The background features a stylized, halftone-style illustration of a natural scene. In the upper left, a sun is depicted with several thick, white, curved rays. To the right, there are several trees with rounded, cloud-like canopies and dark trunks. In the lower right, three fish are shown swimming in the water. The bottom left corner is filled with a pattern of white, wavy lines on a dark background, representing water. The entire scene is rendered in shades of gray with a fine dot pattern.

**A Key to Cladocerans (Crustacea)
of British Columbia: Families
Daphniidae, Sididae,
Bosminidae, Holopediidae,
Leptodoridae and Polyphemidae**

February 1997

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Resources Inventory Committee

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Prepared by
Gordon D. Green
(Royal British Columbia Museum),
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for the Aquatic Ecosystems Taskforce,
Resources Inventory Branch

FEBRUARY 1997

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ABSTRACT

Cladocerans are small crustaceans belonging to the orders, Anomopoda, Ctenopoda, Onychopoda or Haplopoda. This manual provides identification keys for species belonging to the families Holopediidae, Sididae, Daphniidae, Bosminidae, Leptodoridae and Polyphemidae occurring in British Columbia. Species in this key include species reported from British Columbia in the literature, species in the collection of the Royal British Columbia Museum and those in collections made by the B.C. Ministry of Environment Lands and Parks. Some species in the key probably do not occur in British Columbia but are included because one or more authors have reported their presence in the province.

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The Resources Inventory Committee consists of representatives from various ministries and agencies of the Canadian and the British Columbia governments as well as from First Nations peoples. RIC objectives are to develop a common set of standards and procedures for the provincial resources inventories, as recommended by the Forest Resources Commission in its report "The Future of our Forests".

Aquatic Ecosystems Task Force

This key was compiled by Gordon Green, of the Royal British Columbia Museum, Albert Loro, and David Gillan. Illustrations are by Elizabeth J. Stephen.

The authors would like to thank Kelly Sendall of the Royal British Columbia Museum and Jeff Green for assistance with field work during this project. Partial funding was provided by Resources Inventory Committee through Rick Nordin (Water Quality Branch, Ministry of Environment Lands and Parks).

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INTRODUCTION

Cladocerans are small crustaceans belonging to the orders Anomopoda, Ctenopoda, Onychopoda or Haplopoda. Commonly called water fleas, due to their small size and jerky swimming motion, cladocerans are extremely abundant in most freshwater habitats. There are a few estuarine species but this group has not been successful in the oceans. Some species are planktonic living in the open water of lakes, while others live on or near the bottom or on aquatic vegetation. Some species are found primarily in small ponds or saline lakes which lack fish predators.

Cladocerans have a single compound eye and often a smaller secondary eye, the ocellus. A carapace covers the body, including the four to six pairs of thoracic appendages, and is used as a brood chamber. The abdomen and postabdomen (distal to the anus) is generally bent forward under the thorax. The postabdomen bears two large claws used primarily for cleaning debris out of the carapace. Swimming is accomplished by downward strokes of the large second antennae.

There are approximately 150 known species in North America, and it is not uncommon to collect 20 or more species in one small area of lake bottom. A few species are predacious but most are herbivores or detritivores, feeding on phytoplankton, attached vegetation or decaying organic material. In most planktonic species complex movements of the thoracic appendages produce a constant current of water between the valves. Small particles in the water are filtered out by fine setae on the thoracic legs and moved along a groove at the base of legs to the mouth. Although there is some evidence that certain types of food, such as particular types of algae, Protozoa, or bacteria may be selected by some species, it is generally believed that all organic particles of suitable size are ingested without any selective mechanism. When undesirable material or large tangled masses are introduced between the mandibles, they may be removed by spines on the first legs and then kicked out of the carapace by the postabdomen.

An important link in food chains of virtually every inland body of water, cladocerans convert phytoplankton, benthic plants and decaying organic matter into animal tissue that can be used by larger animals. In large lakes they are a major food source for many kinds of fish such as sticklebacks, minnows and young Sockeye salmon. Many aquatic insect larvae and other invertebrates also feed on cladocerans.

Because of their large numbers cladocerans consume vast amounts of organic material, and by reducing the amount of phytoplankton are important in maintaining water clarity in many lakes. Littoral cladocerans are typically the most abundant animals on lake bottoms and are one of the prime converters of decaying organic matter with its associated microorganisms into a form usable by fish and larger invertebrates.

Most cladoceran species can reproduce asexually by parthenogenesis, females producing eggs that develop into young without fertilization by males. As a result, males are not present in the population for much of the year. As long as environmental conditions remain favourable females will continue to reproduce in this manner, producing only female offspring capable of asexual reproduction. If environmental conditions deteriorate due to overcrowding, lack of food or oxygen depletion, eggs are produced that develop into males, and females capable of sexual reproduction. These females have modified carapaces which are thicker and darker dorsally than a regular carapace and produce haploid eggs that must be fertilized by the males. The fertilized egg goes through several cell divisions, the zygote enters a resting stage and cell division stops. The thick dorsal portion of the carapace, the ephippium, containing the resting embryos, is shed when the female next moults. These embryos protected by the ephippium are capable of surviving extended periods of unfavourable conditions such as drying or freezing. In this manner cladoceran populations survive through winter and periods of

drought. When environmental conditions are again favourable the embryos develop and break free of the ephippia. The ephippia are also used as a means of dispersal for many species, being carried by the wind or in the fur, feathers or digestive tracts of animals to new habitats.

Species Included In This Key

Thirty-nine species belonging to six families are included in this key (Table 1). These six families are predominantly planktonic and are commonly found in the inland waters of British Columbia. Three other families the Chydoridae, Macrothricidae and Moinidae are included in the key to families but are not considered in the keys to species. Because males are often not present for examination, characters used in the key are for females except where specifically noted.

Some cladoceran species, especially species in the genus *Daphnia*, show a high degree of morphological variability. Head shape, length of tail spine and size of body may all vary considerably within a species. Although in this key we have tried to illustrate typical specimens, a “typical” form for some species is often hard to determine as morphological characteristics vary according to time of year, presence or absence of certain predators, geographic location etc.

The species included in this key include species reported from British Columbia in the literature, species represented in the collection of the Royal British Columbia Museum, and those in collections made by the B.C. Ministry of Environment, Lands and Parks. Some species in the key probably do not occur in British Columbia but are included because one or more authors have recorded their presence in the province. Most of these reports are probably misidentifications, or European names incorrectly applied to North American species. Since there are usually no specimens to verify or refute the identifications those species are included or synonymies noted. A few species in the key have not been recorded from British Columbia but are included because they have been recorded in areas adjacent to B. C. and may be collected here in the future. Where there is doubt as to the presence of a species in the province it is noted in the key.

