

Woodland and its use in central Bosnia during the late Neolithic. Results from anthracological investigations in the Visoko-basin

Tim Mattis Schroedter^{1,3}, Robert Hofmann^{1,2}, Martin Furholt^{1,2}, Johannes Müller^{1,2} and Oliver Nelle^{1,3}

- 1 Graduate School "Human Development in Landscapes, Christian-Albrechts-Universität zu Kiel, 24098 Kiel, Germany; tschroedter@gshdl.uni-kiel.de
- 2 Institut für Ur- und Frühgeschichte, Christian-Albrechts-Universität zu Kiel, 24098 Kiel, Germany; Robert.hofmann@ufg.uni-kiel.de, Martin.furholt@ufg.uni-kiel.de, Johannes.mueller@ufg.uni-kiel.de
- 3 Institut für Ökosystemforschung, Christian-Albrechts-Universität zu Kiel, 24098 Kiel, Germany; onelle@ecology.uni-kiel.de

Summary: The multi-disciplinary research-project "Tell in the woods? Anthracological investigations in SE Europe and Turkey" deals with the woodland-management of Neolithic and Chalcolithic societies. As part of this project charcoal samples from several sites from a settlement-region in Bosnia and Herzegovina were investigated. First results show an open landscape with manifold vegetation. The investigation of different sites allows the tracing of vegetational differences on a micro-regional scale. High amounts of *Maloideae* in the charcoal assemblages suggest a special treatment of this group of plants. The occurrence of *Pinus* raises questions for potential stands of pine in the neolithic vegetation. In comparison with archaeological and macro-botanical analyses a differentiated picture of the exploitation of woodland can be suggested.

Key words: Late Neolithic, southeast Europe, wood use, vegetation.

INTRODUCTION/BACKGROUND

To gain a better understanding of neolithic societies and their reception of the environment, anthracological investigations provide information about the wood use and the exploitation of woodland. The interdisciplinary PhD-project "Tells in the woods? - anthracological investigations in South-East Europe and Turkey" aims at tracing exploitation strategies for woodland vegetation developed by tell inhabiting societies and raises the question for the beginning of an intentional management of wooden resources.



FIGURE 1. Area of research NE of Sarajevo.

Excavations in the Visoko-basin, Bosnia and Herzegovina, in the years 2002-2008 provided the opportunity to investigate charcoal samples from three sites dating to the time span between 5300 and 4500 cal BC. During the late Neolithic people of the Butmir-group settled in central Bosnia, around 20 km from the today's state Capital Sarajevo (Fig. 1). They erected structured settlements with several rows of parallel houses. The inhabitants maintained connections with

the Adriatic and the Danube area as indicated by pottery decoration patterns and the occurrence of obsidian tools (Hofmann *et al.*, 2007).

Climate data from the eastern Mediterranean suggest a slightly drier climate than today (Roberts *et al.*, 2011) and the present-day potential natural vegetation is in the transition between the central European mountain beech forests and the central European mixed deciduous forests (Horvat *et al.*, 1974).

MATERIAL AND METHODS

During the field campaigns every archaeological feature was sampled for macro-botanical investigation. All samples were processed directly by flotation. All charcoal pieces with an edge-length of more than one millimetre were handpicked. The charcoals were determined under a reflected light microscope and detected on genus level. Per sample 30 pieces were identified, if possible.

RESULTS

More than 120 samples with over 2500 pieces of charcoal were investigated. 17 taxa could be documented (Table 1). The charcoal spectra from different sites, located in various parts of the Visoko-basin differ noticeably (Fig. 2). Near the Bosna-river in the valley, riverine vegetation (*Alnus*, *Fraxinus* and *Ulmus*) is dominant in some areas. In the broad valley bottom mixed deciduous forests (*Quercus* and *Carpinus/Ostrya*) seem to dominate the neolithic vegetation. Growing percentages of mountain species (*Abies*, *Acer* and *Fagus*) are recorded in a steeper side valley. High amounts of light demanding species

(*Cornus*, *Corylus* and Maloideae) in parts of the settlement region indicate at least a partly opened landscape.

	Okolište 738 pcs.	Kundrući 771 pcs.	Zagrebnice 403 pcs.
<i>Abies</i>	7	91	12
<i>Acer</i>	13	111	9
<i>Alnus</i>	18	13	7
<i>Carpinus/Ostrya</i>	7	7	2
<i>Cornus</i>	26	20	40
<i>Corylus</i>	49	51	17
<i>Euonymus</i>	3	0	0
<i>Fagus</i>	36	108	16
<i>Fraxinus</i>	11	45	44
Maloideae	99	116	14
<i>Pinus</i>	123	36	116
<i>Prunus</i>	3	1	0
<i>Quercus</i>	241	115	85
<i>Sambucus</i>	4	0	0
<i>Ulmus</i>	6	18	27
<i>Viburnum</i>	10	4	0
Cf. <i>Populus</i>	1	0	0

TABLE 1. Taxa identified in the investigated settlements and their absolute numbers.

