

■ SUDAN

Sorghum Exploitation at Kassala and Its Environs, North Eastern Sudan in the Second and First Millennia BC

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Introduction

The Italian Archaeological Expedition of the University of Naples "L'Orientale" in Eastern Sudan led by Andrea Manzo conducted extensive survey and excavation between November 2 and 22, 2010¹. In June 2010, five months before the arrival of the expedition, members of the Antiquity Department from Khartoum National Museum and the State of Kassala Ministry for Archaeology, Tourism and Wild Life, conducted a survey of potential sites in the Kassala region and nearby localities. With the objective of recovering more archaeological and archaeobotanical data, and with the idea of preparing an archaeological map of the area, some of the sites (UA 53, UA 17, 14, UA 129, and K1 see Figure 1 for a map of the study area, drainage systems, geographical location and distribution of the sites) were re-visited by members of the Italian Archaeological Expedition in Eastern Sudan. In due course, pottery sherds with vegetal impressions were collected. In addition, very rich vegetal imprints in clay were col-

lected for investigation from an excavation at Kassala, Mahal Teglinos (K1 VI 2010). Thirteen pottery samples from the surveyed sites UA 53, UA 17, 14 and 129, as well as twelve samples from the excavation at Mahal Teglinos, were subjected to analysis using a high powered microscope and comparative plant collections. The identification of the samples included *Setaria sp.* as an imprint, a whole mineralized grain of *Setaria sp.*, a legume (*Vigna unguiculata*), and *Ziziphus spina-christi*. The majority of the impressions (from both the surveyed and excavated samples) belong to sorghum grains, chaffs, spikelets and glom (see Table 1).

