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ENTOMOSTRACA FROM ST. PAUL ISLAND, ALASKA*

By C. Juday and R. A. Muttkowski 1915

The material with which this paper deals was collected by Dr. M. C. Marsh, of the U. S. Bureau of Fisheries, on Saint Paul Island, one of the Pribilof Islands, Alaska, on August 7, 1906. There are three bottles of the material and the labels state that it was obtained from Upper Ice House Lake on Saint Paul Island.

By far the greater portion of the catch consists of the phyllopod *Polyartemiella judayi*, which proved to be not only a new species, but also a new genus, and which was described by Daday[1] in 1909. There are hundreds of individuals of this form. Several other entomostraca are represented, two of which appear to be undescribed.

CLADOCERA

Daphnia pulex (de Geer).

A single, immature specimen of this form was noted.

Eurycercus glacialis Lilljeborg.

This is the most abundant and also the largest cladoceran in the material. The females reach a length of 5 mm.

Alona rectangula Sars.

A few specimens of this form were found.

Chydorus sphaericus (O. F. Mueller)

There were a few specimens of this widely distributed form.

COPEPODA

Diaptomus shoshone var. wardi Pearse.

Through the kindness of Professor Pearse some of the original material of his *D. wardi* has been examined. His form seems to

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[1] Ann. Mus. Hung., vol. 7, 1909, p. 173, fig. 1.

differ in only two particulars from typical *D. shoshone*. These differences are in the length of the appendage on the antepenultimate segment of the right antenna of the male and in the form of the second basal segment of the right fifth foot of the male. In his material the antennal appendage is longer than the last two segments, but in the material from St. Paul Island the length of this appendage is subject to great variation, as shown in figure 1, *A-D*. In some individuals it is only a little longer than the penultimate segment (fig. 1, *A* and *C*), as in typical *D. shoshone*,

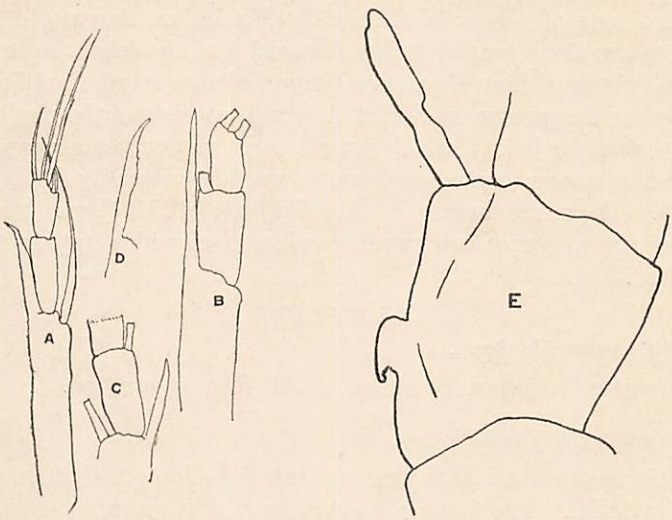

FIG. 1. *Diaptomus shoshone* var. *wardi* Pearse. *A, B, C, D,* SHOWING TERMINAL PROCESS OF ANTEPENULTIMATE SEGMENT OF MALE RIGHT ANTENNA. *E,* SHOWING THE SECOND SEGMENT OF THE RIGHT FIFTH FOOT OF MALE.

while in others it extends beyond the end of the last joint of the antenna (fig. 1, *B*). In view of this fact it appears that the length of this appendage has little or no specific value for this form; and it is opportune to suggest that this taxonomic feature may undergo similar variation in other species of *Diaptomus*.

In the *wardi* form the inner margin of the second basal segment of the right male fifth foot bears a blunt process, while *shoshone* does not possess this process. This structure is present on the specimens from St. Paul Island (fig. 1, *E*). This single differ-

ence seems to be constant and is probably sufficient to give this form a varietal rank.

In the female the two-jointed appendage of the fifth feet will serve to distinguish this form from *D. shoshone* females.

