

KEY TO CERCARIAE

- 1a. Tail absent. Cercariaeum 2
 These are the tailless cercariae, produced by trematodes in the families Leucloridiidae, Zoogonidae, Cyclocoeliidae, Lissorchiidae and Mesocoeliidae.
- 1b. Tail present. 3
- 2a. Cercariae develop in branched sporocysts in terrestrial or amphibious snails; excretory vesicle small thin-walled (Fig. 13). Leucochloridiid cercaria
 The sporocysts of some of these contain pigmented brood sacs in the tentacles of snails. The cercariae migrate into the brood sacs. Produced by trematodes in the family Leucochloridiidae.
- 2b. Cercariae develop in rediae in aquatic snails; excretory vesicle has thick cellular wall (Fig. 14). Mutabile cercaria
 This cercaria is produced by trematodes in the family Lissorchiidae. They encyst in an invertebrate intermediate host.
- 3a. Tail short or knoblike. . Microcercous cercariae 4
- 3b. Tail as long as or longer than the body. 7
- 4a. Stylet absent in oral sucker; tail indistinctly set off from the body; excretory vesicle thin-walled (membranous) with two pronglike extensions in the tail (Fig. 15). Obscuromicrocercous cercaria
 These cercariae develop in branched sporocysts in terrestrial snails. Produced by species in the family Brachylaimidae.
- 4b. Stylet present; tail distinctly set off from body; excretory vesicle with cellular wall. 5
- 5a. Tail cupshaped; contains unicellular adhesive glands; cercariae develop in sporocysts (Fig. 16). Cotylomicrocercous (= Cotylcercous) cercaria
 These cercariae develop in snails and encyst in fishes or in arthropods. The tail functions as an adhesive organ. These cercariae are produced by trematodes in the family Opcoeliidae and by some species in the family Dicrocoeliidae.
- 5b. Tail knoblike, unicellular glands absent; develop in a redia in prosobranch snails. 6
- 6a. Tail knoblike and densely spinous, body also spinous (Fig. 17). Chaetomicrocercous cercaria
 This type of cercaria is produced by trematodes in the families Nanophyetidae, Paragonimidae and some species in the family Lissorchiidae.
- 6b. Tail more triangular with a ventral groove or sulcus; body and tail nonspinous (Fig. 18). Sulcatomicrocercous cercaria
 They are produced by trematodes in the family Troglotremitidae.
- 7a. Tail unusually large, base of tail with a cavity which envelopes body of cercaria. Macrocerous cercariae 8
- 7b. Tail not unusually large or if large, body not enveloped by tail, body entirely anterior to tail. 10
- 8a. Tail bulbous and cystlike, contains body of cercaria and long delivery tube; develop in a redia in snails (Fig. 19). Cystophorous cercaria

The body is ejected through the delivery tube after the cercaria is eaten by the second intermediate host. They are produced by trematodes in the families Hemiuridae and possibly some other families in the superfamily Hemiuroidea.

- 8b. Tail not as described above. 9

- 9a. Tail very long and thick, tapering to a point, cavity in base of tail, no delivery tube; cercariae develop in sporocysts in lamellibranch molluscs of the family Sphaeriidae (Figs. 20, 21). Cystocercous cercaria
 The body of this cercaria contains penetration glands, cellular excretory vesicle, stylet and two well developed suckers. They are produced by trematodes in the family Gorgoderidae.

9b. Tail thick with two paddlelike furcae; develop in a redia in prosobranch snails (Fig. 22) Furcocyctocercous cercaria
 These cercariae are eaten by fishes which serve as definitive host. They are produced by trematodes in the families Azygiidae and Bivesiculidae.

- 10a. Tail forked but not unusually large Furcocercous cercariae 11

10b. Tail not forked, tapering to a point (Leptocercous). 17

- 11a. Tail stem almost nonexistent, furcae long, contractile; mouth on midventral surface or body and opening into saclike single cecum; rhynchus or sucker at anterior end of body (Fig. 23) Bucephaloid or Gasterostome cercaria

These cercariae develop in branched sporocysts in lamellibranch molluscs and encyst in fishes. They are produced by trematodes in the family Bucephalidae.

- 11b. Tail stem at least as long as furcae; mouth at anterior end of body and enveloped by an oral sucker or by an anterior organ; two intestinal ceca usually present. 12

12a. Body with dorso-median finfold. Lophocercous cercariae 13

12b. Body without dorso-median finfold. 14

- 13a. Pigmented eyespots present; ventral sucker vestigial or absent; some flame cells in base of tail; pharynx absent but esophagus enlarged in restricted area; develop in a redia. (Fig. 26). Clinostomoid cercaria
 These cercariae are produced by trematodes in the family Clinostomidae. They encyst in fishes and amphibians, eventually developing into large precocial metacercariae that are eaten by piscivorous birds. Adults then develop rapidly in the mouth and esophagus of birds.

