MARINE WATER MITES FROM JAPAN

BY

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(*With 9 Text-figures*)

With the exception of the Halacaridae, the marine water mites are represented by the three genera, *Pontarachna, Litarachna, Nautarachna,* including about ten species. From the Pacific have been reported only the two species; *Pontarachna formosae* from near Formosa and *P. cruciata* from the coast of California. Through the kindness of Messrs. K. TAKEWAKI, S. OKUDA and H. HORIÉ a fair number of marine water mites collected from Misaki and the coasts of Hokkaido have been submitted to the writer for identification. In these collections are included three species of marine Hygrobatidae; amongst them one probably belongs to the Mediterranean species and two to new species.

Pontarachna pacifica n. sp.

(Figs. 1-3)

Male. Body attaining a length of 0.47 mm and a breath of 0.37 mm. Outline elliptical. Dorsum well-arched. Skin smooth. On the anterior margin there is a pair of antenniform bristles which are directed slightly backward. Eyes situated on the margin to the outer sides from these bristles. Around the eyes are found short bristles, some accompanying glands. Capitulum, as in other species,

Contribution No. 96 from the Zoological Institute, Faculty of Science, Hokkaido Imperial University.

forming a tube and lying beneath the first epimera. Mandibles slightly curved, with the concave edge on the dorsal side, and divided into two segments, of which the anterior narrower part projects a little beyond the tube of the capitulum. Palpi, slender in form, 0.28 mm long on the extensor edge. First segment short. Second segment, widest of all and widened distally, having a rounded extensor edge with two spines arising from the distal portion. The inner spine is much longer than the outer one. Third segment more or less

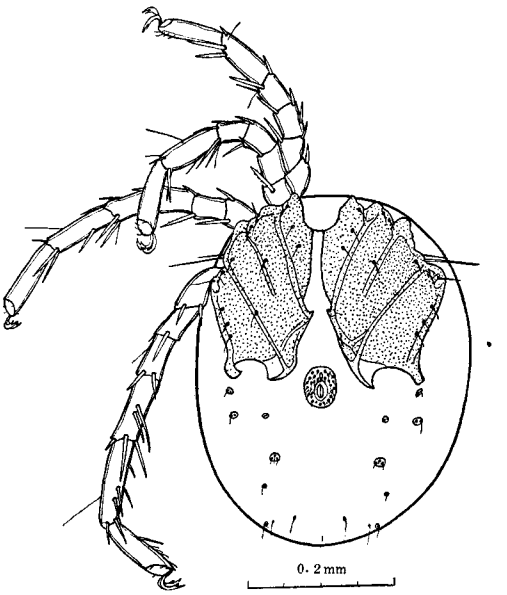

Fig. 1. *Pontarachna pacifica* n. sp., ventral view of male.

narrowing distally and provided with a long spine at the distal end on the extensor surface. Fourth segment, longest of all, gradually narrowing to the distal end, having two pairs of hairs, one ventral and one dorsal, near the narrowed end; ventral one longer than the dorsal one. Fifth segment, smallest of all, ending in two blunt spines and having a hair on the flexor surface. Epimera occupying about half the anterior area of the ventral surface. First pair, narrowing posteriorly to an acute angle and forming an obtuse angle on the

anterior margin, having three hairs upon them. Second and third pairs confused with each other, slightly narrowed axially, longer than the first, each with a ragged expanded outer margin and several hairs sparsely distributed upon them. Two pairs of hairs arising from the outer posterior margin of the third epimera, especially posterior longer ones, conspicuous. Inner parts of these pairs are completely united; the inner margin of them being provided with a slight process on the anterior end and a claw-like posterior end bending posterio-