The Study Area

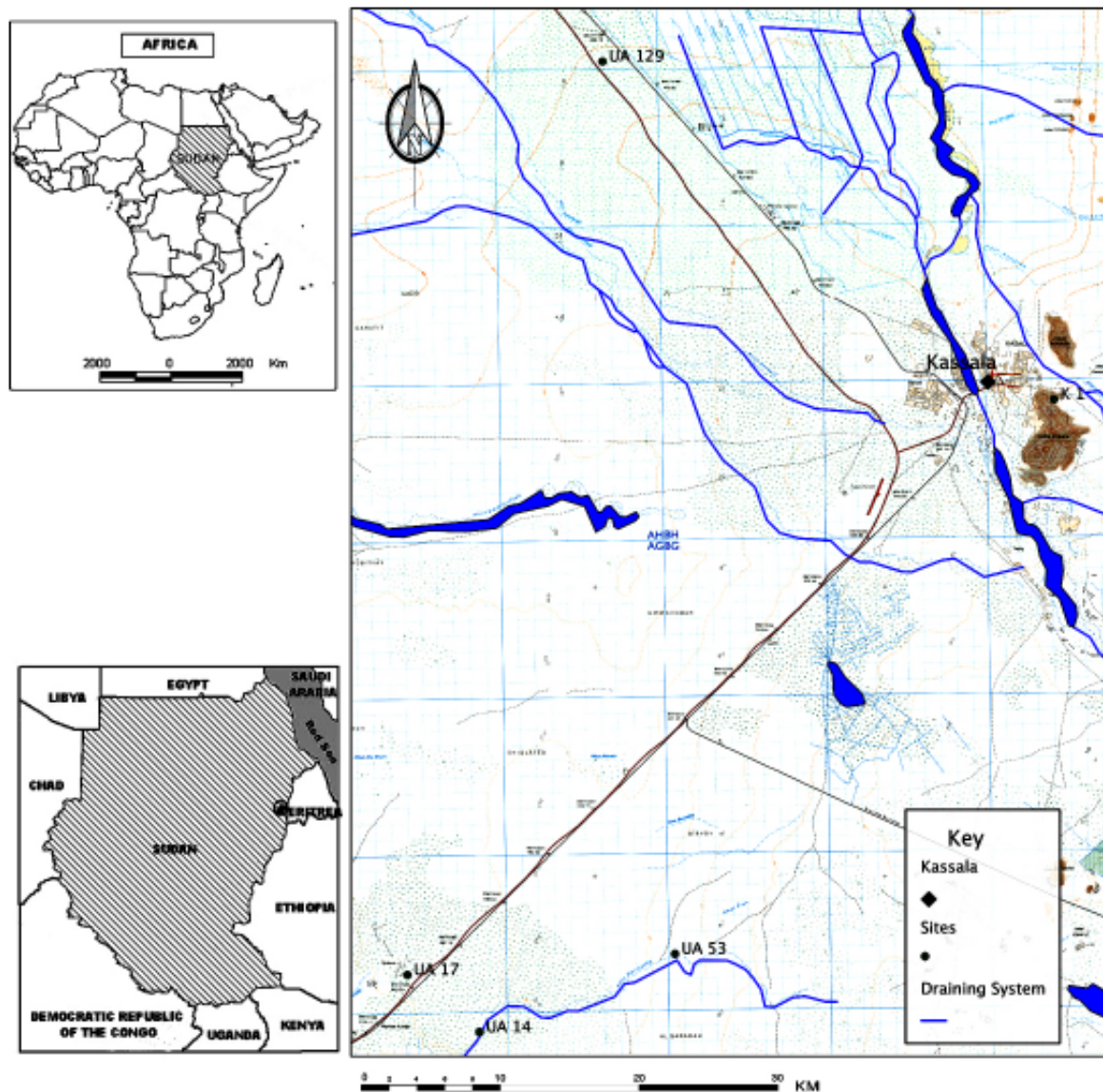
Kassala, the administrative city of the State of Kassala, is located some 350 kilometers to the east of Khartoum, the capital city of the Republic of the Sudan. The center of the city of Kassala is found to the east of the Gash River. Taking into account the semi-desert climatic conditions of the area, it is reasonable to assume that the river is an important attraction for the establishment of the city and for the establishment of settlements in ancient times. The city has also become an important trade center because it is located along the highway between Khartoum and Port Sudan. The granite hills and mountains of Segle Taka, Toteel (Kassala Mountains) and the Mokram, grace the city to the southeast and northeast directions respectively. Further north of Kassala lies the hot, flat territory with isolated jebels that represents the fringes of the Eastern Desert of Sudan, which is characterized by similar geographic and environmental conditions up to the border of Egypt. The Eastern Desert is located between the Nile River to the west and the Red Sea to the east and includes the Red Sea Hills. To the west of Kassala lies the Atbara River, and the Butana Grassland is located between the Atbara River and the Nile River.

The average elevation of the Kassala area is about 500 meters above sea level. This elevation increases by 200 meters at the granite outcrops of Jebel Kassala. The jebels are part of the low-lying extensions of the Eritrean highlands.

The Samples

A total of 25 sherds was examined for plant impressions. All of the samples from the excavated unit at Mahal Teglinos (n=12) were very crude fired

Figure 1: A map showing the location of Kassala and the drainage systems, geographical location and distribution of the surveyed sites.



clay (see Figure 2), whereas the samples from the survey are pottery sherds (n=13). The clay soil has a large proportion of sand particles. Other mineral grains, including quartz, are also observable. Chaff of sorghum is used as temper consistently and uniformly in all of the samples from the excavation and the surveyed sites. Preliminary analysis of the grains and chaff impressions with a comparative sample of different sorghum species (wild and domesticated) enabled us to categorize some imprints as belonging to an intermediate morphotype. The analysis was

done at the Bio-archaeological Research Center of the National Museum of Oriental Art, Rome, Italy.

The area excavated at Mahal Teglinos, Kassala was chosen due to the observation of a large circular fired clay structure brought to light by erosion in the western section of the site. The dry plaster of this structure happens to be very rich in vegetal remains. At first sight the exposure was thought to be a fire place/hearth. The surface of the excavated floor is also rich in lithic flakes. A 2x2m unit was opened.

