PLANT-BASED RESOURCES OF A LATE BRONZE AGE COPPER MINING SITE IN THE EASTERN ALPS

Archaeobotany at Prigglitz-Gasteil (Lower Austria)

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Prigglitz-Gasteil belongs to the **easternmost Bronze Age mining region in the Alps**. The late Urnfield Culture site was occupied from the 11th to the 9th century BC (Trebsche 2015). It can be interpreted as a large work camp where copper ore was extracted, processed and finally alloyed with tin to produce bronze objects (Trebsche & Pucher 2013). Excavations from 2010 – 2014 revealed various antler tools, bone artefacts, numerous animal bones, ceramics, bronze finds and slags. The massive mining waste heap was investigated in order to **reconstruct the work flow of the mining community**, using flotation samples, which were taken in a high-resolution approach. We aimed at the reconstruction of the supply chain necessary to provide the miners with timbers and food, and of spatial and temporal patterns of plant resource use. Both **charcoal and other charred plant macroremains** were used as sources of information.

Fig. 1, 2

Fig. 3

Fig. 4

Fig. 1: Map of Austria with location of Prigglitz.

Fig. 2: Photo of the excavated layer SE 43, a cultural layer rich in charcoal.

Fig. 3: *Abies alba* needles.

Fig. 4: Charred fragment of cereal product containing barley (*Hordeum vulg.*)

Results: Archaeobotanical Macroremains

The preliminary results of the archaeobotanical investigation show that Prigglitz was a work camp for copper extraction and bronze production, which was supplied with food from somewhere else. No remains of food production but **large amounts of forest species**, particularly charred coniferous needles of fir (*Abies alba*) and spruce (*Picea abies*) were found. **Wild plants predominate** in general, and crop plants were mostly found processed as **ready-to-eat cereal products**. The majority of the identified cultivated crops were millets (*Setaria italica* and *Panicum miliaceum*), as well as barley (*Hordeum vulgare*) in lower quantities and few lentils (*Lens culinaris*). Additionally, fruit remains of species of wood margins (*Corylus avellana*, *Malus/Pyrus* sp., *Rosa* sp., *Rubus fruticosus*, *R. idaeus*, *Sambucus* sp.) appeared in the flotation samples and could either indicate further food resources or the clearing of forests for mining, or both.

These results correlate with results of the study of a mining site from the Inn Valley in western Austria: at the Bronze Age mining site of Mauken the most abundant remains found were needles of fir and spruce, as well as species of wood margins. Except for a single grain of *Panicum miliaceum*, no crop remains and no indicators for crop processing activities were found (Schibler et al. 2011).

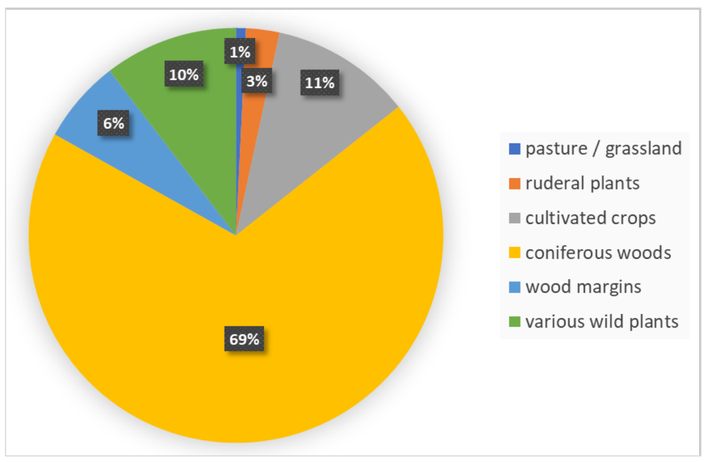


Fig. 5: Plant macroremains from the copper mining site Prigglitz-Gasteil. (N = 5028, unidentified remains were excluded from this graph).