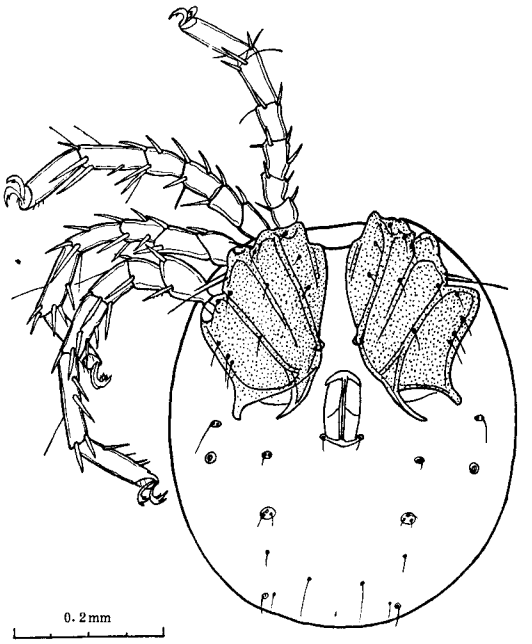

Fig. 2. *Pontarachna pacifica* n. sp., ventral view of female.

laterally. Fourth pair of epimera widened posteriorly, with a rounded anterior margin. The outer margin of the epimera is smooth and has an elongated posterior part which is bent somewhat axially. Along the outer margin of the epimera are arranged three hairs in a row. The genital field lies a little posteriorly between the claw-shaped processes of the second + third epimera. Genital plate, elliptical in shape and chitinous, 0.06 mm long and 0.04 mm wide,

bearing many minute setae arranged in the anterior portion in about three rows and in the lower in one. Genital pore, elongate elliptical, opening outside slightly lower than the centre. On both the sides behind the genital plate there are present three pairs of small chitinous plates, each bearing a hair. Among them each member of the outer posterior pair corresponds to a large gland. There are two chitinous plates in pair, each bearing three minute hairs, lying midway between the genital plate and the posterior margin. Ex-

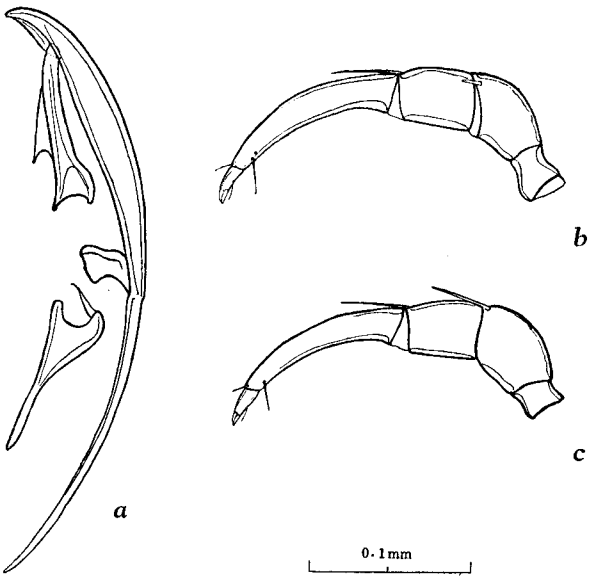

Fig. 3. *Pontarachna pacifica* n. sp., a, mandible of male slightly damaged; b, left palpus of female; c, right palpus of female.

cretory pore situated close to the posterior extremity. The whole length of the first to fourth legs is 0.32 mm, 0.34 mm, 0.37 mm and 0.47 mm respectively. All legs deficient in swimming hairs and bearing spines, especially around the distal margin of the segment. In the proximal segments of the first pair of legs a few spines are found on the dorso-lateral sides, while in the distal segments of the fourth pair several spines grow on the ventro-lateral surface. In the distal

portion of all legs are found three claws, the median one being larger than the lateral ones. Colour red.

Female. Body larger than the male, measuring 0.57 mm long and 0.47 mm wide. The entire length of the first to fourth legs is 0.34 mm, 0.37 mm, 0.41 mm and 0.49 mm respectively. Except the genital organ, characters generally agree with those of the male. Genital organ, 0.1 mm long and 0.05 mm wide, lying between the claw-like expansions of the second + third epimera. The anterior chitinous plate is crescent in form, while the posterior plate, slightly larger than the former, is anchor-like in outline and has paired pores, each with a minute hair. Colour red.

Locality. About ten individuals were collected by Mr. H. HORIÉ at Oshoro on July 6, 1934. Some were found in plankton and some attached to sea-weeds.

