

# Plants of the Neolithic Kadero (Central Sudan): a palaeoethnobotanical study of the plant impressions on pottery

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In the course of the first six seasons of excavations on the Neolithic settlement at Kadero, in the central Sudan, dated to ca 5030-5280 B.P., a sample of about one metric ton of potsherds was obtained. It came from two pits located in the southern (S) and northern (N) settlement deposits on the site (cf. Krzyżaniak, 1978). The excavator selected more than 300 pieces of potsherds from this large sample and gave them to me to study the impressions visible on their surfaces. I was able to find the impressions of plants on 141 potsherds (=47 per cent of the sample).

In total, I found 171 impressions of plants on these potsherds: 153 of these were found on 126 potsherds excavated from the southern and 18 impressions were found on 15 potsherds excavated from the northern settlement deposit. It should be, however, remembered that the pit established in the southern part of the site yielded a large majority of all potteries found at Kadero.

All the identified impressions belong to the grasses (*Gramineae*) and the domesticated forms are clearly predominant among them. The most frequent impressions are those of the domesticated tropical cereals: sorghum and millet.

The plants identified for the Neolithic Kadero are classified into 3 groups:

A. Sorghums

B. Cereal grasses known as millets (*Panicum*) *sensu lato*,

C. Unidentified grasses (*Gramineae* indet.), probably growing wild.

This classification has been introduced as a result of the present situation in the systematics and nomenclature of African cereals characteristic by the use of a number of synonyms. Of considerable help in this respect is the work of W. Nowiński (1970).

The list of the identified plants from the Neolithic Kadero consist of 10 "taxa".

## A. Sorghums

1. *Sorghum vulgare* (= *S. bicolor*),
2. *Sorghum* sp.,
3. *Andropogon halapensis* (= *Sorghum halapense*),
4. *Andropogon* sp.

## B. Millets

1. *Eleusine* cf. *coracana* (= *Cynosurus coracanus*),
2. *Eragrostis abyssinica* (= *Poa abyssinica*),
3. *Digitaria* sp.,
4. *Panicum* sp.,
5. *Setaria* sp.

C. Unidentified grasses (*Gramineae* indet.)

From the botanical evidence from the particular parts of the settlement at Kadero, the following results were obtained:

## Southern settlement deposit

A total of 153 impressions was found on 126 potsherds yielded by the excavations in this part of the Neolithic settlement (Table 1). The most numerous impressions were made by the grains of the finger millet (*Eleusine coracana*) (41.17 per cent) while sorghums were in the second place in this respect (29.10 per cent). Among the

Table 1

## Southern settlement deposit

Group	No.	Taxon	Number of impressions	Per cent
A	1	<i>Sorghum vulgare</i> (= <i>S. bicolor</i> )	31	20.26
	2	<i>Sorghum</i> sp.	9	5.88
	3	<i>Andropogon halapensis</i>	4	2.31
	4	<i>Andropogon</i> sp.	1	0.65
			45	29.10
B	5	<i>Eleusine coracana</i>	63	41.17
	6	<i>Setaria</i> sp.	17	11.11
	7	<i>Setaria</i> sp.?	6	3.92
	8	<i>Panicum</i> sp.	5	3.26
	9	<i>Panicum</i> vel <i>Setaria</i> sp.?	5	3.26
	10	<i>Eragrostis abyssinica</i>	2	1.30
	11	<i>Digitaria</i> sp.	1	0.65
	12	<i>Setaria</i> vel <i>Panicum</i> sp.	1	0.65
			100	65.32
C	13	<i>Gramineae</i> indet.	8	5.22
Total			153	99.64

sorghums, the most numerous impressions were those of the *Sorghum vulgare* (20.26 per cent of all impressions from this part of the settlement). As regards other taxons, the relatively high frequency of the impressions of *Setaria* sp. (11.11 per cent) should be noted in this sample. The frequency of the taxons identified for the southern settlement deposit is presented in the following list:

