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ORIGINAL ARTICLE

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Missing plant macro remains as indicators of plant exploitation in Predynastic Egypt

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Abstract Tubers, leaves and mericarps are underrepresented plant remains in most archaeological sites either due to their tissue softness or small size and fragility. The more resilient and hard cereal remains, drupes, seeds and grains are frequent at most archaeological sites. The remarkable preservation status of organic material retrieved from archaeological sites in arid regions across the world, such as Egypt, increases the possibility of observing such missing botanical material. The present study discusses results of analysing the contents of a basket recovered within an intact grave (Burial 333) of the Predynastic period (3600 B.C.) in cemetery HK 43 at Hierakonpolis in Upper Egypt. The basket was found beside the elbows of the flexed burial of a woman, 40–50 years of age. The cemetery at HK 43 served the non-elite segment of society, as indicated by the overall paucity of grave goods. Children and older women appear to have been most favoured with gifts and among these better endowed graves, Burial 333 stands out for the variety of materials, suggesting that she was a woman of some standing within her community. Botanical contents of the basket include remains of *Cyperus* (sedge tubers), *Anethum graveoloens* L. (dill mericarps) and drupes of *Balanites aegyptiaca* (L.) Delile (balanites) as well as narrow slivers of coniferous wood and other types of plant remains. In addition, objects found in and around the basket include a cosmetic palette, five awls of polished bone, an ivory comb, pendants and amulets, which may be part of a cosmetic kit. In terms of palaeoethnobotanical investigations, this basket is another source of plant macro remains to be added to previous sources recovered from the same cemetery, such as the contents of pottery vessels, matting and viscera contents. This evidence shows that the Predynastic inhabitants adopted a subsistence strategy based on the cultivation of cereals, emmer wheat as the likely staple, and the gathering of wild fruits and tubers as well as herding of livestock. The botanical assemblage identified from the basket suggests the exploitation of wet swamp habitats to collect wild tubers of *Cyperus esculentus* L., *C. rotundus/laevigatus* and culms of *Juncus* sp. On the other hand, the nearby desert habitat was a source of edible fruits like *Balanites aegyptiaca*, *Cordia sinensis* Lam. and *Ziziphus spina-christi* (L.) Desf. The outcome of this study is evidence for the existence of a mixed strategy of subsistence involving herding, gathering and farming in Predynastic Egypt.

Keywords Egypt · Hierakonpolis · Predynastic · Tubers and mericarps · Vegetative plant remains · Gatherers/farmers

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Introduction

The recovery of well-preserved botanical material (charred or desiccated) is a major factor in the success of many palaeoethnobotanical research projects in Egypt. The good level of preservation is attributed to the extremely arid climatic conditions prevailing across the southern part of country now and to a lesser extent in the past. Climatic records of two meteorological stations at Aswan and Qena (Fig. 1) show that there is an extremely arid climate in this area, with high temperature, low relative humidity, high evaporation rate and a negligible rainfall of only between 1.4 and 5.3 mm/year (Anonymous 1960). This area has been described as one of the extremely arid parts of the globe (Bornkamm and Kehl 1990), as it is a part of Zonobiome III, the zone of subtropical arid deserts (Walter 1984).

Remains of tubers, leaves and mericarps are rarely recorded from habitation sites. Plant macro-remains of this type have been described by Hillman (1989) as "remains of low archaeological visibility". The remarkable preservation status of organic material retrieved from archaeological sites in arid regions such as Upper Egypt increases the possibility of recovering such missing plant macro remains. For example, the exceptional assemblage

