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A Key to Species of Cyclops in Iowa

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A KEY TO SPECIES OF CYCLOPS IN IOWA

MALCOLM McDONALD

The genus *Cyclops* is one of the most common of the microcrustacea, and it occurs in almost every body of fresh water. Apparently because of this universality it has developed a wide variety of species and forms which are very difficult to distinguish from each other. For any study of ecological or geographical distribution of the genus, specimens must be identified as to species and subspecies. As an aid to such studies the following key has been compiled. This is not a field key in the sense that it can be used for field identification, but it will serve for identification without dissection of the animal, for the common species known to occur in Iowa.

The nomenclature of this key is the same as that in Ward and Whipple's "Fresh-water Biology." The tendency among recent investigators is to use a taxonomic system which splits the genus into a number of smaller genera, but for the present purpose this may be disregarded. The key includes species of *Cyclops* collected by the author during the past two years and a few reported by Stromsten in 1920.¹ Several species of uncertain status reported by Stromsten have not been included. These are *C. affinis*, *C. macrurus*, *C. fluviatilis*, and *C. insignia*.

This key suffers the fault of all others, in that the immature forms, which are the most abundant, cannot be identified. One essential character used for identification is the number of segments in the antennae, and since this is one of the last characters which are attained during development, identification of immature specimens is usually possible only after adults present in the same sample have been identified. Then the identification may be made on the basis of other characters by comparison with the known adults. The habitats noted are of two types: (1) "shallow water" indicates small ponds or the shore region of lakes, (2) "limnetic" indicates the open water of lakes, and in this case that of Lake West Okoboji. The length given is from the tip of the head to the end of the furcal stylets of the female. The males are smaller.

External morphology of *Cyclops* — Antennae with eight to

¹ Frank A. Stromsten — Copepoda of the Okoboji Region, Proc. Ia. Acad. Sc., Vol. XXVII, 1920, pp. 269-270.

EXPLANATION OF PLATES

(All drawings of abdomens and antennae—X110. Fifth feet, stylets, and antennal segments—X485.)

- C. bicuspidatus*
 abdomen—Plate I, 1
 antennae, female—Plate I, 2
 fifth foot—Plate II, 13
 stylet—Plate V, 34
- C. viridis* var. *brevispinosus*
 abdomen, male—Plate I, 3
 antenna, female—Plate I, 4
 fifth foot—Plate II, 14
 stylet, male—Plate V, 36
- C. viridis* var. *americanus*
 abdomen—Plate I, 5
 antenna, female—Plate I, 6
 fifth foot—Plate II, 15
 stylet—Plate V, 35
- C. bicolor*
 abdomen—Plate II, 7
 antenna, female—Plate II, 8
 fifth foot—Plate II, 9
 swimming foot—Plate V, 40
- C. fimbriatus*
 abdomen—Plate II, 10
 antenna, female—Plate II, 11
 fifth foot—Plate II, 12
 swimming foot—Plate V, 39
- C. serrulatus*
 abdomen, female—Plate III, 18
 antenna, female—Plate III, 19
 fifth foot—Plate III, 20
 stylet, female—Plate V, 37
- C. serrulatus* var. *elegans*
 abdomen—Plate III, 21
 antenna, female—Plate III, 22
 fifth foot—Plate III, 23
- C. prasinus*
 abdomen—Plate III, 24
 antenna, female—Plate III, 25
 fifth foot—Plate III, 26
- C. albidus*
 abdomen—Plate IV, 27
 antenna, female—Plate IV, 28
 fifth foot—Plate II, 16
 17th antennal segment—Plate V, 41
- C. leuckarti*
 abdomen—Plate IV, 29
 antenna, female—Plate IV, 30
 fifth foot—Plate II, 17
 17th antennal segment—Plate V, 42
- C. modestus*
 abdomen—Plate IV, 31
 antenna, female—Plate IV, 32
 fifth foot—Plate IV, 33
 stylet—Plate V, 38

