Evaluation of Mgr. Iveta Husáková Ph.D. Theses

Mgr. Iveta Husáková presents in her Ph.D. theses “Species diversity, distribution and intraspecific and intraspecific variation in performance of dry grassland species” four studies dealing with various aspects of grassland ecology. Three studies were published and one is in the stage of unpublished manuscript. Iveta Husáková is the first author of all presented studies and in consequence there is no doubt that she was the main contributor. The PhD theses are relatively coherent, general introduction is well written and introduces the reader appropriately into the studied problematic. Although the published manuscripts already passed the review process I have some questions and comments to all chapters of the theses, which should be discussed during defence.

Chapter 1“ Relative importance of current and past landscape structure and local habitat conditions for plant species richness in dry grassland-like forest openings.”

page 42: „The studies assessing the effects of current habitat size, isolation and habitat conditions on species richness implicitly assume that the system is in equilibrium “. Why do you think so? How it is related with the cited paper Fahring 2003?

page 46: How were defined species growing in surrounding forest? There was some threshold in respect to species abundance in the forest or the species was excluded if just one individum of the species was found in the forest?

How important were excluded species for richness of the rest of the plant community? I can imagine that some strong competitive species (e.g. Calamagrostis epigeos) could highly affect the diversity.

page 47: The authors were able to classify the old orthophoto maps only into two categories (forest and tree-less area). Can be these problems the main factor behind the small number of papers on landscape fragmentation including the historical data as is highlighted by the authors in the introduction? Is there any possibility how to reconstruct past stage in more complex agriculture landscape with the arable fields, species-poor productive meadows etc.?

page 48: The selection of the isolation index is every time tricky. Nevertheless, it is possible somehow comment why this isolation index was selected? Why the distance between centres and not edge to edge distance among fragments was used? What is the biological meaning of the index and is useful for all scientific questions? For example, will it be the best if I you will study effect of isolation on species dispersal or pollination?
page 49 (and Table S3). Authors in their models included highly correlated predictor variables (both areas in individual years and isolations in individual years are highly correlated). How they managed the problem with possible collinearity.... did they test it?

page 54-55. One of the most important result, which leads to the conclusion about high importance of historical factors is: “Moreover, this pure effect of each of these historical factors explained even more variation in species richness than the pure effect of current habitat area (i.e. pure effect of these variables after removing the effects of all of the other significant factors from the second step of analyses).” I think that the explanation of this result can be much simpler. Areas of individual fragments in 2007 are much more correlated with areas in years 1973, 1988 and 2000 (Table S3), which can be simply consequence of shorter temporal distance between individual years (the year 1938 represents the time outlier). In consequence the four years (1973, 1988, 2000 and 2007) explain more similar part of variability and in the model these years explain small unique part of variability. The question is how the results and conclusions will change if just three years, evenly distributed in time (e.g. 1938, 1973, 2007), will be considered.

Chapter 2: The effect of current and historical landscape structure and species life-history traits on species distribution in dry grassland-like forest openings.

page 84: One of the general disadvantage of the databases is that researcher has very limited control how the data for databases were collected. In consequence the databases can represent “data washing machines”. You can enter whatever you want into the database and then just cite the database. Also reviewers usually do not care about methods of data collection. For example, does author have an idea how were data on self-pollination in BiolFlor database collected?

page 86 (table 2): Similarly as in the previous manuscript the highest explained variability by area since 1938 can be done by higher correlation of other explanatory variables because of time closeness.

Chapter 3: Effects of habitat configuration and population size on performance of dry grassland species with different life-history traits.

page 123: “the degree of dependence on pollinators, i.e. whether the species are outcrossing or able of self-pollination (self-incompatible or self-compatible)” This terminology is misleading. Self-incompatibility vs. self-compatibility refer to the presence of different mechanisms preventing inbreeding. Terms outcrossing and self-pollination are related to type of breeding. We can say that self-incompatibility promote outcrossing but self-compatibility does not need to promote any type of breeding. The fact that the species is self-compatible does not automatically mean that is able of self-pollination (there can be different barriers like protandry etc.). Many self-compatible species which can be self-pollinated moreover needs pollen vector (facilitated selfing) i.e plants are not able to be pollinated inside one flower, but pollen can be transferred from different flower of the same plant (geitonogamy).

page 125: “(i) What is the effect of population size and connectivity on plant performance?” ............ It can be also in opposite: i.e. What is the effect of plant performance and connectivity on population size? I do not think that it is possible to say what is explanatory and what is the response variable.
page 145: “This indicates that the difference...”. Yes, but as discussed latter also maternal effect can influence the results.

page 146: “Lower performance of plants in small and isolated habitats may be caused by pollen and pollinator limitation...” It will be nice to do other experiment on pollen limitation.

Chapter 3: Species traits and shoot-root biomass allocation in 20 dry-grassland species.

I am confused about the methods of biomass partitioning. Plants were divided into aboveground parts (including for example stolons of *Fragaria viridis*) and underground parts (including for example rhizoms of grasses) or the stolons and rhizomes were not included into biomass? How can inclusion or exclusion of rhizomes and stolons affect results and observed differences between annual and perennial plants?

Discussion: Roots have more functions. How can be observed allocation patterns and differences between annual and perennial plants affected by accumulation of carbohydrates in roots?

Despite the above mentioned critical comments the PhD theses by Mgr. Iveta Husáková are of a high quality and are bringing many original results. I recommend the theses for defence.

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