from Japan.

7. *Torrenticola* (s. str.) *brevirostris* (Halbert)

(Fig. 6)

Male. Body elliptical in shape, 665 μ wide, 810 μ long in dorsum aud 956 μ long in venter. Dorsal shields, epimera and genital field as indicated in Figs. 7. a & c. Maxillar organ 325 μ long. Maxillar pocket broad and 162 μ long. Mandibles 370 μ long, including a claw in each. Palps shown in Fig. 7, b, measuring the segments as in Table 11. Measurements of the pedal segments as in Table 12, in μ.

Genital area of ellipse in shape, 207 μ long and 155 μ wide in the largest dimensions. Body colour reddish brown.

Table 11.

Segments	1	2	3	4	5
Extensor surface	32	104	72	106	32
Flexor surface	20	80	52	72	—

Table 12.

Leg \ Segment	1	2	3	4	5	6
I	—	76	100	120	132	104
II	—	88	92	116	120	140
III	—	92	100	140	168	160
IV	116	120	144	192	212	200

Locality. Two males were collected on Oct. 20, 1952 in the River Kayu, Takada-mura, Gunjo-gun.

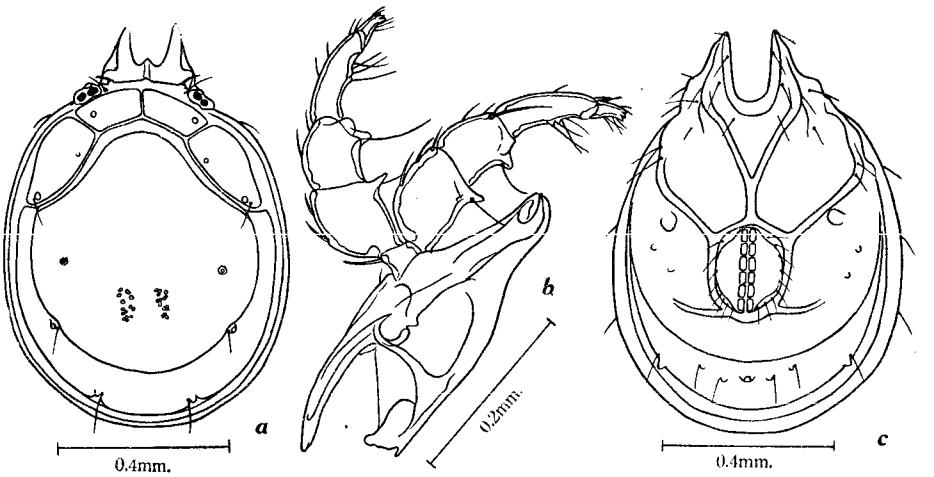

Fig. 6. *Torrenticola brevirostris*, male.
a. Dorsum. b. Maxillar organ with palps. c. Venter.

Remarks The specimens from Gifu Prefecture are well coincided with the descriptions of Soar & Williamson (1927) and Viets (1936). This is the first record of this European species from Japan.

8. *Torrenticola* (s. str.) *ellipiica* Maglio

Female. The body shape, dorsal plates, palps, epimera, legs and the external genital organ are all equal in shapes to those of male. Body larger than that of male, 500 μ wide, 675 μ long in dorsum and 787 μ long in venter. Interval between eyes 187 μ. Maxillar organ 80 μ wide in the widest part. Mandibles 370 μ long, including a claw in each. Palpal segments as in Table 13, in μ.

Table 13.

Segment	1	2	3	4	5
Extensor surface	28	103	51	85	17
Flexor surface	23	85	28	68	—

Genital plates 163 μ long and 150μ wide in both. Body colour reddish brown.

Locality. One female was captured on Oct. 20, 1952 in the River Nagara, Gifu City.

Distribution. Europe. Siberia, Japan (Izu Peninsula, Hiroshima Pref.).

Remarks. The male of the present species was recorded by the author from Hiroshima Prefecture in 1953.

9. *Torrenticola* (s. str.) *gifuensis* n. sp.[1]

(Fig. 7)

Male (holotype, prep. 993). Body oval in shape, 648 μ wide in the widest part, 950 μ long in venter and 793 μ long in dorsum. Dorso-ventral thickness moderate. Interval between eyes 227. Large dorsal plate lying clear from the four smaller anterior plates and not emblasing the hinder ends of the posterior pair of these. Each plates with a gland-pore. Maxillar organ very short in length, measuring 160 μ. Mandibles 222 μ long, including a claw in each. Palps thick and characteristic of bristles as indicated in Fig. 6, c. The dimensions of the palpal segments are given in Table 14, in μ.

Table 14.

Segment	1	2	3	4	5
Extensor surface	21	66	39	54	24
Flexor surface	15	39	30	39	24
Height	36	45	39	27	15

1) This new species has been named in connection with the locality where the specimen was collected.

First segment with a spine moderately long. Second segment largest of all with a long non-feathered spine in the flexor inner terminal end and two spines on the extensor surface. Third segment having a clearly feathered long spine near the terminal end of the flexor surface and four spines, one of which prominently long, on the extensor surface. Fifth segment moderately long and with three claws. Epimera covering less than two-thirds venter as shown in Fig. 6, b. Maxillar pocket characteristically narrow and 181 μ long. Pedal segments measured as in Table 15, in μ.

Table 15.

Leg \ Segment	1	2	3	4	5	6
I	44	72	96	120	120	112
II	44	68	84	128	160	160
III	—	80	104	148	180	180
IV	108	100	140	176	204	188

Genital area about 188 μ long and 160 μ wide in the largest dimensions. Nephridial pore lying at the middle between the posterior margin of genital area and posterior body margin. On each side two gland-pores. Colour reddish brown. Chitin skin blackish brown.

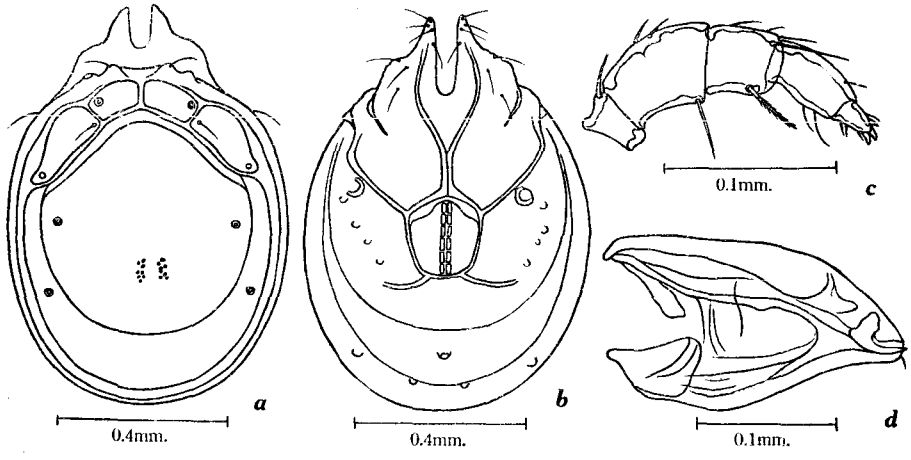

Fig. 7. *Torrenticola gifuensis* n. sp., male.
a. Dorsal view. b. Ventral view. c. Left palp. d. Maxillar organ.

Locality. A male was captured on Oct. 20, 1952 in the River Kayu,

Takada-mura, Gunjo-gun.

Remarks. Though similar to *T. stadleri* (Walter) in Europe and to *T. kyphophorus* (Viets) in Sumatra, it is different in the narrawness of the maxillary pocket and the spines in palps.

10. *Torrenticola* (s. str.) *maglioi* (Koenike)

(Fig. 8)

Male. Body of short ellipse in shape, 548 μ long in dorsum, 632 μ long in venter and 437 μ wide in the widest portion. Eyes elevated over from the body surface, measuring interval 207 μ. Dorsal surface almost occupied with a main plate and two pairs of accessory plates. Frontal pair of trapezoid in shape, situating near each other. Maxillar pocket broad. Maxillar organ 216 μ long and 80 μ wide in the widest part. Mandibles 308 μ long, including a claw in each. Palpal segments measured as in Table 16, in μ.

Table 16.

Segment	1	2	3	4	5
Extensor surface	28	84	52	84	28
Flexor surface	18	64	40	56	26
Height	34	56	48	28	14

Terminal ends of the flexor surfaces in second and third segments each with a conical process on which summit with a hair. Fourth segment bent a little to the flexor side. Terminal segment with three claws. Almost all part in venter is occupied with epimera and genital area as shown in Fig. 8, a. Legs measured segments as in Table 17, in μ. Genital area very large and situated in the posterior

Table 17.

Leg \ Segment	1	2	3	4	5	6
I	—	64	76	92	104	84
II	—	60	68	96	116	124
III	—	64	80	116	148	148
IV	100	108	120	156	180	164

part of venter as compared with those of the other species, measuring 178 μ long and 148 μ wide in the widest portion. Excretory pore lying in venter near the posterior margin. Body colour yellowish brown. Epimera, palps and legs purplish red.

Locality. One male was captured on Oct. 29, 1952 in the River Kayu, Takada-mura, Gunjo-gun.

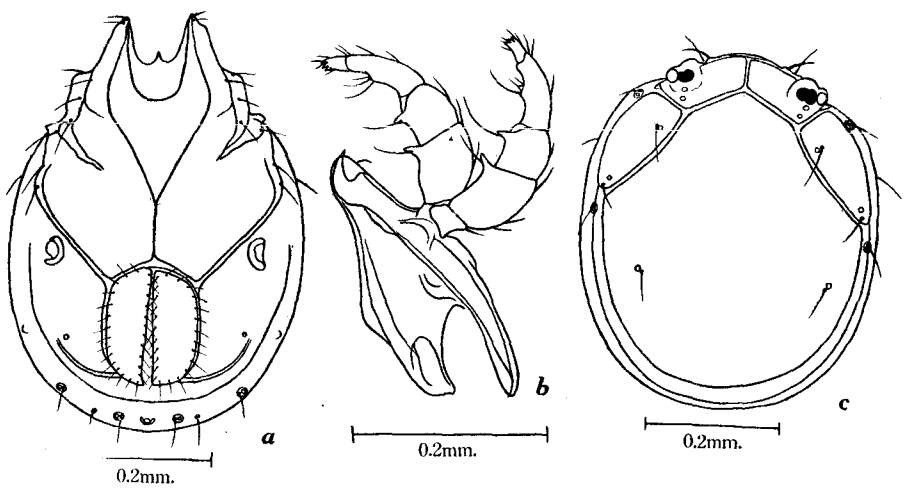

Fig. 8. *Torrenticola maglioi*, male.
a. Venter. b. Maxillar organ with palps. c. Dorsum.

Remarks. The present male specimen coincides on the whole with the description by Soar & Williamson (1927). This is the first record of this European species from Japan.

11. *Limnesia* (s. str.) *koenikei* var. *asiatica* Marshall

(Fig. 9)

Male. Body of oval in shape, 788 μ long and 650 μ wide. Skin soft, colourless, transparent and figureless. Postero-dorsal plate, which measured 52 μ long and 48 μ wide, and glandularia as in Fig. 9, a. Interval between eyes 238 μ. Maxillar organ 150 μ long and 85 μ wide in the widest portion. Mandibles (Fig. 9, d) 56 μ high and 240 μ long, inclusive of a claw in each. Palps characteristic of shapes as in Fig. 9, c. Palpal segments measured as in Table 18, in μ. First segment short and spineless. Second segment broadest of all, having a club-shaped bristle on the elavated flexor terminal end and four spines, of which one feathered, on extensor surface. Third segment expanded in flexor surface and with five spines on extensor surface. Fourth sgement slender and long, courving outwardly a little. Epimera and genital plates as in Fig. 9, b. Pedal segments measured as in Table 19, in μ.

Table 18.

Segment	1	2	3	4	5
Extensor surface	12	80	76	128	36
Flexor surface	28	48	48	104	40
Height	36	60	44	26	12

Table 19.

Leg \ Segment	1	2	3	4	5	6
I	40	60	88	104	112	132
II	44	68	100	128	148	148
III	64	60	84	124	132	120
IV	104	104	120	168	180	168

Terminal spine (Fig. 9, e) of fourth leg 120 μ long. Swimming hairs presented each seven in fifth segments of third legs and each five in fourth and fifth segments of fourth legs. Genital plates 130 μ long and 68 μ wide in widest portion in each.

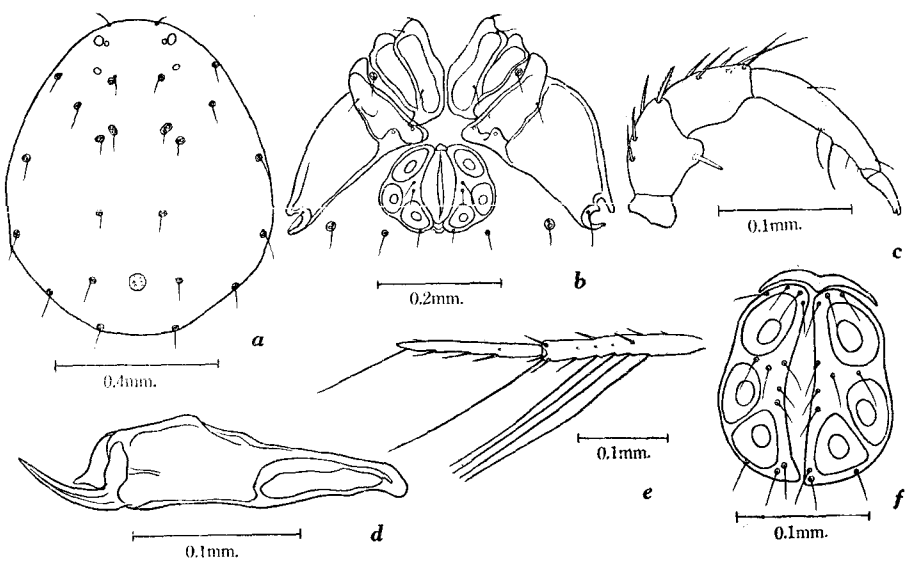

Fig. 9. *Limnesia koenikei* var. *asiatica*.
a. Dorsum of male. b. Epimera and genital area of male. c. Right palp of male. d. Mandible of male. e. Fifth and sixth segments of male right IVth leg. f. Genital organ of female.

Genital opening 114 μ long. Body colour yellowish brown.

