

A NEW CHINESE ISOPOD, ICHTHYOXENUS GEEI.

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The species herein described was found parasitic on the "Tsi-fish" or carp, probably *Cyprinus carpio* taken from lakes and canals around Soochow, China, by Prof. N. Gist Gee, of Soochow University, whose energetic investigations are constantly increasing our knowledge of this hitherto neglected region.

This is the fourth representative of the genus *Ichthyoxenus*, a group whose mode of life is peculiarly interesting. When young, the isopod bores a hole in the body of a fish, just behind the lateral fin, where it lives with its mate, developing so in size that it is impossible for it to escape through the opening by which it entered.

The type species of the genus, *Ichthyoxenus jellinghausii* Herklots,¹ described in 1870, was found parasitic on the fish *Barbodes maculatus* Bleeker from Java, and in 1908 another host for this species was reported by Maj. P. A. Ouwens,² namely, the fish *Nemacheilus fasciatus* van Hasselt from the Tji-Seroema near Batavia.

Ichthyoxenus montanus Schioedte and Meinert,³ the second representative of the genus, was described in 1884 as parasitic on *Puntius sopheres* in the Himalayan Mountains.

In 1913 Richardson described the third species of the genus, *Ichthyoxenus japonensis*,⁴ from the following hosts: *Acheilognathus rhombeum* (Schlegel), *Gnathopogon elongata* (Schlegel), *Acheilgnathus tabira* Jordan and Thompson, *A. lanceolatum* (Schlegel), *A. cynostigma* (Jordan and Fowler), and *A. limbatum* Jordan and Snyder, from Lake Biwa, Japan.

Family CYMOTHOIDAE.

Genus ICHTHYOXENUS Herklots, 1870.

ICHTHYOXENUS GEEI, new species.

Plates 40 and 41.

Female.—Body subovate, strongly convex, about 23.1 mm. long, greatest width about 11.7 mm. Surface smooth; color (preserved

¹ Archives Neerlandaises des Sciences, vol. 5, 1870, pp. 128-137, pl. 5, figs. 10-18.

² Natuurk. Tijdschr. Nederl.-Indie, vol. 67, 1908, pp. 29-35.

³ Naturk. Tidsskrift, Kjobenhavn, ser. 3, vol. 14, 1884, pp. 303-309, pl. 11, figs. 10-17.

⁴ Proc. U. S. Nat. Mus., vol. 45, No. 1995, pp. 559-562, text-figs. 1-6.

specimens) creamy yellowish with minute black dots sparsely scattered on the body and more densely so on the dorsal surface of the head. Irregular carinations on the various segments give the dorsal surface of the body a rugged aspect.

Head small, and subtriangulate, convex, 3.1 mm. long, 3.5 mm. wide, frontal margins slightly rounded and posterior margin strongly rounded. Eyes shining black, subovate, moderately large, 1 mm. long, placed obliquely in the anterolateral angles of the head, and separated from each other at their nearest point by a distance of 2 mm., being distinctly more elongate and different in contour from the eyes of *I. japonensis*. First antennae short, consisting of 8 articles and extending slightly beyond the anterior end of the eye. The second antenna consists of 10 articles and extends quite to the posterior margin of the head.

A comparative diagnosis of the maxillipeds of the present species and its closest ally, *I. japonensis* Richardson,¹ seems desirable, especially since the author made no mention of the mouth parts in her discussion of *japonensis*. In *geei* the maxilliped is relatively quite short, its distal margin having the upper two-thirds of both lobes of the first maxilla entirely exposed while in *japonensis* the space between the anterior lip and the tip of the palp of the maxilliped is quite small and the outer margin of the masticatory lobe is produced beyond the margin of the epistome and the respective margins along the incision bilobating the lower lateral region are greatly roundly produced and overlap. Thus in *japonensis* the maxilliped covers the entire underlying mouth parts except the very tips of the maxillae, which are barely visible, and the distal ends of the palp, which meet above the epistome. In *geei* the maxillipeds are much broader in the basal region, with the bilobation of the masticatory lobe which occurs in the upper outer median lateral area marked by a distinct excavation, and the upper part of the lobe is not greatly produced, the inner area being relatively truncate. The palp is well developed and extends quite beyond the anterior margin of the masticatory lobe. The distal joint of the palp is well developed in marked contrast to that of *japonensis*, which is rudimentary, almost obsolete. The entire palp of *japonensis* is relatively small and overshadowed by the produced masticatory lobe.

