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The Role of *Ziziphus* in the Economy of Neolithic Nomadic Societies of the Sahara (S Egypt)

The strategies adopted by ancient people in order to cover their basic food demands belong to essential questions in the study of prehistoric societies. Much information about procuring foodstuffs can be obtained from plant remains recovered from archaeological sites and the achievements of the Combined Prehistoric Expedition are good example how much can be deduced from properly handled archaeobotanical material. The investigations carried out in Egypt by the Combined Prehistoric Expedition, first under the supervision of Professor Fred Wendorf and Professor Romuald Schild and later by Professor Michał Kobusiewicz, Professor IAE PAS, Dr. hab. Jacek Kabaciński, and Dr. Przemysław Bobrowski, brought about the discovery of numerous settlements and camp sites left by the nomadic Epipaleolithic and Neolithic people. The fillings of these features contained rich plant material which provided numerous information about subsistence of pre-agricultural populations of the Eastern Sahara. From among many plants documented by macrofossils the jujube tree was selected as an example of a wide variety of possible uses confirmed by ethnographic evidence. In 2001-2003 for the first time three cemeteries were discovered in Gebel Ramlah (e.g. Wendorf and Schild 1998; Wendorf *et al.* 2001; Kobusiewicz *et al.* 2004, 2010). With this short article the authors want to pay tribute to the memory of Professor Fred Wendorf and express their appreciation for his deep interest in archaeobotanical investigations.

Fruits and seeds of jujube tree (*Ziziphus* sp.) were found on the Early Neolithic site E-75-6 at Nabta Playa (Wasylkowa *et al.* 1995) and the Early and Middle Neolithic site E-05-1/2 at Berget el Sheb (Bobrowski *et al.* 2010, 2011). In the latter site wood charcoal was also present. The sites are located in the Egyptian Western Desert, about 140 km west from Abu Simbel, at a distance of ca. 25 km from each other (Fig. 1). Nowadays, it is an extremely dry part of the Sahara, with scanty rains occurring irregularly once in many years making possible the growth of only single and scattered plant specimens. More favourable conditions for the development of trees and shrubs exist in the oases (Zahran and Willis 1992, 52-53) and

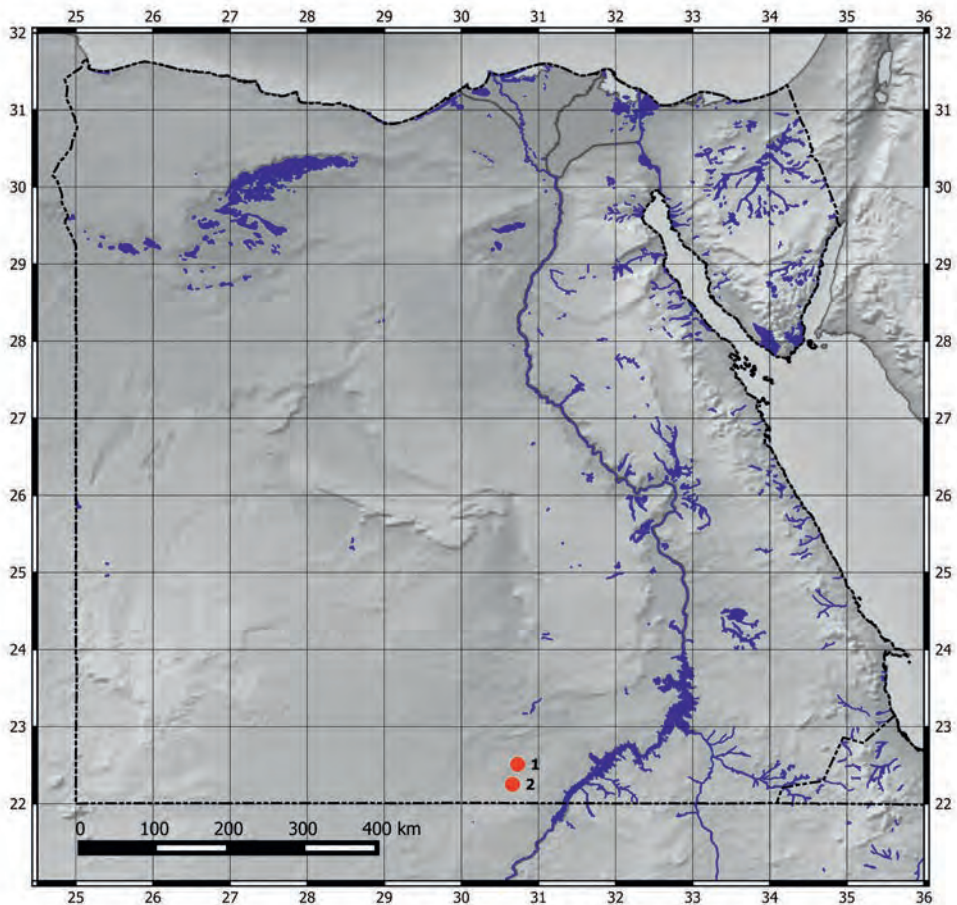


Fig 1. Locations of sites E-75-6 at Nabta Playa and E- 05-1/2 at Berget el Sheb in Western Desert, South Egypt (1 – Nabta Playa; 2 – Berget el Sheb)

