

Lisa Rühl, Christoph Herbig, Astrid Stobbe

Goethe-University Frankfurt/Main, Institute of Archaeological Sciences, Grüneburgplatz 1, 60323 Frankfurt/Main.

lruehl@em.uni-frankfurt.de, C.Herbig@em.uni-frankfurt.de, Stobbe@em.uni-frankfurt.de

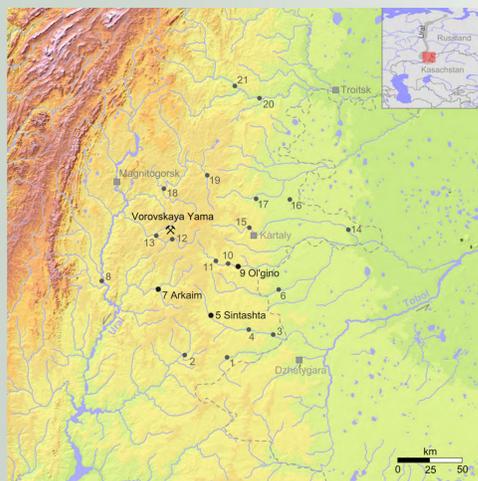


Fig. 1 Location of the research area with Kamennyj Ambar/Ol'gino (No. 9) and other Bronze Age settlements in the Transurals.



Fig. 2 Excavation at Kamennyj Ambar



Fig. 3 Reconstruction model of the fortified settlement Kamennyj Ambar



Fig. 4 Betula forest in the steppe



Fig. 5 Wet-sieving at the riverbank of the Karagajly-Ayat



Fig. 8 Several well features in Kamennyj Ambar (excavation 2010) small photo: well 2.1 during excavation in 2008 with excellent preservation of a wooden construction.

Introduction

Archaeobotanical investigations are an essential part of the DFG-funded project 'Environment, Culture and Society of the Southern Urals in the Bronze Age: A Multidisciplinary Investigation in the Karagajly-Ayat Microregion, Russia', a cooperation between the Goethe-University in Frankfurt/Main and the Russian Academy of Sciences, Ural Branch in Yekaterinburg (KRAUSE ET AL. 2010; KRAUSE/KORYAKOVA IN PRESS; RÜHL 2012).

Methods

In the years 2008-2012 a total of 199 systematic and judgement samples were taken out of features and cultural layers in the Kamennyj Ambar settlement (Fig. 3) and were wet-sieved in the field (Fig. 5). In the Archaeobotanical Laboratory at the Goethe-University the charred plant remains were sorted and identified. For determination, the existing reference collection was upgraded by sampling more than 140 modern records. Geobotanists of the Goethe-University further supported the knowledge about this natural area with vegetation assessments.

Due to the lack of systematic sampling during excavations until recently, not much was known about Bronze Age pastoralists' (Sintashta Culture) plant use in the Transurals-Steppe (Fig. 1). Hypotheses about this topic ranged from a non-plant diet of the settlers to fully developed agriculture (HANKS/DOONAN 2009: 336-337).

Results & Discussion

More than 2600 charred plant remains from 70 taxa out of 24 plant families are identified yet. Residual types range from seeds and fruits to bud scales and needles. The main result of the analyses was the **lack of any remains of domesticated plants** in the fortified settlement Kamennyj Ambar. Hence, speculations about agriculture have no baseline. But which role did plants actually play in the Sintashta Culture?

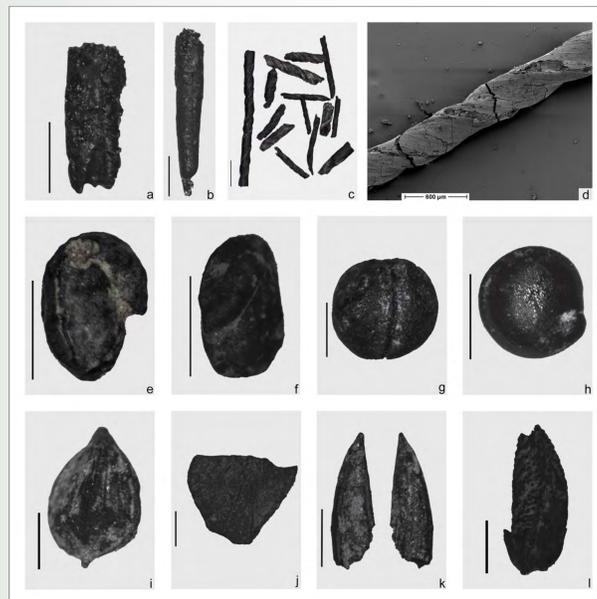


Fig. 6 Charred plant macro-remains
a) - b) *Stipa* sp., caryopses fragm.
c) *Stipa* sp., awn fragm.
d) *Stipa* sp., awn fragm. (SEM photo, 50x magn.)
e) - f) *Trifolium-Melilotus-Medicago* group, seeds
g) *Vicia* sp., seed
h) *Chenopodium album*, seed
i) *Carex* cf. *distans*, achene
j) *Pinus sylvestris*, cone scale fragm.
k) *Pinus sylvestris*, needle fragm.
l) *Alnus* sp., bud

