

Comments to authors:

Overall remarks:

Articulating questions and definitions around community structure and mechanisms driving community structure is extremely important, yet still missing from the paper. At first sight, the paper looks rather exploratory but when reading through the methods and the results, it seems that you still had certain expectations. I propose you nail all this down from the very beginning of the paper, and clarify everything related to trophic subsidy, its role in community dynamics and potential mechanisms in play such as competition, also in relation with your analyses. I also think that insisting a little bit more on definitions is important and will really help guiding the readers.

Some remarks on the Abstract:

Based on the abstract, my perception is that the message of the paper remains unclear. On one side you have the biological invasions aspect, on the other hand you have the trophic subsidy effect of a temporarily over-abundant resource. Connecting those two with the population dynamics of local parasitoids seems indispensable for me in order to understand why are you doing this study. Right now, the abstract rather looks like a list of statements with no common framework to link them.

Also, sometimes you refer to patterns, in other cases to mechanisms. It is not necessarily the same thing. The main advantage with your dataset is that it is not only co-occurrence patterns but also the actual exploitation of the same host. If competition is important aspect in your study, you should highlight this aspect of your dataset. But again, is competition the main focus? What about “boom-and-bust” dynamics? And the habitat type? How are all these things linked? Is the idea that increased abundance of a new host attracts mobile parasitoids from other locations, or that it acts by increasing parasitoid abundances on the next generation? Or perhaps it is both? Is additional (and overabundant) trophic subsidy driving more or less competition among species (i.e. “bird feeder effect”)?

Line 19: Please replace “trophic subsidy” with “additional trophic subsidy” or “supplementary trophic subsidy”. As I guess we don’t know much about their alternate hosts?

Line 20: Please replace with “... decreases in its population densities.”.

Line 22: Please replace “newly-formed” with “local”.

Lines 24-28: This paragraph is a little bit confusing for me. First, it seems that the first two sentences roughly say the same thing. You should perhaps consider combining them (i.e. replace multi-year with 5 years, etc.).

Line 32: inexistent? You mean that the number of sampled individuals was very low or no individuals at all were sampled?

Line 33: But perhaps you could directly provide the result of which community pattern correlates with which habitat?

Lines 42-79: As mentioned previously, I am doubtful about the relevance of these two first paragraphs in the Introduction. All this information is too general to be actually relatable to your study, and some of the information provided is not quite accurate either. I don't think you need to go that far in order to introduce the different mechanisms that likely impact the dynamics of your system. The paragraph starting line 81 is excellent, provides really coherent framework, which allows readers to understand (and connect) biological invasions, trophic subsidies and their potential impact on local communities (without needing to define them in separate paragraphs). Therefore, I recommend you start your Introduction from there.

Lines 90-93: Because you have some space, it will be worth developing briefly (one to two sentences) these long-term direct and indirect effects. What precisely we know it happens in cases like this in from other model systems?

Line 166: Here table 2 is not written with capital letter. Please check throughout the text that tables and figures are presented in a consistent way. The same applies for the captions. Usually, captions for tables are presented above the table, and vice-versa for figures.

Overall, I will suggest to re-work your tables and figures – e.g. there is no need to have colored areas in the tables, and the font size within tables' text should be reduced. There is a problem with the brackets in Table 1. It also seems that the caption of this table needs some more details. It has to be self-explanatory in order to facilitate the reading of the table (the same for figures as well). Figure 3 needs to have its background grid and title ("All years included") removed, and the axis title needs to be edited (i.e. increase the font size, center it, remove the underscores, and put a capital letter). In Figure 3, please also place the caption text together in a single paragraph (the same for all figures and tables, by the way), and also change "From" to "from" in the brackets.

Line 180: Again, there is not a single detail about DNA barcoding analysis, which I find puzzling. Even if you only analyzed a subset of samples, and even if it was for confirming their identities, you still have to present how exactly you did this and provide details about the data (if not the date itself). Which DNA extraction and PCR protocols you used? How many individuals you barcoded in total? How were they selected? Where were they sequenced? How many yielded sequences, how many matched parasitoid species, etc.?

You cite an unpublished reference (which I assume is a way to refer to the molecular methods) but the reference is not even listed in the Bibliography. If all this information could not be accessible elsewhere, I will strongly suggest to include it here. It could be very useful for other people to know how you did your parasitoid DNA barcoding!

Line 185: In Table 2 what is the ">" standing for? It is not very clear. In the legend, please remove "native species". Please list all the references from the table with full details in the Bibliography.

Line 192: Please replace with "Statistical analyses"

Line 194: Please replace with "Species co-occurrence analyses" or perhaps even, "Parasitoid species co-occurrence analyses".

Please pay attention that the style of the different sub-heading is not homogenous (e.g. lines 151 and 163). I also attract attention that there is very little consistency among sub-headings in the Material and Methods and the Results sections.

Line 204: Is this formula at the same font size as the formula line 211?

Lines 217-218: You already said this above, didn't you? Perhaps you can remove this sentence and bring the next sentence at the same line as the previous paragraph as they seem linked.

Lines 233-236: This is not very clear. I assume competition is one possible mechanism but what do you refer to with "association patterns"? Do you have any assumptions about all this? It is very important to clarify it. If you have expectations about precise mechanisms linked to community patterns, why don't you present them in the Introduction? Even if you cannot assume in which case which pattern you will observe, you can perhaps precise that you consider segregative patterns as the result of increased competition, etc. Also, I don't think the sentence "...the community structure relies on association patterns" is correct.

Line 259: Landscaped → Landscape

Line 261: Please reformulate as "In an attempt to evaluate..." or "In order to evaluate...."

Line 264: Please replace "In other words" with "More precisely, sites were...."

