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SOME RHEOPHILOUS WATER-MITES FROM JAPAN

BY

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(With 50 Text-figures)

The investigations of which the writer now publishes an account deal with water mites collected by himself and others from rivers and torrents in Hokkaido and Honshu. At the present time the rheophilous water-mites are among the most interesting objects among hydrachnologists. However, as yet no report has been issued concerning the water mites of Japan. The writer's cordial thanks must be extended to Messrs. Y. MIYASHITA, H. ISHIZUKA and S. NISHIO for their kindness in placing the material at the writer's disposal and for helping in collecting specimens.

With the exception of the cosmopolitan species, *Megapus nodi-palpis*, all the species here considered have been recorded for the first time from this country. The determination of a few species of *Lebertia* and some species belonging to *Aturus* and *Feltria*, which were collected in the same localities with the following water mites, has been postponed until more material is secured.

- 1) *Protzia eximia* (PROTZ) var.
- 2)? *Protzia caucasica* SOKOLOW
- 3) *Protzia japonica* n. sp.
- 4) *Sperchon* (*Squamosperchon*) *glandulosus* KOENIKE
- 5) *Sperchon* (*Squamosperchon*) *fluviatilis* n. sp.
- 6) *Sperchon* (*Hispidosperchon*) *plumifer* THOR
- 7) *Pseudosperchon verrucosus* (PROTZ) var.

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- 8) *Pseudosperchon nipponicus* n. sp.
- 9) *Hygrobates foreli* (LEBERT)
- 10) *Rivobates ezoensis* n. sp.
- 11) *Megapus nodipalpis* THOR
- 12) *Aturus ovalis* n. sp.
- 13) *Aturus miyashitai* n. sp.
- 14) *Feltria* (*Mesofeltria*) *torrenticola* n. sp.
- 15) *Feltria* (*Mesofeltria*) *rotunda* n. sp.

***Protzia eximia* (PROTZ) var.**

(Figs. 1 & 2)

Body 0.88 mm long and 0.75 mm wide in the widest portion. Outline somewhat shouldered in the anterior margin and slightly narrowed in the middle region. Skin soft, covered with small conical papillae which are generally round in outline (Fig. 1, b). Palpi, capitulum, epimera and legs porose. Eyes lying in shouldered margins, double in a capsule. Mandibles, 0.26 mm long, longer than palpi, each with a claw which is moderate in size and slightly recurved innerwards (Fig. 2, d). Palpi, 0.35 mm along the flexor surface, generally similar to descriptions of European individuals, but slightly more slender than them (Fig. 2, a & b). The feathered bristle found in the second segment is often wanting. Epimera in four groups and rather small (Fig. 1, a). The first two pairs situated on the anterior portion abut on the capitulum. The first epimera are triangular in shape and are provided with several blunt bristles at the distal portion, while the second are curved inwards in the posterior margin and are provided with a few conspicuous bristles. The third and fourth pairs lie about half-way between the anterior and the posterior margins. The third pair is somewhat quadrate and the fourth pair lies with the apex in the anterior portion. Legs short, first three pairs about equal in length but slightly longer in the posterior ones. Fourth pair longer than the anterior pairs and slightly shorter than the length of the body. All legs devoid of swimming hairs, but provided with short pectinate and slender spines which are found sparsely on the outer side and around the distal

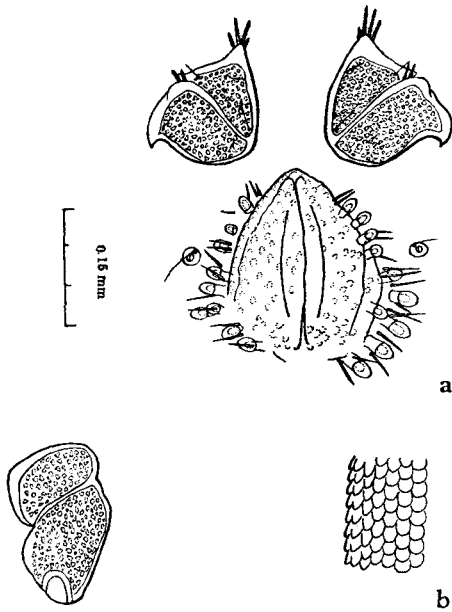


Fig. 1. *Protzia eximia* (PROTZ) var. :
a, epimera and genital area; b,
skin of antero-ventral part. Scale
not applicable to Fig. b.

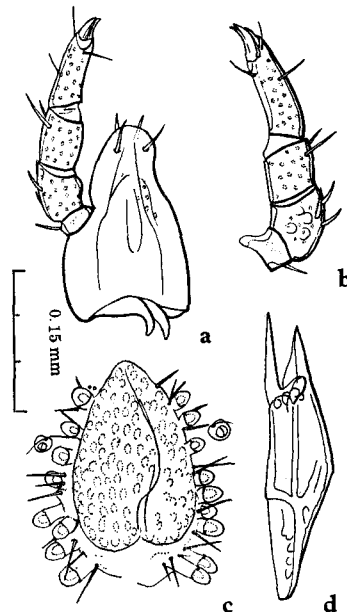


Fig. 2. *Protzia eximia* (PROTZ) var.
a, capitulum with right palpus;
b, left palpus; c, genital area;
d, mandible.

end of segments. Claws large, sickle-shaped, with the limb expanded laterally, taking a spoon-like form. Along the free margin, from fourteen to eighteen small teeth, decreasing in size from the center outwards with a large claw in the middle portion behind them. Genital area, 0.19 mm long and 0.18 mm wide, lying between the four groups of epimera plates and situated nearer to the anterior groups (Fig. 1, a). Acetabula in the groove forming the outer boundary of the genital lips, each stipitate with an oval head (Fig. 2, c). Bristles are found generally at the bases of these acetabula and more in number than the latter. The number of the acetabula in nine individuals is as follows:

left	10	10	9	10	10	9	9	10	11
right	10	10	8	9	9	9	9	9	8

Anus lying a little posterior between the genital area and posterior margin. Colour red.

Locality. About twenty specimens were found attached to stones and water-plants in running water from a spring near Chitosé, Hokkaido on February 25 and July 28, 1932.

Remarks. This is the first record of the cosmopolitan species from Japan. It has been reported heretofore from several places in Europe and, recently, in Asia, from the Ussuri region by SOKOLOV (1934). The Japanese species seems to be somewhat different from those hitherto reported in the form of the mandibles and in the number of the acetabula etc., but such differences seem to be not sufficient to separate the species.

? *Protzia caucasica* SOKOLOV

(Figs. 3 & 4)

Body pyriform in outline, measuring 1.07 mm long and 0.85 mm wide. Skin soft, universally provided with small conical papillae which are thickly set and with their tips directed towards the posterior part. The outline of these papillae is different according to the places and directions from which they are seen: sometimes scale-like and sometimes elliptical with jagged margin (Fig. 4, f & g). Palpi, capitulum, epimera and legs porose. Eyes lying in shoulder margins, double and covered with a capsule. Mandibles longer than palpi, 0.37 mm long, provided with a conspicuously large claw slightly recurved inwards (Fig. 4, d & e). Palpi, 0.44 mm on the flexor surface, very similar to those of *P. caucasica* (Fig. 4, b & c). A single feathered bristle found on the terminal portion of their second segment. Epimera in four groups. The first two pairs are situated on the ventral side of the anterior margin and attached to the capitulum. The distance of these epimera groups is greater than that of *P. caucasica*. The first epimera are, more or less, triangular in shape and are furnished with about 5-6 blunt pectinate bristles at the anterior distal portion and 1 or 2 slender ones on their inner margin (Fig. 3). The second epimera are somewhat quadrate in

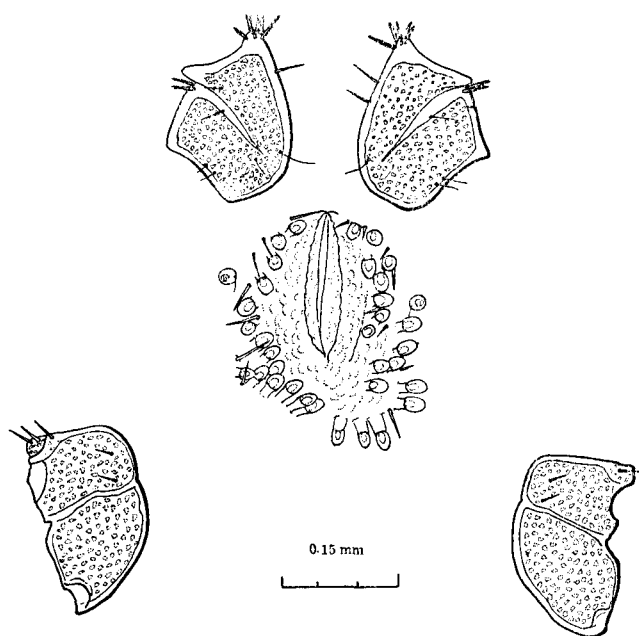


Fig. 3. ? *Protzia caucasica* SOKOLOV: epimera and genital area.

outline, slightly recurved inwards in the postero-lateral margins, and bear a few hairs, the number of which is different in individuals. The third and fourth pairs of epimera lying about half-way between the anterior and the posterior margins have the inner margins running parallel with the genital slit. The third epimera are somewhat quadrate in shape, gradually widened outwards, and each provided with 1-3 bristles on the anterior outer corner and 1 or 2 hairs near the inner margin. The fourth epimera, largest of all, are situated obliquely with the narrowed apex on the inner side. Legs short, first three pairs subequal in length, but longer in posterior ones. Fourth pair, largest of all, slightly shorter than the body length. All legs are destitute of swimming hairs, but bear short pectinate spines which are found around the distal margin and on the dorsal side of segments. Among these spines there are some slender ones which are sparsely distributed. Claws large, sickle-shaped, expanded laterally, provided with about sixteen small teeth along the free mar-

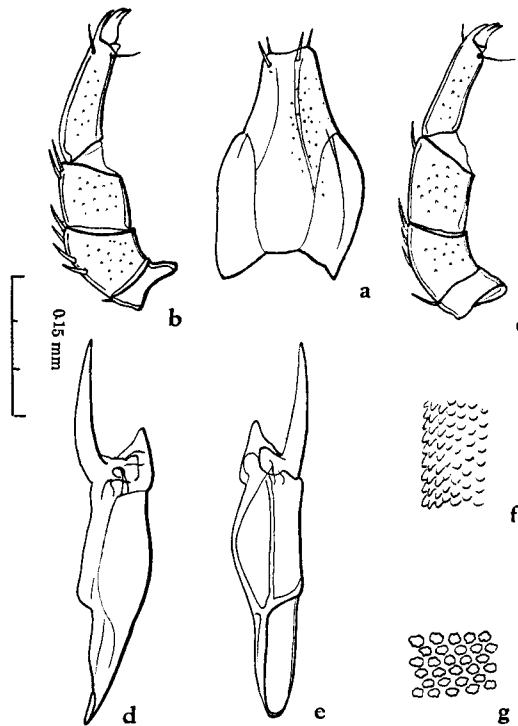


Fig. 4. ? *Protzia caucasica* SOKOLOV: a, capitulum; b, right palpus; c, left palpus; d, ventral view of mandible; e, dorsal view of mandible; f, skin of antero-ventral part; g, skin of dorsal median portion. Scale not applicable to Figs. f and g.

gin, which decrease in size from the center outwards. Genital area, 0.29 mm long and 0.25 mm wide, lying between the four groups of epimera plates and situated nearer to the anterior groups (Fig. 3). Acetabula forming the outer boundary of the genital lips, each capped with an oval head. Spines among them are fewer in number than acetabula. The acetabula counted in five specimens are shown in the following table:

left	14	19	14	17	13
right	14	15	11	19	13

Anus lying between the genital area and the posterior margin. Colour red. Eyes black.

Locality. More than ten specimens found attached to stones in torrents near Sowunkyo, Hokkaido on Aug. 4, 1932.

Remarks. The Japanese specimens are closely related to *P. caucasica* described by SOKOLOW (1927) from the Caucasus. The Japanese species, however, differs slightly from SOKOLOW's specimens in the form of mandibles and genital area, and in the structure of skin. But the writer has identified these specimens—with a query—with the Caucasian water-mites. The present specimens seem to be also very similar to *P. ovata* reported from North America by MARSHALL (1931). But on account of the brief description of the American species the present writer is not in a position to compare them.

Protzia japonica n. sp.

