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Local crop production *versus* import of cereals in the Predynastic period in the Nile Delta

"Was there any crop production in the Nile Delta during the Predynastic period?" This question I have been asked frequently by archaeologists working in the Nile Delta. So far no sickle blades have been found in Predynastic sites in the Nile Delta (Tell el-Fara`in-Buto [Schmidt 1986; 1987; 1988; 1989a; 1992a], Tell Ibrahim Awad [Schmidt 1992a; 1992b] and el-Tell el-Iswid [Schmidt 1989b; 1992a]), the only exception being one with silica gloss in the "Urschicht" of Merimde (Eiwanger 1984: 47, T46 I.879; 1988: 37). Furthermore, the environmental concept of the Nile Delta has been that of an uninhabitable thicket for a long time (cf. Baumgartel 1947: 3ff; Krzyzaniak 1977: 137). Therefore it has been inferred that a fully developed type of agriculture with crop production and life-stock raising was not practised during the Predynastic period; that herding was the economic basis of the settlements; that crop production only arrived in Early Dynastic times.

Meanwhile the previous environmental concept of the Nile Delta has been revised (Bietak 1975; Butzer 1976) but the lack of sickle blades poses two questions: did the people obtain their cereals in the Predynastic period from outside the Nile Delta or did they grow them locally but harvested them without sickles, e.g. by reaping ears only or by reaping ears and straw, or by uprooting? Eiwanger (1988: 37) concludes from the rare occurrence of sickle blades in the "Urschicht" of Merimde that the harvesting methods must have been a different one.

To answer these questions, soil samples from Predynastic and Early Dynastic layers were taken at Tell el-Fara`in-Buto (Table 1 & 3; for a detailed report, Thanheiser forthcoming) and at Tell Ibrahim Awad (Table 2 & 4; preliminary report, Thanheiser 1992a) and processed by the usual water flotation technique (Greig 1989: 34ff.). The contents of jars of the Early Dynastic cemetery at Minshat Abu Omar were also sampled. As the sample composition is rather unusual the results of the analysis are not included here but will be published in the final excavation report (Thanheiser forthcoming b; preliminary report Thanheiser 1992b).

The plant remains from Buto and Tell Ibrahim Awad were identified and classified according to their mode of arrival at the site and, for crops and segetal weeds (i. e. weeds associated with field crops), the crop processing stage which they might represent.

For the classification in respect of crop processing stages ethnographic models were applied. Here the basic rational is the fact that there is a limited range of ways to grow, harvest and process crops. Ethnographic studies of archaic agrarian systems indicate that each step in the operation of crop management, harvesting and processing will result in a distinct composition of products and by-products. Samples of charred plant remains often exhibit a composition closely similar to that observed in archaic agriculture. By reference to the ethnographic models archaeological plant remains can be assigned to certain steps in the crop processing sequence. For more details on ethnographic models and their application in archaeobotany see e.g. Hillman (1981; 1984a; 1984b; 1985) and Jones (1984).

Four groups of plant remains could be distinguished in Buto and Tell Ibrahim Awad:

a) grain and chaff of field-crops grown for human consumption or as animal fodder;
b) weeds associated with the field-crops;
c) plants which might have been collected for food or medicine;
d) others (garden plants, fuel, etc.).

Crops and segetal weeds usually arrive together on site. But for matters of convenience and because of the fact that they outnumber all other plants they are grouped separately. On the other hand garden plants, fuel etc. are brought to the site for different purposes and arrive separately. But the number of recovered taxa and items is so small that they were summarised in one group.

In both sites the majority of plant remains comes from field-crops (emmer wheat, barley, lentil, vetch and in Buto also some flax) and segetal weeds. No striking difference in sample composition could be found neither for the two sites nor for the two periods concerned.

Only minor changes through time were observed. The proportion of cereal grains in each sample is smaller in Early Dynastic layers than in the Predynastic ones. This might be an indication that a more thorough way of crop processing where less of the end-product was lost, was applied in the Early Dynastic period. A decline of plants which might have been collected (e.g. *Malva* sp., *Plantago* sp.) can be observed. Garden plants (grape and fig) only occur in Early Dynastic layers, with the exception of one fig nutlett and one grape pip in Layer II in Buto. Some samples from Early Dynastic layers contain high amounts of fodder plants (*Trifolium*-type, *Lolium*-type, *Phalaris* sp., *Cyperus* sp.) but hardly anything else. This might be an indication for the intensification of cattle breeding in the Early Dynastic period.

