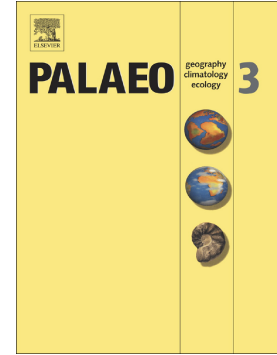


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Giant postembryonic stages of *Hydrocephalus* and *Eccaparadoxides* and the origin of lecithotrophy in Cambrian trilobites

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Abstract

The early postembryonic stages of the Cambrian paradoxid trilobites *Hydrocephalus carens* and *Eccaparadoxides pusillus* show an extraordinary morphology, which is characterised by an inflated glabella and reduced fixigenae. Moreover, the earliest known instars of both taxa are significantly larger than postembryonic instars of most of other Cambrian trilobites. Based on the size and morphology, we suggest that *H. carens* possessed a lecithotrophic type of development. This hypothesis is supported by growth patterns, accelerated development and frequency of distribution of *H. carens*. Lecithotrophic development is also proposed for *E. pusillus*, although the data are less convincing in this case. Analysis of early postembryonic instars of other Cambrian trilobites shows a correlation between their size and palaeogeographic distribution. The appearance of the largest postembryonic instars, including *H. carens* and *E. pusillus*, correlates with higher latitudes along the West Gondwanan margin. The specific environment in this area associated with unpredictable production of planktonic food is probably responsible for evolution of lecithotrophic development in these trilobite taxa.

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