(Figs. 5, 6 & 7)

Body tending to develop antero-lateral corners, 1.05 mm long and 0.9 mm wide in the widest part. Skin soft, provided with small conical papillae which are thickly set and have their tips directed posteriorly (Fig. 7, b & c). These papillae, disposed in scale-like arrangement, differ in outline according to locality and also, more or less, in different individuals. On the dorsal side, especially in the middle region, they are usually jagged in outline, but on the ventral side, especially on the antero-lateral portions, they are semicircular. Palpi, capitulum, epimera and legs porose. Eyes situated on shoulder margins, double and covered with a common capsule. Capitulum broader than that of the two preceding species (Fig. 6, a). Mandibles, 0.29 mm, about of the same length as palpi and short in relation to the length of the capitulum (Fig. 6, b & c). Mandibles each provided with a short crescent claw. Palpi, 0.33 mm long along the flexor edge, quite distinct from other species, their shape being somewhat similar to those of *P. walteri* VIETS found in Spain (Fig. 6, d & e). The fourth segment, however, is not provided with so many

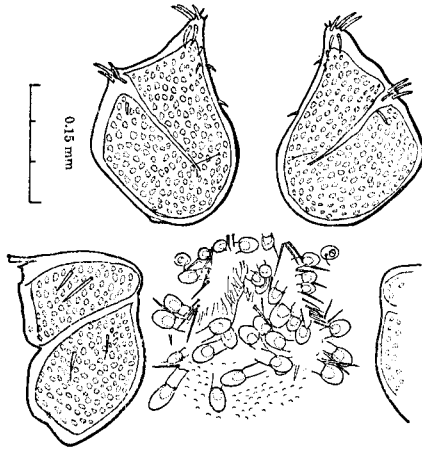


Fig. 5. *Protzia japonica* n. sp.: epimera and genital area of male.

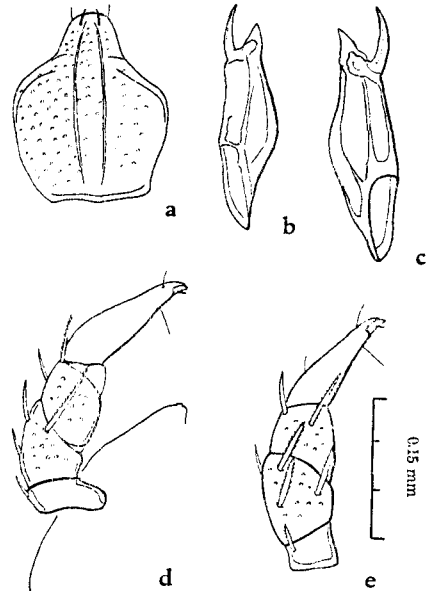


Fig. 6. *Protzia japonica* n. sp.: a, capitulum of male; b, dorsal view of mandible of male; c, ventral view of mandible of female; d, right palpus of female; e, left palpus of female.

hairs, and the ventral side is not so curved inwards as in those of the Spanish species. In the third segment two prominent spines are present, of which one is feathered. The second segment, broadest of all, is provided with several spines, some feathered and some unfeathered. The first segment bears a short pectinate spine on the dorsal side. Epimera in four groups. The anterior two pairs are fused on both sides of the capitulum and comparatively large in the genus in relation to the posterior pairs (Fig. 5). The first epimera are not so triangular in shape as in the former two species, and are furnished with about five blunt, short and claw-shaped feathered spines on the anterior distal end, and a few spines, similar in shape but still shorter than them, on the inner margin. The second epimera, having two nearly paralleled margins, are provided with about four short claw-shaped spines on the anterior corner. The third epimera, gradually narrowing to the median portion, are

furnished with two long slender spines. The fourth epimera, located conspicuously obliquely to the body axis are the largest of all and bear two narrow spines. Legs short and deficient in swimming hairs, but furnished with short and somewhat clawed spines which are found around the distal margin and on the outer side of segments. Those around the distal margin are very stout. There are sparsely

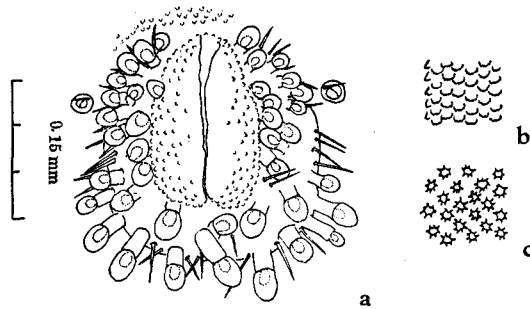


Fig. 7. *Protzia japonica* n. sp.: a, genital area of female; b, skin of antero-ventral part; c, skin of dorsal median portion. Scale not applicable to Figs. b and c.

disposed a few slender spines on the outer side of segments. Claws large, sickle-shaped, expanded laterally, provided with twenty or more teeth along the free margin, with smaller ones in the outer portions. Genital area, 0.25 mm long and 0.24 mm wide, lying in about the middle region surrounded by the four groups of epimera plates (Fig. 7, a). Acetabula arranged broadly in two rows on the boundary of the genital lips, each stipitate with an oval head and variable in number, as shown in the following table compiled from measurements taken of three specimens.

left	20	20	15
right	12	20	18

Spines distributed among acetabula are approximately equal in number with them and grouped especially in the middle part of the lateral

margins. Anus lying nearly midway between the genital area and the posterior margin. Colour red. Eyes black.

Locality. Several specimens were obtained together with the preceding species.

***Sperchon (Squamo.) glandulosus* KOENIKE**

(Figs. 8, 9 & 10)

Body elongate oval, anterior margin slightly truncate, posterior portion more or less constricted in the living state, 1.26 mm long and 0.85 mm wide in the widest part. Skin covered with short coarse ridges irregularly disposed (Fig. 8). Gland areas and hair plates conspicuous, tuberculate, porose and arranged as shown in Figs. 8-9. The anterior gland tubercles, bearing short antenniform hairs transversely directed, stand out prominently on the frontal margin just anterior to the eyes. On the dorsal side are found eighteen gland areas arranged in nine pairs. Except small paired areas situated most axially on the anterior region, these gland areas are found on the dorsal surface arranged in, more or less, four longitudinal rows which are divided into one inner and one outer paired rows. The areas forming the inner lines are larger than those forming the outer. On the ventral side three other pairs can be found. The first pair is present just posterior to the fourth epimera and on both sides of the genital plates. The second pair is small and situated about midway between the genital area and the posterior margin. The third pair, larger than those above mentioned, is located on both sides of and just posterior to the anus. Besides these areas, there are present between the second and the third epimera two conspicuous gland ridges each with a long accessory pair. Eyes, each with a capsule, pronouncedly, protruded anteriorly. Capitulum, 0.25 mm long, somewhat quadrate from the ventral view in the frontal portion, with a rostrum which gradually tapers, and furnished with lobes in a pair and bristles in two pairs at the terminal portion (Fig. 10, b). Mandibles, 0.41 mm long,

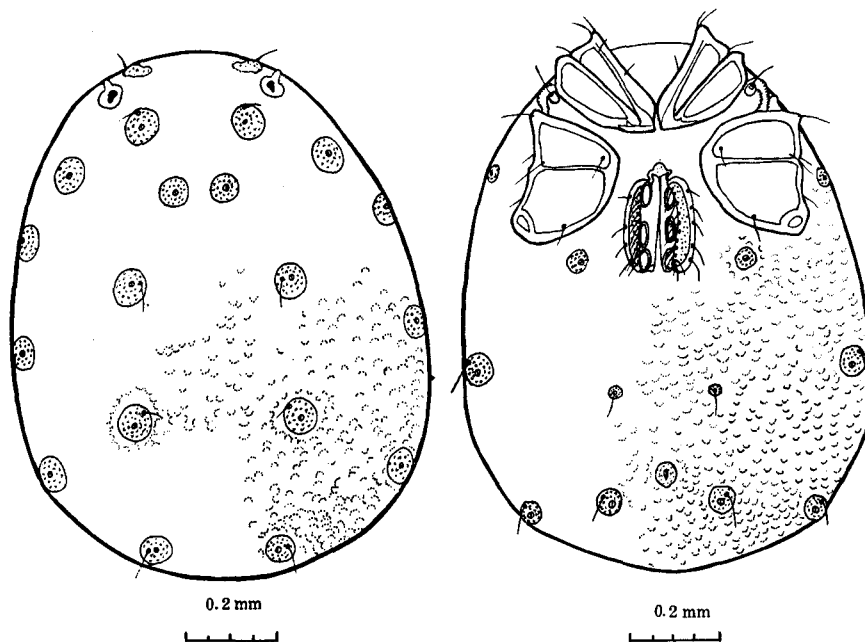


Fig. 8. *Sperchon (Squamo.) glandulosus*
KOENIKE: dorsal side.

Fig. 9. *Sperchon (Squamo.) glandulosus*
KOENIKE: ventral side.

slender and longer than the capitulum, having a short curved claw (Fig. 10, c). Palpi, 0.83 mm long along the extensor edge, stout and porose, first segment short and having a dorsal spine; second segment, widest of all, with extensor surface highly arched and flexor surface almost straight (Fig. 10, a). On the extensor surface are present several clawed spines, some of which are pectinate. At the distal end of the flexor margin is found a stout cone-like process having a blunt spine on the outer side of the base and a long hair on the inner surface of the tip. From the dorsal side of the third segment, which gradually narrows distally, arise about ten spines; among them some on the inner surface are broader than those on the outer surface. Fourth segment, slender and longest of all, having four slender hairs on the extensor surface and two pegs on the flexor surface. Anterior peg, smaller than the posterior, situated about midway between the posterior and the distal end and having a small hair. Fifth segment, smallest of all, with two distal claws,

having hairs on both sides. Epimera in three groups. First and second pairs together with the capitulum form an anterior chitinous plate. Third and fourth pairs form two groups on both sides of genital area. First pair, narrow, slightly widened at the outer margin, the inner end being narrow, curving round outwards along the margin of the second pair, which is shorter and broader than the former. The first epimera are barely fused with each other just behind the capitulum but separated out a little farther back. Third pair with the anterior margin sloping a little downwards towards the inner portion, which is slightly concave near the extremity. Fourth pair, nearly a quadrant in shape, with rounded

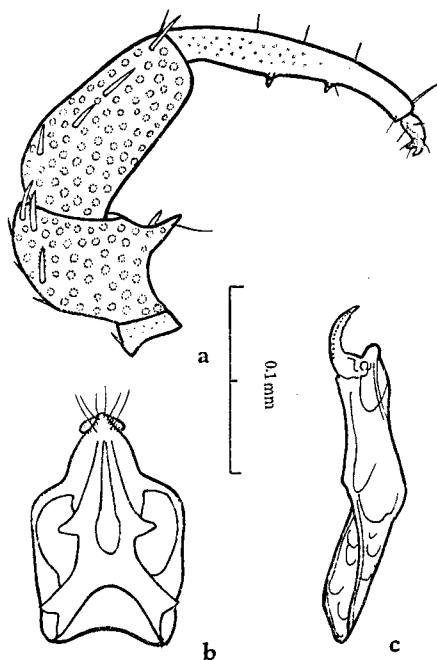


Fig. 10. *Sperchon (Squamo.) glandulosus*
 KOENIKE: a, left palpus; b, capi-
 tulum; c, mandible.

margin running from the inner to the posterior side, and two radii, one on the anterior and another on the outer sides. The third and fourth epimera are confused on a line perpendicular to the sagittal line. Legs slender, deficient in swimming hairs but furnished with many short piniform bristles which are found on the distal margin and on the whole surface of segments. These legs are shorter in the posterior ones. The fourth legs are about equal to the body length. In the distal portion of all legs are present two claws accompanying accessory claws and lamina. Anus lying near the posterior margin between the anal glands. Genital area, 0.25

mm long and 0.15 mm wide, between the fourth pair of epimera extending in the anterior portion to the level of the third epimera and

posteriorly barely to the gland plates situated just below the fourth pair. Outer margin of plates thick, conspicuous, protruded with hairs sparsely disposed; inner margin of plates, thinner than the former, furnished with many hairs arranged in a row. At the anterior end a small chitinous disc. Three pairs of acetabula, the two anterior pairs being elongate and the posterior pair elliptical. Skin brownish red. Epimera and gland plates somewhat greenish. Eyes dark carmine.

Localities. Over ten specimens collected in a trickling stream running from a spring in Chitosé, Hokkaido, on Jan. 25 and July 28, 1932.

Remarks. The Japanese specimens seem to be somewhat larger than those ever described from Europe and, moreover, the palpi are different in small details from those of the European specimens, but such differences are probably attributable to a local variation. The species has been hitherto known from several parts of Europe, the Caucasus and the Ussuri region.

***Sperchon (Squamo.) fluviatilis* n. sp.**

(Figs. 11, 12, 13, 14 & 15)

Body generally 0.55 mm long and 0.5 mm wide. Outline somewhat oval and shouldered with truncate anterior margin. Skin texture, instead of being papillated or areolated, furnished with fine ridges which are somewhat undulating and irregularly disposed (Fig. 11). Gland plates, papillated, arranged in eight pairs on the dorsal surface, nearly equal in size, disposed in four transversal crescents rows, each comprised of four plates (Fig. 11). Gland papillae situated just anterior to and on axial side of eyes, each prominent with a short stout spine. On the ventral surface, gland plates arranged in five pairs (Figs. 12-13). Among them, the most anterior pair situated just posterior to the fourth epimera, the smallest one on the lateral sides of the space between the genital area and the anus, the largest one on both sides and slightly posterior to the anus, and two lateral ones on the lateral margins. Between the second

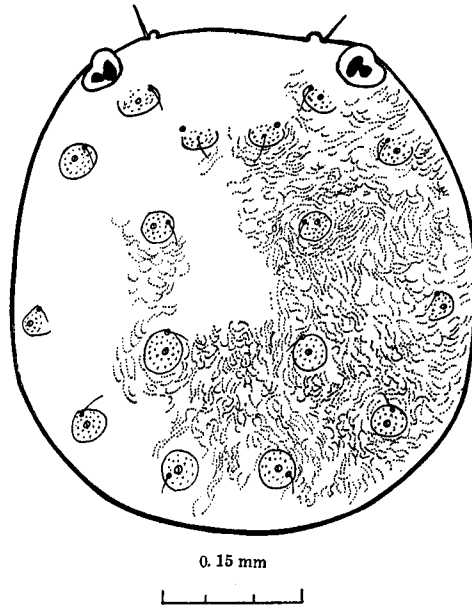


Fig. 11. *Sperchon (Squamo.) fluviatilis* n. sp.: dorsal view of female.

