

## Evidence of early food production in Northeast Africa: an alternative model

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It has long been established that the end of the Pleistocene coincided, in certain regions, with a marked change in man's economic adaptation and social behaviour. The change in the environment might have had a role in the shift witnessed in these modes of life. It was earlier suggested that food production began as a result of such changes, either at "oases" in dry areas (Childe, 1951), or in "nuclear zones" (Braidwood, 1960), or more widely in regions where there was a "disequilibrium" in man-plant-and-animal relationships (Binford, 1968). All these and other models have been criticized on the grounds that "cultivation" and "domestication" as terms were ill-defined, their concepts were obscure, and the reasons offered for their developments by no means convincing (Higgs and Jarman, 1969). In place of this it was suggested that the whole process was rather to be looked at as a long-term evolutionary process of man-plant-and-animal relationship determined by appropriate economy for the particular environment.

When these models are applied to Northeast Africa, two alternative schools of thought emerge: the first believe that the area received knowledge of plant cultivation and animal husbandry from South-West Asia before they spread to the rest of the continent (*e.g.* Epstein, 1971). The Nile Valley and, occasionally, the Horn and Ethiopia were suggested as possible routes for the diffusion of these ideas. The general acceptance of this thesis was due to:

- a) The occurrence in South-West Asia of settlements with evidence of food production predating those from Africa.
- b) The oldest domestic plants and animals (wheat, sheep and goats) recovered from Northeast African sites (Fayum, Merimde, Shaheinab... etc) pointed to a South-West Asian origin, since no local wild ancestors of theirs had been identified.
- c) Farming in temperate African zones was believed to predate that of tropical Africa.
- d) Until recently no settlements with evidence of food production contemporary to, or earlier than, the earliest settlement of the Nile had been discovered in Africa.

The second school supported indigenous African domestication of sub-tropical plants and animals, independent of, and contemporary with, the South-West Asian complex (Vavilov, 1926; Portérés 1951; Harlan *et al.*, 1976). This was also due to a number of factors:

- a) There was increasing evidence supported by radiocarbon dates that in Africa there was a stage of intensive plant exploitation (a necessary prerequisite, it was agreed, for food production) as early as, or even earlier than, equivalent intensive exploitation in South-West Asia (Camps-Fabrer, 1965; Wendorf, 1968; Camps, 1974.)
- b) Recent botanical work has confirmed that present-day African domesticated tropical cereals (*Sorghum*, *Pennisetum* etc) were indigenous to Africa, and that their wild forms were unknown to South-West Asia (see Harlan *et al.*, 1976).
- c) There was sufficient evidence, supported by radiocarbon dates, that at least two of the so-called "Neolithic" innovations (pottery and ground stone tools) were known in the Sahara prior to their introduction into Northeast Africa (Camps *et al.*, 1968; 1973; Adamson *et al.*, 1974).
- d) Wild cattle (*Bos primigenius*) were found widespread in North Africa (Carter and Clark, 1976) and the possibility of a local domestication could not, therefore, be ruled out.

The location of Northeast Africa astride, successively from North to South: the Mediterranean, desert, sahel, savannah, and equatorial zones; and from East to West: the Red Sea Coastlands, the Ethiopian highlands, the Nile Basin, and the Sahara plateaux, together with the evidence it can offer, provides a unique opportunity to contribute towards resolving the differences between the two alternative schools.

Prior to the International Nubian Archaeological Salvage Campaign, the Nile Valley (*i.e.*, Egypt and the Sudan) and the plateaux on either side of it had suffered from an almost complete absence of reliable palaeobotanical and archaeozoological research of any kind and especially from analysis of recovered archaeological materials. In addition, very few attempts had been made to study the floral and faunal distributions of later domesticates along the lines developed in South-West Asia (Harlan *et al.*, 1976; Abbas Mohammed-Ali, 1978; see also Smith, 1976). General problems of ecological adaptations, settlement patterns, etc, had hardly been considered and little was known of the plateaux outside the Nile Valley. It was admitted only recently that any survey of evidence of food production in Africa is "a survey of our ignorance and a reasoned essay in speculation" (Shaw, 1976: 107). The result of recent research has somewhat reduced the areas of ignorance and the questions asked can now be re-stated using, in particular, geochronological, climatological, botanical and zoological evidence to provide a framework for the archaeological one.