1. *Sorghum vulgare* (= *S. bicolor*). 31 impressions, including 30 impressions of unglumed grains and 1 or 2 impressions of glumes.
2. *Sorghum* sp. (but not *S. vulgare*). 9 impressions of the unglumed grains. These include 7 impressions of grains, 1 impression of a spikelet and 1 impression of a grain of somewhat different shape.
3. *Andropogon halapensis* (Sorghum). 4 impressions of unglumed grains. It is possible that one of them belong to *Sorghum* sp.
4. *Andropogon* sp. (Sorghum?). 1 impression of grain.
5. *Eleusine coracana* (Finger millet). 63 impressions of the grains, mostly unglumed, including 21 badly preserved negatives.
6. *Digitaria* sp. 1 impression of a grain.
7. *Eragrostis abyssinica?* (teff?). 2 impressions of the unglumed grains, badly preserved.
8. *Panicum* sp. (Millet). 5 impression of grains.
9. *Panicum* sp.? or *Setaria* sp.? 5 impressions of grains.
10. *Setaria* sp. 17 impressions of grains
11. *Setaria* sp.? (bristle-grass?). 6 impressions of grains.
12. *Setaria* sp. vel *Panicum* sp.? (bristle-grass or millet?). 1 impression of a grain.
13. *Gramineae* indet. (unidentified grasses). 8 impressions, including 5 of grains, 2 of glumes and 1 of a part of a blade.

In the sample of potsherds from this part of the settlement a number of less clearly impressed and unidentified negatives of plants were noted as well as traces of charred plants (charred blades?). In lumps of compact soil, pugging (?) or treshing floor (?) concretions were also noted on more than 50 pieces of these materials; these were found as numerous apertures which probably are the remains of the desintegrated tubes of rootlets of plants.

### Northern settlement deposit

A total of 18 impressions of plants was found on 15 potsherds excavated from this part of the Neolithic settlement (Table 2). The most frequent turned out to be the impressions of domestic *Sorghum vulgare* which are represented by 38.88 per cent of all negatives. The frequency of the botanical taxa identified for the northern settlement deposit is shown by the following list:

1. *Sorghum vulgare* (= *S. bicolor*). 7 impressions of the unglumed grains.
2. *Sorghum* sp. vel *Andropogon* sp. (Sorghum). 4 impressions of glumes.

Table 2

## Northern settlement deposit

Group	No.	Taxon	Number of impressions	Per cent
A	1	<i>Sorghum vulgare</i> (= <i>S. bicolor</i> )	7	38.88
	2	<i>Sorghum</i> vel <i>Andropogon</i> sp.	4	22.22
B	3	<i>Panicum</i> sp.	2	11.11
	4	<i>Eleusine coracana</i> ?	2	11.11
	5	<i>Eleusine</i> sp.?	3	16.66
Total			18	99.98

3. *Panicum* sp. (Millet). 2 impressions of grains.

4. *Eleusine coracana*? (Finger millet?). 2 impressions of grains.

5. Unidentified impressions, perhaps of *Eleusine* sp. 3 impressions of grains.

The frequency of the impressions and taxa from both settlement deposits at Kadero are shown in breakdowns on enclosed Tables 1 and 2, while Table 3 contains the breakdown showing the total of botanical evidence obtained for the Neolithic settlement at Kadero. Table 4 shows the size of the grains of cereals from the southern settlement deposit and Table 5 presents a comparison of size of the presently culti-