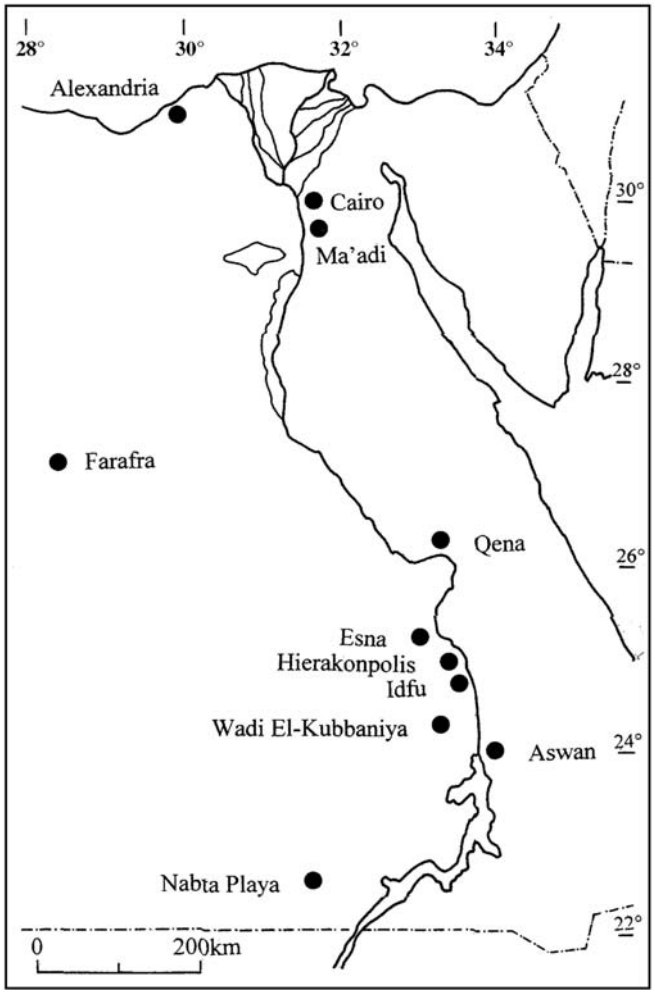

Fig. 1 Map of Egypt showing cities and archaeological sites mentioned in this study

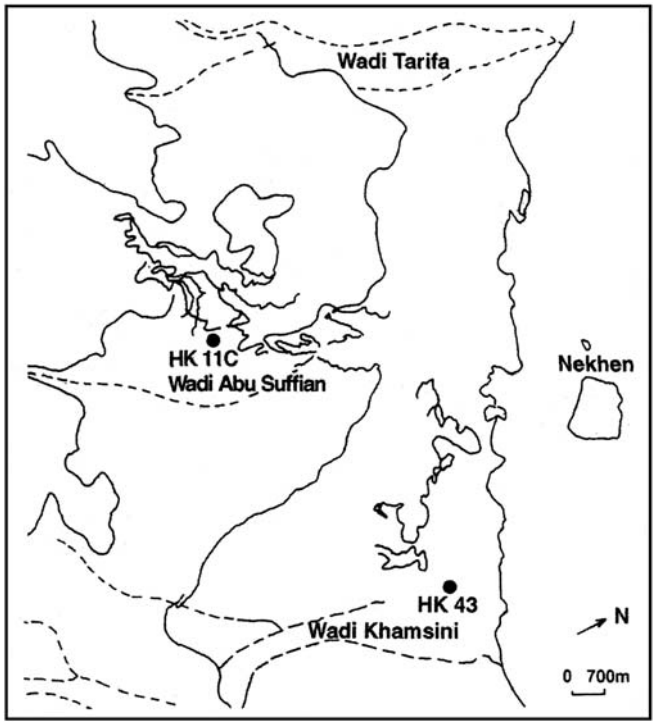

Fig. 2 Map of the Hierakonpolis Concession (copyright 1999, Hierakonpolis Expedition)

of plant food remains recovered from the Palaeolithic site at Wadi Al Kubbaniya (19000–17000 B.P.) included tubers of *Cyperus rotundus* L., *Scirpus maritimus/tuberosus*, rhizome fragments of a pteridophyte, pericarp fragments of *Hyphaene thebaica* (L.) Mart., achenes of Anthemideae, and immature bud receptacles of Nymphaeaceae (Hillman 1989). This record has increased our knowledge of vegetable foods of the Palaeolithic diet in the Old World.