Female. Body and organs, except genital organ, all equal in shapes to those of male. It seems sufficient to indicate the figure of the genital organ as in Fig. 9, f. Genital plates 148 μ long and 60 μ wide in widest portion in each.

Locality. Six males and a female were collected in a pond in Takada-mura, Gunjo-gun.

Remarks. This variety was first recorded by Dr. Marshall (1928) as a new variety from Middle China. This is the first record of this variety from Japan.

12. *Limnesia* (s. str.) *undulata* (Müller)

(Fig. 10)

Nymph. Body oval in shape, 480 μ long and 385 μ wide. Skin soft, colourless, transparent and with finely striated figures on all body surface. Postero-dorsal plate 36 μ long and 34 μ wide. Eyes in two pairs, measuring interval 125 μ in anterior pair. Maxillar organ 111 μ long and 82 μ wide in the widest portion. Mandibles 48 μ high and 180 μ long, including a claw in each. Palps measured the segments as in Table 20, in μ.

Table 20.

Segment	1	2	3	4	5
Extensor surface	16	84	56	120	32
Flexor surface	20	52	32	88	—
Height	48	56	48	28	16

First segment spineless. Second segment of trapezoid in shape, having three spines on the extensor margin. Third segment with two spines rather long. Figures of epimera and genital plates given in Fig. 10, a. Epimera region 280 μ long and 318 μ wide. Pedal segments given in Table 21, in μ.

Table 21.

Leg \ Segment	1	2	3	4	5	6
I	28	44	60	68	84	80
II	56	44	76	100	124	120
III	44	48	68	104	128	100
IV	80	68	88	132	164	196

Terminal spine of fourth leg 134 μ long. Genital plates each with two acetabula on it, fused with each other, measuring 120 μ wide and 76 μ long in the largest

dimensions. Genital aperture not opened. Body colour light brown.

Localities. A nymph was captured on Oct. 18, 1952 in a pond in Shimohaguri-mura, Hajima-gun ; four males, three females and two nymphs were collected on Oct. 29, 1952 in a pond in Kagami-mura, Inaba-gun.

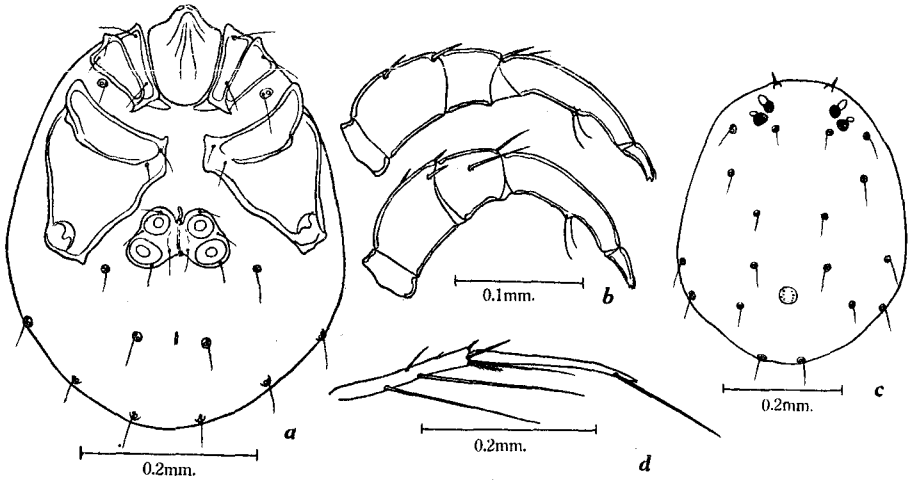

Fig. 10. *Limnesia undulata,* nymph.
a. Ventral view. b. Palps. c. Dorsal view. d. Fifth and sixth segments of left IVth leg.

Remarks. This cosmopolitan species was described by the author in 1953 from Hyogo Prefecture and seems common in Japan.

13. *Hygrobates* (s. str.) *calliger* Piersig

(Fig. 11)

The present species seems common in Japan and was collected in streams in several localities as follows : in 1951, three males and four females, one of which is aberrant in the one of the genital plates as in Fig. 11, on Aug. 12 in Shimohaguri-mura, Hajima-gun ; three females on Oct. 3 in Kamihaguri-mura, Hajima-gun ; each one male and nymph on Oct. 20 in Iwanoda, Gifu City ; one male on Nov. 9 in Nagamori, Gifu City ; four males, five females and two nymphs on Nov. 9 in Akasaka-machi, Fuha-gun, and in 1952, one female on May 6 in Kasamatsu-machi, Hajima-gun ; one male and three females on May 18 in Unuma-machi, Inaba-gun.

This Eurasiatic species was recorded by the author in 1953 from Hiroshima Prefecture.

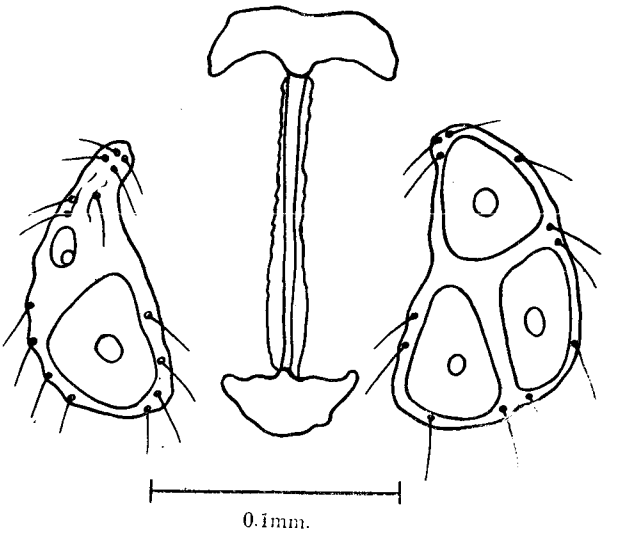

Fig. 11. *Hygrobates calliger*, female.
Aberrant genital plate.

14. *Hygrobates* (s. str.) *japonicus* Uchida

(Fig. 12)

Syn. *Hygrobates bituberosus* Sokolow, ♀, Sokolow, 1931.

Male. Body ellipsoidal in shape, 567 μ long and 454 μ wide. Skin soft, colourless, transparent and finely striated. Interval between eyes 194 μ. Maxillar organ 89μ wide in the widest portion. Mandibles 67μ high and 260μ long including a claw in each. Palps characteristic of shapes as shown in Fig. 12, b. First segment short and with a spine in the extensor terminal end. Second segment broad and with six bristles on the extensor surface and a conical process in the flexor distal end. The process is covered with small conical papillae. Third segment characterized in conically protruded flexor surface with many conical papillae. Fourth segment the largest, curving extensorly a little. The segments are measured as in Table 22, in μ.

Table 22.

Segment	1	2	3	4	5
Extensor surface	26	112	76	132	50
Flexor surface	28	64	64	108	52

Epimera region illustrated in Fig. 12, a, measuring the region 418 μ long and 452 μ

wide. Legs all destitute of swimming hairs. Pedal segments measured as in Table 23, in μ.

Table 23.

Leg \ Segment	1	2	3	4	5	6
I	60	72	108	152	152	152
II	52	72	108	160	164	160
III	64	76	124	188	200	196
IV	112	108	164	228	240	220

Genital plates 192 μ wide with both and 140 μ long. Genital aperture 72 μ long. Colour brown. Eyes black.

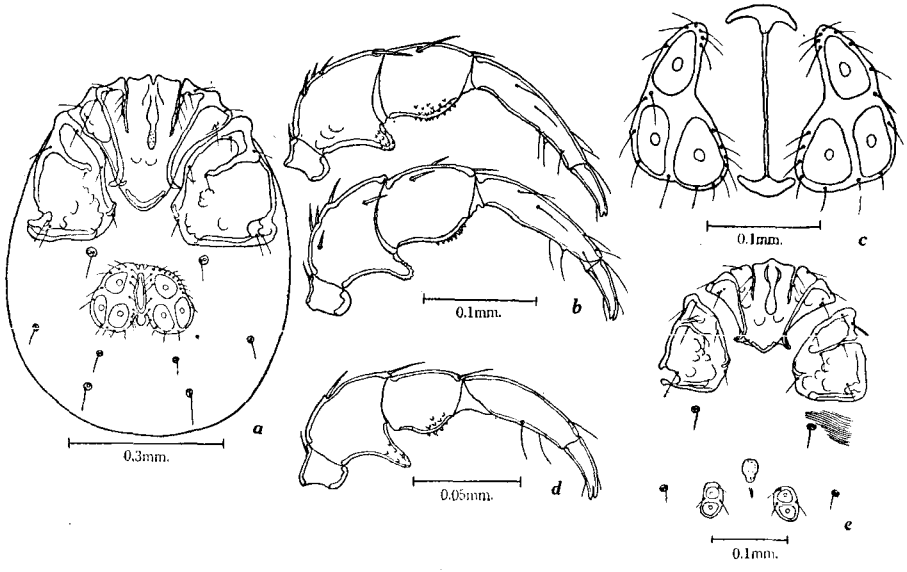

Fig. 12. *Hygrobates japonicus.*
a. Venter of male. b. Palps of male. c. Genital organ of male. d. Palp of nymph. e. Venter of nymph.

Female. Body shape, colour, skin and organs, except genital organ, all similar to those of male. So there are only given measurements as follows. Body 573 μ long in dorsum and 486 μ wide. Interval between eyes 195 μ. Maxillar organ 104 μ wide in the widest part. Mandibles 67 μ high and 304 μ long, inclusive

of a claw in each. Palpal segments as in Table 24, in μ.

Table 24.

Segment	1	2	3	4	5
Extensor surface	36	128	88	148	56
Flexor surface	32	72	72	120	46

Genital plates 140 μ long. Genital opening 126 μ long.

Nymph (Figs. 12, d, e). Body shape, colour, skin, epimera and mouth parts all resemble almost those of imagines. Body 380 μ long in dorsum and 310 μ wide in the widest part. Interval between eyes 120 μ. Maxillar organ 48 μ wide in the widest dimension. Mandibles 21 μ high and 114 μ long, inclusive of a claw in each. Palps few in the number of spines as compared with those of adults, measuring the segments as in Table 25, in μ.

Table 25.

Segment	1	2	3	4	5
Extensor surface	12	48	36	60	27
Flexor surface	9	27	30	42	—

The measurement of the pedal segments is given in Table 26, in μ. Provisional genital plates almost elliptical in shape, 45 μ long and 30 μ wide in the largest dimensions, having two round acetabula and three minute hairs as in Fig. 12, e. Mid-anterior portion between the provisional genital plates is found a chitinous plate which seems to be a provisional genital suspender. No genital aperture.

Table 26.

Leg \ Segment	1	2	3	4	5	6
I	30	27	45	69	72	75
II	30	36	48	75	81	87
III	30	36	54	84	96	99
IV	60	69	75	114	126	117

Locality. Seven males, six females and two nymphs were collected on Oct. 21, 1951 among water weeds in the River Toba, Iwanoda, Gifu City.

Distribution. Japan (Tokyo, Gifu Pref.), Ussuri-Regions.

Remarks. Though the specimens collected from Gifu Prefecture are smaller and somewhat different in the shape of third palpal segment as compared

with those of the specimens described by Dr. T. Uchida (1931) from Tokyo as a new species and by Sokolow (1931) from Ussuri-Regions, the present specimens seem to be the younger forms of this Oriental species.

15. *Hygrobates* (s. str.) *longiporus* Thor

This Eurasiatic species was reported by the author in 1953 from Hiroshima Prefecture. One nymph was captured on Oct. 20, 1952 in the River Kayu, Takada-mura, Gunjo-gun.

16. *Hygrobates* (s. str.) *minutus* Imamura

The present species was recorded by the author in 1953 as a new species from Hiroshima Prefecture. Specimens collected in 1951 from several localities in Gifu Prefecture as follows: two males and a female on Oct. 3 in Kamihaguri-mura, Hajima-gun ; one male and four females on Nov. 9 in Akasaka-machi, Fuha-gun ; each two males and females on Nov. 9 in Nagamori, Gifu City.

17. *Hygrobates* (s. str.) *papillosus* Imamura

One male was captured on Oct. 3, 1951 in a stream in Kamihaguri-mura, Hajima-gun. This endemic species was recorded by the author in 1953 from Hiroshima Prefecture as a new species.

18. *Hygrobates* (s. str.) *sinensis* Uchida & Imamura

(Fig. 13)

The present species was recorded in male and female by Dr. T. Uchida and T. Imamura (1951) as a new species from a lake in Wuchang, Hupeh, Middle China. The male and female specimens from Gifu Prefecture are mostly coincided with those of the Chinese ones, so the author gives in this paper only their figures and the description of a nymph as follows.

Nymph (nymphotype, prep. 963). Body ellipsoidal in shape, 296 μ long and 230 μ wide in the widest portion. Skin soft, colourless, indicating fine striations on all body surface as in adults. Interval between eyes 89 μ . Maxillar organ 41 μ wide in the widest part. Palps mostly equal in shape to those of imagines, measuring the segments as in Table 27, in μ.

Table 27.

Segment	1	2	3	4	5
Extensor surface	12	36	22	48	24
Flexor surface	12	16	20	36	20
Height	16	24	22	18	8

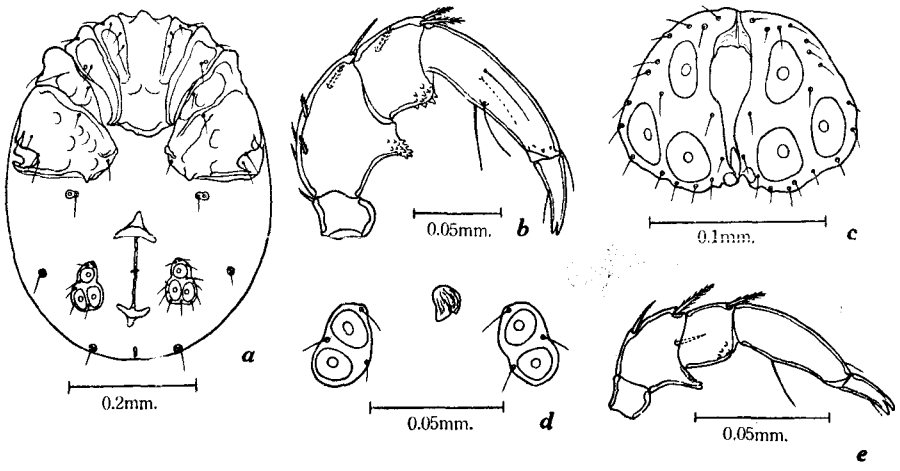

Fig. 13. *Hygrobates sinensis.*
a. Venter of female. b. Left palp of male. c. Genital organ of male. d. Provisional genital organ of nymph. e. Palp of nymph.