Plate I

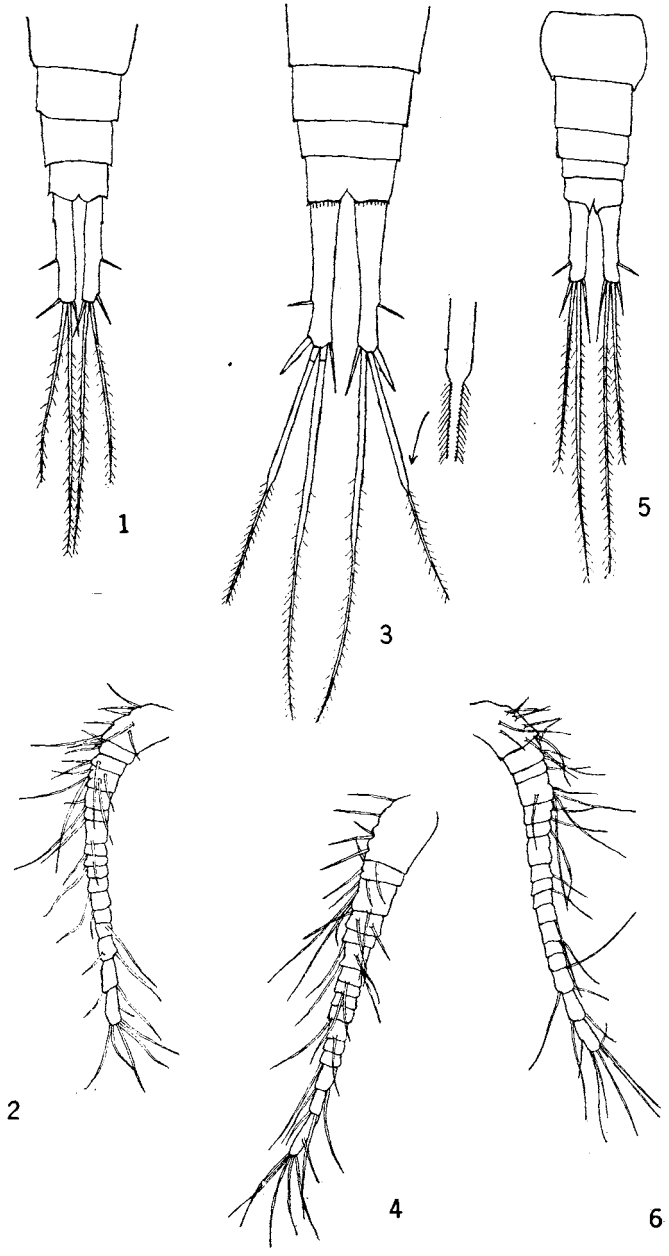


Plate II

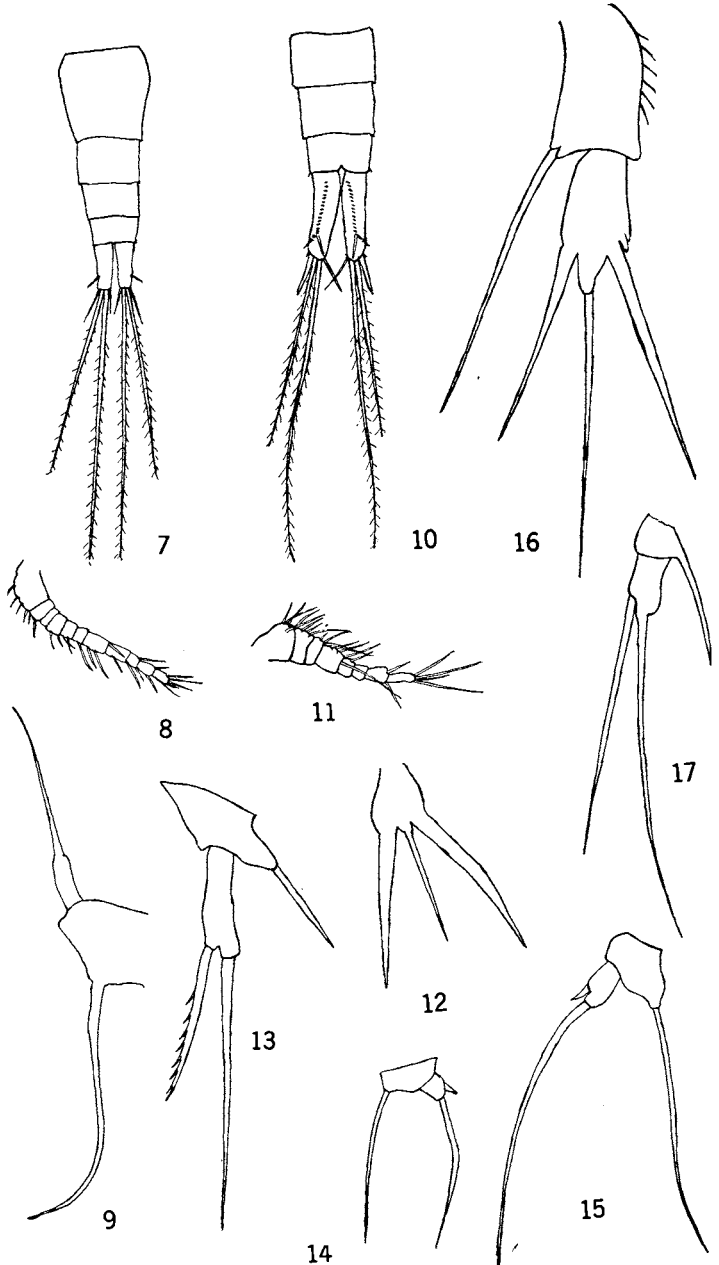


Plate III

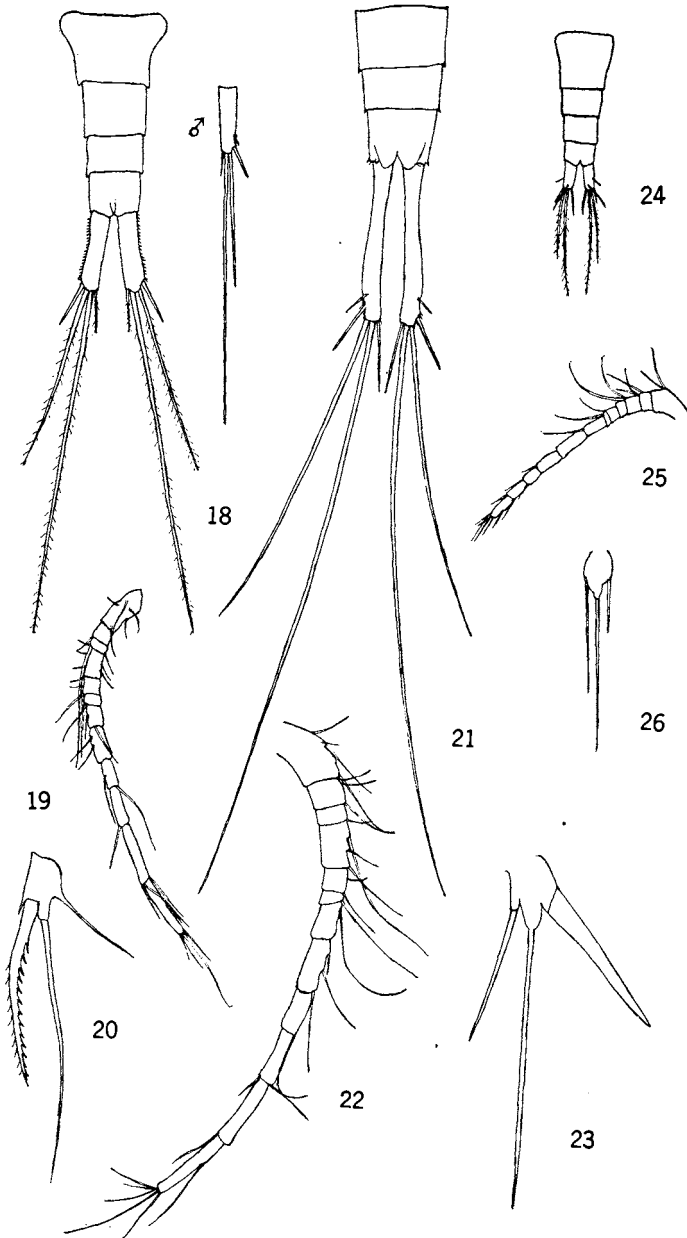


Plate IV

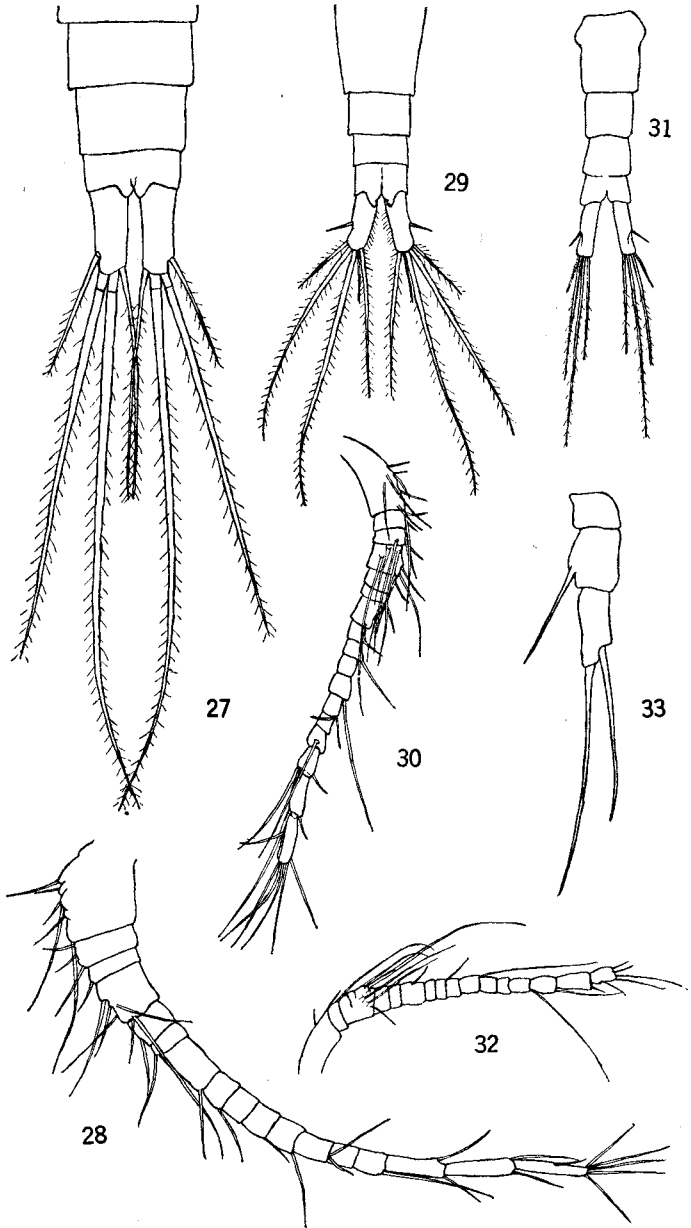
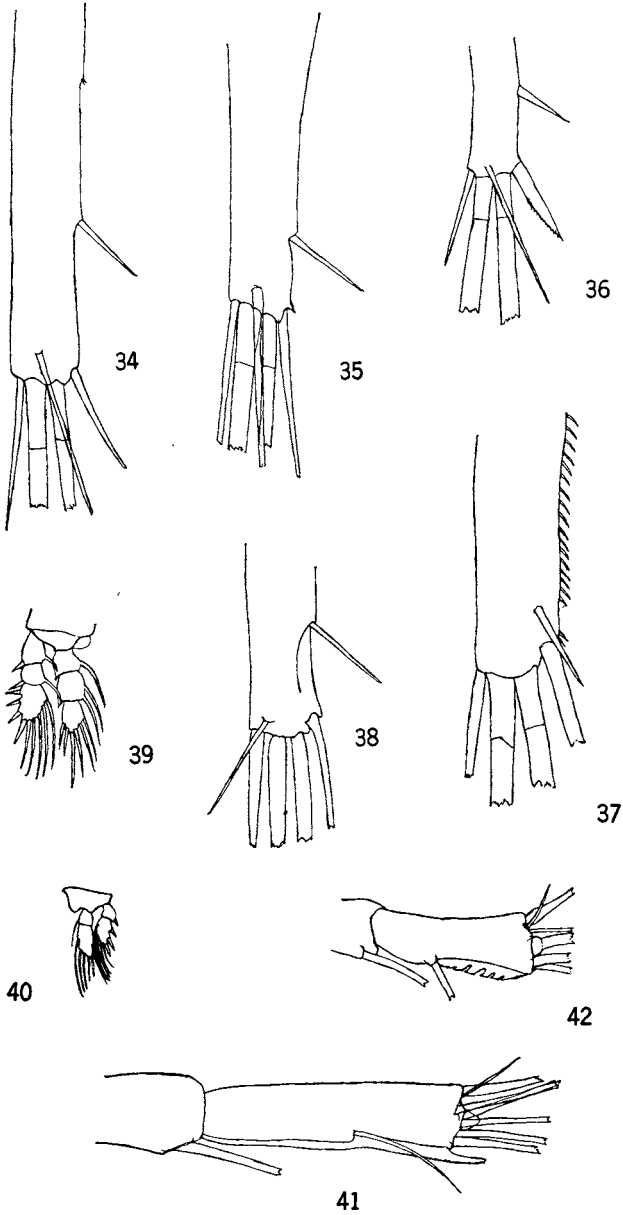


Plate V



seventeen segments, hyaline lamella sometimes present on last segments. Five pairs of swimming feet. The first four pairs are biramous, each branch having three segments, except in *C. bicolor* which has two segments in each branch. Fifth pair of feet rudimentary, one to three segments, very characteristic of species. Abdomen separate from cephalothorax, is tapered, and ends in two branches, the furcal stylets. Each stylet with five terminal setae and one lateral seta on the outer edge. Male with both antennae modified for grasping. Female with two egg sacs.

