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A New Species of Daphina, and Brief Notes on Other Cladocera of Iowa

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lower margin has a few long hairs anteriorly which are followed by a series of teeth, and in the concave part a somewhat longer set to a point just before the lower curved angle."

In most respects the Manitoba specimens agree more nearly with Herrick's description than with Birge's. A few points of difference are noted. In the Manitoba specimens a few long hairs are present on the lower margin anteriorly, then at a little distance posteriorly from the hairs are short, sharp bristles, hardly heavy enough to be called teeth, becoming largest on the concave part of the margin. In one specimen the end of the abdomen is deeply cleft, the posterior lobe bearing four very strong teeth of nearly equal size. Herrick says that hexagonal reticulations are seen upon the shell of the embryo yet in the brood sac. In several sexually mature females observed faint reticulations are present, more distinctly seen near the ventral margin.

Polyphemus pediculus.—This species was found to be quite common in the Portage Plains region. It has not been reported from Iowa. Although reported from Georgia it seems to be more commonly found in the north.

A NEW SPECIES OF DAPHNIA, AND BRIEF NOTES ON OTHER CLADOCERA OF IOWA.

BY L. S. ROSS.

A few collections taken from West and East Okoboji Lakes and Spirit lake in June, and from the sloughs of the Des Moines river in the fall of 1896, have added six more species to the list of Cladocera in the state, as given in the "Proceedings" of the Academy for 1895. Five of the species are common to the country, and one is an hitherto undescribed species of Daphnia. A few individuals of a form of the difficult genus Bosmina were found which may be the young of Bosmina longirostris, O. F. Muller. If not the young of this species then seven instead of six species will be added to the list.

The species taken the past summer and fall not reported in the "Preliminary Notes" are:

Daphnia pulex De Geer.
Daphnia hybus n. sp.
Bosmina longirostris O. F. Muller.

Pleuroxus exiguus Lilljeborg.
Alona guttata Sars.
Graptoleberis testudinaria var. inernis, Birge.

This gives a total list of thirty-one species of Cladocera reported from the state.

DESCRIPTION OF A NEW SPECIES—DAPHNIA HYBUS.

The body is large, robust, with a prominent keel shaped projection on the dorsal margin immediately anterior to the brood chamber; the projection rises at a rather low angle anteriorly, approximately 20 to 25 degrees, but falls posteriorly at a greater angle, approximately 40 to 50 degrees. It is present on the ephippial females and also on those bearing summer eggs. The measurement of the projection on one specimen gave the length of .14 mm. and a height of .05 mm. On one specimen a second projection is present, located on the dorsal margin above the base of the antennæ. Measurement showed its length to be .28 mm. and height, .09 mm. In yet another specimen the projection above the base of the antennæ is evident under the shell, and it would apparently have become external at the next moult. The dorsal margin of the shell is convex, minutely spined from the posterior shell spine nearly to the front of the brood chamber. In one or two specimens the spines were not observed. The ventral margin is strongly convex, and is armed with small spines about one-half the distance forward from the posterior shell spine; the margin is sinuous below the posterior spine, which is situated usually about half way between the median line of the body and the dorsal margin, but sometimes nearly on the median line. Spine is straight, slender, directed slightly upward, .77 mm. long in one specimen, and has scattering, feeble spinules.

The head is broad, not helmeted, strongly arched dorsally, and is not separated from the body by a depression. The ventral margin of the head is slightly concave below the eye, midway between the front of the head and the end of the long beak. Depth of the head is about two times the length from the base of the antennæ.

The eye is of medium size, with few prominent crystalline lenses, and is situated at a distance from the front of the head, about equal to the diameter of the pigmented portion. Distance of the eye from the posterior margin of the head is little greater than diameter of the eye. The transparent orbit reaches to the front of the head. Pigment fleck is small, not

more than one-fourth the diameter of a crystalline lens. It is situated near the median line, about midway between lower half of eye and the posterior margin of the head.

The antennæ are moderately developed, the setæ reaching nearly to the posterior margin of the shell. The first joint of the setæ is longer than the second.

The post abdomen is rather slender, tapering toward the posterior end, and is armed with about fifteen strong curved spines, which become gradually smaller anteriorly. Anal claws are pectinated, and armed with a strongly developed basal comb of two groups of spines of about six in each group. Spines of upper group much smaller than those of lower. Processes of the post abdomen are separate, first longest, not haired, second and third haired.

Some measurements are as follows:

Length	2.30 mm.	Height	1.32 mm.
Length	2.00 mm.	Height	1.27 mm.
Length	2.77 mm.	Height	1.85 mm.
Depth of head	1.00 mm.	Length of head	.46 mm.
Depth of head	1.07 mm.	Length of head	.50 mm.
Depth of head	.88 mm.	Length of head	.44 mm.

Posterior spine, .70 mm. to .77 mm.

The species is evidently very closely related to D. minnehaha, Herrick, and may have only varietal rank.

