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Review of the PhD thesis:
The Early Medieval landscape, and transformation during the High Medieval colonization
by Mgr. Radka Kozáková

In recent years, past environmental changes has been a subject of interest of many specific scientific disciplines. In the scientific community there is a growing conviction that knowledge in this field will give a better understanding of the mechanisms of climate change, the evolution of soils, long-term natural succession of vegetation and the process of synanthropization. These data are necessary for work on scenarios of future environmental change, and recently their importance to the rational management of natural resources has been increasingly emphasized. Information on the environmental conditions in specific prehistoric or historic periods is also necessary for studies on past settlement dynamics. Pollen analysis belongs to the basic methods for the reconstruction of environmental changes in the past. In recent years, projects aimed at a better understanding of the origins of the composition of the fossil pollen spectra, the improvement of the pollen-analytical methods, and the development of tools enabling more precise interpretation of pollen data are of special importance. The doctoral thesis by Mgr. Radka Kozáková falls into the mainstream of recent palynological research.

The main topic of the doctoral thesis by Mgr. Radka Kozáková concerns palaeoecological reconstruction of the history of the landscape transformation in medieval times around a hill-fort in Libice/Cidlinou and different contexts in Prague based on the results of pollen analysis. An

important aspect of this work is the methodological issues concerning potentials of pollen analysis in the study of archaeological layers and as a source of information on environmental changes in a landscape scale. Therefore, in my opinion, the scientific problems which are the subject of the thesis are real and their examination is fully justified.

The thesis consists of five papers published in the period 2006-2011. Two articles appeared in a Czech archaeological journal (*Archeologické rozhledy*), one in a Czech botanical journal of high international scientific rank (*Preslia*) and two in well-recognized international journals on palaeoecology (*Vegetation History and Archaeoebotany*, *The Holocene*). It is supplemented with an Introduction and Conclusions, both comprehensively related to most of the problems studied by the Author. The thesis is based on the Author's own original materials and is supplemented by data extracted from the Czech Quaternary Palynological Database (PALYCZ). The use of these data is correct and fully acceptable. I would particularly like to underline the very precise, high quality analysis with respect to pollen taxonomy and the professional use of the ecologic characteristics of plant taxa for the palaeoecological interpretations. In these terms Radka Kozáková is a fully qualified palynologist representing the youngest generation of scientists continuing the best traditions of well-recognized Czech palaeoecology.

Both articles in *Archeologické rozhledy* present case studies characterizing the local environment during the Early Medieval period. The most important results published in these papers are long lists of the determined pollen taxa, indicating a moderately deforested, highly diversified landscape of rural character. The articles published in *Preslia* and *Veg Hist Archaeobot* give information on a distinct environmental change in the High Medieval period which can be described as higher deforestation of the landscape and simplified composition of vegetation with a predominance of cereals and nitrophilous weeds. To emphasize these features several sophisticated numerical methods have been successfully used. The article in *The Holocene* differs from the rest of the papers by its topic, material and methods. It illustrates the history of *Abies alba* in the Czech territory based on pollen analysis, and discusses the representativeness of these data against the evidence from forestry and the results of anthracological analysis. In my opinion, the methodological aspects of this paper are especially important. The thesis is well written.

The thesis by Radka Kozáková, as with each interesting and well-made scientific work, brings to mind several questions which directly or indirectly concern the results of her research. I would like to discuss the following more general and more specific issues:

(1) In my opinion the title of the thesis and the first of the aims formulated for this study are too general. It should be specified to which geographic/historic region the study and then the conclusions may concern. **In this respect I would like to ask the Candidate for a more precise delimitation of the area to which her conclusions on landscape transformation in the medieval period might be applied. In which European regions could similar processes be expected, and in which regions could they already have been described?**

(2) The formulation of the second aim: "to assess the potential of analytical pollen data from both archaeological layers and natural sediments …" supplemented with two additional questions: "whether … pollen analysis can be successfully applied to archaeological research in urban contexts" and "if the detail of pollen data is sufficient to reflect landscape changes" (see p. 139) is also too general and suggests that the Author has undertaken a pioneering study to resolve these problems, which is certainly not the case. The work done by Radka Kozáková, and especially the application of numerical methods, affords new data and new arguments for a better understanding of what pollen spectra from the specific kind of cultural layers may represent; however, the results of palynological research providing important data in this respect has already been published by many authors, e.g. Dimbleby, J. Greig, I. Vuorela, K. Krzywinski, K. Wasylikowa, A. Wacnik, H. Seppä, V. Jankovská, P. Pokorný, M. Stančikaitė, and also M. Latałowa and many others. Some of these papers are cited by the Author. From all of these studies the great potential of pollen analysis of urban cultural layers is evident, even though the highly complex nature of such material is usually a limiting factor for its comprehensive interpretation. **Therefore, I would like to ask the Candidate for her opinion on the most important new achievements brought about by her own pollen study on cultural layers to this research trend.**

