OnLine Journal of Biological Sciences 1 (8): 772-774, 2001

Plant Remains in Gut Contents of Ancient Egyptian Predynastic Mummies (3750 – 3300 BC)

Ahmed Gamal-El-Din Fahmy
Department of Botany, Faculty of Science, University of Helwan, Cairo, Egypt

Abstract: 153 burials of workers dated to 3750-3300 BC were recovered at the Predynastic cemetery HK 43 of the archaeological site in Hierakonpolis, 113 km north of Aswan, Egypt. Plant remains recovered from the gut contents (thorax area) of nine intact burials (seven adults and two children) were analyzed. The desiccated gut contents were rehydrated by 0.5% trisodium phosphate aqueus solution and sorted under wet conditions (water/alcohol), classified into two major categories: plant macro- and micro-remains. The first group contained two seeds of melon (*Cucumis melo* L.) and the second group included phytoliths and starch grains separated from emmer wheat which proves that glumed grains of the emmer wheat were subjected for grinding without dehusking. The most significant result of the micro-botanical analysis of the gut contents is the identification of two different diets: a coarse meal for adults and a fine cooked for children.

Key words: Predynastic Egypt, plant remains, gut contents, emmer wheat

Introduction

Excavations at the archaeological site of Hierakonpolis, 113 km north of Aswan (Fig. 1) uncovered 153 burials at the cemetery HK 43, of which several were intact. Friedman (1999) concludes that the burials belong to Middle Predynastic period between 3750 – 3300 BC.

The Predynastic period (5000 – 3000 BC) represents the cultural stages from the introduction of agriculture to the beginning of Dynastic Egyptian history (Adams and Cialwicz, 1997). Physical investigation carried out by Maish (1999) revealed that a strong muscular nature of the bodies combined with the general poverty of the burials suggests that the cemetery belonged to a working class of Predynastic Hierakonpolis. The exceptional good preservation of the mummies study is attributed to the dry arid environmental conditions in Egypt besides the application of efficient mummification techniques. Desiccated gut contents were recovered from the thorax area of nine intact burials (seven adults and two children) for botanical analysis.

Archaeological and archaeobotanical studies of the Predynastic cemeteries in Egypt were mainly focused on the analysis of grave goods (pottery contents), e.g. Brunton and Caton-Thompson (1928), Brunton (1937), Brunton(1948), El Hadidi (1982), Fahmy (1995, 1997 and 1999). Netolitzky (1943) studied the gut contents from mummies recovered at Nag El-Deir.

The present study aims to investigate the plant remains in the recovered gut contents to give clear insights on the major components of workers' diet of Predynastic Hierakonpolis.

Materials and Methods

During the excavation seasons of 1997 and 1998, desiccated gut contents were recovered from the thorax area of nine well-preserved burials at cemetery HK 43. All samples were measured, weighed and photographed before the laboratory procedures. The samples were rehydrated by adding 0.5% trisodium phosphate aqueus solution (Holden, 1994. Bryant (1974) recommends that the strength of the trisodium phosphate solution must be exactly 0.5%. Strengths exceeding 0.5% may destroy the middle lamella of plant cells and cause the destruction of the delicate plant tissue which hampers the identification process. After 4-10 days, a reddish brown solution fluid is obtained, decanted into a separate container and replaced with an alcohol/water mixture. This wet condition prevents the deformation of morphological and anatomical features of the plant remains. Smears for microscopic examination under a 100 - 500x magnification of Nikon S-KT microscope were studied.

The identification of recovered plant macro-remains, based on their gross morphological features, were compared with modern reference collections kept at the University of Helwan. A variety of taxonomic keys of seed and fruit identification as well as illustrations were used, e.g those of Frank and Stika (1988) and Fahmy (1995). The recovered phytoliths and starch grains were identified after the studies on anatomical features of plant micro-remains by Gassner (1973), Pearsall (1989), Rosen (1992 and 1996).

