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Brackish water Plathelminthes from Alaska
as evidence for the existence of a boreal brackish water
community
with circumpolar distribution

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Abstract

The brackish water plathelminth fauna of Alaska is compared to European and Canadian brackish water biotopes. 37 species are presented including descriptions of 18 new species. 13 species (35 % of the total number found in Alaska) also occur in Europe and 6 (16 %) in SE Canada. Most of the common species are confined to brackish waters. *Coronhelmis lutheri*, *Halammovortex nigrifrons*, and 3 marine species are common to Alaska, Canada, and Europe. *Maehrenthalia americana* n. sp. occurs in Canada and Alaska but is unknown from Europe. Results corroborate the hypothesis of the existence of a boreal to subarctic brackish water community of Plathelminthes with a circumpolar distribution.

C. Results

Macrostomida

Macrostomum bicurvistyla Armonies & Hellwig, 1987

(Fig. 4, 5)

Localities: Seward. (1) Fourth of July Beach. Lower beach slope with effluent freshwater; coarse sand, gravel, and boulders (25.7.1988). (2) Lowell Point. Sandy sediment with effluent freshwater (2. and 4. 8.1988).

Material: Live observations on several specimens, including drawings and photographs.

Distribution: North Sea (ARMONIES & HELLWIG 1987, HELLWIG 1987)

Unpigmented animals with small eye pigmentations close to each other. With densely packed aggregates of rhabdites. Normally about 1 mm long with tubular intestine, but some individuals of both locations 3 to 4 mm long and with an

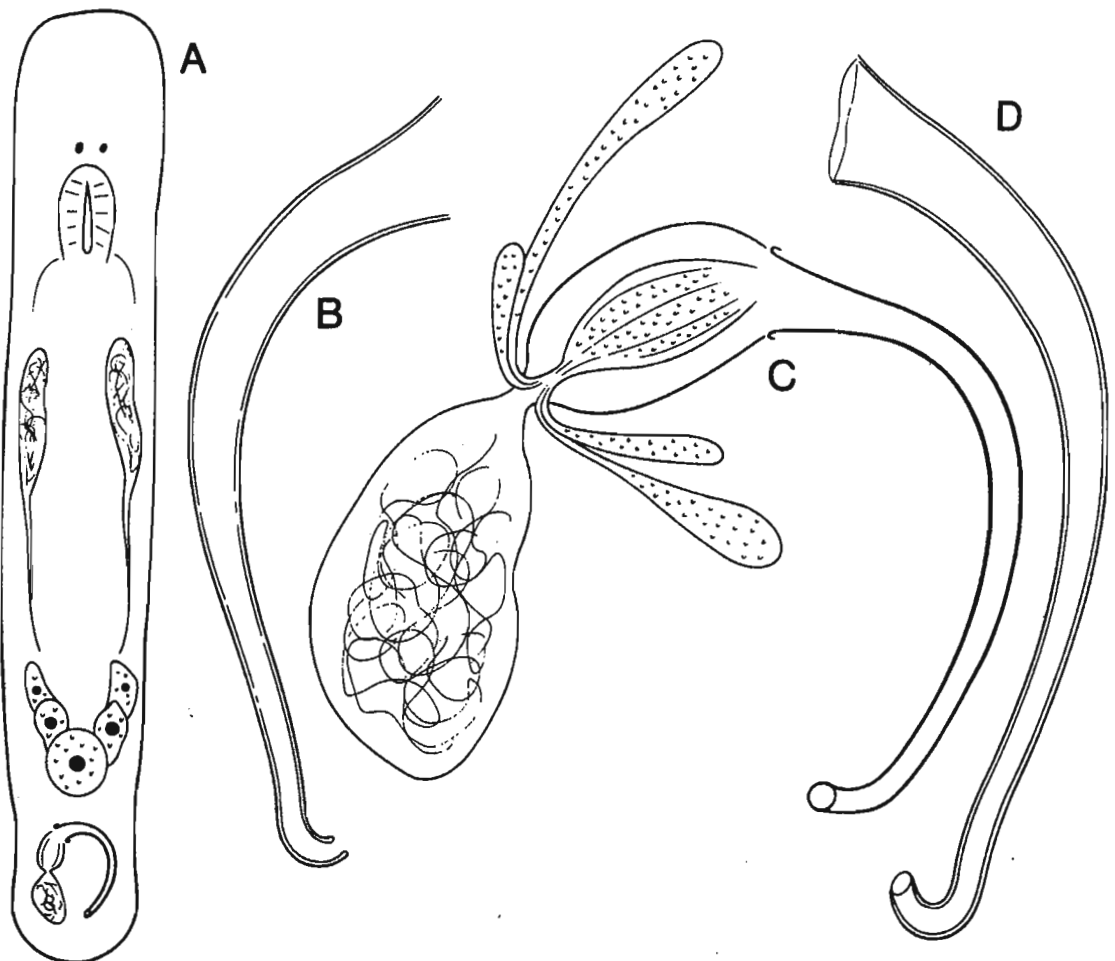


Fig. 4. *Macrostomum bicurvistyla*. A. Habitus. B. Stylet. C. Male organ (Seward: Fourth of July Beach). D. Stylet (Seward: Lowell Point).

intestine with lateral diverticles. The stylets of large and small individuals are identical: Length 120 to 148 μm (diagonally), with stronger coverslip compression up to 158 μm . Proximal opening 20 to 25 μm , strongly compressed up to 41 μm . Distal opening 6 to 7 μm . Median diameter 8 to 10 μm . The stylet is two-fold flexed in the same direction with an average diameter of 10 (9 to 12) μm