13b. Pigmented eyespots absent; ventral sucker absent or vestigial; no flame cells in tail stem; pharynx absent and no thickening of esophagus; develop in a sporocyst (Fig. 24). Lophocercous-apharyngeate cercaria
 These cercariae are produced by trematodes in the family Sanguinicolidae, the blood flukes of fishes. They penetrate the skin and mucous membranes of fishes directly.

13c. Pigmented eyespots absent; ventral sucker absent or vestigial; no flame cells in tail stem; pharynx absent and no thickening of esophagus; develop in a sporocyst (Fig. 24). Lophocercous-apharyngeate cercaria
 These cercariae are produced by trematodes in the family Sanguinicolidae, the blood flukes of fishes. They penetrate the skin and mucous membranes of fishes directly.

13d. Pigmented eyespots absent; ventral sucker absent or vestigial; no flame cells in tail stem; pharynx absent and no thickening of esophagus; develop in a sporocyst (Fig. 24). Lophocercous-apharyngeate cercaria
 These cercariae are produced by trematodes in the family Sanguinicolidae, the blood flukes of fishes. They penetrate the skin and mucous membranes of fishes directly.

13e. Pigmented eyespots absent; ventral sucker absent or vestigial; no flame cells in tail stem; pharynx absent and no thickening of esophagus; develop in a sporocyst (Fig. 24). Lophocercous-apharyngeate cercaria
 These cercariae are produced by trematodes in the family Sanguinicolidae, the blood flukes of fishes. They penetrate the skin and mucous membranes of fishes directly.

13f. Pigmented eyespots absent; ventral sucker absent or vestigial; no flame cells in tail stem; pharynx absent and no thickening of esophagus; develop in a sporocyst (Fig. 24). Lophocercous-apharyngeate cercaria
 These cercariae are produced by trematodes in the family Sanguinicolidae, the blood flukes of fishes. They penetrate the skin and mucous membranes of fishes directly.

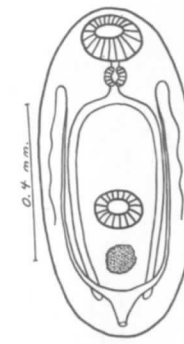


Fig. 13. Leucochloridiid cercariaeum.



Fig. 14. Mutabile cercariaeum.

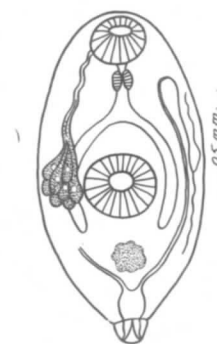


Fig. 15. Obscuromicrocercous cercaria.

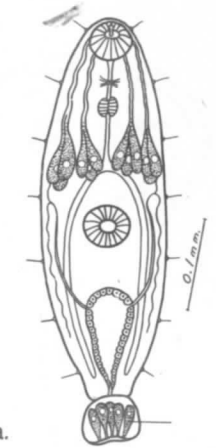


Fig. 16. Cotylomicrocercous cercaria.



Fig. 17. Chaetomicrocercous cercaria.



Fig. 18. Sulcatomicrocercous cercaria.



Fig. 19. Cystophorous cercaria.

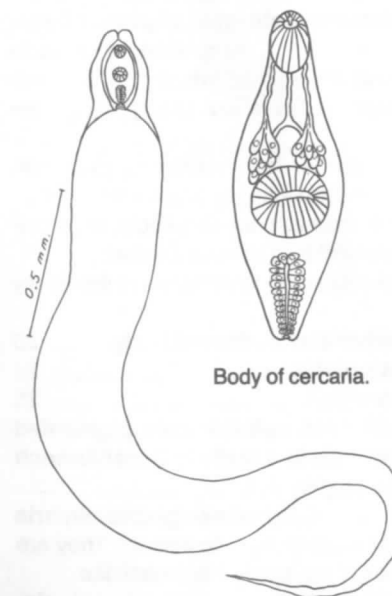


Fig. 20. Cystocercous cercaria.