## Plant cultivation

It has to be stressed that unlike South-West Asia, Northeast Africa can not and should not be treated as a single geographical unit, and the cultivated plants found in it to-day could not have originated in one common area. Plants such as *Sorghum*, *Pennisetum*, *Eragrostis*, *Tef*, *Ensete*, *Ventricosum* etc, although they are all tropical plants, belong by their very nature to more than one habitat and can, therefore, be expected to have been harvested in their wild forms from Ethiopia to the Sahara. For the area under discussion, it can be accepted that at least two major plant complexes existed throughout the Early Holocene, the boundary between them fluctuating but always being within the area. These are a sub-tropical (Mediterranean) complex and a tropical (Sahel-Savannah) complex.

## The sub-tropical region

The sub-tropical warm-temperate plant complex has to-day two major domesticates: *Triticum* sp. and *Hordeum* sp. They require either 300 mm of winter rainfall or regular means of irrigation to grow, and cannot to-day be grown successfully south of latitude 25°N except at high elevations. Their wild progenitors are believed to have been common in South-West Asia in post-glacial times, and it was there, during the 10th - 7th millennium B. C. that evidence suggesting their cultivation was found (see Harlan and Zohary, 1966). It was argued that thereafter they spread to other areas, including the Nile Valley, which are considered to have been outside their natural habitat (Zohary, 1969). The wild species of barley which to-day grow on the Mediterranean coast of Africa is believed not to be a progenitor of the domestic barley cultivated in that region (*Ibid*). Yet before this assumption is accepted the recently accumulated evidence from the Egyptian Sahara (Wendorf *et al.*, 1977) should be fully considered. Wild wheat is unknown from Northeast Africa although climatic conditions were not unfavourable to it and in wet phases its southern limits could have shifted with the Mediterranean isohyets as far south as the Tropic of Cancer. Nevertheless the 5th millennium B.C. communities of North and Northeast Africa (McBurney, 1960; 1967; see also Abbas Mohammed-Ali, 1978) show little evidence, as yet, of agriculture in their archaeological record.

Northeast Africa has a wide range of environmental zones and the situation gets rather complicated when we consider the fact that both wheat and barley are cultivated in Egypt while neither of them is a successful crop in the Sudan. In Ethiopia the highlands might allow for their growth, but the lowlands do not. Wheat and barley cultivation, as imported cultigens seem to have developed after 4,500 B.C.; but for climatic reasons they could not spread south of the 20° N parallel.

The kind of evidence which can be considered here is mainly palaeobotanical, consisting of the remains obtained from archaeological contexts; and, more remo-

tely, the cultural evidence traditionally labelled "Neolithic" and dated to the 8th - 5th millennium B.C., or even earlier. To mention some, the Epi-Palaeolithic communities of the area (13th - 5th millennium B.C.) revealed evidence of numerous grinding stones and microlithic flakes with lustrous edges (Wendorf and Schild, 1975; Caton-Thompson, 1952; Hester and Hobler, 1969) suggesting that intensive collecting and grinding of seeds were amongst the major economic activities of those groups. By the 5th - 4th millennium B.C. the archaeological record shows a well developed adaptation to wheat and barley cultivation (Helback, 1955; Hays, 1976; Lal, 1967; evidence summerized in: Abbas Mohammed-Ali, 1978).

There is, therefore, a strong case for sub-tropical Northeast Africa being within a zone of Post-Pleistocene intensive gathering using specialized equipment. But, similar to other parts of the world (*e.g.*, the American Southwest) it did not develop into full agriculture though it might have pre-adapted those communities for later innovations.

### The tropical region

Here we are concerned with two indigenous plant domesticates; *Sorghum* sp. and *Pennisetum* sp. In its wild form, *Sorghum* is indigenous to the Sahel-Sudanic belt, north of latitude 10°N and east of longitude 25°E (Harlan *et al.*, 1976). In this region most of its domestic varieties occur. It is logical to assume (Harlan *et al.*, 1976) that it was first cultivated where "the most massive stands of its wild (forms) occur, north of the equator and on the east side of the continent". It is believed (*Ibid*) that *bicolor* is the most primitive among the many races and sub-races of *Sorghum*, and it could give birth to any one of them. To-day *bicolor* occurs side by side with wild *Sorghum* in Eastern Sudan.

Being a tropical summer crop, *Sorghum* should not be expected to have grown north of the Tropic of Cancer if our palaeoclimatic map is correct. The domestication of the *bicolor* remains, therefore, a Sahel-Sudanic development. The eastern part of the Sahel belt (Lake Chad to the Ethiopian Plateau), was nominated as a possible area for its early domestication (Harlan *et al.*, 1976).