The species is very abundant in the St. Paul Island material.

Diaptomus pribilofensis nov. sp.

This is a small species. The suture of the first cephalothoracic segment is fairly distinct; this segment is about as long as the three following ones. The last thoracic segment bears two lateral lobes which are pointed at their outer extremities (see fig. 2, *B* and *C*). The male has smaller lateral lobes than the female.

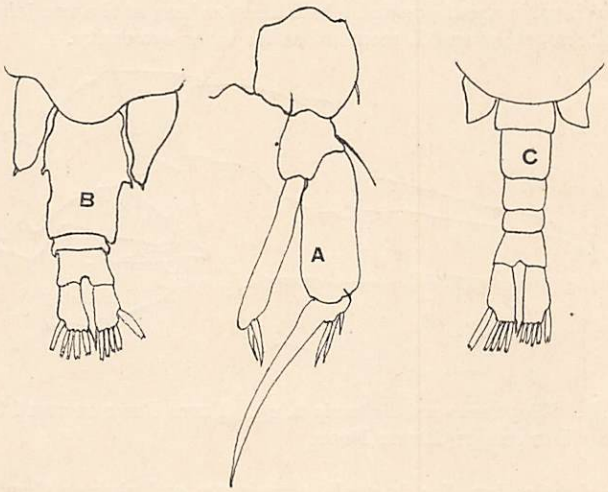

FIG. 2. *Diaptomus pribilofensis* n. sp. *A*, FIFTH FOOT OF FEMALE; *B*, ABDOMEN OF FEMALE; *C*, ABDOMEN OF MALE.

The antennae reach to the end of the furca or slightly beyond. The antepenultimate segment of the right male antenna bears no appendage.

The abdomen of the female is rather long (fig. 2, *B*), the first segment is about twice as long as the second and third combined, moderately dilated anteriorly, and bears two lateral spines near the posterior edge of the dilated portion. The second segment of the abdomen is very short, distinctly shorter than broad. The third segment is about as long as broad. The furcal rami are about as long as the third segment of the abdomen.

Fifth feet of female.—The first basal segment bears a small spine on the posterior surface, the second basal segment is rather short and slender, and bears a lateral seta (fig. 2, *A*). The first segment of the exopodite is a little more than twice as long as wide. The second segment is one-third

longer than the first, is curved outward, and bears three spines on its outer margin, the inner one being the longest. The two inner spines represent the third segment. The endopodite is somewhat longer than the first segment of the exopodite, is not distinctly segmented, and bears two spines about equal in length on its outer margin near the end.

Fifth feet of male.—Each of the first basal segments bears a minute spine and each of the second segments bears a lateral seta (fig. 3, *A*). The second basal segment of the right foot is somewhat longer than broad, with a broadly rounded prominence at the proximal inner angle (3, *A*). The first segment of the exopodite is broader than long and somewhat produced at the inner distal angle. The second segment of the exopodite is somewhat longer than the two preceding segments. It is broadest a little beyond the middle and the lateral spine is situated at the widest portion. The terminal hook is about one and a half times as long as the two joints of the exopodite together and is recurved at its outer extremity.

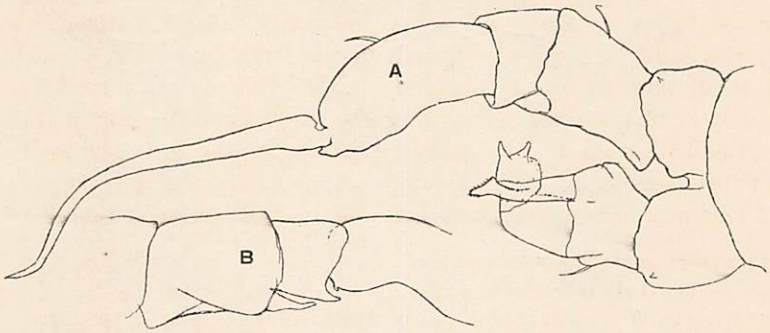

FIG. 3. *Diaptomus pribilofensis* n. sp. FIFTH FEET OF THE MALE. *B*, SHOWING DETAILS OF RIGHT FOOT.