Table 1. Cladocerans Included In This Key

Family Bosminidae

- Bosmina coregoni* (Baird, 1850)
- Bosmina longirostris* (O.F. Müller, 1785)
- Bosmina longispina* Leydig, 1860

Family Daphniidae

- Ceriodaphnia acanthina* Ross, 1897
- Ceriodaphnia lacustris* Birge, 1893
- Ceriodaphnia dubia* Richard, 1894
- Ceriodaphnia laticaudata* P.E. Müller, 1867
- Ceriodaphnia megops* Sars, 1862
- Ceriodaphnia pulchella* Sars, 1862
- Ceriodaphnia quadrangula* (Müller, 1785)
- Ceriodaphnia reticulata* (Jurine, 1820)

Daphnia ambigua Scourfield, 1947
Daphnia catawba Coker, 1926
Daphnia galeata Sars, 1864 *mendotae* Birge, 1918
Daphnia laevis Birge, 1878
Daphnia longiremis Sars, 1861
Daphnia magna Straus, 1820
Daphnia middendorffiana Fischer, 1851
Daphnia parvula Fordyce, 1901
Daphnia pulex Leydig 1860, emend. Richard, 1896
Daphnia pulicaria Forbes, 1893, emend. Hrbáček, 1959
Daphnia retrocurva Forbes, 1882
Daphnia rosea Sars, 1862, emend. Richard, 1896
Daphnia similis Claus, 1876
Daphnia thorata Forbes, 1893

Megafenestra nasuta (Birge, 1879)

Scapholeberis mucronata (O.F.Müller 1776)
Scapholeberis rammneri Dumont and Pensaert 1983

Simocephalus exspinosus (Koch, 1841)
Simocephalus serrulatus (Koch, 1841)
Simocephalus vetulus Schfdler, 1858

Family Holopediidae

Holopedium gibberum Zaddach, 1855

Family Leptodoridae

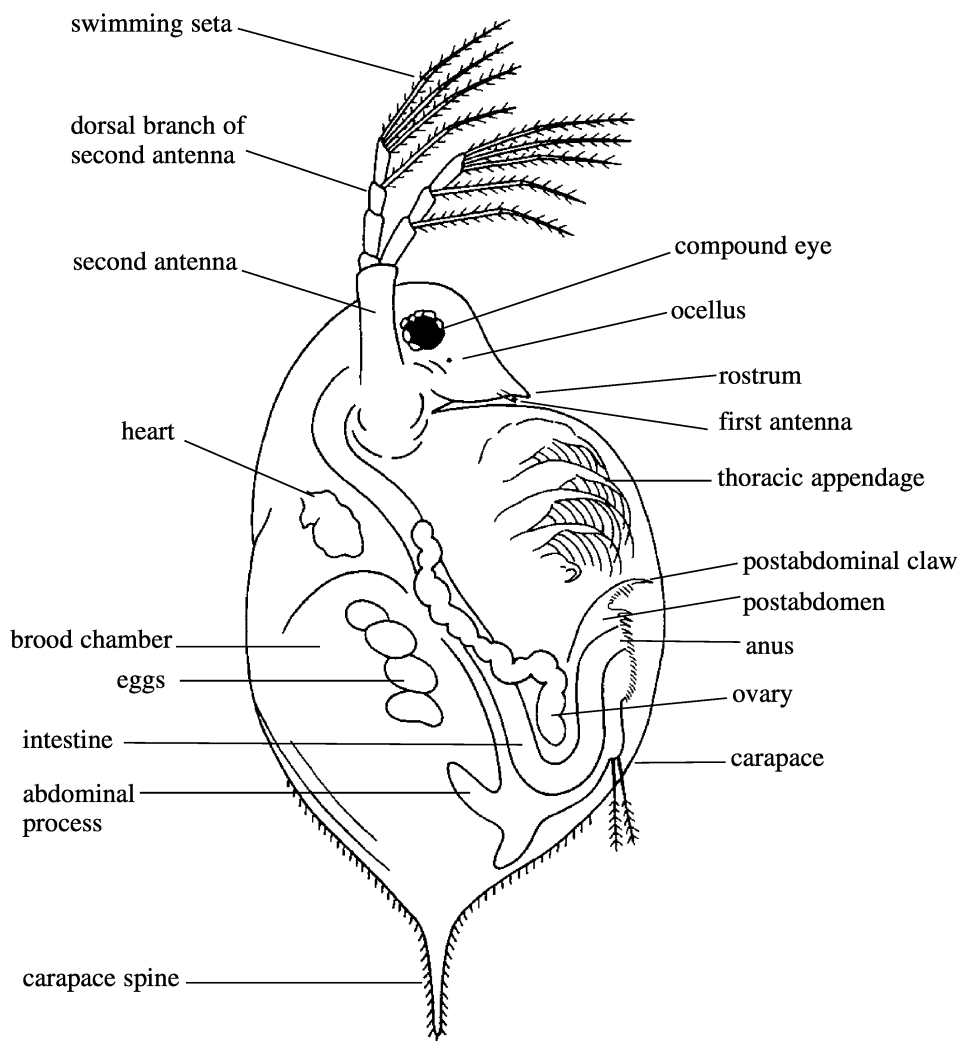
Leptodora kindtii (Focke, 1844)

Family Polyphemidae

Polyphemus pediculus (Linnee, 1761)

Family Sididae

Diaphanosoma brachyurum (Lie'ven 1848)
Diaphanosoma birgei Korínek 1981
Latona setifera (Mueller, 1776)
Pseudosida bidentata Herrick, 1884
Sida crystallina (O.F. Müller, 1776)

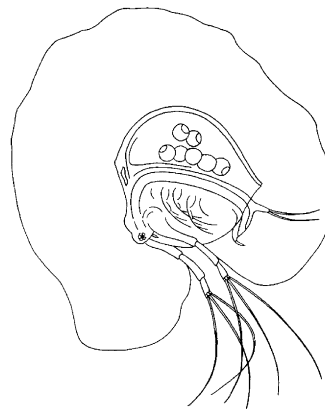


KEY TO FAMILIES

1(a) Thorax, abdomen and thoracic legs covered by the carapace. Brood chamber is a space between the body and carapace; legs foliaceous and not clearly segmented.....2

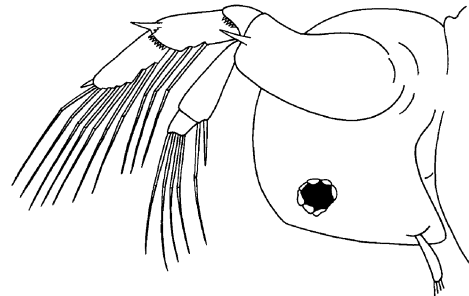
1(b) Thorax, abdomen and thoracic legs not covered by the carapace; the carapace is present as brood chamber only; legs clearly segmented.....8

2(a) Animal enclosed in a large gelatinous mantle. Second antennae (swimming appendages) unbranched in female
**Family Holopediidae**

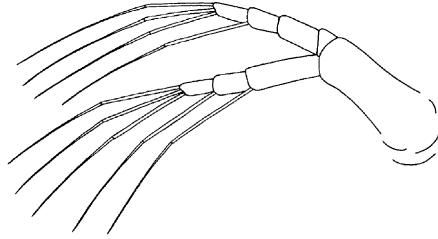


2(b) Carapace not gelatinous. Second antennae branched3

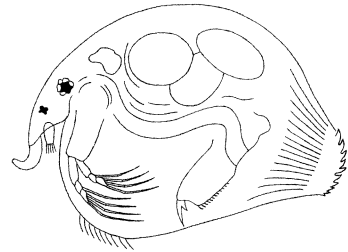
3(a) Second antennae each with at least 15 setae (both branches combined).....**Family Sididae**



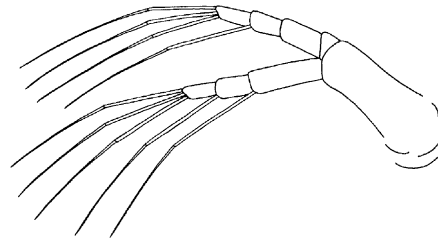
3(b) Second antennae with 10 or fewer swimming setae (counting setae on both branches of antenna)4



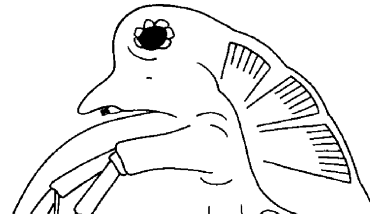
4(a) Both branches of the second antennae with 3 segments; first antennae at least partly covered by flanges on the side of the head
**Family Chydoridae**



4(b) One branch of the second antennae with three segments the other with four (basal segment short); base of first antennae not covered by a flange on the side of the head5

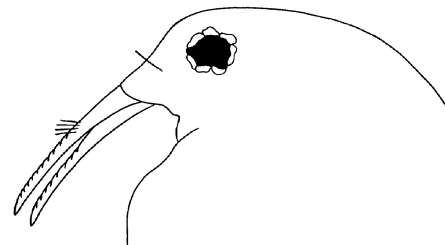


5(a) First antennae less than three times as long as wide and attached to head near the carapace margin.....**Family Daphniidae**



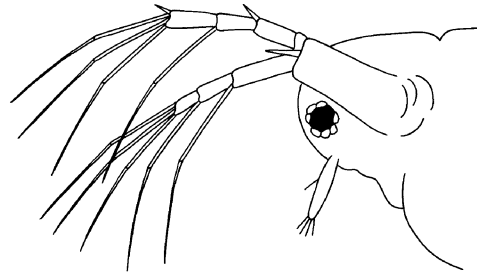
5(b) First antennae more than five times as long as wide; not attached to the head near the carapace margin6

6(a) First antennae rigidly fixed to head, tapered to a point and curved, resembling elephant tusks; first antennae with several sensory hairs about halfway between tip and base, none at tip
 **Family Bosminidae**

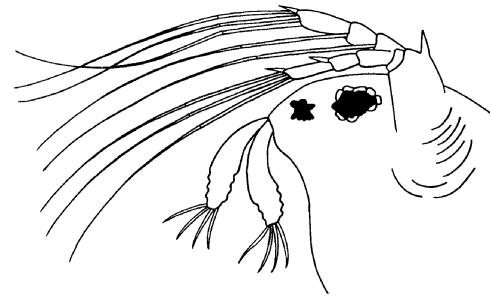


6(b) First antennae blunt and flexible; sensory hairs at the tip of the first antennae7

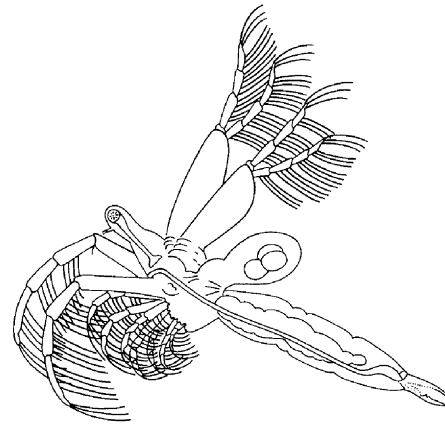
7(a) First antennae attached posterior to compound eye; postabdomen with a row of lateral feathered setae, and a distal bident tooth on postabdominal margin near base of postabdominal claw.....
**Family Moinidae**



7(b) First antennae attached anterior to, or just below, compound eye; no distal bident tooth on postabdominal margin **Family Macrothricidae**



8(a) Body more than four times as long as high; second antenna with about 50 swimming setae, none longer than the branches of the antenna ...
**Family Leptodoridae**



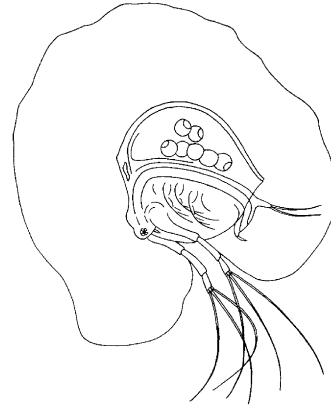
8(b) Body less than twice as long as high; second antennae with about 25 swimming setae, some as long as the branches.....**Family Polyphemidae**



Family Holopediidae

One species in the family, *Holopedium gibberum*
Zaddach, 1855.

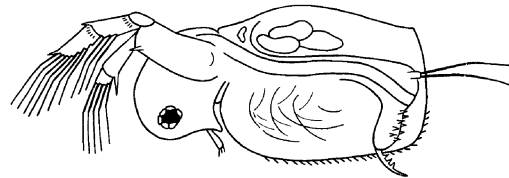
Planktonic habitat. Animal surrounded by a mass of clear jelly attached to the carapace (often lost during collection or sorting). Widespread and common.



Family Sididae

- 1(a) Dorsal ramus of second antennae three segmented; 3-4 mm long; common among aquatic plants in lakes and ponds
.....*Sida crystallina*

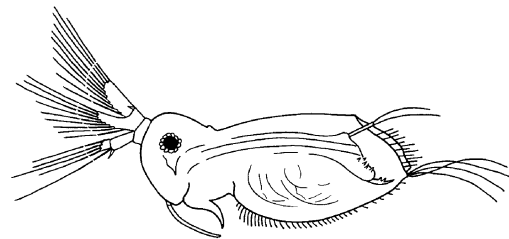
The only known species in the genus *Sida*, *S. crystallina* occurs in lakes and ponds throughout British Columbia. Although it is predominantly littoral, it is also taken in open water plankton tows.



- 1(b) Dorsal ramus of antennae with two segments....2

- 2(a) With lateral expansion on basal segment of dorsal ramus of antenna; with a tongue-like projection on ventral surface of head.....*Latona setifera*

A littoral species occurring in lakes and ponds, *L. setifera* appears to be widespread, but not common, in B.C.

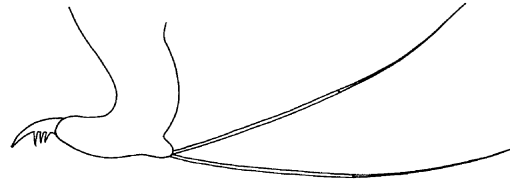


- 2(b) Without lateral expansion of antenna; no tongue-like projection on ventral surface of head3

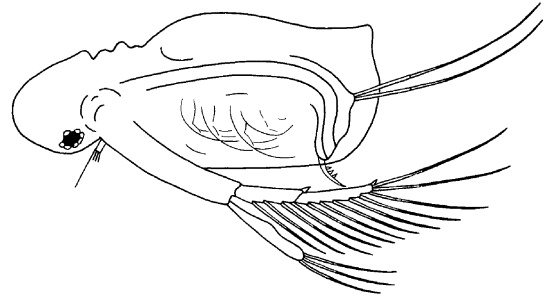
- 3(a) With anal spines on the postabdomen; ocellus present; about 2 mm long
.....*Pseudosida bidentata*

Although this species has been recorded from B.C., it is unlikely that it occurs here. It is known from the southern United States where it occurs in lakes and ponds. There are no known specimens from B.C.

3(b) Without anal spines on the postabdomen; ocellus absent; 0.8-1.2 mm long; common and widely distributed . . . *Diaphanosoma*4

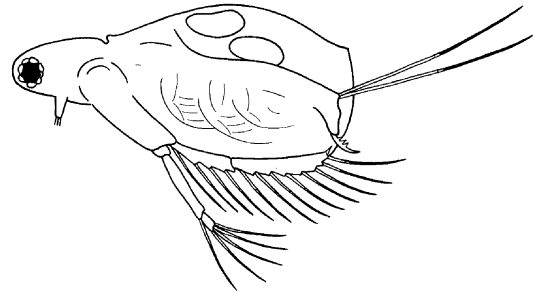


4(a) Head about 2/3 the valve length; eye in the middle of the head near the ventral margin; reflexed antennae reaching or exceeding posterior margin of carapace; limnetic.....
.....*Diaphanosoma birgei*



Widespread and common in the limnetic zone of lakes in British Columbia. Previously recorded as *D. leuchtenbergianum*, this species was described in 1981 by Korinek. *D. leuchtenbergianum* is a European species not occurring in North America.

4(b) Head no more than 1/2 valve length; eye anterior, occupying most of the anterior region of the head; reflexed antennae not reaching posterior margin of carapace; littoral
.....*Diaphanosoma brachyurum*



Widespread and common in ponds and the littoral zone of lakes.

Family Daphniidae

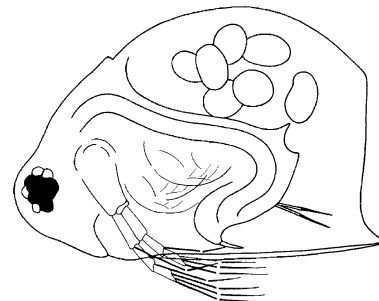
Key to Genera

1(a) Ventral margin of carapace straight and usually black, posterior end of ventral margin extended into a point or spine; usually found in vegetation . . . Subfamily *Scapholeberinae*2



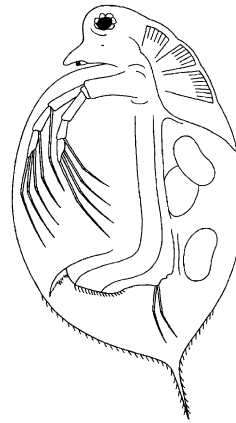
1(b) Ventral margin of carapace rounded and not pigmented3

2(a) Female with a more or less pointed rostrum in lateral view; ventral margin of head sinuate or slightly concave; posteroventral spine short; dorsum of valves with an oval plate (fenestra) situated on the anterior side of the dorsal notch*Megafenestra*



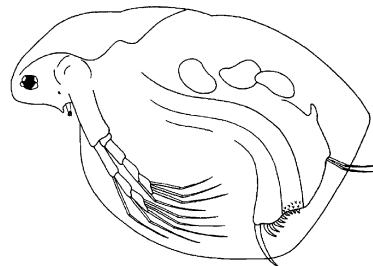
2(b) Female rostrum never acutely pointed in lateral view; ventral margin of head concave; posteroventral spine well developed; no dorsal plate..... *Scapholeberis*

3(a) Adults with a tail spine, usually at least four times as long as broad, and pointed; no cervical sinus*Daphnia*

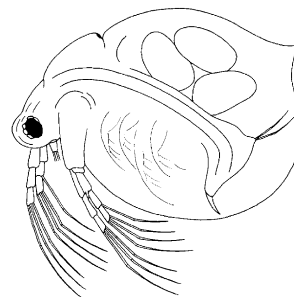


3(b) Adults without a tail spine — or if one is present, it is less than four times as long as broad and rounded; cervical sinus present4

4(a) Rostrum present; second segment of the four-segment branch of the second antenna with an apical spine, the spine about 1/4 as long as the second segment; carapace with transverse striations*Simocephalus*



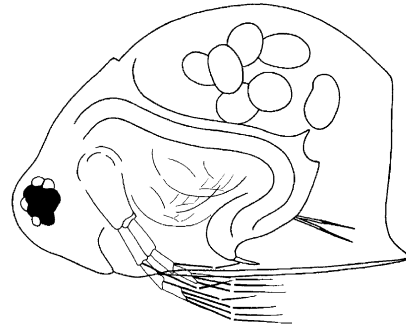
4(b) Rostrum absent; second segment of four-segment branch of the second antenna without an apical spine.....*Ceriodaphnia*



Genus *Megafenestra*

Megafenestra nasuta, is the only species of this genus reported from British Columbia.

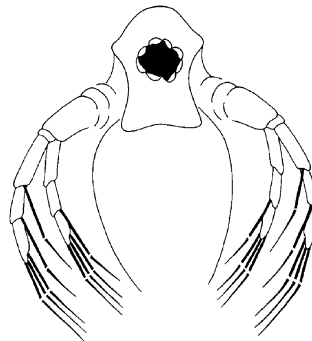
Megafenestra aurita has previously been reported from British Columbia as *Scapholeberis aurita*. However a revision of the subfamily Scapholeberinae by Dumont & Pensaert (1983), concluded that *M. aurita* does not occur in North America. Reports of *M. aurita* are assumed to be *M. nasuta*, which is the only species of *Megafenestra* known to occur in North America. Uncommon in British Columbia.



Genus *Scapholeberis*

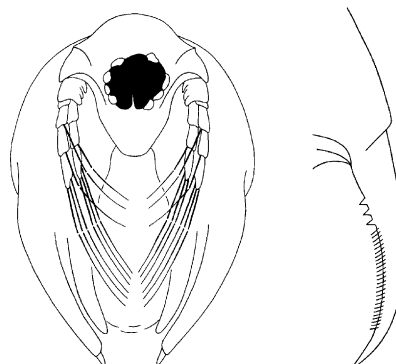
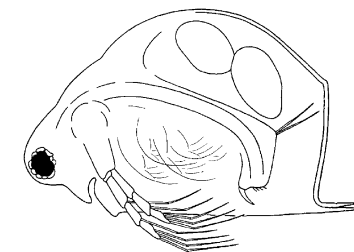
- 1(a) Pecten on postabdominal claw composed of numerous spinules; basal spinules not more robust than others; front of rostrum flaring distally; mucro (posteroventral spine) 1/3-1/2 length of ventral margin of carapace.....*Scapholeberis mucronata*

The range of *S. mucronata* is poorly known because the name has been used incorrectly for other species. In a revision of the subfamily Scapholeberinae, Dumont and Pensaert (1983) report the distribution in North America as arctic and subarctic. Most, perhaps all, reports of this species in B.C. are probably misidentifications.



- 1(b) Pecten of postabdominal claw with 2-5 more strongly built basal spinules; females with rostrum triangularly produced; mucro 1/8-1/4 length of ventral margin*Scapholeberis rammneri*

Common and widespread in B.C. The distribution of this species is poorly recorded due to confusion with *S. mucronata* Müller 1776 and *S. kingi* Sars 1888. In a revision of the Scapholeberinae, Dumont and Pensaert (1983) concluded that *S. kingi* does not occur in North America, and described a new species: *S. rammneri*. All specimens of *Scapholeberis* examined in the collection of the Royal B.C. Museum are *S. rammneri*.

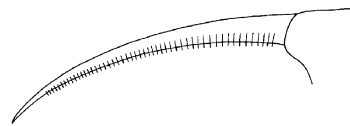


Genus *Simocephalus*

- 1(a) postabdominal claws with a proximal pecten....
*Simocephalus exspinosus*

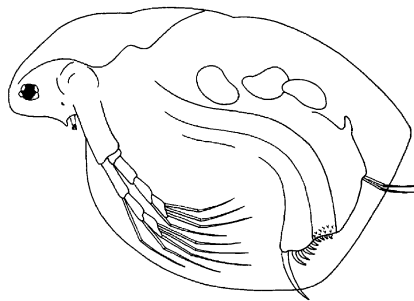
Reported from British Columbia only once (Carl, 1940), in Okanagan Lake. The presence of this species in B.C. needs to be confirmed.

- 1(b) Claws with a row of fine spinules; no proximal pecten2



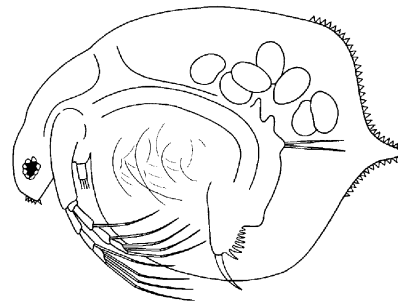
- 2(a) Vertex evenly rounded about the eye and without serrations or spinules.....*Simocephalus vetulus*

In ponds and littoral zones of lakes, often on vegetation. Common and widely distributed.



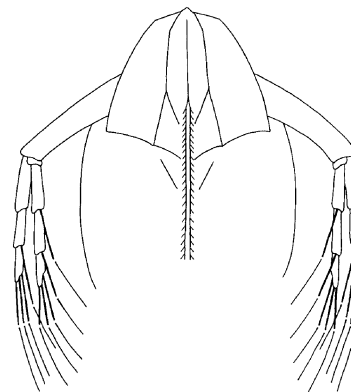
- 2(b) With serrations or spinules in front of or below the eyes; vertex more or less angulate
 *Simocephalus serrulatus*

Occurs in ponds and littoral zones of lakes. Often found attached to plants using sticky secretions produced from a gland at the back of the neck. Common and widespread.



