

Dear Dr Burdon,

Please find attached the new version of the manuscript entitled “The return of the trophic chain: fundamental vs. realized interactions in a simple arthropod food web”. We deeply appreciate your comments and editions, most of which we have incorporated in the new version. A detailed answer to each of your suggestions is provided below. Again, thank you very much for your help! We hope that the manuscript is now ready for recommendation from PCI Ecology.

All the best,

Marta Montserrat, on behalf of all authors

*Dear Authors,*

*Thank you very much for resubmitting your revised manuscript on this interesting study. I have now read through your responses to the reviewers and the amended version of the manuscript. I appreciate the further consideration of weak interactions in the Introduction and Discussion. Whilst I can see that you have met the vast majority of the reviewers concerns, there remain some minor edits that should be made before I submit my recommendation. I have attached an annotated version with suggested changes. However, below I have highlighted some of the more important minor edits that would in my mind help “polish” the final version.*

*Sincerely, Dr. Francis J. Burdon*

*Minor comments*

*L20-40. I have suggested some changes to the abstract that would help make this summary “pop” a bit more. See scan of the annotated MS for further information. As the first key pt. I would reword the opening sentence to “The mathematical theory describing small assemblages of interacting species (community modules or motifs) has proven to be essential to understanding the emergent properties of ecological communities.” As another key pt., it might be good to finish with a statement indicating the path forward E.g., “This further suggests a need for empirical research to work in concert with theoretical approaches to develop more realistic and predictive food-web models.”*

R: We have changed the text as you suggested, except for the term “reproduction success”, which we consider to be excessive relative to what we actually measured (reproductive success is a surrogate for fitness and in general concerns the lifetime fecundity of an organism, which we did not measure).

*L42. Reviewer 2 suggested that you could reference the seminal work of Charles Elton. I have suggested that you could cite Elton 1927 (“Animal Ecology”) in this first sentence. I would reword this opening statement to “Community ecology initially conceptualized trophic interactions as linear chains (Elton 1927), with an upper trophic level potentially controlling the densities of the level immediately below, thus generating a trophic cascade (HSS..., etc.).*

R: We have reworded the paragraph as suggested. L 44-45

*L46. "blurring the notion of a trophic guild (sensu trophic coherence)..."*

R: Done, L49.

L48. I appreciate that you have defined "community modules" in response to the comments by Reviewer 3. However, I wondered if it might be good to briefly explain how these are similar to "motifs" (since that is a major feature of ecological network analysis). E.g., "Our community modules are similar to network motifs studied in previous research (e.g., Bascompte and Melian 2005, Prill et al. 2005, Stouffer et al. 2007)."

R: Nice suggestion, thanks, we did it L53-54.

*L56. Reviewer 3 was concerned that the stability concept was used loosely, and I tend to agree. I would go further with defining "persistence" E.g., "temporal stability in community composition" (Pimm 1984 Nature). I would also check if stability as a general concept versus a particular dimension (sensu Donohue et al. 2010 Ecol. Letters) is correctly used in the Intro and Discussion (e.g., L78, L80, L82, L83). I wouldn't get bogged down in semantics, but some clarity might be good if there is some underlying nuance missed with the ideas presented here.*

R: We agree that the term "stability" may be misleading, and replaced it by the terms "community persistence" or "species coexistence" throughout the manuscript. We also added a definition of persistence in the introduction (L59-111).

*L106-108. Reviewer 2 was concerned that the niche concept might need further elaboration. Here it might be good to indicate that you are considering the niche in the Eltonian sense E.g., "The 'niche' of an animal means its place in the biotic environment, its relations to food and enemies." (Elton 1927). You then apply the Hutchinsonian concepts of fundamental and realized roles to the Eltonian niche (i.e., fundamental and realized trophic roles). I don't think this needs to be long-winded or overly complicated, but some "hat-tipping" here would satisfy the concerns of Reviewer 2.*

R: We politely disagree. Our paper does not concern the concept of niche. The fact that we use 'fundamental' and 'realized' food webs is just an analogy. We thus opted for removing the references to this concept, in the hope that this has clarified the message of the manuscript.

*L115. New paragraph.*

R: Done. L 112.

*L147. I wonder if it is worth mentioning Hypothesis (f) at all here – it seems nice to know, but not need to know. It could be considered in the Discussion, but I am concerned that you don't have the ability to test this adequately – i.e., it could be difficult to establish if adding prey type also increases the amount of food available (i.e., the same result might be observed by adding more of one prey type – depending on the functional response, etc.).*

R: We believe that our experiments allows to test whether egg production stemming from predation on different prey types is additive, because we include controls in which egg production is measured for each prey type independently. Therefore, we would like to keep this hypothesis in the ms.

*L209-234. I would break the community modules up into numbered points to help make the text less dense in this section.*

Done. L214-232.

*L327-485. I wondered if the Discussion would not benefit from some sub-headings (e.g., L338-416 seems to mostly discuss the actual results in context of the study systems, whereas L417-485 focuses more on the contribution of the results to food-web theory). Those sections could have sub-heading to help guide the reader.*

R: Done. L345, L426

*L337. Add disclaimer "...all modules could be described by linear food chains in our study system."*

R: Done. L343

*L345. "bursts" = "outbreaks"*

R: Done. L353.

*L352. "temporal segregation" = "temporal partitioning" (keeps it consistent with niche concepts).*

R: Done. L360.

*L370. I would be more specific here "Food web ecology" = "Optimal foraging theory" E.g. Pulliam 1974 The American Naturalist.*

R: Done. L378-379.

*L381. "...communities tended to be reduced to two simple trophic chains,..."*

R: Done. L389.

*L428. It would be good to define connectance more specifically as a measure of food-web complexity before making the point that it is general a lot lower than the number of potential interactions. E.g., "Connectance is a fundamental measure of food-web complexity which describes the proportion of realized interactions amongst all possible ones (May 1972). It is becoming increasingly evident that connectance is generally much lower than the total number of potential interactions (Beckerman et al. 2006)."*

R: Done. L438-440.

*L438. Could be good to explicitly give plant-pollinator networks as an example here.*

R: Done. L 450.

*L476. Reword. E.g., "Our results suggest that increasing the number of potentially interacting species results in the majority of species interactions becoming weaker."*

R: Done. Thank you! 486-488.