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Polish Archaeobotanical Studies in Africa

Polish botanists became involved in archaeological studies carried out in Africa as early as the '80s of the twentieth century. Initially samples were collected by archaeologists and later submitted for investigation by botanists, but as demands for cooperation of high standard increased botanists began to take part in archaeological expeditions and did the sampling themselves. Hitherto examined plant material originated from Sudan, Mali, Libya, and Egypt.

African archaeobotany was initiated in Poland by Melania Klichowska, who studied plant material collected by Lech Krzyżaniak at the Neolithic site Kadero in Sudan. On the basis of plant impressions preserved on potsherds she identified grains of sorghum *Sorghum vulgare* (syn. S. *bicolor*) and finger millet *Eleusine coracana*, the size of which in her opinion indicated cultivated forms. In addition she found wild grasses, *Setaria* and *Digitaria*, which were probably gathered for food (Klichowska 1984a). Plant impressions on this pottery were later examined by Ann Stemler, who verified Klichowska's identifications (Stemler 1990). Observations in a scanning electron microscope allowed her to identify wild sorghum spikelets, *Sorghum bicolor* ssp. *arundinaceum*, and to state that all sorghum imprints (also those seen by Klichowska) were of this species. She found also other wild grasses, *Setaria* and *Pennisetum*. The continuation of the study of Kadero materials by Lucyna Kubiak-Martens (Kubiak-Martens 2010) added two edible plants, jujube *Ziziphus* and hackberry *Celtis*, to the list of taxa known from this site. Melania Klichowska also examined four samples from Niani, the capital of

medieval Mali (IX-XI, XIV and XVI-XVII century AD) and one sample from a medieval pot found in Yendouman, supplied by Władysław Filipowiak (Klichowska 1984b).

In cooperation with the Archaeological Museum in Gdańsk new studies in Sudan were undertaken by Monika Badura at the site Wadi Umm Rahau from the Napatan Period. She discovered a few grass species, including commonly collected *Panicum turgidum*, as well as *Arnebia hispidissima*, *Citrullus colocynthis* and some unidentified plants from the Cyperaceae family, which could also be used for human or animal consumption (Badura 2007; in press; Badura et al. 2007).

Fairly rich plant material, collected by Barbara E. Barich at two rock shelter sites, the Epipaleolithic Ti-n-Torha/Two Caves and Neolithic Uan Muhuggiag, located in the Acacus Mountains, SW Libya (Barich 1992), was examined by Krystyna Wasylikowa (1992a; 1992b; 1993). Both sites contained several species of wild plants that are now gathered in various parts of the Sahara and savanna zones for their useful properties and certainly were used by people in older times. In addition to the most numerous grasses from the genera *Brachiaria*, *Cenchrus*, *Digitaria*, *Echinochloa*, *Panicum*, *Pennisetum*, *Setaria*, and cf. *Urochloa*, fruits of the desert date *Balanites aegyptiaca* and seeds of the colocynth *Citrullus colocynthis* and watermelon *C. lanatus* were found. These investigations also revealed some interesting paleoecological information. At present, the species of *Brachiaria* and *Urochloa* are not recorded in the flora of Libya but grow south of the Sahara. Their presence in the sites discussed indicates that they were growing locally during the early and middle Holocene period. This agrees well with the conclusion drawn from pollen analysis that the annual plant communities, which at that time developed in the Acacus Mountains in the rainy season were richer than in the present day (Schulz 1987). The occurrence of *Citrullus lanatus* seeds in both sites was another discovery interesting from the point of view of the former plant distribution. Radiocarbon dating of its seeds from Uan Muhuggiag gave the age 4361-4000 cal. yrs BC, excluding the possibility that they were intrusive. The whole archaeological context of the site indicated that it was inhabited by pastoralists who did not know plant cultivation, therefore it seems that watermelon was also not cultivated. As the presumed wild progenitor of watermelon grows today only in the Kalahari Desert it has been suggested that the wild *Citrullus* must have had broader range in the past than at present and the whole question of the place and time of origin of cultivated watermelon requires reinvestigation (Wasylikowa and van der Veen 2004).