Most of the weed seeds/fruits are smaller than the cereal grains. This indicates that the samples represent waste from fine sieving, a by-product usually found on sites where cereals are grown and processed.

The weeds present in the samples all belong to the usual weed assemblage of winter crops in northern Egypt. No weeds typical for the Levant or for Upper Egypt are present. Therefore the import of cereals from these two areas is very unlikely. Furthermore the results from both periods compare well with results from Tell el-Dab`a (Thanheiser 1987) where undoubtedly a highly developed type of agriculture was practised.

Taking into account all facts (the same sample composition in both periods with cereals and segetal weeds being dominant, with waste from fine sieving, without foreign weeds) the import of cereals from Upper Egypt or the Levant during the Predynastic period is unlikely.

Could the cereals have been harvested then by different methods? Whenever cereals are harvested some of the weeds associated with them will inevitably be harvested as well. Which weeds will be harvested depends on their growth habit (twining, free-standing) and height in relation to their host crop and on the harvesting method.

The weeds present in the samples were grouped according to their growth habit and height. Here again no difference in the two sets of samples could be detected. All weeds are free-standing and most of them flower at medium, some at low height. Therefore it is likely that in both periods the cereals were harvested by the same method - in my opinion with sickles and cut just above the ground. The presence of seeds of rather low growing weeds like *Crypsis* sp. prove that. Why there are no sickle blades in Predynastic layers remains unresolved (discussed by von der Way 1993: 7ff.).

Conclusion

There is no significant difference in sample composition between the Predynastic and the Early Dynastic period. Minor differences are the decline of the percentage of cereal grains, the decline of plants which might have been collected for food or medicine, the appearance of garden plants and samples which contain hardly anything else but fodder plants in the Early Dynastic period. Therefore, agriculture seems to have been practised during the Predynastic period but has become more diversified during the Early Dynastic period.

Table. 1. Plant remains from Tell el-Fara`in - Buto (Summary).

Phase	Pre-Dynastic		Early Dynastic	
Layer	**I**	**II**	**III**	**IV**
No. of Samples	**13**	**11**	**6**	**19**
Amount of Soil Sampled (Liter)	**263**	**265**	**273**	**218**
No. of Recovered Items	**3329**	**4155**	**2996**	**11793**
Triticum dicoccum s.f	170	452	47	179
Triticum dicoccum s.f. term.	6	-	1	12
Triticum dicoccum	21	75	14	42
Triticum dicoccum t.g.	5	1	2	8
Triticum dicoccum/durum	2	1	2	2
Triticum sp. r.f.	20	35	3	2
Triticum sp. g.b.	559	862	406	1023
Triticum sp.	33	70	24	65
Triticum sp. t.g.	1	3	-	2
Hordeum vulgare ssp. distichum r.f.	52	11	-	-
Hordeum vulgare ssp. vulgare r.f.	6	-	-	-
Hordeum vulgare s/h	4	7	10	18
Hordeum vulgare s/h t.g.	1	-	2	13
Hordeum vulgare s/?	69	22	19	39
Hordeum vulgare s/? t.g.	3	-	-	12
Hordeum vulgare a/h	-	1	-	2
Hordeum vulgare a/h t.g.	-	-	-	15
Hordeum vulgare a/?	1	5	-	-
Hordeum vulgare a/? t.g.	-	1	-	-
Hordeum vulgare ?/h	2	3	3	8
Hordeum vulgare ?/h t.g.	-	-	-	3
Hordeum vulgare indet. r.f.	27	9	-	-
Hordeum vulgare indet.	26	57	25	80
Hordeum vulgare indet. t.g.	1	2	-	12
Cereals indet. r.f.	1	23	16	13
Cereals indet.	310	296	78	177
Cereals indet. t.g.	-	-	-	11
Cereals indet. embryo	8	35	28	172
Vicia ervilia	-	1	-	-
Lens culinaris	13	7	-	4
Lathyrus sativus	13	23	-	4
Pisum sativum	6	9	-	2
Vicieae indet.	27	103	1	112
Linum usitatissimum	-	-	4	-
Ficus carica	-	1	33	81
Vitis vinifera	-	1	7	59
Silene sp.	-	-	-	3
Chenopodium album	139	57	20	3
Chenopodium murale	70	42	13	5
Chenopodium sp.	148	75	77	11
Suaeda sp.	33	8	33	69
Amaranthus sp.	-	-	13	11
Polygonum persicaria	-	1	-	1
Polygonum/Rumex sp.	57	33	-	38
Rumex simpliciflorus	7	-	-	-