Fig. 6

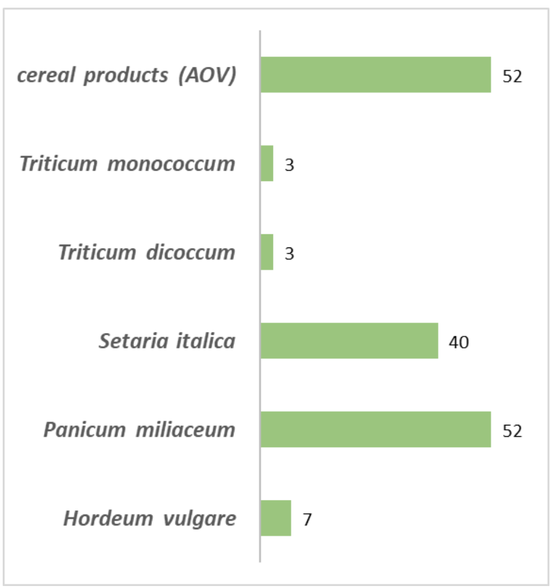
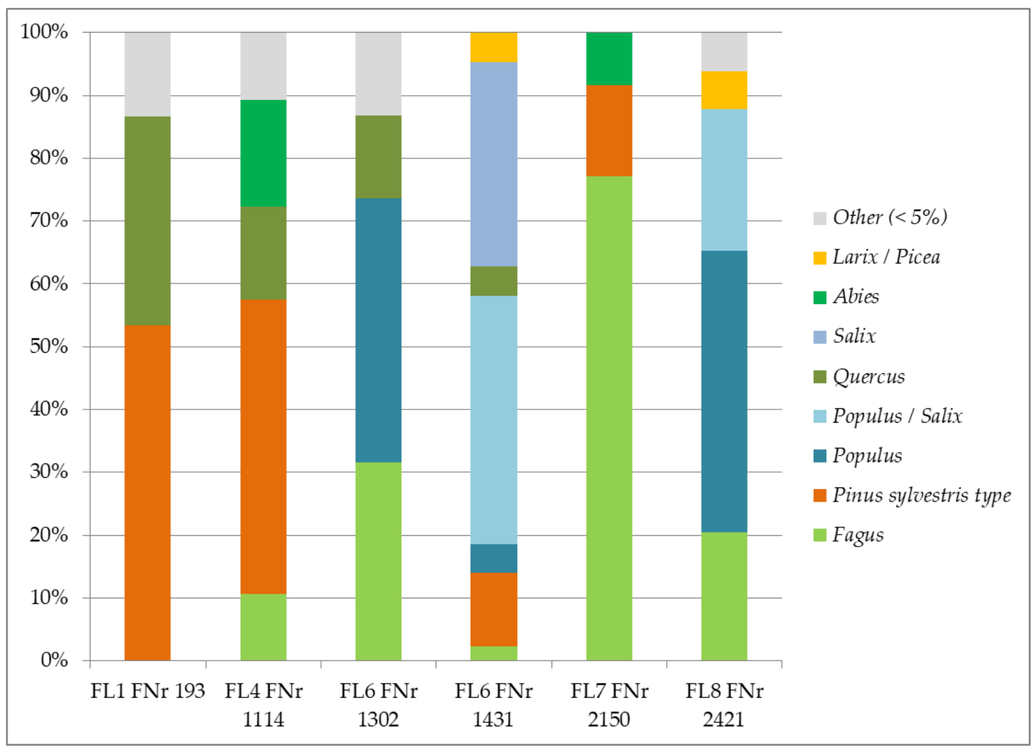


Fig. 6: Cultivated crops and processed food remains (N = 157, unidentified remains were excluded from this graph)

Fig. 7: Charcoal assemblage from 6 flotation samples at the mining site in Prigglitz. (N = 300, taxa with a quantity less than 5% in relation to the whole sample are grouped as „Other (<5%)". Sample FL7 FNr 2150 was taken from a burnt building structure and depicts most likely construction wood)

Fig. 7



Results: Charcoal Analysis

A number of 6 samples with 50 pieces of charcoal each (300 in total) have been analysed so far. Woody taxa from the cultural layers may have been used as **fuel**, especially for the **processing of copper ores**. Following the theory of the ‚*Principle of Least Effort*', those taxa reflect the natural environment at that time. The composition of species depicts a montane **pine-dominated mixed forest** (*Fagus*, *Larix / Picea*, *Pinus sylvestris* type, *Quercus*), with **species of open grounds** (*Pinus sylvestris* type, *Populus*, *Salix*), showing **small-scale open areas due to human impact**. One of the samples was taken from a layer in a burnt building (FL 7 FNr 2150) and might consist of construction wood. It seems that construction wood was carefully chosen as this sample consists almost entirely of *Fagus* wood.

Again the results correlate with the results of the mining site in the Inn Valley. Charcoals from Mauken indicate the use of timber from a semi-natural mixed forest with minor quantities of species from open grounds (Schibler et al. 2011; Heiss & Oeggl 2008).

Conclusion:

The archaeobotanical results suggest that Prigglitz was a highly specialized mining site with no local food production or food processing: The majority of macroremains derives from forest species and wild plants, whereas remains of crop plants are rare, mostly in a processed form and by-products of crop plant processing are basically absent.

The anthracological results indicate that the mining activities had impact on the local forests due to the high needs for fuelwood. Species of open grounds show small-scale open areas near the mining site (working platforms and rock waste heaps).

Literature:
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