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NEMATODES DO HAVE A COELOMATIC CAVITY

by

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Up to the present time nematodes have been considered to be pseudocoelomatic organisms (Türk, 1903; Goldschmidt, 1906; Chitwood and Chitwood, 1950). These authors failed to observe true membranes completely surrounding the organs and separating them from the body cavity and were only able to detect net-like tissues arising from mesenchymatous cells covering or partially supporting the organs (pseudocoelomatic membranes and mesenteries) and series of isolated cells (coelomocytes) (Chitwood and Chitwood, 1950).

Observations by Grimaldi De Zio and Morone De Lucia in 1974 revealed the presence of a true membrane completely enveloping the gonads of species of *Longidorus* (Micoletzky) Filipjev and *Xiphinema* Cobb (Dorylaimida: Longidoridae). Further studies with the electron microscope, carried out in the Laboratorio di Nematologia agraria, have confirmed these observations and have led to the discovery of a similar structure along the digestive tract and lining the somatic muscles.

Xiphinema index Thorne et Allen and *X. mediterraneum* Martelli et Lamberti, used for electron microscopy, were fixed in 3% glutaraldehyde and in 1% osmium tetroxide and embedded in Araldite. Sections were stained on the grids with 5% uranyl acetate and lead citrate, and observed in a Hitachi electron microscope (Bleve Zacheo et al., in preparation).

The membranes associated with the digestive tract and somatic muscles consist of large flat cells with lenticular nuclei (Figs. 1 and 3). The structure is continuous, having contiguous cells throughout its length and is of homogeneous thickness. It is distinct from the pseudocoelomatic membrane of the previous authors (ibid) rather

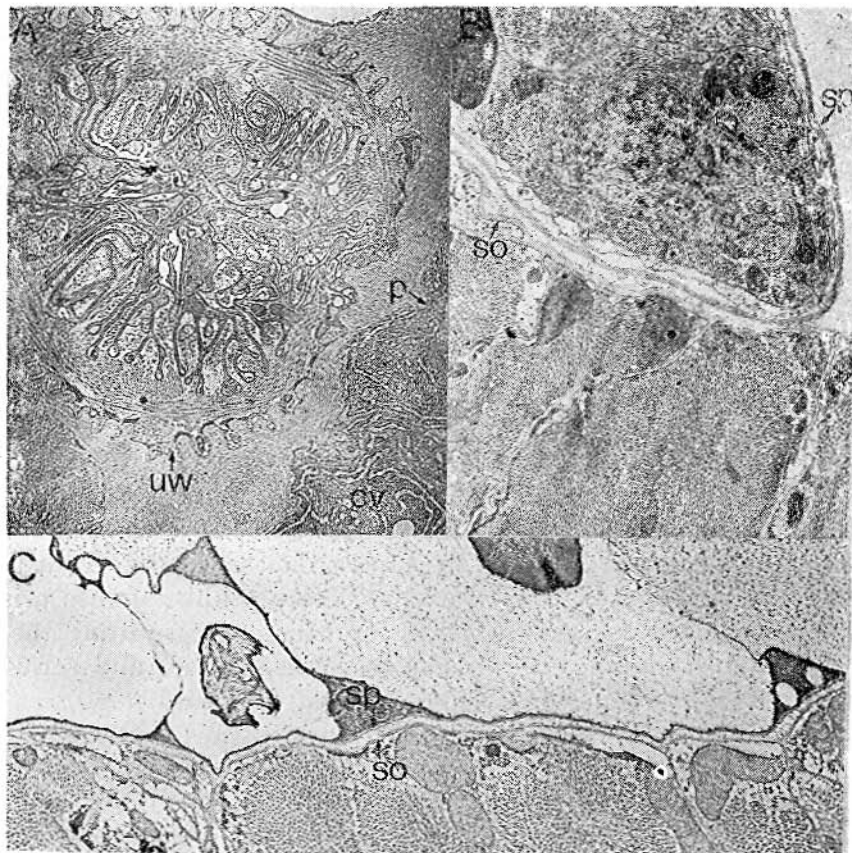


Fig. 1 - Photomicrographs of cross sections of *Xiphinema index*: A, distal portion of the uterus (uw = uterus wall; p = peritoneum; cv = ventral cord, x 5,000); B, ovary and somatic muscles (sp = splanchnopleura; so = somatopleura, x 14,000); C, intestine and somatic muscles (sp = splanchnopleura; so = somatopleura, x 19,500).

resembling the «Y» organ described by Remane (1926 and 1936) for the Gastrotrichs.