Genus *Daphnia*

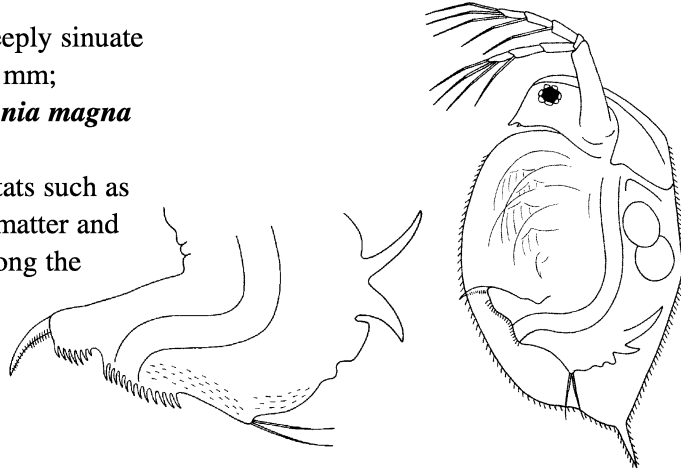
- 1(a) Carapace continues anteriorly along mid-dorsal line as median strip between halves of head shield; heavy-bodied forms with little lateral compression. . . . **Subgenus *Ctenodaphnia*2**



- 1(b) Apex of head shield continues posteriorly along mid-dorsal line onto carapace; large to small forms with marked lateral compression . . .
Subgenus *Daphnia*3

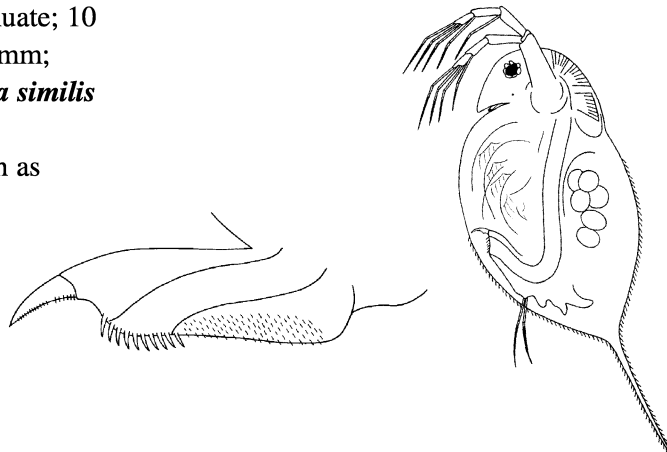
- 2(a) Posterior margin of postabdomen deeply sinuate in lateral view; female length to 5.0 mm; carapace spine usually short....***Daphnia magna***

D. magna is found in marginal habitats such as small ponds with abundant organic matter and saline ponds. Occasionally found along the margins of lakes.



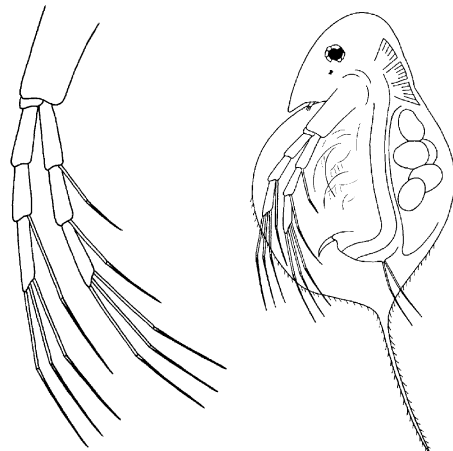
- 2(b) Posterior postabdominal margin not sinuate; 10 to 14 anal spines; female length to 3.0 mm; carapace spine usually long***Daphnia similis***

Usually found in marginal habitats such as temporary, saline or alkaline ponds.



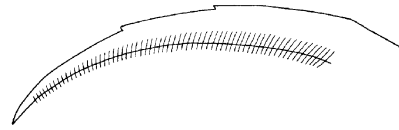
- 3(a) Swimming setae of reflexed antenna reaching or surpassing posterior margin of valves; seta arising from first joint of three-segment ramus of second antenna does not reach end of ramus; a small species***Daphnia longiremis***

D. longiremis prefers cold waters. In the southern parts of its range, including most of B.C., it occurs in larger lakes. During summer when surface waters warm up *D. longiremis* is restricted to deep waters below the thermocline. In cooler northern regions it may occur in smaller water bodies. Widespread in B.C.

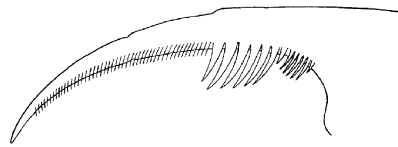


3(b) Swimming setae of reflexed antennae never reaching posterior margin of valves in adult females; seta arising from first joint of three-segment ramus reaches or exceeds end of ramus4

4(a) Teeth of all three pectens of postabdominal claw small and inconspicuous, all about the same length.....5

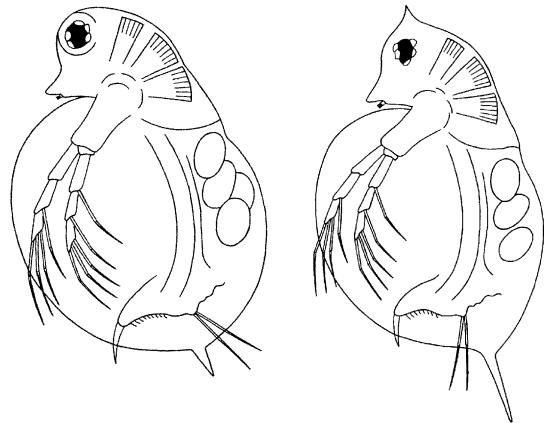


4(b) Teeth of middle and proximal pecten larger than teeth of distal pecten9



5(a) Animal small, head and valves of adult females 1 mm or less in length; head may be drawn out into a small point anteriorly or be rounded; carapace spine less than 1/2 carapace length, usually very short.....*Daphnia ambigua*

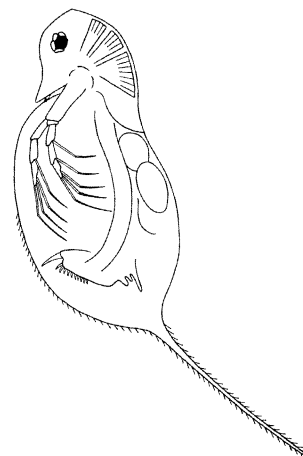
An inhabitant of a variety of habitats from small ditches to lakes.



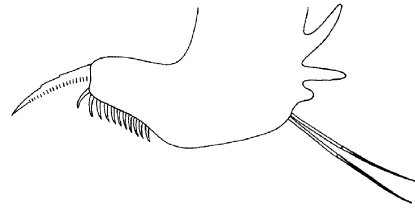
5(b) Head and valves more than 1.25 mm long6

6(a) Second abdominal process in female much smaller than first, usually about 1/4 length of first; carapace spine very long 3/4 length of valves or more.....*Daphnia laevis*

Occurring in the southern regions of North America, *D. laevis* has been reported along the west coast as far north as “Puget Sound” in Washington State (Brooks, 1957). Although there are no specimens known from B.C., it is possible this species will be found here. Lives in ponds and swamps.