Remarks. The species is easily distinguished from other species in the form of the epimera, genital plates and palpi with the long fourth segment. The palpi of *P. capensis* are like to those of the present species, but the two species are easily distinguishable by the position and shape of the genital organs of both sexes.

Litarachna divergens WALTER

(Figs. 4-6)

Male. Body elliptical in outline, 0.48 mm long and 0.38 mm wide. Dorsum well-arched. Skin smooth, with several small chitinous plates, each accompanying a hair. From the anterior margin arise a pair of antenniform bristles. Eyes in pair, present on the outer sides of the antenniform bristles. Capitulum as in other species of the genus. Mandibles 0.24 mm in length, each furnished in the distal portion with a curved claw, which is somewhat truncated in the tip and has a middle ridge. The shape of them generally agrees with Fig. 4, Taf. 1 of v. SCHAUB (1889). Palpi, stout and large, 0.43 mm along the extensor edge. First segment short, narrowed in the middle length and having a short spine on the distal end of the extensor

surface. Second segment, broadest of all, the extensor edge being three times the length of the flexor one. Two spines present on the extensor surface of the segment, the proximal one situated in the middle portion and the distal one on the extremity. Third segment slightly narrower than the second, becoming narrow anteriorly and having a long spine in the distal portion on the dorsal surface. Fourth segment, largest of all, broadly equal in width, with a conspicuously concave flexor edge. Near the distal portion of the segment one

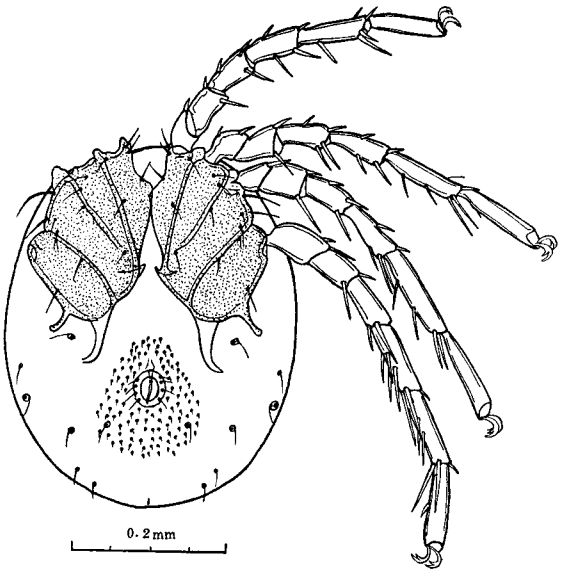

Fig. 4. *Litarachna divergens* WALTER, ventral view of male.

dorsal and two ventral hairs are seen. Fifth segment, smallest of all, generally narrowing to a tip ended in two short spines. Two hairs, one dorsal and one ventral, present near the terminal end of the segment. Epimera covering about half the anterior portion of the ventral surface. First pair narrowing posteriorly to an acute angle and concave in the anterior half along the inner edge for the reception of the capitulum. The outer margin is roundly concave. Hairs present, three on the inner margin and two near the edge facing the second epimera. Second and third pairs of epimera united and

forming a large plate. The second epimera are nearly of the form of an isosceles triangle, with the outer margin as the base. The inner apex is merged into the plate made of the two epimera. The third epimera slightly widened outwards have two long hairs on the outer edge. On the inner edge of two confused plates occurs a claw-shaped process. A few hairs grow on these epimera. Fourth plates widened

