

ARGULIDAE FROM THE SHUBENACADIE RIVER, NOVA SCOTIA.

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A survey of the Shubenacadie river, which empties into the Basin of Minas, Nova Scotia, was recently made by Mr. A. H. Leim in connection with the Canadian shad fisheries. During this survey many specimens of both young and adult argulids were obtained at Shubenacadie with the tow-net in tidal water which seemed to be fresh rather than salt.

These specimens were sent to the present author for identification, and they proved to contain an abundance of both sexes of two species of *Argulus*, one of which had previously been found in many localities on the Atlantic coast farther south, while the other was new to science. The following record of these two species is herewith submitted.

ARGULUS ALOSÆ Gould

Argulus alosae Gould, Invertebrata of Massachusetts, 1841, p. 340, text figure S. I. Smith Report U. S. Com. Fish and Fisheries, 1872, p. 575 (281): R. Rathbun, Proc. U. S. National Museum, vol. 7, 1884, p. 485: J. F. Whiteaves, Cat. Marine Invertebrata of Eastern Canada, 1901, p. 216: C. B. Wilson, Proc. U. S. National Museum, vol. 25, 1902, p. 707, pl. 12; pl. 26, fig. 80.

Record of specimens. Ten specimens, including both sexes, were obtained August 1, 1919: at 8.45 p.m.: two males were obtained on the same date at 9.10 p.m.: a single male was obtained July 21, at 6.15 p.m.

Remarks. This species was doubtfully recorded by Mr. J. F. Whiteaves in the reference given above as attached to *Gasterosteus biculeatus* Shaw, and other small fishes taken off Pictou island in the Gulf of St. Lawrence. All the other recorded localities are much farther south. The present record substantiates that of Whiteaves and fully establishes the species in Canadian waters. Again it has hitherto been found only upon fish hosts in salt water; the present specimens were captured in a tow-net in fresh water. Their presence in the tow makes it certain that they infest fish in the immediate vicinity, and it may be that they will be found some day upon the shad whose name they bear.

ARGULUS PIPERATUS, new species.

Record of specimens. Twenty-two specimens, of which six were females and the rest males, were obtained August 1, 1919, at 8.45 p.m. in company

with the first lot of *Argulus alosae*. Another lot of ten specimens, including both sexes, were caught in the second towing, August 1 at 9.15 p.m. Five males were obtained July 31 at 9.50 p.m., and two males on the same date at 10.10 p.m. The majority of all these specimens were of small size although sexually mature. But a few of them were large enough to be regarded as fully developed adults, and from these the following description has been taken.

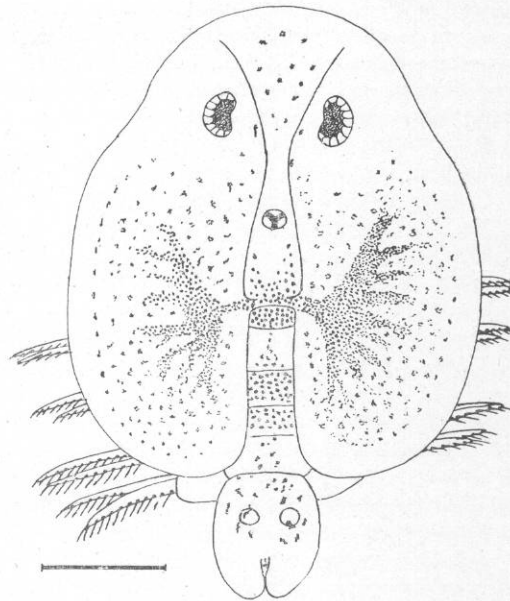


Fig 1. Dorsal view of *Argulus piperatus*, female. The line represents a length of 1 mm.

Special characters of female. General shape of the carapace elliptical, one-fourth longer than wide, with shallow lateral sinuses and broad, well rounded posterior lobes. Posterior sinus, one-third the length of the carapace, with parallel sides; posterior lobes just reaching the base of the abdomen. Eyes far forward and well separated.

Abdomen elliptical, one-fourth the length of the carapace, the longitudinal and transverse diameters in the proportion of 11 to 9; its posterior lobes well rounded and inclined inward so that their inner margins are in contact. Anal sinus 27.50% of the abdomen length; anal laminae basal, minute and unarmed; sperm receptacles small, circular and rather widely separated.