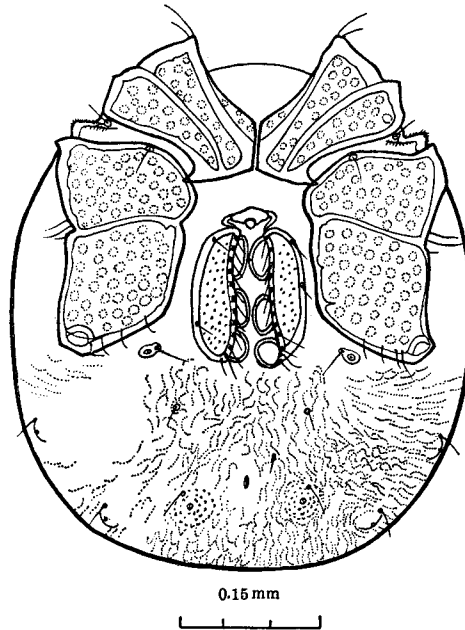


Fig. 12. *Sperchon (Squamo.) fluviatilis* n. sp.: ventral view of female.

and third epimera are present two gland papillae, each furnished with an accessory hair. Eyes, double on each side of the anterior margin, covered by a common chitinous capsule. Just anterior to and inside of the eyes standing two short antenniform bristles each on the base of the gland papillae. Capitulum rather short. Mandibles, 0.23 mm long, slender, well-curved in posterior portion, ending in a short claw at the distal part (Fig. 14, c). Palpi stout, more than twice as long as mandibles, 0.55 mm in length, along the extensor surface (Fig. 14, a & b). First segment short and with a dorsal spine. Second segment, broadest, having on the flexor surface a prominent process at the distal end and on the rounded extensor surface several spines, feathered or unfeathered. The process, somewhat rapidly narrowed near the distal end, is provided with two hairs near the extremity and a prominent spine at the

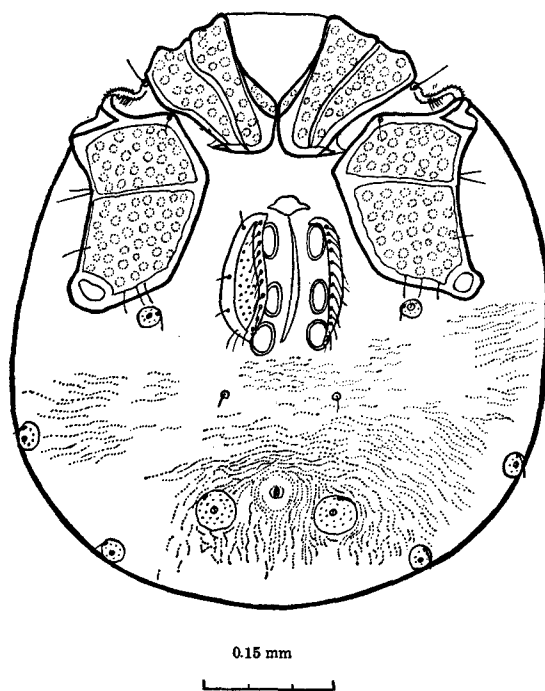


Fig. 13. *Spermion (Squamo.) fluviatilis* n. sp.: ventral surface of male, viewed slightly sideways.

base. Third segment slightly narrowing distally, having a few spines on the dorsal surface. Fourth segment, longest of all, bearing two pegs and a few hairs on the ventral side, and two long hairs on the distal portion of the dorsal side. Fifth segment, small, furnished with two claws and several hairs. Epimera covering nearly the anterior half of the ventral surface, almost the same in both sexes (Figs. 12 & 13). First pair slender, broadest at the outer extremity and narrowest in the middle region. Along the free margins of the epimera a broad chitinous part bordering them

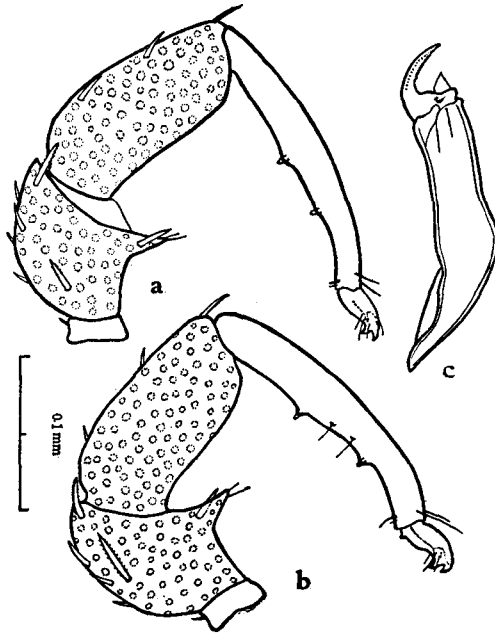


Fig. 14. *Sperchon (Squamo.) fluviatilis* n. sp.: a, right palpus of female; b, left palpus of female; c, mandible.

and in the posterior portion they are confused with the second pair. Epimera of the first pair barely meeting on the median line in the posterior portion. Second pair widening towards the outer extremities and tapering towards the inner end, each surrounded by a chitinous margin which gives rise to a process towards the third

pair in the posterior portion. Third pair uniting with the fourth pair on a line slightly sloping downwards towards the outer portion, characterized in having the inner margin concave. Fourth pair somewhat rhomboidal, having a few bristles on the posterior edge. Legs stout and long, all legs longer than the body. No swimming hairs. On the distal margin and on the dorsal side of each segment are present several spines. At the distal end of all legs are present claws, sickle-shaped, with accessory claws and hyalin lamina at base. Anus lying nearer to the posterior margin between the genital area and the posterior margin. Genital area situated between the fourth epimera. Genital plates chitinous; the inner margin being furnished with a row of sensory hairs and the outer margin with a few hairs sparsely distributed. At the anterior end a small but conspicuous disc. Three pairs of acetabula, the two anterior pairs being elongate, the posterior pair elliptical. Colour red. Eyes black. The size is nearly equal in both sexes but there is found a large male, 0.7 mm long and 0.65 mm wide.

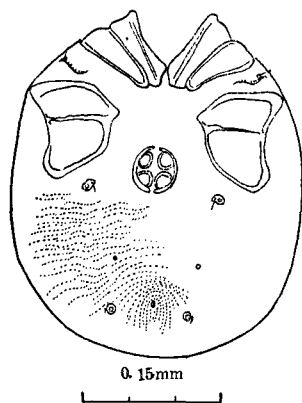


Fig. 15. *Sperchon* (*Squamo.*) *fluviatilis* n. sp.: ventral view of nymph.

Nymph. Nymph, 0.35 mm long and 0.3 mm wide, the intervals between the second and third epimera being larger than in the adult (Fig. 15).

Genital area furnished with four acetabula only. Other characters not especially different from the adult.

Locality. Several specimens found under stones in the River Ishikari and her tributary torrents near Sowunkyo, Hokkaido.

Remarks. The species is easily distinguishable from others in the skin texture marked by undulating lines. *Sperchon lineatus* occurring in Norway and England seems to be somewhat similar to the species in the possession of skin provided with fine ridges more or less curved and having the appearance of the skin at the tip of

the human thumb, but is quite different in the shape of the epimera and the position of the genital area.

Sperchon (Hispidio.) plumifer THOR

(Figs. 16, 17 & 18)

Body, 0.65 mm long and 0.66 mm wide in the widest portion. Outline about circular, the anterior margin being distinctly shouldered and the posterior portion slightly narrowed. Surface of skin reticulate, each areolation of irregular polygonal form and marked off by the minute chitinous aciculae (Fig. 16). On the ventral surface between the genital organ and the epimera plates skin finely striated (Fig. 16). The arrangement and number of gland plates and accessory hairs accord both in ventral and dorsal sides with those of Fig. 1 made SZALAY (1932) for *S. plumifer* var. *danubialis*. Antenniform bristles short and stout. Just inside of them are present prominent gland papillae. Eyes double on each side of the anterior margin and covered by a chitinous copsule. Capitulum with a short

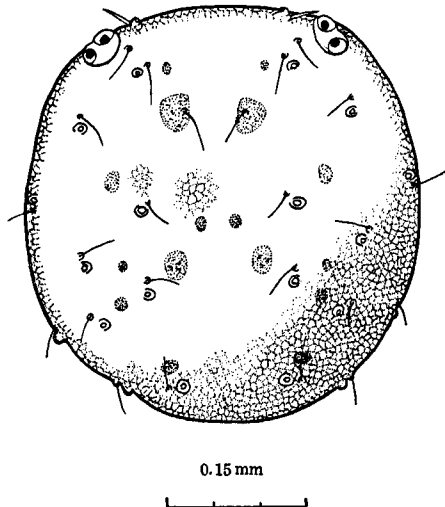


Fig. 16. *Sperchon (Hispidio.) plumifer* THOR: dorsal view of male.

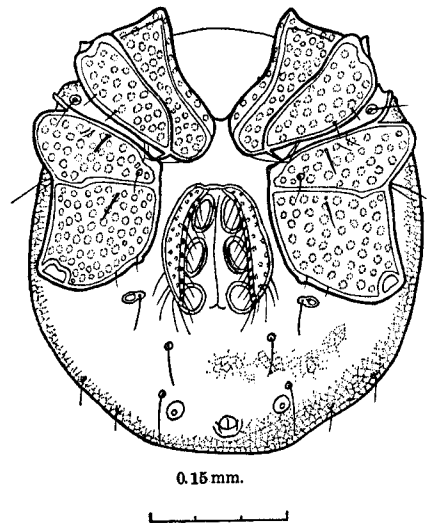


Fig. 17. *Sperchon (Hispidio.) plumifer* THOR: ventral view of male.

rostrum (Fig. 18, c). Mandibles, 0.25 mm long, slightly longer than capitulum, armed with a strong well-curved claw (Fig. 18, d). Palpi, 0.63 mm along the extensor surface, large, about as twice long as the mandibles (Fig. 18, a & b). First segment short and deficient in spines. Second segment, broadest of all, having a prominent process at the distal portion on the flexor surface and several spines on the rounded extensor surface. The process, somewhat recurved off towards the lower side near the apex, bears three bristles in the distal part, a long and a short one on the outer, and a short one on the inner side. Some of dorsal spines large and pectinate. Third segment having one feathered and several unfeathered spines on dorsum only. Processes on the flexor surface of penultimate segment, minute and two in number. About midway between these processes are found two hairs. On the distal portion of the segment two more hairs are found in specimens collected in Hokkaido. In specimens from the River Kako and the River Yura, both in Honshu, the position of these processes and hairs is somewhat variable. On the distal part of the extensor surface are found two bristles, the proximal one being longer than the distal one. Fifth segment, smallest of all, with two distal claws and several hairs. Epimera, covering more than half the ventral surface, somewhat different in both sexes. In the male, the intervals between the second and the third epimera are narrower than in the female (Fig. 17). First pair very narrow in proportion to their length, broadest at the outer margin and narrowest in the middle region. Along the free edges a broad chitinous part borders and extends to the posterior margin of the second pair, forming a claw-shaped process there. Second pair wedge-shaped. Third pair, somewhat resembling in form of the forewings of butterflies, narrowing towards the inner portion and extending anterolaterally, the chitinous inner margin being rectangular in the anterior corner. Fourth pair confusing with third pair on a line approximately transversal to the body axis, the inner margins gradually opening out towards the posterior to the base of the fourth legs. Legs stout and long, all legs exceeding in length the body length

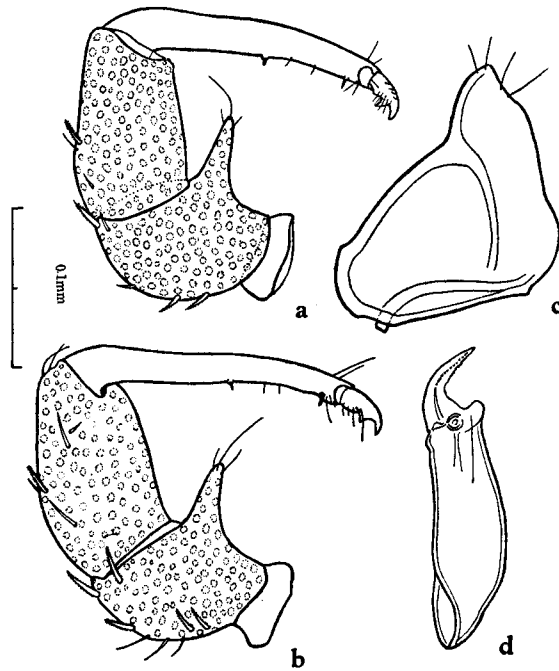


Fig. 18. *Sperchon (Hispid.) plumifer* THOR: a, left palpus; b, right palpus; c, side view of capitulum; d, mandible.

