Dear Sandrine Charles,

Many thanks for the invitation to review this manuscript. After reading carefully this work, I found it very interesting and I think it represents a great contribution to discussions about how to advance with sustainable agricultures. In general terms, the manuscript is very well introduced and methods are precisely described, but results and discussion sections need to be reorganised, with great emphasis on the main objectives of the article. Moreover, including explanatory figures describing the modelling process and scenarios evaluated will certainly allow the manuscript attain a wider public. I made numerous comments and suggestions to the authors in the original manuscript. I attach the commented version and I hope that my review helps improving the manuscript.

Best,

Julia Astegiano

Title: may be you should use spatial distribution instead of deployment?

Abstract

L.2 What do mean with "its share of agricultural landscapes"? Is not clear for me

L. 16 What do mean by "landscape context"? Please, try to be a bit more specific while describing your study

L. 18 One species of pest, one of predator? Please, be more specific while describing your model

L.19 Maybe you should use "spatial distribution" instead of deployment?

L. 21 I suggest you be more specific here as fragmentation can be measured in many different ways

L 23. what do you mean by different initializations of pop dynamics? Species combination of abundances? Please, be more specific

L. 23-24 various combinations of pesticides effects… diferent management scenarios? This last part of the sentence is not clear for me

General: It seems to me that a good description of your response variables is lacking (how did you measure CBC?)

L. 26 First you used landscape context, here you use landscape types. It is hard to get what you mean

L 26. "Its" -> I suggest you repeat OF as you have many different elements in your model and is easy to confound them. In this case I do not understand which impact you refer.

L. 28 What do you mean? Landscapes with more fragments but similar total forest cover?

L. 32. Here you mention quantity of semi-natural habitats but before you used other forms to refer to landscape effects. I suggest being more consistent with the terms you use

Introduction

I really liked your introduction; it's clear enough and provides information on all topics you develop in your study

L.44 Many thanks for mentioning impacts of industrial agriculture on human and non-human health in your introduction. This helps constructing a different narrative based on other values different from the false and hegemonic simplified view behind the sentence "we need to increase food production" (which in general means "commodities production")

L.68 I do not understand what do you mean with "its share"

L. 90 This is an uncommon word… May be you should use maximum or great?

Line 140 "fragmentation" measured as… I suggest you clarify how you measured fragmentation

Lines 139-142. Ok, you are exploring interactions among management practices at different spatial scales (local and landscape). This is not clear in your abstract, at least not as clear as here.

Lines 155-158. Ok, you are measuring fragmentation as an effect of isolation, it is important to mention that in your abstract and maybe focus your literature review cited in the introduction on isolation effects (which are different from area effects)

General comment on section 1.2. Even if the model is described elsewhere, I suggest you construct a figure to easily explain the "steps" and elements of the model. This would facilitate your dialogue with people working with OF that do not use mathematical modelling.

Also considering this point, maybe you can add some biological interpretation to model description (I made some comments below)

Lines 139-142. Ok, you are exploring interactions among management practices at different spatial scales (local and landscape). This is not clear in your abstract, at least not as clear as here.

Lines 155-158. Ok, you are measuring fragmentation as an effect of isolation, it is important to mention that in your abstract and maybe focus your literature review cited in the introduction on isolation effects (which are different from area effects)

L62 Check the double space "the pest population"

Equations: I do not understand how predators only reproduce in SNH… what is the biological explanation for this decision? Indeed, it is not clear how these general equations describe dynamics in different land uses if the pest and the predator are specialized.

L 191. This means that you are working with a pest that is specific of a given crop. This is a very important point of your work and I suggest you mention it in different parts of your manuscript. I mean, model dynamics may apply only for specialized predator-prey interactions, This is not a minor point in your work and is key to understand your results on the expansion of OF

L. 193-94 Are they generalists? How predators diet is considered in your model? Clarify this point, please.

I suggest you complement your tables with a figure in which you explain the different modelling scenarios you implemented, emphasizing the two different spatial scales of management that you are evaluating

Section "Initial conditions". All this information needs to be summarized in a figure, which certainly will facilitate the understanding of your model and modelling scenarios, and therefore your results

L. 244 I suggest you use isolation directly

Results

General comment: even I consider your results are very interesting, I think that you need to make a choice about what to share in the main text. For instance, point 1 is not part of your main objective (evaluating CBC at different management scenarios). I suggest more descriptive and exploratory results, that are interesting themselves, should be part of a supplementary material and here you should concentrate on the main results of your model following your specific objectives. I suggest you start your results with section 2, which gives the "control" scenario to make comparisons with the other scenarios. That is why I suggest you a figure explaining the modeling process and the scenarios evaluated.

L. 339 on the dynamics of the number and area of…

Section 1. I suggest you summarize in a sentence this first description on landscapes dynamics following different ways of increasing OF patches and send it to a SM, to facilitate readers comprehension of your results. I think it is interesting to read such description to get some elements to discuss your results.

