

## RESEARCH NOTE

### FEMALE MORPHOLOGY OF *PHILOMETRA RUBRA* (NEMATODA: PHILOMETRIDAE), A PARASITE OF THE ABDOMINAL CAVITY OF THE STRIPED SEA-BASS *MORONE SAXATILIS* (MORONIDAE, PERCIFORMES) IN THE USA

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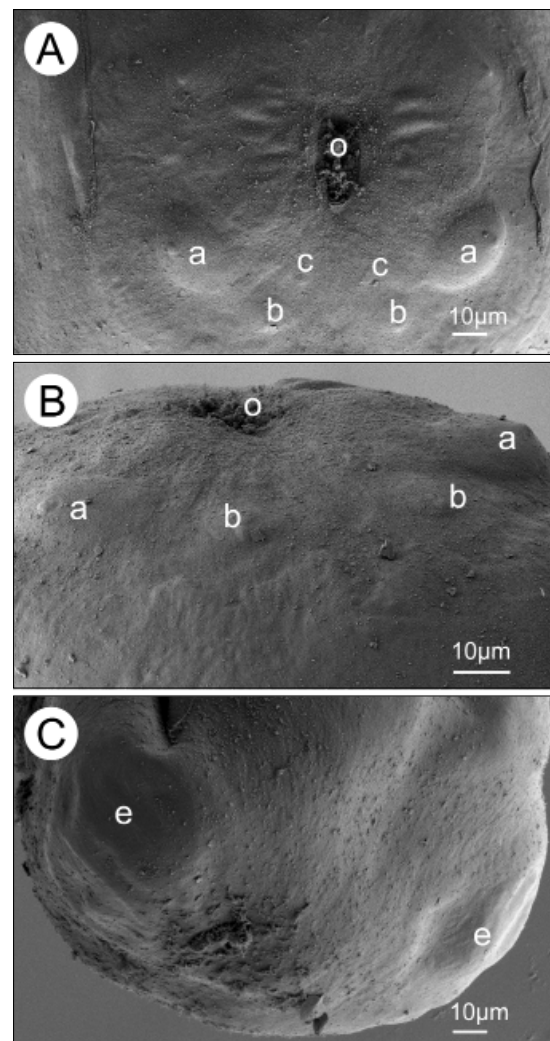
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**Abstract.** The nematode *Philometra rubra* (Leidy, 1856) (Philometridae) is redescribed from subgravid females found in the abdominal cavity of the fish *Morone saxatilis* (Walbaum) from South Carolina, USA in November 2008. The species is characterized by the presence of 14 cephalic papillae arranged in two circles, a relatively long oesophagus with a distinct anterior inflation, and well-developed papilla-like caudal projections. Cephalic papillae of the external circle differ from those in other congeners in that the dorso-lateral and ventro-lateral papillae are large, dome-shaped, whereas the dorso-dorsal and ventro-ventral papillae are small.