humid depressions are periodically covered with luxuriant grass communities with sedges and rushes. Archaeobotanical, anthracological, and geological investigations indicate that in the Neolithic much better moisture conditions prevailed in this area and the development of fairly abundant herbaceous vegetation with some trees and shrubs was possible. Such favourable environment encouraged nomadic populations to locate their seasonal settlements near the then existing water reservoirs (e.g. Kubiak-Martens and Wasylkowa 1994; Barakat 1995, 2001; Wasylkowa 1997, 2001; Wendorf and Schild 1998; Wendorf *et al.* 2001; Wasylkowa *et al.* 2001, 2001a; Kobusiewicz *et al.* 2004).

Huts and pits from Nabta Playa provided the richest assemblage of plant remains hitherto known from the Western Desert, which contained at least 128 species of wild plants. Many of them had useful properties and were collected and stored for food or for other uses, for instance grass grains (including the oldest finding of wild sorghum *Sorghum bicolor* var. *arundinaceum*), fruits and seeds of several other herbaceous plants and of few trees or shrubs (e.g. Kubiak-Martens and Wasylkowa 1994; Wasylkowa *et al.* 1995; Wasylkowa 1997, 2001; Wasylkowa *et al.* 1997, 2001, 2001a). Plant material from Berget el Sheb was poorer (Lityńska-Zajac 2016, in preparation). Both sites provided relatively high number of *Ziziphus* remnants (Fig. 2) which suggests that useful properties of this plant were recognized by their inhabitants.

The genus *Ziziphus* Mill. from the family Rhamnaceae includes about 86 species (or over 40 according to other sources, Shahat *et al.* 2001) which grow in the subtropical, tropical, and warm zones (Boulos 2000: 84). Three species *Ziziphus spina-christi* (L.) Desf., *Z. lotus* (L.) Lam. and *Z. nummularia* (Burm. f.) Wight & Walk. occur in the modern flora of Egypt. The first one is an evergreen tree up to 4-8 m high, the two others are deciduous shrubs. The Christ's thorn jujube, *Ziziphus spina-christi*, is a plant of subtropical zone, nowadays growing on the Mediterranean and Black Sea coasts, in the Nile delta and in the oases. It can be found also in desert *wadi* in the Western and Eastern Deserts. It belongs to the native flora of Sudan (Jafri 1977). Due to human activity it was introduced to the Sahara already in the Neolithic (Marinova 2008), because its fruits and seeds could have been transported by people and animals (Bakarat 2001). At present, it is cultivated in the Nile valley and in the oases (Boulos 2000: 84) but its remnants found in the Roman port Berenike at the Red Sea coast suggest that it was cultivated as early as the 1st – 5th c. A.D. (Cappers 1999). *Z. lotus* is a 1-3 m high shrub growing on stony and sandy substrate in north Africa. *Z. nummularia* is a relatively small shrub reaching the maximum height of ca. 1-2.5 m. In Egypt it



Fig. 2. Remains of *Ziziphus* from Nabta Playa and Berget el Sheb (1 – Nabta Playa – complete fruitstone; 2 – Nabta Playa – fruitstone fragment with two cells which contain seeds; 3 – Berget el Sheb – fruitstone fragments (1-2 photo: A. Pachoński; after Wasylikowa 1997 with permission from the W. Szafer Institute of Botany PAS, Cracow; 3 photo: K. Cywa). Scale bars equal 1 mm

is recorded only from Ka-el-Nabg, about 15 km north-west of Taba (Boulos 2000: 85-86). According to some authors (Barakat 1995) it is a pioneer tree.

Mature fleshy *Ziziphus* fruits are edible and can be consumed either fresh with no preparation or dried. Coarse-grained flour made from dried fruits can be used for baking or making porridge (Wasylikowa 1997: 133 ; Wasylikowa and Mitka 1998; Wasylikowa *et al.* 2001: 559 and the lit. cited). *Ziziphus* fruits can also be used as components of different food products (Tenberg 2003), for instance thick paste used for spreading on bread. Ethnographic data indicate that fresh and dried fruits of *Ziziphus spina-christi* are valued by Egyptian Arabs and Bedouins. Bedouins gather fruits, dry them and store for future use during winter time. Similar use of *Z. lotus* fruits is reported from Cyprus and Saudi Arabia (Dafni *et al.* 2005). *Ziziphus* species belong to melliferous plants and are important source of honey in Eritrea and Jemen (Dafni *et al.* 2005). This honey, known under the name *sidr* after the local name of the tree, is considered highly valuable and belongs to the most precious ones. The pap made of the bark from young branches is also consumed (El Hadidi 1985). In ancient Egypt *Ziziphus spina-christi* was probably considered sacred tree, it was found in the Dynastic tombs and was used for making funerary loaves (Fahmy 2003: 104, and the lit. cited).

Fruits, leaves and ashes from burnt wood were used in folk medicine (Wasylikowa 1997: 133). Few examples cited below illustrate fairly broad use of jujube in phytotherapy thanks to its antiseptic properties. The ash obtained by burning wood and mixed with vinegar was applied locally to cure wounds caused by serpent bites. Cataplasms made of leaves were used against abscesses and furuncles and for skin softening. Fresh green leaves were put on swollen eyes. *Ziziphus* was used as antiphlogistic, purifying and analgesic medium as well as shrinking medium for gargling. In Saudi Arabian folk medicine leaves were applied to speed up the healing of wounds and to cure some skin diseases. The brew made from bark and fresh fruits was used for compresses applied in healing wounds and for body washing. People suffering from bronchitis, cough, and tuberculosis were also treated with brew from fruits (Shahat *et al.* 2001, and the lit. cited.).

Heavy and durable *Ziziphus spina-christi* wood is used in the production of artistic woodworks while branches and wastes from trunk woodworking are used for fuel and for making the high quality charcoal (Dafni *et al.* 2005). According to the records dated to various historical periods of ancient Egypt jujube wood was used for making boats, dowels, coffins, mummy labels, stelae, bows

and several other objects (Gale and Cutler 2000, 286-288; Cartwright and Taylor 2008).

Collecting fruits was a seasonal activity dependent on the rhythm of nature. Following summer floods, during the period of abundant vegetation development mainly fruits and seeds of herbaceous plants were available. In winter months, as the other environmental resources were exhausted, human activity was focused on gathering mature fruits of trees and shrubs (El Hadidi 1985). It is worth emphasizing that collecting wild plants was not given up in the times of the intensive cultivation of cereals, as evidenced by the numerous findings coming from the pre-dynastic localities (Fahmy 2005).

Macroscopic remains of the genus *Ziziphus* recovered from archaeological sites include fruits, seeds and charcoals, among which the lignified fruit-stone (endocarp) fragments are usually the most frequent. They are recorded in archaeological sources of different age, prehistoric and historic ones, situated in the Western and Eastern Deserts in Egypt (e.g. El Hadidi 1985; Neumann 1987; Wasylkowa 1997; Marinova *et al.* 2008; Neef *et al.* 2011: 554-560; Fadl 2013). The material from Nabta Playa, site E-75-6 included 7 complete fruit-stones, over 670 their fragments of various sizes and 27 seeds. They were found in eight huts and four pits. Radiocarbon dating of fruit-stones from three features gave the following results: 1. 8050±130 BP OxA-3218 (hut F 1/90); 2. 9025±120 BP OxA-3220 (pit P 1/90); 3. 7980±95 BP OxA-3485 (pit P 75/5) (Wasylkowa 1997). In the neighbouring site Nabta Playa, E-92-7, dated also to the Early Neolithic, 71 charcoal fragments were found and identified as *Ziziphus spina-christi* (Barakat 2001). Fairly large number of remains was found also in Berget el Sheb, site E-05-1/2. They were represented by 72 fruit-stone fragments and 2 seeds, which occurred mainly in pits 4 and 6, but also in pits 3 and 5. Pits 4 and 6 contained also charcoals, four and two specimens respectively (Lityńska-Zajac 2016, in preparation). Wood charcoals represented the remnants of fuel.

The occurrence of jujube tree remnants (most probably *Ziziphus spina-christi*) at Nabta Playa and Berget el Sheb indicates that they were intentionally collected and stored for different purposes. Some fresh fruits were certainly consumed on the spot but a portion of the gathered yield must have been dried (over a fire?) for future use because the nomadic tribes only seasonally visited this area. The presence of many endocarp fragments may be an evidence of purposeful crushing of fruit-stones in order to extract seeds but some spontaneous fragmentation of stones thrown to the hearth was also possible (Wasylkowa 1997: 133). The presence of charcoals indicates that jujube wood was used for fuel.

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