# Comments on the evolution of the Annelida

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**Abstract**

The structure of the male ducts and their relative positions are significant indicators of the fact that the Lumbriculidae do not represent the stem forms of the Oligochaeta, confirming the recently expressed opinion of Hrabě (1983). However, the same arguments provide the basis for the separation of *Dorydrilus* in the family Dorydrilidae.

## Introduction

According to Hrabě (1983) the prosoporous form of the male ducts in the Lumbriculidae can be derived from the plesiopore state, which means that the Lumbriculidae can no longer be regarded as a stem group from which the aquatic oligochaetes (at least) can be derived. It is correct to state that most authorities up to and including the account by Brinkhurst & Jamieson (1971) accepted that view but Brinkhurst (1982) no longer supports the views attributed to him by Hrabě (1983). The fact that the original coelomoduct must have been plesioporous (Goodrich, 1946), the plesiopore state of many female gonoducts in supposedly older families of aquatic oligochaetes (at least) and the penetration of the rearward septum of the atrial segment by the posterior vasa deferentia of many lumbriculids all indicate that the prosopore condition is secondary. Additional direct evidence is available to demonstrate a prosopore ancestry for those genera in the Lumbriculidae in which one pair of atria (or even a single atrium) in the second testicular segment (GII of Brinkhurst, 1982) provides the outlet for all four testes and their associated vasa deferentia. Rudimentary atria may be found in GI (in *Rhynchelmis* for example) but never in GIII, the first ovarian segment. Once the shift to the prosopore condition took place, the atria are, of necessity, in testes-bearing segments. All of these arguments remain as presented by Brinkhurst & Jameison (1971) so far as evolution within the Lumbriculidae is concerned.

In *Dorydrilus* (Dorydrilidae) the atria are in the first ovarian segment, GIII, a condition that cannot be derived from that of a lumbriculid ancestor. Alternatively, the reverse polarity might be considered, but the difficulty with the derivation of the lumbriculids from the modern *Dorydrilus* is that the gonad sequence has already been reduced to GII–GIII in that genus.

The Dorydrilidae also lack prostates on the atria, a condition thought to be plesiomorphic even though there is uncontravertible evidence of subsequent reduction of the prostate in genera such as *Potamothrix* (Tubificidae) which otherwise exhibit a great many apomorphic characteristics (hair and pectinate setae in dorsal setal bundles and fully developed spermatozeugmata for example, plus the apomorphic characteristics of the subfamily Tubificinae, surely the most advanced of the Tubificidae with their stalked prostates and almost universal development of elaborate cuticular penis sheaths).

The possession of paired simple-pointed setae in

Hydrobiologia 109, 189–191 (1984).

Dorydrilidae is no certain evidence of their relationship to the Lumbriculidae as suggested by Hrabě (1983) but rather constitutes another plesiomorphy shared by all or most of the Haplotaxidae, the megadrile families, many enchytraeids and even (in the ventral setal bundles) by the Phreodrilidae (Brinkhurst, 1982). Paired bifid setae are characteristic of many lumbriculids, and multiple setae are only common in the naidids and tubificids and, to a lesser extent, in the enchytraeids and phreodrilids. The bifid nature of the setae in many of these families seems to be connected in some way as yet not fully understood, with the aquatic habit, but this characteristic can be found within the very ancient Haplotaxidae, and in the genus *Propappus,* currently classified as an aquatic enchytraeid (although this will be revised elsewhere).

In general, then, *Dorydrilus* is seen to be a descendent of a form that is ancestral to the common ancestor of the lumbriculids and naidid/tubificid line (Fig. 1). In that regard my current views are a little closer to those expressed by Hrabě (1983) who placed *Dorydrilus* as an immediate ancestor of the lumbriculids. My version is simply a very simplified Hennig-style arrangement showing progressive evolutionary steps in a parsimonious arrangement, but it does reveal that the Dorydrilidae should be retained as a distinct family.