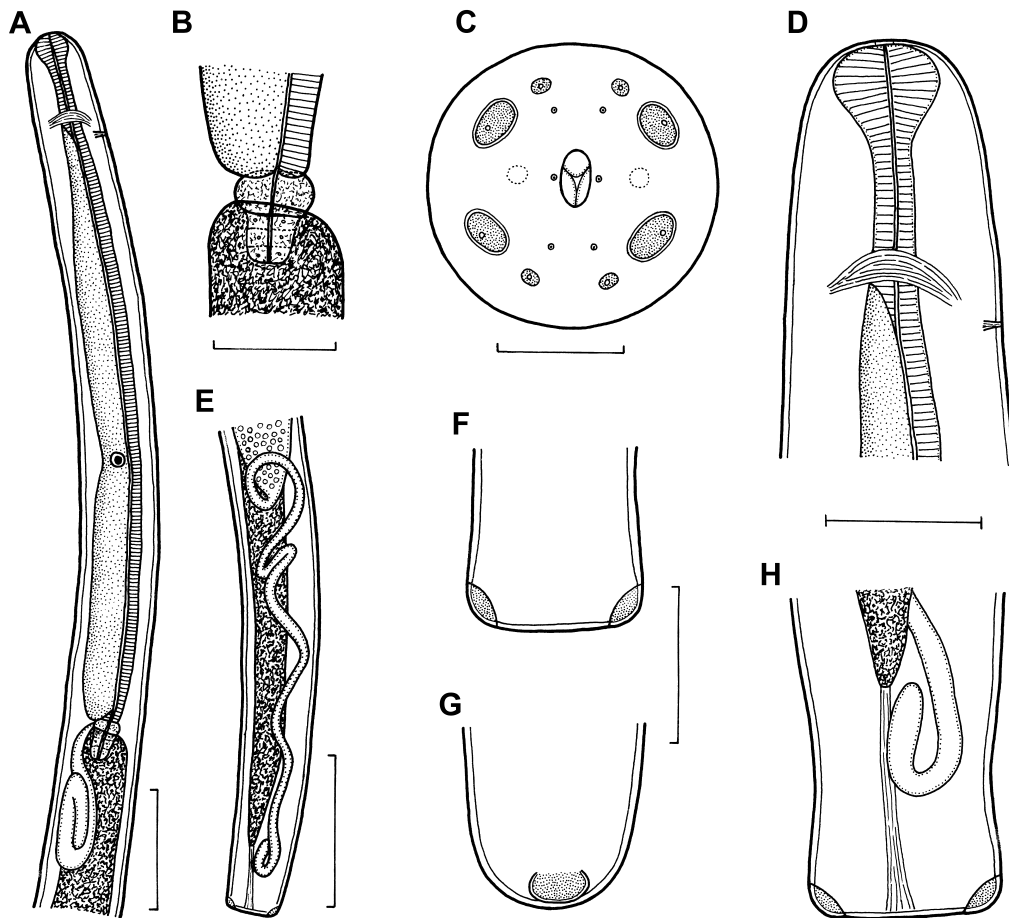
Leidy (1856) succinctly described *Filaria rubra* (= *Philometra rubra*) from a young female specimen found in the abdominal cavity of *Labrax lineatus* [= *Morone saxatilis* (Walbaum)] (Moronidae, Perciformes) from an unknown North American locality, probably in the USA. He only stated that the body was cylindrical, 4 1/2 inches (= 10.16 mm) long and 1/4 of a "line" (= 529 µm) wide, anteriorly truncated, posteriorly obtusely conical, dark brownish red in colour; he remarked that this species was frequently found in considerable numbers in the peritoneal cavity of the fish hosts during winter. The type specimen of *F. rubra* was lost (Walton 1928).

Later, *F. rubra* was reported by Linton (1901) from *M. saxatilis* and *Centropristis striata* Linnaeus (Serranidae) from the USA (states of New York and Washington, respectively), but the nematodes from the latter host were probably larvae of *Eustrongylides* (see Moravec 2006). Walton (1928) reported *F. rubra* from *Morone americana* (Gmelin) and *Micropterus dolomieu* Lacépède (Centrarchidae) of the Leidy's collection, but the specimens from the latter host were probably misidentified. *Philometra rubra* (Leidy, 1856) Yamaguti, 1961 was subsequently reported from *M. saxatilis* from Virginia and Maryland, USA (Paperna and Zwerner 1976, Hoffman 1999), but no species description was provided and no specimens were deposited in museums, so that most taxonomically important features remained unknown.

Two subgravid females of this parasite were found in the abdominal cavity of a single *Morone saxatilis* specimen from the freshwater lower reaches of the Cooper River, South Carolina, examined on 12 November 2008. Their light and scanning electron microscopy (JEOL ISM-7401F) examination made it possible to redescribe this poorly known species. Voucher specimens are deposited in the Institute of Parasitology, BC ASCR, in České Budějovice (Cat. No. N-920).



**Fig. 1.** *Philometra rubra* (Leidy, 1856), scanning electron micrographs of subgravid female. **A, B** – cephalic end, apical and subdorsoventral views; **C** – caudal end, subdorsoventral view. **Abbreviations:** a – large submedian cephalic papilla of external circle; b – small submedian cephalic papilla of external circle; c – submedian cephalic papilla of internal circle; e – lateral caudal projection; o – oral aperture.