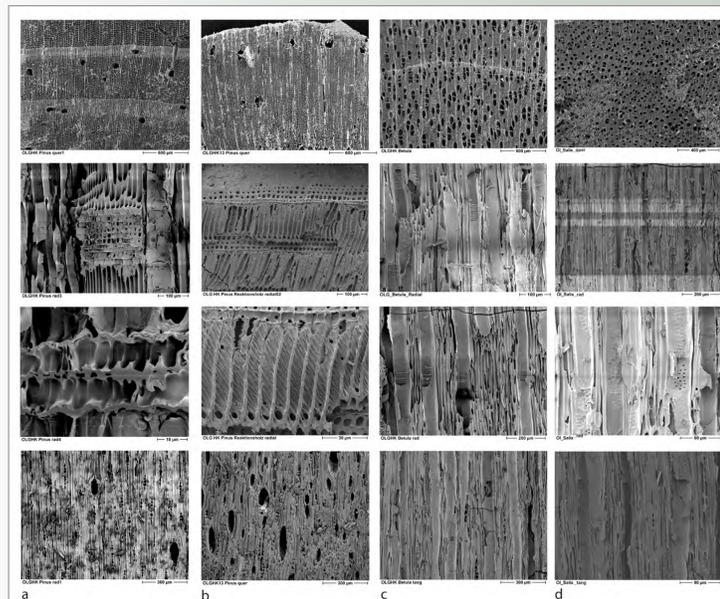


Fig. 7 Wood charcoals
(t=transversal; r=radial; tan=tangential section)
a) *Pinus sylvestris* (t, r, tan)
b) *Pinus sylvestris* reaction wood (t, r, tan)
c) *Betula* sp. (t, r, tan)
d) *Salix* sp. (t, r, tan)

Food

There are several edible wild plants in the charred material that we consider as possible parts of the human diet. The most common seeds are those of *Chenopodium album* (Fig. 6h). They are often found together with awn fragments of *Stipa* sp., indicating that both plants were roasted together over a fire (Fig. 6c-d). De-husked *Stipa* caryopses (Fig. 6a-b) are less common, probably because they were carefully collected after this process. Similar preparation can be assumed for the fruits of Cyperaceae (Fig. 6i) and Polygonaceae. *Fragaria viridis* is the only typical gathering plant among the seeds and fruits. Besides, the consumption of not surviving plant parts like leaves, stems and rhizomes can be assumed for a lot of plants (f.ex. *Urtica dioica*).

Whether any of the plants represented by charred macro-remains ever played a role in the nutrition of the inhabitants of the settlement, is difficult to assess. All of them also occur in the surroundings and their presence in the settlement layers can have various reasons. But why should the settlers not have exploited the plant resources right on their doorstep?

Fodder

39 % of all taxa (27 out of 70) could be considered suitable as green fodder. Seven of them have an extraordinary high fodder value, especially Fabaceae like *Trifolium* sp., *Medicago* sp., *Melilotus* sp., and *Vicia* sp. (Fig. 6e-g).

13 of the potential forage plants provide above ground green also in winter and thus the steppe environment with its fertile and productive flood-plain meadows offers a year-round pasture. Probably, this particular feature of the landscape made the region so attractive for the Bronze Age stock-breeders.

Timber

For the wooden architectural elements of the buildings and the fortification like piles and beams mostly trunks of *Pinus sylvestris* (Fig. 7a-b), with an average diameter of 5-20 cm and 5-20 tree rings were used, whereas remains of only one pile of *Betula* sp. were found. Some specimens even show traces of wood working. Nevertheless, Birch (*Betula* sp.) was second most common and as the merely fragmented objects derived mostly from twigs with 2-5 tree rings they can be interpreted as firewood (Fig. 7c).

Finally, only a couple of fragments of *Salix* sp. have been identified (Fig. 7d).

Evidence for these trees is also given by charred leaf scars of *Betula* sp., needle fragments as well as cone scales of *Pinus sylvestris* (Fig. 6j-k), and buds of *Salix* sp. Besides, the presence of *Alnus* sp. is proven by bud finds (Fig. 6l). Like the charred seeds and fruits the species assemblages of the wood charcoals reflect a typical spectrum for the surrounding steppe and therefore the woods were extracted from areas near the site (Fig. 4).

Future investigations

In order to enhance our knowledge about plant use of the settlers and to answer remaining questions like the entry of plants into the settlement (dung?), processing and charring events, storage of hay and/or leaves as winter fodder and, thus, the overwintering of the herd, the sampling is continued in the following campaign. These investigations will also include sampling in the neighbored fortified Bronze Age settlement Konoplyanka. An important issue will be the investigation of waterlogged organic material from numerous well features (Fig. 8).

References & Acknowledgements

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