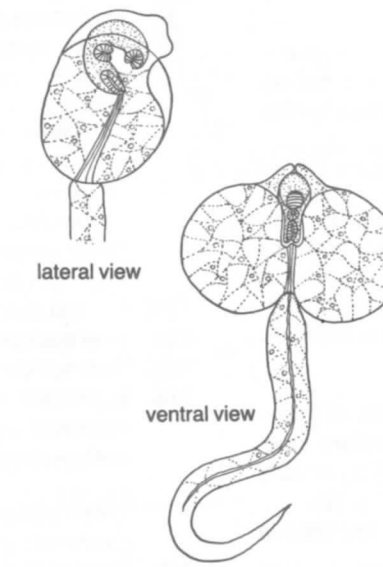


Fig. 21. Cystocercous

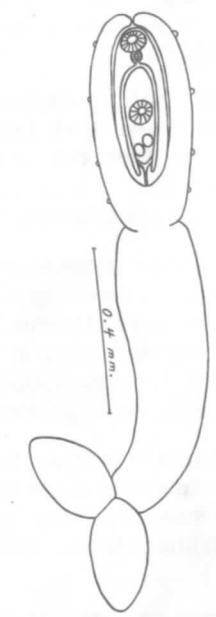


Fig. 22. Furcocyctocercous cercaria.

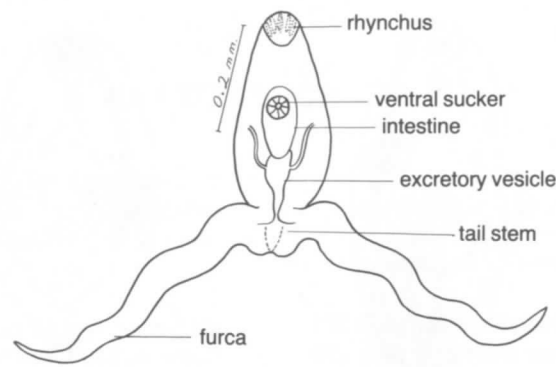


Fig. 23. Bucephaloid cercaria.

14a. Pharynx absent; pigmented eyespots usually present; penetration glands large, of two kinds; tail stem distinctly longer than furcae (Fig. 25).

..... Brevifurcate-apharyngeate cercaria
These are produced by trematodes in the families Spirorchiidae and Schistosomatidae, the blood flukes of reptiles, birds and mammals. They penetrate the skin and mucous membranes of the host directly.

14b. Pharynx present; pigmented eyespots seldom present; penetration glands all of one kind; tail stem only slightly longer than furcae or shorter than furcae. 15

15a. Cercariae very small; excretory vesicle large and U-shaped; ceca short; develop in sporocysts in marine lamellibranchs or prosobranch molluscs. (Fig. 27).

..... Dichotoma cercaria
These cercariae are produced by trematodes in the families Gymnophallidae and Leucochloridiomorphidae. In some species the tail regresses before the cercaria leaves the sporocyst, causing it to resemble a metacercaria. Metacercariae are frequently found in molluscs, encysted or not encysted.

15b. Cercariae not unusually small; excretory vesicle small, not U-shaped; furcae about as long as tail stem; some flame cells in tail stem; develop in sporocysts in snails.

..... Longifurcate-pharyngeate cercaria 16

16a. Ventral sucker present; one pair of longitudinal collecting ducts connected to excretory vesicle, excretory pores at sides of furcae (Fig. 28) .. Strigea cercaria

These cercariae develop in sporocysts in aquatic pulmonate snails. They are produced by trematodes in the families Strigeidae and Diplostomidae.

16b. Ventral sucker vestigial or absent; two pairs of longitudinal collecting ducts connected to excretory vesicle, the median pair fuse in midline of body; excretory pores at tips of furcae, finfolds on furcae (Fig. 29).

..... Vivax cercaria

These cercariae develop in sporocysts in prosobranch snails. They are produced by trematodes of the family Cyathocotylidae.

17a. Tail contains paired lateral fingerlike processes and one terminal process; intestine is a single cecum; body contains many cystogenous glands (bâtonnet cells); pigmented eyespots are present (Fig. 30).

..... Haplospilchnid cercaria
These cercariae develop in sporocysts in marine snails and encyst on vegetation. It is assumed to be the cercaria of trematodes of the family Haplospilchnidae.

17b. Tail without fingerlike processes; two intestinal ceca present; pigmented eyespots present or absent. 18

18a. Ventral sucker absent; pigmented eyespots present; adhesive organs at posterior end of body; excretory system of the stenostomate type with the main ducts united across the anterior part of the body; many cystogenous glands present (Fig. 31)

..... Monostome cercaria
These cercariae develop in a redia and encyst within hemispherical cyst membranes on aquatic vegetation. They are produced by trematodes in the families Notocotylidae, Nudacotylidae and Pronocephalidae.