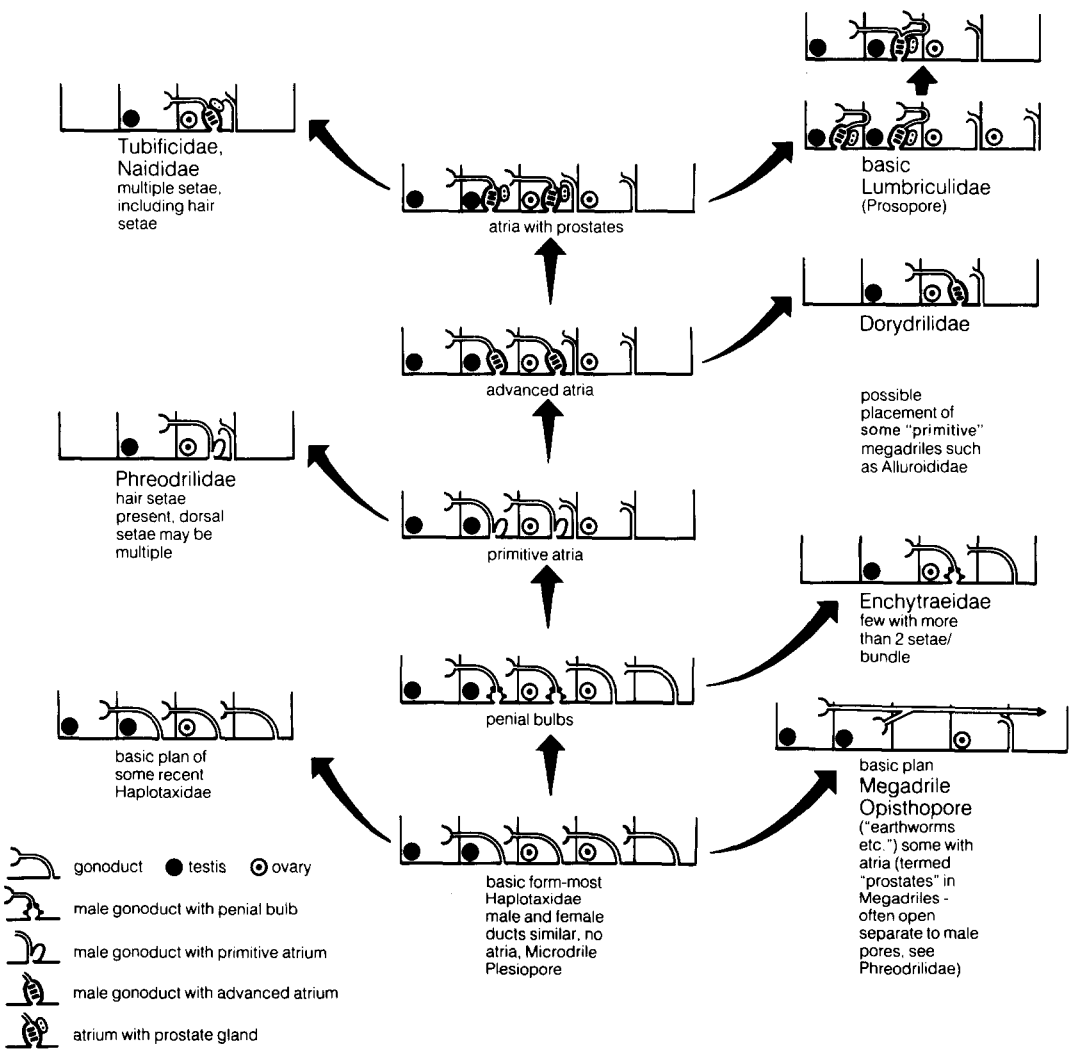


*Fig. 1.* Possible evolutionary pathway of microdrile oligochaetes assuming that atria evolved only once. The relationship between microdrile artria plus prostates and megadrile prostates has yet to be established.

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