The greatest group of botanists participated in the investigations carried out

by the Combined Prehistoric Expedition, initially under the leadership of Fred Wendorf and Romuald Schild, and recently of Michał Kobusiewicz and Jacek Kabaciński. Since 1980 several sites were studied by the members of this expedition. Ewa Madeyska and Kazimierz Szczepanek participated in field works carried out in the complex of late paleolithic sites at Wadi Kubbaniya near Assuan. The recovered vegetal remnants included a few species which could have been collected for food, including numerous tubers of *Cyperus rotundus*, and less frequent *Scirpus tuberosus* (closely related to or synonym of *S. maritimus*). Special attention was paid to the seasonal availability of various foods in connection with Nile floods. Species composition of plant and animal remains indicated that the sites were inhabited by people carrying on a very specialized hunter-gatherer husbandry. Very thorough on-site collection of small fragments of organic tissues allowed Gordon Hillman to reconstruct the infant diet and on this basis to contribute to the discussion on possible causes of a rise in population in the late Paleolithic (Hillman et al. 1989). K. Szczepanek collected several samples for pollen analysis but found no pollen grains, which brought in question the results obtained earlier by Mieczysław Dąbrowski (Close 1980). Zofia Tomczyńska examined wood charcoal from these sites (Tomczyńska 1989).

The Combined Prehistoric Expedition carried out large-scale excavations also in a complex of sites called Nabta Playa, situated in the driest part of the Sahara, about 120 km west of Abu Simbel (Wendorf *et al.* 2001). From the Polish side the following botanists participated in the investigation of these sites: Krystyna Wasylikowa, Lucyna Kubiak-Martens, Aldona Mueller-Bieniek, Renata Stachowicz-Rybka, and Maria Lityńska-Zając. A very interesting assemblage of plant remains was found in the early Neolithic site E-75-6 dated to about 8000 ^{14}C BP. It included fruits, seeds, wood, tubers, and rhizomes of over 128 species of wild plants, many of which could have been collected for food or other purposes (Wasylikowa *et al.* 2001). The recovery of the wild sorghum *Sorghum bicolor* subsp. *arundinaceum* was of special interest being the first evidence of the use of this grass that was later cultivated and became a very important African cereal (Wendorf *et al.* 1992; Wasylikowa *et al.* 1993; Kubiak-Martens and Wasylikowa 1994; Wasylikowa and Dahlberg 1999). The detailed qualitative and quantitative comparison of plant assemblages recovered from various archaeological features indicated the selected gathering of plants available to the inhabitants of different huts (Wasylikowa and Mitka 1998). The work on the sites of the Nabta Playa complex was continued by Maria Lityńska-Zając, who found more sorghum in addition to other plant species. In the cemetery of Gebel Ramlah mainly charcoal pieces of tamarisk *Tamarix*

sp. and acacia *Acacia* sp. were found and a few diaspores of wild herbaceous plants (Lityńska-Zając 2010). The most promising materials were excavated at the site Berget el Sheb, which contained several useful plants that were probably collected.