Table 1. Samples and their identification

No.	Sample Code	Type	Source (Excavation/Survey)	Identification (<i>Sorghum bicolor</i> , Wild and Cultivated)		Identification other than <i>Sorghum bicolor</i>
				Wild shape	Cultivated shape	
1	SU2-1	Fired clay	excavation	+	+	
2	SU2-2	»	»	+	+	
3	S3-1	»	»	+		Imprints of <i>Setaria sp.</i> and <i>Vigna unguiculata</i>
4	S3-2	»	»			
5	S3-3	»	»	+	+	
6	S4	»	»	+	+	
7	S5	»	»	+	+	Fruit stone of <i>Ziziphus spina-christi</i> and <i>Setaria sp.</i>
8	S6	»	»	+	+	
9	S7	»	»	+	+	
10	S8	»	»	+		
11	S9	»	»	+	+	
12	S10	»	»	+	+	
13	S129-a	Sherd	Survey		+	
14	S129-b		»		+	
15	S53-a	»	»	+	+	
16	S53-b	»	»		+	
17	S53-c	»	»		+	
18	S53-d	»	»	+	+	
19	S53-e	»	»		+	
20	S53-f	»	»	+	+	
21	S14-a	»	»	+	+	
22	S14-b	»	»	+	+	
23	S14-c	»	»			
24	S14-d	»			+	Imprints and mineralized grain of <i>Setaria sp.</i>
25	S14-e	»				Imprint and grain of <i>Setaria Sp.</i>

Figure 2: Fired clay fragment tempered with chaff of sorghum from the excavation at Mahal Teglinos.