These legs destitute of swimming hairs, but furnished with stout spines on the ventral side and around their distal margin. Besides these spines, on the dorsal side of segments III-V of these legs are found narrow feathered spines which are longer in the posterior segments and in the posterior legs. The feathered spines in my specimens are not so long as in the original description but agree with SZALAY's note on *S. plumifer* var. *danubialis*. In the distal portion of all legs are found two claws, each provided with an accessory claw and a laminal plate. Genital area lying between the posterior pairs of epimera. Genital plates, chitinous, narrower in the female than in the male, with many hairs arranged in a row on the inner margins and a few hairs on the outer margins of the posterior part (Fig. 17). Two anterior pairs of acetbula equal in size and shape; and more elongate than the posterior pair. The anterior margin

of the genital plates is connected by a chitinous bridge. Anus lying fairly close to the posterior extremity behind the genital area. Colour ranging from reddish yellow to brown.

Localities. Many individuals were collected under stones in the River Ishikari and torrents near Sowunkyo, Hokkaido, in Aug. 4-5, 1932. Several specimens were obtained by Mr. Y. MIYASHITA in the River Yura, near Kyoto, on Aug. 22, 1932, and a few examples were secured by Mr. S. NISHIO in the River Kako, Hyogo Pref. on Aug. 23, 1932. The species is known from Europe, the Caucasus and through Siberia to the Ussuri region.

Pseudosperchon verrucosus (PROTZ) var.

(Figs. 19 & 20)

Japanese specimens of the cosmopolitan species generally agree with descriptions hitherto given for European specimens with the exception of the form of the genital area which is exceedingly round compared with that of the European species (Fig. 20). On account of the meagreness of specimens the writer provisionally identified

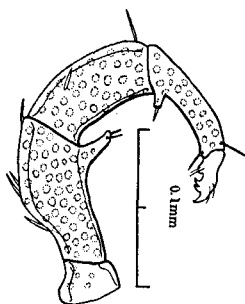


Fig. 19. *Pseudosperchon verrucosus* (PROTZ) var.: left palpus.

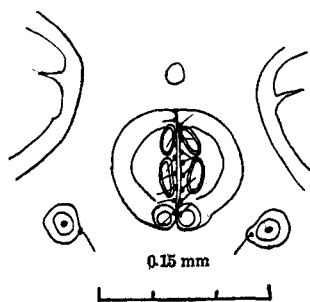


Fig. 20. *Pseudosperchon verrucosus* (PROTZ) var.: genital area.

the Japanese species with the common species. For a comparison with the European and the succeeding new species, figures of palpi and the genital area are given.

Nymph. Nymph, not so elongate, having smaller epimera and smaller warts in proportion to the body than in the adult. Provisional genital area represented by four rounded acetabula and two genital plates.

Locality. A female and a nymph were collected by Mr. S. NISHIO from the River Kako, Hyogo Pref., Honshu, on Aug. 23, 1932. The type species is one of cosmopolitan species and has been known from Europe, the Northern part of Africa, North America, European Russia, the Caucasus and the Ussuri region.

Pseudosperchon Nipponicus n. sp.

(Figs. 21, 22, 23 & 24)

Body in the male, oval and shouldered, 0.5 mm long and 0.35 mm wide in the widest portion. Female slightly larger than the male. Anterior margin slightly convex. Dorsum moderately arched, ventor flat. Chitinous skin robust, covered with small conical papillae which are thickly set near the periphery and are sparsely distributed both on the dorsum and ventor in the median portion. Palpi, capitulum, epimera, legs and genital plates porose. On the dorsal side and on the posterior margin of the ventral side are found several large rounded warts with papillated surface (Fig. 21). On the dorsum there are nine pairs, arranged broadly in four rows in two pairs, the inner pair comprising ten warts and the outer one consisting of six warts. Besides them, just anterior to the middle part of either lateral margin, is present a wart. Among the warts in the inner lines above mentioned, the most anterior and posterior ones are larger than the others. Of the warts in the outer lines, the two posterior ones are larger than the anterior. Between the eyes are two skin glands in a pair and in the middle area of the dorsal side four glands in two pairs, the anterior pair being smaller than the posterior. Among the ventral warts the posterior four are larger than the rest. Between the second and the third epimera, and also close to the posterior margin of the fourth epimera are

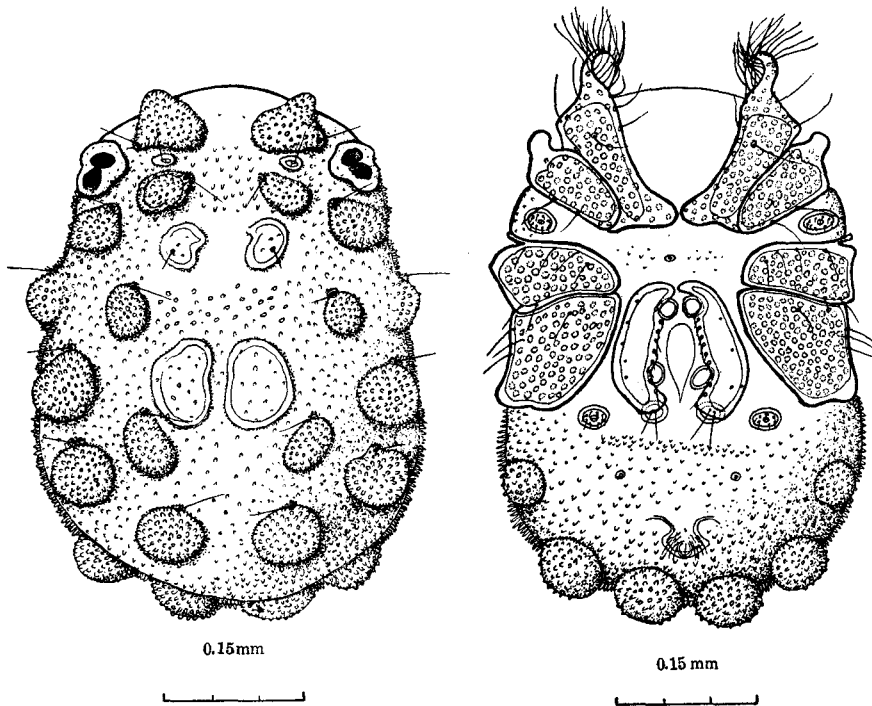


Fig. 21. *Pseudosperchon nipponicus* n. sp.: dorsal view of male. Fig. 22. *Pseudosperchon nipponicus* n. sp.: ventral view of male.

found large gland plates (Fig. 22). Eye-capsules lying wide apart towards the antero-lateral margin and each covering double eyes. Capitulum with broad base gradually narrowing to the cylindrical rostrum, having lateral ridges in the basal half, which are arranged parallel. Mandibles, 0.21 mm long, slender and nearly straight in the median length, having a well-curved claw at the distal end and a sharp edge directed ventrally on the base (Fig. 23, c). Palpi, 0.39 mm along the extensor surface, stout and porose (Fig. 23, a & b). First and fifth segments considerably shorter than the other three, the latter being nearly equal to one another in length. Second segment, stoutest of all, with several short curved spines on extensor surface and a conspicuous process near the distal end of the flexor surface. The process is directed obliquely upwards, with an accessory spines and a hair near the apex. Third segment, narrower

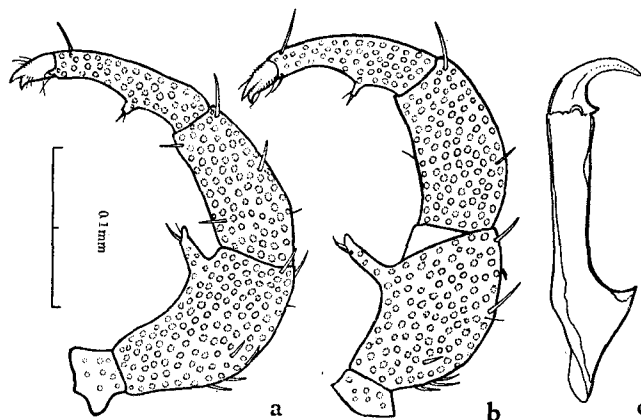


Fig. 23. *Pseudosperchon nipponicus* n. sp.: a, right palpus; b, left palpus; c, mandible.

than the former, having a few spines sparsely distributed on the dorsal and the ventral surface. Fourth segment, very slender and gradually narrowing distally, provided with a long bristle near the distal part of the dorsum and a blunt peg, accompanied with a spine and a bristle, just nearer to the proximal end of the flexor. Fifth segment with double claws and several bristles. Epimera in four group (Fig. 22). First epimera furnished with a well-developed inner subcutaneous margin extending forwards beyond the body margin and having a thick cluster of long hairs, and in the posterior

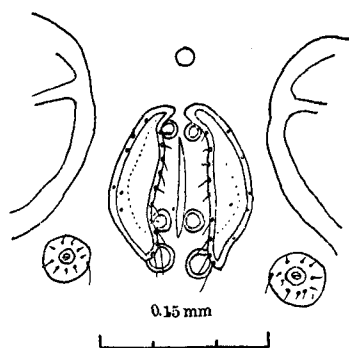


Fig. 24. *Pseudosperchon nipponicus* n. sp.: genital area.

part barely meeting each other in the median line behind the capitulum. Second epimera, wedge-shaped with a blunt tip, smaller than the first, bordered by a subcutaneous margin. Third epimera, separate from the second by an interval, having a decidedly curved anterior margin, a slightly sloping posterior edge and a lateral connecting them. Fourth epimera, largest of all, showing the shape of an obtuse triangle with an acute apex truncated. Inner

margin largest and gradually curving laterally. Legs deficient in swimming hairs and bearing spines around the distal margin and on the dorso-lateral surface of each segment. At the distal part of all legs are found claws, each with an accessory claw and laminate base. Genital area lying for the most part between the fourth pair of epimera (Fig. 24). Genital opening flanked by three pairs of acetabula, the two anterior pairs being oval and smaller than the posterior one, which is quite round in outline. In the anterior pairs the second pair is smaller than the first. Inner margin of genital plates fringed with a row of hairs. Anus situated near the posterior margin. Colour brownish red.

Female. Slightly larger than the male, measuring 0.59 mm long and 0.47 mm wide in the widest part. Gland warts smaller than those of the male.

Locality. Several specimens found attached to stones in torrents near Sowunkyo, Hokkaido, on Aug. 4-5, 1932.

Remarks. Two species in the genus are reported, the cosmopolitan species, *P. verrucosus* and the Canadian species, *P. ovalis* MARSHALL, which is described on the basis of an ill-preserved specimen. The present species, though closely related, is distinctly separate from the former species in having larger warts and papillae more thickly set on the skin, different form of palpi and genital area. As pointed out by SOKOLOV (1934), the papillation on the skin may be variable in individuals. The difference in size of the warts alone seems to be rather unimportant for the specific character. But the palpi of the new species are different from the cosmopolitan species in having more spines in the third segment and especially the peg on the penultimate segment, which is situated near the middle portion (not close to the proximal end as in *P. verrucosus*) of the ventor surface. Moreover, in the genital area of *P. verrucosus* the two anterior pairs of acetabula are elongate and larger than the posterior pair, while in *P. nipponicus* the two anterior pairs are oval and clearly smaller than the posterior pair. *P. ovalis*, having a still smaller number of conical elevations on the dorsal surface but gene-

rally coinciding with *P. verrucosus*, obviously differs from the Japanese species.

***Hygrobates foreli* (LEBERT)**

(Fig. 25)

The species is known from Europe and also through Altai to Kamtchatka and the Ussuri region. Though the species is closely

related to *H. longipalpis* already reported from Honshu, Japan, the palpi of this species are different from those of the latter, the second segment having a much smaller and less pronounced process than that of the latter and the third segment being on the flexor side distinctly convex, as pointed out by LUNDBLAD (1930).

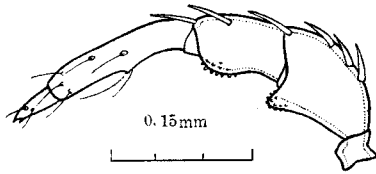


Fig. 25. *Hygrobates foreli* (LEBERT):
right palpus of male.

Locality. Several specimens were collected in the Ishikari River near Sowunkyo, Hokkaido, on Aug. 4, 1932.

