



SWEDISH TAXONOMY INITIATIVE RESEARCH REPORT

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FLATWORMS:

Biodiversity and Phylogeny of Catenulida, with emphasis on the Swedish fauna

Catenulida is a group of microscopic free-living worms mainly found in freshwater habitats. The Swedish catenulid fauna was previously virtually unknown. The taxonomy of Catenulida is difficult because of the paucity of good morphological characters, which makes species identification extremely difficult.

Molecular phylogenies were inferred from DNA sequences. Based on two molecular markers, 18S rDNA and 28S rDNA, the phylogenetic position of Catenulida has now been well established as the sister group to the rest of the flatworms, Rhabditophora.

Within Catenulida we found a basal split between two major clades: Retronectidae + Catenulidae and Stenostomidae. The hypothesis of the marine Retronectidae as the sister group of the limnic Catenulida was rejected.

Four molecular markers, 18S rDNA, 28S rDNA, ITS-5.8S and CO1, were used as a backbone to infer phylogeny and to generate hypotheses about species delimitation in Catenulida using parsimony jackknifing and Bayesian analysis.

Anokkostenostomum was non-monophyletic, and *Suomina* was nested within *Catenula*, so two new synonyms were proposed: *Stenostomum* Schmidt, 1848 (*Anokkostenostomum* Noreña et al. 2005) and *Catenula* Duges, 1832 (*Suomina* Marcus, 1945).

A first report on Swedish freshwater Catenulida is presented. A total of 13 species are reported from Sweden. Four of them, all belonging to the genus *Stenostomum* are new to science: *S. gotlandense* n.sp.; *S. handoelense* n.sp.; *S. heebuktense* n.sp. and *S. steveoi* n.sp..