18b. Oral and ventral suckers present. 19

19a. Ventral sucker large, at posterior end of body; excretory system of the stenostomate type; pigmented eyespots present (Fig. 32).

..... Amphistome cercaria
These cercariae encyst on aquatic vegetation in hemispherical cyst membranes. There are two types of amphistome cercariae:

1. Diplocotylea: Oral sucker has diverticula; main collecting ducts are not connected by a transverse duct.
2. Pigmentata: Oral sucker without diverticula; main collecting ducts connected by a transverse duct.

These cercariae are produced by trematodes of the family Paramphistomidae.

19b. Ventral sucker on midventral surface of body. 20

20a. Oral sucker contains a stylet. 21

20b. Oral sucker without a stylet. 25

21a. Excretory vesicle has thick cellular wall; pigmented eyespots present; develop in a redia in lamellibranch and gastropod molluscs (Fig. 33).

..... Ophthalmoxiphidiocercaria
These cercariae encyst in larval aquatic insects. They are produced by trematodes of the family Allocreadiidae.

21b. Excretory vesicle thin-walled; eyespots absent; develop in sporocysts in aquatic snails.

..... Xiphidiocercariae 22

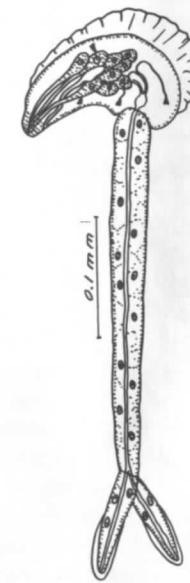


Fig. 24. Lophocercous-apharyngeate cercaria.

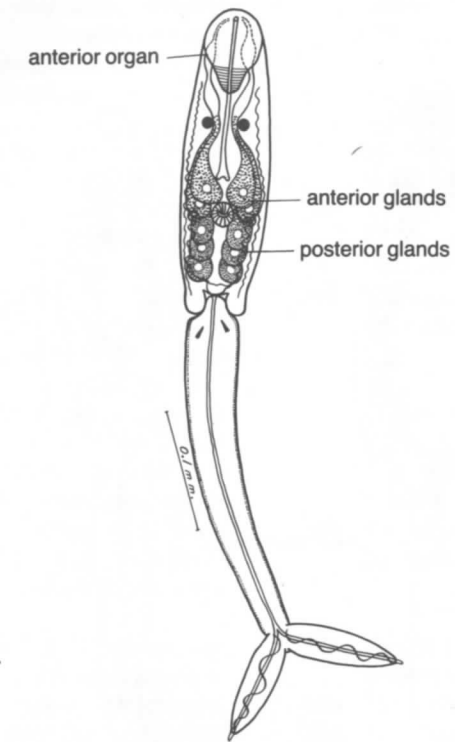


Fig. 25. Brevifurcate-apharyngeate cercaria.

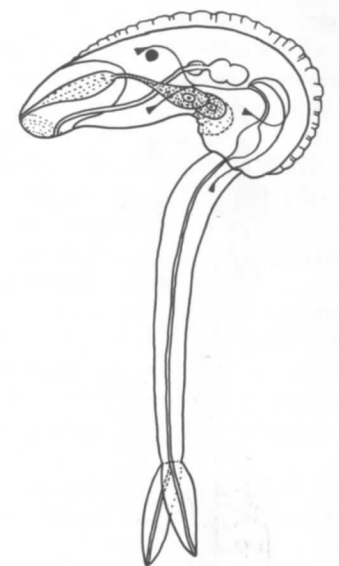


Fig. 26. Brevifurcate-pharyngeate (clinostomoid) cercaria.

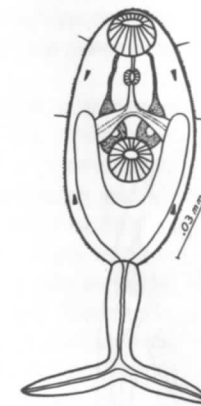


Fig. 27. Dichotoma cercaria.

