

Evaluation of the PhD thesis FACTORS ASSOCIATED WITH INVASIVENESS IN THE GENUS IMPATIENS: INTERACTION OF SPECIES TRAITS, COMPETITION AND ENVIRONMENT submitted by Jan Čuda

Jan Čuda submitted a well-balanced thesis consisting of four papers, all already published in good international journals. The papers are framed by introductory and synthetic chapters. I like the scope of the thesis going from particular species traits of ten species of the genus, through coexistence and competition among one native and two invasive species, to the landscape scale of invasion of *Impatiens glandulifera*. Because the published papers passed through standard reviewing process in the high quality journals, I concentrate here especially on the introductory and synthetic chapters.

Abstract:

The rather extensive first part of Abstract has a character of a general introduction. I would expect here some exact information and not mostly general statements. The author among others wrote: “Invasive and native species compete only if their niches overlap and the strength of competition depends on niche similarity” – It is trivial, generally known and not specific for the studied species. Why is it in abstract?

P5: The author found that “...germination postponed to the period of more favourable conditions was more strongly associated with invasiveness ...” - It is interesting, in our study of the native and non-native *Bidens* species we found just opposite trend: the invasive species started to germinate and grow earlier in the season, i.e. under less favourable conditions. Has the candidate any explanation for these contrasting findings?

Introduction:

P10, above: The author wrote: “Invasiveness is determined not only by the traits alone, the traits act in concert with dispersal pathways.” - Not only, other factors are also important, such as priority effect, mass effect etc.

P11, 2nd paragraph: I do not understand the following sentence “Competitiveness of an alien species is important when it spreads from human-altered landscapes” - How can competitiveness, as a characteristic of species, can depend on a type of landscape when it is species-species interaction?

P11, below: “The genus *Impatiens* was chosen as a suitable study system, because it includes both successful invaders and species that do not invade.” - This genus is suitable study system also for other reasons such as annual character, seeds are comparably large and easy manipulated, etc.

P12-17: Nice and very illustrative characteristics of *Impatiens* species and their distribution maps.

Study 1:

The very important finding is that species traits linked to early stages of life-cycle are more important in determining invasiveness than traits of adults. Usually high stature, SLA and other adult characteristics are reported as decisive. How far is it possible to generalize this finding?

Study 2:

It is a nice field study. I have one question concerning methods: Why just these five localities were selected? In the paper there is simply written that the sites were chosen because they hosted populations of all three species. But there are much more such sites over the country. Fig. 3 may have an ambition to be included into textbooks.

Study 3:

The study experimentally confirmed what is expected regarding competition among the studied species. But it is experimentally a well-done study.

Study 4:

This study is closest to my experience because we earlier conducted a similar study with one of my former students. Results in Fig. 2 contradict our findings. Does the candidate have any other explanation for the fact that along the earliest invaded river *I.g.* occurs in the shorter distance from the river bank than along the later invaded river, beside the mentioned explanation that more accurate GPS was recently used? A general question: How much the different geomorphology of rivers can influence the spread of *I.g.*, or possibly other alien species, along and across river corridors?

Concluding chapters:

There is very well written Synthesis chapter, especially Table 2 is highly informative.

P79: The author wrote: "Frequency of planting was a stronger predictor of naturalization than the biological traits". It is a very important conclusion. But the frequency of planting is also influenced by species traits as the author himself wrote elsewhere. Thus, it is not a completely independent predictor. But this remark has only a theoretical sense, as a practical criterion to predict species invasion can be used. Does any broader study exist which would prove this for a higher number of species, thus having general validity? This is not discussed in Synthesis. The chapters Synthesis and Conclusions could be merged into one.

P83: Regarding the spread of *I.p.* I guess forestry machinery is the main vector of spreading seeds.

I enjoyed reading the thesis. There are many new findings presented and the thesis as a whole represents important contribution to invasive ecology. I fully recommend it.

In Třeboň, Sept. 21st 2017

Karel Prach