

Assessment of PhD thesis submitted by Vojtěch Abraham

This thesis – “Palynological synthesis for the Czech Republic” - consists of seven sections, including an introduction, four published articles, one unpublished manuscript, and conclusions. The PhD candidate, Vojtěch Abraham, is a junior author for the first two articles and the senior author for the other three. The first two articles (Kuneš et al. 2009; Daneck et al. 2011) demonstrate that, as a co-author, he has acquired broad and in-depth knowledge and training in botany and paleoecology on the general vegetation history and phylogeography of *Lonicera nigra* in the Czech Republic and its vicinity. The third article (Abraham et al. 2012) shows that he was able to execute his own project independently for obtaining estimates of pollen productivity for plant taxa that are important for quantitative reconstruction of vegetation in the region; his understanding of the theory and methods applied in this work is very good. Vojtěch exhibits his critical and original thinking in the fourth article (Abraham et al. 2014). The REVEALS model for quantitative reconstruction of the past regional vegetation, used also in the fifth article (Abraham et al. in preparation), assumes several critical factors and conditions; one of the assumptions is that pollen grains accumulated at a sampling point in a sedimentary basin come from outside of the basin. This assumption is often violated when applied for pollen records from mires and bogs in the Czech Republic and elsewhere. Vojtěch and his colleagues provide insights into possible modifications and strategies to deal with this difficult issue using thoughtful research design and simulations. The fifth article summarizes the REVEALS-based reconstruction of regional vegetation using the pollen records compiled for the Czech pollen database described in the first article. This article provides insights into the Holocene vegetation history and one of the central issues in phytosociology – the potential natural vegetation in the region; implications of the finding are thoroughly discussed in relation to nature conservation and natural resource management in the future.

All things considered Vojtěch’s contributions to all the articles are substantial, and significant to the advances in Quaternary paleoecology and palynology as well. Although writing needs further improvement (e.g., further editing and reorganization is required for readability of the introduction and conclusion sections and the 4th and 5th articles), he demonstrates a clear understanding of the subjects and good command in numerical analyses and modeling. Following are my questions for clarification of some of the important points raised in the thesis and his future directions in research:

- (1) If you were allowed to study again, how would your research plans and strategies be different from those published in the 2nd and 3rd articles? For another phylogeographic study, which species would you select, and why? Would you use different methods and different forms of DNA and materials? If pollen productivity estimates for other taxa were necessary in the region, what would be the selection criteria for study areas, and what would be your sampling design?
- (2) What are the pros and cons of the research approach you used for estimating pollen productivity in the 3rd article? Based on the results from the 4th article, would you modify the research design and strategy both in the field sampling and data analysis, and if so, how?
- (3) Please clarify and articulate the major findings in the 4th article, particularly on your ideas and approaches to improve reliability of the REVEALS results using pollen data from bogs and mires in general. Based on your results and experience from this article, what would be your approach for local vegetation reconstruction using pollen records from small bogs and mires? It would be good if you could provide general directions and approaches you would take in the future.
- (4) For the 5th article and the entire thesis, what are your definitions of “naturalness,” “natural vegetation,” “potential natural vegetation,” and “actual vegetation”? Please clarify. After quantitative reconstruction of the regional vegetation is completed, what would be the next important steps to “explain the naturalness of today’s vegetation” further in the Czech Republic?

In addition, if you are familiar to the ecological debate on plant communities between the Clements and Gleason schools in North America in the mid-20th century, would your definitions for those terms be different or the same? What would be the contribution of the REVEALS-based reconstruction of vegetation to the debate?