The present study is based on the Predynastic archaeological site of Hierakonpolis in Upper Egypt. The extensive archaeological site of Hierakonpolis (25°06′N, 32°46′E) comprises a number of interrelated sites stretching for over 3.5 km on the west bank of the Nile Valley and encompasses several ecozones including the Nubian sandstone formation of the Western Desert of Egypt and wadis, low desert palaeoterraces of the Nile (Sahaba and Masmas Formation) and the floodplain. It is located ca. 650 km south of Cairo, and 113 km north of Aswan, between the modern towns of Esna and Idfu (Fig. 1). Archaeological excavations at Hierakonpolis are providing an excellent opportunity to study well-preserved botanical material from various archaeological features, such as kilns, rubbish mounds, settlement layers and cemeteries from the formative period of Egyptian civilisation, ca. 3800–3100 B.C. (Fahmy 1995, 1997; Friedman et al. 2002).

This study concerns the workers' cemetery of locality HK 43 (Fig. 2). Excavations undertaken from 1996 to 2004 at the cemetery HK 43 examined an area of ca. 2,000 m^2.

The investigations were conducted by the Hierakonpolis expedition under the direction of R. Friedman (University of Arkansas/British Museum). The result was the discovery of ca. 470 human burials, some with associated pottery and most with remnants of matting which ranged in condition from completely intact to disturbed at and around the head and to complete disarray with no bone in situ. Dating of Predynastic burials is based on the relative chronology of grave goods, mainly pottery, combined with radiocarbon dates (Adams and Cialowicz 1997). The majority of graves is assigned to the Nagada IIb-c (3650–3400 B.C.) phase of the Predynastic period (Friedman et al. 1999, 2002). The general poverty of the burials and the robust nature of the skeletons have been used to propose that HK 43 was the cemetery of the working class inhabitants of Predynastic Hierakonpolis (Maish 1999). Interdisciplinary research studies conducted on the material recovered at cemetery HK 43 have contributed to our knowledge with results on the diet and health of Predynastic workers (Friedman et al. 1999; Friedman and Rose in press), and it was possible to assort plant macro remains (fruits, seeds and charcoal) from pot

Fig. 3 Burial 333 at HK 43 (copyright 2003, Hierakonpolis Expedition, photo by R. Friedman)

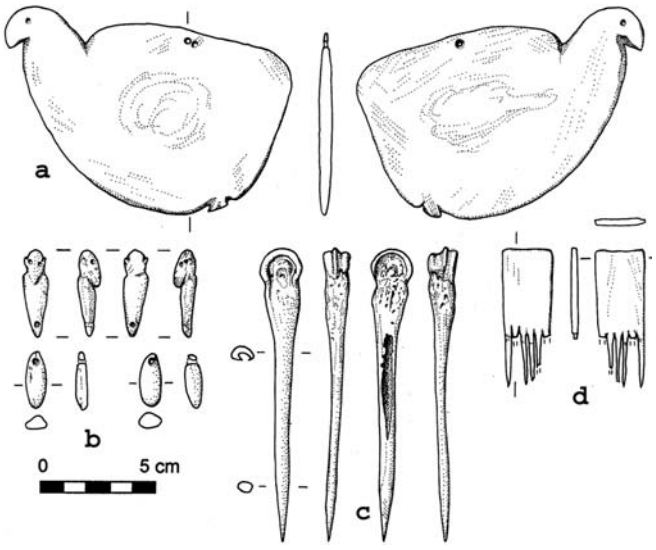

Fig. 4 Archaeological objects recovered inside the basket (copyright 2003, Hierakonpolis Expedition, drawn by J. Smythe, Macquarie University, Australia): (**a**) a bird shaped palette, (**b**) a human headed amulet, (**c**) polished awls of sheep and pig bone, (**d**) an ivory hair comb

contents and detect a chaff mattress underneath human burials (Fahmy 2003). Analysis of viscera contents and identification of plant micro-remains including starch grains and epidermal cells have opened up a new dimension of palaeo-ethnobotanical studies in Egypt. (Fahmy 2001, 2003).