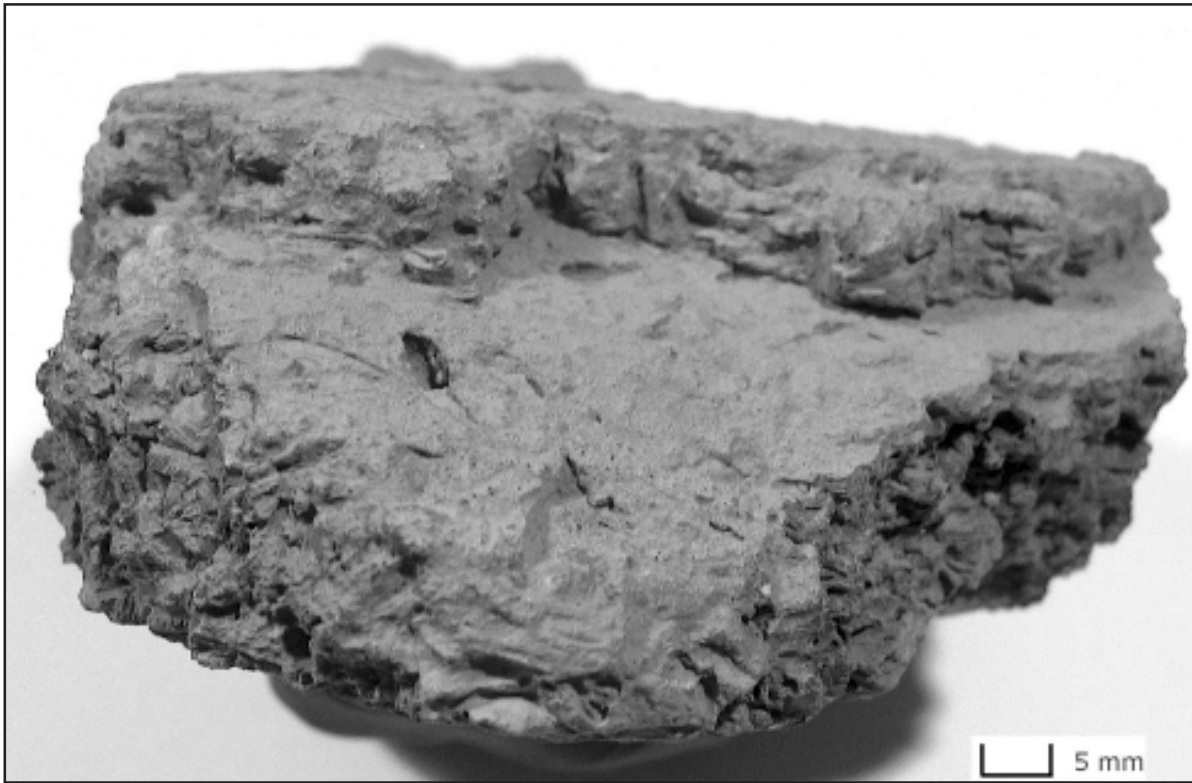
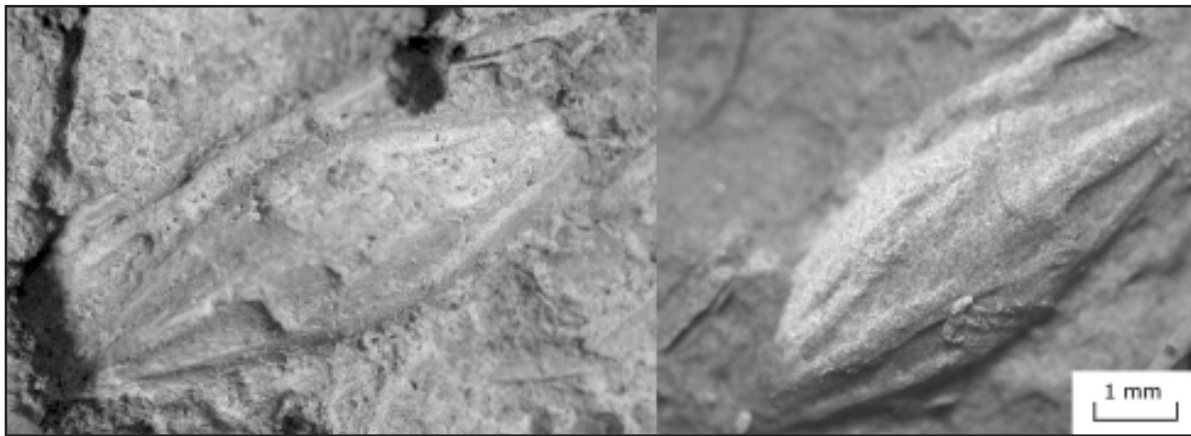


Figure 3: Impression and cast of Sorghum cf. bicolor spikelet.



Later the 2×2m unit was reduced to a 1×2m unit with the intention of clearing the whole area of the fired circular clay feature. A maximum depth of 70cm was excavated. The GPS co-ordinates of the excavation unit are 36°25'57" E and 15°26'57" N. The excavation unit was labeled as K1VI, 2010.

Previously, three samples of charcoal from K1 II (excavated by Rodolfo Fattovich in the central section of Mahal Teglinos) provided a radiocarbon date of 3,860±60 bp at a depth of 155cm. Between 155cm and 175cm approximately 200cc of plant remains were collected and subjected to examination.

Figure 4: Impression (left) and cast (right below) of *Sorghum* cf. *bicolor* spikelet; spikelet of *Sorghum bicolor* from reference collection (right top).



This analysis identified one fragmentary *Hordeum* sp., many fragments of fruit stones of *Ziziphus* sp., and many fragmentary fruits of *Leguminosae* (Costantini et al. 1981: 30-33; 1983: 17-19). Beldados et al. (2007:6) reported wild sorghum, *Sorghum bicolor* var. *verticilliflorum* from a more or less similar geographical zone and comparable culture from Agordat in western Eritrea.