***Rivobates exoensis* n. sp.**

(Figs. 26, 27 & 28)

Body attaining a length of 0.9 mm and a breadth of 0.73 mm. Outline nearly oval, with somewhat emarginate anterior portion. Dorsum well-arched and ventor almost flat. Skin finely striated. Capitulum slightly narrowed in the posterior portion and fused with the first pair of epimera in the posterior half. Palpi, 0.45 mm long on the extensor edge, first segment short, with a short spine on the extensor surface (Fig. 28). The second segment, widest of all and widened distally, has a cone-shaped process covered with chitinous denticles on the flexor surface and a few spines on the extensor surface. The third segment, nearly similar in width throughout the

whole of the length, has usually six chitinous denticles on the terminal half of the flexor surface and a few stout spines on the extensor surface. Fourth segment, longest of all, narrowing to both ends, and having two large ventral hairs, the proximal one being longer

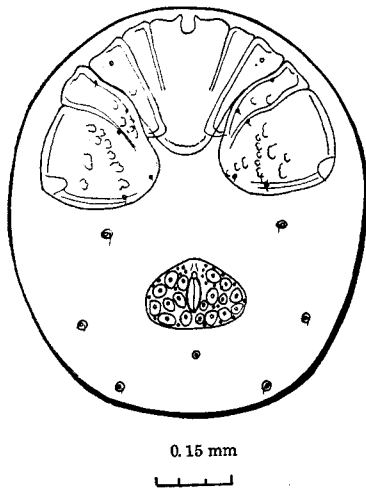


Fig. 26. *Rivobates ezoensis* n. sp.:
ventral view of male.

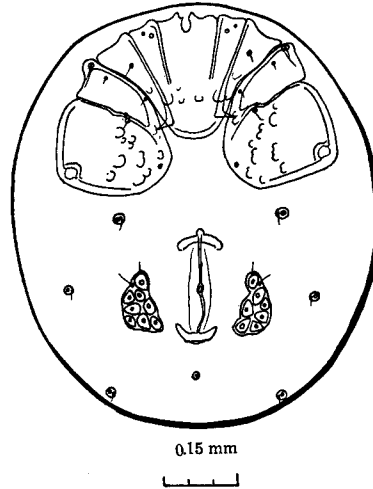


Fig. 27. *Rivobates ezoensis* n. sp.:
ventral view of female.

than the distal, each situated on a papilla, somewhere in the middle portion. The segment is also furnished with several hairs, each arising from a papilla on the lateral sides and a hair near the distal portion of the rounded extensor surface. Fifth segment ending in two teeth and having two small hairs. Epimera occupying about two-fifths of the length of the ventral side (Fig. 26 & 27). First pair, narrowing posteriorly, united in the posterior half to the capitulum without any suture indicating points of fusion, extending well back and rounded in the posterior margin. Second pair, shorter than the first, widening to the outer extremities, united to the first pair on an almost straight suture and with the third on a concave margin. At the posterior end of the second pair a short process pointed upwards. Third pair larger than the second and fused with the latter throughout nearly the whole length, having a convex an-

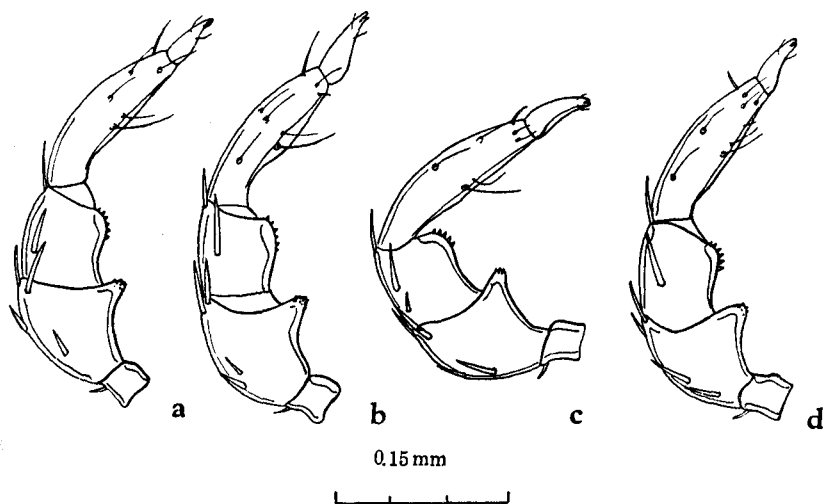


Fig. 28. *Rivobates ezoensis* n. sp.: a, left palp of female; b, right palp of female; c, left palp of male; d, right palp of male.

terior margin and a posteriorly narrowed end in the inner side, with a somewhat concave margin near the process of the second pair. Fourth pair, largest of all, widened upwards, having inner edges tending to be rounded and posterior edges running slightly obliquely to the transverse line of the body, as shown in Figs. 26–27. Legs destitute of swimming hairs, slender. On the distal margin of each segment are found a few long spines and several short spines on both sides, ventral and dorsal, of each segment. Genital area, 0.15 mm long and 0.2 mm wide in the male and 0.22 mm long and 0.3 mm wide in the female, wider than long, lying about midway between the epimera and the posterior margin. In the male, genital plates uniting in the extremities, surrounding two genital lips, showing something of a coconut-shape (Fig. 26). In the female, aperture flanked by two narrow lips and demarcated in both extremities by two lunate chitinous disc for muscle attachment (Fig. 27). Genital plates, showing the form of a half-moon, quite separated from each other, situated on both lateral sides of the genital slit. The number of genital acetabula is variable, as shown in the following table:

	♂	♂	♂	♀	♀	♀	♀	♀
right	10	7	7	7	6	7	7	7
left	8	7	8	8	6	8	7	7

Among the acetabula, the most anterior one is often the largest. Anus lying midway between the genital area and the posterior margin. Colour brownish with black flecks. Malpighian vessel yellow.

Locality. Many specimens were collected by Mr. H. ISHIZUKA from a spring in Chitosé, Hokkaido on Feb. 6, 1932.

Remarks. The species is easily distinguished from *P. norvegicus* (THOR) in the smaller number of acetabula in genital plates and in having no intervals between the second and the third epimera, and from *R. diversiporus* (SOKOLOW) by the form of the third epimera and genital plates. *R. microepimeratus* SOKOLOW recently recorded from the Ussuri region differs from the new species in the form of palpi and especially in the smaller size of epimera.

Megapus nodipalpis THOR

A few specimens of the cosmopolitan species were collected by Mr. Y. MIYASHITA from the River Yura near Kyoto on Aug. 4, 1932. The species has already been reported by the present writer (1931) from pools near Kyoto and Tokyo.

Aturus ovalis n. sp.

(Figs. 29, 30, 31, 32, 33, 34 & 35)

Male. Body dorso-ventrally compressed, 0.29 mm long and 0.24 mm wide in the widest part. Outline, elliptical, slightly shouldered anteriorly, tapering posteriorly, having a shallow anterior incision and a deep posterior fissure (Fig. 29). Ventral plate extending up more than anterior half of the dorsal margin and separated from

the dorsal plate by a dorsal groove. Along the anterior margin of the ventral plate extended up in the dorsal side, are present two pairs

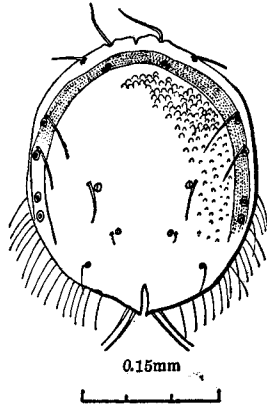


Fig. 29. *Aturus ovalis* n. sp.: dorsal view of male.

of gland pores, each with an accessory bristle, the anterior one being antenniform standing on the slightly projecting part, and the posterior one laterally inserted. On the dorsal groove are found a pair of double eyes and four pairs of lateral gland papillae, each accompanying a bristle. On the dorsal plate are present three pairs of gland plates and accessory bristle. Dorsal plate papillated and porose. Dorsal groove, running near the margin of the dorsal plate, finely striated. Posterior end of the dorsal plate roundly protruded and having a deep incision. From the margin of the posterior half arise many bristles arranged in a row,

among them two pairs situated on the posterior end being long and conspicuous. Capitulum about half the length of palpi. Mandibles with a large curved claw in the anterior portion and tapering towards the posterior end. Palpi shorter than one half the body length, but 0.21 mm long along the extensor surface (Fig. 31). Second segment, broadest of all, with a conical process directed outwards at the distal end of the flexor surface and having a few spines on the extensor surface. Third segment, about half as wide as the second, with convex flexor surface. Fourth segment, narrowest in the proximal portion and broadest in the portion a little distal from the middle region, furnished with a conspicuous and also a minute hair on the flexor surface. Fifth segment ending in two claws provided with several bristles. Epimera united to form a plate covering about one half of the ventral surface, sutures between them being partly obliterated (Fig. 30). First pair extending beyond the anterior body margin, with an acute-angled end having three long bristles. Outer margin of all epimera more or less ragged. Ventral plates porose, having many minute

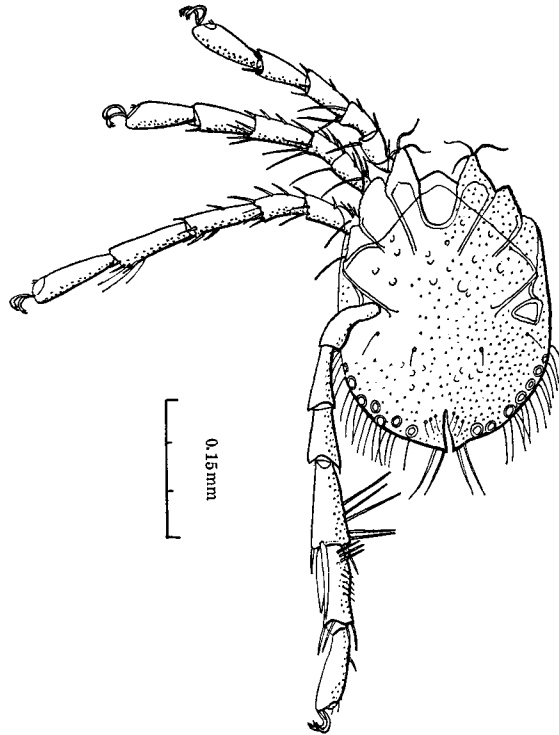


Fig. 30. *Aturus ovalis* n. sp.: ventral view of male.

papillae universally distributed all over the surface. Behind the epimera are found two pairs of glands with accessory hairs. Scale-like patches are found on the venter, especially on epimera. Leg,

stout, longer in posterior ones (Fig. 30). First two pairs about equal to the length of the body, third pair slightly longer; fourth pair about one and half as long as the body. All segments deficient in swimming hairs but provided with short bristles which are found on the dorsal surface of the four proximal segments and around the

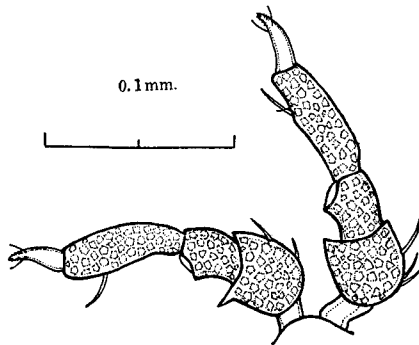


Fig. 31. *Aturus ovalis* n. sp.: palpi of male.

distal margin of the first three pairs. Besides these spines there are found long bristles on the ventral surface of the distal portion of the first three segments in the first and second legs, and on the first five segments in the third legs. The bristles are especially conspicuous on the distal portion of the fifth segment of the third legs. In the male the fourth legs are characterized by the presence of peculiar bristles in the fourth and the fifth segments. First segment at first narrow but becoming broader from the curved corner. First three segments, being wider towards the distal portion, are provided with one or two short distal spines. Fourth segment, also widened towards distal margin, provided with five long and two moderate bristles on the inner side, and also two large blade-shaped bristles on the ventral side of the outer margin (Fig. 32). Fifth segment characterized by the possession of three long proximal and five short distal bristles on the ventral side, the arrangement of three bristles being somewhat variable, but long ones and short ones being always separated in groups. From the distal margin of the fifth segments arise spines, of which some are long, while others are minute. Claws of the distal segment of all legs are each furnished with two accessory claws and lamina. Anus situated on a papilla,

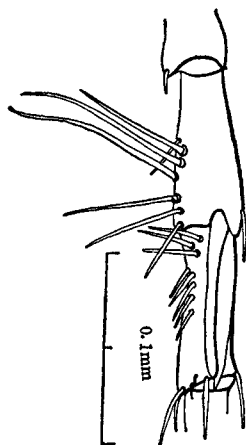


Fig. 32. *Aturus ovalis* n. sp.: fourth and fifth segments of left fourth leg of male.

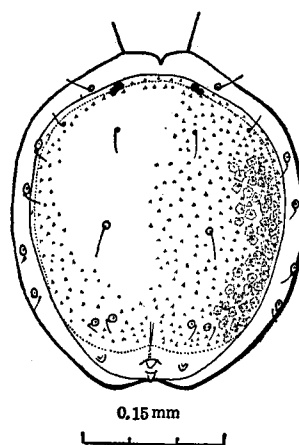


Fig. 33. *Aturus ovalis* n. sp.: dorsal view of female.

lying at the posterior end on dorsum. On both sides of the genital opening are arranged three bristles, each mounted on a papilla. Acetabula arranged on the postero-lateral edges, from six to eight in number on each side. Colour red, fourth legs and posterior part of the body slightly purplish.