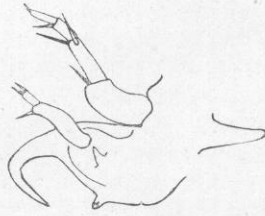


Fig. 2. *Argulus piperatus*; first and second antennae of male, much enlarged

Lateral claw of basal joint of first antenna long and slender and curved into a half circle; anterior claw short and weak. Second joint slender, three times the length of the terminal joint, and armed at the distal anterior corner with a short spine; terminal joint tipped with two spines. Second antenna of the usual pattern, the basal joint one-half wider than the succeeding joints and tipped with a long spine; second joint with two spines; third and fourth joints with one spine each.

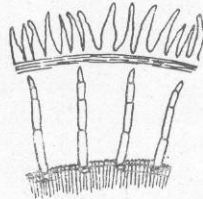


Fig. 3. *Argulus piperatus*; supporting rods in sucking disks; much enlarged.

Sucking disks of second maxillae far forward and well separated, each about 15% of the width of the carapace; the supporting rods slender and far apart, each made up of four cylindrical joints which diminish regularly in size from the base outwardly, and which do not quite reach the margin. The latter has a fringe of flattened fleshy setae, attached side by side in a single row.

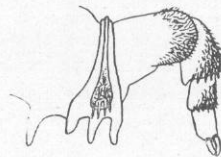


Fig. 4. *Argulus piperatus*; maxilliped of male; much enlarged.

The maxillipeds are rather short but stout; the triangular plate on their base is wide posteriorly and much narrowed anteriorly, but extends to the anterior margin of the appendage; the teeth are long and wide and bluntly rounded. Inside of the base of the appendage, on the ventral surface of the head, is an accessory tooth of the same pattern as those on the plate itself.

The rami of the swimming legs reach considerably beyond the margin of the carapace. The lobes on the basal joints of the fourth legs are small and not very prominent.

Color a light cartilage gray, the dorsal surface covered with small black dots, as though it had been sprinkled with pepper. These dots are not evenly distributed but are massed as shown in the figure.

Total length 5mm. Carapace 4 mm. long, 3.25 mm. wide. Abdomen 1 mm. long, 0.90 mm. wide

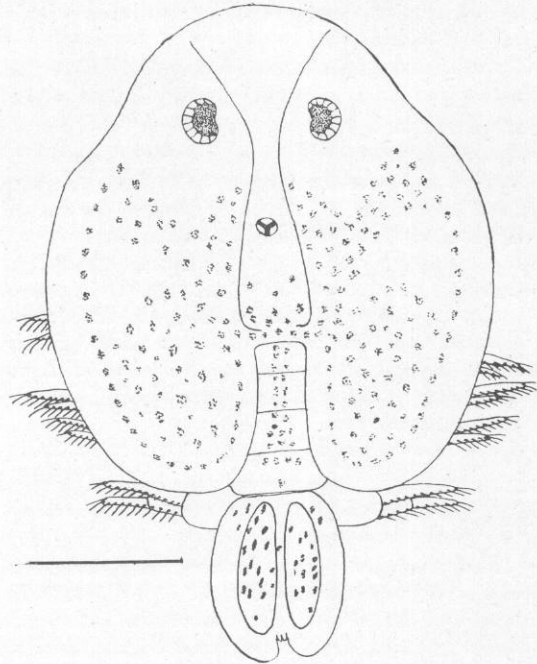


Fig. 5. Dorsal view of *Argulus piperatus*, male. The line represents a length of 1 mm.

Specific character of male. Carapace relatively the same size and shape as in the female; abdomen longer, one-third the length of the carapace, the longitudinal and transverse diameters in the proportion of 15 to 11. Anal sinus not as deep, only 14% of the length of the abdomen and never closed by the approximation of the posterior lobes.

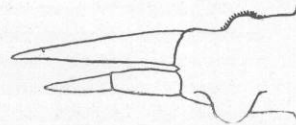


Fig. 6. *Argulus piperatus*; third legs of male, much enlarged.

Of the accessory sexual characters the peg on the anterior margin of the basal joint of the fourth legs is a broad cone, inclined strongly outwards and bluntly rounded at the tip, with a tiny spine on its

anterior margin. On the ventral surface of the basal joint of the third legs is a broad flap, projecting backwards, and on the anterior margin a rounded knob armed with minute setae.