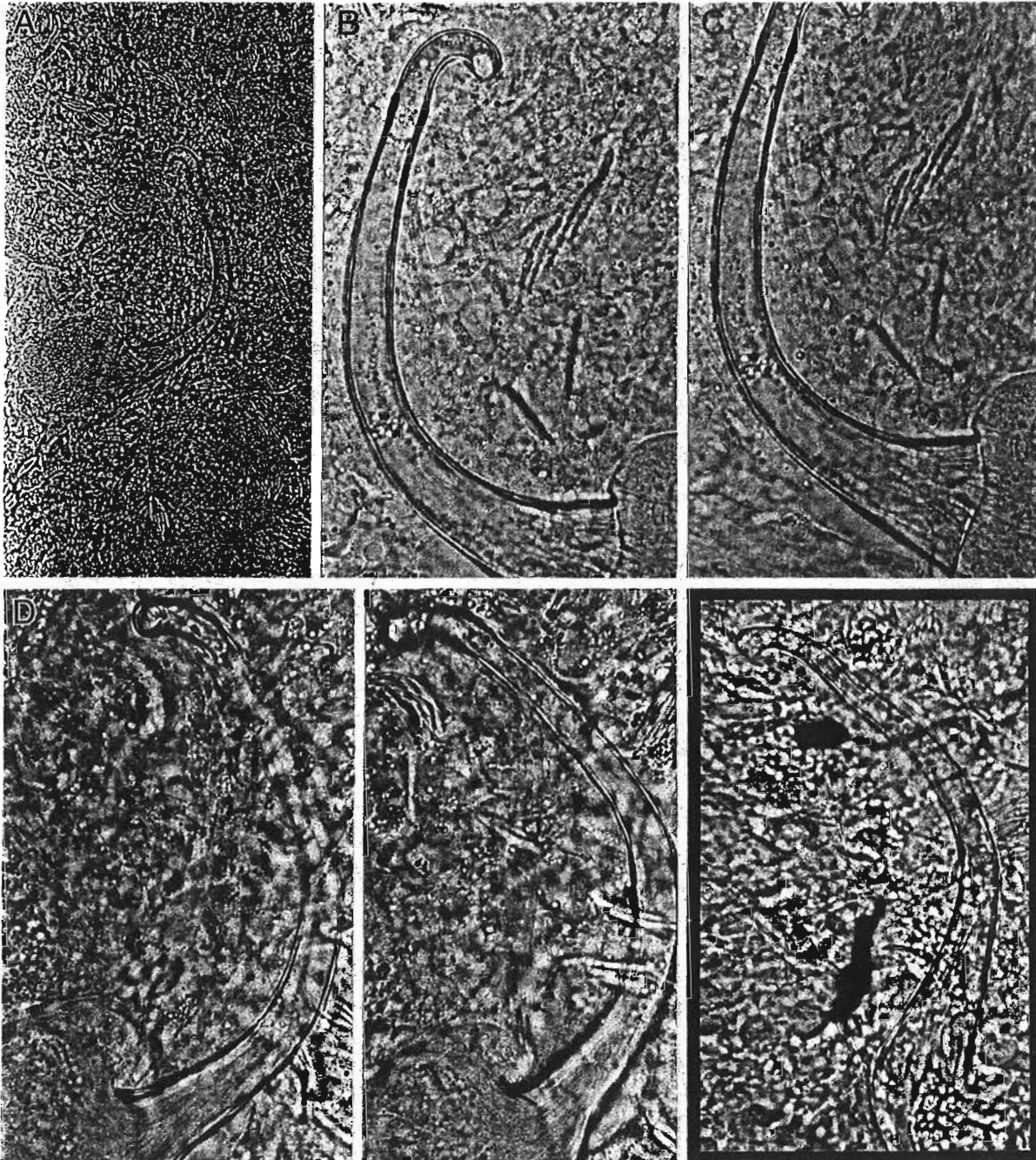


Fig. 5. *Macrostomum bicurvistyla*. A-C. Stylet (Seward: Lowell Point). D, E. Stylet (Seward: Fourth of July Beach). F. Stylet (North Sea: Island of Sylt).

at the first and 6 to 7 μm at the second flexion. At the distal opening the tube is slightly strengthened at one side.

In the North Sea only small (up to 1.5 mm long) specimens have been found up to now. In accordance with the above specimens they have small eye spots and many groups of tightly packed rhabdites. The shape of the stylet is identical, however, the measures of the European animals are slightly smaller: Length 105 to 125 μm , proximal opening 20 μm , diameter 7 μm at the first and 4.5 μm at the second flexion, distal opening 5 μm (only two specimens, cf. ARMONIES & HELLWIG 1987).

Macrostomum curvituba Luther, 1947

(Fig. 6, 7)

Locality: Kotzebue Sound. Medium to coarse sand with gravel at the outlet of a small river. Salinity of the river mouth 10 ‰, Kotzebue Sound 16 ‰ S (8. 8. 1988).

Material: Live observations on five specimens, including drawings and photographs. Additionally five specimens sectioned.

Distribution: North Sea, Baltic Sea (cf. ARMONIES 1987).

