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The reviewers report on the PhD thesis of

**Zdeněk Janovský**

## The role of biotic interaction in population biology of meadow plants

The thesis consists of five papers, one already published and four manuscripts in the state ready for submission (I suppose that some of them have already been submitted). In all the papers, Zdeněk Janovský is the first author. These five papers are preceded by a general introduction, which should provide wider context to the study, and all the papers have very extensive appendices, which enable very well reconstruction of the often rather complicated and sophisticated analyses done.

The paper is based on extensive data, collected for a long time in the field, and uses rich toolbox of analytical methods. In general, the analyses are well done, and the conclusions are well supported with their results.

The topic of the thesis is well selected, it is very important. I like the connection of herbivory and pollination, and the results show the candidates ability to design a field study, to get reliable data, to analyse the data, and to draw defensible conclusions from the results.

**Without any doubt, the author demonstrated the ability of independent scientific work, and I fully recommend to award him with the PhD.**

Nevertheless, as any reviewer, I have found some places that are from my point of view problematic, and I am looking forward to discuss them during the defense.

I would like to stress that I do not consider the thesis review to be *laudatio*, but rather an opportunity to discuss some topics, and so the length of this section does not mean, that there

would be many mistakes in the thesis, but rather that there are many points worth of discussion.

## **Introduction**

Fig. 1 (p. 13) is clearly some very general synthesis. However, I must admit that, despite my repeated attempts, I was not able to fully understand its meaning. Even after I realized that there is some typographic mismatch (end of the figure caption is included in the main text in the next page 14), I still think that there must be some mismatch between the figure caption and the figure itself).

## **Paper I**

You have got data from two years, and decided to average them. This probably made the statistical tests more powerful. Nevertheless, I would be also interested to know, how consistent are your results in different years. Have you at least tried to check this?

I have some problem to understand, what was the response (i.e. magnitude of herbivory) in the statistical analyses. In particular, in the section 2.3.3 you describe that the percentage of foliage consumed was multiplied by the foliage available. If this would be used, this can lead to rather trivial conclusion that herbivores eat more from large plants. Nevertheless, in Fig. 1, you have in B and C proportion of populations, which seem to be a relative measure. What are the units for the response in Fig. 1A?

How have you done the classification based on the first axis of DCA, and particularly, why you decided that you need the classification. I would use the scores of samples on the DCA axis directly as quantitative predictors. Is there any advantage of having the vegetation first classified? – Only after reading the Appendix (which most of the readers usually do not do, as far as I can judge), I realized that this question is not correct, because you actually used the DCA axes as quantitative predictors – nevertheless, in this case, the statement in 2.4.1 “followed by a **classification based on the 1<sup>st</sup> axis**” is rather misleading.

## **Paper II**

I would be interested in some methodological details, which, however, might change in my view the interpretation of results.

How was the  $\chi^2$  test calculated? In this test, each observation (which is in this case an individual, at least I think so) should be an independent observation. However, how was then reflected the number of censuses carried out. (I would guess that using this methodology,

there will be significant differences also among individual censuses.) I would rather consider each individual census to be an independent observation (as it is affected by weather in each individual census done etc.).

Was some standardization used in RDA? It would be interesting to compare RDA with and without standardization by samples.

The most pronounced effect found in RDA is negative effect of conspecific density. I am afraid that this might be simple a result of type of data collection – p. 50: “Each pollinator individual was recorded only once...” I would guess that during the census, this individual visited several stalks of the same species within a patch. Consequently, the probability of visitation of a flower during a time interval need not be decreased by the presence of conspecific stalks. In other words, because the numbers recorded during a census are divided by the number of stalks, it is not so surprising that the response and number of stalks are negatively correlated.

Nitpickers comment – it is not so difficult to tell apart *Hypericum perforatum* and *H. maculatum*.

### **Paper III**

Large proportion of the populations are in meadows, which are mown (the unmown meadows are listed as abandoned). How is the mowing introduced into the IPM – in particular, seed production is dependent on whether the seeds manage to ripe before mowing.

Also, have you ever observed clonality in *Succisa*? I would expect that this species is able to split into two rosettes, particularly after some injury (e.g. if trampled on pastures). If yes, would it change the estimates of  $\lambda$ ?

### **Paper IV**

We can learn that the meadow is mown in the first week of September. I suppose that it is not the first cut. Is it so? Might some flowers be simply lost because the plant started to flower before the first cut, and, being mown, it did not re-sprout its flowering stalks?

I am surprised by the large proportion of individuals of this species that flowered just once during the four (five) years (I was slightly confused, when you speak sometimes about 2008 to 2012, and sometime about 2009-2012, could you explain this). I would expect that the species flowers quite regularly, however, I have never tagged individuals, so I just remember seeing flowers at the same spot. What might be the mechanisms limiting the frequency of flowering?

## **Paper V**

I am not completely sure that I would agree with the argumentation in favor of regressions with Type I Sum of Squares instead of Path Analysis. Accordingly, in your design, you have confounded effect of timing and site type – the importance of time of flowering might be simply artifact of your decision that timing goes first in the Type I SS calculation: in the early period, only verges were available (as you correctly write in the bottom of p. 100), so these two factors are necessarily confounded, and the one which you decided to come first is the more important one. I would be afraid that Type I SS, with you arbitrarily deciding the order of predictors might cause your results too much affected by these decisions. And also some of the results in Fig. 1 seem to be rather spurious correlations – have you any explanation, why the hoverfly density should have (albeit small) negative effect on germinability?

In České Budějovice, January 4th, 2015

Jan Lepš