The legs are all destitute of swimming hairs as in those of adults. The measurements of legs are given in Table 28, in μ.

Table 28.

Leg \ Segment	1	2	3	4	5	6
I	24	24	32	48	54	64
II	24	24	36	56	62	72
III	28	28	42	64	76	80
IV	40	36	56	80	96	88

Provisional genital organ illustrated in Fig. 13, d, measuring the plates each 34 μ long and 20 μ wide in the widest portion, with two acetabula and three minute sensory hairs in each. Colour yellowish brown. Eyes black.

Locality. Two males, four females and a nymph were captured on Aug. 12, 1951 in a gently flowing stream of the River Kiso, Shimohaguri-mura, Hajima-gun.

Distribution. Middle China, Japan.

19. *Atractides* (s. str.) *nodipalpis* var. *miyazakii* n. var.[1]

(Figs. 14-16)

Male (holotype, prep. 976). Body oval in shape, 422 μ wide in widest portion, 520 μ long in dorsum and 577 μ long in venter. Skin soft, colourless, transparent and finely striated on all body surface. Epimera, genital plates, legs all light black in colour. Interval between eyes 155 μ. Maxillar organ 111 μ long and 74 μ wide in widest portion. Palps measured as in Table 29, in μ.

Table 29.

Segment	1	2	3	4	5
Extensor surface	28	68	76	96	36
Flexor surface	24	36	52	76	36
Height	32	56	44	36	16

First segment trapezoidal in shape, having a spine in the extensor terminal end. Second segment the broadest, conically protruded in the flexor distal portion, having five feathered and a non-feathered bristles. Third segment with three spines and several hairs. Fourth segment with many sensory hairs mostly in the

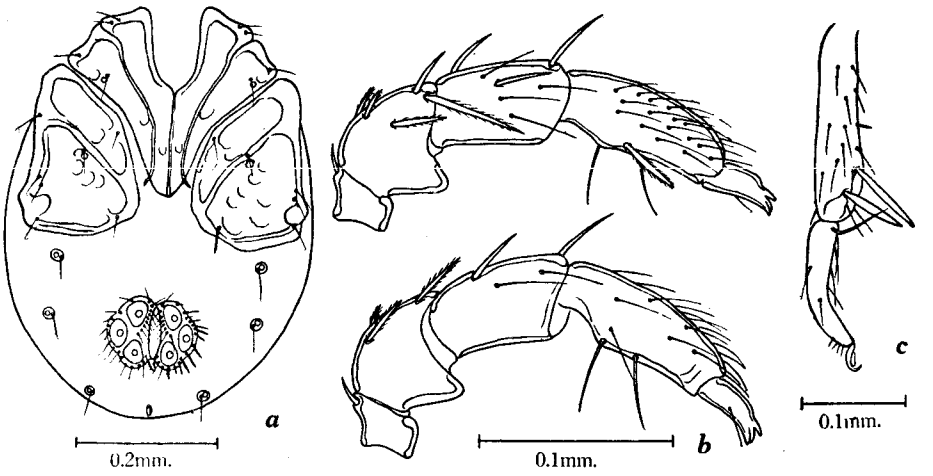

Fig. 14. *Atractides nodipalpis* var. *miyazakii* n. var., male.
a. Venter. b. Palps. c. Fifth and sixth segments of right Ist leg.

1) This new variety has been named in honour of Mr. Jun Miyazaki who has collected these specimens.

extensor side and a club-shaped spine, which feathered, and two slender spines in the flexor edge. Fifth segment trifurcated in its terminal end. Epimera indicated in Fig. 14, a. Epimera region 326 μ long and 400 μ wide in the largest dimensions. Legs all destitute of swimming hairs, measuring segments as in Table 30, in μ.

Table 30.

Leg \ Segment	1	2	3	4	5	6
I	52	72	120	184	188	132
II	48	56	100	136	140	140
III	48	60	108	164	176	160
IV	112	92	160	212	220	196

Terminal segments of the first legs bent moderately as in Fig. 14, c. Genital plates almost round, 108 μ long, 128 μ wide in each in the widest dimension and fringed with many sensory hairs. Genital aperture 72 μ long. Excretory pore opening in venter at the posterior margin. Body colour blackish brown. Eyes reddish black.

Female (allotype, prep. 974). Body shape, skin, colour and legs all similar to those of male. Body larger than male, 632 μ wide in the widest portion, 745 μ long in dorsum and 793 μ long in venter. Interval between eyes 210 μ. Maxillar organ 145 μ long and 80 μ wide in the widest part. Mandibles 240 μ long, inclusive of a claw in each. Palps measured as in Table 31, in μ.

Table 31.

Segment	1	2	3	4	5
Extensor surface	28	72	108	120	40
Flexor surface	24	40	84	108	40
Height	32	52	44	28	16

All segments thinner than those of male. The second segment has no conical protrusion in its flexor surface. Epimera region relatively small as compared with those of male. Pedal segment measured as in Table 32, in μ.

Table 32.

Leg \ Segment	1	2	3	4	5	6
I	52	92	156	236	240	160
II	60	68	124	172	176	172
III	56	76	136	200	212	192
IV	128	116	192	256	268	232

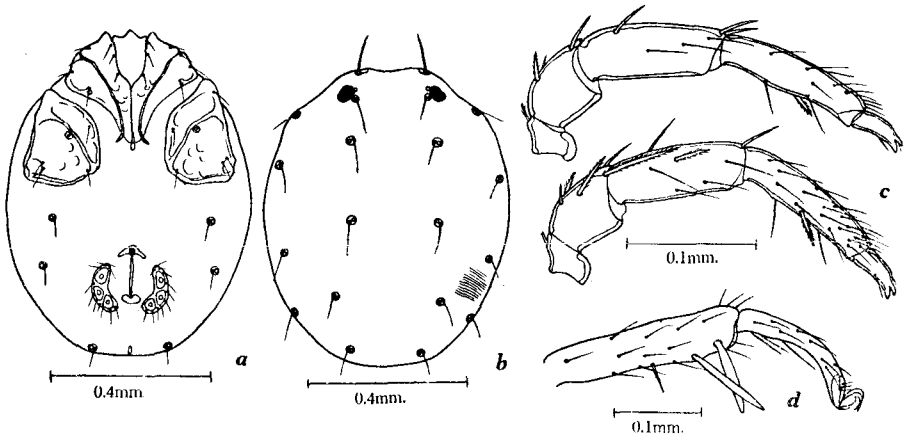

Fig. 15. *Atractides nodipalpis* var. *miyazakii* n. var., female.
a. Venter. b. Dorsum. c. Palps. d. Fifth and sixth segments of right 1st leg.

Genital plates 132 μ long and 52 μ wide in the widest portion. Genital opening 120 μ long. Excretory pore opening in venter at the rear margin.

Nymph (nymphotype, prep. 962). Body, skin and organs coincide globely with those of adults. Body oval in shape, 340μ long and 280 μ wide in the widest portion. Interval between eyes 111 μ. Mandibles 128 μ long, inclusive of a claw in each. Palps measured as in Table 33, in μ.

Table 33.

Segment	1	2	3	4	5
Extensor surface	16	40	44	56	24
Flexor surface	10	20	32	44	22
Height	16	28	24	20	12

Bristles in palps fewer in numbers than those of imagines as indicated in Fig. 16, b. Epimera region 240 μ wide and 192 μ long in the largest dimensions. Legs all destitute of swimming hairs. The measurements of segments are as in Table 34, in μ.

Table 34.

Leg \ Segment	1	2	3	4	5	6
I	28	36	52	88	100	72
II	28	28	44	64	72	80
III	32	28	52	76	88	92
IV	56	52	84	112	128	112

Provisional genital plates 48 μ long and 28 μ wide in the widest portion and with two large acetabula in each. Genital pore not opened.

Localities. Collected in 1951, one male and three females on Aug. 20 in the River Nagara, Gifu City ; one nymph on Aug. 12 in a branch stream of the River Kiso, Shimohaguri-mura, Hajima-gun.

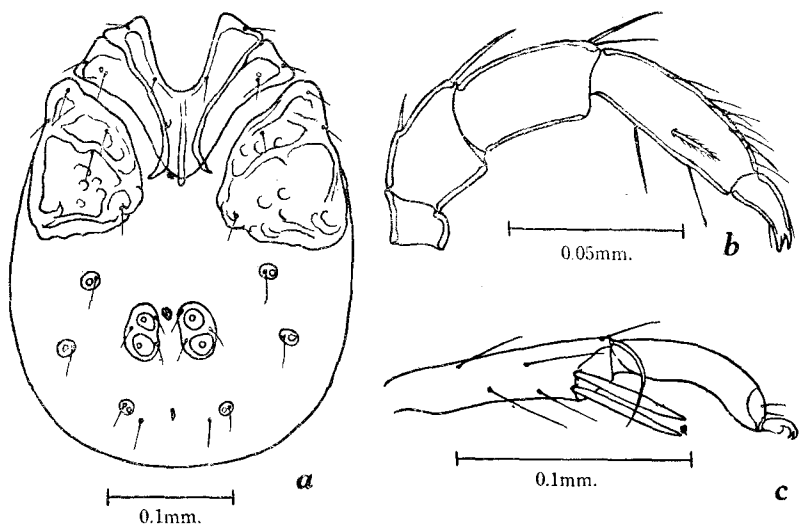

Fig. 16. *Atractides nodipalpis* var. *miyazakii* n. var., nymph.
a. Venter. b. Palp. c. Fifth and sixth segments of left Ist leg.

Remarks. The species *Atractides nodipalpis* is divided into several varieties as follows : *pennata* (Viets), 1920 ; *fonticola* (Viets), 1923 ; *fluviatilis* (Szalay), 1935 ; *lobatus* (Szalay), 1935 ; *constrictus* (Sokolow), 1934. But the present specimens from Gifu Prefecture are somewhat different in details from all of them up described in palps and in the shapes of epimera, hence the author makes a new variety from Japan on these specimens.

20. *Atractiaes* (s. str.) *nodipalpis noaipalpis* (Thor)

Locality. Four males were captured on Nov. 9, 1951 in a stream in Akasaka-machi, Fuha-gun.

Distribution. All Europe, Japan (Hokkaido, Tokyo, Kyoto Pref.).

21. *Atractides* (s. str.) *violaceus* n. sp.[1]

(Fig. 17)

Male (holotype, prep. 1020). Body ellipsoidal in shape, 281 μ wide in the widest part, 378 μ long in dorsum and 400 μ long in venter. Skin somewhat hard, elastic and finely striated on all body surface. In dorsum and venter, present large chitinous plates, each with a glandular pore and a hair, as are illustrated in Fig. 17, a & d. These chitin plates, palps, epimera plates, legs and genital plates are all purplish in colour. Interval between eyes 96 μ. Maxillar organ 96 μ long and 60 μ wide in the widest portion. Mandibles 152 μ long, including a claw in each. The palpal segments are measured as in Table 35, in μ.

Table 35.

Segment	1	2	3	4	5
Extensor surface	20	40	48	56	26
Flexor surface	16	26	32	40	26
Height	24	40	32	28	12

First segment of trapezoid in shape and with a spine in extensor terminal end.

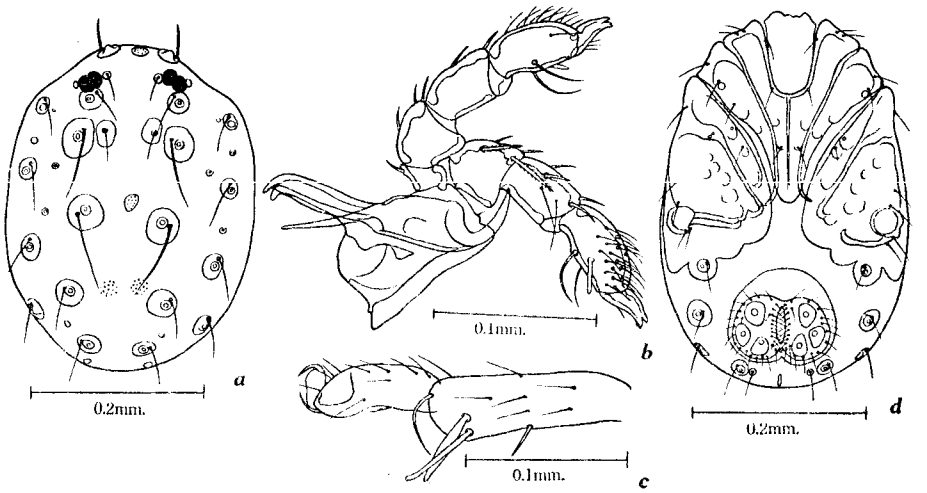

Fig. 17. *Atractides violaceus* n. sp., male.
a. Dorsum. b. Maxillar organ with palps. c. Fifth and sixth segments of Ist leg. d. Ventral view.

1) The specific trivial name has been offered in accordanc with the colour of the chitinous skin.

Seocnd segment the broadest, conically protruded in the flexor distal portion, having five spines, two of which on the inner surface feathered. Third segment with four spines and two long hairs. Fourth segment with many sensory hairs on the inner and extensor surfaces, and a club and two crooked hairs near the flexor edge. Fifth segment moderately small in shape, trifurcating in its terminal end. Legs measured as in Table 36, in μ. Legs all destitute of swimming hairs. The terminal segments of first legs are thick as in Fig. 17, c. Genital plates almost round with a broad chitinous margin, measuring 120 μ long and 128 μ wide in the largest dimensions. Genital aperture 44 μ long. Penis scaffold prominent, measuring 90 μ long and 96 μ wide. Nephridial pore opening in venter at the posterior margin. Colour reddish purple. Eyes reddish black.

Table 36.

Leg \ Segment	1	2	3	4	5	6
I	36	42	68	116	124	80
II	32	40	56	72	76	84
III	36	36	60	92	104	104
IV	76	64	104	132	140	132

Locality. One male was only captured on Oct. 20, 1952 in a stream of the River Kayu, Takada-mura, Gunjo-gun.