During the 2003 season one of the richest burials at the site was discovered: burial 333. The following information was obtained from Friedman (2003). The undisturbed, flexed burial of a 40–50 year old woman, dated to 3600 B.C., was found covered by matting with four ceramic vessels around the head (Fig. 3). Beneath the upper matting, a bird-shaped palette of greywacke stone and a basket were close to the elbows. A flat, round lid covered the basket and its contents, which included stone pendants, a human-headed amulet, pieces of red ochre and galena (lead ore), as well as the pebble used to grind these minerals on the palette for cosmetic use. Polished awls of sheep and pig bone, flint bladelets, gaming pieces of polished stone and faience, the remains of a leather bag, chunks of resin, a mixture of plant remains and wood splint and an ivory hair comb were also recovered (Fig. 4). These objects and materials combined with care and effort of this burial suggest that the deceased was a woman held in high regard by those who buried her.

The present study deals with the analysis of the plant macro remains which have been retrieved from the basket in question. What this basket presents and what it represents for our palaeoethnobotanical knowledge are queries to be considered. Integration of the current results with those previously obtained from the same cemetery (Fahmy 2003) prove the significance of the site to the palaeoethnobotany of Predynastic Egypt.

Material and methods

Burial 333 was discovered 64 cm below the surface during wide area clearance of the white aeolian sand into which the graves were dug. The basket, approximately 20 cm in diameter was detected during the brushing of the upper matting. Due to bad weather conditions with high winds, the basket had to be excavated with reasonable speed. A sable hair fan brush was used to excavate the contents of the basket and all artefacts were hand collected. Below the lid, the upper layer of the basket was filled with fine sand. Below this, the archaeological artefacts were mixed with organic and botanical material. The sampling system was designed to classify the basket content in situ into four arbitrary layers as they appeared: top with pendants and amulets; two layers in the middle which contained the majority of artefacts, and bottom, which was removed with the basket itself in as complete a state as possible under the circumstances. Five soil samples were collected from inside the basket. The soil samples were sieved on a 0.5 mm mesh. Plant macro remains were sorted using a binocular microscope with magnifications between 10× and 20×. Identification of the plant macro remains has been undertaken at the Department of Botany, Faculty of Science, University of Helwan, Egypt and Seminar für Vor-u. Frühgeschichte, Archäologie und Archäobotanik Afrikas, J.W. Goethe University, Frankfurt am Main, Germany.

Results

Morphological examination of the basket body reveals that it had been manufactured from culms of *Juncus* sp. (rush). Analysis of the basket contents shows the presence of fruits, seeds, tubers, and mericarps belonging to 11 types of plants. All of the specimens were desiccated,

Table 1 Desiccated (d) and charred (c) plant macro remains recovered from the basket of burial 333, cemetery HK 43 at Hierakonpolis, expressed in number of remains per sample, the symbol X indicates the presence of non-quantified remains

Taxon	Type of remains	Sample number				
		03-586	03-587	03-588	03-613	03-618
Anethum graveolens L	Mericarp (d)			211		
Balanites aegyptiaca (L.) Del	Fruit (d)		1			
	Seed (d)		1			
Compositae	Capitulum (d)			1		
Cordia sinensis Lam	Fruit (d)				3	
	Seed (d)					1
Cyperus esculentus L	Tuber fragment (d)					3
Cyperus rotundus/ laevigatus	Tuber fragment (c)					1
Juncus sp	Culm fragment (d)	+			+	+
Labiatae	Nutlet (d)			1		
Rumex pulcher L	Fruit (d)			3		
Tamarix sp	Leaflet (d)			+		
Conifer wood		1		1		
Resin				3		

Fig. 5 Mericarps of *Anethum graveolens* L

except fragments of *Cyperus rotundus/laevigatus*, which were partially charred or roasted. Table 1 shows that the plant macro remains were concentrated in the middle and bottom layers.

Identified plant macro remains

Identification was successful to genus and species level for some of the remains. In this section a brief description of the recovered plant macro remains is given and their ecological and economic significance is discussed and compared with modern phytosociological studies in Egypt and ethnographic parallels from Africa and Arabia.