Results

The Investigation of rehydrated gut contents revealed the presence of botanical materials, which have been classified into two major groups: plant macro-remains and plant micro-remians (Table 1).

The macro-remains: two melon seeds (*Cucumis melo* L.) were found among the gut contents of burial 110. This popular fruit was recorded from archaeological sites in Egypt dating from Predynastic (4500 - 3200 BC) to Graeco-roman times (332 BC - AD 395), (Fahmy, 1995, Vartavan and Amoros, 1997). The seeds of Hierakonpolis were identified as *Cucumis melo* L., which are asymmetrical and the radicle exit opening is in flank position, while the epicarp is characterized by sclerenchymatous cells in longitudinal rows. However, the morphological comparison according to Frank and Stika (1988) shows that the seeds of *C. sativus* L. are symmetrical and the base is relatively regular and straightly cut off, the radicle exit opening set in an intermediate spot.

Although it is most likely that these seeds were swallowed accidentally, their presence may be used as a tool to identify the season of death of the young person (14-16 years of age) in burial 110, as this melon is a summer fruit.

The other plant materials were present as micro-remains because of food processing or digestion. The microbotanical analysis confirmed the presence of phytoliths, fruit epicarp fragments and starch grains.

Cereal husk fragments were separated from the gut contents of seven burials (Table 1), which were attributed to the emmer wheat (*Triticum dicoccon*), based on anatomical/taxonomical features of phytoliths separated from glumes. The long cell

Table 1: Plant remains separated from the gut contents of nine burials at Hierakonpolis

Burial No.	110	117	79	126 b	81	85	113	80	76
Age	14-16	30-34	50-60	Child	22-29	22-24	Adult	5	35-40
Sex	Unkonwn	M	F	Unknown	F	F	M	F	F
Cucumis melo	2								
Phytoliths from emmer glumes Triticum dicoccon	+	+	+		+	+	+		+
Unidentified Parenchyma	+	+							
Grit	+	+	+		+	+	+		+
Starch grains of wheat (*Triticum*)			+	+			+	+	

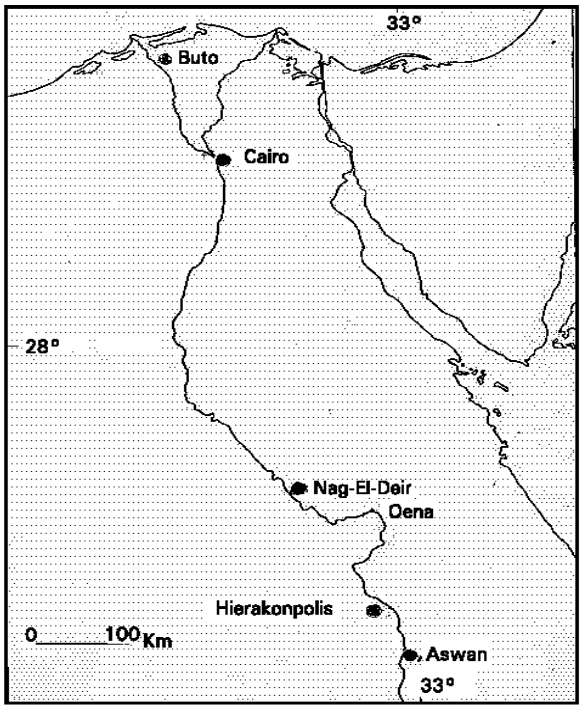

Fig. 1: Geographic location of the Predynastic site at Hierakonpolis, Egypt.

