

Review of ‘*Herpetogaster collinsi* from the Cambrian of China elucidates the dispersal and palaeogeographic distribution of early deuterostomes’ by Yang et al. for *PeerJ*

In this contribution Yang et al. describe new material of *Herpetogaster collinsi* from the Balang Formation (Series 2, Stage 4), China. Previously this species was only known from Laurentia, raising the question of how these sessile organisms were able to disperse over multiple palaeocontinents during the Cambrian. The authors speculate that *H. collinsi* possessed a motile larval stage facilitating this observed broad dispersal.

The manuscript is clearly written, the taxonomic assignment well supported, and more speculative interpretations are clearly identified as such in the discussion. I have only a few suggestions for the authors (one in basic reporting, the remainder in general comments).

1. Basic reporting

Clear and unambiguous professional English is used throughout. The article conforms to professional standards of courtesy and expression.

Sufficient background is provided and the references are sufficient.

The article is well structured and conforms to an acceptable format.

Figures are clear, relevant, and appropriately described and labelled. **The numbers in Fig. 1C are not clear to me, could they be increased in size?**

The submission is self-contained and presents results relevant to the discussion.

2. Experimental design

The research is original and fits within the Aims and Scope of *PeerJ*

It is clear how the research fills a knowledge gap.

The investigation of the fossil material and its preservation is rigorous. While the discussion is speculative it is clearly highlighted as such.

Methods are well described and could be replicated with the relevant equipment.

3. Validity of the findings

All underlying data have been provided.

Conclusions are clearly stated and link to the original question.

4. General comments

Line 78 – ‘recent flume experiments have shown that soft-bodied animals can hypothetically be transported over tens of kilometers by current flow’. The authors state that this is an improbable explanation, and I agree. However given that it is the only alternative hypothesis considered, it is worth expanding on a little further. Could the authors add one or two more sentences, perhaps considering the presence of other continents (e.g. Siberia, Australia in Fig. 1C) and vast distance (>10s of km) between South China and Laurentia, to more fully justify this sentence?

Line 237 ff. – I am not sure about the origination and dispersal proposed here. Given the scarcity of Series 2 Stage 3 deposits outside South China where *Herpetogaster* might be preserved and discovered, it is unclear to me whether the genus originated there or if instead we find the oldest

material there due to the significant amount of fossil material and research effort on Stage 3 exceptional deposits. I suggest the authors at least add a statement acknowledging the unequal geographic and temporal sampling of deposits that might preserve *Herpetogaster* and how this influences their dispersal hypothesis.

Lines 274-6 – ‘we can make some assumptions from modern ambulacrarian species...’ – can the authors provide some references for this sentence?

Line 283 – this study (Yang et al. 2022) is a preprint. If it is not published before acceptance of this manuscript I would suggest softening the language here to, from ‘...larvae has been found in acorn worms...’ to ‘...larvae has been proposed in acorn worms...’ to reflect this.

Further comment – given the range of deposits from which *Herpetogaster collinsi* has now been recovered from (and the range of ages) can the authors comment on the range of environments that this species was able to colonize and/or its relative longevity compared to other Cambrian species?

Further comment 2 – the authors clearly highlight that their identification of a larva is speculative (line 303) and that more work is required to demonstrate a larval stage in *H. collinsi* (e.g. paragraph beginning line 268, sentence beginning line 317). Could the authors expand on what investigations are required to confirm/adapt/overturn their provisional inferences that *H. collinsi* possessed a planktonic larval stage? Comparison to recent work by Laibl on trilobites (e.g. Laibl et al. 2023 *Palaeo3* <https://doi.org/10.1016/j.palaeo.2023.111403>) might be useful? Setting out a workflow or threshold of evidence required to be confident of planktonic larvae in *H. collinsi* would make the finale of the discussion more compelling.

5. Confidential comments to the editor

None.