Figures Section 1. I suggest you move these figures to a supplementary material

Line 404. In which scenarios? Initial ones?

Lines 411-417. Maybe I did not understand your biological decision about the model, but as described in methods, this is about specialized predators that only reproduce in SNH which food is only reproduced in crops. Can you give some example of such biological system? I am not sure these results make strong biological sense if the predator is not a generalist one. I mean, according to your model you have a pest specialized in a crop and

predators specialized in that pest, but predators only reproduce in SNH, i.e. they use the landscape in a complementary way.

Line 420. I suggest you refer to isolation, as is the factor of fragmentation that you are managing with your model parameters.

Line 422. This means that you have an habitat loss effect, not just an effect of isolation. This is interesting!

Section 3 describes your main results. I suggest you merge sections 2 and 3, as section 2 describes the "control" landscape that allows understanding the effects of landscape management

L 432. Maybe measuring mean edge density in your landscapes can be very informative. Does the model allow you to measure MED?

Section "Pest dynamics". General comment on the significance of results on pest dynamics: these results are very interesting. They mean that pest densities are responding more to habitat loss than to habitat fragmentation and that at least with the percentages of SNH explored you do not show the existence of a threshold, which is commonly reported in fragmentation studies. How such results can be affected by the fact that you incorporate some kind of the landscape heterogeneity perspective?

Lines 451-453. This is interesting indeed. Can we say that you have an interaction between habitat loss and fragmentation, in the sense that the way you increased OF (in a more fragmented way) has effects depending on the % of SNH.

Lines 455-456. Here your results suggest a threshold associated to the concept of habitat loss, interesting!

Lines 464-466. This means that conventional fields are benefited by surrounding OF. What can you say about the other direction? Is OF benefited by conventional farming?

Line 477. I suspect that in fact is more to the contact among pest and predators sources, that is why I suggest you measuring mean edge density

Lines 484-487. I found this dynamic very interesting. How can we think about local management in OF allowing some pest increase to maintain predators densities, instead of having large conventional farms providing predators food? (considering differences in human health that the different agricultural practices imply).

Figure 5. This is the main figure and result of your article. I understand the importance of describing pest and predator dynamics first; however, I suggest you summarize your main results in 4-5 paragraph in one result section and then add a more detailed description of those results in a supplementary material to facilitate the understanding of your whole modelling exercise to stakeholders. I do think all your results are interesting, but I feel that in the way you communicate them is too detailed and not that easy to be followed by a more general public. But it is just a suggestion. On the other hand, this figure can be improved by adding some designs that facilitate the lecture of axes (fragmentation in fact is a measure of SNH isolation in your case; and the proportion of SNH a measure of habitat loss; maybe you can add some representative designs of this?).

Lines 525-527. These results are very interesting, because the CBC seems to respond to an interaction among isolation and habitat loss, differently if we only measure pests or predators. I suggest you find a way to organize your result section to highlight these results

General comment on section 6. These results are interesting, but support your main results. I suggest you summarize them in one or two sentences and move the description to supplementary material

Lines 569-570. This is why I suggest that it is more an effect of the level of contact among the three different land uses than of SNH isolation and suggest measuring the landscape mean edge density.

Line 596-597. I suggest "pest and predator abundances dynamics"

Lines 598-606. Following your main objectives, this is an important but secondary result. Discussing it at this point in your discussion section deviates the focus of your study. Please, reorganize your discussion by following your main objectives and then add secondary results that may strengthen that discussion.

Landscape complexity is a too wide term and means so many different things that I suggest you use more specific concepts like patch isolation or amount of SNH (the parameters you explored).

Line 614. You do not need to cite figures that were already showed in your results section in your discussion

Lines 619-620. This sentence is rare, because in fact deployment strategies are part of landscape characteristics, are part of the construction of that landscape. Moreover, from your results I see a predominance of habitat loss effects (in the sense that dynamics respond more to increases in SNH).

Lines 619-624 and 625-630. In this sense, I wonder how considering coevolutionary dynamics may affect these results. I mean, if conventional fields led to pest resistance and OF drives to more diversified predator-prey coevolutionary dynamics

Line 649. For me this is the main discussion of your article. I suggest you give priority to these results and discussion

Lines 654, 658-661. I agree with your discussion and that is why I suggest you measure mean edge density, to have a measure of contact among different land uses and landscape configurational complexity that may be interacting with the % of SNH

General comment on section 2.1. I understand your results are exciting but I feel that you concentrate too much on it and do not discuss with other literature. Can you add some discussion in this sense?

General comment on section 2.3. Please, add discussion with previous work on the subject.

General comment: please, include discussion with the literature. Moreover, I think it would be interesting to include the metacommunity perspective here to discuss the importance of species dispersal and its interaction with landscape configuration

General comment on section 2.2. Same general comment as in the previous section. Moreover, how your results discuss with recent discussions about landscape effects in the context of European agrienvironmental schemes?