Mericarps

Anethum graveolens L. (dill): The family *Apiaceae* is characterised by a schizocarpic fruit, of two mericarps. Mericarp length and the number of ribs on both sides (adaxial and abaxial) are taxonomic features to identify genera and species belonging to this family (Schoch et al. 1988). A total of 211 mericarps of dill were sorted from sample 03-588. The mericarps measured 2–5 mm × 0.7–1 mm (Fig. 5). Three distinct longitudinal ribs exist clearly on the dorsal side of the archaeological specimens. The ventral side is flat with one narrow long rib. Few mericarps possess curved styles. The surface is dark brown. Dill is an erect freely branching herb, growing to about 0.9–1.5 m in height. The whole inflorescence can be 25 cm across. Leaves and fruits are very rich in volatile oils. This herb grows on fertile soil and its fruits ripen in the spring (Zahran and Willis 1992). Dill is a common spice (Zohary and Hopf 2000) and has many medicinal application (Boulos 1983), which were also recognised by the ancient Egyptians (see Manniche 1989, p. 74).

Drupes

Balanites aegyptiaca (L.) Delile (balanites): One desiccated fruit (drupe) with fibrous pulp and a seed were recovered from sample 03-587. The fruit is broadly oblong-ellipsoid in outline, 23 mm× 13 mm. The dimensions of the seed are 16 mm × 13 mm. The seed has a characteristic rough texture. *Balanites aegyptiaca* is a tree, 12 m in height with a crown tangled with thorny twigs at the distal ends, which is common in the Egyptian oases (Boulos 2000). The pericarp of the fresh fruits is sticky, surrounding the hard woody kernel. The vernacular name is "desert date" (Täckholm 1974). Zahran and Willis (1992) noted that a community of *Balanites aegyptiaca* dominates the xerophytic vegetation of Kharga and Dakhla oases. It forms scrub, which is an advanced type of the xerophytic vegetation known as the "xerosere" stage. The fruits are oily with many medicinal applications (Boulos 2000). The kernels are nutritious. It contains 40–60% of oil, which is still highly valued in Africa (Burkil 1985). The seeds have been considered by Germer (1988) among the valuable sources of oil in ancient Egypt. Fruits and seeds of this plant have been recorded as offerings since prehistoric times (Germer 1985).

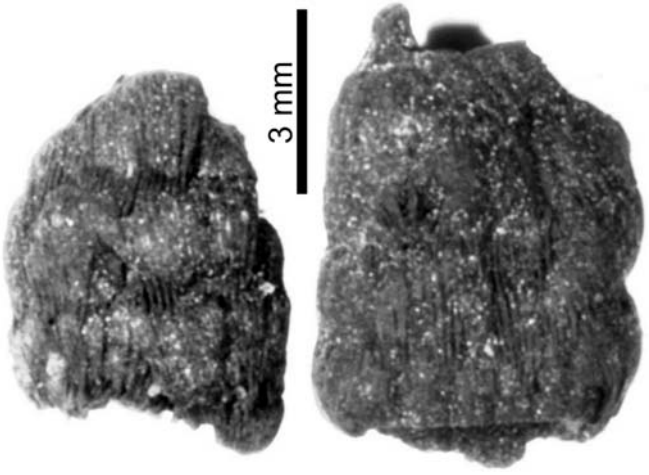

Fig. 6 Tuber of *Cyperus rotundus/laevigatus*

Cordia sinensis Lam: One stone of *Cordia* was recorded from sample 03-618 (7.5 mm × 7 mm width) and three fruits together inside a cupuliform calyx were identified from sample 03-613 (8 mm × 7.5 mm).) The genus *Cordia* L. is represented in Egypt by *Cordia sinensis*, which matches perfectly with the archaeological remains. It is a tree or shrub, 2–6 m high. Fresh fruits are ovoid, mucilaginous and edible. It grows on moist ground in the oases (Boulos 2000). This taxon is characterised by a wide ecological amplitude. It grows in damp sites in Senegal and northern Nigeria and extends to drier parts of Africa (Burkil 1985).

Tubers

Metamorphism in the shape of tubers causes difficulties in the identification to species level. However, Hillman (1989) recognised valuable criteria for tuber identification, such as the distribution of scars left by lateral buds or rhizomes and the place of development of the terminal buds. The surface morphological features described by Hather (2000) were helpful in identifying two types of *Cyperus*: *C. esculentus* and *C. rotundus/laevigatus*. This genus is represented in Egypt by 15 species (Boulos 1995). They are recorded as water loving species in many hydrophilic communities across the country (Zahran and Willis 1992).

