

## SUMMARY

The botanical macro-remains of the Middle Pleistocene deposits in Schöningen offer the possibility to look at these otherwise rarely preserved findings. Unlike other botanical studies from the Pleistocene, which focus on palaeoecological questions, the influence of humans factor was involved in this work.

Time, space and lithic artifacts point to *Homo heidelbergensis* as manufacturer of the spears. The physical requirements and metabolism are different from that of modern humans, particularly the energy balance. The cognitive abilities are shown by the complex chain of thoughts, which is required for manufacturing distance weapons.

For the botanical analyses, 36 sediment samples from sites Schöningen 13 II-1, 4 and 5 plus one sample from Schöningen 12 II-1 were available. More than 21 000 fruits and seeds could be found. Furthermore, several hundred wood fragments from different localities (Schöningen 12 II-1, 2 and 4; Schöningen 12 II-Nordwest; Schöningen 13 DB; Schöningen 13 II-1, 2, 3 and 4) were studied.

The species list comprises a total of 70 plant species, which could be determined with the help of characteristic features of fruits, seeds or wood. The local vegetation at the site 13 II is composed of representatives of aquatic plants, sedges and cattails of the riparian zone, remnants of the adjacent alder fen wood, and some terrestrial plants of more open habitats. This reflects a shore vegetation of a standing or slow-flowing waters with quiet accumulation of sediments. The embedding of the organic material must have, due to the good preservation and low fragmentation, occurred rapidly and without long transport.

For the further work, the flora list of H. Jechorek (1997; 2000), the wood species identifications of W. H. Schoch (1995; 2007b) and the pollen analyses of B. Urban (1992; 1993; 1995; 2007a; Urban/Sierralta 2012; Urban u. a. 1991b; 2011) were considered. This resulted in a more reliable local and regional picture of the vegetation. With the help of the »coexistence approach« it was possible to draw conclusions on the climate of Schöningen 13 II. While the beginning of the Reinsdorf interglacial (layers 1 and 2) tends to be slightly warmer than today, the middle Reinsdorf (layers 3 and 4) shows cooler annual average temperatures. The climate points to continental conditions, with cold winters and warm summers. Layer 5 yielded little botanical material. However, the remains indicate cool conditions. The precipitation, calculated from the habitat requirements of plants, is high for a continental climate, but can be attributed to the proximity to a water body.

The material was further screened for artifacts and anthropogenic modifications. Concerning the wood fragments, there was no reliable evidence for anthropogenic influence. The sediment samples from the presumed hearths and other contexts turned out to be natural deposits. Fire, concentrations of plant material or other possible traces were not observable.

While the evidence beyond raw material for tools and weapons was not detected, several factors speak for the importance of plants in the subsistence of *Homo heidelbergensis*. The species spectrum includes many plants that were useable as food, raw materials, medicine, fuel, environmental defense and other purposes.

This work focuses largely on the use of plants as a food source. The lake shore vegetation yields at that time of the year, in which other resources were scarce, underground storage organs in large quantities. They contain much starch, particularly from autumn until sprout of the plants in early spring, and can be effectively converted by the human metabolism into energy. The rest of the year inner bark, young shoots, leaves, fruits (including nuts) and berries with different nutritional values are available as food. An example calculation for energy demand and expenditure of *Homo heidelbergensis* demonstrates that plant food sources must have been used in everyday life.

Raw material for manufacturing of tools and weapons, as firewood or shelter constructions, was available in sufficient quantities and was certainly used in many ways. The discussion of the already published wooden artifacts showed that the spears were probably really used for hunting. Even the so-called roasting spit had a function close to the maintaining of fire. In contrast, the throwing stick and the digging stick have to be regarded critically concerning their function, as well as the »Klemmschäfte«. New ideas about them show different interpretation possibilities.

Many plants contain not only nutrients, but medically active constituents that may be suitable for the treatment of wounds, gastrointestinal disorders or other commonly occurring diseases and injuries. Their use is discussed in the corresponding chapter.

The species spectrum also includes plants from which one can obtain fibers, tannins, saponins, resins, bitumen among other things. Most of the various processing or extraction techniques are not sophisticated and likely lie within the cognitive abilities of the hominins.

The potential, specifically the one offered to the Schöninger hominins, is presented and discussed in detail in this work. Overall, the Schöninger flora at the time of the Reinsdorf interglacial documents the presence of abundant resources. One can assume that *Homo heidelbergensis* knew how to use his environment and rarely spurned an easily usable food or raw material source. Several modern hunter-gatherer societies provide evidence for that hypothesis. Therefore, it is argued that plants played an important role in everyday life of early hominids, even if evidence is rarely detectable in the archaeological record.