**Fig. 2.** *Philometra rubra* (Leidy, 1856), subgravid female. **A** – anterior part of body, lateral view; **B** – region of ventriculus, lateral view; **C** – cephalic end, apical view; **D** – anterior end, lateral view; **E** – posterior end, dorsoventral view; **F, G** – caudal end, dorsoventral and lateral views; **H** – posterior end, dorsoventral view. Scale bars: A, E = 500  $\mu\text{m}$ ; B, D, F–H = 200  $\mu\text{m}$ ; C = 50  $\mu\text{m}$ .

**Description of *Philometra rubra* female** (based on 2 subgravid specimens) (Figs. 1, 2): Body of fixed specimens brown-coloured, filiform, almost cylindrical, 40.42–59.36 mm long, maximum width 476–503  $\mu\text{m}$ . Maximum width/body length ratio 1:85–118. Cuticle smooth. Cephalic end rounded, 258–261  $\mu\text{m}$  wide; cephalic papillae indistinct in lateral view. Oral aperture oval, surrounded by 14 cephalic papillae arranged in two circles; lateral amphids slightly outlined. Four dorso-lateral papillae of external circle large, dome-shaped, whereas four dorso-dorsal and ventro-ventral papillae small; internal circle formed by one pair of minute lateral papillae and two pairs of minute submedian papillae. Bottom of mouth with three flat surfaces of oesophageal sectors. Anterior end of oesophagus forming well-developed onion-shaped muscular bulb 105–144  $\mu\text{m}$  long and 150–186  $\mu\text{m}$  wide. Posterior portion of oesophagus cylindrical, with prominent dorsal oesophageal gland extending anteriorly to level of nerve ring, posteriorly to small ventriculus measuring 82–84  $\times$  150–156  $\mu\text{m}$ ; large nucleus of oesophageal gland 2.04–2.31 mm from anterior extremity. Entire oesophagus 3.37–3.88 mm long, representing 7–8% of body length. Oesophageal valve well developed. Nerve ring and excretory pore 326–381 and 503–506  $\mu\text{m}$ , respectively, from anterior end. Intestine dark-brown, with posterior end atrophied, forming ligament attached

ventrally to body wall; length of ligament 245–313  $\mu\text{m}$ . Posterior end of body rounded in lateral view and rectangular in dorsoventral view, bearing two large lateral papilla-like caudal projections 12–21  $\mu\text{m}$  high. Ovaries narrow, long, reflected. Uterus filled with groups of small spherical eggs.

Some taxonomically important morphological features, such as the presence of 14 cephalic papillae, their size and arrangement, a relatively long oesophagus with a distinct anterior inflation, and well-developed caudal projections, are described for the first time in this paper. Although they distinctly differentiate *P. rubra* from other congeners, a detailed description of conspecific gravid females and hitherto unknown males is urgently needed.

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## References

- HOFFMAN G.L. 1999: Parasites of North American Freshwater Fishes. Second edition. Cornell University Press, Ithaca and London, 539 pp.
- LEIDY J. 1856: A synopsis of entozoa and some of their ecto-congeners observed by the author. Proc. Acad. Nat. Sci. Philadelphia 8: 42–58.
- LINTON E. 1901: Parasites of fishes of the Woods Hole Region. Bull. U.S. Fish. Comm. 1899: 441–481.
- MORAVEC F. 2006: Dracunculoid and Anguillicoloid Nematodes Parasitic in Vertebrates. Academia, Prague, 634 pp.
- PAPERNA I., ZWERNER D.E. 1976: Parasites and diseases of striped bass, *Morone saxatilis* (Walbaum), from the lower Chesapeake Bay. J. Fish Biol. 9: 267–287.
- WALTON A.C. 1928: A revision of the nematodes of the Leidy collections. Proc. Acad. Nat. Sci. Philadelphia 79: 49–163 + Plts. 4–10.

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