Cyperus esculentus L.: Three tubers of *Cyperus esculentus* were recovered in sample 03-588. Examination of the archaeological specimens shows that they are desiccated, well-preserved and retain valuable taxonomic criteria, like nodes and internodes along the whole body of the tuber. Remains of scale leaves were recognised at one distal end. It is a perennial herb, 30–40 m high with a slender rhizome and tubers at the base of each group of leafy stems. It has been considered as a famine food in Africa where it is cooked as a vegetable or roasted on sand (Burkil 1985, pp. 615–616). Germer (2002) noted that the edible tubers of *Cyperus esculentus* were collected in Egypt since prehistoric times. Initially it was collected from its swampy habitat, and later cultivated in the fields along the Nile Valley.

Cyperus rotundus/laevigatus: One complete well-preserved tuber was recovered in sample 03-618 along with many fragments. The complete tuber is ovoid with recognisable longitudinal fine ridges (Fig. 6). Tuber length is 14 mm × 7 mm width. The tubers of *Cyperus rotundus* L. are characterised by the presence of long fibrous roots on the nodes, sometimes extending to cover the whole tuber with a rough surface texture. The recovered archaeological tuber fragments were attributed to the category *Cyperus rotundus/laevigatus* type due to gaps in the reference collection. Living populations of *Cyperus rotundus* were recorded by Abdel Ghani and Fahmy (2001) dominating terraces of wetlands along the Nile valley. This habitat is characterised by high percentages of fine sand, silt and clay (92.2%). Burkil (1985, p. 622) reports that the tubers are scented due to their high content of volatile oil, however, they have been considered as a famine food in East Africa.

Rumex pulcher L.: Three fruits of *Rumex* were separated from sample 03-588. They measure 2.5–3.1 mm × 2–2.3 mm. They are ovoid in shape with characteristic compressed perianth remains on the fruit valves. Morphological examination reveals that the archaeological remains resemble modern fruits of *Rumex pulcher*. The presence of wrinkled reticulate features on the surface of the archaeological fruit base is used to confirm the identification. This taxon grows as an annual herb, up to one metre high, along canal banks and in farmlands (Boulos 1999). Hassan et al. (2001) recorded *Rumex dentatus* L. on stands along Nile bank terraces rich in silt and sand. Desiccated fruits and nutlets of this taxon were identified from another locality at Hierakonpolis by Fahmy (1995).

Culms

Juncus sp.: Remains of *Juncus* culms were found in three samples (Table 1). Surface examination of these culms reveals the presence of longitudinal furrows. Epidermal cells are arranged in alternating bands. These cells are rectangular, covered by thick cuticle. The cell wall is relatively straight (Greiss 1957). According to Boulos (1995), ten species of *Juncus* grow in Egypt. Further taxonomic/anatomical studies are required to differentiate between the different taxa of *Juncus*. Zahran and Willis (1992) recorded four species of this genus dominating halophytic vegetation, *Juncus bufonius* L., *J. rigidus* Desf., *J. subulatus* Forssk. and *J. acutus* L.

Compositae type: One desiccated capitulum (head) of Compositae was recovered from sample 03-588. The capitulum inflorescence of the family Compositae is a major taxonomic feature for identification. Boulos (2002) names 98 genera as belonging to the family in the Flora of Egypt.

Leaflets

Tamarix sp. (tamarisk): A desiccated branchlet of *Tamarix* was sorted from sample 03-588. Examination of herbarium specimens proves that *Tamarix aphylla* (L.) H. Karst. can be separated from other taxa based on the absence of leaf blades. This genus includes trees and shrubs. Boulos (2000) described five species of *Tamarix* characterised by distinct free blades. All of these taxa possess sessile leaves with blades and salt-exuding glands. Therefore, it was not possible to identify our archaeological material to the species level. Zahran and Willis (1992) described many communities of *Tamarix* species growing in wet stands forming halophytic plant cover.

Conifer wood

Two specimens of conifer wood were found among the basket contents. Both specimens were identified by R. Gale, Jodrell Institute, Royal Botanic Gardens, Kew, England.

