



## A new cycloneuralian from the Burgess Shale with a palaeoscolecid-type terminal end

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With 2 figures

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**Abstract:** We describe a new cycloneuralian worm from the Cambrian Burgess Shale, British Columbia, Canada, *Pseudoperipatus hintelmannae* gen. et sp. nov. The new species differs from all other known species of cycloneuralians occurring in the Burgess Shale fauna in the possession of a pair of terminal structures. These are slightly inward-curved claw-like spines that arise from annulated, distally tapering sockets. This morphology partly resembles the morphology of terminal ends of palaeoscolecid worms. Unlike most palaeoscolecids, the skin of the new species appears to lack sclerotised plates; the body is finely annulated. Certain specimens attributed to palaeoscolecids in Orsten-type preservation from the Cambrian of Australia strongly resemble the trunk end of *P. hintelmannae*. This similarity between the two types indicates a new possible faunal overlap between the Burgess Shale-type preserved macro-faunas and the Orsten-type preserved meio-faunas of the Cambrian.

**Keywords:** Cycloneuralia, “stem-priapulid”, Burgess Shale-type fauna, Orsten-type preservation.

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### 1. Introduction

Cycloneuralia comprises five major extant groups: Nematoda and Nematomorpha (together forming Nematoida), Priapulida and Loricifera (together forming Vinciplicata), and Kinorhyncha (together with Vinciplicata forming Scalidophora; e.g., MAAS et al. 2007a, b). Representatives of Cycloneuralia are characterised by a worm-shaped body, their cross-section is rather circular. Their outer surface is covered by a chitinous cuticle (besides nematodes and adult nematomorphs), which means that these animals have to moult. The anterior mouth region is in many species armed with teeth or spine-like structures, which can be partly intruded or extruded for locomotion or for feeding.

In modern faunas only nematodes are extremely diverse and widespread; especially Scalidophora is nei-

ther very species-rich nor abundant. Yet, half a billion years ago in Cambrian times representatives of Scalidophora were quite diverse and formed an important part of the biomass (e.g., WILLS et al. 2012). Cambrian fossils of cycloneuralians have been found as microfossils of their embryos (BENGTSON & ZHAO 1997; DONOGHUE et al. 2006a, b; HAUG JT et al. 2009), their larvae (MAAS et al. 2007a, 2009) or parts of their skin (HARVEY et al. 2010), but also as macro-fossils (e.g., CONWAY MORRIS 1977; MAAS et al. 2007b). Together with arthropods, cycloneuralians were a dominating factor in both famous Cambrian macro-fossil faunas, the North American Burgess Shale and the Chinese Chengjiang fauna.

Especially the morphology of cycloneuralians of the Burgess Shale has not been thoroughly reinvestigated in recent years (last comparative study: CONWAY MORRIS 1977). Yet, new imaging techniques and