Remarks. Though similar to the following species: *A. loricatus* Piersig; *A. barsiensis* (Szalay); *A. perangustus* (Viets), the present male is different in the chitinous plates on body surface, the figures of the rear margins of fourth epimera and in palps.

22. *Atractides* (s. str.) *gifuensis* n. sp.[1]

(Fig. 18)

Female (holotype, prep. 943). Body ellipsoidal in shape, 625 μ long in dorsum and 500 μ wide. Skin soft, colourless and finely striated on all body surface. Interval between eyes 200 μ. Antenniform bristles long. Maxillar organ 177 μ long. Mandibles 308 μ long, including a claw in each. Palps measured as in Table 37, in μ.

Table 37.

Segment	1	2	3	4	5
Extensor surface	33	84	114	129	45
Flexor surface	30	45	90	108	42
Height	—	60	45	30	—

1) The specific trivial name has been endowed in accordance with the locality where the specimens were collected.

First segment with a spine in extensor distal end. Second segment moderately broad and with four spines, of which one in distal end prominently long. Third segment long, having three spines and several hairs. Fourth segment provided with many sensory hairs and three bristles in the flexor edge. Fifth segment bent a little and trifurcated in its terminal end. Epimera region long as in Fig. 18, a, measuring 407 μ long and 503 μ wide in the largest dimensions. The surfaces of epimera are finely dotted. The measurement of legs is as in Table 38, in μ.

Table 38.

Leg \ Segment	1	2	3	4	5	6
I	67	96	163	259	266	178
II	67	81	141	200	207	207
III	74	82	148	163	260	230
IV	163	148	230	318	333	274

Legs all devoid of swimming hairs. Terminal segment of the first leg bent as in Fig. 18, e. Genital plates characteristic of shapes as in Fig. 18, a, measuring 133 μ

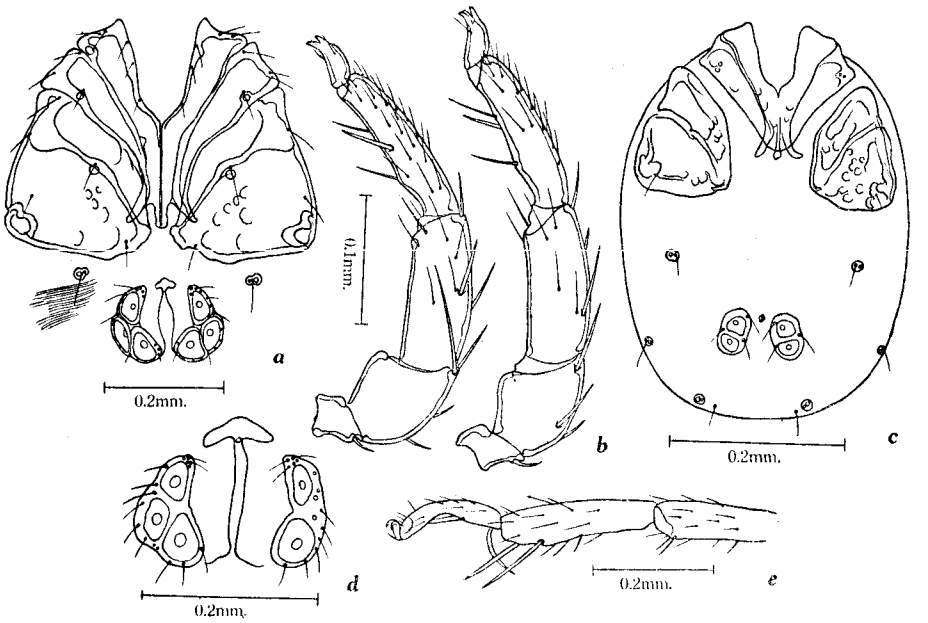

Fig. 18. *Atractides gifuensis* n. sp.
a. Epimera and genital organ of female. b. Palps of female. c. Venter of nymph. d. Aberrant genital plate of female. e. Fourth to sixth segments of left 1st leg of female.

long. An aberrant genital plates with only two acetabula are found as in Fig. 18, d. Colour brown. Eyes black.

Nymph (nymphotype, prep. 944). Body oval in shape, 470 μ long and 364 μ wide. Antenniform bristles large. Skin equal to that of female. Interval between eyes 162 μ. Mandibles 26 μ high and 124 μ long, including a claw in each. Palpal segments as in Table 39, in μ.

Table 39.

Segment	1	2	3	4	5
Extensor surface	16	36	48	60	24
Flexor surface	14	20	36	48	24
Height	20	28	24	20	12

Legs all destitute of swimming hairs, measuring the segments as in Table 40, in μ.

Table 40.

Leg \ Segment	1	2	3	4	5	6
I	32	40	60	96	108	76
II	28	32	48	68	80	80
III	32	32	56	88	104	96
IV	64	56	92	124	136	120

Provisional genital plates elliptical in shapes, 56 μ long and 32 μ wide, each having two acetabula and three hairs on it. Genital aperture not opened.

Localities. Collected in 1951 : one female on Oct. 3 in a stream in Kamihaguri-mura, Hajima-gun ; two females on Nov. 9 in a stream in Akasaka-machi, Fuha-gun ; each one female and nymph on Oct. 20 in the River Toba, Iwanoda, Gifu City.

Remarks. Though the present species is very akin to *A. izuensis* (Enami), 1940 ; *A. nodipalpis* var. *pennata* (Viets), 1920 ; *A. manensis* (Sokolow), 1930, it is different in sizes, spines in palps and genital plates. This female resembles also *A. walteri* (Viets), 1925, but it has no papillae in dorsum.

23. *Unionicola* (*Pentatax*) *bonzi* (*Claparède*)

(Fig. 19)

Male. Body ellipsoidal in shape, 503 μ long and 380 μ wide. Skin soft, colourless, having no figures. Interval between eyes 185 μ. Maxillar organ 105 μ long and 85 μ wide in the widest portion. Mandibles 144 μ long, including a claw

in each. Palps measured as in Table 41, in μ.

Table 41.

Segment	1	2	3	4	5
Extensor surface	20	112	52	96	44
Flexor surface	16	56	20	68	28
Height	48	68	56	36	20

First segment spineless. Second segment moderately broad, with four spines, two of which in inner lateral side feathered. Third segment with a spine on the inner surface. Fourth segment with three small papillae towards the distal end of flexor surface. Fifth segment less than a half the length of the fourth, and thinner than the others, ending in three large downwards curved claws. Epimera in four groups occupying more than a half ventral surface as indicated in Fig. 19, a. Legs measured the segments as in Table 42, in μ. Equipment of bristles

Table 42.

Leg \ Segment	1	2	3	4	5	6
I	60	72	108	160	116	112
II	56	88	120	184	180	152
III	56	76	100	128	136	140
IV	88	92	120	172	224	200

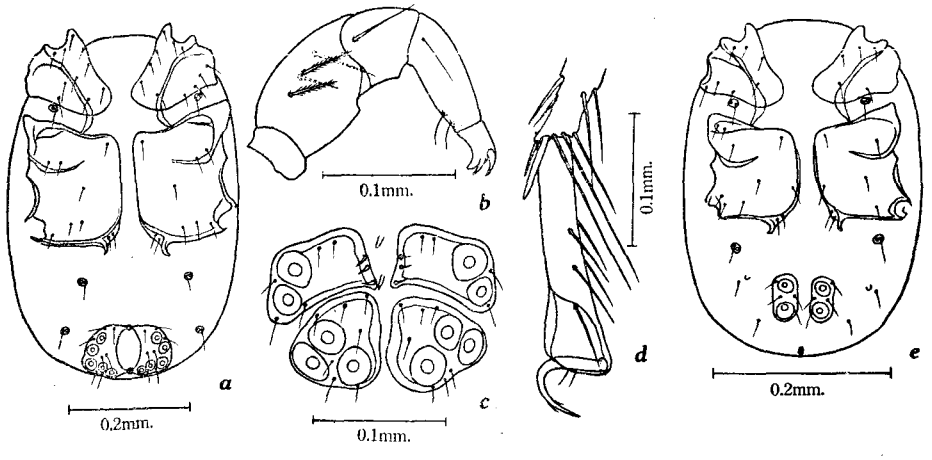

Fig. 19. *Unionicola bonzi*.
a. Ventral view of male. b. Right palp of male. c. Genital organ of female. d. Fifth and sixth segments of left IVth leg of male. e. Ventral view of nymph.

fairly abundant, more particular on the fourth and fifth segments. All destitute of swimming hairs. Claws with two minute furcation near distal ends. Genital organ situating in venter at the posterior end of body . Genital plates each with five round acetabula and several minute hairs, fusing each other with right and left ones at the anterior and posterior ends of genital opening. Genital plates 128 μ long and 156 μ wide together with both ones. Genital opening 100 μ long. Excretory pore not opened. Body colour straw yellow. Eyes black.

Female. Body shape, colour, skin, mouth parts, epimera and legs all similar to those of male. Body larger than male, 632 μ long and 438 μ wide in the widest part. Interval between eyes 210 μ. Maxillar organ 152 μ long and 116 μ wide. Mandibles 130 μ long, including a claw in each. Palpal segments as in Table 43, in μ.

Table 43.

Segment	1	2	3	4	5
Extensor surface	16	108	52	100	44
Flexor surface	20	60	24	76	32
Height	48	68	48	38	18

Legs measured as in Table 44, in μ. Genital plates composed of four as illustrated in Fig. 19, c. Anterior pair each with two acetabula on it and the posterior ones each with three acetabula.

Table 44.

Leg \ Segment	1	2	3	4	5	6
I	60	80	108	164	132	116
II	60	92	124	200	192	168
III	56	72	96	136	148	140
IV	100	100	124	180	240	228

Nymph. Body and organs, except genital organ, almost similar to those of imagines. Skin finely striated on all body surface. Body 392 μ long and 266 μ wide in the widest portion. Interval between eyes 155 μ. Maxillar organ 100 μ long and 80 μ wide. Palps measured as in Table 45, in μ.

Table 45.

Segment	1	2	3	4	5
Extensor surface	10	68	28	60	32
Flexor surface	8	36	12	40	20
Height	32	44	32	28	16

Provisional genital plates each 52 μ long, 26 μ wide in the widest part and each with two acetabula and four hairs on it. Provisional excretory pore found in the posterior margin of venter.

Locality. Many males, females and two nymphs were captured on Oct. 26, 1952 in the mantle cavities of fresh-water mussels, *Unio douglasiae nipponensis*,[1] captured in Shimohaguri-mura, Hajima-gun.

Remarks. This is the first record of this European species from Japan.

24. *Unionicola* (*Hexatax*) *crassipes* var. *miyazakii* n. var.[2]

(Fig. 20)

Male (holotype, prep. 1014). Body ellipsoidal in shape, 700 μ long and 525 μ wide in the widest part. Skin soft, colourless, transparent and finely striated on all body surface. Interval between eyes 238 μ. Maxillar organ 130 μ long and 108 μ wide in the widest portion. Mandibles 68 μ high and 152 μ long, inclusive of a claw in each. The segments of palps are as in Table 46, in μ.

Table 46.

Segment	1	2	3	4	5
Extensor surface	16	104	52	104	76
Flexor surface	16	72	20	80	64

The features of segments are on the whole similar to those of *U. crassipes*. First segment devoid of spines. Second segment with a spine and three feathered bristles. Segments of the third to fifth all equal in shapes to *U. crassipes*. Epimera as in Fig. 20, a and covered with hexagonal network on all surfaces. Legs measured as in Table 47, in μ.

Table 47.

Leg \ Segment	1	2	3	4	5	6
I	72	128	200	260	176	196
II	64	148	236	300	310	273
III	74	118	177	207	266	222
IV	89	148	215	252	348	318

1) Mr. Jun Miyazaki informed to the author that the species has been identified by Dr. Isao Taki, Head Curator of Zoology in the National Science Museum, Uéno Park, Tokyo.

2) This new variety has been named in honour of Mr. Jun Miyazaki, collector of these water-mites, in Gifu Prefecture.

Genital plates fringed with a chitin margin, 185 μ long and 170 μ wide in the largest dimensions together with both ones. Genital aperture 140 μ long. In preserved specimen, a penis scaffold is protruded from genital opening as in Figs. 20, a & b. Body colour light brown. Eyes black.

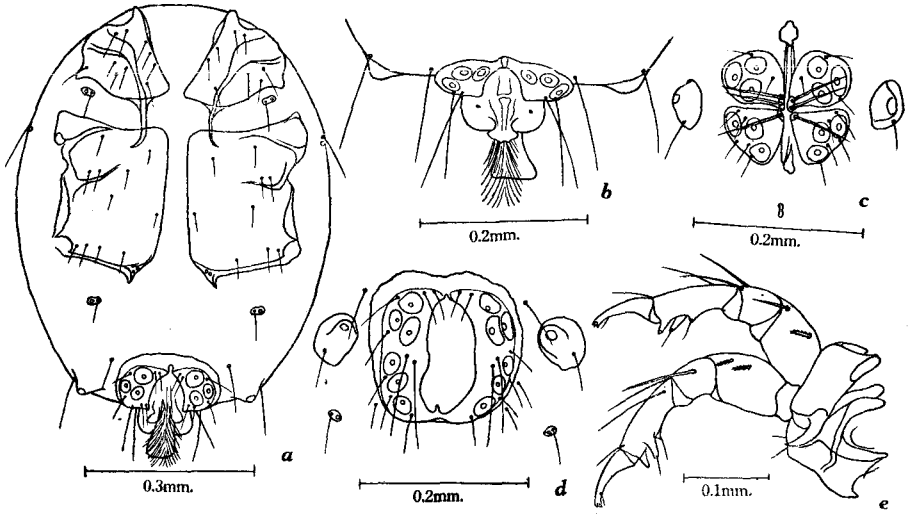

Fig. 20. *Unionicola crassipes* var. *miyazakii* n. var.
a. Venter of male. b. Posterior dorsum of male. c. Genital organ of female.
d. Genital area of male. e. Palps attached to maxillar organ of male.

Female (allotype, prep. 1016). Body shape, skin, mouth parts, epimera and legs all similar to those of male. Body 842 μ long and 550 μ wide in the widest portion. Interval between eyes 240 μ. Maxillar organ 163 μ long and 126 μ wide. Mandibles 74 μ high and 155 μ long, inclusive of a claw in each. Palps measured as in Table 48, in μ.

