



# Life History, Systematics and Evolution of the Diplostomoidea Poirier, 1886: Progress, Promises and Challenges Emerging From Molecular Studies

Isabel Blasco-Costa<sup>\*,1,a</sup>, Sean A. Locke<sup>§,a</sup>

<sup>\*</sup>Natural History Museum of Geneva, Geneva, Switzerland

<sup>§</sup>University of Puerto Rico at Mayagüez, Mayagüez, Puerto Rico

<sup>1</sup>Corresponding author: E-mail: isa.blasco.costa@gmail.com

## Contents

1. Introduction	168
2. Life History and Biology of Diplostomoids	171
2.1 The miracidium	173
2.2 Parthenitae generations and the cercaria	175
2.3 The diplostomoid metacercaria	176
2.4 The mesocercaria, a unique innovation	177
2.5 The adult	178
2.6 Atypical transmission strategies	179
3. Current Systematics and Phylogenetic Tests of the Diplostomoidea	186
4. Use of Molecules to Prospect for and Delimit Species	194
5. Taxonomic Implications of Recent Studies	199
6. Host–Parasite Interactions	201
7. Linking Life-Cycle Stages and Their Characterization	205
8. Conclusions	210
Acknowledgements	212
References	213

## Abstract

Members of the Diplostomoidea mature in amniotes and employ vertebrates, annelids and molluscs as second intermediate hosts. Diplostomoid life cycles generally follow a three-host pattern typical of digeneans, but novelties have arisen in some species,

<sup>a</sup> Authors declare equal contribution.

including obligate four-host life cycles, vertical transmission, and intracellular parasitism. In this review, we summarize the basic biology of diplostomoids with reference to molecular studies, and present challenges, gaps and areas where molecular data could address long-standing questions. Our analysis of published studies revealed that most molecular surveys find more diplostomoid species than expected, but this tendency is influenced by how much effort goes into examining specimens morphologically and the number of sequenced worms. To date, molecular work has concentrated disproportionately on intraspecific or species-level diversity of larval stages in the Diplostomidae in temperate northern regions. Although the higher taxonomy of the superfamily is recognized to be in need of revision, little molecular work has been conducted at this level. Our phylogenetic analysis indicates several families and subfamilies require reconsideration, and that larval morphotypes are more reflective of evolutionary relationships than definitive hosts. The host associations of adult diplostomoids result from host-switching processes, whereas molecular surveys indicate that larval diplostomoid metacercariae have narrow ranges of second intermediate hosts, consistent with coevolution. Molecular data are often used to link diplostomoid developmental stages, and we provide data from adult *Neodiplostomum* and *Mesophorodiplostomum* that correct earlier misidentifications of their larval stages and propose alternatives to collecting definitive hosts.



## 1. INTRODUCTION

The superfamily Diplostomoidea Poirier, 1886, comprises a peculiar group of digenetic trematodes possessing a holdfast organ found posterior to the ventral sucker, a morphological innovation unique to this trematode group. This superfamily contains over 250 described species, 88 genera, 16 subfamilies and 6 families (Dubois, 1938; Niewiadomska, 2002a,b,c,d,e,f). Two families Brauninidae Bosma, 1931 and Bolbocephalodidae Strand, 1935 are monotypic, in sharp contrast with the speciose Cyathocotylidae Mühling, 1898, Strigeidae Railliet, 1919, Diplostomidae Poirier, 1886 and Proterodiplostomidae Dubois, 1936. Definitive hosts of diplostomoid species are amniotes, with some families exploiting members of different classes of vertebrates (Fig. 1).

As described in detail below, most diplostomoids have a three-host life cycle in many respects typical of digenetic trematodes. Although the systematics of this superfamily are based largely on the morphology and to a lesser extent host associations of adults (Dubois, 1938; Niewiadomska, 2002a,b,c,d,e,f), diplostomoids are most frequently encountered and studied in second intermediate hosts, particularly freshwater fish. Several problems

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات