Catharina Blänsdorf, Stephanie Pfeffer, Edmund Melzl

Identification of Wood Species

From the hundreds of wooden pieces found in the rubble of the Buddha statues 321 selected samples were sent to Munich for determination of wood species and ^{14}C-AMS dating (fig. 1 and 2). Most of these splinters come from the wooden pegs used on the Western Buddha (320 samples), one belongs to the anchoring system of the Eastern Buddha. Seven complete pegs were sent to Munich as well, but should not undergo invasive sampling. Additionally, samples of trees now growing in the valleys of Bamiyan, Fuladi and Kakrak were collected.

First analyses were made in 2002. The results were cedar and poplar.[45] In 2007 and 2008, the samples of wooden splinters were separated into groups according to macroscopic characteristics. From each group several samples were selected. Altogether 20 samples were analysed in the Zentrum für Holzwirtschaft at the University of Hamburg.[46] The samples GBL 5, 8, 39, 88, 126, 260, 261, 340, 367, 393, 1394, 1622, 1748, 1805 a, 1805b, 1805c, 1914, 2001a, 2011, 2098 were identified by means of characteristics of wood structures (microscopic analysis). Four different genera could be identified:

- *Populus* (poplar)
- *Sorbus* (rowan)
- *Cedrus* (cedar)
- *Quercus* (oak)

In 2007, the reference samples from the Bamiyan region were identified based on botanical characteristics.[47]

Interpretation of results

Different wood species were used for the pegs and anchoring timbers of the Western Buddha. Most of them were poplar, a tree which is still wide-spread in Bamiyan nowadays. It is still used as wood for construction like timbers and may have been used for the same purpose already in the time of the origination of Buddha statues. Cedar, rowan or oak trees, however, cannot be found in Bamiyan today.

Today trees and wood are very rare in Bamiyan. Maybe wood was a rather valuable good already during the time when the Buddha statues were made. The use of different wood species could mean that all available construction woods were used. This theory is supported by a small wooden element which came from a sculpted ornament and obviously was re-used as peg (fig. 3).

The analyses covered only a fracture of the wooden parts preserved in Bamiyan and also only a smaller part of the samples stored in Munich. Although groups were formed and samples were chosen carefully, a quantitative or statistic interpretation of the results is not possible. Several pegs found in Bamiyan were macroscopically identified as wood from fruit trees, but samples of these pegs could not be included in the analysis.

All identified species produce a durable wood, especially cedar. The state of preservation of most wooden elements is remarkably good.

Table 1 Identified wood genera and species endemic in Afghanistan

fragment numbers	identified genus	name	species endemic in Afghanistan
8, 88, 126, 340, 367, 393, 1394, 1748, 1805a, 1805c, 2098, 2011	*Populus*, family Salicea	popular Pappel	
5, 39, 1622, 1914	*Sorbus*, family Rosacea	haw, rowan Eberesche, Mehlbeere	*Sorbus cashmiriana* (Himalaya Eberesche/ cashmir rowan), *Sorbus lantana, S. microphylla, S. tianschanica, S. turkestanica*
260, 261, 2001a	*Cedrus*, family Pinaceae	true cedar/Echte Zeder	*Cedrus doedara* (Himalaya cedar)
1805b	*Quercus*, family Fagaceae	oak/immergrüne Eiche	*Quercus balood, Quercus floribunda, Quercus semecarpifolia*

Table 2 Species identified on samples of tress growing in Bamiyan valley

name used in Bamiyan	identified genus	name
tschinar	*Salix excelsa*	willow/hohe Weide
dschangali	*Salix cf. pycnostacya*	dichtjährige Weide
safeh-dal	*Populus spec.*	popular/Pappel
sabs-tschinar	*Populus caspica*	kaspische Pappel

Fig. 1. Ropes used for analysis of the plant species: ropes from the Western Buddha (on the left) and from the bazaar in Bāmiyān (long one on the right)

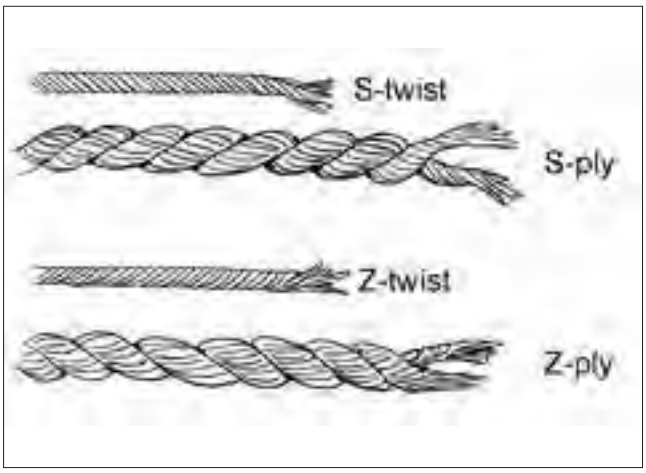

Fig. 2. Production technique of ropes. Most ropes show S-twist and Z-ply (above); one rope (GBL 662) is made in Z-twist and S-ply (below)

Fig. 3. *Astragalus cuneifolius* Bunge, in Farsi Dom-i-shutur