Table 48.

Segment	1	2	3	4	5
Extensor surface	16	120	48	120	88
Flexor surface	18	80	20	84	68

Measurement of legs given in Table 49, in μ. Genital organ composed of four plates each with three acetabula as in Fig. 20, c.

Locality. Three males and two females were collected on Oct. 31, 1952 in a gently streamed water in the River Ibi, Ishizu-mura, Kaizu-gun.

Remarks. Though the present species is very akin to *U. crassipes* (Müller)

Table 49.

Leg \ Segment	1	2	3	4	5	6
I	74	148	222	281	185	215
II	67	155	244	310	333	281
III	67	133	200	230	274	222
IV	104	163	230	266	370	333

and *U. crassipes minor* (Soar), it is different from them in the genital plates of male and the featheration of bristles in the second palpal segments.

25. *Unionicola* (*Hexatax*) *crassipes minor* (Soar)

(Fig. 21)

Female. Body ellipsoidal in shape, 600 μ long and 413 μ wide. Skin soft, colourless, having finely striated patterns on all body surface. Interval between eyes 213 μ. Mandibles 150 μ long, including a claw in each. The measurement of palps is as in Table 50, in μ.

Table 50.

Segment	1	2	3	4	5
Extensor surface	15	120	33	105	81
Flexor surface	24	75	30	60	60

First segment having no spine. Second segment with four spines. Third segment short and with two long spines, one on each lateral side. Fourth segment long and slender, having three long papillae in flexor side. Fifth segment bent a little and trifurcated in its distal end. Epimera region 428 μ long and 422 μ wide, occupying almost two-third ventral surface. Legs all resemble fairly those of *U. crassipes*, measuring as in Table 51, in μ.

Table 51.

Leg \ Segment	1	2	3	4	5	6
I	68	137	217	274	160	217
II	57	137	228	280	120	274
III	57	120	182	205	251	228
VI	86	137	200	234	325	285

Genital plates illustrated in Fig. 21, b. Colour light brown. Eyes black.

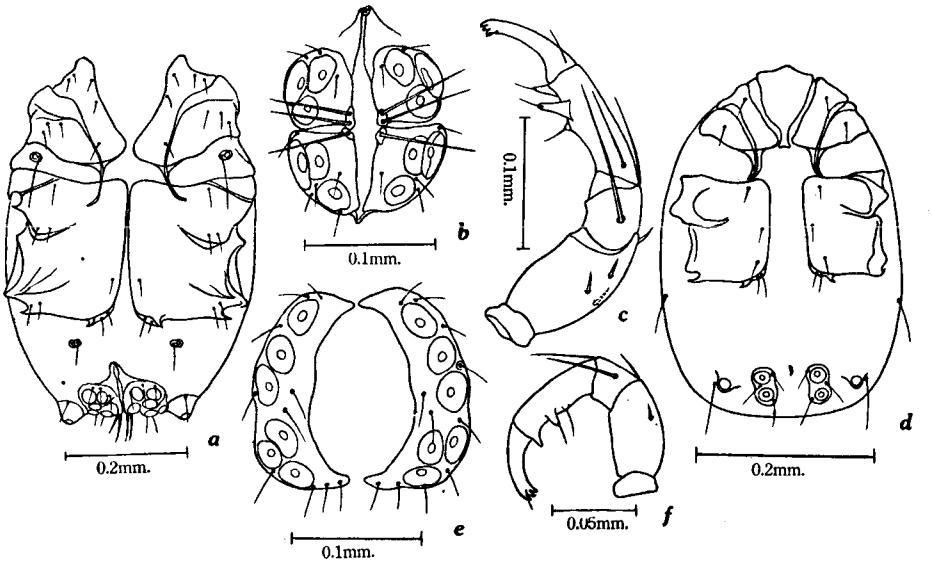

Fig. 21. *Unionicola crassipes minor.*
a. Female venter. b. Female gential organ. c. Male palp. d. Venter of nymph.
e. Male genital organ. f. Palp of nymph.

Male. Body and organs all similar to those of female. Genital plates 160 μ in length, each with six acetabula and several minute hairs.

Nymph. Body and organs equal on the most to those of imagines. Provisional genital plates each with two acetabula and three sensory hairs on it.

Locality. One male, female and two nymphs were captured on May 6, 1951 in a pond in Shimohaguri-mura, Hajima-gun.

Remarks. This is the first record of this European species from Japan.

26. *Unionicola* (*Polyatax*) *japonensis* Viets

One male and two females were captured on Oct. 10, 1950 in the mantle cavities of fresh-water snails, *Viviparus malleatus*, collected in a pond in Shimohaguri-mura, Hajima-gun.

This endemic species was reported by the author in 1953 from Hyogo Prefecture.

27. *Unionicola* (s. str.) *arcuata* (Wolcott)

(Fig. 22)

Male. Body ellipsoidal in shape, 1216 μ long and 842 μ wide. Skin soft,

colourless, transparent and covered with hexagonal figures on all body surface. Mouth parts, epimera, legs and genital plates all straw yellow in colour. Interval between eyes 374 μ. Maxillar organ 155 μ long and 193 μ wide in the widest portion. Mandibles 104 μ high and 204 μ long, including a claw in each. The measurement of the palpal segments is given in Table 52, in μ.

Table 52.

Segment	1	2	3	4	5
Extensor surface	20	140	100	140	72
Flexor surface	28	80	20	92	—
Height	80	144	84	60	36

First segment having no spines. Second segment very thick and with five spines, of which one very long. Third segment rather short and with a long spine. Fourth segment characteristic of shape, curving in the extensor margin. Fifth segment curved downwards and trifurcated in its terminal end. Epimera characteristic of shapes as in the text-figure. Posterior groups short as compared with those of *U. ypsilophora*. All epimera are covered with hexagonal patterns and dotted figures. The legs are long and slender, especially in the fourth ones, which the last segment is curved and tapers towards the tip, but just at the tip is broadly expanded to receive the short, thick, bifid claws. The second to fifth segments of all legs are provided with long spines. Segments measured as in Table 53, in μ.

Table 53.

Leg \ Segment	1	2	3	4	5	5
I	111	126	193	266	266	163
II	133	163	296	377	437	252
III	133	155	281	326	437	311
IV	222	200	370	474	666	511

Genital organ located in venter near the posterior margin. The genital plates are broad, much alike in the two sexes, with a large number of acetsbula, 33 in right side and 34 in left one. Genital plate 244 μ long and 111 μ wide in the widest part. The excretory pore is not opened. Body colour brown. Eyes black.

Female. Body shape, colour, skin and organs, except genital area, all equal to those of male. Body 1210 μ long and 835 μ wide in the widest portion. Interval between eyes 365 μ. Mandibles 104 μ high and 220 μ long, inclusive of a claw in each. Palpal segments measured as in Table 54, in μ.

The last segments of legs widened, but not so expanded as in those of male. The

Table 54.

Segment	1	2	3	4	5
Extensor surface	28	152	100	152	80
Flexor surface	32	80	20	108	—
Height	96	148	80	72	36

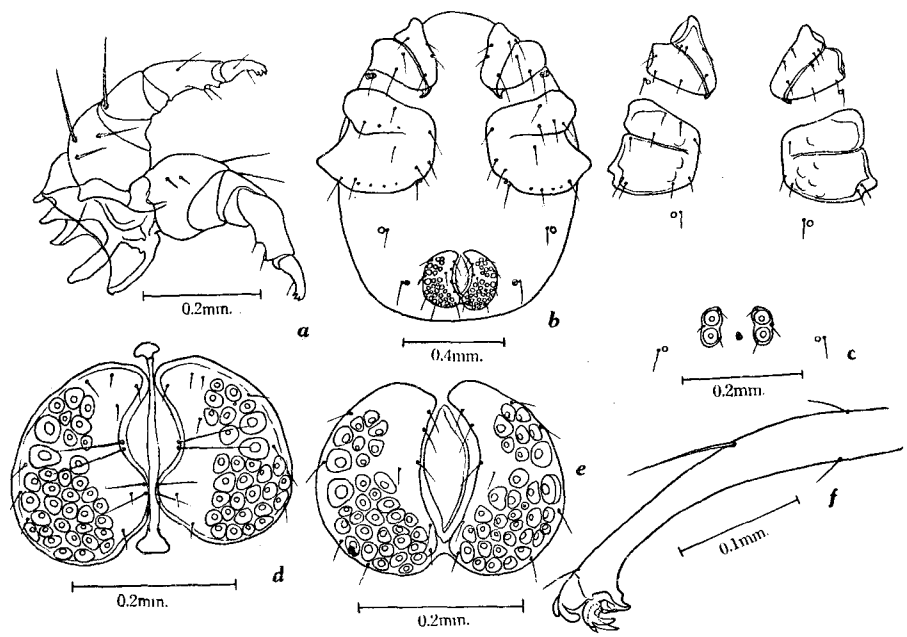

Fig. 22. *Unionicola arcuata.*
a. Male palps. b. Venter of male. c. Venter of nymph. d. Female genital organ. e. Male genital organ. f. Terminal segment of male right IIIrd leg.

measurement of legs is given in Table 55, in μ.

Table 55.

Leg \ Segment	1	2	3	4	5	6
I	111	148	192	311	311	178
II	104	164	326	430	488	274
III	133	163	296	348	451	296
IV	244	207	392	496	718	518

Genital plates broad, 260 μ long and 177 μ wide in the widest portion and with 30 & 35 acetabula in each plate. Genital opening 245 μ long.

Nymph. Body oval in shape, 616 μ long and 470 μ wide. Skin soft, colourless, transparent and figureless. Interval between eyes 210 μ. Maxillar organ 133 μ long and 104 μ wide. Palps similar to those of imagines, measuring segments as in Table 56, in μ.

Table 56.

Segment	1	2	3	4	5
Extensor surface	12	84	24	72	52
Flexor surface	14	36	20	44	—
Height	48	66	40	38	20

Epimera region occupying 303 μ long and 430 μ wide. Epimera and provisional genital area shown in Fig. 22, c. Provisional genital plates elliptical in contour, 64 μ long, 32 μ wide in the largest dimensions and each with two large acetabula and three minute sensory hairs on it. Body colour straw yellow.

Locality. Two males, each one female and nymph were obtained on Sept. 15, 1951 in the mantle cavities of fresh-water mussels collected in a gently streamed brook in Shiroyama-mura, Kaizu-gun.

Remarks. The present specimens coincide completely with the descriptions by Wolcott (1889 & 1899) and Marshall (1933) of this North American species.

28. *Unionicola* (s. str.) *uchidai* n. sp.[1]

(Figs. 23, 24)

Male (holotype, prep. 929). Body of long ellipsoid in shape, 1264 μ long and 778 μ wide in the widest portion. Skin characteristic of feature, yellow in colour, untransparent, with hexagonal patterns and also granulated on all body surface, and hardened in dorsum and venter. In venter, it is hard to distinguish epimera regions from the skin outsides of epimera. Interval between eyes 389 μ. Maxillar organ 250 μ long and the same width in the widest portion. Mandibles 193 μ high and 326 μ long, including a claw in each. Palps measured as in Table 57, in μ.

Table 57.

Segment	1	2	3	4	5
Extensor surface	16	260	116	196	84
Flexor surface	36	120	44	120	—
Height	108	220	100	76	40

1) The new species has been named in honour of Dr. Tohru Uchida, Professor of Hokkaido University.

First segment short, having no spines. Second segment expanded roundly in extensor and flexor surfaces and with four spines, two on each lateral surface. Third segment short and with two spines, one on each lateral surface. Fourth segment slender and with three small papillae in the flexor side near the distal end. Fifth segment trifurcated in its terminal end. Epimera in four groups as shown in Fig. 23, a. Posterior groups very long in shape. Pedal segments measured as in Table 58, in μ.

Table 58.

Leg \ Segment	1	2	3	4	5	6
I	131	125	211	320	302	171
II	131	137	262	393	393	257
III	133	141	215	296	333	237
IV	178	178	266	459	718	555

Legs all provided with spines in moderate numbers but no swimming hairs. Distal ends of sixth segments extended broadly, especially in the fourth legs, as shown in Fig. 23, d. Genital area situated in the rear margin of body. Genital plate of

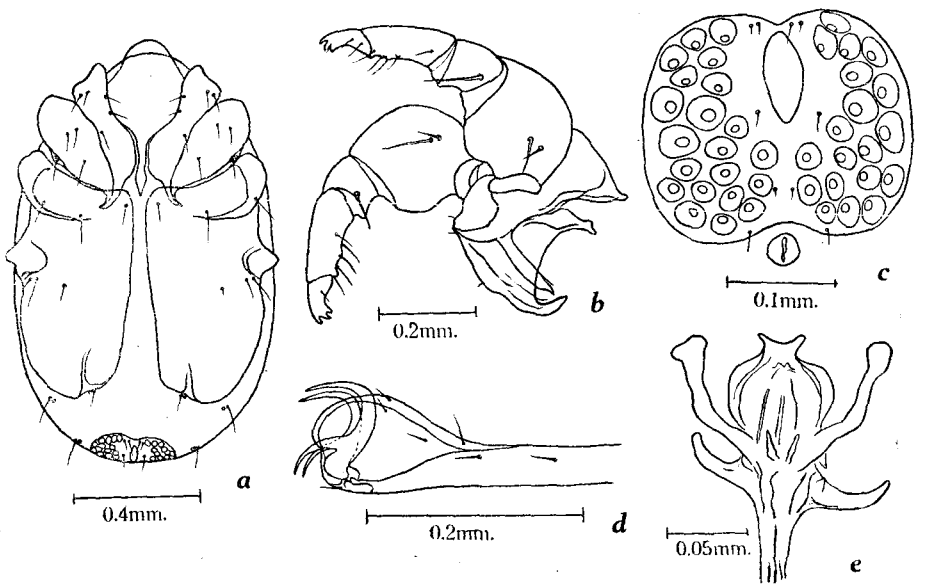

Fig. 23. *Unionicola uchidai* n. sp., male.
a. Venter. b. Palps attached to maxillar organ. c. Genital organ. d. Distal end of left IVth leg. e. Penis scaffold.

almost square in shape, 207 μ long, 230 μ wide and with many round acetabula on it. The acetabula are counted 21 in the right side and 19 in the left one. Genital opening 89 μ in length. Penis scaffold 142 μ long and 125 μ wide. Nephridial pore opening near just upper portion in the rear body surface as shown in Fig. 23, c. Body colour dark brown. Eyes black.