Whitish animals 0.7 to 1.2 mm long without pigmented eye spots. Stylet 89 to 91 μm long with a proximal opening of 12 to 15 μm and a distal opening of 4 to 5 μm (21 to 26 and 5 to 7 μm , respectively, in strongly compressed specimens). The shape and size of the stylets conform well with those of European specimens (AX 1951, LUTHER 1960, AX & AX 1970). Examination of the sectioned material states the species identity.

M. curvituba is a brackish water species favouring the oligo- and mesohalini-cum. So far, the species has not been found south of 53° N, presumably because of its preference for temperatures lower than 10 °C (ARMONIES 1987).

Macrostomum extraculum n. sp.

(Fig. 8, 9)

Locality: Niničhik. Lagoon near the Cook Inlet River (locus typicus). Medium sand with moderate amounts of detritus from the shore zone. Salinity 5 ‰, regularly found in several samples (16. 7. 1988).

Material: Live observations on several specimens, including drawings and photographs.

About 1.0 to 1.2 mm long unpigmented specimens. With strong bundles of rhabdites, with paired eye pigmentations. Seminal vesicle ovoid, prostatic vesicle ovoid to spherical. The stylet is a tube of 68 to 72 μm height (3 measurements) which is flexed like a cork-screw. The proximal opening is 18 to 22 μm wide and

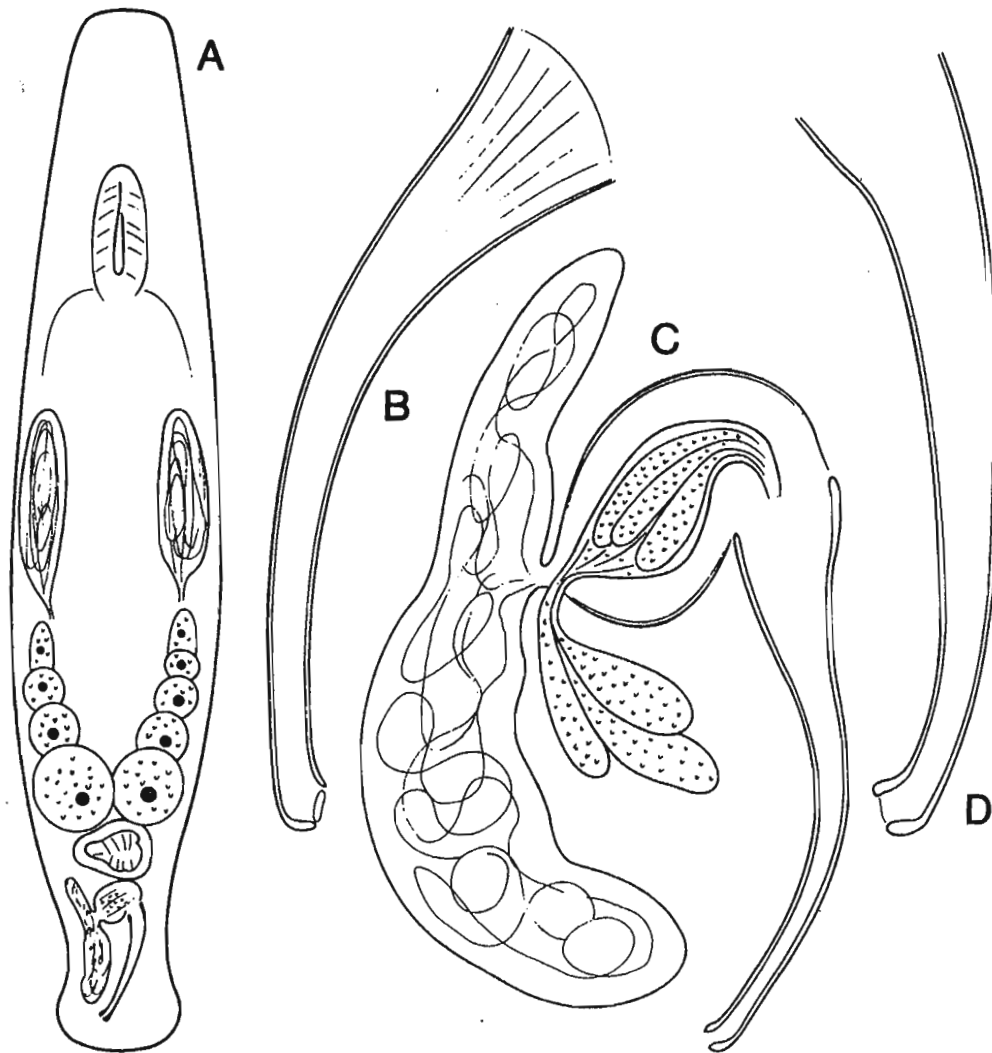


Fig. 6. *Macrostomum curvituba*. A. Habitus and organisation. B. Stylet. C. Male organ. D. Stylet (Kotzebue).

the distal opening $3\ \mu\text{m}$. There is a solid conical enlargement of about $4 \times 6\ \mu\text{m}$ near the distal opening.

Discussion. A stylet formed like a cork-screw and with a distal conical enlargement is unique in the taxon *Macrostomum*. Cork-screw formed stylets also occur in *M. reynoldsi* Ferguson, 1939, and *M. retortum* Papi, 1951. A lateral clubshaped enlargement of the distal part of the stylet is also found in *M. mediterraneum* Ax, 1956.