Thorax roundly ovate, strongly convex, moderately asymmetrical. First segment 3 mm. long in median line, 9 mm. wide, with anterior margin deeply roundly excavate surrounding the posterior margin of the head. The lateral margins have the anterior half produced anterolaterally beyond the angles of the head and the posterior half directed almost straight back; the posterior margin is also relatively a straight

¹ *Ichthyoxenus japonensis* Richardson, Proc. U. S. Nat. Mus., vol. 45, No. 1995, vol. 45, pp. 561-562, text figs. 4-6.

line, in striking contrast to that of *japonensis*, which is recurvate. The entire segment is distinctly narrower than the second segment, extending only to the inner margin of the latter's epimera. The second, third, and fourth segments are similar and subequal, differing only in that their lateral parts graduately increase posteriorly and their respective epimera correspondingly graduately decrease posteriorly. The fifth, sixth, and seventh segments are similar, each being about two-thirds the length of the preceding segment; all are decidedly constricted postlaterally. Epimera are present on the last six segments; all are roughly triangulate. Those of the second, third, and fourth segments are relatively large, occupying the anterolateral angle of the margin of their respective segments and being closely appressed. The epimera of the fifth, sixth, and seventh segments are proportionately weaker and are almost hidden by the overlapping of the respective preceding segments due to their great constriction. All seven pairs of legs are strongly prehensile, the first three being directed forward, the last four backward. The second pair are decidedly stronger than any of the others; the seventh pair are uniquely distinctive.

In order to emphasize the validity of the present species it has seemed advisable to present a critical comparative diagnosis of the seventh legs of three adult female specimens, representing, respectively, *I. geei*, *I. japonensis*, and *I. jellinghausii*, which yields the following results:

I. geei: Coxopodite rudimentary; basipodite conspicuously constricted basally, its greatest width occurring midway the distal end, the outer margin distinctly keeled and deflected, only the distal end approaching true convexity, the point of union with the ischium is emphasized by a break in the marginal line, the inner side bears a distinct groove near the basal end on either side of which the margin is accentuated and reflected outwards, the distal end is convexly produced, this sculpturing of the entire inner margin dovetails with the flattened inner margin of the ischium, thus greatly enhancing the strength of the limb. The ischium has the form of an inverted triangulate pyramid, with each side slightly concavely depressed and the inferior margin flattened. The merus is nearly half as long as the ischium, wider than long, the outer margin broadly, roundly produced into a flaring lobe. The inner distal area is only very little produced and extends only a trifle along the inner side of the carpus in striking contrast to that of *I. japonensis* Richardson; the distal margin of the merus is also differently sculptured, the articulation of the carpus with the merus is also different from that of *japonensis*. The carpus of the present species is approximately as large as the merus of *japonensis*, although the specimen of *geei* is 23.1 mm. long, while *japonensis* is 14.2 mm. long. In shape the carpus of *geei* is

quite similar to its merus; its contour and proportions are quite different from the carpus of *I. japonensis*. The propodus of *I. geei* is relatively stout, evenly curved, not quite as long as the dactyl, which forms a strongly curved hook extending upon and overlapping midway on the inner side of the carpus. It will be noted that this hook is more strongly pronounced and differently bent from that of any of the previously described species of the genus.

I. japonensis: Coxopodite rudimentary; basipodite slightly wider basally than distally, the outer side is relatively convex, not conspicuously keeled; the distal end broadly, roundly shouldered, its point of union with the ischium preserving the unbroken marginal line; the inner side bears a distinct groove, which widens near the basal end; the margins on either side are distinct, slightly produced. The ischium is as long as the basipodite, narrow, subcylindric basally, widening distally, roundly thickened along the inner side and with the outer distal portion reduced, flattened. The merus is slightly wider than long, the outer margin evenly rounded, the inner distal area strongly produced projecting along nearly seven-eighths of the length of the inner side of the carpus; the distal margin of the merus is strongly deeply excavate, encupping the carpus and reenforcing it on the inner side. The carpus is shorter than the merus, subcylindrical, with the inferior margin so little produced that the "rounded expansion" is visible only at the outer basal area tapering to a hair's breadth at the distal end. The propodus is slightly longer than the carpus and only a trifle narrower and is evenly recurved. The dactyl is relatively stout basally, but curves somewhat and tapers to a very fine point, which is directed toward the distal end of the carpus but barely reaches the extreme tip of the margin of the carpus.

