

## EARLY FOOD PRODUCTION IN THE SAHEL OF BURKINA FASO

*Katharina Neumann, Peter Breunig et Stefanie Kahlheber*

### Abstract

From 2000 to 1000 BC hunters and gatherers lived in the North of Burkina Faso and started to cultivate domesticated plants at the end of the period. This economic change did not stabilise human occupation, but resulted in the first millennium BC in a way of life not visible by archaeological means, so far. This paper presents the archaeological sequence in the context of environmental change and interregional relations.

### Résumé

Entre 2000 à 1000 BC vivaient dans le nord du Burkina Faso des chasseurs-cueilleurs qui commençaient à cultiver des plantes domestiquées à la fin de la période. Ce changement économique ne devait pas conduire à une stabilisation de l'occupation humaine, mais aboutit dans le premier millénaire BC à un mode de vie difficile à appréhender sur le plan archéologique. Cet article présente la séquence archéologique dans le contexte des changements environnementaux et ses relations à l'échelle régionale.

### Introduction

This paper is concerned with the transition from hunting and gathering to food production in West Africa, based on evidence from the Sahel Zone of Burkina Faso compiled by field research during the last years. Our study intends to enhance the knowledge about the West African versions of this transition, traditionally seen as one of the most fundamental changes in human prehistory. Embedded in an interregional program (BREUNIG & NEUMANN, in press) the Sahel Zone of Burkina Faso has proved to be one of its most unexpected examples.

The study area is situated in the North of Burkina Faso (Province de l'Oudalan) (see map fig. 1 in the section's introduction). A typical feature of the landscape are the dunes extending from East to West. Most archaeological sites dated to the period considered in this paper have been found inside the dune area or nearby. This indicates either a selective behaviour of the prehis-

toric settlers for a special environmental setting, or alternatively, favourable preservation conditions for the remains of human occupation. A conclusive argument for an environmentally induced settlement pattern is the significant concentration of sites in the vicinity of shallow depressions flooded in the rainy season. The Mare d'Oursi is the largest of these temporary lakes, the formation of which is related to the late Pleistocene or early Holocene history of the dunes (ANDRES, BALLOUCHE & MÜLLER-HAUDE 1996). The lakes attract occupation nowadays, and the clusters of archaeological sites indicate similar conditions in the past.

## Archaeology

From surveys and excavations in the entire region we have established a chronology which is shown in fig. 2 of the section's introduction. There are two early Holocene dates, which we assume to be wrong as they contradict other dates. Obviously there are no securely dated sites older than 2000 BC<sup>1</sup>. It seems to be a quite inconclusive explanation that the area was uninhabited. We rather suppose that the period is not visible by archaeological means so far.

For the second millenium BC, there is a cluster of dates for the excavated Final Stone Age dune sites. A quite dense occupation is indicated by numerous other sites - not investigated so far - with a comparable appearance and most probably similar age. This raises the question about the reasons for such a sudden increase of population density in comparison with the invisible period before. The Final Stone Age phase is followed by an almost complete lack of data in the first millennium BC and a detailed Iron Age sequence lasting from about 0 AD up to 1500 AD. We concentrate on the Final Stone Age dune sites, because the transition from hunting to farming took place during this period.

Most Final Stone Age sites show quite simple structures with a concentration of stone artefacts mainly made of quartz and other siliceous rocks as well as some potsherds scattered on the surface over some square meters. The cultural material is composed of comb- and roulette decorated pottery, polished stone axes, some grinding equipment, a microlithic stone industry with segments as dominating type and sometimes bifacially retouched arrow-points of Saharan type. The small extension and the rather low amount of cultural remains leads us to assume that the sites are remnants of highly mobile groups. Test trenches have shown that the artifacts are in most cases restricted to the surface or embedded in the uppermost centimetres of the top soil. Therefore these sites hardly provide any evidence for the transition from hunting to farming.

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<sup>1</sup> All dates in this paper are based on calibrated radiocarbon measurements.

In two cases (Tin-Akof and Corcoba) pits have been found dug down to a maximum of about one metre. The function of these pits is unknown, but with regard to the preservation of organic material they are a boon. Apart from numerous fish remains, WIM VAN NEER (Musée Royale de l'Afrique centrale, Tervuren, Belgium) has identified reedbuck, kob and large bovids – but no traces of any domesticated animals, so far. This is a bit astonishing, as cattle is reported for the same period further north in Mali (MACDONALD 1996). Even if cattle will be found in the future, it will not fundamentally change the model for the Sahel of Burkina Faso: the second millennium BC is dominated by highly mobile groups – most probably hunters and gatherers.

