11 Order Haplobothriidea Joyeux & Baer, 1961

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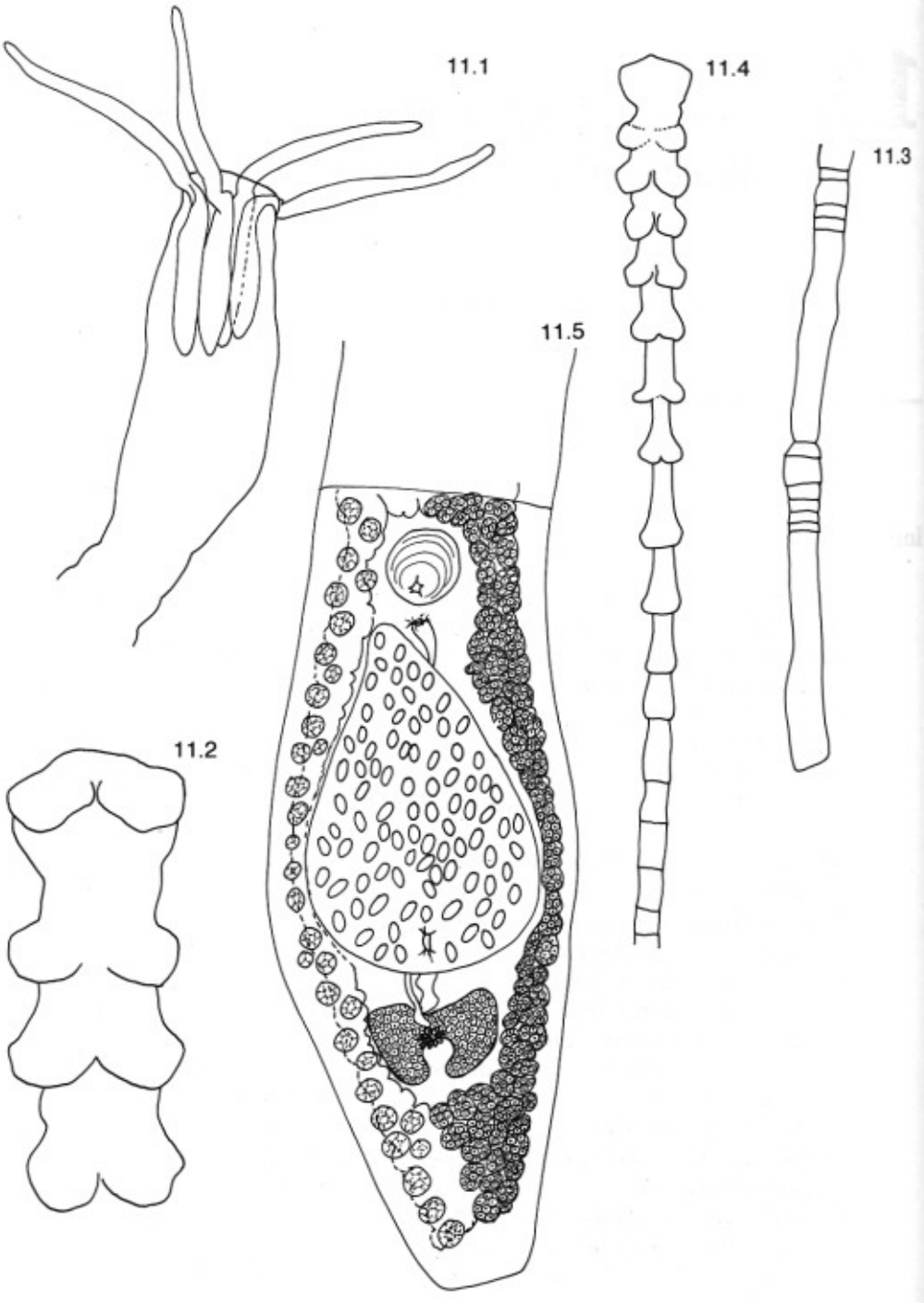
Introduction