I. jellinghausii: Coxopodite rudimentary, basipodite but little constricted basally and upcurved, relatively convex, distal end pronouncedly shouldered, forming a blunt right-angled projection on the outer distal margin; the line of union with the ischium is relatively straight, the side is convex, in marked contrast to that of *geei*. The ischium has the form of an inverted truncated triangulate pyramid, with the sides not concavely depressed and the margins scarcely at all produced. The merus is more than half as long as the ischium, slightly longer than wide; the outer margin roundly produced but with a relatively less flaring lobe than either of its allies. The produced inner distal area extends less along the inner side of the carpus than in *geei*. The articulation of the carpus with the merus is also distinctive; the carpus is compressed, subpyriform; the propodus is a trifle longer than the carpus, is less pronouncedly curved than is *geei* or *japonensis*. The dactyl is differently inserted basally,

moderately curved, tapering to a fine point, which is reflected almost straight back on the carpus, but does not reach the merus.

Male.—The male is similar to the female in general appearance, but is distinctly smaller, the largest full-grown specimen being only 14.2 long and 8 mm. wide; the body outline is more elongate ovate and only slightly convex; the telson is not quite so long and is more rounded posteriorly; the uropoda are relatively larger and are slightly conspicuous dorsally; and the pleopoda cover almost the entire ventral cavity, but not quite extending to its terminal margin.

As is the case with many of the parasitic Cymothoidea, the present species is not pronouncedly different in general appearance from its allies; in fact, a superficial diagnosis would quite probably designate it a form of *Ichthyoxenus japonensis* Richardson, but a critical comparison of the entire series of specimens of the present species with the entire series of *I. japonensis* Richardson, including the type material, and likewise with the series of *I. jellinghausii* Herklots in the United States National Museum, augmented by careful study of all the literature on the group *Ichthyoxenus*, especially that of *I. montanus* Schioedte and Meinert, of which no specimens were available, consideration of this species being necessarily based on the text and Schiodte's and Meinert's excellent figures of the various phases of the species, establish beyond question the fact that *I. geei* is as distinct specifically as the three previously described members of the genus.

The adult females of *I. geei* are uniformly less asymmetrical in contour than those of *I. japonensis*; the insertion of the head of *geei* is distinctive; the number of ocelli and the shape of the eye of *geei* differs from that of *japonensis*; the posterior margin of the first thoracic segment of *geei* is relatively a straight line, while in *japonensis* this is uniformly recurvate. The proportionately larger and broader telson and the relatively smaller pleopoda and uropoda of the female is distinctive of *geei*, as are the uniquely different seventh pair of legs. Finally, the differently shaped and proportionately much smaller maxillipeds of *geei* preclude its confusion with the other members of the genus.

It is interesting to note that all the so far recorded hosts of the members of the genus *Ichthyoxenus* are confined to the fresh-water fishes of the closely related families Cobitidae and Cyprinidae.

Type.—An adult female, Cat. No. 53304, U. S. N. M., and an adult male paratype, were found parasitic in "Tsi-fish," or carp, probably *Cyprinus carpio* Linnaeus, taken from lakes and canals around Soochow, China. The following additional paratypes—two males, one female—and about 40 very young specimens, Cat. No. 53305, U. S. N. M., were likewise collected by Prof. N. Gist Gee, of Soochow University, for whom I take great pleasure in naming the species.

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EXPLANATION OF PLATES.