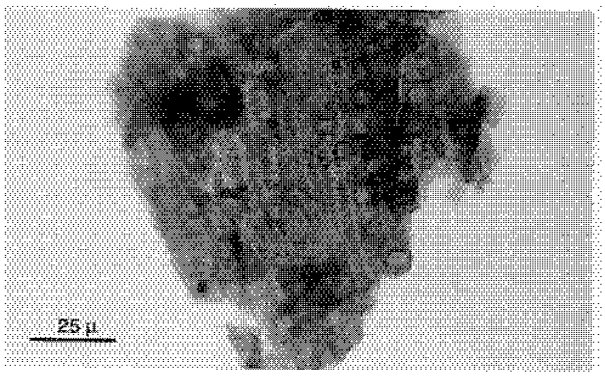

Fig. 2: Phytoliths in epidermal cells of emmer wheat separated from the gut contents of burial number 110.

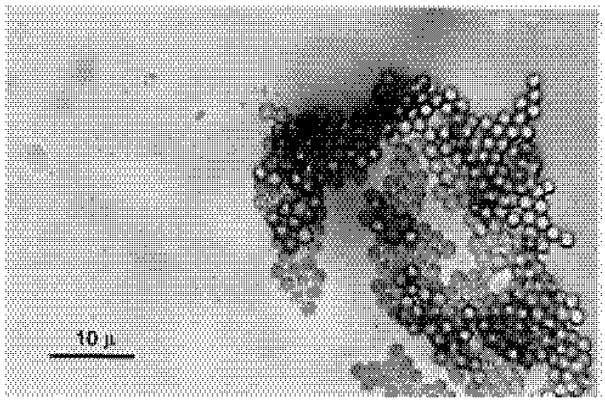

Fig. 3: Starch grains separated from the gut contents of burial 126.

walls possess high obtuse waves of a symmetrical magnitude and height of the waves ranges between 11-13.5 microns(Fig. 2). The frequent occurrence of dendritic forms of long cell phytoliths indicates the presence of a significantly large number of cereal glumes in the diet under investigation, which may suggest that glumed grains of emmer wheat were subjected for grinding without dehusking.

The recovered starch grains from burials:97, 80, 113 & 126 are spherical, 25-40 microns in diameter, characterized by different shapes of surface corrosions (Fig. 3) and were identified as wheat (*Triticum* sp.). These characters were used as valuable taxonomic features by Gassner (1973).

Discussion

The most common remains were those of emmer wheat (*Triticum dicoccon* Schrank), suggested by the fragments of husks and the presence of phytoliths and starch grains. Palaeo-ethnobotanical studies repeatdly stressed on the emmer wheat which apparently played a crucial role in

the agricultural economy of Predynastic Egypt and continued its role until the Ptolemaic period (332-30 BC.), when it was replaced by the free threshing wheats (durum and bread wheats), which did not require the laborious process of removing the chaff from the grains. In fact the significant amount of husk fragments found in the gut contents from the seven adult burials suggests that no or little attempt was made to remove the husks before the grains were ground to flour as part of the bread production process. It seems that in all periods of ancient Egypt emmer wheat grains were kept in their husks to protect them from insects and to preserve their freshness. The removal of the husks before making flour apparently was according to individual preferences. Based on ethnographic examples and Pharaonic evidence, this tedious cleaning process required several steps.

The lack of grave goods and the strong muscular build of the

burials suggests that these people were the working class inhabitants of ancient Hierakonpolis. One of the most significant results of the microanalysis of the gut contents has been the possible identification of a different meal for children. Samples from the child less than 5 years of age in burial 80, and the child of about 10 in grave 126 contained pure starch grains only with no husk fragments whatsoever. It is concluded that the wheat had been well cleaned before being ground to fine flour to make what appeared to be baby food.This finding seems to represent the first evidence of a baby food in ancient Egypt.

Acknowledgments

I thank with gratitude Dr Renee Friedman (University of Berkley/ British Museum) for inviting me to join the excavations at Hierakonpolis (1996-2000) and for the valuable discussions and review of this manuscript.
Many thanks are due to Prof. Cathy D'Andrea and the staff members of the department of archaeology at Simon Fraser University, BC, Canada for offering me research facilities during my stay in Canada, January/February 2000.