Female. Body, dorso-ventrally compressed, larger than the male, measuring 0.37 mm long and 0.29 mm wide. Skin similar in structure to the male. Outline oval, with a narrow incision in the anterior margin and a shallowly concave margin in the posterior end (Fig. 33). Arrangement of gland papillae and accessory hairs different from that of the male both in dorsum and ventor. Four pairs of lateral gland plates found on the dorsal groove but arrangement of the posterior two different from in the male. Along the posterior

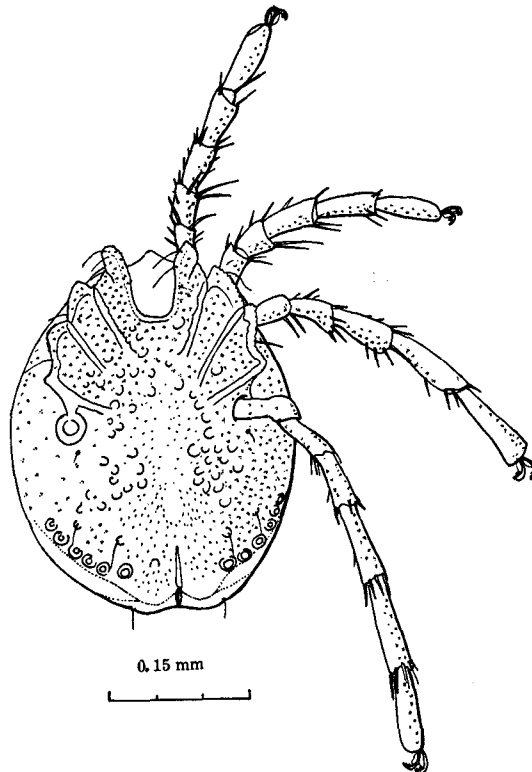


Fig. 34. *Aturus ovalis* n. sp.: ventral view of female.

margin there are no bristles except a pair of short ones, each standing on a papilla. Palpi, 0.23 mm long on the extensor surface, slightly larger than but similar in form to those of the male (Fig. 35). Epimera broadly resembling those of the male (Fig. 34). Legs slender and shorter than those of the male in relation to the body. First and second pairs of legs not especially different in structure from those of the male. Third pair distinguished from those of the male in the lack of long bristles on the ventral surface of the distal

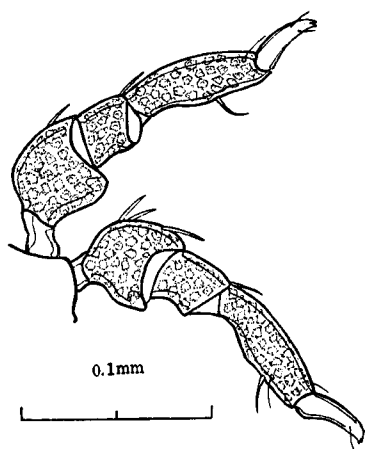


Fig. 35. *Aturus ovalis* n. sp.: palpi of female.

portion of the fifth segment. The first segment of these three anterior pairs is barely visible on account of expanded margin of epimera. Fourth pair of legs, less than one and half times the length of the body, slender, the fourth and fifth segments only having around the distal margin spines similar in form to those of other legs but destitute of the bristle-complex consisting of both blade-like and long bristles, present in the male.

Genital aperture lying at the median posterior part of the body. Acetabula from six to eight, arranged

usually in a row, though sometimes irregularly disposed, just inside of the postero-lateral margins on both sides of the genital opening. Anus found on the dorsal surface. Colour red or vermilion.

Localities. About twenty specimens, including males and females, collected from torrents near Sowunkyo, Hokkaido, on Aug. 4, 1932. Five females obtained by Mr. S. NISHIO from the upper part of the River Kako, Hyogo Pref. on Aug. 23, 1932.

Remarks. The male of the species agrees with that of *A. crinitus* THOR found in Germany, in the lack of scoop-like bristles in the fourth segments. The new species, however, is quite different

from the European species in the outline of the body and in the form of palpi. *Aturus latus*, recently (1934) reported by SOKOLOV from the Ussuri region on the basis of a single female specimen, bears a close resemblance to the female of the Japanese species, but seems to be distinguishable in the arrangement of the gland papillae on the dorsal surface and in having a larger number of acetabula (twelve on each side) thickly set.

Aturus miyashitai n. sp.

(Figs. 36, 37, 38, 39, 40, 41 & 42)

Male. Body dorso-ventrally compressed, 0.4 mm long and 0.3 mm wide. Outline oval, antero-lateral portions slightly shouldered,

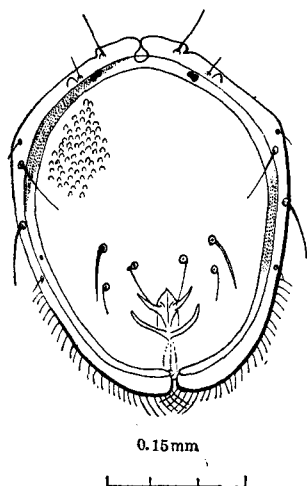


Fig. 36. *Aturus miyashitai* n. sp.: dorsal view of male.

having small paired anterior wings and a deep incision at the posterior end (Fig. 36). Ventral plate extending up on the margin of the dorsal side, surrounding the dorsal plate. Between the ventral and dorsal plates is found a narrow dorsal groove, elliptical in outline. Skin on dorsum and ventor, porose and finely papillated, more than anterior half which becomes lower, showing smooth surface provided with no distinct papillae. Dorsal groove striated with fine lines arranged in parallel. On the dorsal surface the arrangement of bristles and gland plates are characterized; antenniform bristles

each arising from just anterior to each double eye and a gland plate accompanying a bristle present on the lateral side of the eyes. On the lateral margin of the body, just outside the dorsal groove, are arranged four pairs of gland plates with bristles, the second and third of them being larger than the first and fourth. Along the

posterior half of the margin hairs are arranged in a row, with five or six larger pairs in the postero-median margin. On the dorsal plate are found three pairs of gland plates, each with a bristle, which come together in the antero-median portion in the posterior half. On the ventral side a pair of bristles, each on a gland plate

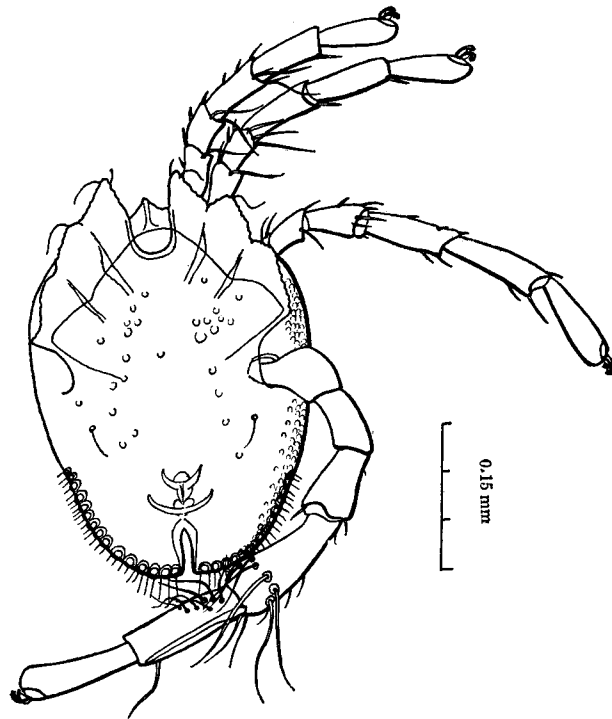


Fig. 37. *Aturus miyashitai* n. sp.: ventral view of male.

present just posterior to the middle portion. Capitulum about one half the length of palpi. Palpi, porose, less than one half the body length, but 0.19 mm long along the flexor edge (Fig. 38). First segment small, having a spine on the extensor surface. Second segment, broadest of all, having several well-pointed spines on the extensor surface but no distinct conical spines on the distal part of the flexor margin. Third segment, shorter and exceedingly narrower than the former, having a spine on the dorsal margin of the

extensor surface but none on the flexor surface curved inwards. Penultimate segment, largest of all, nearly equal in a breadth

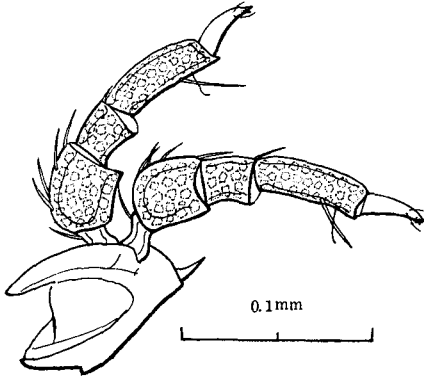


Fig. 38. *Aturus miyashitai* n. sp.: palpi of male.

throughout the whole length, having two long bristles in the distal half of the flexor surface, the posterior of them being broader and longer. Fifth segment ending in two claws and having several minute hairs. Epimera united to form a plate almost covering the anterior half of the ventral surface, sutures between them being partly obliterated (Fig. 37). Outer margin of all epimera more or

less ragged. The anterior pair extends beyond the anterior body margin and each epimeron is provided with two long bristles at the protruded anterior end. Legs stout, deficient in swimming hairs, longer in the posterior ones (Fig. 37). Anterior two pairs shorter than the body length but the third pair a little longer than the latter. Around the distal margin and on the dorsal side of each segment are sparsely distributed short spines. From the distal margin of segments II-VI of the first pair and of segments II-III of the second pair arise a few long bristles which are present in the third pair only in the first segment. Fourth pair, stoutest and longest of all, characterized by the structure of the fourth and fifth segments having bristles modified in form. In the distal half of the fourth segment are found several long whip-like bristles arranged in something of a circlet surrounding the segment (Fig. 39). From the distal margin arise a blunt blade-like bristle on the inner side and several bristles on the outer side, of which some are whip-like, while two are large and blade-like. On the ventral side of the fourth segment are found eight short whip-like bristles, arranged in apparently two series, the proximal row being composed of three longer bristles and the

distal one made of five bristles, with longer ones in the more distal portion. Claws of the distal segment of all legs, each with two accessory claws and lamina. Anus lying on the dorsal side. Genital opening in the posterior fissure. Along the postero-lateral margins are arranged fifteen acetabula thickly set in a row. Colour reddish purple.

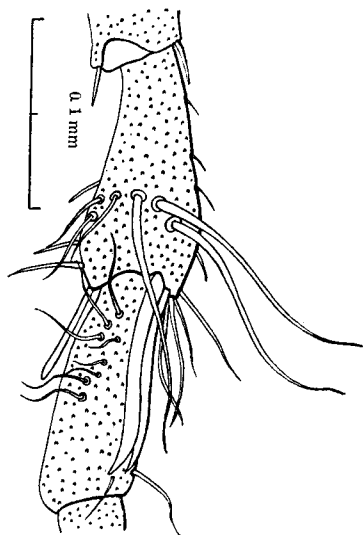


Fig. 39. *Aturus miyashitai* n. sp.: fourth and fifth segments of left fourth leg of male.

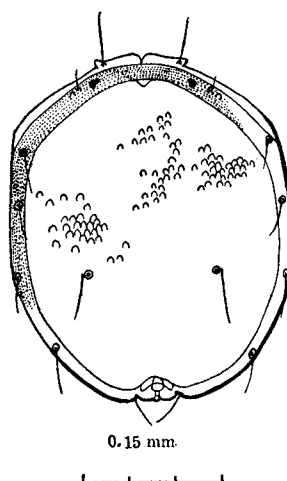


Fig. 40. *Aturus miyashitai* n. sp.: dorsal view of female.