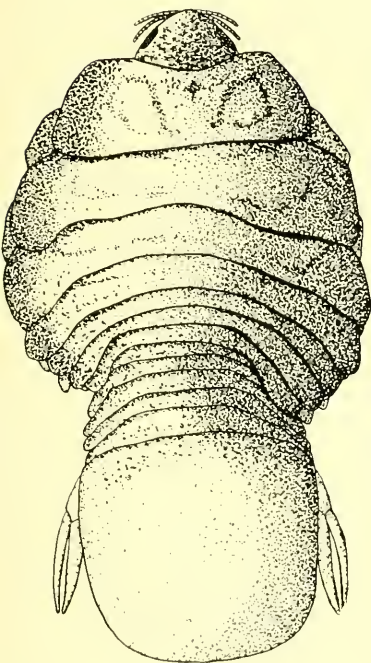
PLATE 40.

- FIG. 1. *Ichthyoxenus geei*, new species, female, type.
 2. *Ichthyoxenus geei*, new species, male, paratype.

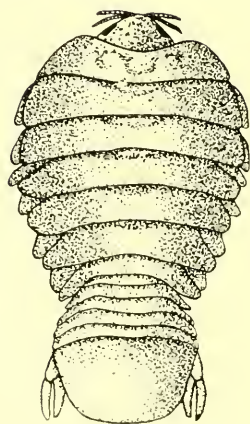
PLATE 41.

- FIG. 1. *Ichthyoxenus geei*, seventh leg of female.
 2. *Ichthyoxenus japonensis* Richardson, seventh leg of female.
 3. *Ichthyoxenus jellinghausii* Herklots, seventh leg of female.
 4. *Ichthyoxenus geei*, new species, maxilliped.
 5. *Ichthyoxenus japonensis* Richardson, maxilliped.

¹ I have not been able to obtain this paper.



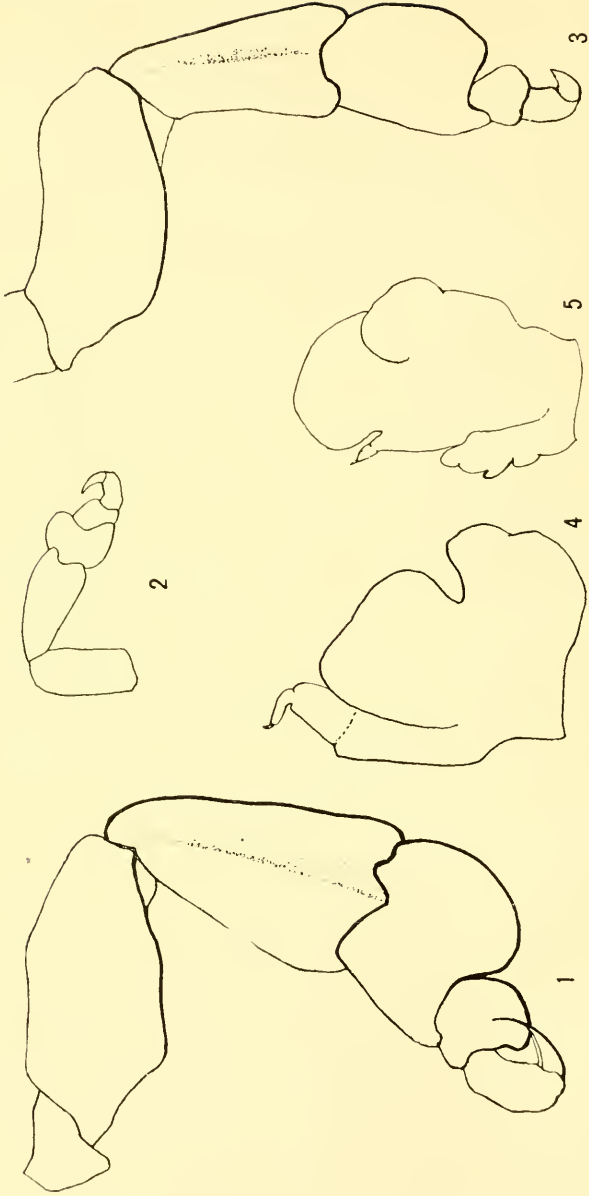
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ICHTHYOXENUS GEEI. (1) FEMALE, (2) MALE.

FOR EXPLANATION OF PLATE SEE PAGE 502.



PARTS OF DIFFERENT SPECIES OF *ICHTHYOXENUS* CONTRASTED.

FOR EXPLANATION OF PLATE SEE PAGE 802.