Preliminary Results

Based on pottery decoration patterns and techniques and the composition of the wares, K1VI, 2010 is chronologically identified as belonging to Jebel Mokram Cultural Group, ca. 1500-500 BC (see open archive of the University of Naples "L'Orientale"). The fired clay has a pinkish, brownish and light grayish color. The exterior has a finished surface and the interior is rough and unfinished. The average thickness of the sherds is between 22 and 33mm.

In each fragment of the fired clay, there are up to eleven identifiable plant impressions. The impressions belong to spikelets and grains of *sorghum*

bicolor (Figures 3 and 4), *Setaria* sp (Figure 5), *Vigna unguiculata* (Figure 6) and *Ziziphus* sp. (Figure 7). The morphology of the grain impressions can be basically divided into two: rounded and elongated. Most of the rounded impressions can be compared with cultivated sorghum (*Sorghum bicolor*), whereas the morphotypes of the elongated impressions belong to wild sorghum (*Sorghum bicolor*).

The archaeobotanical analysis of the data showed that during the second millennium BC, sorghum was widely cultivated in the eastern part of the Sudan. It is also possible to see the simultaneous presence of wild and cultivated sorghum for exploitation by the inhabitants of the region. It is important to note that during the time under consideration, *Sorghum bicolor* developed a change in morphology from its wild progenitor. This intermediary morphotype probably represents one of the earliest and most abundant evidence of the change in the plant's morphology. In addition, by breaking the fired clay samples, it was possible to see chaffs and spikelets of sorghum as an imprint, as well as imprints of small stems and leaves of straw.