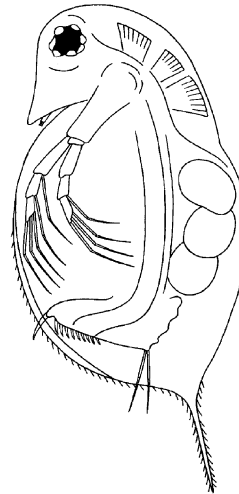


6(b) Second abdominal process in female about half the length of first process.....7



7(a) Anterior margin of head often with low, rounded crest, but never produced into a helmet; head twice as deep as long; optic vessicle very close to anteroventral margin of head; spines on ventral margin on posterior half only*Daphnia rosea*

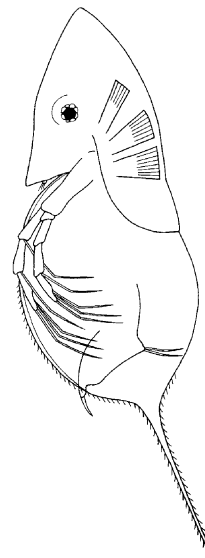
An inhabitant of ponds and lakes, *D. rosea* is widespread and common in British Columbia.



7(b) Anterior margin produced into a helmet so the head is always longer than half its greatest depth; spines on ventral margin of carapace usually extend over more than posterior 1/28

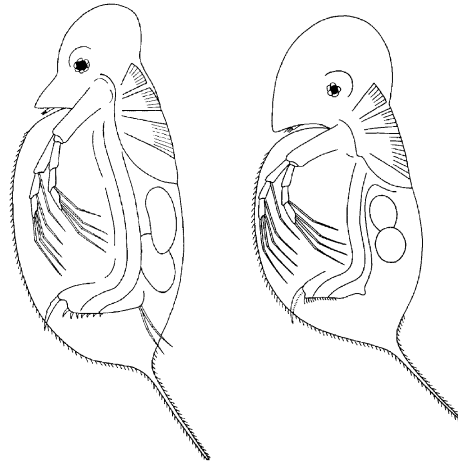
8(a) Helmet usually pointed (sometimes rounded); dorsal margin of head never with concavity at level of most anterior antennal muscles; valves viewed laterally a broad oval, less than 1 1/2 times as long as wide; spinules extend over posterior 1/2 to 2/3 of ventral margin of carapace, never more than 2/3*Daphnia galeata mendotae*

A lake-dwelling species, *D. galeata mendotae* is tolerant of warm temperatures and is often found in the upper layers of lakes. Limnetic.



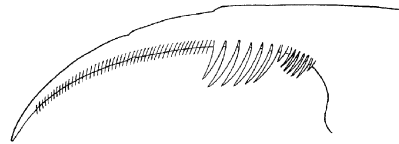
- 8(b) Helmet rounded; dorsal margin of head usually with concavity at level of most anterior antennal muscle; spinules extend over at least posterior 2/3 of ventral margin of carapace.....*Daphnia thorata*

D. thorata is a medium to large species found in larger lakes. Head shape is variable, but a rounded helmet is always present. An atypical form with a very wide helmet is occasionally found in British Columbia lakes. Limnetic.



- 9(a) Teeth of middle and proximal pectens of about the same length, somewhat larger than teeth of distal pecten; ocellus inconspicuous or absent10

- 9(b) Teeth of middle pecten distinctly larger than teeth of either proximal or distal pectens; ocellus present11

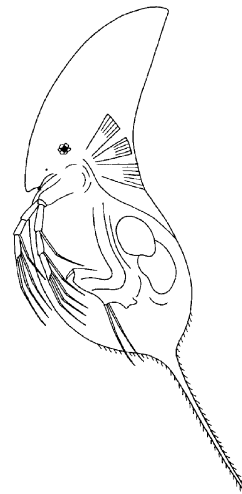


- 10(a) Anterior margin of head with broadly rounded crest, longest in mid-line; rostrum small; helmet rounded; carapace spine less than 1/4 valve length*Daphnia parvula*

An inhabitant of permanent ponds and small lakes, *D. parvula* is widespread across the United States, and has been reported to extend into southern Canada (Brooks 1957).

- 10(b) Anterior margin of head produced into helmet, apex of which is always dorsal to mid-line; carapace spine at least 1/3 length of valve
.....*Daphnia retrocurva*

Uncommon in British Columbia *D. retrocurva* is known from lakes in glaciated regions east of the Rocky Mountains (Brooks 1957) and from Washington and Oregon (Pennak 1989). B.C. collections are from the limnetic zone of lakes.

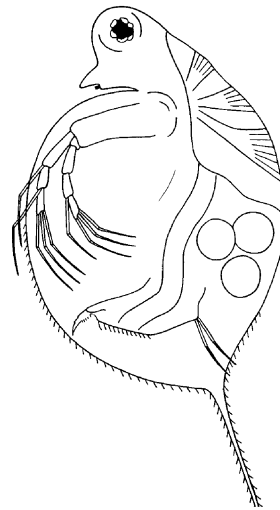


11(a) Ventral margin of head concave; optic vesicle contiguous with margin in lateral view12

11(b) Ventral margin of head sinuate or more or less straight, never strongly concave; optic vesicle usually separated from margin in lateral view...
.....14

12(a) Head longest over optic vesicle; exoskeleton of dorsal part of head often distinctly brown; carapace spine 1/3 to 1/2 of length of carapace; spines of middle pecten of postabdominal claw separated at their bases; length 2.5 to 3.0 mm...
.....*Daphnia middendorffiana*

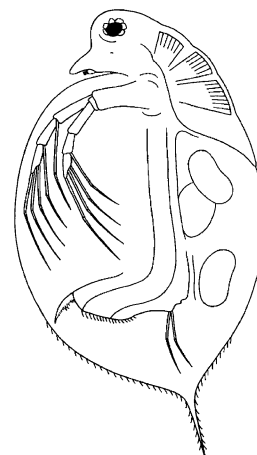
D. middendorffiana is most common in shallow ponds and lakes of arctic and subarctic regions (Brooks 1957; Haney and Buchanan 1987). Uncommon in southern British Columbia it may be more abundant in northern areas of the province. Closely related to *D. pulex*.



12(b) Head longest in mid-line or between mid-line and optic vesicle, with anterior margin of head more or less straight perpendicular to body axis; posterior margin of ventral part of head close to anterior margin of valves; exoskeleton of dorsal part of head not distinctly brown..... 13

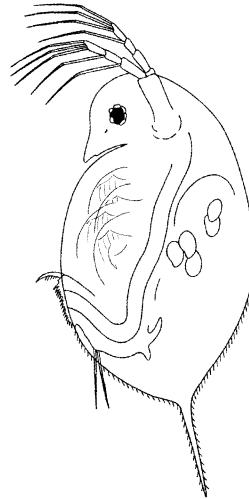
13(a) Reticulations between the antennules and the compound eye nearly symmetrical polygons; carapace spine 1/5 to 1/3 of carapace length in mature specimens; length 1.3-2.2 mm; **in males** dorsal abdominal process long, extending beyond the base of the dorsal abdominal setae; generally in small ponds, occasionally in shallow water along the edge of small lakes....*Daphnia pulex*

The taxonomy of *D. pulex* and related species is very confused and it can be very difficult to distinguish this species from other species with large teeth in the middle pecten of the postabdominal claw, especially *D. pulicaria* and *D. middendorffiana*. The characteristics used to separate these species are extremely variable and many intermediate forms occur. Brooks (1957)



considered *D. pulicaria* a variety of *D. pulex*. Males are easier to distinguish based on the length of the anterior-most dorsal abdominal process, but are often not present for examination. *D. pulex* is a littoral species generally found in small ponds or occasionally in shallow water along the margins of lakes. It is common and widespread.