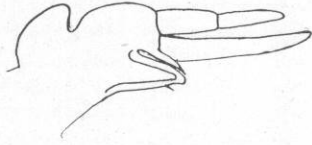
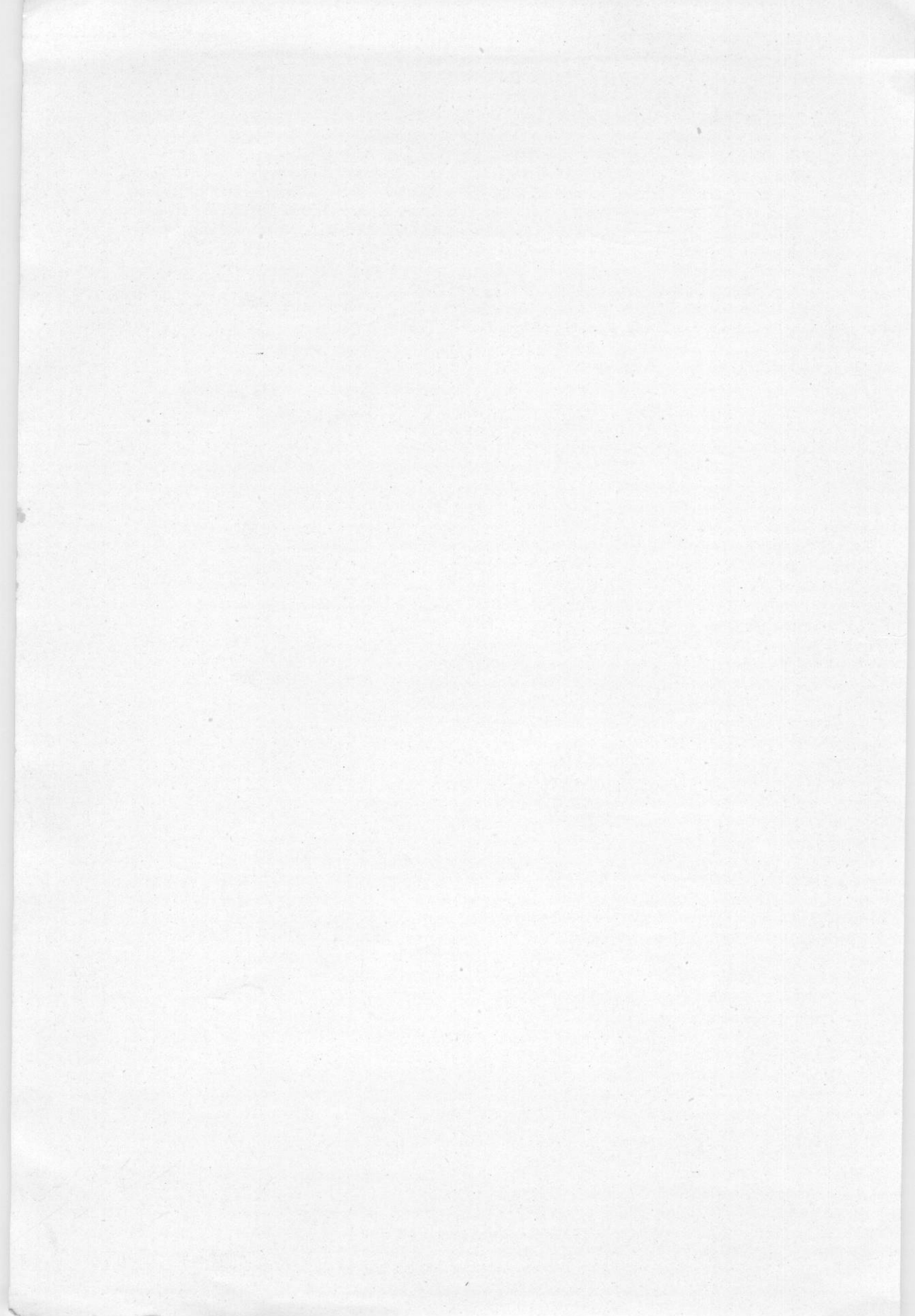


Fig. 7. *Argulus piperatus*; fourth legs of male; much enlarged.

Color the same as in the female except that the black spots on the dorsal surface are larger and more scattered.

Total length 4 mm. Carapace 3 mm. long, 2.65 mm. wide. Abdomen 1 mm. long, 0.80 mm. wide. (*piperatus*, sprinkled with pepper, alluding to the black spots).

The types of this species are deposited in the Museum of the Atlantic Biological Station, St. Andrews, N.B.



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