The right endopodite is small, acuminate, and shorter than the first joint of the exopodite (fig. 3, *B*).

The inner margin of the second basal segment of the left fifth foot is broadly conical in form, the apex being near the middle of the joint. The conical portion sometimes shows a groove, thus giving it a bilobed appearance. The first segment of the exopodite is about as broad as long. It is convex on its outer margin and about straight or slightly concave on its inner margin. The terminal segment is somewhat longer than broad, with a large setose pad on its inner margin. It terminates in two finger-like processes which are equal in length.

The endopodite is long and slender, and is not distinctly segmented. It is pointed and setose at the end.

Length, ♂ 1.25–1.3 mm., ♀ 1.35–1.45 mm.

This species appears to be most closely related to *D. théeli*, with which it has certain features in common, such as the lobate proc-

esses of the thorax and the lateral spines of the first abdominal segment of the female. These spines, however, are located in the basal third of the abdominal segment of *théeli*, about in the middle in *pribilofensis;* the lobate processes of the thorax are more acuminate in adult *pribilofensis*. The fifth feet of the female of *théeli* show a terminal segment which is as broad at the base as the preceding segment, with two spines at the base, one of the spines with two joints; in addition the endopodite is two-segmented. In *pribilofensis* the terminal segment is long and slender, with three spines at the base, none of them jointed; the endopodite shows no indication of bisegmentation.

In the male fifth feet of *théeli* the second segment of the right foot bears a medial internal tubercle, the endopodite is as long, or longer, as the first joint of the exopodite, one-third the width of this joint; the second segment of the left foot is oblong, with a small internal basal tubercle. In *pribilofensis* no tubercle is found on the second segment of the right foot, the endopodite is small, acuminate, the second segment of the left foot bears an internal median notch, giving a bilobate appearance.

This new form is represented in our material in large numbers

Heterocope septentrionalis nov. sp.

♀.—The body is robust and broadly oval in outline, the widest portion is a little anterior to the middle and is nearly half the length. The urosome and metasome are about equal in length. The first or genital segment of the abdomen is about as long as the two succeeding segments (fig. 4, *C*). The posterior portion of the genital area bears two conspicuous processes which are curved and trilobate on their outer margin (fig. 4, *D* and *E*). The second and third abdominal segments are about equal in length. The caudal rami are about one and a half times as long as broad and ciliate on the inner margin. At the outer end each ramus bears three plumose setae and two bristle-like appendages which are about as long as the rami themselves. One of these bristles is situated at the outer distal angle of each ramus and the other on the ventral surface near the inner angle.

The reflexed antennae extend about to the end of the genital segment.

The swimming appendages are all symmetrical. The first pair bears only plumose setae while the next three bear spines instead of setae on the outer margin of the exopodite. The terminal segment of the fifth pair of feet bears four toothed processes on its inner margin, two fairly large spines on its outer margin, and two apical spines, one of which is small and the other long and spinose (fig. 4, *B*).

♂.—The male is somewhat smaller than the female. The abdomen is slenderer than that of the female and consists of five segments instead of three of which the fourth is the smallest (fig. 4, *F*).

The first pair of swimming feet bear only plumose setae and the next three pairs bear spines on the outer margin of the exopodite as in the female (fig. 5). The first, third and fourth pairs of feet are symmetrical, only the second and fifth pairs are asymmetrical (fig. 4, *A*,; fig. 6).