Figure 5: Impression of *Setaria sp.*

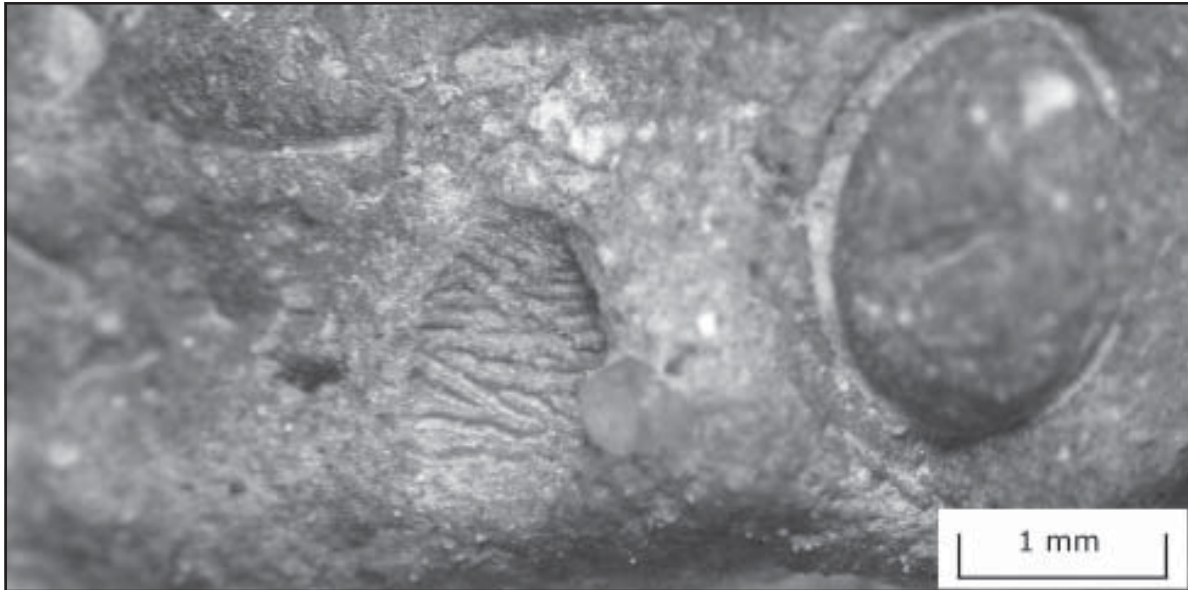


Figure 6: Impression of single cotyledon of *Vigna sp.*

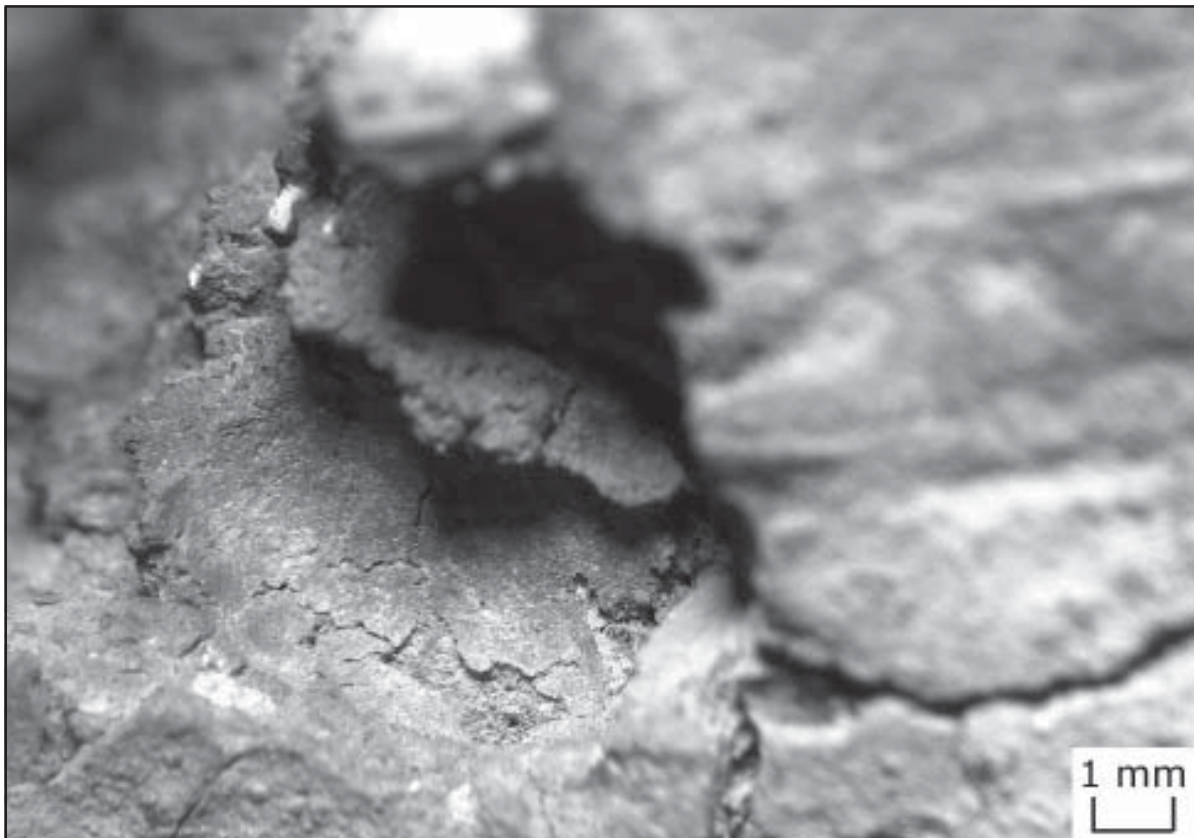
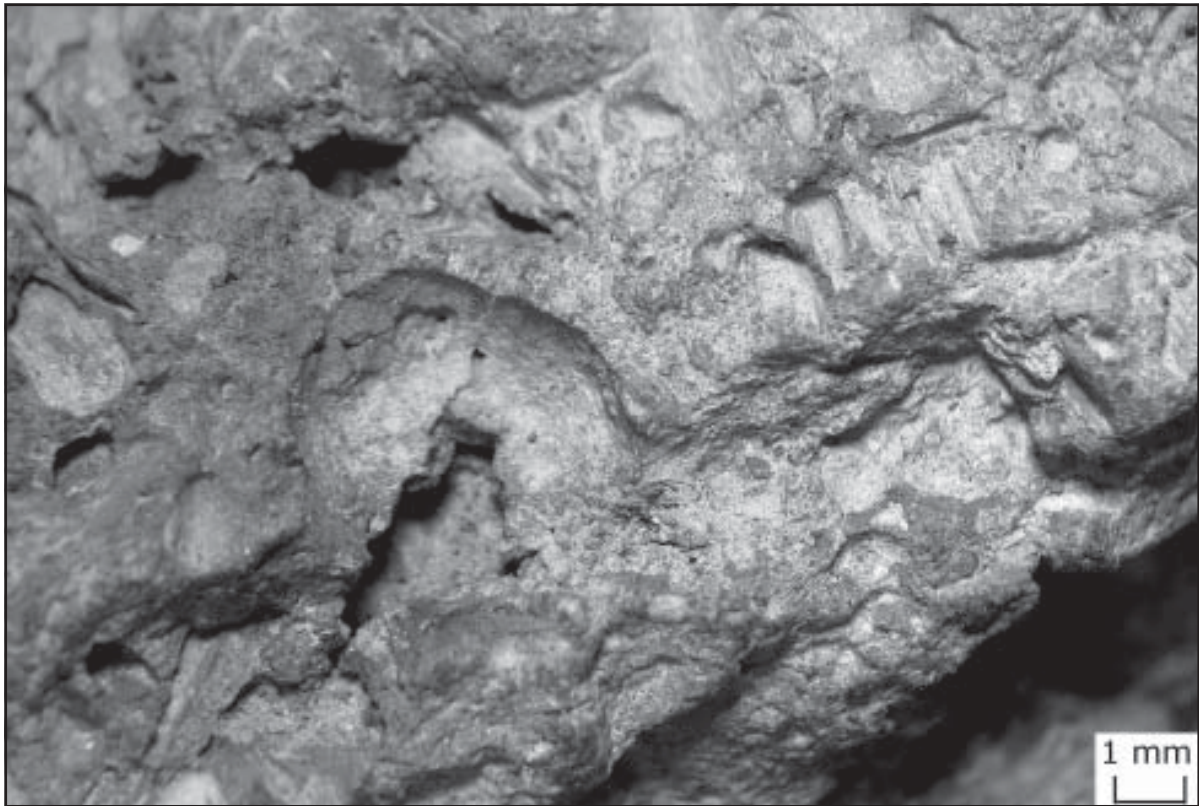


Figure 7: Fragmentary impression of a fruit stone of *Ziziphus* sp.



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Bibliography

- Beldados A., R. Haaland R. and A. Majid
2007 New Perspectives on the Agordat Material: A Re-examination of the collection in Khartoum National Museum, Kartoum. *Nyame Akuma* 67: 4-10.
- Costantini L., R. Fattovich, E. Pardini and M. Piperno
1982 Preliminary Report of Archaeological Investigations at the Site of Teglinos (Kassala). *Nyame Akuma* 21: 30-33.

Costantini, L., R. Fattovich, M. Piperno and K. Sadr
1983 Gash Delta Archaeological Project: 1982 field season. *Nyame Akuma* 23: 17-19.

OPAR l'Orientale Open archive of the University of Naples. <http://opar.uni.or.it/460/1/AMReport-Eng.pdf>.

Footnote

- 1 The project was initiated in 1980 by Rodolfo Fattovich and is presently directed by Andrea Manzo. The 2010 season was sponsored by Poliass Marine and General, Broker Assicurativo (Naples), Centro Ricerche Sul Deserto Orientale (Varese, Italy), Michela Schiff Giorgini Foundation (Geneve, Switzerland).