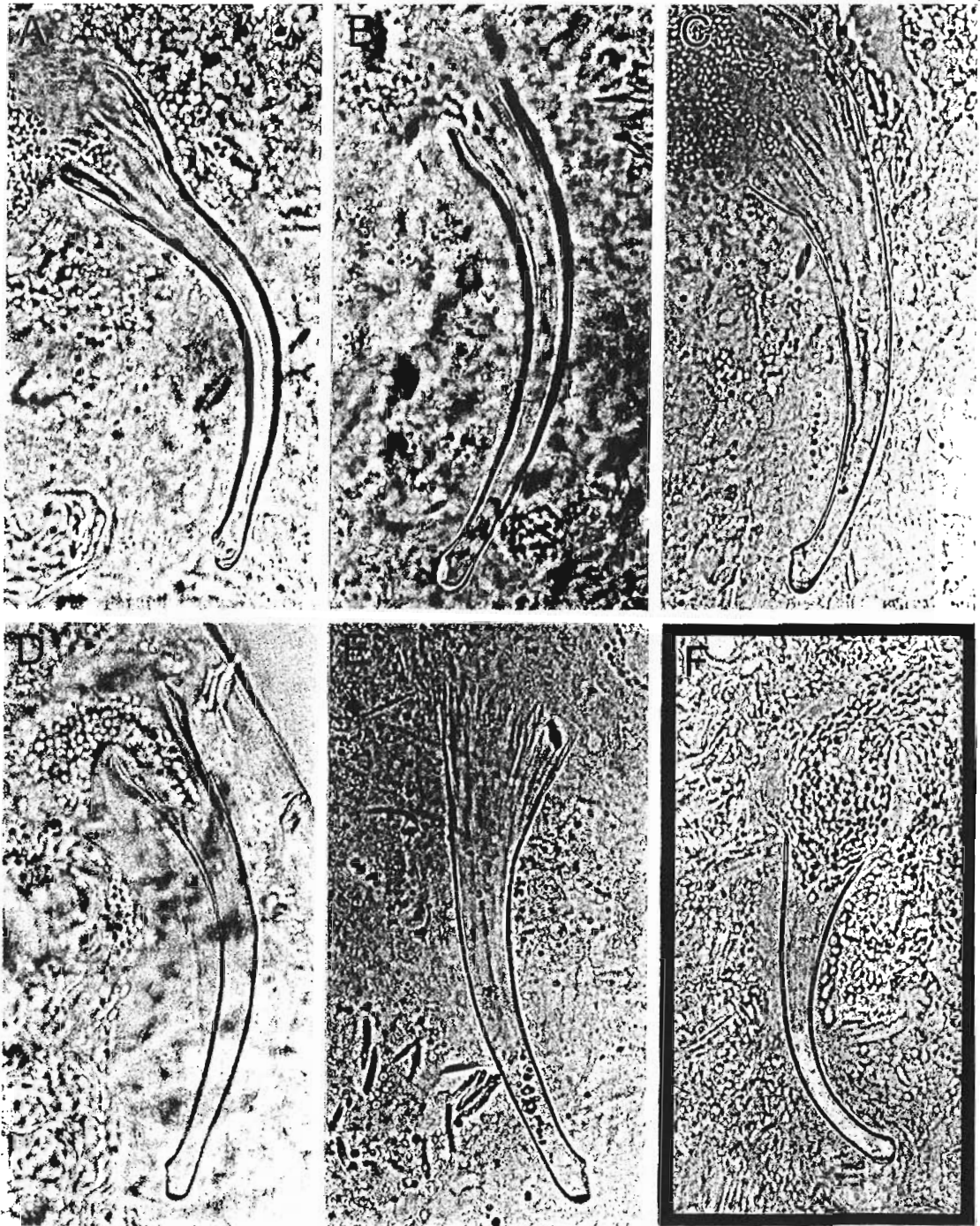


Fig. 7. *Macrostomum curvituba*. A–E. Stylets of different individuals (Kotzebue). F. Stylet (North Sea: Island of Sylt).