Table 3

## Impressions of plants from the Neolithic settlement at Kadero

Taxon	S		N		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
A <i>Sorghum vulgare</i> (= <i>S. bicolor</i> )	31	20.3	7	38.9	38	22.2
<i>Sorghum</i> sp.	9	5.9	—	—	9	5.3
<i>Andropogon halapensis</i>	4	2.3	—	—	4	2.3
<i>Andropogon</i> sp.	1	0.6	—	—	1	0.6
<i>Sorghum</i> vel <i>Andropogon</i>	—	—	4	22.2	4	2.3
B <i>Eleusine coracana</i>	63	41.2	—	—	63	36.8
<i>Eleusine coracana</i> ?	—	—	2	11.1	2	1.2
<i>Eleusine</i> sp.?	—	—	3	16.7	3	1.7
<i>Setaria</i> sp.	17	11.1	—	—	17	9.9
<i>Setaria</i> sp.?	6	3.9	—	—	6	3.5
<i>Panicum</i> sp.	5	3.3	2	11.1	7	4.0
<i>Panicum</i> vel <i>Setaria</i> sp.	5	3.3	—	—	5	2.9
<i>Eragrostis abyssinica</i>	2	1.3	—	—	2	1.2
<i>Digitaria</i> sp.	1	0.6	—	—	1	0.6
<i>Setaria</i> vel <i>Panicum</i> sp.	1	0.6	—	—	1	0.6
C <i>Gramineae</i> indet.	8	5.2	—	—	8	4.7
Total	153	99.6	18	100.0	171	97.8

Table 4

## The measurements of the impressions of grains from the southern (S) settlement deposit

No.	Taxon	Length in mm	Breadth in mm	
1	<i>Sorghum vulgare</i> (= <i>S. bicolor</i> ) (15 impressions)	average	3.27	3.58
		minimum	2.7	2.8
		maximum	4.0	4.1
2	<i>Sorghum</i> cf. <i>vulgare</i> (11 impressions)	average	3.69	3.41
		minimum	2.9	2.7
		maximum	4.3	4.3
3	<i>Sorghum</i> sp. (8 impressions)	average	3.71	2.32
		minimum	2.7	1.7
		maximum	4.6	2.7
4	<i>Eleusine coracana</i> (20 impressions)	average	2.14	2.0
		minimum	1.8	1.6
		maximum	2.5	2.6

Table 5

The measurements of the grains of *Sorghum*

1. The measurements of the grains of the presently cultivated *Sorghum vulgare* in the area of Khartoum (on the basis of measurements of 50 unglumed grains)

	length in mm	breadth in mm	thickness in mm
average	3.90	3.93	2.53
minimum	3.7	3.7	2.2
maximum	4.2	4.1	3.0

2. The measurements of the charred grains of *Sorghum bicolor* (L.), race *bicolor* from the excavations at Jebel el Tomat on the lower White Nile, dated to 245 ± 60 A.D. (after J.D. Clark and A. Stemler, 1975)

length: 3.0–3.4 mm  
breadth: 2.3–2.9 mm

vated *Sorghum vulgare* in the environs of Khartoum (delivered by Dr. Ikhlas Abd el Bari from the Department of Botany, University of Khartoum) and the charred grains of *Sorghum bicolor* (L.) from the recent excavations at Jebel el Tomat on the lower White Nile dated to ca. 245 A. D. as they were published by J. D. Clark and A. Stemler (1975).

## Summary

The identification of the plant impressions found on the potsherds from the Neolithic settlement at Kadero is a contribution to the growing research on the ecology and economy developing in present day Central Sudan in the later prehistory. It looks to the present writer as the social group of Kadero was engaged in the cultivation of 2 taxa of tropical cereals: sorghum (*Sorghum vulgare* = *S. bicolor*) and millet (*Eleusine coracana*); the impressions of these cereals constitute a large majority of all negatives of plants found in this sample of potsherds. The domestic status of these cereals is indicated by the size of their grains, similar to the presently cultivated forms.

It should be added that large quantities of grindstones are reported by the excavator of Kadero (Krzyżaniak, *op. cit.*) and it looks, therefore, as if the cultivated grains were extensively processed for foods in this settlement. It seems also that the supposed wild grasses which, perhaps, may be associated with some impressions, *e.g.* *Setaria* sp., may have been collected by the Neolithic Kaderans, or perhaps some species may have been both cultivated and/or collected in wild form (*Panicum*, *Digitaria*). In most cases it was, however, very difficult to identify more precisely the impressions of *Panicum*, *Digitaria* and *Setaria* because of the unclear shape and/or excessive depth of the negatives of their grains preserved in the ceramic paste.

This paper is the final version of the preliminary studies pursued on the Kadero botanical evidence which were published earlier by this author as a communique (Klichowska, 1978).

## References

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