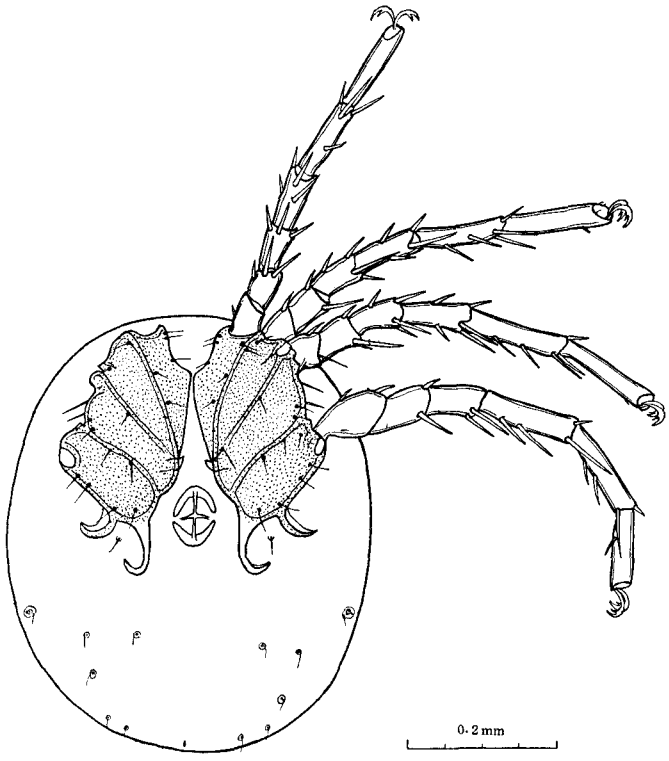

Fig. 5. *Litarachna divergens* WALTER, ventral view of female.

inwards, the posterio-inner margin being rounded with two long chitinous expansions which are bent anterio-laterally, the inner one being longer than the outer one. A few hairs on the epimera. Genital field situated a little posteriorly between the inner chitinous processes. Genital pore slit-like, flanked by two thin chitinous plates which are attached to a distinct chitinous ring. The chitinous ring

has eight small pores, four on either side, each pore accompanying a short hair. Around the genital organ are found many small bristles which are more numerous in the posterior than in the anterior part of the genital organ. Chitinous plates with glands are mostly arranged in the portion posterior to the genital area, but between two chitinous expansions of the fourth epimera is found a small chitinous plate. Excretory pore lies on the ventral side near the posterior margin. The entire length of the first to fourth legs is 0.44 mm,

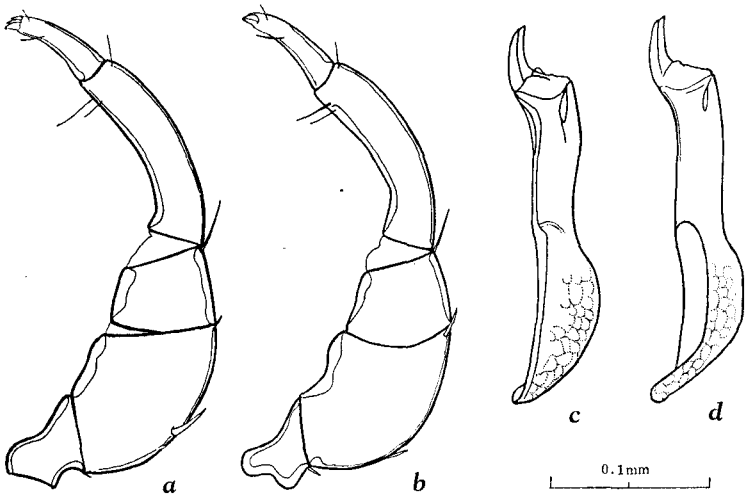

Fig. 6. *Litarachna divergens* WALTER; a, left palpus of female; b, right palpus of female; c, left mandible of female; d, right mandible of female.

0.47 mm, 0.52 mm and 0.53 mm respectively. Legs lacking in swimming hairs and bearing spines around the distal margin and on the ventro-lateral surface of the distal segments, especially in the fourth and fifth segments. All legs have two sets of claws, each composed of a median large and two lateral small ones. Colour orange.

Female. Body larger than the male, 0.56 mm long and 0.46 mm wide. Whole length of the first to fourth legs measuring 0.47 mm, 0.61 mm, 0.63 mm and 0.68 mm respectively. The general characters

agree with those of the male. Genital field, 0.08 mm long and 0.06 mm wide, situated much further forward than in the male and between the third and fourth epimera. The genital plates are made of two anchor-shaped chitinous ones, both symmetrical in form. No pore with a bristle could be found on the lower chitinous plate. No bristles around the genital organ. Colour orange.

Localities. The species is common among plankton in Misaki during July. More than twenty specimens were collected by Mr. K. TAKEWAKI in Misaki in July, 1932 and 1935. Over ten examples were obtained by Mr. H. HORIÉ in Oshoro on July 6, 1934.