Sample 03-586: This sample contained a narrow splinter of coniferous wood about 40 mm in length. R. Gale noted that many definite anatomical features of this specimen are not clear, due to preservation status. She has concluded that this specimen could be of *Cedrus* sp. (cedar), *Abies* sp. (fir), *Cupressus* sp. (cypress) or *Juniperus* sp. (juniper). However, she has suggested that specimen 03-586 could belong to *Juniperus* as a more likely choice than the other genera. Due to difficulty of identifying the species level of *Juniperus*, its point of origin during the Predynastic period cannot be determined, however it could have been introduced from Sinai, Libya, Levant, East Africa or Arabia, where many species of this genus are still growing.

Sample 03-588: The sample included a narrow sliver of coniferous wood measuring 30 mm in length and small fragments of resinous material. The criteria used for the identification of sample 03-586 also applied to this sample. *Cedrus* sp. (cedar), or *Abies* sp. (fir) are a possibility, however, *Cupressus* sp. (cypress) was more likely, and, in the absence of further diagnostic features, it was not possible to provide a closer identification. Specimen 03-588, could be of *Cupressus*, *Cedrus* or *Abies*, but none of these genera are native to the present flora of Egypt and there is no clear evidence in the archaeobotanical literature to suggest that these taxa were grown in ancient Egypt.

Discussion

Archaeological sites in arid regions provide a unique opportunity to recover soft and fragile plant macro remains like leaves, tubers, mericarps and achenes. Excellent preservation conditions increase the possibility of finding such missing botanical material. A good example comes from the Egyptian archaeological sites with well preserved organic material. The study of Hillman (1989) on the Wadi El-Kubbaniya (19000–17000 B.P.) botanical remains shows the significance of finding vegetative remains, including tubers of *Cyperus rotundus* and of *Scirpus maritimus/tuberosus*. With such well-preserved remains we have been able to understand the subsistence strategy of a hunter gatherer society in the Nile Valley during the late Palaeolithic. The recovery of the contents of the basket in question is ascribed to its remarkable preservation status and the application of excavation methods to retrieve all archaeological artefacts safely (Friedman 2003). The basket presents a new source of palaeoethnobotanical data to be added to other from the same cemetery, including pottery contents, matting and gut contents (Fahmy 2003). The presence of edible wild tubers of *Cyperus esculentus* L. and edible wild fruits of *Balanites aegyptiaca*, *Cordia sinensis* and *Ziziphus spina-christi* is interesting in a period when the cultivation of cereals (emmer wheat and barley) was abundant. This would confirm that the Predynastic inhabitants of the site had their own subsistence strategy based on the cultivation of cereals and gathering of wild tubers and fruits as well as animal husbandry.

Fig. 7 Mericarps of *Anethum graveolens* L. attached to tuber fragments of *Cyperus rotundus/laevigatus*

Retrieval of partially charred/roasted tubers of *Cyperus laevigatus/rotundus* type which were attached to seeds of *Anethum graveolens* (Fig. 7), in what appears to be the result of mixing, raises a number of possibilities: this combination of tubers and mericarps could be a result of a special type of food preparation. Both plants are rich in their content of volatile oils, which could also suggest their use as medicine, such as aromatherapy medication. Modern ethnographic parallels for the use of *Cyperus laevigatus* tubers in incense have been recorded by the author from south west Saudi Arabia and tubers of *Cyperus* cf. *rotundus* are sold in the markets of Burkina Faso to be used as incense (S. Kahlheber, personal communication). In addition, we have to bear in mind that many

species of *Cyperus* are today recorded as weeds of cultivation (Abdel Ghani 1985) or grow naturally in wetland habitats (Zahran and Willis 1992; Abdel Ghani and Fahmy 2001). Archaeological nutlets of *Cyperus rotundus* were retrieved from the rubbish mound HK 11C of Hierakonpolis (3800–3500 B.C.), which was composed overwhelmingly of emmer wheat and barley refuse. Hence, the presence of *C. rotundus* remains was interpreted as a field weed (Fahmy 1995). The tubers of *Cyperus* species were of multipurpose use in ancient Egypt. Since the late Palaeolithic (19000–17000 B.P.), sedge tubers are documented as a major food resource (Hillman 1989). Ancient texts and pictures show other forms of exploitation (Germer 1985). In ancient medicinal texts, the tubers of *Cyperus esculentus* were used as the base for drugs of internal use (Germer 1979). This may be attributed to its sweet taste. It was also cultivated as a source of food oil (Germer 1985).

