

New palaeoscolecidan worms from the Lower Cambrian: Sirius Passet, Latham Shale, and Kinzers Shale

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Palaeoscolecidan worms are an important component of many Lower Palaeozoic marine assemblages, with notable occurrences in a number of Burgess Shale-type Fossil-Lagerstätten. In addition to material from the lower Cambrian Kinzers Formation and Latham Shale, we also describe two new palaeoscolecidan taxa from the lower Cambrian Sirius Passet Fossil-Lagerstätte of North Greenland: *Chalazoscolex pharkus* gen. et sp. nov. and *Xystoscolex boreogyrus* gen. et sp. nov. These palaeoscolecidans appear to be the oldest known (Cambrian Series 2, Stage 3) soft-bodied examples, being somewhat older than the diverse assemblages from the Chengjiang Fossil-Lagerstätte of China. In the Sirius Passet taxa the body is composed of a spinose introvert (or proboscis), trunk with ornamentation that includes regions bearing cuticular ridges and sclerites, and a caudal zone with prominent circles of sclerites. The taxa are evidently quite closely related; generic differentiation is based on degree of trunk ornamentation, details of introvert structure and nature of the caudal region. The worms were probably infaunal or semi-epifaunal; gut contents suggest that at least *X. boreogyrus* may have preyed on the arthropod *Isoxys*. Comparison with other palaeoscolecidans is relatively straightforward in terms of comparable examples in other Burgess Shale-type occurrences, but is much more tenuous with respect to the important record of isolated sclerites. These finds from Greenland provide further evidence that palaeoscolecidans possessed a complex anterior introvert directly comparable to a number of priapulid-like taxa from other Burgess Shale-type assemblages. Although these palaeoscolecidans have been allied with the nematomorphs, molecular data in conjunction with our observations suggest that this hypothesis is untenable. Palaeoscolecidans and similar priapulid-like taxa are probably primitive cycloneuralians and as such may indicate the original bodyplan of this important group of ecdysozoans. In addition, we describe another sclerite-bearing fossil from the Sirius Passet Fossil-Lagerstätte that may be related to the cambroclaves.

Key words: Palaeoscolecida, *Chalazoscolex*, *Xystoscolex*, Cycloneuralia, Cambrian, Kinzers Formation, Latham Shale, Sirius Passet, Greenland, California, Pennsylvania.

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