KEY TO SPECIES OF CYCLOPS

Two large setae on furcal stylets.

Antennae — 17 segments.

Small notch and spine on outer edge of stylet $\frac{1}{4}$ from base. Lateral seta $\frac{1}{2}$ from base of stylet. Shallow water, limnetic. Common. L. 1.0-1.3 mm.
C. bicuspidatus

No such notch or spine. Lateral seta $\frac{2}{3}$ from base of stylet.

Outer terminal seta of stylet a short broad spine. In males the long terminal setae narrow abruptly $\frac{1}{3}$ from base. Limnetic. L. 1.0 mm.

C. viridis var. *brevispinosus*

Outer terminal seta long and slender. Number of spines on last segment of exopodites of swimming feet 3,4,4,4, respectively. Inner margin of stylets not ciliated. Spine on 2nd segment of 5th foot relatively large. Shallow water. Common. L. 0.9-1.5 mm.

C. viridis var. *americanus*

Outer terminal seta long and slender. Number of spines on last segment of exopodites of swimming feet 2,3,3,3, respectively. Inner margin of stylets ciliated. Spine on 2nd segments of 5th foot very small. (Reported by Stromsten.) 1.2-1.5 mm.

C. viridis

Antennae — 12 segments.

Antennae slender, last three segments very long. Lateral seta near end of stylet.

Stylets serrate on outer margin.

♀ *C. serrulatus*

Stylets not serrate on outer margin.

♂ *C. serrulatus*

This dimorphism not confusing because of ready sexual differentiation. Males and females usually found in same sample. Shallow water. Common. L. 0.8-1.25 mm.

Stylets minutely serrate. Entire animal long and slender. Limnetic. L. 1.6 mm.

C. serrulatus var. *elegans*

Antennae short, relatively stout, last three segments normal. Lateral seta $\frac{1}{2}$ from base of stylet. Limnetic. L. 0.4-0.6 mm.

C. prasinus

Antennae — 11 segments.

Small. Stylets rather short. Lateral seta $\frac{2}{3}$ from base of stylet. All branches of swimming feet with only two segments. Shallow water. Not common. L. 0.4-0.6 mm.

C. bicolor

Easily confused with immature forms of other species. These other forms, however, will show immaturity by indistinctness of antennal segments, indefinite granular appearance of body wall, differences in form of fifth foot, and lack of egg sacs in female or hooked antennae in male.

Average size. Stylets short. Lateral seta near end of stylet. All branches of swimming feet with three segments. (Reported by Stromsten).
L. 1-2 mm. *C. phaleratus*

Antennae—8 segments. Lateral seta near end of stylet. Row of spines down center of stylet. Shallow water. L. 0.6-0.8 mm. *C. fimbriatus*

Three long setae on furcal stylets.

Antennae—17 segments.

Lateral seta near end of stylet. 5th foot with two segments, 2nd segment with three setae.

17th antennal segments smooth or barely serrate. 12th antennal segments with sensory club. Egg sacs standing out from abdomen. Shallow water. Common. L. 1.3-2.0 mm. *C. albidus*

17th antennal segments deeply notched. 12th antennal segments with sensory hair. Egg sacs appressed. (Reported by Stromsten.) L. 2.0 mm. *C. fuscus*

Lateral seta near end of stylet. 5th foot with one segment, armed with one spine and two setae. (Reported by Stromsten.) L. 1.8-2.9. mm.

C. ater

Lateral seta $\frac{1}{2}$ from base of stylet. 5th foot with two segments, 2nd segment armed with two long setae. 17th antennal segments deeply notched. Inner edge of stylets ciliated. Limnetic. L. 1.2-1.3 mm.

C. leuckarti

Antennae—16 segments. Stylets grooved on outside edge for caudal $\frac{1}{3}$, starting from lateral setae. 5th foot three segments. Limnetic. L. 1.25 mm. *C. modestus*

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