Review for PCI Ecology: preprint *The open bar is closed: restructuration of a native parasitoid community following successful control of an invasive pest.* By Muru *et al.*

General comments

This paper is overall well written and deals with an important question in the context of biological invasions and community ecology. The introduction is clear and presents the state of the Art and the general context in a very concise manner. The material and methods and the result section were a bit more confusing. I have made some suggestion that could help improving the way information is displayed. The work is overall very descriptive and somehow lacks statistical evidences to fully support the results and to claim strong conclusions. For example, it should be interesting to mention that *M. sericeus* is statistically more present in semi-natural orchards than in other sites, and significantly more present in those sites than any other species at year 5. GLMs on relative abundances could be done to resolve this issue. Overall the result and discussion sections could be improved by adding more quantitative information into the manuscript. It should be kept in mind (and discussed) that with descriptive analyses such as PCAs or cluster analyses, one overabundant species may be driving the observed patterns. Conclusions should thus be made with caution and nuance.

Please add line numbers on the next version of the manuscript so it is easier to comment.

Please make sure the past tense is used in both the material and methods and the result sections.

Please double check the reference section as some reference are not lister properly.

Abstract

I like the word "bonanza" but maybe a more common synonym would facilitate the reading

First paragraph: Remove "the" before "patterns"

The authority Yasumatsu is given for *Dryocosmus kuriphilus*, please do the same (or remove it) for every species mentioned in the manuscript, for consistency

After reading the results, I would add "two alternative patterns were observed depending on the sampled site" or "on the sampled location"

Introduction

Page 2, 2nd paragraph: I would suggest replacing "invasive species" by "primary-consumer invasive species" to match the "top-consumer" mentioned at the beginning of the sentence.

I would replace "host range expansion" by another term because at first reading I immediately thought of geographic range expansion and it was a bit confusing. Maybe use the term "host spectrum" or any similar wording?

Page 3, "In other words…": I guess this situation only happens when the native parasitoid community has been facing the exotic pest for a short time? If native parasitoids have time to get used and to adapt to the exotic pest, the introduction of the exotic parasitoid is unlikely to have huge effects on native parasitoid communities. Is there any reference in the literature on this time factor? When native parasitoids are displaced from their native hosts to an invasive one, aren't they becoming as efficient

and as specialized on this exotic host than the invasive parasitoid? Is the introduced parasitoid in all or most cases a superior competitor?

Page 3, last paragraph: please add ":" between "Hymenoptera" and "Cynipidae"

You mention apiculture. Is it because of honey produced from chestnut trees? I am just curious, no need to precise in the manuscript.

I would replace the second to last sentence by: "*Torymus sinensis* has been proven established in France with fast and significant impacts on the targeted pest in the subsequent years (Borowiec et al 2018)."

Material and methods

Page 3, first paragraph of the methods, line 2: write "*Torymus*" in full at the beginning of the sentence

Figure 1: Please precise in the figure caption what you mean by "agricultural" and "semi-natural" habitats. It would be worth mentioning it also in the main text (or refer to another study describing it)

Page 4: Please replace "10" by "Ten" at the beginning o the sentence

On the random selection method: precise how it was done? Only twigs with at least one gall were selected, or was it totally random?

Page 5: Please add more details on the identification process (especially for barcoding).

Why were the galls in boxes placed outdoor? Was it necessary for complete development of the wasps?

Askew and Thuroczy: incomplete reference

Please write the nine native parasitoid species and their characteristics in a sentence or in a table, not using a bullet list. I suggest a clear table presenting the species, its degree of specialization and the *ad hoc* references.

It can be a bit tricky to understand how the C-score works for those who have never used such metric. Maybe just add a short example of what it means to have a low (aggregative) or high (segregative) C-score in terms of species interactions within a community?

Page 6: Does *pheatmap* uses relative abundances of each species or absolute abundance values? It is of first importance to interpret the results. For example, *M. sericeus* could be more abundant than other species in Corsica, but the interpretation of the results could change a bit if we use relative abundances.