Compared to *Sorghum*, little work has yet been done on early distribution and cultivation of *Pennisetum* (Portérés, 1976; Munson, 1976). In its wild form it exists almost in the whole Sahel-Savannah belt (Purseglove, 1976) and Ethiopia has been suggested as the centre of its domestication (Dogget, 1970). This was supplemented by the possibility of a second centre in the Sudan zone. If these arguments are accepted, then three alternatives need to be tested:

- a) Did *Sorghum* and *Pennisetum* cultivation precede wheat and barley cultivation in Northeast Africa?
- b) Did it develop as part of the same process?
- c) Was it only a later development in which ideas transferred from sub-tropical to tropical milieu?

Both from Sudan and Ethiopia the evidence for early *Sorghum* and/or *Pennisetum* cultivation is too recent to be of use (summarized in: Abbas S. Mohammed-Ali, 1978). From the Nabta Playa, in the Egyptian desert, some botanical remains have been tentatively so identified (Wendorf *et al.*, 1977). There is some isolated evidence, though with earlier dates, for the occurrence of *Sorghum* in the Sahara (Camps, 1969; Mond, 1963; see summary in: Abbas S. Mohammed-Ali, 1978). Although there is as yet very little in terms of direct evidence from this tropical zone to rely upon, yet it appears that both *Sorghum* and *Pennisetum* may have been harvested in the 5th millennium B.C. If that was the case, it would be contemporary with the earliest known spread of domesticated wheat and barley strains into Northeast Africa, and it might well represent a separate local acculturation.

### Animal Domestication

Unlike cereal cultivation evidence for animal utilization, whether wild or domestic, is more often preserved in archaeological sites, but quite often there is difficulty in distinguishing wild from domestic forms of species. Here we are mainly concerned with species: *Capra*, *Ovis* and *Bos*.

#### Capra and Ovis

The wild ancestors of *Capra* and *Ovis* are believed to be indigenous to the mountains of South-West Asia. Both species were exploited through the Late Pleistocene and Early Holocene and they were domesticated in this region.

Wild goat and sheep is not known to be indigenous to Northeast Africa, although the presence of the wild "Barbary" sheep (*Ovis ammon*) is beyond doubt (Epstein, 1971). When the African evidence for these two species, which does not predate the mid- 5th millennium B.C., is contrasted with that of South-West Asia, it remains beyond doubt that an Asian origin for both is most likely. As there is no evidence as yet to support any importation of these species from the Mediterranean islands to the North African coast or from Arabia to the Horn, it is most likely that similarly to wheat and barley they were brought to Northeast Africa through contacts across Sinai. The only major and extremely important difference was that sheep and goat, unlike wheat and barley, faced no climatic difficulties to prevent their penetration into the continent.

#### Bos sp.

Compared to the above species, *Bos* sp. has a wider Pleistocene distribution. It was found over the whole of Africa north of the savannah, and it was reported from a number of Upper Pleistocene Northeast African sites (summarized in: Abbas S. Mohammed-Ali, 1978). Despite certain zoological problems concerning the spe-

cies (see Grigson, 1969; Jarman, 1969), it is believed that it was domesticated in Greece and Anatolia by the 7th millennium B. C. but made a rather late appearance in Palestine (Reed, 1969); in Northeast Africa the evidence argues for a 5th - 4th millennium B. C. presence of cattle (see Abbas S. Mohammed-Ali, 1978). This development would suggest certain alternatives:

- a) Were the African domestic cattle an introduction from South-West Asia?
- b) Were they a result of migration from the Mediterranean islands, or the product of a diffusion from that direction?
- c) Was this a product of a diffusion of ideas? and,
- d) Were they a local, indigenous development (domestication)?

The evidence from South-West Asia suggests that cattle was not a significant part of the domestic fauna in Palestine before the 4th millennium B.C.; from Egypt we do not seem to have any direct evidence for cattle domestication before the late 5th millennium B.C. The suggestion of cattle migration from Southern Europe and the Mediterranean islands rests on no archaeological evidence and lacks the support of early occurrences of domestic cattle on the North African coast. Culturally, there is very little in common between North Africa and Southern Europe during the Neolithic. As it stands to-day the evidence from the Sahara argues for a local domestication of cattle before the 5th millennium B.C.

## Conclusion

Northeast Africa does not seem to have been a cul-de-sac as it was previously thought of. The domesticated species of this region were not necessarily only those of South-West Asian origin. The Neolithic adaptation of those groups can hardly, if at all, be understood without realizing that the area, by its very nature, belongs to at least two geographical units: tropical and subtropical. This factor must have had determined the kind of species involved in the local process of domestication.

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