The affinities and systematic position of *Haplobothrium* Cooper, 1914 are controversial. The genus, the only one in the order, is known only from a North American freshwater fish, *Amia calva* L., an archaic holostean. Two species have been described: *H. globuliforme* Cooper, 1914 and *H. bistrobilae* Premvati, 1969. This genus has a primary scolex with four tentacles reminiscent of those of the Trypanorhyncha but the anatomy of the proglottids (Cooper, 1914a, b; 1917) and the life-cycle pattern are characteristic of the Pseudophyllidea (Essex, 1929; Thomas, 1930; Meinkoth, 1947). Although Nybelin (1922), Poche (1924) (who placed it in its own suborder) and Fuhrmann (1931) aligned *Haplobothrium* with the trypanorhynchs, Woodland (1927) and Dollfus (1942) believed that its affinities were pseudophyllidean and that its tentacles and those of the trypanorhynchs represented a case of parallel evolution. Dollfus (1942) pointed out that a digenean, *Rhopalias* Stiles & Hassall, 1898 has a pair of armed retractile proboscides. Thomas (1983) concluded that the tentacle muscle system of *H. globuliforme* differed from that of the trypanorhynchs and that the genus was closer to the pseudophyllideans.

Cooper's (1914a, b) original descriptions of *H. globuliforme* included only the secondary scolex, which lacks tentacles. Consequently, he placed the genus in the family Diphyllobothriidae (= Dibothriocephalidae). Later, having discovered the tentacle-bearing primary scolex, he (1917) erected the subfamily Haplobothriinae in the same family; subsequently, Meggitt (1924a) elevated it to family rank. According to Article 50(c) of the *International Code of Zoological Nomenclature*, the authority for the family should be Cooper, 1917, as attributed by Meggitt (1924a). The family was accepted in the Pseudophyllidea by Wardle and McLeod (1952), Yamaguti (1959) and Schmidt (1986).

Joyeux & Baer (1961) erected a separate order, Haplobothrioidea [*sic*], for *Haplobothrium* on the grounds that it occupied an important place in cestode



Figs 11.1-11.5 *Haplobothrium globuliforme* Cooper, 1914. 11.1. Primary scolex. 11.2. Secondary scolex. 11.3. Primary strobila. 11.4. Secondary strobila. 11.5. Gravid proglottid.

phylogeny and was morphologically distinct from both the trypanorhynchs and pseudophyllideans. This has been adopted by MacKinnon, Jarecka & Burt (1985) and MacKinnon & Burt (1985a, b, c). Significance was also attached to its restriction to a relict fish species. MacKinnon & Burt (1985a) found that sperm structure in *H. globuliforme* indicated a close relationship with the Pseudophyllidea rather than the Trypanorhyncha. According to MacKinnon, Jarecka & Burt (1985), *H. globuliforme* exhibits a form of asexual reproduction unique in the cestodes.

ORDER HAPLOBOTHRIIDEA JOYEUX & BAER, 1961

Diagnosis: Primary scolex club-shaped with four tentacles, with spine-like microtriches basally, which can be withdrawn into muscular sacs. Bothria absent. Primary strobila does not itself develop proglottids but has segmented regions, at intervals behind the primary scolex, each of which separates off to become a secondary strobila. Anterior segment of secondary strobila modified as pseudoscolex (or secondary scolex). Pseudoscolex flattened anteriorly, with four shallow indentations around raised central dome. Posterior margin of pseudoscolex and succeeding proglottids form four flat projecting appendages. One set of genitalia per proglottid. Genital pore midventral, anterior. Cirrus-sac median, anterior. Cirrus armed with minute spines. Testes medullary in two lateral fields. Ovary posterior, median, horseshoe-shaped with anterior isthmus. Vagina opens behind cirrus-sac. Seminal receptacle present. Vitelline follicles medullary, confluent in midline anteriorly and posteriorly. Uterus with coiled uterine duct and dilated uterine sac. Uterine pore persistent or transient. Eggs operculate, embryonated. In North American freshwater teleosts (bowfin, *Amia calva* L.). Type-family Haplobothriidae Cooper, 1917.

Family Haplobothriidae Cooper, 1917

Diagnosis: With the characters of the order. Type and only genus *Haplobothrium* Cooper, 1914.

Genus *Haplobothrium* Cooper, 1914 (Figs 11.1–11.5)

Diagnosis: With the characters of the family. Type-species *H. globuliforme* Cooper, 1914.