More informative metrics on community structure and composition could for instance be added to support the results from the PCA and the heatmap. Authors could for instance use metrics from the packages *codyn* or *bipartite* in R to describe how each parasitoid species interact with the exotic host (relative abundances, …). But maybe it is impossible to assess in communities where only one host species was monitored.

Results

Figure 2: The y scale for infestation by *D. kuriphilus* has to match the scale provided in Table 1. It should go from 1 to 5 if I understand correctly.

Please also add details in the figure caption. I do not understand what each point stands for. Is each point representing a field replicate? In that case there should be 26 points per year per species. If some points are confounded, it should be stated in the caption to clarify this matter. Are the lines and points in bold representing mean values? If so, standard errors should also be supplied, either to the text or in the figure itself.

Is it possible to provide numbers on the rate of infestation level decrease of *D. kuriphilus*? And on the rate of increase in the introduced parasitoid?

"The concomitance between…": This is already discussion. Please remove from the result section.

Page 8: Is it possible to provide the relative abundance of each species, in % of the total number of parasitoid species, in addition to the absolute numbers that are already provided?

Figure 3: I understand this was done for space issues, but the figure should be placed after the paragraph "Co-occurrence null model analyses" describing it.

The paragraph "Co-occurrence null model analyses" has to explain the results to the readers in biological terms. The description of the figure has already been done in the figure caption. Therefore, "The higher the observed value compared to the simulated values, the more the community is structured by exclusion patterns. Conversely, the lower the observed value, the more the community structure relies on association patterns." should be in the figure caption and "Here, a clear trend is observed towards an overall exclusion which seems to appear around the third year of the survey." should appear in the description paragraph. Please also provide directly in the text statistical results for the C-score values analyses: confidence intervals 95%, the observed value and any p-value that could have been calculated from the permutation tests done to simulate C-values.

Figure 4 caption: What do the numbers represent for *M. sericeus* on the figure? Values of the heatmap scale depending on the species' abundances and occurrences? Please precise.

Figure 5 and 6: Same issue as for Fig 3, the figure should be placed after the paragraph "Role of the environment" describing it. I would suggest combining both figures into one using the *biplot* function of the package *factoextra* (may also work with *FactoMineR*). Also, please precise how the ellipses were calculated (what is the confidence interval around the barycenter).

Figure 7: This figure does not bring much more information that what is already provided in the text and by the PCA. I suggest removing it or placing it in supplementary material. Adding the text that is currently present in the discussion would also work: "five continental sites (i.e. ArdX6, Dro3, Ard1T, Ard4, Ard1; assigned with stars in Figure 4) also exhibits a less marked but similar increase of *M. sericeus*, four of them being in semi-natural landscapes (Figure 1)."

Discussion

Paragraph 2: Is there any evidence of native parasitoids shifting hosts after introduction of the exotic parasitoid (e.g. on other Cynipidae)? I see this question is raised on the second to last paragraph, so maybe it is worth to merge these two paragraphs here.

M. sericeus seems to be a specialist. Did the authors try to redo the analysis (heatmap and PCA) by removing this species from the dataset? I am not implying this is the way results should be presented, but that this species seems to drive everything in the cluster analysis and in the PCA, so by removing it we could see what happens with the other 8 native parasitoid species. The problem with analyses presented in Figures 4 to 6 is that they are relative comparisons (i.e. a species is more abundant or occurs more frequently than others), so it is sometime tricky to see a clear pattern. Other 8 species can be masked/hidden by the effect of *M. sericeus* in the analyses.

Paragraph 3: I think the survey would really benefit from an analysis on parasitoid relative abundances depending either on the site (continental vs. island) or the habitat (agricultural vs. semi-natural). It could be easily done using GLMs because of the numerous replication points in the study, and it would allow answering the issue raised by the authors at the end of Page 12

Is anything expected in the context of climate-change and biological invasions in southern France? I am thinking about new geographic range shifts, phenology shifts and mis-synchrony between hosts and parasitoids (and host plants) that could happen within these communities. I think it could be interesting to add a few sentences on these matters without being too speculative because it is not the core aim of this survey.