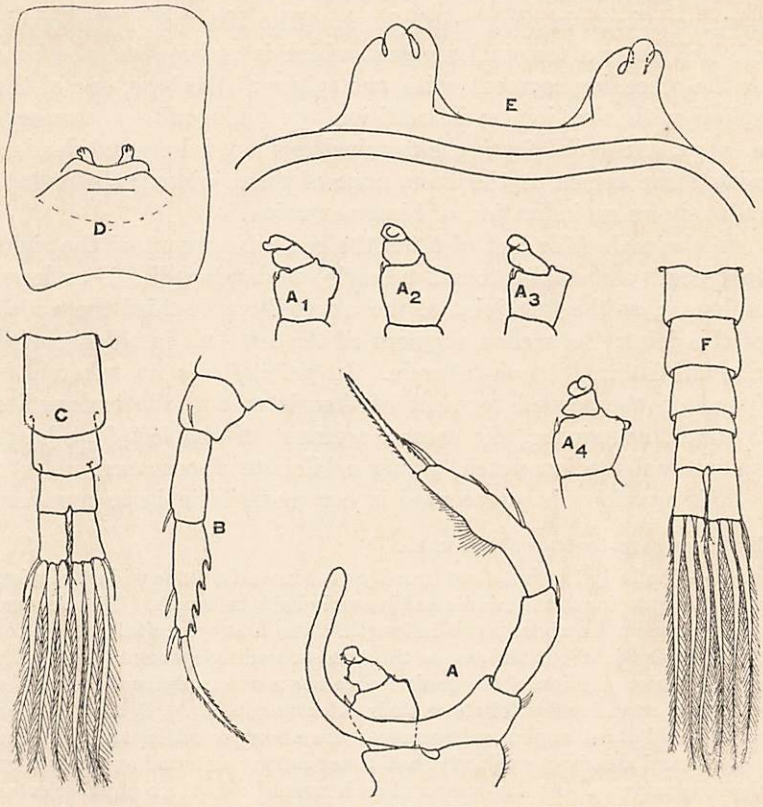

FIG. 4. *Heterocope septentrionalis* n. sp. *A*, FIFTH FEET OF THE MALE. *A1–A4*, SHOWING VARIATIONS IN LEFT FOOT OF THE MALE. *B*, FIFTH FOOT OF THE FEMALE; *C*, ABDOMEN OF FEMALE; *D*, GENITAL SEGMENT OF FEMALE, *E*, GENITAL PLATE OF FEMALE, *F*, ABDOMEN OF MALE.

Second feet.—The first joint of the right exopodite (fig. 6, *A*) is somewhat shorter and broader than the corresponding joint of the left foot (fig. 6, *B*) and the spine of the right joint is slightly longer and distinctly stouter than that on the left. The second joint of the right exopodite is slightly smaller than that of the left side and bears a distinctly longer spine. The last joints of these exopodites are similar in size and form, the right joint being a little broader than the left in some individuals. The long

terminal spines borne by these two joints are alike, but the other two spines are different. The two outer spines of the left joint are armed with teeth as in the third and fourth feet, while those on the right joint are unarmed. The second spine of the right joint is somewhat larger than that on the left and is rather sharply curved in the middle and then reflexed at the end. There is a minute unarmed spine on both joints at the base of the long terminal spine.