Line 267: Perhaps "hills" and "mountains" are not the more convincing examples of semi-natural habitats. Could it be rather forested areas or prairies? Please precise.

Line 269: Why was the satellite confirmation necessary? In order to check whether these habitats stayed the same during the 5-years period? Please precise.

Please provide few details about how you did that and which satellite images were used.

Line 275: Figure2 → Figure 2

Line 281: In the figure caption you can also recall the number of sites infested.

Line 281: Please replace "were" with "where"

Line 284: You refer to "diversity" in the sub-heading but don't mention anything about it in the sub-section. First, isn't it rather the species richness that you are referring to? In all cases, it will be worth mentioning in a short sentence, how many parasitoid species you recovered overall, and how this pattern varied across sites (e.g. did you have sites that systematically harbored high parasitoid richness, and sites where richness was low, etc.).

Line 286: Please replace "Taken as a whole" with "Overall" or "In total". Please do the same for line 303.

Please replace 71494 with 71 494, and likewise for all the numbers with more than three digits. I think it helps the reader actually.

Line 288: Which and where is this laboratory? Perhaps you should provide this info in the Material and Methods sections.

Line 293: Please write 911 with letters at the beginning of the sentence.

Line 312: Please replace “the different native species” with the “different species of native parasitoids”.

Line 320: Here, instead of describing the figure, I would rather suggest to directly present the results while referring to the figure (i.e. confidence intervals and observed C-score). Please use past tense to describe your results in the same way you did in the Results sections above.

Line 322: It would be better if you can reformulate this sentence – e.g. instead of saying “clear trend was observed”, rather say “Overall, parasitoid species tended to co-occur less frequently than expected by chance, and results were significant, etc. ...”. I guess this is what your comparison with the null models indicates.

Or did parasitoids occur more frequently? It is very confusing as we don’t know how are you defining your expectations. Competition and competitive exclusion (which I don’t think has been mentioned above) are not the same thing.

Lines 324-326: This sentence sounds already like an interpretation of results. Either you reformulate, or move it to the Discussion part.

Line 327: Please replace “native species” with “native parasitoids”

Lines 337-343: This section needs substantial improvement. First, the sub-heading is very confusing – does this correspond to the “Native parasitoids community structure” section in the Material and Methods? Second, it refers to Figure 4 but I assume it is Figure 5, correct? Also, the first sentence needs to be re-formulated. Competitive exclusion resulting from two alternative patterns does not sound correct, and does not provide much information. What is the message here? How is this connected to low parasitoid abundances or to the varying abundances of *M. sericeus*?

Lines 340-341: I have already made this comment but defining a community as “poor” or “non-existent” seems a bit unprecise. Is it that parasitoid diversity and abundances were very low?

Line 348-349: What is the story with the stars? Why is this important, how is *M. sericeus* connected and why it is important to mention in the caption that this is discussed (in the Discussion section, indeed)?

Line 352: Is this referring to the “Landscape context” line 259?

Line 354: Please use past tense. Please replace “confirms” with “shows”.

Line 356: Figure 6A, right?

Lines 358: I suggest that some parts here should be moved to the Materials and Methods section.

Line 375: I think that this section should be merged with the previous one.

Line 377: Please remove “the species”.

Line 378: “Smaller responses”? Perhaps simply replace with “responses” or “patterns”. Please replace “did the analysis..” with “run the analysis by excluding *M. sericeus*”.

Line 379: Please replace “native” with “native parasitoid”.
Is the term “evolves towards a segregation pattern” really correct?

Line 383: Please replace “In the same vein” with “likewise” or “similarly”

Line 390-395: I think you really should remove this paragraph (as well as the sub-sections below). The flow of the discussion should be implicit and roughly follow your questions (as presented in the Introduction), and usually hierarchizing results according to their importance. Of course, you can start with a short paragraph reminding your questions and summarizing results.

Lines 399-411: Typically this entire paragraph could be significantly shortened and presented towards the end of the Discussion (or in connection with a more relevant results if they need to be interpreted with caution). Also, it is always better to start with the most interesting results.

Line 405: You mention two different types of galls – it will be good if you can already give this precision in the Materials and Methods sections by saying that you made the choice of focusing on winter galls (you had logistical reasons, I presume), and that therefore you are mainly sampling the part of the parasitoid community associated with the winter galls. I don't think this is a problem per se but needs to be precised.

Lines 414-472: These two paragraphs are extremely nicely written and should form the core of the Discussion.

Line 435: I wonder whether some of these aspects could not be already pointed in the Introduction, even if not necessarily into details. Indeed, one expects that a community is composed of species with varying diet range (and you already know the host range of your parasitoids), and I assume one also expects that according to that, their response to the arrival of new host and new competitor will be also different...? This might also be partially linked to expectations about the effect of the habitat type. Briefly articulating something like this in the Introduction could be actually really nice and contribute to the coherence of the manuscript.

Lines 474-491: I am not entirely sure how information provided in this paragraph relates to limitations and strengths of the study. In terms of limitations I might rather emphasize here aspects related to data analyses and sampling effort, or choice of the analytical methods for revealing given mechanisms (e.g. you didn't include analyses of parasitoid phylogeny or

functional traits for instance – even if I don't suggest that you have to but just to give an example). And in terms of strengths, I would rather imagine emphasizing community dynamics analyses, which are rarely performed for organisms at higher trophic levels but also (as you already mentioned) the long-term aspect, etc.

I am not surprised that you cannot really predict how will the community evolve – it is not really the aim of the study, or of the analytical tools you used. But I would not necessarily qualify this as a limitation. Could this section rather be “Implications for long-term biological control dynamics” or something along this line?

Line 493: This is a great conclusion!