Female. Body dorso-ventrally compressed, 0.38 mm long and 0.32 mm wide, slightly shorter than but slightly wider in the posterior half than the male. Skin similar in structure to that of the male. Outline oval and somewhat shouldered, anterior end extending forwards, making a short pair of wings, and posterior end with two rounded lobes within the incision (Fig. 40). Arrangement of gland papillae generally similar to that on the ventral surface but different on the dorsal surface from that of the male (Figs. 40 & 41). The anterior two pairs adjacent to the eyes are located as in the male, but four lateral pairs, nearly equal in size, are distributed

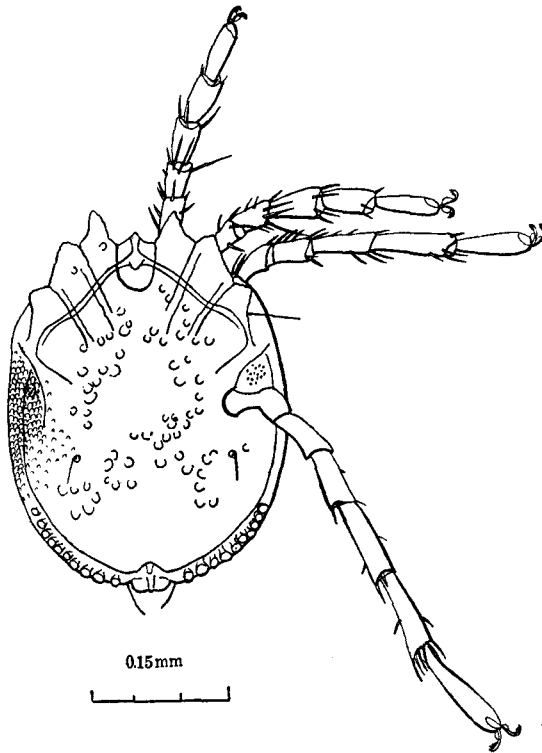


Fig. 41. *Aturus miyashitai* n. sp.: ventral view of female.

farther posterior than in the male. On the dorsal plate one can find only a pair of gland plates, each with an accessory hair as

shown in Fig. 40. Along the posterior margin there are no bristles with the exception of a pair arising from the posterior incision. Palpi, 0.17 mm along the extensor edge, though shorter, generally similar to those of the male (Fig. 42). Epimera in general coinciding with those of the male. Legs quite different from those of the male. All legs much slenderer and

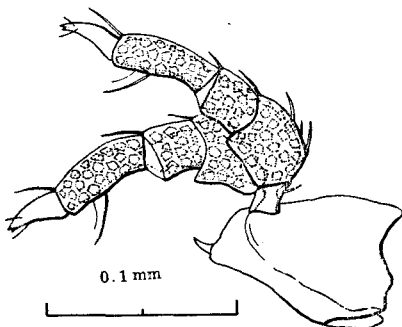


Fig. 42. *Aturus miyashitai* n. sp.: palpi of female.

slightly shorter than those of the male (Fig. 41). In the anterior two pairs whip-like bristles sparsely found on some median segments. Fourth pair quite deficient in whip-like or blade-like bristles, though furnished with several ordinary spines around the distal margin of segments III-V (especially numerous in the fifth segment). Genital aperture lying at the posterior median portion of the body. Acetabula ten on each side, arranged in a row.

Locality. A few specimens were collected from the River Yura by Mr. Y. MIYASHITA on Aug. 22, 1933.

Remarks. The species, together with the preceding species and *Aturus crinitus* THOR, is eligible for inclusion in a group having no scoop-like bristles in the fourth legs of the male. The species is easily distinguishable from the two above mentioned by the form and the arrangement of bristles in the legs.

Subgenus *Mesofeltria* n. subgen.

In 1904 SOAR instituted a new genus, *Pseudofeltria*, which resembles *Feltria* in most characteristics, differing only from the latter in the possession of a small peg situated on the distal inner edge of the fourth segment of the palpi and in the lack of chitinous dorsal plates. So far as I am aware, the genus is at present represented by the two following species, *P. scourfieldi* SOAR and *P. scutigera* WALTER. Among my collections I found two species of water mites bearing dorsal chitinous plates and also a small peg on the distal inner edge of fourth segment of palpi. These species are thus equipped with both characters of the two genera, *Feltria* and *Pseudofeltria* and makes the third group in these related genera. WOLCOTT (1905) pointed out that "This (*Pseudofeltria*) is very close to *Feltria* and it is very much a question whether it should not stand simply as a subgenus." It seems to me that these groups should be united into the genus *Feltria*, but for the convenience' sake the genus has been here again divided into three subgenera as follows.

1) Subgenus *Feltria* KOENIKE, 1892 s. st. With chitinous dorsal plates and without a small peg on the distal inner edge of fourth segment of palpi. *F. minuta*, *F. rouxi* etc.

2) Subgenus *Pseudofeltria* SOAR, 1904. Without chitinous dorsal plates and with a small peg on the distal inner edge of fourth segment of palpi. *P. scourfieldi*, *P. scutigera*.

3) Subgenus *Mesofeltria* n. subgen. With chitinous dorsal plates and with a small peg on the distal inner edge of fourth segment of palpi. *M. torrenticola* n. sp., *M. rotunda* n. sp.

***Feltria (Mesofeltria) torrenticola* n. sp.**

(Figs. 43, 44, 45, 46 & 47)

Male. Body dorso-ventrally compressed, 0.37 mm long and 0.3 mm wide in the widest portion. Outline, elliptical, shouldered anteriorly, with protruded frontal margin (Fig. 43). Most of the

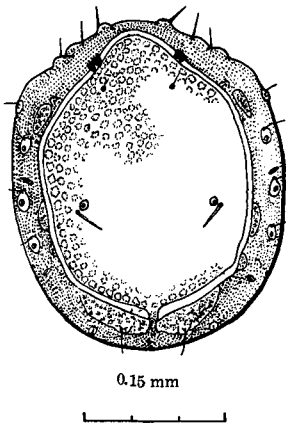


Fig. 43. *Feltria (Meso.) torrenticola* n. sp.: dorsal view of male.

dorsal surface covered with a large median chitinous plate which is somewhat leaf-shaped and the surface universally furnished with similar minute papillae. Outside the area, is striated by many parallel undulating lines which are in places interrupted by several dorsal and gland plates. Along the narrow lateral margins are arranged several pairs of gland plates and papillae, each provided with an accessory hair. Besides them, nearly attached to the dorsal plate are found four pairs of chitinous plates marked by irregular papillation.

Among them the third pair is the smallest and the fourth pair is largest, each having a gland papilla and a hair. Antenniform spines standing on anterior papillae are short but stout. On the dorsal plate are found two pairs of gland papillae, each accom-

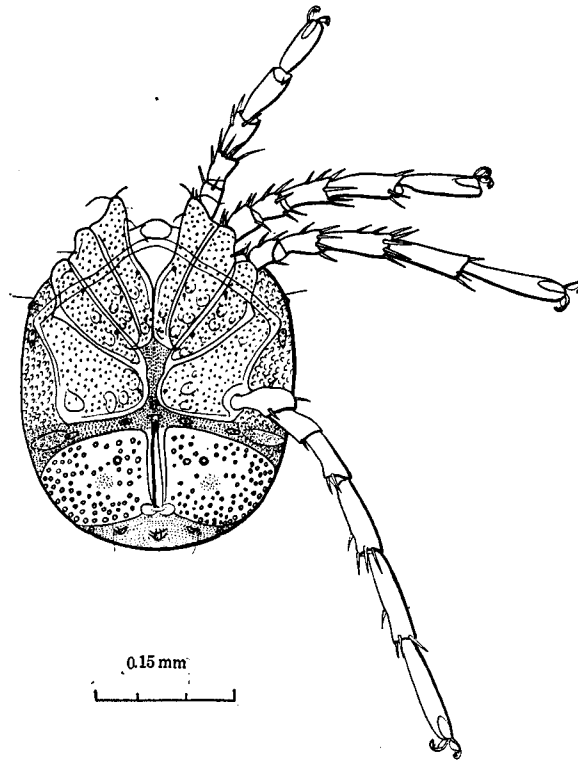


Fig. 44. *Feltria (Meso.) torrenticola* n. sp.: ventral view of male.

panied with a hair, the posterior one larger than the anterior. Palpi, 0.28 mm along the extensor edge, prominently large and stout (Fig. 45). First segment, smallest, with a spine on the extensor surface. Second segment, broadest of all, with rounded extensor surface having a few stout spines. Third pair, much narrower than the former, nearly equal in breadth throughout the whole length; the flexor surface being curved inwards and the extensor surface provided with a few spines. Penultimate segment, largest of all, narrowest at the proximal portion, widest in the middle part, having two small hairs on the extensor surface and a long hair arising from the portion a little anterior to the middle region of the ventor surface. Besides these hairs a peg situated on the inner edge near the junction with the fifth segment. Fifth segment, claw-like, rather large in rela-

tion to the body, ending in two claws and bearing several hairs. Epimera occupying more than half the ventral surface, nearly fused into two lateral groups, each bordered with subcutaneous margin (Fig. 44). First pair of epimera, narrow, fused into each other in

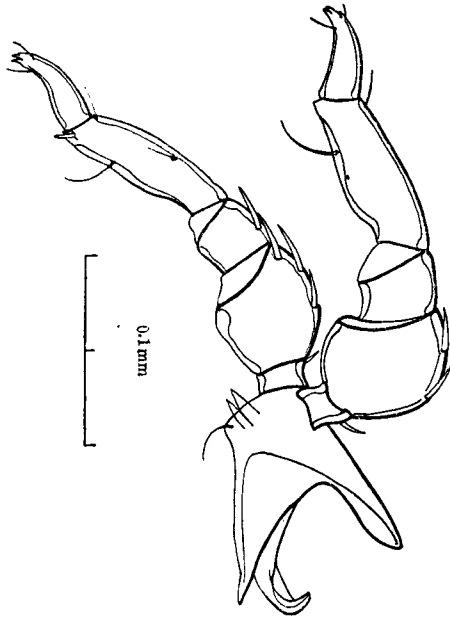


Fig. 45. *Feltria (Meso.) torrenticola* n. sp.: palpi of male.

the posterior half, having a convex inner margin and slightly widened outer margin. Anterior edge of the first pair extending forwards beyond the anterior margin of the body. Second pair, slightly broader than the former, widest in the middle length, and having a rounded inner end. Third pair, fused with the second pair in the upper margin, nearly straight, triangular in shape with a narrow acute angle in the inner portion. Fourth pair, nearly a right angled triangle in shape, with a rounded inner corner and

protruded outer end. Legs stout but rather short. Anterior two pairs slightly shorter than the body length, while the two posterior pairs are longer than the latter (Fig 44). All legs nearly similar in form and destitute of swimming hairs, but furnished with short stout spines which are distributed on the dorsal edge and around the distal margin of each segment of the legs. Fourth legs alone devoid of dorsal spines, their distal segment not especially modified and without spines of any special form. Distal end of all legs ending in claws with two accessory claws and lamina. On the ventral surface are found several pairs of gland plates and a pair of chitinous plates similar to those of the dorsal surface. On the intermediate space

between the fourth epimera and genital area are found two pairs of gland plate arranged in a row. Outside the outer pair are present a pair of fusiform plates characterized by irregular papillation. Behind the genital area is situated a pair of gland papillae, each member having an accessory hair. Skin covering more than the anterior half of the body universally papillated, but in the median portion between the epimera plates and behind the epimera plates is striated by parallel sinuate lines. Genital area separated by a long slit-like aperture into two lateral wings, each extending to the lateral margin and bearing numerous acetabula which are mostly distributed in the lateral and posterior regions (Fig. 44). A pair

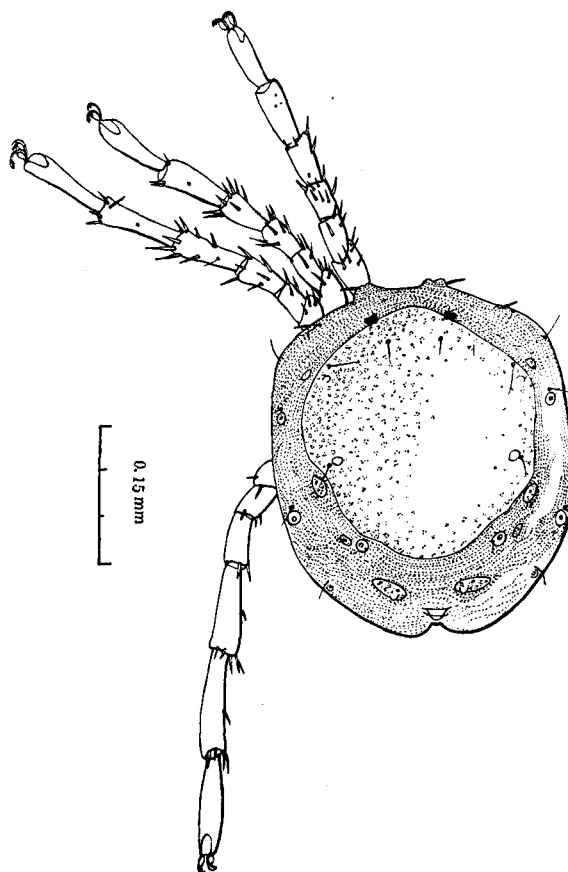
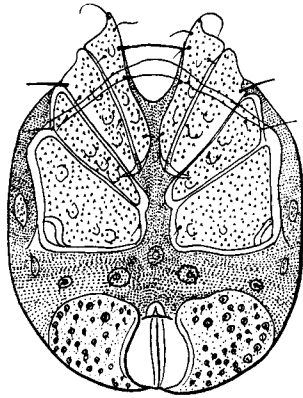


Fig. 46. *Feltria (Meso.) torrenticola* n. sp.: dorsal view of female.

of acetabula situated on both sides of the genital aperture is distinctly larger than the others. On the anterior end of the slit is present a chitinous disc. In the middle portion of both wings of genital plates are found a group of small papillae. Anus lying just posterior to the genital slit. Colour reddish.