Female (allotype, prep. 932). Body equal in shape to that of male, 1247 μ long and 730 μ wide. Skin different from that of male, soft, colourless, transparent, finely striated on all body surface and not granulated as in male. In the anterior part of dorsum, presents a antero-dorsal plate, horse shoe in shape as in Fig. 24, a. Antero-dorsal plate 502 μ long, 324 μ wide in the widest part, yellow in colour, granulated and with hexagonal patterns on the surface. Interval between eyes 330 μ. Maxillar organ 210 μ long and 220 μ wide. Mandibles 172 μ high and 280 μ long, including a claw in each. Palps equal in shapes to those of male, measuring segments as in Table 59, in μ.

Table 59.

Segment	1	2	3	4	5
Extensor surface	12	220	80	148	88
Flexor surface	32	84	36	100	—
Height	88	176	84	64	36

Legs also equal to those of male and measured as in Table 60, in μ.

Table 60.

Leg \ Segment	1	2	3	4	5	6
I	118	111	185	259	244	155
II	133	148	266	377	363	252
III	126	141	215	289	311	237
IV	207	170	289	444	636	548

Genital plates shown in Fig. 24, b, measuring 260 μ long and 326 μ wide with both ones. Acetabula situated mostly on the outer area and arranged almost in two rows. Acetabula counted 16 in the right plate and 18 in the left one. Genital opening 244 μ long. Body colour and eyes similar to those of male.

Nymph (nymphotype, prep. 934). Body of slender ellipsoid in shape, 890 μ long and 454 μ wide in the widest portion. Skin soft, colourless, finely striated on all body surface and with two antero-dorsal plates. These plates are each measured 160 μ long, 36 μ wide and granulated on all surface as shown in Fig. 24, c. Interval between eyes 211 μ. Mandibles 72 μ high-and 132 μ long, including

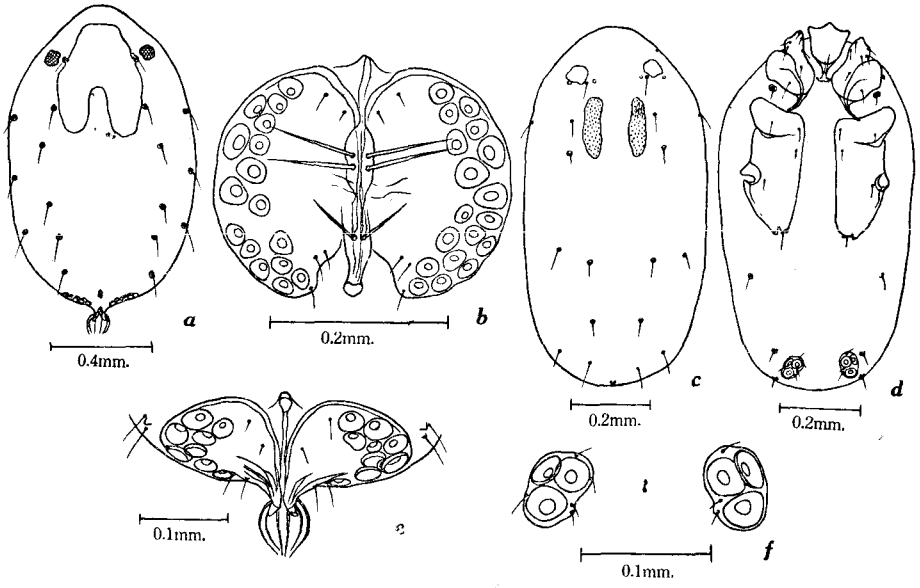

Fig. 24. *Unionicola uchidai* n. sp.
a. Female dorsum. b. Female genital organ. c. Nymph dorsum. d. Nymph venter. e. Female genital organ in ventral view. f. Provisional genital organ of nymph.

a claw in each. Palps measured as in Table 61, in μ.

Table 61.

Segment	1	2	3	4	5
Extensor surface	8	100	32	64	46
Flexor surface	16	40	20	40	--
Height	44	72	36	32	24

The dimensions of the pedal segments are given in Table 62, in μ.

Table 62.

Leg \ Segment	1	2	3	4	5	6
I	56	48	80	100	88	80
II	60	60	104	136	128	116
III	60	60	92	132	132	124
IV	88	88	124	204	292	260

Provisional genital plates clearly distinguished from those of the other species, belonging to the subgenus *Unionicola*, by having three acetabula in a plate as shown in Figs. 24, d & f. The plates are each measured 68 μ long and 44 μ wide in the widest dimensions. Genital pore not opened. Body colour straw yellow. Eyes black.

Locality. Two males, many females and two nymphs were obtained on Sept. 15, 1951 in the mantle cavities of fresh-water mussels, captured in Shiroyama-mura, Kaizu-gun.

Remarks. This new species is easily distinguished from any other species of the subgenus *Unionicola* by the hard skin of male, antero-dorsal plates in female and nymph, and the provisional genital plates, which have three acetabula, in nymphs.

29. *Unionicola* sp.

(Fig. 25)

Nymph. Body oval in shape, 370 μ long and 210 μ wide. Skin colourless, transparent and finely striated on all body surface. Interval between eyes 140 μ. Maxillar organ 84 μ long and 100 μ wide in the widest portion. Mandibles 116 μ long, including a claw in each. Palps measured as in Table 63, in μ.

Table 63.

Segment	1	2	3	4	5
Extensor surface	12	88	28	88	52
Flexor surface	14	52	12	56	—
Height	40	48	40	32	20

First segment of short and spineless. Second segment moderately long, curved extensorly and with two spines. Third segment short and with two spines. Fourth segment the longest and with three papillae in flexor surface. Fifth segment with a claw-shaped spine at the one-third portion from the terminal end. Pedal segments measured as in Table 64, in μ.

Table 64.

Leg \ Segment	1	2	3	4	5	6
I	52	84	132	196	124	160
II	48	84	144	188	216	232
III	52	76	100	128	152	168
IV	68	100	132	164	224	240

Epimera plates shown in Fig. 25, a. Provisional genital plates 68 μ long, 36 μ

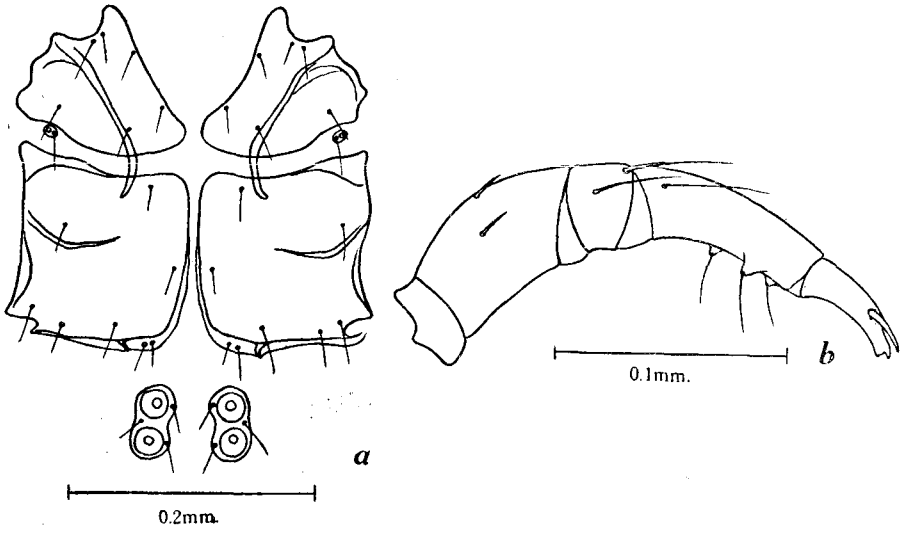

Fig. 25. *Unionicola* sp., nymph.
a. Venter. b. Palp.

wide and each with two acetabula on it. Genital opening not opened. Body light brown in colour. Eyes black.

Locality. One nymph was captured on Oct. 31, 1952 in a pond in Nishié-mura, Kaizu-gun.

30. *Neumania* (s. str.) *angulata* Sokolow

(Fig. 26)

Female. Body almost globular in shape, 762 μ long and 664 μ wide in the widest dimension. Skin covered with fine hair-like conical papillae on all body surface. In dorsum, present two pairs of chitin plates which figureless. Interval between eyes 390 μ. Maxillar organ 108 μ long and 96 μ wide. Mandibles 180 μ long, inclusive of a claw in each. Palps most characteristic of bristles as in Fig. 26, d and measured as in Table 65, in μ.

Table 65.

Segment	1	2	3	4	5
Extensor surface	32	100	52	76	28
Flexor surface	20	68	36	60	—
Height	40	48	36	24	16

First segment with a spine in the extensor terminal end. Second segment the largest and with two club-shaped bristles, which bear many minute spine-like hairs, in the extensor distal portion. Third segment with also two haired club-shaped bristles. Legs all as in Fig. 26, b, measuring segments as in Table 66, in μ.

Table 66.

Leg \ Segment	1	2	3	4	5	6
I	56	108	112	156	164	212
II	56	116	104	164	184	216
III	64	108	96	168	200	200
IV	84	128	132	212	248	220

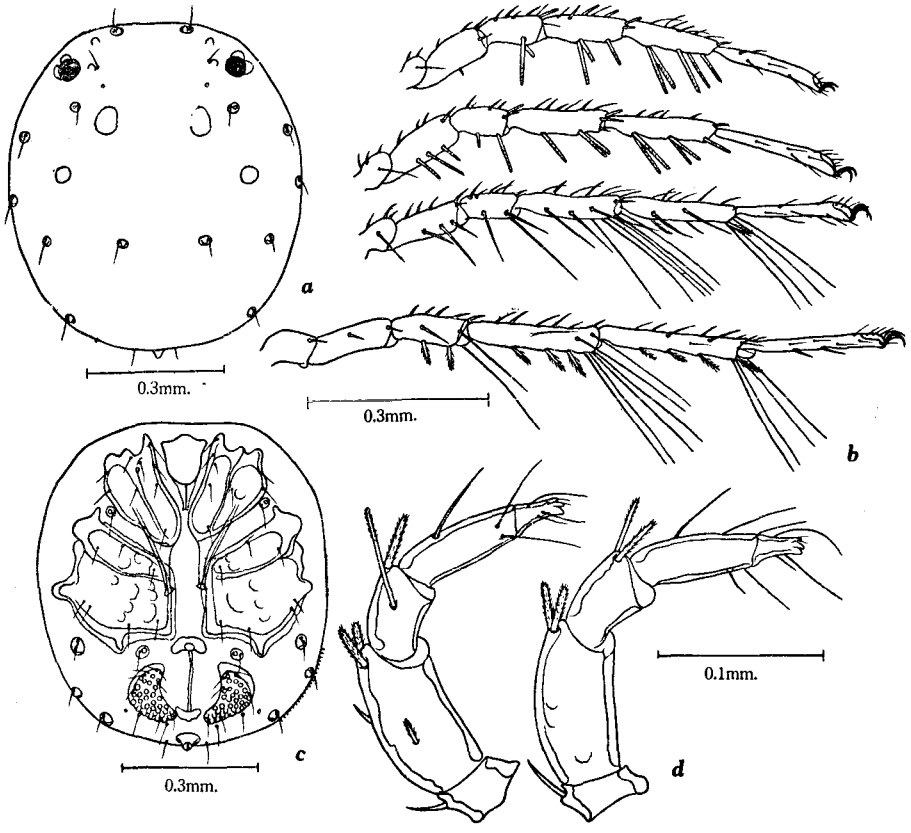

Fig. 26. *Neumania angulata*, female.
a. Dorsum. b. Legs (from top to bottom, Ist-IVth). c. Venter. d. Palps.

Epimera and genital plates indicated in Fig. 26, c. Genital plates 152 μ long and 80 μ wide in the widest portion. Nephridial pore opening on the summit of the conical papilla at the posterior portion in venter. Body colour yellowish brown. Epimera, legs and genital plates all blackish brown in colour.

Locality. One female was captured on Oct. 17, 1952 in a pool in Shimohaguri-mura, Hajima-gun.

Remarks. The present female is perfectly coincided with the Ussuri's species *N. angulata* Sokolow, 1931. This is the first record of this Oriental species from Japan.

31. *Feltria* (s. str.) *minuta* Koenike

(Fig. 27)

Female. Body almost hexagonal in dorsal view, 400 μ long and 333 μ wide. In dorsum, present a large main plate and four pairs of accessory plates, which surround main plate. Plates of the hindermost pair the longest. Interval between eyes 110 μ. Maxillar organ 96 μ long and 60 μ wide. Mandbiles 28 μ high and 104 μ long, including a claw in each. Palps shown in Fig, 27, b and measured as in Table 67, in μ.

Table 67.

Segment	1	2	3	4	5
Extensor surface	20	56	32	72	40
Flexor surface	16	32	16	52	—
Height	24	48	32	28	14

Epimera and genital plates completely shown in Fig. 27, c. Epimera region 260 μ long and 326 μ wide in the widest portion. Pedal segments measured as in Table 68, in μ.

Table 68.

Leg \ Segment	1	2	3	4	5	6
I	36	32	40	56	64	68
II	40	36	44	60	76	84
III	44	40	52	80	92	96
IV	76	44	60	88	104	108

Genital plates 118 μ long and 126 μ wide in each. Genital opening 88 μ long. Nephridial pore opening in venter just behind the genital aperture. Colour ruby red. Eyes reddish black.

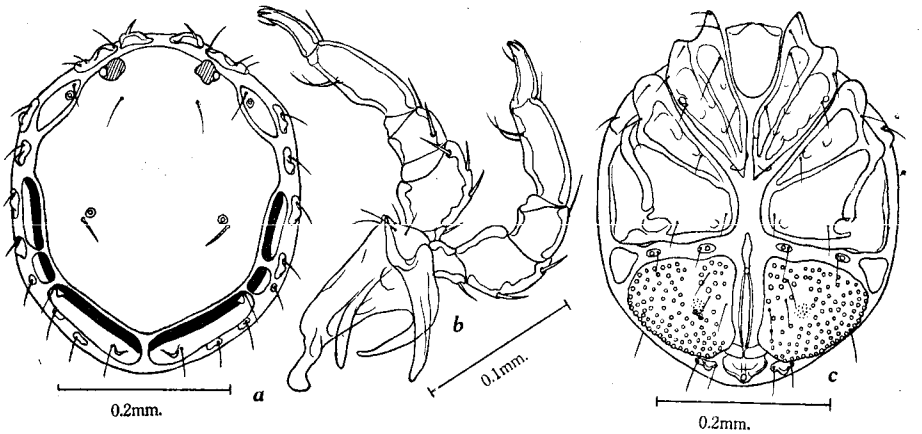

Fig. 27. *Feltria minuta*, female.
a. Dorsum b. palps attached to maxillar organ. c. Venter.