Remarks. The Japanese water mite is very similar to the description of the specimens collected in Triest and described by v. SCHAUB (1889) as *Pontarachna punctulum.* v. SCHAUB's species which is quite different from the type species, *P. punctulum,* has been, with a query, referred by WALTER (1923) basing on v. SCHAUB's description, to a new species as *L. divergens.* According to WALTER, the mite recorded by SERNOW (1913) from the Black Sea is also referable to the species. The Japanese specimens coincide well with v. SCHAUB's description in the possession of mandibles with a truncated tip and large palpi of similar form. Furthermore, as in v. SCHAUB's figures the male genital plate is represented by a chitinous ring furnished with four pairs of pores with accompanying hairs, and the female genital plates resembling in form v. SCHAUB's figure also have neither pore nor accompanying hair. In addition to the common characters above mentioned, the chitinous expansions of the fourth epimera are directed laterally in the Japanese specimens as in v. SCHAUB's.

Litarachna kamui[1] n. sp.

(Figs. 7–9)

Male. Body nearly oval, 0.43 mm long and 0.33 mm wide. Dorsal side well-arched. Skin smooth. Antenniform bristles and

1) "kamui" is an Aino language in the meaning "holy".

eyes present on the dorsal side near the anterior margin. Capitulum approximately triangular in shape, relatively large. Mandibles slightly shorter than 0.15 mm, having a short blunt claw-shaped distal portion. Palpi 0.27 mm long on the extensor edge. First segment short, having no spine. Second segment, widest of all and becoming wide distally, its extensor edge being twice the length of the flexor one. On the extensor surface are present two spines, one in the middle portion and another on the distal end. On the flexor

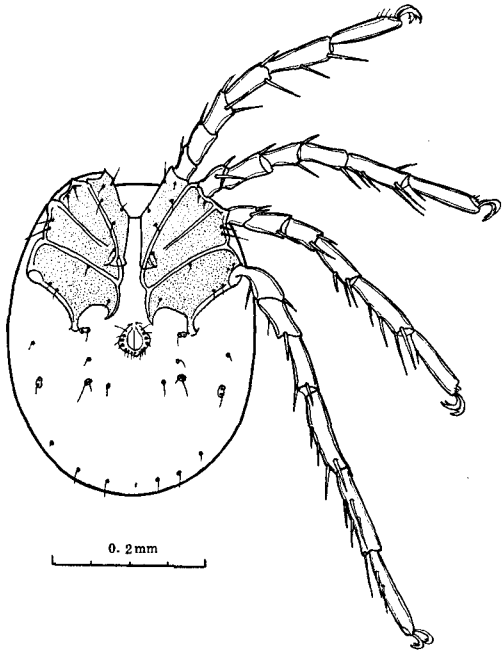

Fig. 7. *Litarachna kamui* n. sp., ventral side of male.

edge occurs a process which is lacking in other species of the genus. Third segment narrowing distally, with a slightly rounded extensor surface and a concave flexor edge. No spines were found. Penultimate segment, longest of all, gradually becoming narrow and having a minute process found on the flexor edge slightly distal from the middle length. There are two hairs on the segment, one near the distal end of the extensor edge and another just anterior to the

ventral process. Fifth segment somewhat rapidly narrowed near the tip having two short spines. A ventral hair alone present. Epimera occupying less than the anterior half of the ventral surface. First pair nearly equal in width throughout the anterior half but becoming narrow towards the posterior extremity which ends in a small process projected inwards. Each epimeron having five hairs separately distributed. Second and third epimera united in the