The general outline of the body of old females is similar to that of D. minnehaha, including the angle or projection in front of the brood chamber. None of the specimens examined showed any evidence of teeth upon the dorsal angle as are present in males and young females of D. minnehaha. No broad projection on the dorsal margin above the base of the antennæ is mentioned in descriptions of D. minnehaha or figured in the drawings. The beak is longer in D. hybus, and is slightly curved toward the end. The eye in D. hybus is farther from the front margin of the head, and the lenses much larger than are figured in D. minnehaha. The posterior spine is longer in D. hybus. In D. minnehaha "the anal spines are eleven or more in full grown females, and decrease only moderately upward." In D. hybus the anal spines vary from about fifteen to nineteen. Herrick says of D. minnehaha: "The size is small but variable; 1.8 mm. is a common measurement." In addition the following measurements are given: "Female, length, 1.44 mm.; spine, .33 mm.; head, .26 mm.; depth of

head, .46 mm. Ephippial female, length, 1.64 mm.; spine, .20 mm.; head, .85 mm.; depth of head, .80 mm.; greatest depth of shell, .94 mm."

A comparison with the measurements given of D. hybus shows the latter to be a much larger form, in some instances approaching a length and depth double that of D. minnehaha.

In the "Preliminary Notes on the Iowa Entomostraca," published in the proceedings of the Iowa Academy of Sciences, vol. III, I followed the classification of Birge and Herrick, and placed Daphnia retrocurva, Forbes, in the list as a variety of Daphnia kalbergiensis, Schoedler. At that time I had not seen the original description of either species.

In Forbes' description of D. retrocurva first published in the American Naturalist, vol. XVI, page 642, August, 1882, he says: "The shell is reticulate and its spine long and straight, there is no macula nigra, and the caudal claws have a row of teeth at their base." The row of teeth referred to is the accessory comb. The teeth of the comb are often very small and hard to distinguish, but in all the specimens of D. retrocurva I have examined they are present. In "Die Cladoceren des Frischen Haffs," published in 1886, Schoedler gives his original description of D. kalbergiensis under the name Hyalodaphnia kalbergiensis. The statement in regard to an accessory comb is: "Die Schwanzklauen sind ohne secundare Zahnelung."

The presence or absence of the accessory comb is recognized by systematists as a specific character. Hence D. retrocurva cannot be ranked as a variety of D. kalbergiensis but as a distinct species. In his "Notes on Cladocera Crustacea at Madison, Wis.," Birge suggests the propriety of separating the American forms from the European D. kalbergiensis, because of the pectinated caudal claw, and says: "This would probably bear the name D. keruses, Cox."

The note by Cox in the American Monthly Microscopical Journal of May, 1883, in which the name of D. keruses is proposed for this remarkable form is an incomplete description and the illustration is not accurate. The description of the species with the proposed name D. retrocurva was published in August of the preceding year.

It is evident that the form described under the names D. retrocurva and D. keruses is not a variety of D. kalbergiensis, but is species D. retrocurva, Forbes, of which D. keruses, Cox, is a synonym.

NOTE.—Since writing the above upon D. retrocurva the "Revision of the Genus Daphnia," by Jules Richard of Paris, has been published, in which D. retrocurva is recognized as a species because of pigment-spot and caudal claw characters, and D. keruses as a synonym of it.

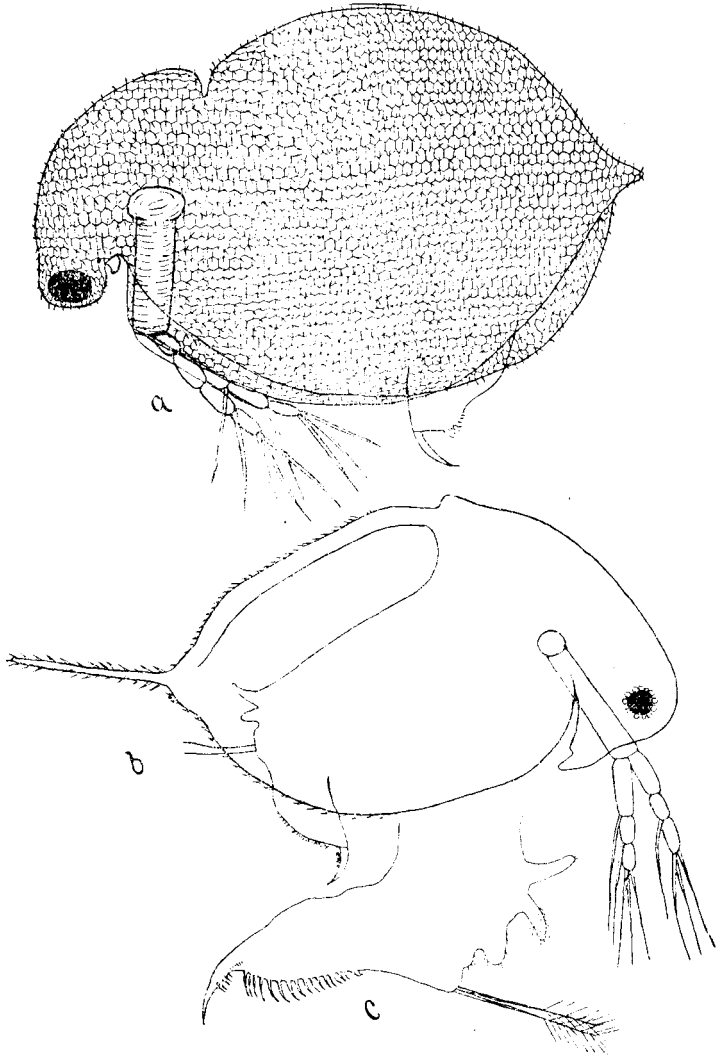

Fig. 5. (*a*) Ceriodaphnia acanthinus, n. sp. (*b*) Daphnia hybus, n. sp. (*c*) Daphnia hybus, post abdomen.

NOTE—The reticulations in *a* are somewhat too regular.