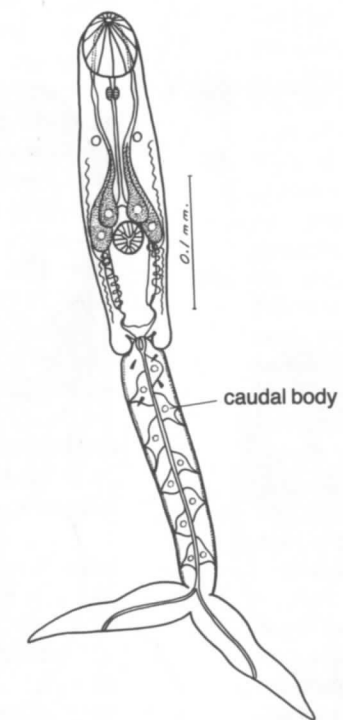


Fig. 28. Longifurcate-pharyngeate (strigea) cercaria.

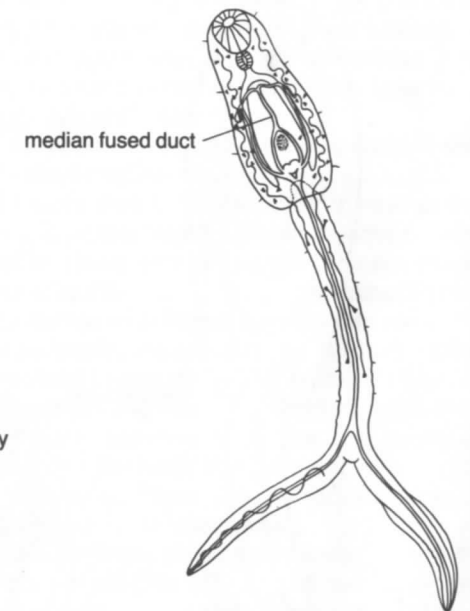


Fig. 29. Vivax cercaria.

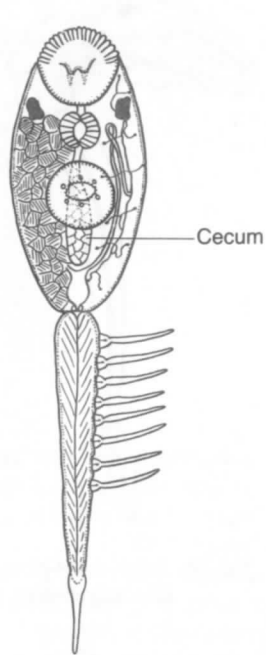


Fig. 30. Haploplanchnid cercaria (from Cable, 1954).

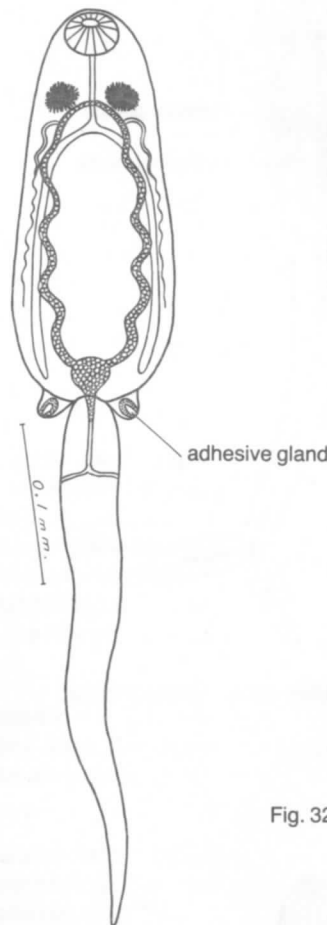


Fig. 31. Monostome cercaria.

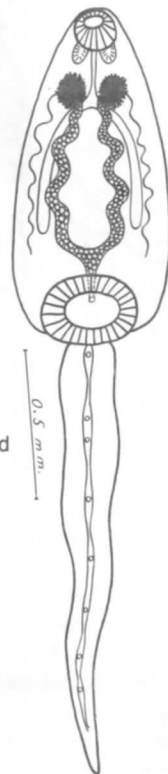


Fig. 32. Amphistome cercaria.



Fig. 33. Ophthalmoxiphidio cercaria.

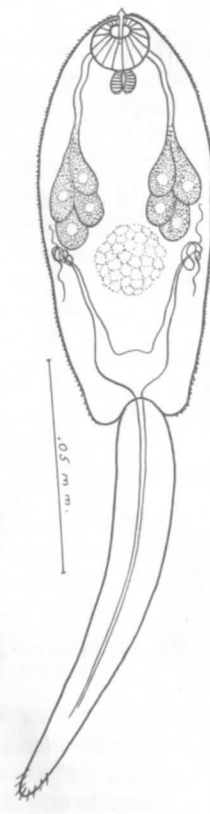


Fig. 34. Ornatae cercaria.