The presence of a number of cosmetic items inside the basket in question may suggest that the mericarps of *Anethum graveolens* and the tubers of *Cyperus rotundus/laevigatus* were used to perfume the basket. The present study suggests that the landscape around the site included fields of cultivation stretching on the alluvium of the Nile as well as swamp and desert habitats. The desert vegetation grew on an area nearby the site and included the trees of *Balanites aegyptiaca*, *Cordia sinensis* and *Ziziphus spina-christi*. These taxa still grow in many localities in the Western Desert of Egypt and form the main components of a contracted type of vegetation (Zahran and Willis 1992). This type of plant cover still characterises the desert areas west of the Nile (El Hadidi et al. 1997). The reconstructed reed swamp vegetation included *Juncus* sp. and *Cyperus rotundus/laevigatus* covering waterlogged soils around the margins of depressions and wadis. It is expected that dense populations of *Juncus* grew nearby the site. This is based on the great quantities of matting made from this plant found covering almost all of the burials of cemetery HK 43. Butzer (1959) suggested that the area of Hierakonpolis (between Esna and Idfu, Fig. 1) received a mean annual rainfall of ca. 50–100 mm during the period between 5000 and 3000 B.C. If so, this amount of precipitation was quite enough to support the growth of the above reconstructed types of plant cover. The occurrence of coniferous wood in the basket is of particular interest because this is evidence of foreign trade. Timber of *Abies*, *Cedrus*, *Cupressus*, *Pinus* and *Juniperus* must have been brought in from a considerable distance. The nearest coniferous trees are in Lebanon, Palestine and western Jordan (Zohary 1973). *Cedrus libani* A. Rich (cedar of Lebanon) was widespread in the mountains of Lebanon and western Syria and southern Turkey. *Juniperus phoenicea* L. (juniper) wood could have been obtained in the northern ranges of the Sinai and in the highlands of Edom, western Jordan (Zohary 1973; Boulos 1999). These exotic woods may have been supplied at this time via the Lower Egyptian settlement of Maadi, where sticks of cedar that had been partly burnt, perhaps as a kind of incense and other Levantine artefacts have been found (Rizkana and Seeher 1989; Kroll 1989). The distinctive pottery of the Buto-Maadi culture has been found in the HK43 cemetery (Friedman et al. 1999).

Conclusion

The evidence obtained from this study shows that the Predynastic inhabitants of Hierakonpolis exploited the available wild plants in different ways. Edible fruits and tubers were collected from accessible stands in desert and reed swamp habitats. *Anethum graveolens* L. mericarps and tubers of *Cyperus laevigatus/rotundus* were also used as perfume in the basket because of their volatile oil contents. Other discoveries from the cemetery at HK43 have shown that appearance in death was already considered of much importance. Dyed hair, carefully trimmed beards and well-manicured nails have been observed among these working class burials. Recovery of what may at least partly be a cosmetic kit inside the basket provides further insights into the conception of the afterlife in this early period of ancient Egypt. Manniche (1999) noted that cosmetics in a funerary setting helped the deceased to undergo the vital process of rebirth in the same manner as the cosmetics in real life.

On the basis of the available palaeoethnobotanical data from the worker's cemetery at Hierakonpolis, HK 43 (Fahmy 2001, 2003), a clear picture has been obtained on the economy of the site. The inhabitants based their subsistence strategy on the cultivation of cereals, basically emmer wheat, which was the preferred cereal, as presence of emmer wheat remains in human gut contents from Hierakonpolis proves that this crop formed a basic constituent of the inhabitants' meals (Fahmy 2003). Wild edible fruits were also important food supplements. Herding of livestock as well as production of matting and pottery formed basic parts of the economy. The current study proves that to understand the life of the ancient Egyptians with palaeoethnobotanical evidence we have to approach them first through their funerary beliefs, which in turn reflect their attitude to life itself.

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