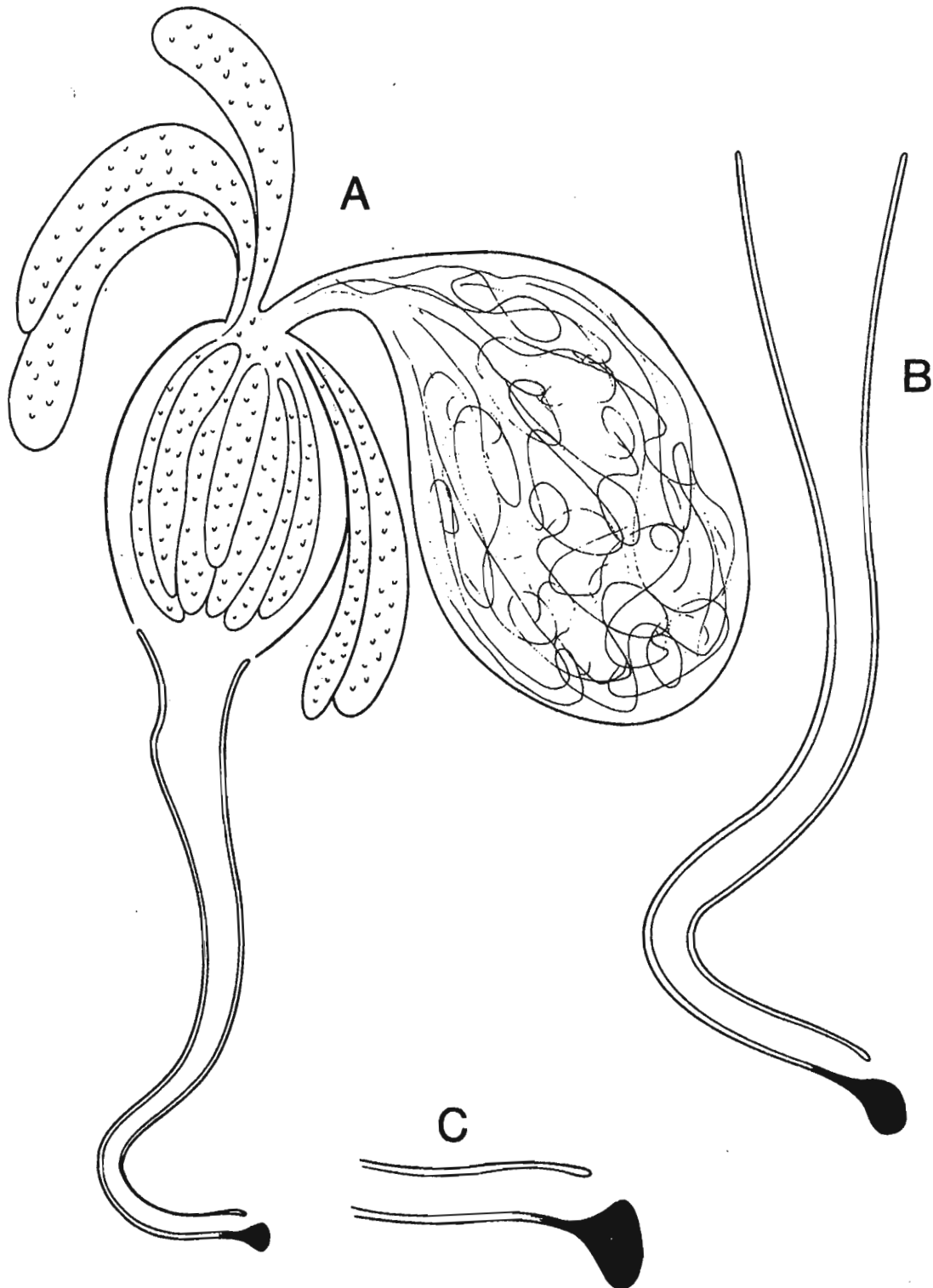


Fig. 8. *Macrostomum extraculum*. A. Male organ. B. Stylet. C. Tip of the stylet, enlarged (Kenai Peninsula: Ninilchik).