Table 1. (continued

Rumex dentatus	69	90	-	-
Rumex sp.	130	85	30	326
Atriplex sp.	-	-	-	2
Lagonychium farctum	-	-	-	3
Trifolium-type	114	55	80	2252
Scorpiurus sp.	5	-	-	3
Vicieae indet.	100	78	51	190
Medicago sp.	-	-	-	6
Fabaceae indet.	35	21	3	73
Geranium sp.	-	-	-	1
Apiaceae indet.	14	-	-	-
Brassica sp.	2	-	-	-
Raphanus sp. pod	8	-	-	-
Sinapis sp.	-	-	-	1
Erucaria sp.	-	-	-	10
Malva sp.	43	49	52	37
Lamiaceae indet.	2	1	-	-
Senecio sp.	2	-	-	-
Cotula-type head	5	-	-	-
Pulicaria sp.	-	2	-	-
Matricaria-type head	2	-	-	-
Sonchus-type head	4	-	-	-
Asteraceae indet. head	-	-	-	12
Asteraceae indet.	-	-	-	80
Bellevalia sp.	-	1	-	-
Muscari sp.	-	-	-	16
Hyacinthaceae indet.	14	10	6	83
Cyperus sp.	63	24	14	177
Eleocharis sp.	2	4	-	-
Schoenoplectus triqueter/litoralis	1	1	1	19
Scirpus sp.	10	-	9	2
Carex sp.	10	3	2	30
Cyperaceae indet.	5	38	18	77
Lolium temulentum	-	8	1	1
Lolium sp.	6	54	122	123
Lolium-type	252	335	1155	1733
Bromus sp.	11	52	8	15
Agropyron sp.	11	-	-	-
Phalaris sp.	107	88	127	3375
Crypsis sp.	9	-	1	3
Poaceae indet. culm	12	26	7	4
Poaceae indet. node	15	9	1	-
Poaceae indet. r.f.	1	-	3	3
Poaceae indet. awn	8	75	10	6
Poaceae indet.	348	615	386	713
INDET.	68	99	28	104

Abbreviations:

a	symmetric
g.b	glume base
h	hulled
r.f.	rhachis fragment
s	symmetric
s.f.	spikelet fork
s.f.term.	terminal spikelet fork
t.g.	tail grain

Table 2. Plant remains from Tell Ibrahim Awad (Summary).

Phase	Pre-dynastic	Early Dynastic
No. of Samples	**7**	**17**
Amount of Soil Sampled (Liter)	**150**	**300**
No. of Recovered Items	**1263**	**6471**
Triticum dicoccum s.f	14	50
Triticum dicoccum s.f. term.	1	7
Triticum dicoccum	6	20
Triticum dicoccum t.g.	11	46
Triticum sp. g.b.	51	72
Triticum sp.	23	51
Triticum sp. t.g.	3	-
Hordeum vulgare s/h	5	35
Hordeum vulgare s/h t.g.	1	12
Hordeum vulgare s/?	4	14
Hordeum vulgare s/? t.g.	9	1
Hordeum vulgare a/h	-	2
Hordeum vulgare a/h t.g.	1	1
Hordeum vulgare a/?	-	1
Hordeum vulgare a/? t.g.	-	2
Hordeum vulgare ?/h	-	15
Hordeum vulgare ?/h t.g.	1	1
Hordeum vulgare a/n	-	1
Hordeum vulgare indet.	15	26
cereals indet. r.f.	8	16
cereals indet.	142	284
cereals indet. embryo	5	25
Vicia ervilia	1	-
Lens culinaris	2	2
Lathyrus sativus	-	2
Vicieae indet.	14	43
Ficus sp.	-	2
Vitis vinifera	-	1
Silene sp.	-	3
Chenopodium murale	-	2
Polygonum persicaria	9	5
Polygonum/Rumex sp.	35	113
Rumex sp.	163	793
Trifolium-type	13	70
Vicieae indet.	-	7
Fabaceae indet.	-	16
Apium cf. *graveolens*	-	1
Apiaceae indet.	-	1
Brassica/Sinapis sp.	-	14

