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 dehydrated gut contents were rehydrated by 0.5% trisodium phosphate aqueous 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 to 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 (3000 – 3000 BC) represents the cultural stages from the introduction of agriculture to the beginning of Dynastic Egyptian history (Adams and Clavianez, 1997). Physical investigation carried out by Maish (1989) revealed that a strong muscular nature of the bodies combined with the general poverty of the burial 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 mumification 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 Naga 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 1987 and 1988, 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 aqueous 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 - 600x 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), Pearisall (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-remains (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, 1986, Vartanian 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 dicoccum), 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

<table>
<thead>
<tr>
<th>Burial No.</th>
<th>110</th>
<th>117</th>
<th>79</th>
<th>126 b</th>
<th>81</th>
<th>86</th>
<th>113</th>
<th>80</th>
<th>76</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>14-16</td>
<td>30-34</td>
<td>60-60</td>
<td>Child</td>
<td>22-29</td>
<td>22-24</td>
<td>Adult</td>
<td>6</td>
<td>36-40</td>
</tr>
<tr>
<td>Sex</td>
<td>Unknown</td>
<td>M</td>
<td>F</td>
<td>Unknown</td>
<td>F</td>
<td>F</td>
<td>M</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>Cucumis melo</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phytoliths from emmer glumes</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triticum dicoecum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unidentified Parenchyma</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grit</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starch grains of wheat (Triticum)</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 grains in the diet under investigation, which may suggest that plumed grains of emmer wheat were subjected to grinding without dehulling.

The recovered starch grains from burials 97, 80, 113 & 126 are spherical, 25-40 microns in diameter, characterized by different shapes of surface corrations (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 dicoccum Schrank), suggested by the fragments of husks and the presence of phytoliths and starch grains. Palaeo-ethnobotanical studies repeatedly 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 micromorphological analysis 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 128 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 Berkeley/British Museum) for inviting me to join the excavations at Hierakonpolis (1986-2000) 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