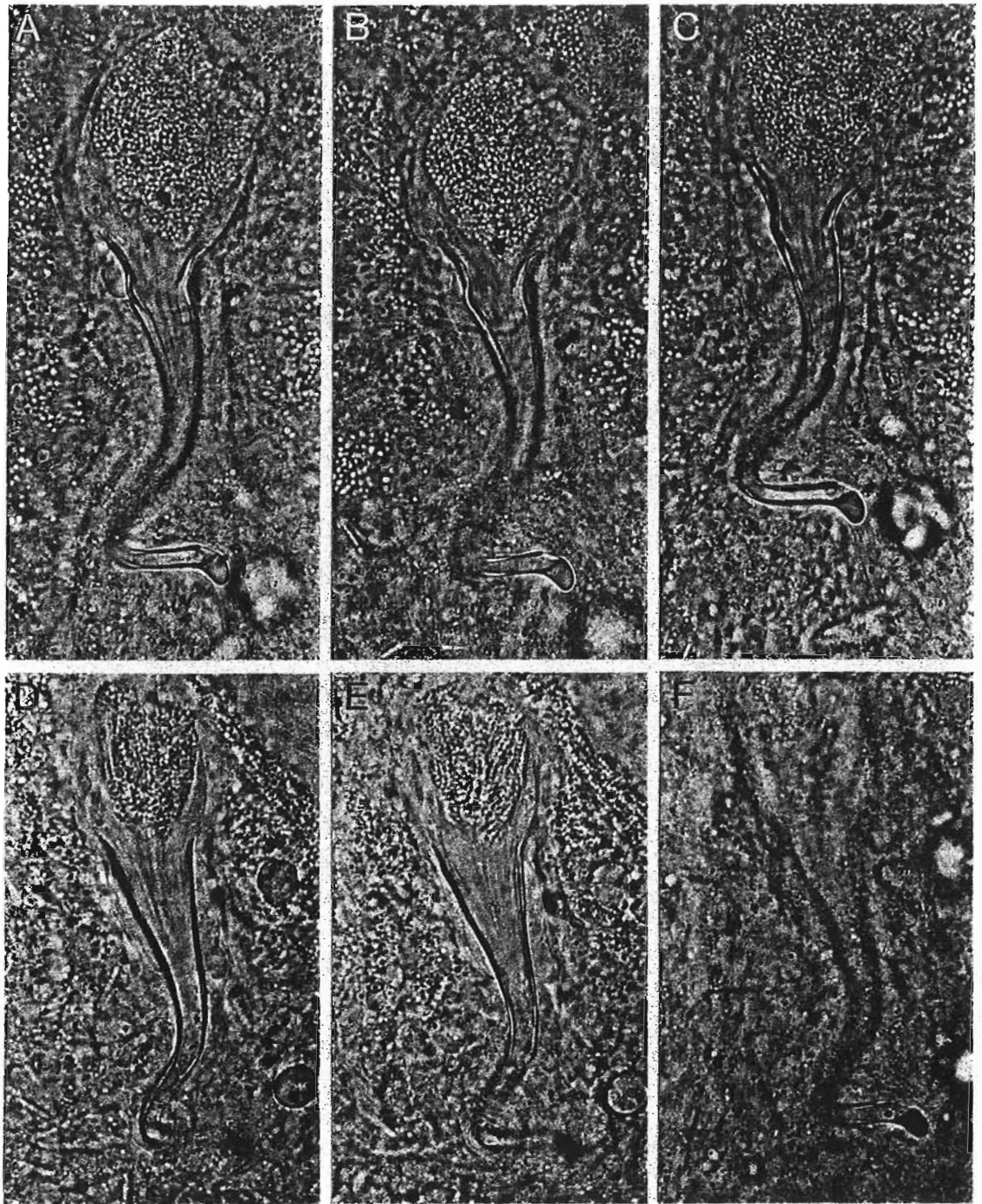


Fig. 9. *Macrostomum extraculum*. A-C. Stylet of one specimen, different focus. D-F. Stylet of another specimen, different focus (Kenai Peninsula: Ninilchik).

Macrostomum pusillum Ax, 1951

(Fig. 10 A)

Locality: Homer Spit. Intertidal sandflat behind a dune wall (16. 7. 1988).

Material: Live observations on a few specimens, including photographs.

Distribution: North Sea, Baltic Sea, Atlantic coast of Norway, Mediterranean, Black Sea; SE Canada (AX & ARMONIES 1987).

The shape of the stylet conforms well with European and Canadian specimens. Length of the stylet: Alaska 26 to 27 μm , Canada 23 to 25 μm , Europe up to 26 μm . Diameter of the proximal opening: Alaska 16 to 17 μm , Canada 10 to 15 μm , Europe 14 to 17 μm (see AX & ARMONIES 1987).

Macrostomum spirale Ax, 1956

(Fig. 10 B, C, 11)

Locality: Kotzebue. Salt marsh east of the village, salinity 7 to 11 ‰ (8. 8. 1988).

Material: Live observations on two specimens, including drawings and photographs.

Distribution: North Sea, Baltic Sea, Mediterranean; in poly- to mesohaline habitats without strong currents (AX 1951, 1956 a, DEN HARTOG 1977, ARMONIES 1987).

About 1.5 mm long specimens with weakly developed eye pigmentations. The vaginal pore with its conspicuous strengthening and the surrounding voluminous glands, the shape of the seminal and prostatic vesicles and the stylet all conform well with European animals.

Macrostomum tenuicauda Luther, 1947

(Fig. 10 D–F, 12)

Localities: (1) Seward. Lowell Point, fine sand of the lower beach slope with effluent freshwater (10. 7. 1988). (2) Homer Spit. Lower beach slope behind a dune dam (16. 7. 1988).

Material: Live observations on several specimens, including drawings and photographs.

Distribution: North Sea, Baltic Sea, and a salt lake in N-Germany (LUTHER 1947, 1960, RIXEN 1961, KARLING 1974, DEN HARTOG 1977, ARMONIES 1987). Most localities are in meso- to oligohaline salt marshes.

Animals 0.7 to 0.8 mm long, some with and some without pigmentation of the eye spots. The stylet is a tube of 55 to 65 μm tapering distally. At the distal opening one side is elongate, the wall strengthened and curved, thus causing the distal opening to lie in a line with the shorter wall of the stylet. The stylets of