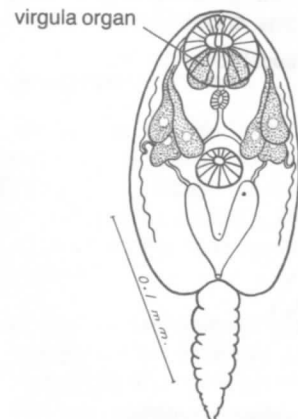


Fig. 35. Virgulate cercaria.

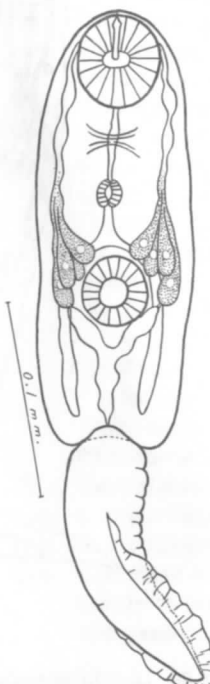


Fig. 36. Ubiquita cercaria.



Fig. 37. Armatae cercaria.

- 22a. Tail has dorso-ventral finfolds; ventral sucker smaller than oral sucker (Fig. 34). Ornatae cercaria
These cercariae are produced by trematodes in the families Macroderoididae and Haematoloechidae.
- 22b. Tail without finfolds. 23
- 23a. Bilobed or pyriform virgula organ located in region of oral sucker; tail shorter than body; ventral sucker smaller than oral sucker (Fig. 35) Virgulate cercaria
The virgula organ contains mucoid secretions which are of use to the cercaria. They develop in sporocysts in prosobranch snails and are produced by trematodes in the families Lecithodendriidae, Allassogonoporidae and Pleurogenidae. Hall (1960) published a key to species of virgulate cercariae.
- 23b. Virgula organ absent; tail about same length as body. 24
- 24a. Ventral sucker vestigial or absent; ceca absent; cercaria usually very small; develop in sporocysts in prosobranch snails; (Fig. 36). Ubiquita cercaria
These cercariae encyst in aquatic arthropods and are produced by trematodes in the family Microphallidae. (See remarks under family diagnosis)
- 24b. Ventral sucker present and at least as large as oral sucker (Fig. 37). Armatae cercaria
Trematodes in the families Plagiorchiidae, Telorchidae, Auridistomidae, Ochetosomatidae and Cephalogonimidae produce this kind of cercaria.
- 25a. Oral sucker surrounded by a spiny collar; stenostomate excretory system; develop in a redia. 26
- 25b. Spiny collar absent; excretory system of the mesostomate type or some modification of that type. 27
- 26a. Tail narrower than body (Fig. 38). Echinostome cercaria
These cercariae encyst in molluscs and other invertebrates. They are produced by trematodes in the family Echinostomatidae.
- 26b. Tail much wider and three to five times as long as body. (Fig. 39). Magnacauda cercaria
These are like the Echinostome cercariae except for the unusually large tail. They are eaten by fishes in which they encyst. Trematodes in the families Echinostomatidae and some Psilostomidae produce this type of cercaria. Nasir and Scorza (1968) published a key to species of these cercariae.
- 27a. Cercariae emerge from snails in clusters with tails intertwined; body like that of echinostome cercaria except for absence of spiny collar (Fig. 40). Zygocercous cercaria
These cercariae encyst in fishes. They are thought to be produced by some species in the families Psilostomidae and Echinostomatidae.
- 27b. Cercariae emerge singly; tails not intertwined; body not echinostome-like. 28
- 28a. Tail has long lateral setae or finlets (Figs. 41,42) .. 29
- 28b. Tail without setae or finlets but may have finfolds. 31
- 29a. Tail with long lateral finlets; excretory vesicle large and U-shaped; eyespots absent; cercariae develop in