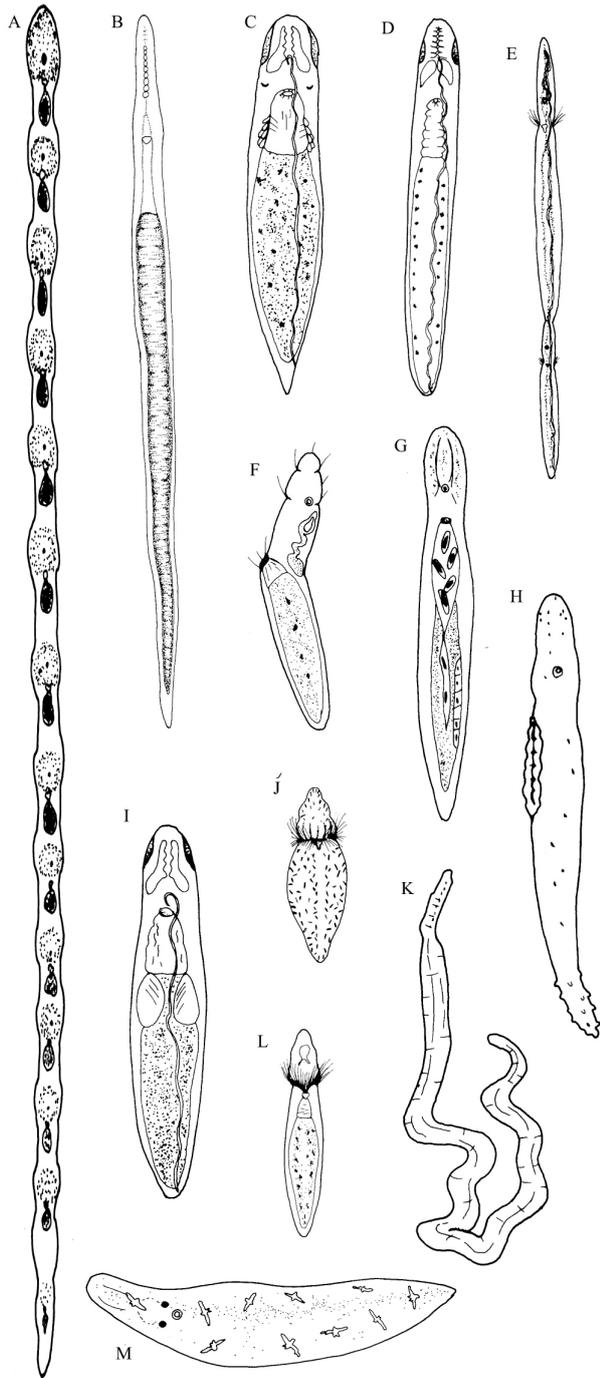


Figure 1. Representatives of the different genera of catenulids (Catenulida). A: *Africatenula riuruae*; B: *Rhynchoscolex simplex*; C: *Stenostomum leucops*; D: *Anokkostenostomum* sp.; E: *Catenula lemnae*; F: *Chordarium evelinae*; G: *Retronectes thalia*; H: *Myoretronectes paranaensis*; I: *Myostenostomum bulbocaudatum*; J: *Suomina sawayai*; K: *Paracatenula urania*; L: *Dasyhormus lasius*; M: *Tyrrheniella sigillata*. A: modified from Young, 1976; B–E: Illustrations of live specimens; F, J, L: modified from Marcus, 1945b; G, K: modified from Sterrer & Rieger, 1974; H: modified from Noreña-Janssen & Faubel, 1996; I: modified from Luther, 1960; M: modified from, 1959.

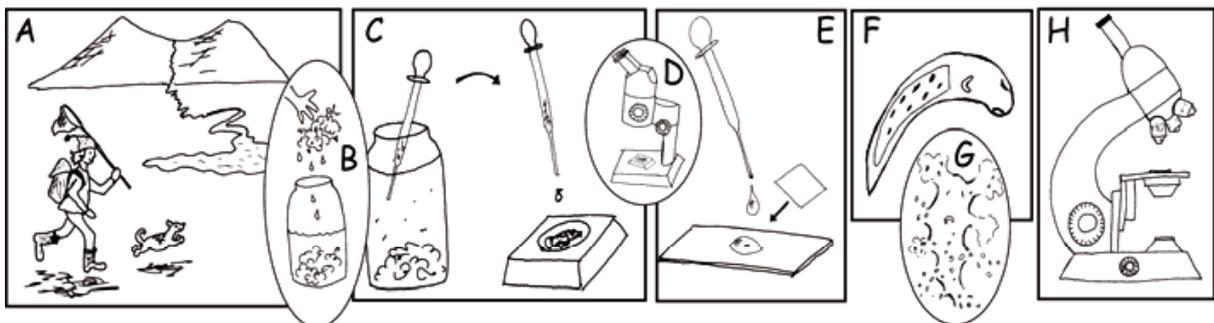


Figure 2. Collection of worms.