Table 2. (continued).

cf. *Sisymbrium sp.*	1	-
Malva sp.	9	11
Solanum nigrum	-	3
Lithospermum sp.	-	1
Plantago sp.	5	7
Lamiaceae indet.	-	1
Matricaria sp.	1	-
Asteraceae indet.	1	1
Hyacinthaceae indet.	14	130
Cyperus sp.	167	344
Schoenoplectus sp.	6	8
Carex sp.	3	14
Cyperaceae indet.	3	14
Lolium-type	285	2922
Bromus diandrus	1	2
Phalaris sp.	54	300
Crypsis sp.	15	1
Poaceae indet. culm	-	7
Poaceae indet. node	-	1
Poaceae indet. r.f.	-	1
Poaceae indet. awn	6	32
Poaceae indet.	104	854
INDET.	32	60

Abbreviations:

a	asymmetric		
g.b.	glume base	s	symmetric
h	hulled	s.f.	spikelet fork
n	naked	s.f.term.	terminal spikelet fork
r.f.	rhachis fragment	t.g.	tail grain

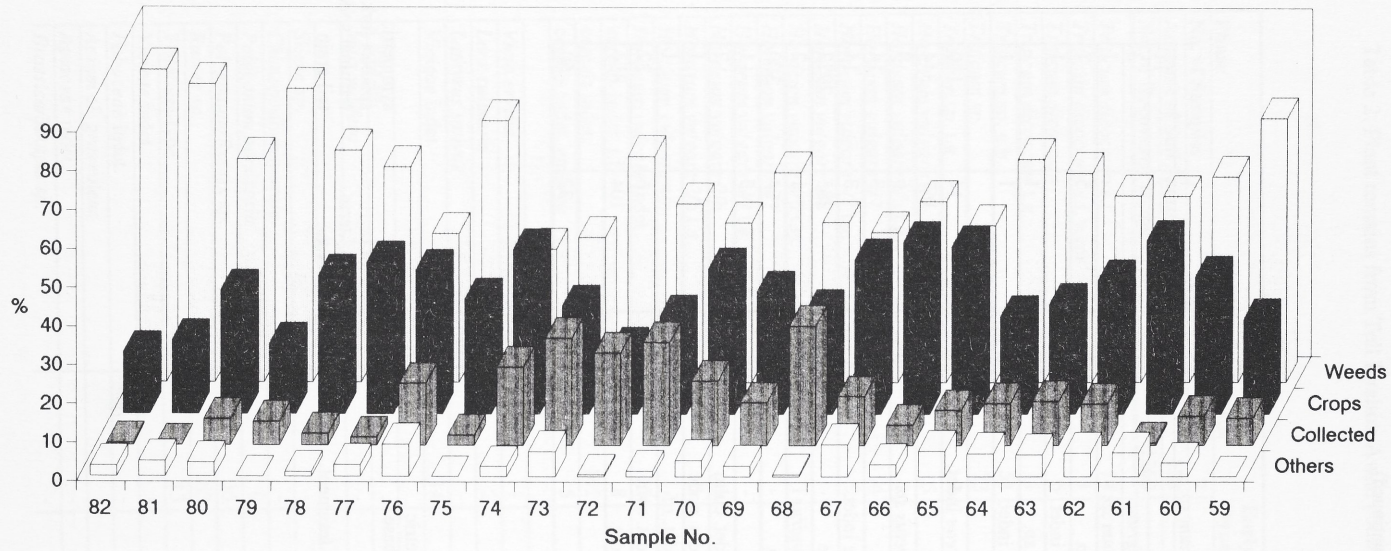

Table 3. Composition of Predynastic plant remains from Tell el-Far'in - Buto.