- sporocysts in marine lamellibranch molluscs (Fig. 41). Nonoculate trichocercous cercaria (= Fellodistomid cercaria)
The finlets are really clusters of long setae enclosed in a membrane. These cercariae encyst in invertebrates and are thought to be produced by some trematodes in the family Fellodistomidae.
- 29b. Tail has lateral setae, singly or in clusters (Figs. 42,43); excretory vesicle not U-shaped; pigmented eyespots present; develop in a redia 30
- 30a. Tail much longer than body; setae in lateral clusters; excretory vesicle thin-walled (Fig. 42). Oculate trichocercous cercaria (= Lepocreadiid cercaria)
These cercariae develop in rediae in marine prosobranch snails and penetrate a variety of marine invertebrates. They are produced by some species in the family Lepocreadiidae.
- 30b. Tail about as long as body; single setae on tail and body; excretory vesicle has cellular wall (Fig. 43). Homalometronine cercaria (= Anallocreadine cercaria)
- 31a. Tail has dorso-ventral and sometimes lateral finfolds; eyespots present; develop in a redia in snails. 32
- 31b. Tail without finfolds; eyespots absent. 34
- 32a. Tail has dorso-ventral finfolds; excretory vesicle large, with thick cellular (syncytial) wall; ventral sucker vestigial; excretory pores at sides of basal portion of tail. Pleurolophocercous cercaria (= Opisthorchioid)
If lateral finfolds are also present the cercaria is parapleurolophocercous (Fig. 44). Both types develop in a redia in prosobranch snails and encyst in fishes. Species in the families Cryptogonimidae and Opisthorchiidae produce pleurolophocercous cercariae. Both types have been reported for the family Heterophyidae.
- 32b. Excretory vesicle Y-shaped and thin-walled; ventral sucker always well developed 33
- 33a. Ventral finfold small, lateral finfolds wide and supported by filaments; main collecting ducts of excretory vesicle short and without numerous lateral branches (Fig. 45). Megaperid cercaria
- 33b. Tail with dorsal and ventral finfolds and short lateral finfolds or finlets; main collecting ducts of excretory vesicle extend to anterior end of body and have many lateral branches (Fig. 46). Rhodometopa cercaria
This cercaria is assumed to be one type produced by some species in the family Renicolidae. Flame cells are in groups of five or six. These cercariae develop in large yellow sporocysts in prosobranch snails.
- 34a. Tip of tail contains adhesive glands; no excretory duct in base of tail (Fig. 47). Megalurous cercaria
Trematodes in the family Philophthalmidae produce this type of cercaria.
- 34b. Tip of tail without adhesive glands; excretory duct extends into base of tail; excretory pores on margin of tail (Fig. 48). Gymnocephalous cercaria
This cercaria is produced by species in the family Fasciolidae and possibly some species in the family Renicolidae.



Fig. 38. Echinostome cercaria.

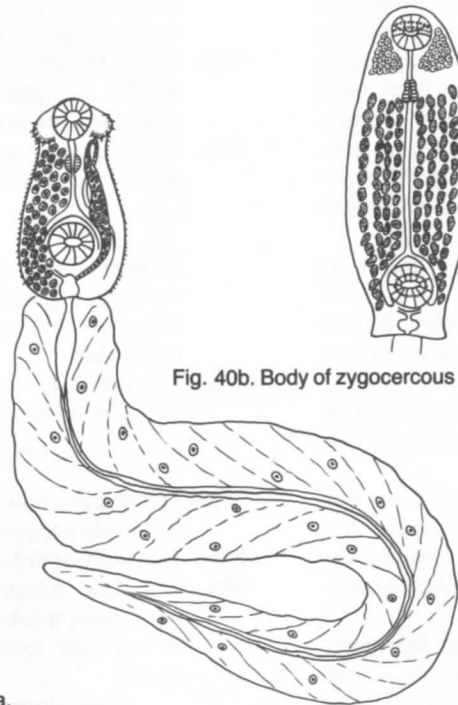


Fig. 39. Magnacauda cercaria.

Fig. 40b. Body of zygocercous cercaria.

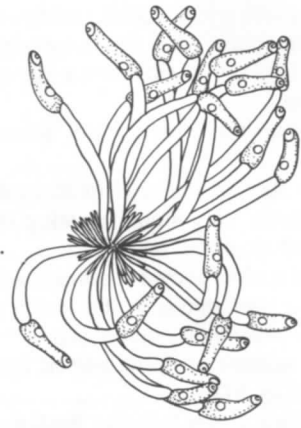


Fig. 40a. Zygocercous cercariae

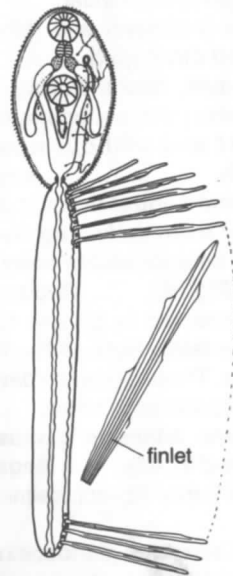


Fig. 41. Nonoculate trichocercous cercaria
(from Cable, 1954).