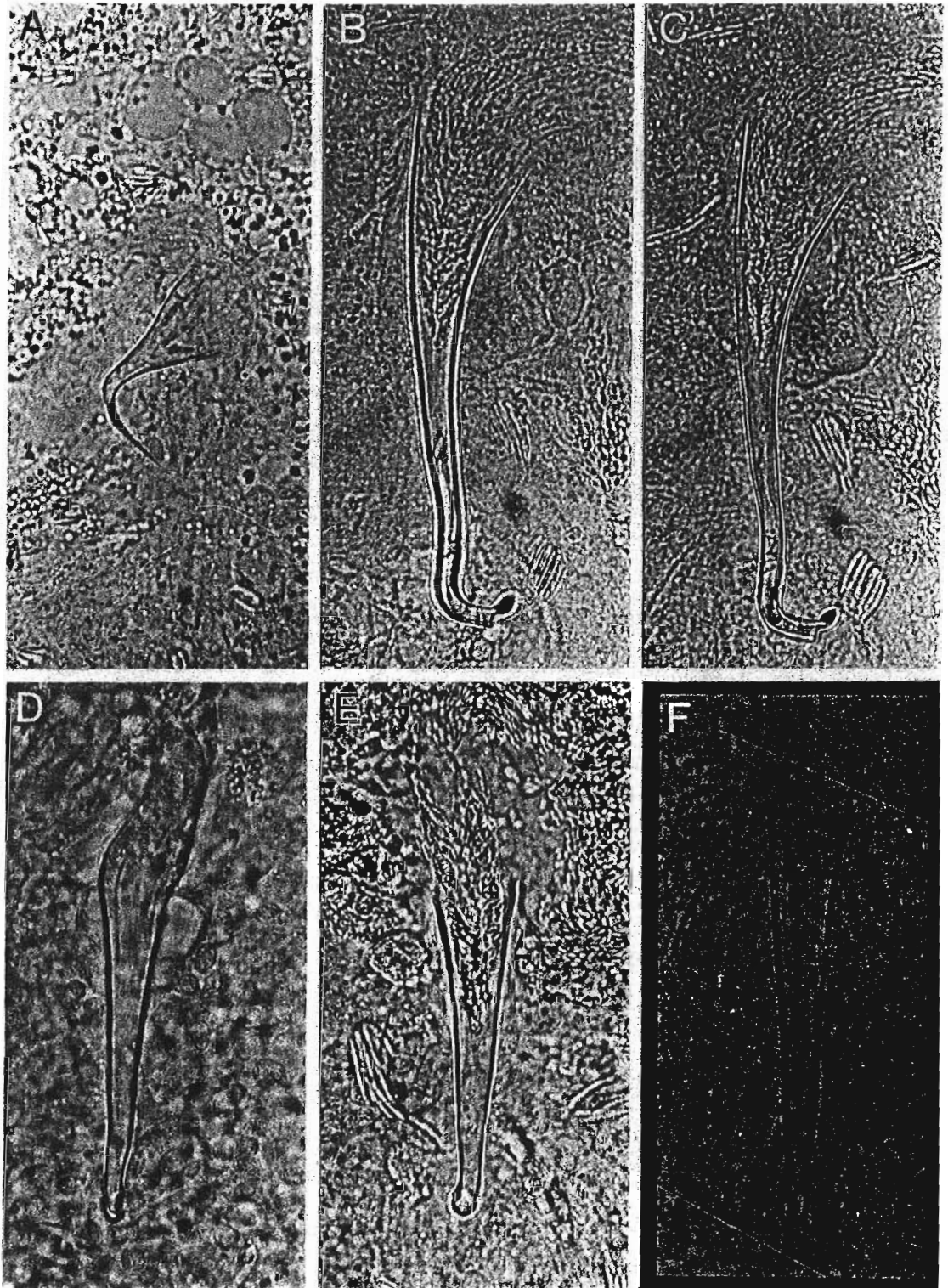


Fig. 10. A. *Macrostomum pusillum*. Stylet (Kenai Peninsula: Homer Spit). B, C. *Macrostomum spirale*. Stylet (Kotzebue). D, E. *Macrostomum tenuicauda*. Stylet (D Seward: Lowell Point, E Kenai Peninsula: Homer Spit). F. *Macrostomum tenuicauda* (North Sea: Island of Sylt).