Female. Body broader than the male, 0.34 mm long and 0.29 mm wide. Outline elliptical, shouldered anteriorly, having a pair of protruded processes on the anterior frontal margin and a shallow incision on the posterior margin (Fig. 46). Dorsal surface with a central dorsal plate, smaller than that of the male, furnished with papillae universally distributed and three pairs of gland papillae, each having an accessory hair. Around the dorsal plate are disposed several pairs of gland papillae with accessory hairs and



0.15mm

Fig. 47. *Feltria (Meso.) torrenticola* n. sp.: ventral view of female.

chitinous plates, their arrangement and size being somewhat different from those of the male as shown in Fig. 46. Antenniform spines short and stout. Palpi and legs nearly similar to those of the male. Epimera, though generally according with those of the male, different in the respect that the members of the first pair are not fused to each other, thence leaving an area striated within the two epimera groups (Fig. 47). Genital area lying in the posterior end of the body the space between the epimera and the genital area being therefore much larger than in the male. The genital aperture is a long slit-like opening and flanked by two semicircular lips. At the anterior end of the aperture is present a chitinous disc. Genital plates, something like that of *F. rubra* in shape, bearing numerous acetabula which are mostly distributed on the lateral and posterior regions. Beside the genital lips on the anterior portion of the plates

the space between the epimera and the genital area being therefore much larger than in the male. The genital aperture is a long slit-like opening and flanked by two semicircular lips. At the anterior end of the aperture is present a chitinous disc. Genital plates, something like that of *F. rubra* in shape, bearing numerous acetabula which are mostly distributed on the lateral and posterior regions. Beside the genital lips on the anterior portion of the plates

is present a pair of large acetabula. Anus lying on the dorsal side in the female.

Locality. Several specimens including both sexes were collected by the writer from torrents in the vicinity of Sowunkyo, Hokkaido, on Aug. 4-5, 1932.

Feltria (Mesofeltria) rotunda n. sp.

(Figs. 48, 49 & 50)

Body dorso-ventrally compressed, 0.29 mm long and 0.34 mm wide in the widest portion. Outline nearly round, slightly shoulder-
ed and produced anteriorly (Fig. 48). In the median portion is

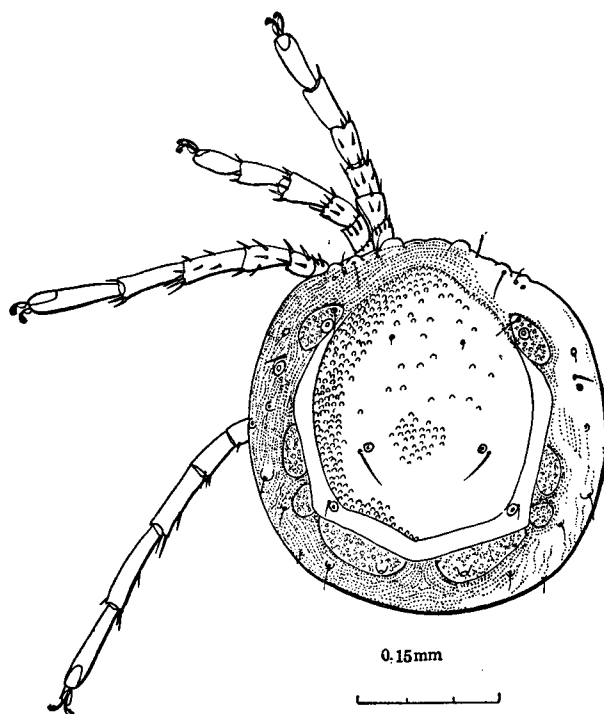


Fig. 48. *Feltria (Meso.) rotunda* n. sp.: dorsal view of male.

present a large dorsal plate universally papillated and having two pairs of gland papillae with accessory hairs, the posterior pair larger

than the anterior pair. Around more than the posterior half of the plate runs a dorsal groove, bearing a pair of gland papillae and hairs and somewhat angulated in places. Chitinous plates, found attached to the groove, arranged in four pairs, the first and the fourth having gland papillae. Fourth pair situated behind the dorsal groove, largest of all; the third pair smallest. Outside the groove the skin is marked by undulating striations mostly disposed in parallels. Antenniform spines minute. Palpi, 0.23 mm long along the extensor edge, moderate in size (Fig. 50). First segment having a spine on the extensor surface. Second segment, broadest of all, with several stout spines on the rounded extensor surface and no process on the flexor surface. Third segment, narrower than the former, having a concave flexor surface and convex extensor surface bearing a few spines. Fourth segment, longest of all, narrowest in the proximal end,

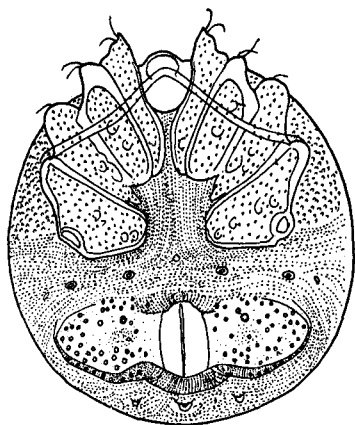


Fig. 49. *Feltria (Meso.) rotunda* n. sp.: ventral view of male.

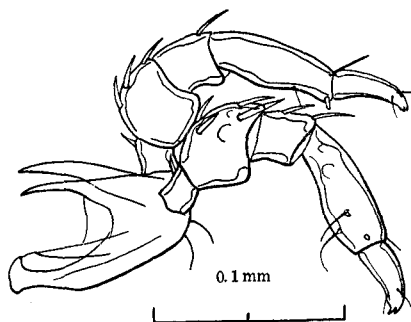


Fig. 50. *Feltria (Meso.) rotunda* n. sp.: palpi of male.

becoming gradually wider and, towards the distal portion, again narrower. On the terminal end of the extensor surface is present a hair. On the ventral surface, a little distal from the middle portion, arise two long hairs, each standing on a papilla. On the inner edge of

the distal end is present a small peg. Fifth segment ending in two claws, having a few hairs. Epimera fused into two lateral groups covering the anterior half of the ventral surface (Fig. 49). The first pair, slender, convex in the middle portion of the inner edge, narrowing posteriorly and widening anteriorly, the outer margin extending far beyond the anterior margin of the body. Second pair, broader than the first, nearly equal in width, having a round posterior end and a protruded anterior edge. Third pair having rounded outer margin, narrowing innerwards and ending in an acute inner corner. Fourth pair, taking nearly a form of a right-angled triangle, having a rounded apex, largest of all. The skin between and behind the epimera is striated with lines arranged in parallels. Between the epimera and the genital area are arranged two pairs of gland papillae. On the sides of the anus is found a pair of gland papillae. All legs deficient in swimming hairs. Two anterior pairs shorter than the body length. Third pair nearly equal to the body length and fourth pair longer than the latter. Short spines are distributed on the dorsal side of the three anterior legs and on the distal margin of segments of all legs. Distal end of all legs ending in a claw with two accessory claws and lamina. Genital area extending laterally behind the epimera (Fig. 49). Genital opening, slit-like, flanked by two large lips. Genital plates surrounding these lips are furnished with many acetabula distributed mostly on the lateral and posterior regions. On either side of the genital lips and in the rather anterior portion of the genital plates are present two acetabula in a pair slightly larger than the others. Posterior to these acetabula are found many minute papillae in groups, one in each genital plate. At the anterior end of the genital slit is found an obscure chitinous disc. Along the median anterior margin and the whole posterior margin of genital plates extends a chitinous border longitudinally striated. Anus lying just behind the genital opening on the ventral surface. Colour red.

Locality. Three males were collected with the former species from torrents near Sowunkyo, Hokkaido on Aug. 4-5, 1932.

Literature consulted

- 1) KOENIKE, F., 1895. Neue *Sperchon*-Arten aus der Schweiz. Rev. Suisse d. Zool. et Ann. d. Mus. d'Hist. Nat. Genève, Tome 3.
- 2) KOENIKE, F., 1909. Araneae und Acarina. Die Süßwasserfauna Deutschlands. Hft. 12.
- 3) LUNDBLAD, O., 1920. Süßwasseracarinen aus Dänemark. Mem. Acad. Roy. Sci. et Lettr. Denmark, Copenhagen, Ser. 8, t. VI.
- 4) LUNDBLAD, O., 1927. Die Hydracarinen Schwedens 1. Beitrag zur Systematik, Embryologie, Oekologie und Verbreitungsgeschichte der Schwedischen Arten. Zool. Bid. Uppsala, Bd. 11.
- 5) LUNDBLAD, O., 1930. Hydracarina. Zoology of the Faroes Copenhagen.
- 6) LUNDBLAD, O., 1930a. Die Hydracarinen der Insel Bornholm. Kgl. Dans. Videns. Selsk., Biol. Medd., 8, 7.
- 7) MARSHALL, R., 1929 Canadian Hydracarina. Publ. Ontario Fish. Res. Lab., No. 39.
- 8) MARSHALL, R., 1931. Preliminary list of the Hydracarina of Wisconsin. 1. The red mites. Trans. Wisconsin Acad. Sci. Art. & Lett., Vol. 26.
- 9) MARSHALL, R., 1933. Water mites from Wyoming as fish food. Trans. American Mic. Soc., Vol. 52, No. 1.
- 10) MOTAS, O., 1928. Contribution à la Connaissance des Hydracariens français particulièrement du Sud-Est de la France. Trav. Lab. d'Hydrobiol. et Piscicul. Univ. Grenoble, 20.
- 11) MONTI, R., 1910. Contributo alla biologia degli idracnidi Alpini in relazione all' Ambiente. Atti. Soc. Italiana Sci. Nat., Vol. 49.
- 12) PIERSIG, R., 1900. Deutschlands Hydrachniden. Zoologica, Bd. 22.
- 13) PIERSIG, R. u. H. LOHMANN, 1901. Hydrachnidae und Halacaridae. Das Tierreich, Lief. 13.
- 14) SOAR, C. D., 1904. Two new British water mites. Jour. Quekett Mic. Club. Vol. 9.
- 15) SOAR, C. D., 1921. A species of Hydracarina found at Bear Island, June 17th, 1921. The same, Vol. 14.
- 16) SOAR, C. D. & W. WILLIAMSON, 1925, 1927 & 1929. The British Hydracarina, Vols. 1-3. London.
- 17) SOKOLOV, J., 1927. Beitrag zur Kenntnis der Hydracarinenfauna von Kaukasus. Trav. Stat. Biol. Caucase du Nord, Vol. 2, Fasc. 1.
- 18) SOKOLOV, J., 1930. Die Hydracarinen von Russisch-Karelien. Zool. Jahrb. Syst., Bd. 59.
- 19) SOKOLOV, J., 1930a. Beiträge zur Kenntnis der Hydracarinen Sibiriens. Arch. Hydrobiol., Bd. 22.
- 20) SOKOLOV, J., 1934. Beiträge zur Kenntnis der Hydracarinenfauna des Ussuri-Gebietes. II. Hydracarinen der fließenden Gewässer. Zool. Jahrb., Syst., Bd. 65.

- 21) SZALAY, R., 1932. Ueber drei *Sperchon*-Arten. Zool. Anz., Bd. 99.
 - 22) THOR, S., 1899. En ny Hydrachnide-slegt og andre nye arter fundne i Norge sommeren 1899.
 - 23) THOR, S., 1914. Zur Kenntnis der Hydracarina-Fauna von Kaukasus nach den Sammlungen des Herrn Julius KOMÁREK (Prag). Bull. intern. l'Acad. Sci. Bohême.
 - 24) THOR, S., 1930. Einige Acarina, besonders Hydracarina aus Turkestan. Zool. Anz., Bd. 88.
 - 25) UCHIDA, T., 1931. Einige Wassermilben aus Japan. Zool. Anz., Bd. 95.
 - 26) VIETS, K., 1922. Hydracarinen aus Quellen in den Weserbergen. Arch. f. Naturg., Jahrg. 88.
 - 27) VIETS, K., 1926. Versuch eines Systems der Hydracarinen. Zool. Anz., Bd. 69.
 - 28) VIETS, K., 1930. Zur Kenntnis der Hydracarinen-Fauna von Spanien. Arch. f. Hydrobiol., Bd. 21.
 - 29) WALTER, CH., 1907. Die Hydracarinen der Schweiz. Rev. Suisse Zool., Vol. 15.
 - 30) WALTER, CH., 1922. Hydracarinen aus den Alpen. Rev. Suisse Zool., Vol. 29.
 - 31) WALTER, CH., 1924. Quelques espèces nouvelles d'Hydracariens du Maroc et du Soudan. Bull. Soc. Sci. Nat. Maroc. Tome 4.
 - 32) WALTER, CH., 1926. Hydracariens du Maroc. The same, Tome 6.
 - 33) WALTER, CH. et C. MOTAS, 1926. Hydracariens nouveaux ou peu connus du Sud-Est de la France. Trav. Lab. Piscicul. Univ. d. Grenoble, Tome 11.
 - 34) WALTER, CH., 1928. Zur Kenntnis der Mikrofauna von Britisch Indien. 11. Hydracarina. Rec. Indian Mus., Vol. 30.
 - 35) WOLCOTT, R. H., 1905. A review of the genera of the water-mites. Trans. American Mic. Soc., Vol. 26.
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