A similar membrane has also been discovered recently surrounding female and male gonads in specimens of *Ditylenchus dipsaci* (Kühn) Filipjev (Tylenchida: Tylenchidae) stained with acetic orceine (Fig. 2). We, therefore, feel that there is now substantial evidence to postulate that the body cavity of nematodes is not a pseudocoel but a true coelome (Fig. 3). Consequently, the systematic position of the phylum Nematoda in the higher taxa and its relationship with other invertebrates must be reconsidered.

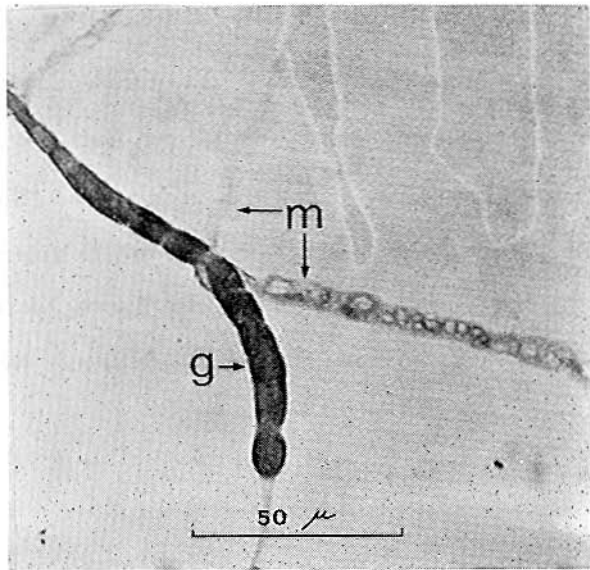


Fig. 2 - Female gonad of *Ditylenchus dipsaci* (g = gonad; m = membrane from which the gonad has been extruded).

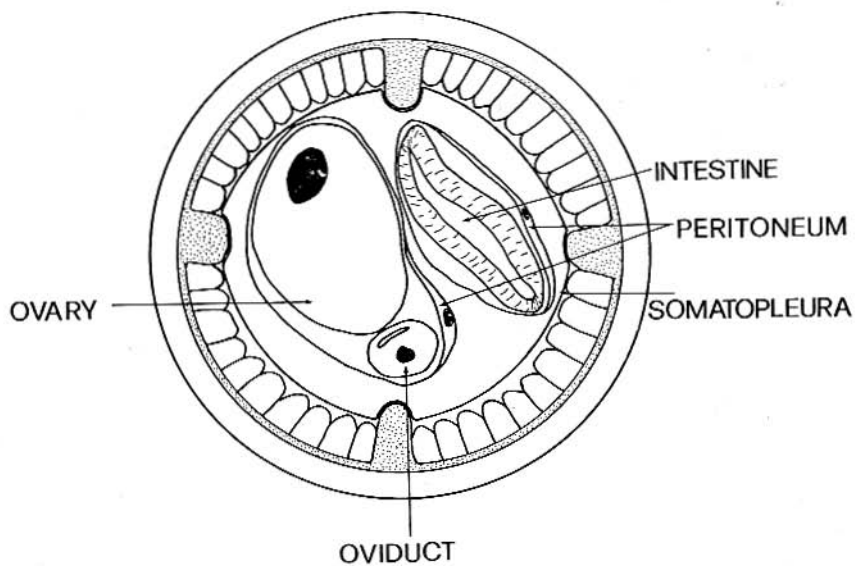


Fig. 3 - Cross section of a generalised nematode body.

L I T E R A T U R E C I T E D

- CHITWOOD G.B. and CHITWOOD M.B., 1950 - An Introduction to Nematology. Monumental Printing Co., Baltimore, Md., 213 pp.
- GOLDSCHMIDT R., 1906 - Zur Histologie von Ascaris. *Zool. Anz.*, 29: 1908-1910.
- GRIMALDI DE ZIO S. and MORONE DE LUCIA M.R., 1974 - Presenza di un involucro intorno alle gonadi di femmine di Longidoridae (Nematoda: Dorylaimoidea). *Nematol. medit.*, 2: 77-80.
- REMANE A., 1926 - Morphologie und Verwandtschaftsbeziehungen der aberranten Gastrotrichen. I. *Verh. dt. zool. Ges.* 30.
- REMANE A., 1936 - Gastrotricha und Kinorhyncha Brown. *Klass Bd. 4 Abt. 2 Buch 1, T12, Lief 2*, 161-242.
- TÜRK F., 1093 - Über einige im Golfe von Neapel freilebende Nematoden. *Mitt. Zool. Staz. Neapel.*, 16: 1-67.

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