Locality. One female was obtained in a stream of the River Kayu in Takada-mura, Gunjo-gun.

Distribution. All Europe, North America, Saghalien, Japan.

Remarks. Viets (1936, p. 304) included the Japan species *Feltria rotunda* Uchida, 1934 in the present species *F. minuta* Koenike. But, in the author's view, *F. rotunda* Uchida seems to be a different species, probably new as Uchida described, from *F. minuta*. The author will describe on *F. rotunda* Uchida in the near future from Hokkaido.

32. *Tiphys* (?) sp.

(Fig. 28)

Nymph. Body long oval in shape, 475 μ long and 362 μ wide in middle portion. Skin soft, colourless and finely striated on all body surface. In dorsum, present three pairs of small chitin plates. Interval between eyes 125 μ. Maxillar orgain 63 μ long and 46 μ wide. Mandibles 36 μ high and 96 μ long, including a claw in each. Palps measured as in Table 69, in μ.

Table 69.

Segment	1	2	3	4	5
Extensor surface	15	48	27	48	33
Flexor surface	13	33	12	33	—
Height	27	30	24	21	12

First segment spineless. Second segment with three spines, of which two feathered, on extensor surface. Third segment provided with two spines. Fourth segment of long trapezoid in shape, having two papillae in the flexor surface. Fifth segment trifurcated in its terminal end. Epimera and provisional genital plates given in Fig. 28, a. Epimera region 240 μ long. Legs measured as in Table 70, in μ.

Table 70.

Leg \ Segment	1	2	3	4	5	6
I	32	28	36	44	48	72
II	36	36	40	48	72	80
III	40	40	44	56	92	80
IV	60	36	60	84	88	92

Fifth segment of each leg provided with several long swimming hairs. Provisional genital plates 68 μ long, 22 μ wide and each with two acetabula on it. Body colour brown. Eyes black.

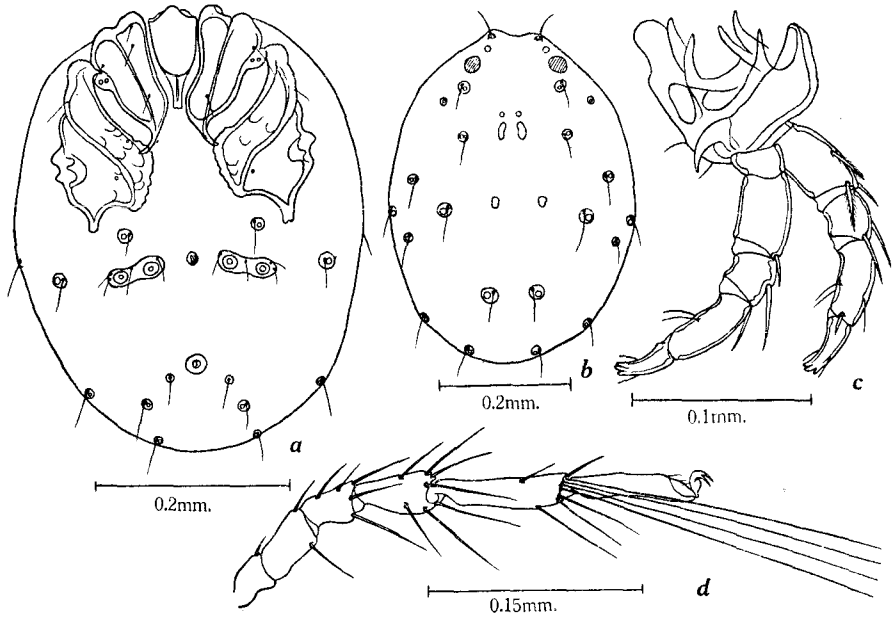

Fig. 28. *Tiphys* (?) sp., nymph.
a. Venter. b. Dorsum. c. Maxillar organ with palps. d. Right IIIrd leg.

Locality. Captured a nymph on Oct. 17, 1952 in a pool in Shimohagurimura, Hajima-gun.

33. *Brachypoda* (s. str.) *versicolor* (Müller)

Collected in 1952 each one female on Oct. 20 in the River Nagara, Takadamura, Gunjo-gun and on Nov. 2 in the River Kiso, Kawashima-mura, Hajima-gun. This species was described by the author in 1953 from Hiroshima Prefecture.

34. *Axonopsis* (*Haxaxonopsis*) *fluviatilis* n. sp.[1]

(Fig. 29)

Male (holotype, prep. 1013). Body oval in shape, somewhat sharply pointed in the posterior body margin, 355 μ long and 290 μ wide in the widest portion. Skin porous in dorsum and venter. Interval between eyes 126 μ. Maxillar organ small, 64 μ long and 36 μ wide. Mandibles 88 μ long, including a claw in each. Palps measured as in Table 71, in μ.

Table 71.

Segment	1	2	3	4	5
Extensor surface	28	40	28	64	26
Flexor surface	16	36	20	52	24
Height	16	32	20	22	8

Inner surface of the segments second to fourth, noticed striations as in Fig. 29, b. First segment bent a little and with a spine. Second segment the broadest, having four spines. Third segment with a spine, curving inwards in flexor edge. First and second epimera with zig-zag edges as the teeth of a saw and conical spines in the outer margins. Legs measured as in Table 72, in μ.

Table 72.

Leg \ Segment	1	2	3	4	5	6
I	24	28	28	48	56	60
II	24	36	32	52	60	72
III	40	44	40	56	68	76
IV	44	60	52	68	76	80

Fourth and fifth segments of third and fourth legs provided with two or three swimming hairs in each distal end. Genital organ situated in posterior area in

1) The specific trivial name has been endowed in accordance with its *Biotop*.

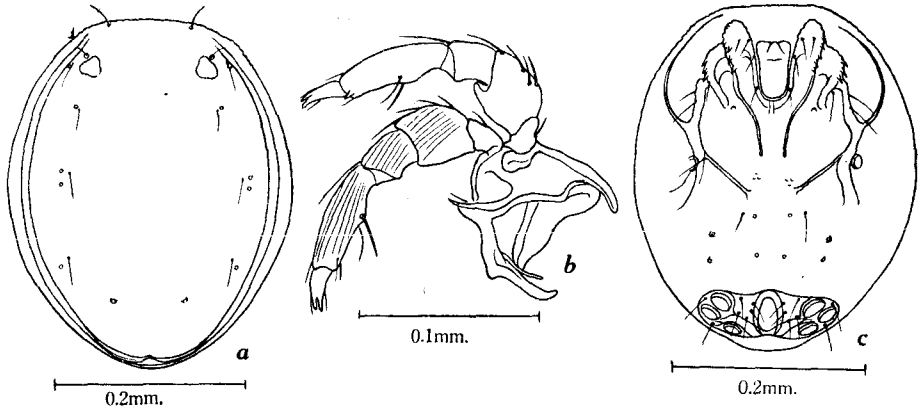

Fig. 29. *Axonopsis fluviatilis* n. sp., male.
a. Dorsum. b. Maxillar organ with palps. c. Venter.

venter, measuring the plates 40 μ long. Each genital plate with three acetabula and several minute hairs. Penis scaffold 110 μ long and 60 μ wide in the largest dimensions. Body and legs all purplish red in colour. Eyes reddish black.

Locality. One male was captured on Oct. 20, 1952 in the River Kayu, Takada-mura, Gunjo-gun.

Remarks. Though the present male is very akin to the Javanese species *Hexaxonopsis subacuta* Viets, 1935, it is distinguished from the latter by the body colour, shapes of first and second epimera and in the posterior body margin.

35. *Aturus* (s. str.) *duplex* Thor

One male was captured on Oct. 20, 1952 in the River Kayu, Takada-mura, Gunjo-gun. This species was recorded by the author in 1953 from Hiroshima Prefecture.

36. *Aturus* (s. str.) *miyashitai* Uchida

(Fig. 30)

Female. Body of short ellipse in shape, 347 μ wide in the widest portion, 422 μ long in dorsum and 474 μ long in venter. Dorsum covered with a large shield which with four groups of papillous figures as shown in Fig. 30, a. Interval between eyes 104 μ. Maxillar organ 92 μ long and 60 μ wide in the widest portion. Palps indicated in Fig. 30, b and measured as in Table 73, in μ.

Table 73.

Segment	1	2	3	4	5
Extensor surface	20	52	32	60	32
Flexor surface	16	32	24	44	32

Epimera covering almost all the surface of venter. The dimensions of legs are given in Table 74, in μ.

Table 74.

Leg \ Segment	1	2	3	4	5	6
I	24	32	40	56	60	64
II	24	32	44	60	64	68
III	28	36	52	76	84	80
IV	64	64	72	100	104	104

Genital aperture lying at the posterior median portion in venter. Genital acetabula eleven on each side, arranged in a row. Colour purplish red. Eyes reddish black.

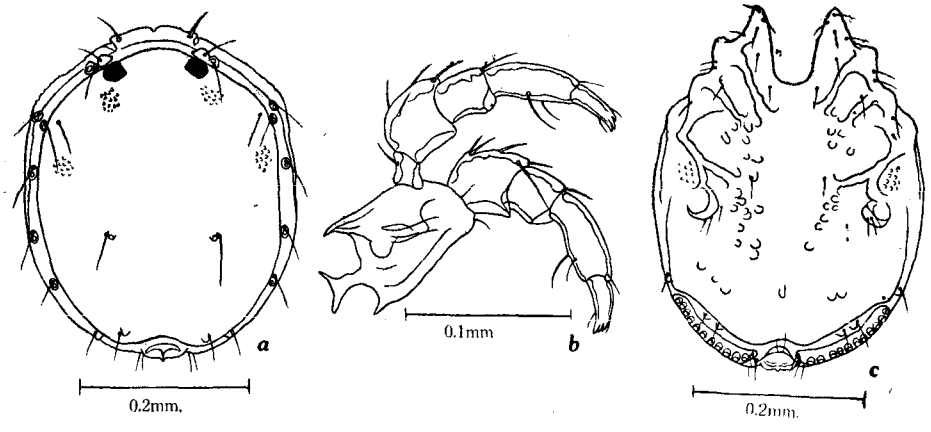

Fig. 30. *Aturus miyashitai*, female.
a. Dorsum. b. Maxillar organ with palps. c. Venter.

Locality. Five females were collected on Oct. 20, 1952 in the River Kayu, Takada-mura, Gunjo-gun.

Remarks. The males of this endemic species was recorded by the author in 1953 from Hiroshima Prefecture.

37. *Aturus* (s. str.) *miyazakii* n. sp.[1]

(Figs. 31, 32)

Male (holotype, prep. 1012). Body almost hexagonal in shape, 330 μ wide in the widest portion and 355 μ long in dorsum, excluding posterior hyaline appendages. Median portion of dorsum falled in characteristically. A pair of antenniform bristles at the anterior extremity and besides them two pairs of accessory hairs. Behind eyes, a pair of trifurcated hairs, each branch feathered. Many long silver-white hairs, crooked roundly, arising from the postero-lateral areas in four groups in each side as illustrated in Fig. 31, a. Mid-posterior corner of body sharpened, making two conical tips and with a deep bay between them. From the center portion of the bay arising two pairs of hyaline lobes. Interval between eyes 170 μ. Maxillar organ 76 μ long and 56 μ wide in the widest portion. Mandibles 108 μ long, including a claw in each. Palps given in Fig. 31, d, measuring the segments as in Table 75, in μ.

Table 75.

Segment	1	2	3	4	5
Extensor surface	20	60	40	88	38
Flexor surface	18	40	22	72	36
Height	20	48	32	28	12

Epimera plates fused each other to form a hexagonal shape, covering the whole surface of venter. Maxillar bay characteristic of shape as in Fig. 31, c. Along the postero-lateral margins in venter grew hairs in a line on each side. The measurements of the legs are given in Table 76, in μ.

Table 76.

Leg \ Segment	1	2	3	4	5	6
I	40	40	52	80	96	112
II	40	44	60	92	108	120
III	—	56	72	124	144	144
IV	100	84	88	120	152	144

Fourth legs characteristic of shapes in the first, fourth and fifth segments. First segment with three sword-shaped bristles, somewhat twisted, and a hair. Fourth and fifth segments with very complicated bristles, almost incapable to draw in an illustration, as in Fig. 31, b. Genital acetabula nine in number on each side and

1) The new species has been named in honour of Mr. Jun Miyazaki who collected these specimens.

arranged in a row along the postero-lateral body margins. Genital crest 28 μ long

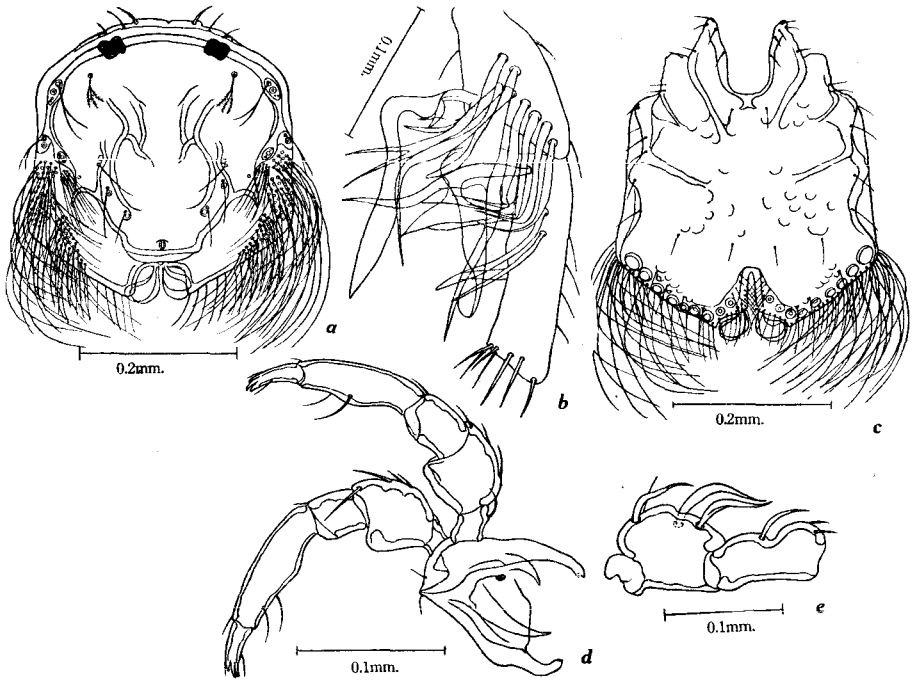

Fig. 31. *Aturus miyazakii* n. sp., male.
a. Dorsum. b. Fourth and fifth segments of right fourth leg. c. Venter.
d. Maxillar organ with palps. e. First and second segments of right IVth leg.

in ventral view. Excretory pore opening in dorsum at the median extremity of the dorsal plate. Colour red. Eyes black.