Maria Lityńska-Zając was also engaged in the exploration of the Nagada culture site at Armant near Luxor in the frame of archaeological investigations carried out by Bolesław Ginter and Janusz K. Kozłowski. Plant remains were present in all three chronological periods covered by the site, Early (6000-5900 cal. yr BP), Middle (5960-5700 cal. yr BP), and Younger Phase (after 5800 cal. yr BP). Grains and spike parts of emmer wheat *Triticum dicoccon* and barley *Hordeum vulgare*, preserved in charred and uncharred condition, predominated among plant remains and were probably the main cultivated plants of the Nagada people. Large accumulation of *Citrullus colocynthis* seeds suggests that they were gathered for food. Rare finds included lentil *Lens culinaris*, flax *Linum usitatissimum*, millet *Panicum miliaceum*, and pea *Pisum sativum* and *Pisum* sp., all certainly cultivated, and a few wild herbaceous plants, for instance *Vicia*, *Echinochloa crus-galli*, and undermined Asteraceae. On the basis of plants found in different archaeological features the presumed purpose was suggested for which individual pits were used. The discerning scrutiny of the state of preservation of plant remains made it possible to eliminate samples of age different to the whole archaeological context (Lityńska 1993; 1994; Lityńska-Zając 2003).

Tell el-Farcha in the Nile Delta in Egypt was another locality excavated by a Polish team of archaeologists under the leadership of Krzysztof Ciałowicz and Marek Chłodnicki. The content of a vat discovered in the pre-dynastic site was examined by a botanist Lucyna Kubiak-Martens and a physicist Jerzy J. Langer. Charred organic material that adhered to the bottom of this vat contained fragments of grain and chaff of emmer wheat *Triticum dicoccon* and barley *Hordeum vulgare* together with a few remnants of darnel ryegrass *Lolium* cf. *temulentum*, which is a weed in cereals fields. The detailed physicochemical analysis of this unusual finding suggested that the discovered substance was the remnant of beer and allowed the reconstruction of the beer production process (Kubiak-Martens and Langer 2008).

As the final note, the investigation of materials kept in different museum's collections is worth mentioning. The authors of this paper examined plant materials preserved in deposits belonging to the Egyptian collection of the Archaeological Museum in Cracow. Two out of the four corn-mummies (probably from el-Ashmunein) stored in the Museum and described by Maarten J. Raven (Raven 1997) contained spikelets of germinating barley *Hordeum vulgare*. In ancient Egypt ger-

minating barley symbolized resurrection and placing such grains in mummies was connected with the cult of Osiris (Wasylikowa and Jankun 1997). Spikelet fragments of common barley *Hordeum vulgare* together with some wild grasses were also found in a sarcophagus from the Ptolemaic period containing the mummy of Aset-iri-khet-es. The fibres, which appeared between the bandages of this mummy, were made of flax *Linum usistatissimum* (Lityńska-Zając 2001). Another type of material represents the content of two Coptic vessels from the Museum's collection. They were filled with fruits of coriander *Coriandrum sativum*, edible plant, having also therapeutic properties (Lityńska-Zając 1997). An interesting finding was the discovery of a bulb of *Narcissus* cf. *tazetta* in an Egyptian mummy of unknown origin stored in the Collegium Antropologicum of the Wrocław University. This plant was used in ancient Egypt for its ornamental values (Wasylikowa 2005, unpbl.) .

The purpose of this article was to present a brief survey of the results of investigations carried out by Polish botanists on archaeological sites in Africa. The information obtained by these studies essentially increased our knowledge on wild plants gathered by hunter-gatherer and pastoral societies in Egypt, Sudan, and south-west Libya. A large assortment of wild species, among which grasses played an important role, contributed significantly to the diet of ancient people. Particularly interesting was the finding of the oldest wild sorghum in a context, which indicated its special significance for the early Neolithic tribes living at Nabta Playa. New data were also supplied for the reconstruction of agriculture of the Nagada culture. The results obtained from the studies described above prove the basic meaning of archaeobotanical investigations for the understanding economic processes in the past, provided that sampling of a site is performed in a proper way. Our experience clearly indicates that the best interpretation of data can be achieved when on-site sampling is done by a botanist. Questions put forward by Polish archaeobotanists aroused a lot of interest among the specialists from the other countries that led to the organization of the first international symposium "Archaeobotany of North Africa" in 1994, in Mogilany near Kraków. The cooperation thus started continues and since then every three years similar symposia are organized in different countries.

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