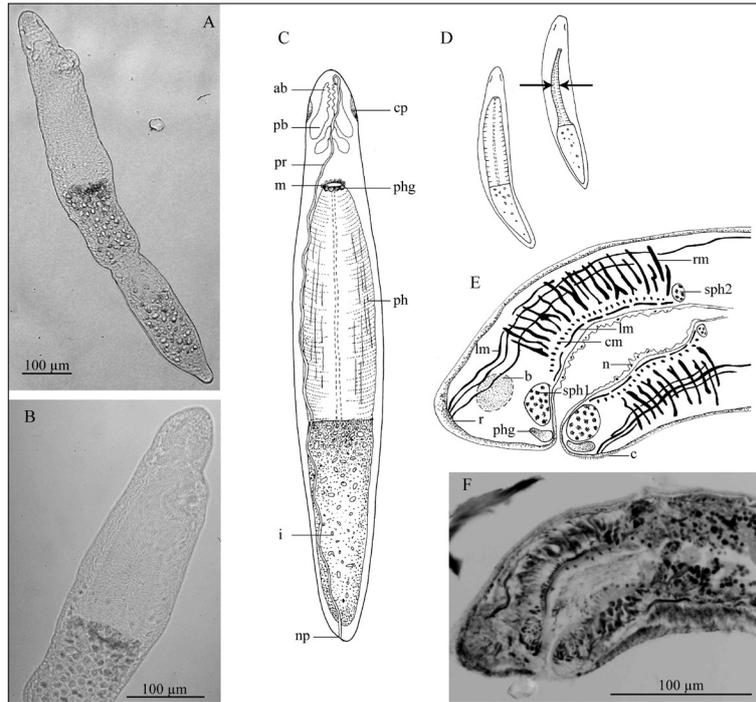


Figure 3. *Stenostomum heebuktense* n. sp. (A–B: photographs of live specimens; C: habitus of live specimen; D: live individual illustrating pharynx constriction; E: sagittal reconstruction of the pharynx from the left hand side (pharynx appears shorter in comparison with live animals due to constriction during fixation); F: anterior end of sagittal section).

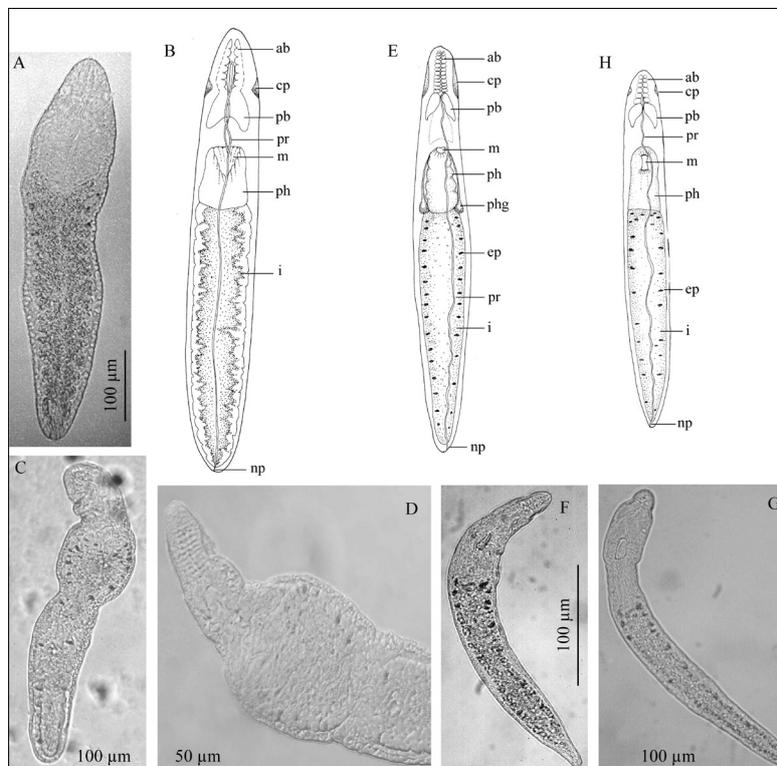


Figure 4. A–B: *Stenostomum gotlandense* n. sp., C–E: *Stenostomum handoelense* n. sp., F–H: *Stenostomum steveoi* n. sp. (A, C, D, F, G: photographs of live specimens; B, E, H: freehand drawings of habitus of live specimen).