Female (allotype, prep. 1023). Body of short oval in shape, 348 μ wide, 407 μ long in dorsum and 430 μ long in venter. Dorsal plate almost circular in contour and with three pairs of gland pores, each with a hair. Posterior body end protruded as in Figs. 32, a & c. Interval between eyes 120 μ. Maxillar orgain 84 μ long and 60 μ wide in the widest portion. Mandibles 128 μ long, inclusive of a claw in each. The palpal segments are given in Table 77, in μ.

Table 77.

Segment	1	2	3	4	5
Extensor surface	24	52	36	80	40
Flexor surface	20	36	20	68	—

Legs measured as in Table 78, in μ.

Table 78.

Leg \ Segment	1	2	3	4	5	6
I	28	32	40	56	68	72
II	32	40	44	64	76	76
III	36	44	52	80	96	92
IV	64	60	72	96	104	96

Genital plates 148 μ in length in each and counted acetabula 8 on the right side and 9 on the left one.

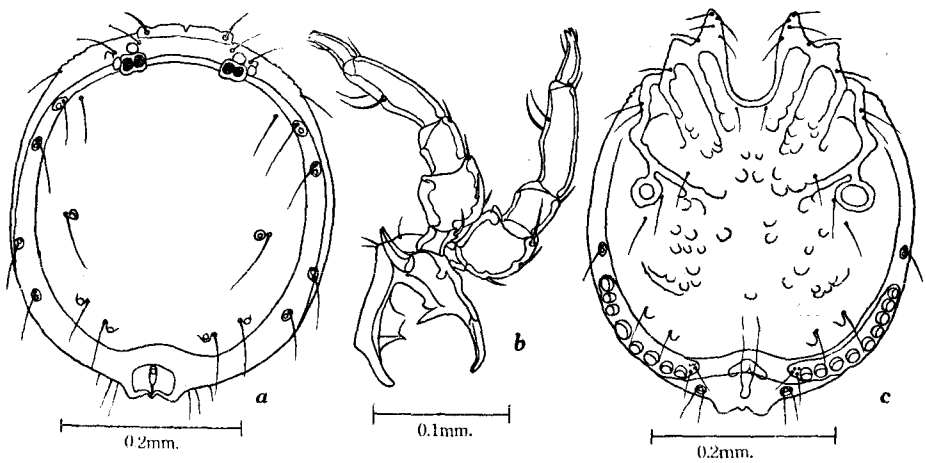

Fig. 32. *Aturus miyazakii* n. sp., female.
a. Dorsum. b. Maxillar organ with palps. c. Venter.

Locality. One male and female were captured on Oct. 20, 1952 in the River Kayu, Takada-mura, Gunjo-gun.

Remarks. Though the male of the present species resembles *A. duplex* Thor and *A. complexus* Sokolow in body shape, it is easily distinguished from them in the straight postero-lateral body margin and the broad posterior bay. The present female is on the whole matched with this male.

38. *Aturus* (s. str.) *japonicus* n. sp.

This species was recorded by the author (1953, a) from Hiroshima Prefecture as a new species, *Aturus rotundus*. But the author must change the specific name

from *A. rotundus* to *A. japonicus* n. sp., because there has been recorded by Romijn in 1921 *A. scaber rotundus* from Europe.

Locality. Four females were captured on Oct. 20, 1952 in the River Kayu, Takada-mura, Gunjo-gun.

39. *Aturus* sp.

(Fig. 33)

Female. Body elliptical in shape, 303 μ wide, 368 μ long in dorsum and 414 μ long in venter. Interval between eyes 100 μ. Maxillar organ 76 μ long and 56 μ wide. Mandibles 28 μ high and 112 μ long, including a claw in each. Palps measured as in Table 79, in μ.

Table 79.

Segment	1	2	3	4	5
Extensor surface	24	52	32	80	36
Flexor surface	20	36	22	64	—

Pedal segments measured as in Table 80, in μ.

Table 80.

Leg \ Segment	1	2	3	4	5	6
I	24	28	40	52	68	72
II	28	32	44	60	68	76
III	32	36	48	72	88	84
IV	52	52	60	84	104	100

Genital area as illustrated in Fig. 33, c, having acetabula 10 in the right side and 9 in the left one. Colour yellowish red. Eyes black.

Locality. Two females were collected on Oct. 20, 1953 in the River Kayu, Takada-mura, Gunjo-gun.

Remarks. Though the present female is very akin to the female of *A. miyazakii* Imamura, it is different in shapes of the posterior contour of body and postero-dorsal plate. This female is also resemble the ones of *A. ovalis* Uchida ; *A. hiroshimaensis* Imamura ; *A. crinitus* Thor. The author reserves identifying of the species on only the female specimens.

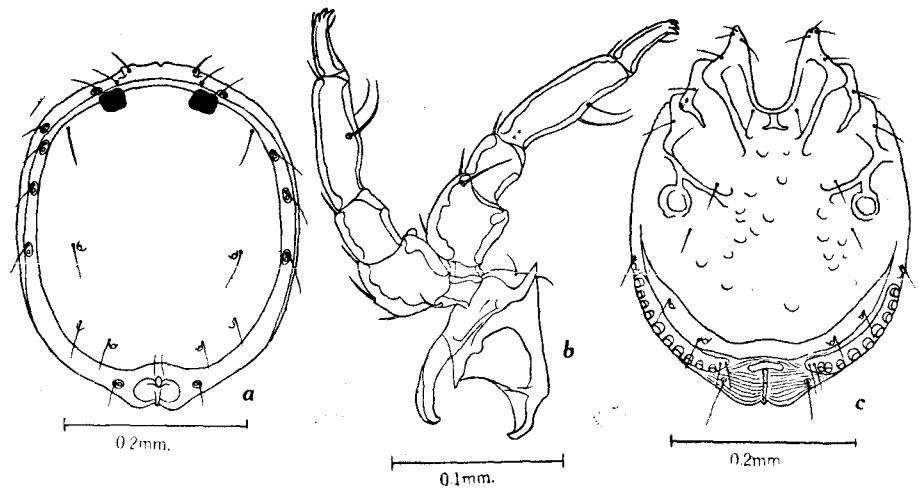

Fig. 33. *Aturus* sp., female.
a. Dorsum b. Maxillar organ with palps c. Venter.

40. *Kongsbergia enamii* Imamura

(Fig. 34)

Female (allotype, prep. 978). Body oval in shape, 380 μ long in venter and 266 μ wide in the widest portion. Interval between eyes 114 μ. Maxillar organ 96 μ long and 72 μ wide. Mandibles 130 μ long, including a claw in each. Palps measured as in Table 81, in μ.

Table 81.

Segment	1	2	3	4	5
Extensor surface	18	69	27	78	42
Flexor surface	18	36	15	60	39
Height	27	60	39	30	18

First segment of short and with a spine in the extensor terminal end. Second segment with four spines on the extensor surface and a papilla on the flexor surface. Third segment short and with two spines on the extensor surface. Fourth segment the longest and with two crooked spines on the flexor surface near terminal end. Legs measured as in Table 82, in μ.

Table 82.

Leg \ Segment	1	2	3	4	5	6
I	27	30	33	42	57	60
II	30	30	39	45	60	74
III	30	36	42	54	75	84
IV	60	51	45	60	78	81

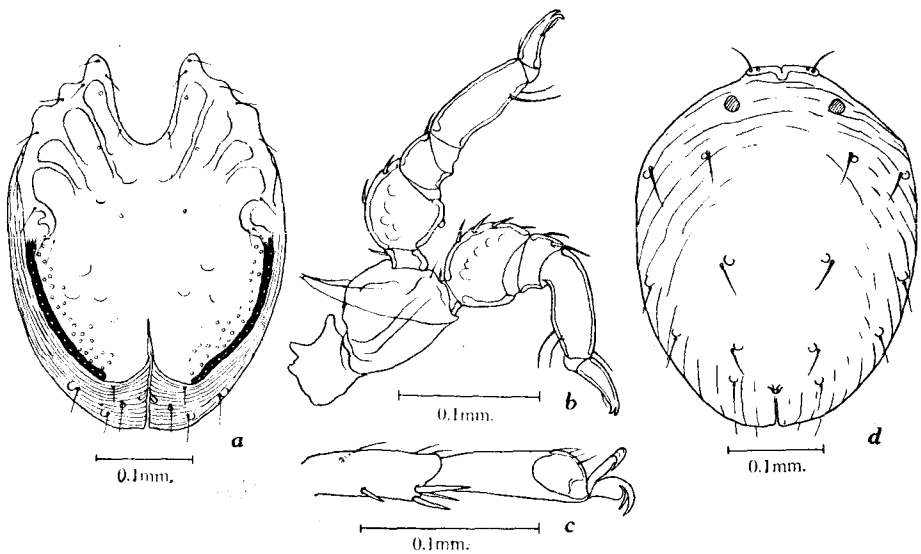

Fig. 34. *Kongsbergia enamii*, female.
a. Venter. b. Maxillar organ with palps. c. Fifth and sixth segments of right IVth leg. d. Dorsum.

Epimera and genital area shown in Fig. 34, a. Nephridial pore opening in dorsum near the mid-posterior margin. Colour purplish red. Eyes black.

Locality. Each one male and female were captured on Aug. 20, 1951 in the River Nagara, Gifu City.

Remarks. The male of this species was described by the author in 1953 from Hiroshima Prefecture as a new species. The present female seems to the author to be the female of this species, judging from the various characters. Though this female resembles also the female of *K. materna* Thor, it is different from the latter in palps which are more short and stout in the fourth segments.

41. *Kongsbergia rundiformis* n. sp.[1]

(Fig. 35)

Female (holotype, prep. 977). Body oval in shape, 237 μ wide, 296 μ long in dorsum and 314 μ long in venter. Two pairs of papillous groups in dorsum near the lateral margins. Interval between eyes 96 μ. Maxillar organ 76 μ long and 52 μ wide. Palps measured as in Table 83, in μ.

1) The specific trivial name has been offered in connection with the round body shape.

Table 83.

Segment	1	2	3	4	5
Extensor surface	15	51	21	57	39
Flexor surface	15	30	15	45	—
Height	18	39	30	21	15

First segment with a spine in the extensor terminal end. Second segment broad and with two spines. Third segment with a spine near the extensor terminal end. Fourth segment moderately thick and with two crooked spines in the middle portion of the flexor surface. Fifth segment bent a little and bifurcated in its distal end. The segments of legs are measured as in Table 84, in μ.

Table 84.

Leg \ Segment	1	2	3	4	5	6
I	24	28	36	44	56	60
II	28	32	36	44	56	60
III	28	32	40	52	72	76
IV	40	48	44	60	72	80

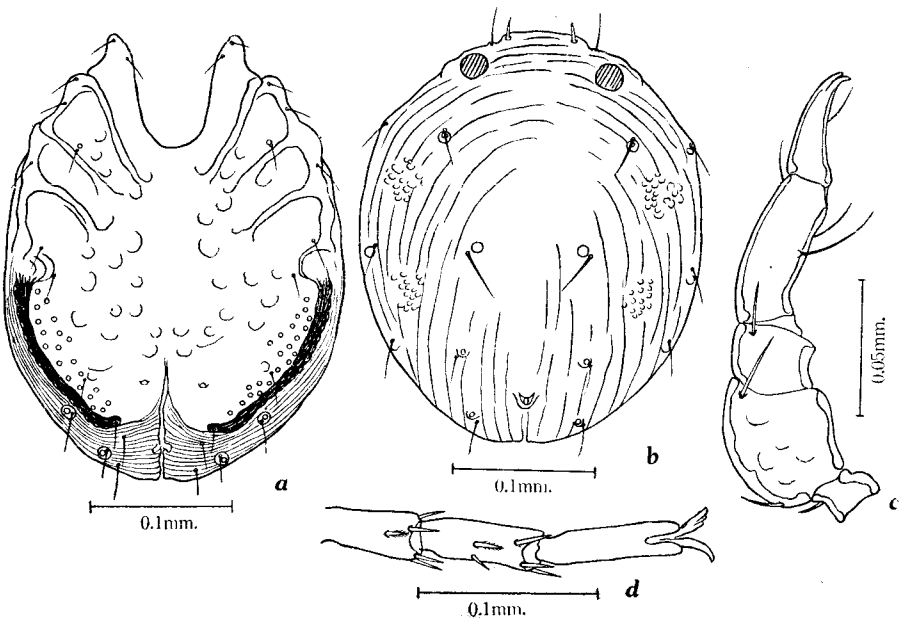

Fig. 35. *Kongsbergia rundiformis* n. sp., female.
a. Venter. b. Dorsum. c. Left palp. d. Fourth to sixth segments of left IVth leg.

Epimera and genital acetabula shown in Fig. 35, a. Excretory pore opening in dorsum near the mid-posterior margin. Colour red. Eyes black.

Locality. One female was obtained in the River Nagara, Gifu City.

Remarks. Though the present new species is akin to *K. angulata* Walter of Madagascar, it is more globular in body shape than the latter and has no notch in the mid-portion of the frontal body margin.

42. *Arrenurus* (*Micruracarus*) *madarászi* (Daday)

Two males were collected on Oct. 3, 1951 in a pond in Kamihaguri-mura, Hajima-gun. This species was reported by the author in 1953 from Hiroshima Prefecture.

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The other literature consulted in this research has been given in the previous papers (1952, 1953, a & b)

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