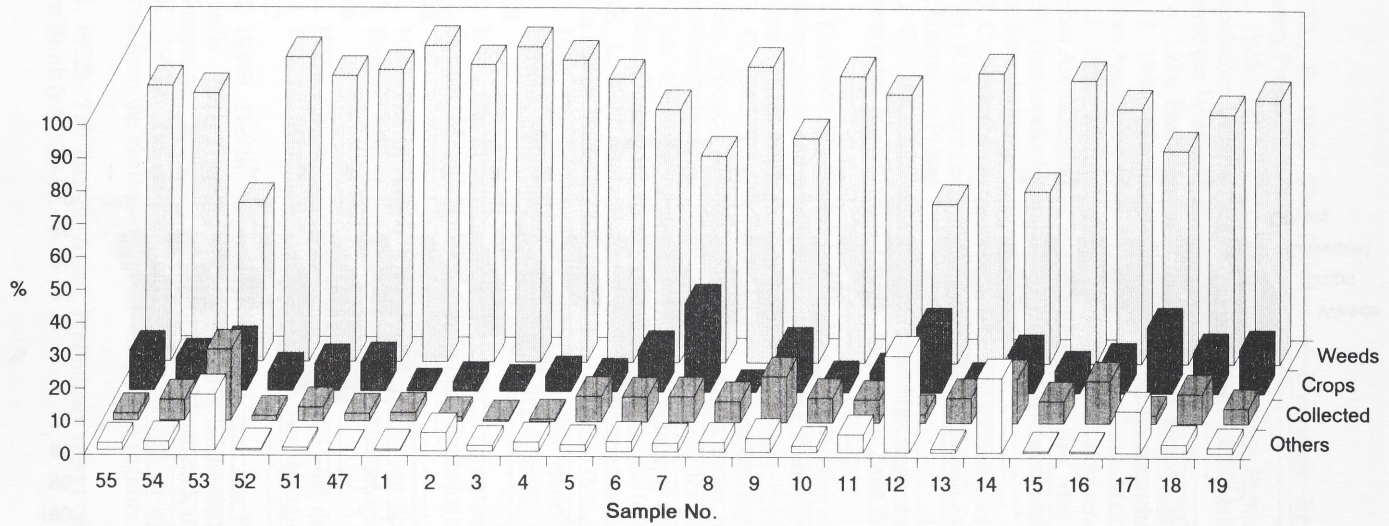

Table 3 (continuation). Composition of Predynastic plant remains from Tell el-Far'in - Buto.

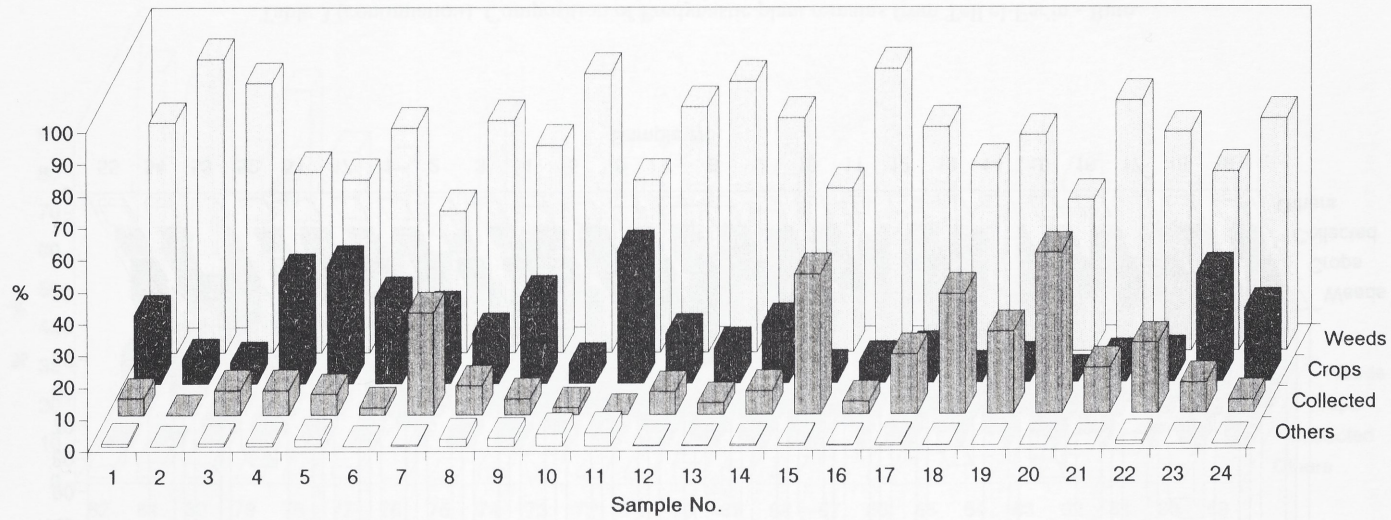

Table 4. Composition of Predynastic plant remains from Tell Ibrahim Awad.

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