(3) I would also like to relate to the second question mentioned by the Author among the aims of the thesis, according to which she intends to study "if the detail of pollen data is sufficient to reflect landscape changes". The task is formulated in a way that suggests that at least a part of the study has been focused on this first-rank methodological problem in pollen analysis. Here again, the work by Radka Kozáková offers us new examples that are important for a better understanding the problem of spatial representation of pollen analysis, but her data cannot be a base for a more comprehensive answer to this very complex question; the pollen data used in this

study do not fulfil the specific methodological conditions needed for such work. Both theoretical and analytical studies indicate the great potential of pollen analysis for palaeoenvironmental reconstructions at the landscape scale. However, successful results may be obtained only under rigid methodological conditions considering spatial coverage by pollen sites. Theoretical work based on specific modelling should precede the choice of potential pollen sites. **In this respect I would like to ask the Candidate to present at least the most important factors which should be taken into consideration for the landscape palaeoecological reconstruction, for example, in two areas contrasting in respect to the main vegetation constituents (pine forests and broad-leaved tree forests).**

(4) I would also like to comment on two other aspects of the paper on the history of *Abies*. 1- in the proper comparison of pollen and historical sources both kinds of data should come directly from the same area and the chronostratigraphic resolution of the pollen record should be of the highest quality. Preferably, pollen data examined in a stand scale should supplement such a study, especially due to the usually low *Abies* pollen representation. As concerns the abundance of *Abies* charcoal in archaeological layers – this might be interpreted in different ways: as a high proportion of silver fir in the local woodland, which should be reflected as a high proportion of *Abies* pollen in the diagrams (as interpreted by the Author), or as over-exploitation of this species, which resulted in the decline observed in pollen diagrams. I would like to underline that I am not against the interpretation given by Radka Kozáková, but it is important to show other possibilities due to the complexity of these results. It should be stressed that further steps to solve such problems must involve very precisely planned pollen analysis and high chronostratigraphic resolution of the data. 2- The Author discusses her data from the Czech area against data from the Alps. In this context I would like to mention that the geographical range of *Abies alba* extends more than 200 km north of the Czech NE border, through the Carpathians and Sudety Mts. up to the mid-Polish uplands. The history of *Abies* in the Polish territory is well documented**. I would like to ask the Candidate if, in her opinion, the data from Poland might be helpful in further ecological interpretation of the late Holocene *Abies* dynamics.**

(5) The main topic of the thesis is the landscape transformation at the turn of Early and High Middle Ages around Prague and Libice due to changes in human pressure. This process has been well documented based on a pollen data set comprising a large number of well-determined taxa. However, during the medieval period important

climate changes also took place. **I would like to ask whether the collected data afford any evidence for the Early Medieval Warming or the following climate cooling. Does the interplay between *Abies*, *Fagus* and *Picea* in the pollen diagrams from "natural" sites, relating to the medieval period, at least in part, may reflect climate change?**

The above comments and questions are of disputable character and do not diminish my very positive opinion on the thesis. Pollen analysis is a powerful method enabling us to take a trip to the past; however, the specific character of the source material usually leaves space for more than one interpretation. The data concerning the late Holocene are especially difficult in this respect because of the increasing human impact which masks changes resulting from natural factors. More precise interpretations are possible only when all methodological aspects of the study are established in advance, according to the specific needs of the project. I hope that Radka Kozáková will have opportunities to create her own well-planned projects focused on the topics which she find especially interesting.

Conclusion

Summing up, I confirm that the thesis by Radka Kozáková is a wholly professional palaeoecological study based on original data illustrating the history of the medieval landscape in the surroundings of two historical sites, and the history of silver fir (*Abies alba*) in the area of the present-day Czech Republic. The methodological aspects of this study are of wider palynological interest. All five papers are well published, three of them in recognized scientific journals of international interest.

In my opinion, the thesis fulfils the criteria necessary to obtain a PhD degree. Therefore I am putting forward a motion to the Board of the Faculty of Science of Charles University in Prague to allow Mgr. Radka Kozáková to face a doctoral defence.

Gdańsk, Sept. 29th, 2011.

Prof. dr hab. Małgorzata Latałowa