



## Nervous system of the dwarf ectoparasitic male of *Scolelepis laonicola* (Polychaeta, Spionidae)

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### Abstract

The nervous system of the ectoparasitic male of *Scolelepis laonicola* (Tzetlin, 1985), which attaches to the dorsal side of the female, was investigated by immunohistochemical methods in combination with confocal laser scanning microscopy. The male's nervous system is reduced; no ganglia are found in the central nervous system. The circumesophageal connective is split into dorsal and ventral roots. Two median and one paramedial nerve run along the midventral axis of the male. The peripheral nervous system is well developed. Five commissures arise from each main cord per segment. There are two dorsolateral and two ventrolateral longitudinal nerves. The biggest segmental transverse nerve runs to the parapodia and diverges into a few fine nerves at the top of the parapodia. The nerve cord turns 90° in the male-female contact zone. Well-developed peripheral nerves, the presence of lateral nerves, and the absence of differentiated ganglia indicate the progenetic origin of the *S. laonicola* male. Well-developed parapodial nerves in immobilized mature males suggest an important role of the parapodia prior to settlement and possible presence of chaetae in the larva.

**Key words:** dwarf male, nervous system, sexual dimorphism, Polychaeta, Spionidae

### Introduction

*Scolelepis laonicola* (Tzetlin, 1985) is a spionid polychaete with vividly pronounced sexual dimorphism (Vortsepneva et al. 2008). During the summer months of 1996–2005, 28 females and 36 males attached to females were collected at the type locality in the White Sea (depth 18–20 m). Female *S. laonicola* are large spionid polychaetes about 2 cm long; they inhabit flimsy mucous tubes found about 20 cm below the surface of the bottom. In all investigated females, oocytes were accumulated in the parapodial cavities of the middle region of the body (starting at segments 22–34 and ending at segments 35–55). The males are oligomeric polychaetes (up to 14 segments) lacking chaetae in the parapodia and appendages in the head region. The males are oriented along the longitudinal axis of the female (Fig. 1A) (Vortsepneva et al. 2008). The anterior part of the male's body penetrates into the female's dorsal tissues and into its body cavity. The epidermal tissues of the male and the female are highly integrated in the area of contact. It was difficult to define whether epidermal cells and vessels belonged to the male or the female. Septae of the female form a chamber around the anterior region of the male (Fig. 1B) Vortsepneva et al. (2008). The coelomic cavity of the male's body is filled with spermatids and mature spermatozoa (Vortsepneva et al. 2006).