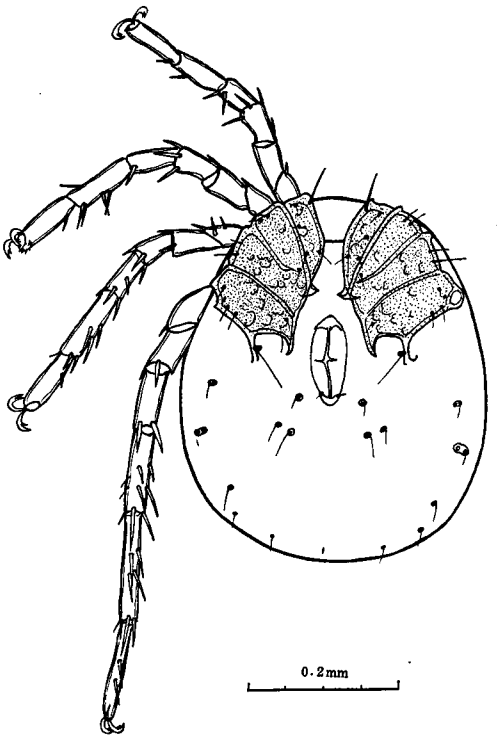

Fig. 8. *Litarachna kamui* n. sp., ventral side of female.

posterior portion, forming a nearly triangular shape, though the outer margin is undulating. Posterior end of the second epimeron and anterio-inner edge of the third epimeron are completely fused and form a chitinous process. A few hairs present on the outer margin of these plates. Fourth epimera, widest of all, becoming wide inwards, having the posterior margin diverging into two

chitinous expansions; the inner one claw-shaped, while the outer one larger than the former having a round tip, both expansions being directed laterally. The measurement of the whole length of the first to fourth legs is as follows, 0.37 mm, 0.4 mm, 0.41 mm and 0.56 mm respectively. All legs devoid of swimming hairs and provided with spines which are mostly growing around the distal margin and on the ventral side of the segments. These legs are provided in the distal end with two paired claws, each consisting of one large median and two small lateral ones. Genital organ lying just behind between the fourth epimera, 0.04 mm long and 0.035 mm wide.

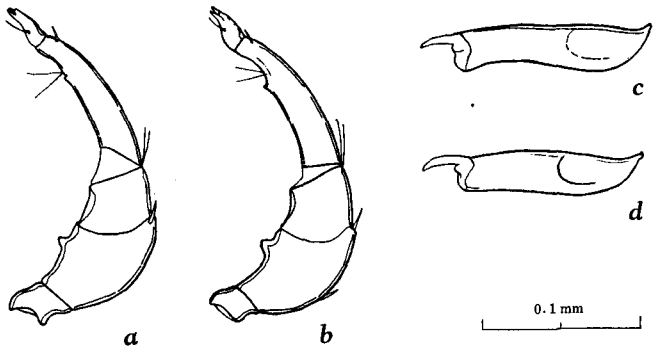

Fig. 9. *Litarachna kamui* n. sp.; a, left palpus of male; b, right palpus of male; c, right palpus of male, d, left palpus of male.

Chitinous ring encircling the genital slit provided with pores having accessory hairs which are arranged in a circlet. Chitinous plates with accessory hairs and glands, are found mostly posterior to the genital field, but one pair of plates is present just inside the base of the outer chitinous process of the fourth epimera. Excretory pore lying near the posterior extremity. Colour reddish orange.

Female. Body oval, larger than the male, 0.49 mm long and 0.41 mm wide. The length of the first to fourth legs is 0.34 mm, 0.39 mm, 0.4 mm and 0.62 mm respectively. Though slightly different, the shape of epimera and distribution of the chitinous plates are generally similar to those of the male. The striking difference in

the epimera of the female from those of the male lies in the presence of distinct irregular shaped hyaline flecks upon them. In the male the flecks are very indistinct and hardly recognizable. Genital organ far more elongate than that of the male, extending backwards between the fourth epimera, about 0.12 mm long and 0.05 mm wide. Genital opening long slit-like, limited by two supporting chitinous plates, both crescent in shape. The posterior plate, smaller than the anterior one, is provided with two lateral pores with accessory hairs. Colour reddish orange.

Localities. Two females were collected by Mr. S. OKUDA from the Bay of Usu, Hokkaido in July, 1934, and two males and three females were obtained by Mr. H. HORIÉ from Oshoro on July 6, 1934. They were found among plankton or attached to sea-weeds.

Remarks. The species is easily distinguished from other species by the epimera, genital organs and relatively great length of the fourth legs. But, above all, the palpi provided with the ventral process are the most distinct characteristic of the new form.

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