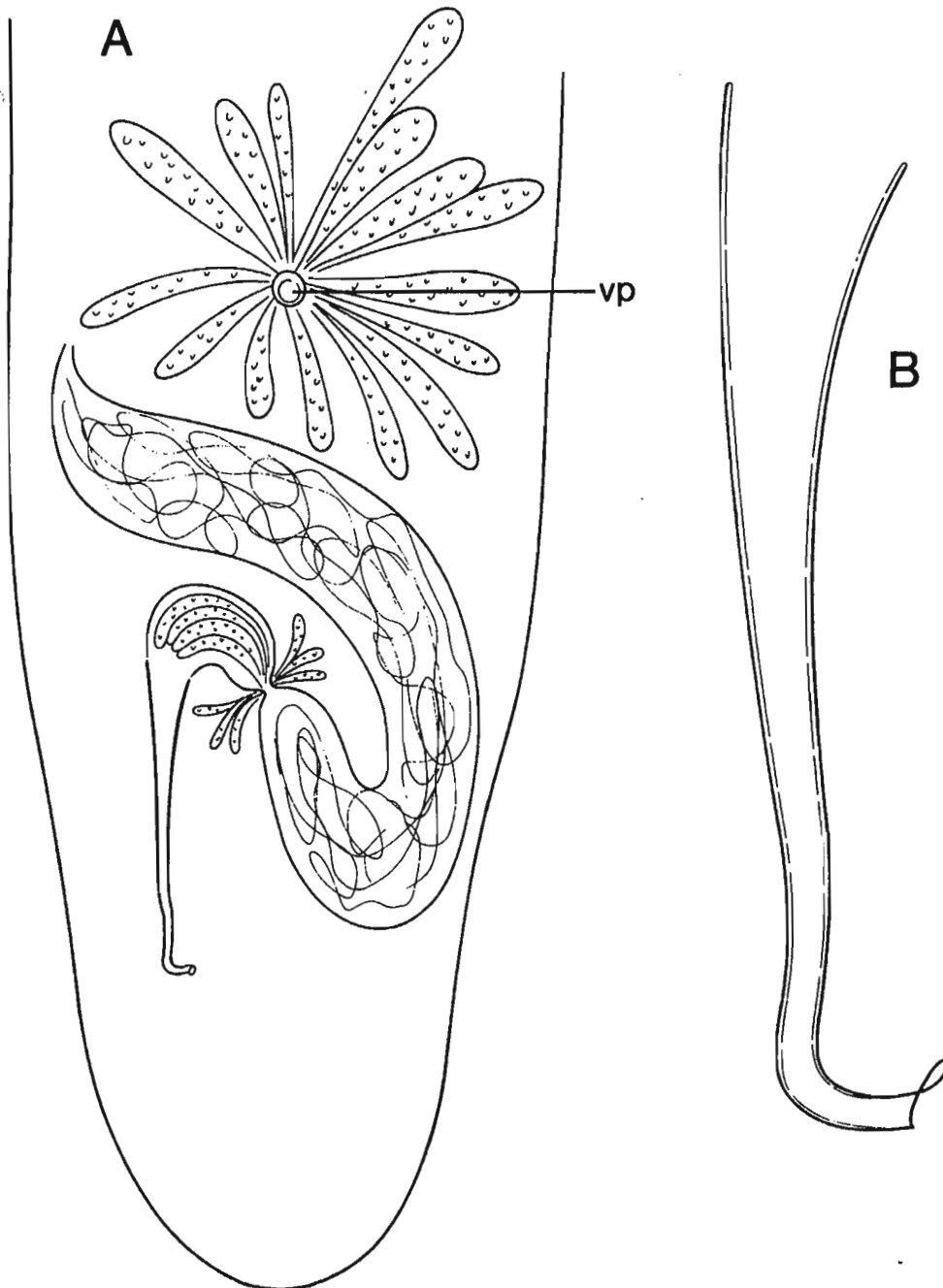


Fig. 11. *Macrostomum spirale*. A. Male organ. B. Stylet (Kotzebue).

European animals have the same shape and size (62 to 66 μm LUTHER 1960; unpubl. own data). In salt marshes of the Island of Sylt in the North Sea, specimens with and without eye pigmentations may be mixed in a single population as was the case in the Alaskan populations.

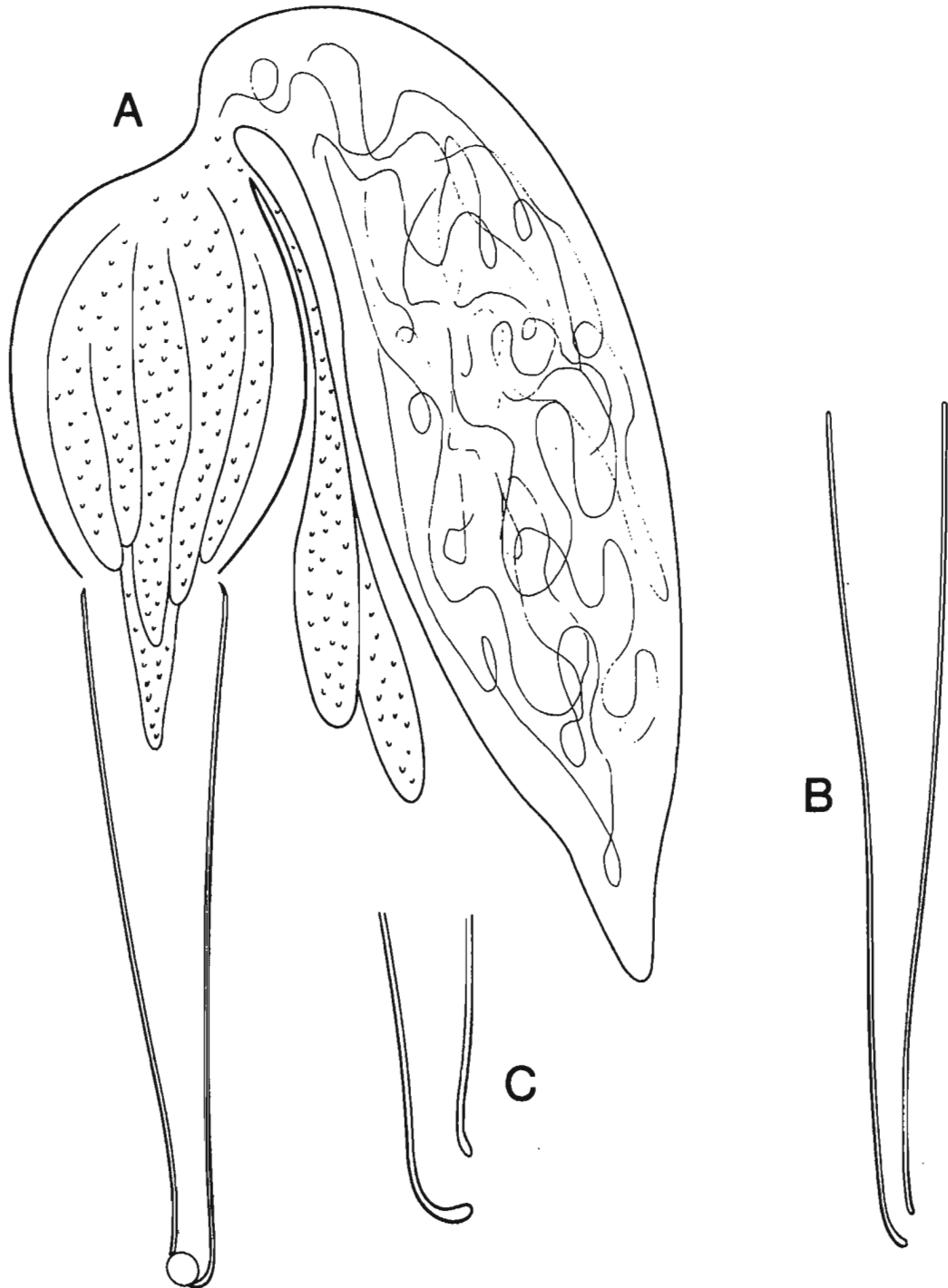


Fig. 12. *Macrostomum tenuicauda*. A. Male organ (Kenai Peninsula: Homer Spit). B. Stylet. C. Tip of the stylet, enlarged (Seward: Lowell Point).