Internal analyses suggest the use of pine and oak for timber. More species were found in the space between houses and in fireplaces (*Euonymus*, *Sambucus*, *Prunus*, etc). In addition, one of the documented houses offers an assemblage of taxa, differing from the other houses in the use of elm and the absence of pine.

DISCUSSION

The intra-site analysis led to the distinction of timber and fuel wood, indicated by differences in the charcoal spectra found in archaeologically identified house contexts and, contrasting these, hearths and open areas. A preference in the use of pine and oak for timber is documented, whereas the fuel wood record shows rich and diverse vegetation in the surroundings of the investigated settlements. The characteristic combination of taxa in the charcoal record of one of the houses can be interpreted as an indication for exclusive use of single wood species in exceptional contexts, which is also suggested by the archaeological finds. The comparison of fuel wood spectra derived from

several settlements accounts for the identification of different ecosystems used by the neolithic population.

The high amounts of light demanding species suggest the preferential treatment of single species. Especially in combination with the macro-botanical analyses, it can be assumed that hazel, cornelian cherry and possibly apple trees were pollarded regularly. The stands of these plants may be located in edge situations in the manifold landscape. The occurrence of *Pinus* raises the question of transportation of wood versus changes in site conditions in the Visoko-basin since the Neolithic.

CONCLUSIONS

For the first time, vegetation data are available for the Visoko-basin and provide insights in the mid-Holocene vegetation of central Bosnia. The dispersal of charcoal assemblages within the settlements can be used to distinguish timber and fuel wood. In combination with the archaeological data it seems possible to trace cultural restraints or at least exclusive use of single taxa. The comparison of fuel wood assemblages shows the exploitation of different ecosystems by the Neolithic population and suggests an open landscape. The high percentages of Maloideae, *Corylus* and *Cornus* are the result of human influence on the vegetation and let us think of a careful management of fruit bearing trees and shrubs.

REFERENCES

- HOFMANN, R., KUJUNDŽIĆ-VEJZAGIĆ, Z., MÜLLER, J., MÜLLER-SCHEEßEL, N., RASSMANN, K., 2007. Prospektionen und Ausgrabungen in Okolište (Bosnien-Herzegowina): Siedlungsarchäologische Studien zum zentral-bosnischen Spätneolithikum (5300-4500 v. Chr.). *Ber. RGK* 86, 41–212.
- HORVAT, I., GLAVAC, V., ELLENBERG, H., 1974. *Vegetation Südosteuropas*. Stuttgart.
- ROBERTS, N., EASTWOOD, W. J., KUZUCOGLE, C., FIORENTINO, G., CARACUTTA, V., 2011. Climatic, vegetation and cultural change in the eastern Mediterranean during the mid-Holocene environmental transition. *The Holocene* 21 (1), 147-162.

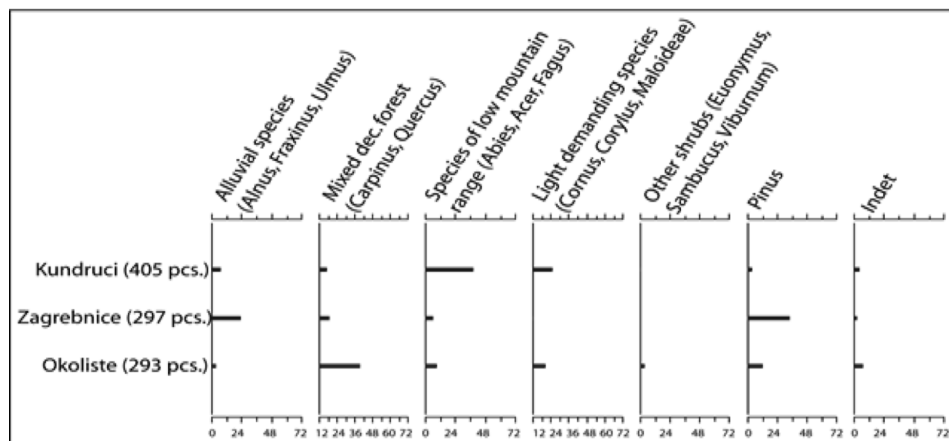


FIGURE 2. Fuel wood assemblages from the different settlements in the Visoko-basin.