- 13(b) Some reticulations between antennules and compound eye elongate; rostrum pointed and ventrally prolonged; carapace spine more than 1/3 length of carapace; in males dorsal abdominal process short never reaching the base of the abdominal setae; occurs in lakes and ponds
*Daphnia pulicaria*

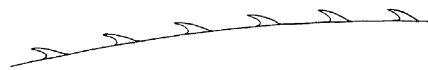


As noted in the previous account *D. pulicaria* can be difficult to distinguish from *D. pulex*. Most authors consider *D. pulicaria* to be synonymous with North American specimens reported as *Daphnia schodleri* Sars (Grogg, 1977; Dodson, 1981; Evans, 1985). A limnetic species, *D. pulicaria* is widespread and common in lakes and permanent ponds of British Columbia.

- 14(a) Spinules on dorsal margin of valves large, distance between spinules less than 1 1/2 times spinule length; postabdomen with 13 to 16 anal spines, all nearly equal length; 4 to 7 teeth (usually 5 or 6) in middle pecten of claw*Daphnia pulicaria*



- 14(b) Spinules of dorsal margin of valves small, distance between spinules at least twice, often three times, spinule length; carapace spine 1/3 to 1/2 valve length; postabdomen with 8 to 11 spines distal spines much larger; middle pecten with 2 to 4 (rarely 5) widely spaced teeth*Daphnia catawba*

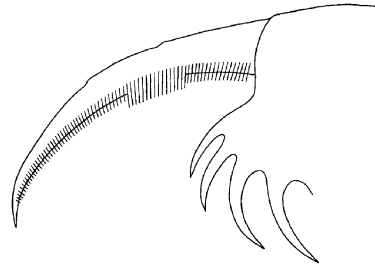


Although reported from British Columbia, this species is probably restricted to eastern regions of North America (Brooks 1957; Pennak 1989); it is doubtful it occurs in British Columbia. In the eastern U.S. it is found in the plankton of small to large lakes (Brooks, 1957).

Genus *Ceriodaphnia*

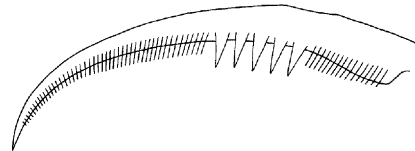
1(a) Central pecten of claw of postabdomen with prominent teeth 2

1(b) Central pecten of postabdominal claw without prominent teeth; with thin spinules, the central pecten of which may be longer and heavier than the distal 3



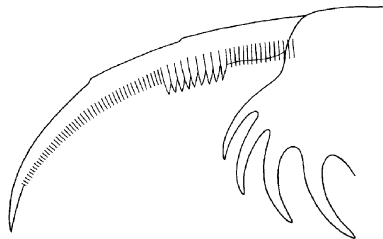
2(a) Central pecten of two to eight teeth with sides evenly tapered to a sharp point, usually separated from each other and from adjacent pectens by a space *Ceriodaphnia reticulata*

A littoral species, *C. reticulata* is found in ponds and shallow water along the margins of lakes throughout British Columbia – often among aquatic vegetation. It generally does not exceed 1 mm in length.

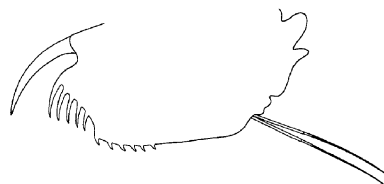


2(b) Central pecten of 8 to 16 narrow teeth with nearly parallel sides and sharp tips, often abutting each other.....*Ceriodaphnia dubia*

Widely reported as *C. affinis* (a junior synonym), *C. dubia* is the most common species of *Ceriodaphnia* in British Columbia. Two forms occur, one with a coarse central pecten on the claw of the postabdomen, and one with a fine central pecten (Berner, 1986). Occurs in the limnetic and littoral zones of ponds and lakes throughout British Columbia.



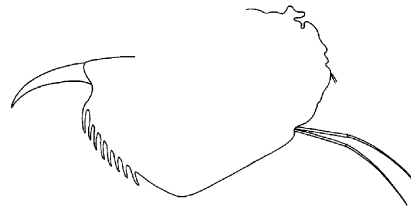
3(a) Postabdomen sharply incised proximal to anus; dorsal margin serrated between midpoint and incision; anal denticles straight, increasing in size distally.....*Ceriodaphnia megops*



Reported in most keys as *C. megalops*, the original spelling of this species was *megops* (Sars 1862) and so takes precedence. Generally found in shallow water with abundant organic matter. *C. megalops* is a rare species. Although reported from B.C., there are no collections from the province available for examination. It has been collected from southern Alaska (D. Berner pers. comm.), so may occur in B.C.

3(b) Dorsal margin of postabdomen not incised4

4(a) Postabdomen very broad at midpoint, obliquely truncated distally; anal denticles short, nearly equal in length; littoral***Ceriodaphnia laticaudata***



If *C. laticaudata* occurs in British Columbia it is very rare. It has been found in Alberta, the western Northwest Territories and a small coastal pond in Oregon, so probably will be found in B.C. There are no specimens from B.C. in the collection of the Royal B.C. Museum, or in the collection of D. Berner (pers. comm).

4(b) Postabdomen not expanded broadly at midpoint5

5(a) Fornices high, usually very extended dorsolaterally6

5(b) Fornices smoothly arched or only slightly expanded laterally7

6(a) Large, heavily reticulated body; very small head and eye***Ceriodaphnia acanthina***

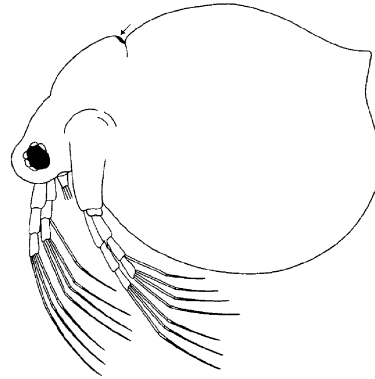
Primarily littoral, but occasionally collected in plankton tows. Widespread but not common in British Columbia.

6(b) Body small and not heavily reticulated***Ceriodaphnia lacustris***

This species has been reported from B.C., but may have been confused with *C. acanthina*. Although it may eventually be found in British

Columbia, there are currently no confirmed B.C. collections. Not known west of the Rocky Mountains (D. Berner pers comm). Limnetic.

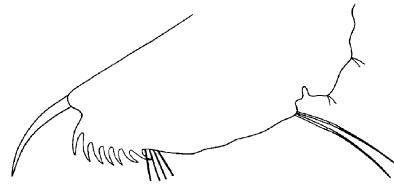
- 7(a) Cervical notch with a fenestra on the anterior surface; postabdominal claw with spinules of central pecten slightly longer than distal pecten; antennule with sensory hair at about midpoint..
***Ceriodaphnia dubia***



The most common species of *Ceriodaphnia* in British Columbia. *C. affinis* is a synonym. Limnetic and littoral in lakes and ponds.

- 7(b) Cervical notch without a fenestra on the anterior surface8

- 8(a) Anal denticles recurved with longer, finer spines between the short spines proximal to the anus; postabdomen tapered moderately beyond midpoint***Ceriodaphnia pulchella***



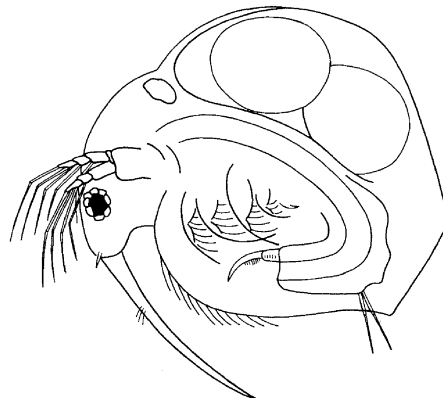
Most collections from British Columbia are from central and northern regions, although this species probably occurs throughout the province. Widely distributed but not common. Limnetic and littoral.

- 8(b) Anal denticles nearly straight, without long, fine spines; postabdomen narrow
***Ceriodaphnia quadrangula***

Widely distributed but not common in British Columbia. Primarily littoral among vegetation but also reported in the limnetic zone.