References

Adams, B. and K. M. Cialowicz, 1997. Protodynastic Egypt. First edition. Buckinghamshire: Shire Egyptology, pp:1- 72

Brunton, G., 1937. Mostagedda and the Tasian Culture. British Museum expedition to Egypt, first and second Years 1928-1929. London: Bernard Quaritch, pp: 1-1128.

Brunton, G., 1948, Matmar. British Museum expedition to middle Egypt, 1929-1931. London: Bernard Quaritch, pp: 1-143.

Brunton, G. and G. Caton Thompson, 1928. The Badarian Civilization and Prehistoric Remains Near Badari. London: Bernard Quarich, pp: 1-142.

Bryant, V.M., 1974. Diet in southwest Texas: the coprolite evidence. American Antiquity, 39: 407-420

El Hadidi, M.N.,1982. The predynastic flora of the Hierakonpolis region. In: M.A. Hoffman (ed.),The predynastic of Hierakonpolis, An Interim Report. Egyptain Studies Association 1: 102-115.

Fahmy, A.G., 1995. A Historical Flora of Egypt: preliminary survey. Ph.D. Thesis. Giza: University of Cairo, pp: 1- 247

Fahmy, A.G., 1997. Evaluation of the weed flora of Egypt from Predynastic to Graeco-Roman times. Vegetation History and Archaeobotany, 6: 241-247.

Fahmy, A.G., 1999. Plant macro-remains from HK 43: an Interim Report. In R. Friedman (ed) Preliminary report on field work at Hierakonpolis: 1996 – 1998. J. Ame. Res. Center in Egypt, 36: 14-18

Frank, K.S. and H.P. Stika, 1988. Bearbeitung der makroskopischen pflanzen und eniger tierreste des Romerkastells Sablonetum (Ellingen bei Weissenburg in Bayern). Kaellmuenz: Michael Lassleben Verlag, pp: 1-150

Friedman , R., 1999. Preliminary report on field work at Hierakonpolis: 1996 – 1998. J. Ame. Res. Center in Egypt. 36: 1-35

Gassner, G., 1973. Mikroskopische untersuchung pflanzlicher lebensmittel. Fourth edition. Stuttgart: Gustav Fischer Verlag, pp: 1- 396.

Holden, T., 1994. Dietry evidence from the intestinal contents of ancient humans with particular reference to desiccated remains from northern Chile. In: J. Hather (ed.) Tropical Archaeobotany: applications and new developments. London / New York: Routledge, pp: 66-81

Maish, A., 1999. Report on the physical remains from the Predynastic cemetery at HK 43. In: R. Friedman (ed) Preliminary report on field work at Hierakonpolis: 1996 – 1998. J. Ame. Res. Center in Egypt, 36: 11-14

Netolitzky, F., 1943. Nachweise von nahrungs- und heilmitteln in den trockenleichen von Naga-Ed-Der (Ägypten). Mitteilungen des Deutschen Instituts für Ägyptische Altertumskunde in Kairo, Erstes Ergänzungsheft, 11:1-33.

Pearsall, D., 1989. Paleoethnobotany: a handbook of procedures. San Diego/ New York/ London: Academic Press, pp :1- 470.

Rosen, A.M., 1992. Preliminary identification of silica skeletons from Near Eastern archaeological sites: an anatomical approach. In: G. Rapp & S.C. Mulholland (eds.), Phytolith systematics: emerging issues. New York/ London, 129-147.

Rosen, A.M., 1996. Phytoliths in Predynastic: a cicrobotanical analysis of plant use at HG, in the Hu Semaineh region, Egypt. Archéo-Nil 6: 77-82.

Vartavan, C.and V. A. Amoros, 1997. Codex of ancient Egyptian plant remains. London: Triade Exploration, pp: 1-401. Zohary, D. and M. Hopf, 1993. Domestication of Plants in the Old World, Second edition. Oxford: Clarendon Press, pp: 1-144.