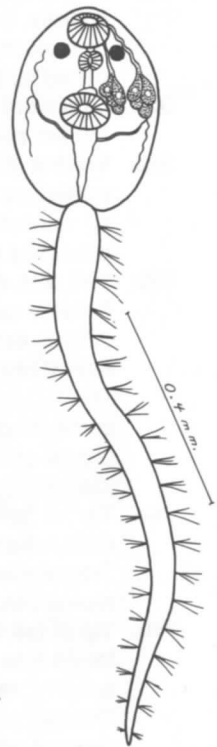


Fig. 42. Oculate trichocercous cercaria.

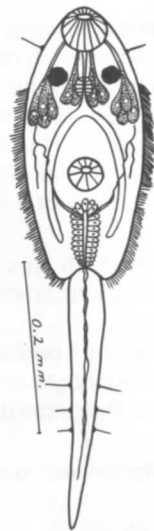


Fig. 43. Homalometronine cercaria.

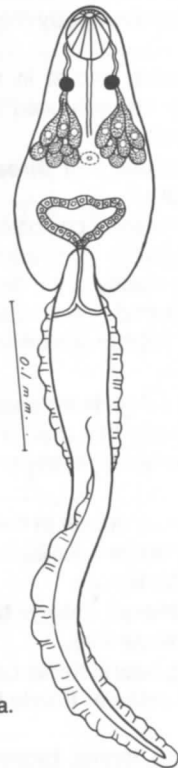


Fig. 44. Parapleurolophocercous cercaria.

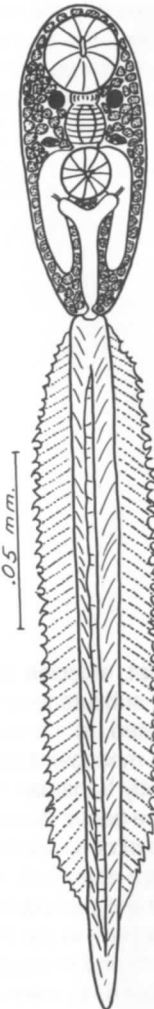


Fig. 45. Megaperid cercaria
(from Cable, 1954).

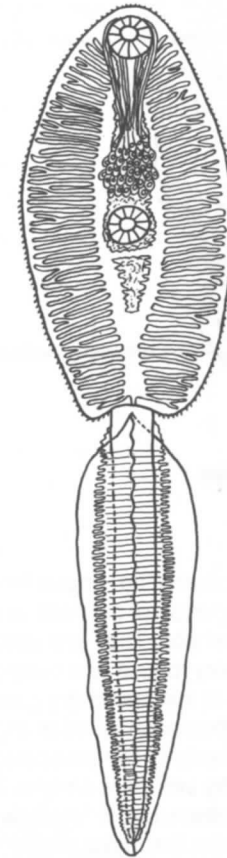


Fig. 46. Rhodometopa cercaria
(from Rothschild, 1936).

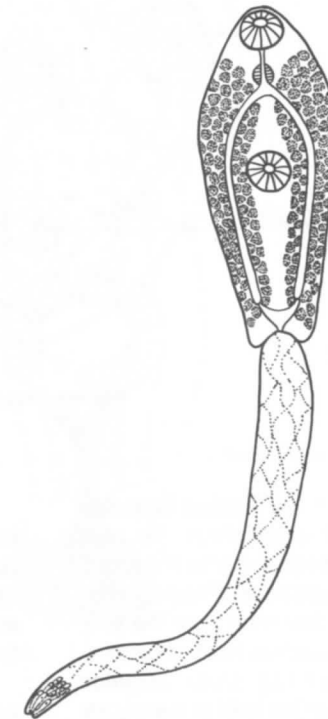


Fig. 47. Megalura cercaria.

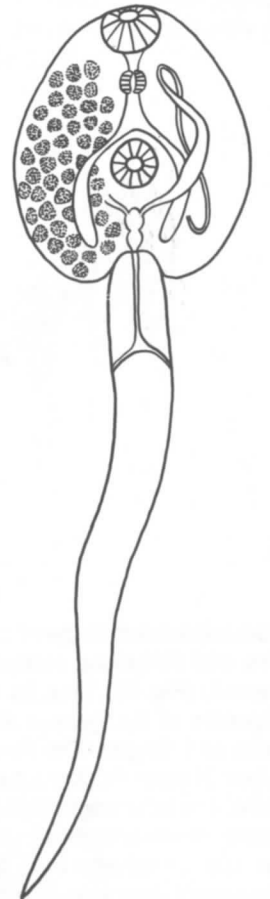


Fig. 48. Gymnocephalous cercaria.