

Peer Review

Review of: "A Developmental Table for the Florida Carpenter Ant *Camponotus floridanus*: Establishing Foundations for Mechanistic Studies of Development and Evolution in Ants"

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Review

This is an excellent, detailed description of the embryonic and postembryonic stages of *C. floridanus* development. The paper provides an excellent basis for future comparative studies, and I wish a similarly high-quality and comprehensive description of normal development were available for all emerging model systems!

There are some minor issues with language and textual clarity that I marked in the annotated PDF, which I include with this review. Addressing these should make for a better read. The paper should then be accepted with no further review.

Here are some more general points that seem relevant to me – but it is up to you if you want to address them:

(1) In the title and the main text, the term “mechanistic studies of development” I find prone to misunderstandings. I realize you are thinking about studies that aim at understanding the mechanism of development, caste differentiation, etc. But to me, the term “mechanistic studies” sounds a bit like “mechanical,” implying more classical experimental approaches. What you have in mind might better be called “functional studies,” a term often used to describe genetic methods (including RNAi).

In the title itself, maybe the word “mechanistic” can simply be removed.

(2) While structures like specific organs or processes like mesoderm invagination clearly can be homologous, I am not convinced that developmental stages should be called “homologous.” I commend you for developing a staging system that makes it easy to compare ant development directly with that of *Drosophila* and to name these stages with the same numbering system as the one used in the fly – that makes life easier when reading ant papers as an outsider. So far, so good.

But are these stages really homologous? Consider the following example from fly and beetle: in *Drosophila*, gastrulation starts in the late blastoderm with the invagination of the mesoderm and midgut. In *Tribolium*, however (similarly as in this ant), the mesoderm invaginates in the germ disc state, while the gut invaginates much later, during germband retraction. Which is now the stage homologous to the gastrulation stage in the fly? The stages that you define differ greatly in duration from the similarly named stages in *Drosophila*; is that really because these stages differ in length, or does it reflect that the mosaic of events that characterizes a certain stage simply is not the same in both species?

I think the staging you provide us with is perfectly fine, but a more careful language like “comparable stages” or “we aligned the stages between the two species as well as possible” would be better than using the scientifically problematic term “homologous stage.” I feel that many readers will stumble over that term and feel it isn’t quite right.

However, please address these two points:

(3) On page 19, you write, “The pupal stage is used in many systems across insects to effectively knock down genes using parental RNAi for testing maternal effect genes.” This is not correct; parental RNAi degrades both maternal and zygotic mRNAs in the offspring (e.g., our paper Bucher et al. 2002).

(4) The arrowheads in some of the figures are too small and hard to see!

Attachments: available at <https://doi.org/10.32388/NVKGPS>

Declarations

Potential competing interests: No potential competing interests to declare.