Family Bosminidae

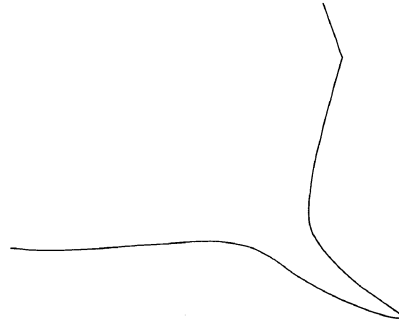
- 1(a) Posterior-ventral angle of carapace rounded or pointed, but not produced into spine
***Bosmina (Eubosmina) coregoni***



Although reported frequently from British Columbia these reports are probably misidentifications based largely on a popular key

by Brooks (1959), who described and illustrated *B. longispina* under the name *B. coregoni*. Lieder (1991) considers *B. coregoni* to be introduced to North America from Eurasia in the early 1960s possibly through a ship's bilgewater in the Great Lakes. Known from eastern North America, it is unlikely this species occurs in B.C. Limnetic.

1(b) Posterior-ventral angle produced into spine2



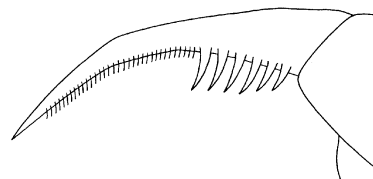
2(a) Postabdominal claw with a proximal pecten of 4 to 12 large spines, increasing in length distally, the distal one much larger than the remaining proximal spines; with a distal pecten of short triangular spines decreasing in size towards the end of the claw; frontal sensory bristle near midpoint between eye and tip of rostrum; common.....*Bosmina (Bosmina) longirostris*

Common and widely distributed in British Columbia.



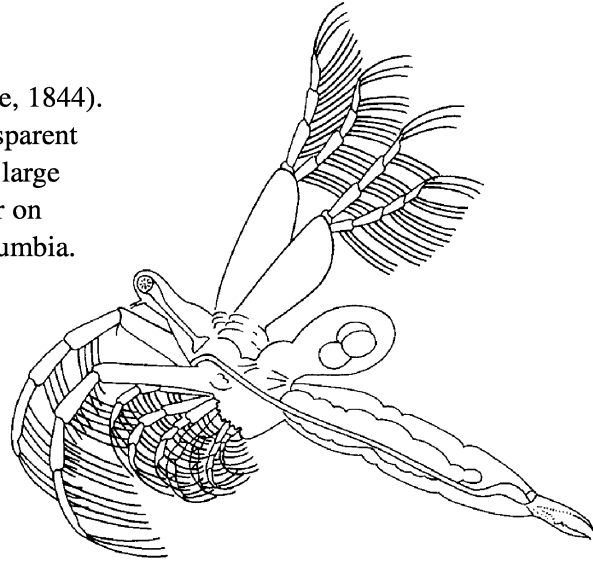
2(b) Postabdominal claw with proximal pecten of spines increasing slightly in size distally; with a distal pecten of very fine setae-like spinules; frontal sensory bristle near tip of rostrum, near or at base of antennule*Bosmina (Eubosmina) longispina*

Postabdominal claws of specimens examined have a row of very fine spinules distally, visible under high magnification. This species has gone in and out of synonymy with *Bosmina (Eubosmina) coregoni*. Brooks (1959) illustrated this species under the name *B. coregoni* and also indicates fine distal spinules on the claw. Not as common as *B. longirostris*.



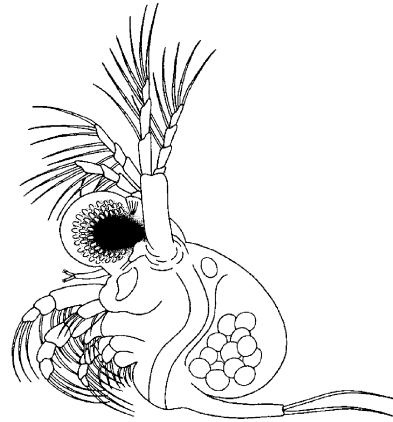
Family Leptodoridae

One species in the family: *Leptodora kindtii* (Focke, 1844). Adult females up to 18 mm long. Animals are transparent and difficult to see. Common in the open water of large lakes and are occasionally found in ponds. Predator on smaller plankton. Widely distributed in British Columbia.



Family Polyphemidae

One species: *Polyphemus pediculus* (L.). Generally planktonic, found in lakes and ponds often near shore or in aquatic vegetation. A predator on protozoans, rotifers and small cladocerans; *P. pediculus* is widespread in British Columbia.



Synonymies

The following species have been reported in the literature as occurring in British Columbia, but are not included in this key. Some are synonyms of earlier names while others are misidentifications caused by applying names of European species to North American species.

Reported Species

Synonym

Family Daphniidae

Ceriodaphnia affinis Lillj.

Ceriodaphnia dubia Richard, 1894

Daphnia arcuata Forbes, 1893

Daphnia pulicaria Forbes, 1893

Daphnia longispina O.F.M.

A European species; various species of *Daphnia* (e.g. *D. rosea* Sars, 1862 and *D. thorata* Forbes, 1893) have been erroneously reported as this species in North America.

Daphnia schodleri Sars, 1862

Daphnia pulicaria Forbes, 1893

Scapholeberis aurita (Fischer, 1849)

Megafenestra aurita (Fischer, 1849); occurring in Europe and Africa this species is not known to occur in North America.

Scapholeberis kingi Sars, 1903

This species is not known to occur in North America. The name has been erroneously used for *S. rammneri* Dumont & Pensaert and possibly for *S. mucronata* O.F.M.

Family Sididae

Diaphanosoma leuchtenbergianum Fischer, 1850

Diaphanosoma birgei Korinek, 1981

Family Bosminidae

Bosmina obtusirostris Sars, 1861

B. coregoni (Baird, 1850). Some North American authors have also used this name for *B. hagmanni* and possibly *B. tubicen*.

LITERATURE CITED

- Berner, D.B. 1986. Taxonomy of *Ceriodaphnia* (Crustacea: Cladocera) in U.S. Environmental Protection Agency Cultures. U.S. Environmental Protection Agency. EPA/600/4-86/032.
- Brooks, J.L. 1957. The systematics of North American *Daphnia*. *Memoirs of the Connecticut Academy of Arts and Sciences* 13:1-180.
- Brooks, J.L. 1959. Cladocera. pp. 587-656 in W.T. Edmondson, ed. *Freshwater Biology*. 2nd Edition. Wiley, New York.
- Carl, G.C. 1940. The distribution of some Cladocera and free-living Copepoda in British Columbia. *Ecol. Mongr.* 10:55-110.
- Dumont, H.J. and J. Pensaert. 1983. A revision of the Scapholeberinae (Crustacea: Cladocera). *Hydrobiologia* 100:3-45.
- Haney, J.F. and C. Buchanan. 1987. Distribution and biogeography of *Daphnia* in the arctic. pp. 77-105 in *Daphnia* edited by R.H. Peters and R. de Bernardi. Mem. Ist. Ital. Idrobiol. Vol. 45.
- Lieder, U. 1991. The *Bosmina kessleri*-like morphotype of *Eubosmina* in Lake Muskoka, Ontario, Canada, as putative interspecific hybrids *Hydrobiologia* 225:71-80.
- Pennak, R.W. 1989. *Fresh-water Invertebrates of the United States*. 3rd edition. Wiley (Interscience), New York. 628 pp.
- Sars, G.O. 1862. *Oversigt af de af ham i Omegnen af Christiania iagttagne Crustacea cladosera*. Forhand. Vidensk.-Selsk. *Christiania* (1861): 144-302.

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