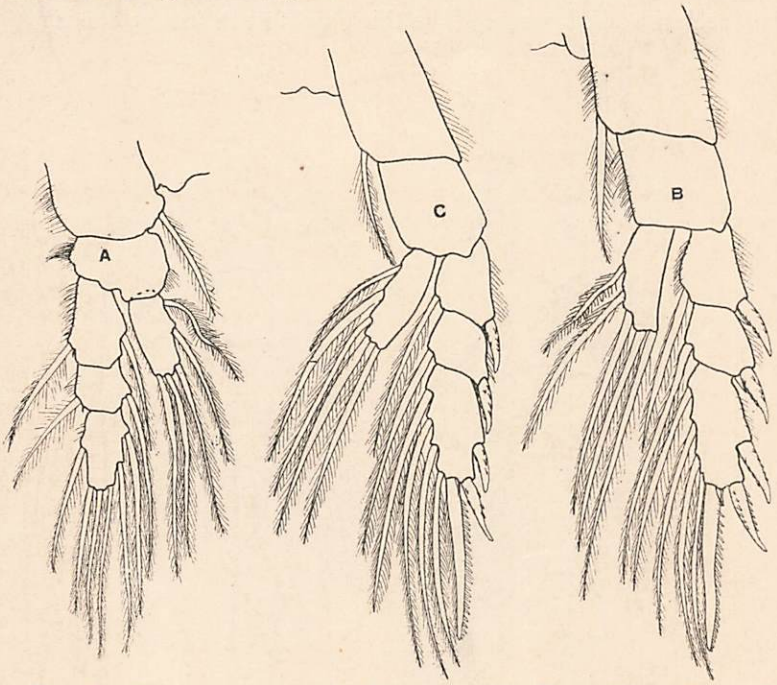

FIG. 5. *Heterocope septentrionalis* n. sp. *A*, FIRST RIGHT FOOT OF MALE; *B*, THIRD RIGHT FOOT, AND *C*, FOURTH RIGHT FOOT OF MALE.

The terminal joint of the left leg of the fifth pair is about as long as the two preceding joints (fig. 4, *A*). The antepenultimate joint of the right leg is about as broad as long and bears a slight protuberance on its inner margin. This joint is subject to some variation, as indicated in figure 4, *A1–A4*.

Length: ♀ 4.00 mm., ♂ 3.85 mm.

Described from a large number of specimens from Upper Ice House Lake, St. Paul Island. Both sexes are very abundant in the material.

A comparison of this form with specimens of *Heterocope borealis*

Fischer (*H. weismanni* Imhof) from Finmark and Zürichsee shows that *H. septentrionalis* very closely resembles the former but is readily distinguished by the trilobate processes on the genital plate of the female and by the symmetry of the third and fourth pairs of swimming feet in the male. The asymmetry of the second feet of *H. septentrionalis* is of a different type than found in its relative, *H. borealis*. The third and fourth feet on the right

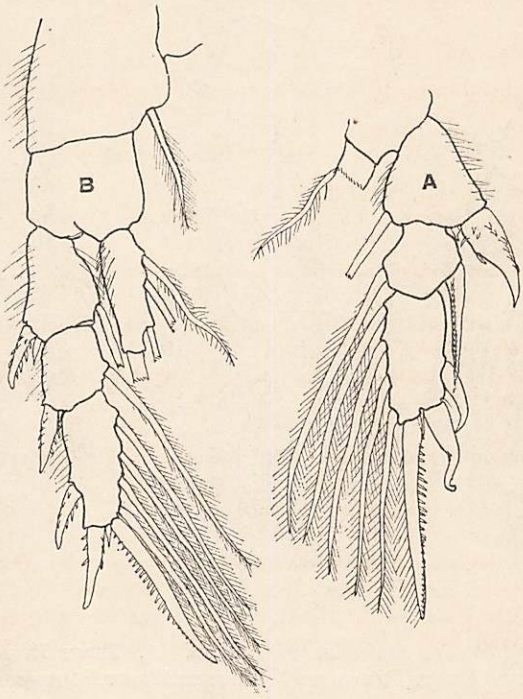

FIG. 6. *Heterocope septentrionalis* n. sp. SECOND FEET OF THE MALE, SHOWING ASYMMETRY.

side of the male do not show the peculiar modifications so characteristic of *H. borealis*.

This is the first authentic record of this genus for the Western Hemisphere. The four species of this genus hitherto described have been taken in northern Europe, in some of the Alpine lakes, and in Siberia. The genus is boreal and even arctic. We have also found the species in material from within the Arctic Circle on the Alaskan mainland.

This Alaskan material was collected by J. M. Jessup in 1911 along the boundary of Alaska and Canada during late June, July, and early August, in various lakes at various distances to the north of New Rampart House, Alaska. All the localities lie within the Arctic Circle.

Cyclops serrulatus Fischer.

A very few specimens of this form were noted in the material.

Canthocamptus sp.

Two or three immature specimens of *Canthocamptus* were found.

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