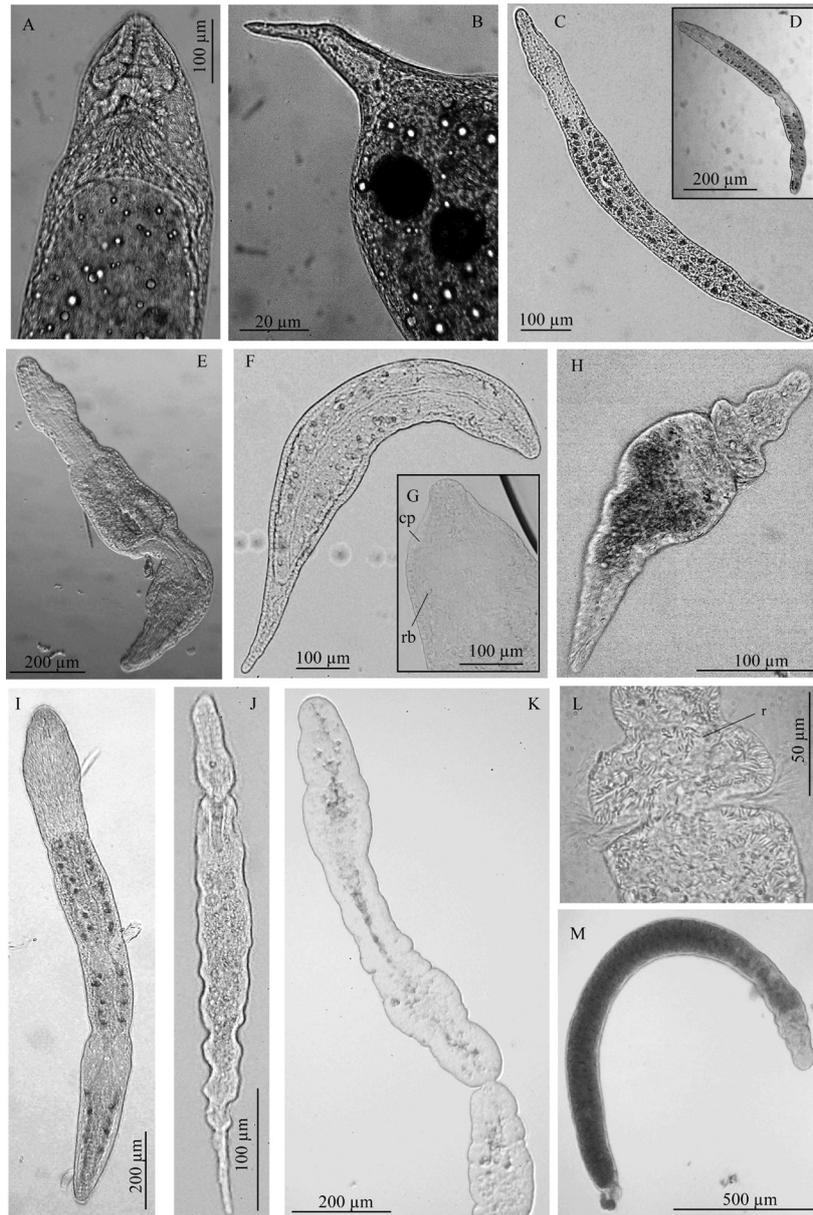


Figure 5. Live specimens of Catenulida: A–B: *Stenostomum arevaloi* (A: anterior end, B: tail); C–D: *Stenostomum bryophilum* (C: one zooid, D: two zooids); E: *Stenostomum grabbskogense*; F–G: *Stenostomum leucops* (F: whole animal, G: anterior end); H, L: *Catenula turgida* (H: whole individual, L: mouth region); I: *Stenostomum sphagnetorum*; J: *Catenula macrura*; K: *Catenula lemnae*; M: *Rhynchoscolex simplex*.

PUBLICATIONS

Larsson, K. & Willems, W., 2010. Report on freshwater Catenulida (Platyhelminthes) from Sweden with the description of four new species. *Zootaxa* nr 2396, 1-18.

Larsson, K., Ahmadzadeh, A., Jondelius, U., 2008. DNA taxonomy of Swedish Catenulida (Platyhelminthes) and a phylogenetic framework for catenulid classification. *Organisms, Diversity & Evolution* 8: 399–412. <http://dx.doi.org/10.1016/j.ode.2008.09.003>

Larsson, K. & Jondelius, U., 2008. Phylogeny of Catenulida and support for Platyhelminthes. *Organisms, Diversity & Evolution* 8: 378–387. <http://dx.doi.org/10.1016/j.ode.2008.09.002>