

External Examiner Report on Doctoral Dissertation for PhD Degree

Name of Candidate **Mgr. Radka Kozáková**

Title of Thesis

The Early Medieval landscape and transformation during the High Medieval colonization

Dissertation Supervisor Mgr. Petr Pokorný, Ph. D.

Institution Charles University of Prague, Faculty of Science, Department of Botany

Overall academic merit of the dissertation

The candidate presents in the dissertation a contribution to the knowledge of the interpretation of pollen spectra from sedimentary series of medieval urban centers. Such sediments are not natural but of anthropogenic origin, a fact that complicates the interpretation considerably. Biostratigraphically, natural sediments of this age are assigned to the period of Younger Subatlantic (numbered X), as defined by the founder of pollen biostratigraphy Franz Firbas. Pollen assemblages of Younger Subatlantic age reflect the landscape colonization during the Middle Ages and associated deforestation. The degree of deforestation and synantropization or land use in the Middle Ages are important subjects of study in the disciplines of archaeobotany and palaeoecology. The candidate sub-divides the Middle Ages in several phases according to the representation of pollen and palynomorphs in both archaeological and natural sediments. She exploited the unique opportunity for the palaeoecological research provided by the availability of sedimentary series of the Early Middle Ages from the Prague Castle and of Liblice on Cidlina River, two key locations for early medieval history in Bohemia. The candidate also studied the decline of *Abies alba* (fir) during the Late Holocene in the Czech Basin and in Moravia.

Structure and composition

The dissertation comprises 140 pages, an Appendix (17pages) and a *Curriculum vitae* (3 pages). The structure of the dissertation is coherent and flows logically from chapter to chapter (from one publication to another). The research undertaken is contextualized clearly. The Thesis consists of four chapters. Chapter 1 constitutes the Introduction and explains the topic of research: the Early and High Medieval environment. Chapter 2 contains two articles published in 2006 and 2007 in the peer-reviewed journal of the Archaeological Institute of Prague *Archeologické rozhledy*. Chapter 3 also comprises two articles, published in journals with an impact factor and cited in ISI Web of Knowledge: *Preslia* (2007) and *Vegetation History and Archaeobotany* (2009). Chapter 4 consists of one article published in the prestigious journal *The Holocene* (2011). The successful publication of results in such a wide range of journals bears witness of the originality of contributions and fullness of her PhD studies in the years from 2004 to 2011.

General content

Chapter 1 (11 pages) forms the Introduction, in which the theme of the dissertation is reported fully and clearly. The research questions are well-justified and integrated into the larger field of associated scientific disciplines.

Chapter 2 (47 pages) contains two published articles: **Kozáková R.** & Kaplan M. (2006), Příspěvek pylové analýzy k rekonstrukci přírodních poměrů v okolí Libice nad Cidlinou, *Archeologické rozhledy* 58: 540–549; and **Kozáková R.** & Boháčová I. (2008), Přírodní prostředí Pražského hradu a jeho zázemí v raném středověku – výpověď pylové analýzy sedimentů ze III. nádvoří. *Archeologické rozhledy* 60: 547–564; written in Czech language with summaries in English. These articles document the impact of the early medieval settlement on the natural landscape. The provenience of palynomorphs in the cultural layers was discussed, and the results presented in tables listing the pollen types identified in the sediment layers, the plant taxa included in each pollen type, and the biotopes corresponding to each pollen type. The biotopes were visualized in specific pollen diagrams. The rural character of the settlements was shown on both localities (Prague Castle and Liblice on Cidlina River). A surprisingly balanced character of natural forest and synanthropic vegetation was observed. The candidate also integrated pollen observations with macroscopic remains analyzed in the same sediment layers. This method appeared to be very beneficial for the evaluation of the Early and Middle Ages environment.

In **Chapter 3** (49 pages) includes two articles written in English: **Kozáková R.** & Pokorný P. (2007), Dynamics of the biotopes at the edge of a medieval town: pollen analysis of Vltava river sediments in Prague, Czech Republic, *Preslia* 79: 259–281; and **Kozáková R.**, Pokorný P., Havrda J. & Jankovská V. (2009), The potential of pollen analyses from urban deposits: multivariate statistical analysis of a data-set from the medieval city of Prague (Czech Republic), *Vegetation History and Archaeobotany* 18: 477–488. These papers studied the fortified settlement agglomeration under the Prague Castle both on the left riverside of the Moldau (Small Town) during 9th century and on the right riverside (Old Town) during the 11th and 12th centuries. The candidate concentrated on the question whether the statistical method of multivariate analysis can disentangle the contrast between anthropogenic and natural environments, and also between anthropogenic spectra of the Early Middle Ages and of the High Middle Ages. She came to the conclusion that pollen spectra from archaeological and settlement layers dated to the 9th century reflect a more natural environment than those of sediments from medieval wells or cesspits dated to the 11th and 12th centuries. She claims that *Centaurea cyanus* pollen is the only reliable indicator taxon for the High Middle Ages. This pollen type is in the same group as *Fagopyrum* (buckwheat), but it appeared earlier in the pollen diagrams. Some hesitation is also about *Myrtus/Eugenia* which was included to anthropogenic indicators even that is exotic in our conditions.

Chapter 4 (29 pages) focuses on the Late Holocene decline of *Abies alba* in the Czech Basin and in Moravia (**Kozáková R.**, Šamonil P., Kuneš P., Novák J., Kočár P. & Kočárová R., 2011, Contrasting local and regional Holocene histories of *Abies alba* in the Czech Republic in relation to human impact: Evidence from forestry, pollen and anthracological data, *The Holocene* 21: 431–444). 23 pollen sites were reviewed. The pollen data were shown in diagrams drawn on a BC/AD time scale, showing the main expansion of *Abies alba* in the Subboreal after 2200 BC (archaeologically in the Bronze and Iron Ages) and a next expansion during the Early Middle Ages. A general decline of *Abies alba* at the beginning of 14th century was shown on a vertical transect from the lowlands to highlands. This contrasts with

the Late Holocene expansion, which was only apparent on a few sites. Still open for discussion are the relative contributions to the decline of human impact and changed climatic conditions during the Late Middle Ages and the Early Modern Times.

Methodology

The methodology used is described in detail and is relevant to the research questions and the theme of the thesis. The articles of the thesis reflect sufficient competence in the survey of literature and documentation of statements. For the future I would recommend an increased use of all the pollen keys of North European Pollen Flora (I – VIII), in addition to Volume IV used in this thesis.

Implications of the scientific research

The merits of the PhD Dissertation are the use of a new statistical approach to the pollen results of the anthropogenically influenced sediments and pollen analyses made in high taxonomic and temporal resolution. The Early Middle Ages and the High Middle Ages were defined according to the assemblages of species or pollen types using multivariate analyses of CANOCO. Interesting is the approach to explain the Late Holocene vegetation history of *Abies alba* by human influence.

Formal layout

The thesis is in a form suitable to the discipline. The format and literary presentation of the thesis are satisfactory. Writing of the document is of professional standard.

Recommendation

Thesis constitutes a significant contribution to the knowledge and understanding of the field concerned. After successful oral defense I recommend that the candidate Mgr. Radka Kozáková should be awarded the degree of Doctor of Philosophy without further examination or modification.

External Examiner

PhDr. Helena Svitavská, CSc.

In Průhonice July 22, 2011