### Archaeobotany

The archaeobotanical material does not contradict this picture but it provides further arguments for an economic model not exemplified in the West African Final Stone Age so far.

Our archaeobotanical starting point was the pollen diagram from the Mare d'Oursi (BALLOUCHE & NEUMANN 1995) which illustrates the vegetation history of the last 8000 years. From the lower part of the profile, a closed grassland with only a few trees can be reconstructed which covered the dunes around the lake of Oursi between 8000 and 3000 BP. Around 3000 BP, a distinct change is visible in the diagram: In the upper part the percentages of grasses decrease whereas those of several herbs and the woody family Combretaceae increase. Our interpretation of this upper part says that it represents a landscape under human impact. Agriculture, including a shifting cultivation system with fields and fallows is supposed to have started 3000 years ago.

This hypothesis needs to be tested through direct archaeobotanical evidence, i.e. macro-remains (fruits, seeds and charcoal) from archaeological sites. Unfortunately organic material is generally not well preserved in the Final Stone Age dune sites, and in spite of extensive sampling during the excavations, only a few charred plant remains have been recovered. These, however, allow for some general statements about subsistence strategies and seasonality.

Most of the data come from the site Tin-Akof (NEUMANN & VOGELSANG 1996, VOGELSANG 1997; VOGELSANG et al. 1999), where numerous charcoal fragments and a reasonable number of fruits and seeds have been found. A distinct feature of this site is the presence of remains of edible fruits, e.g. *Adansonia digitata* (baobab), *Vitex* sp., *Ziziphus* sp. and *Sclerocarya birrea*. Wild fruits are also present on two other Final Stone Age sites, Corcoba and Oursi. Obviously collecting of wild fruits from trees was an important part of the subsistence, and the finds indicate that this special resource utilization which is widely practised today, has a tradition of at least 3000 years.

In addition, grains of domesticated pearl millet (*Pennisetum glaucum*) have been recovered at Tin-Akof. One grain has been directly AMS dated to 2840±49 BP (1034-916 cal BC, UtC-4906) and such confirms the hypothesis that agriculture was known 3000 years ago in the Sahel of Burkina Faso. At the Final Stone Age site of Oursi, domesticated *Pennisetum* has been found in a layer dated to 2931±32 BP (1257-1053 cal BC, UtC 7281). Two main questions arise from these find: 1. Is it possible that the domestication process took place in the Sahel of Burkina Faso, or had pearl millet been domesticated elsewhere and introduced into the area? 2. Did the people of Tin-Akof and Oursi grow millet themselves, were they sedentary farmers?

Based on the distribution area of the wild ancestor of pearl millet, HARLAN (1971) has stated that the domestication of this important African crop either took place in the southern Sahara or the West African Sahel. Harlan's hypothesis can be tested with material from the Final Stone Age sites. If the people in the Sahel of Burkina Faso had started with domestication from wild ancestors of pearl millet, these wild races should be found in the archaeobotanical samples. But this is not the case. In the Final Stone Age sites we have not found any remains of wild pearl millet, but all grains can be attributed to fully domesticated plants. Similar evidence is available from impressions in potsherds from the site Gajiganna in NE Nigeria (KLEE & ZACH 1999, BREUNIG & NEUMANN in press), where the first occurrence of domesticated *Pennisetum* has been dated to 1500 cal BC. In the ceramic impressions from Gajiganna, wild *Pennisetum* is also absent, hence indicating an introduction of this crop from elsewhere.

So far, the oldest domesticated *Pennisetum* finds come from Dhar Tichitt / Mauretania, where potsherds with impressions have been dated to 3500 bp (ca. 1900-1500 cal BC) (AMBLARD 1996). The presence of domesticated as well as wild forms in the impressions of the Tichitt ceramics makes a local domestication possible. The available data lead us to assume that *Pennisetum* domestication started somewhere in the Central or West-Central Sahara at some time before 3500 bp. From there the crop plant was introduced into the Sahel by the end of the second millenium BC.

Now let us turn to the question if the people from Tin-Akof and Oursi cultivated millet on the sites. At Tin-Akof we have tried to reconstruct the possible season of site occupation through the fruit remains. Most of the fruits that have been found ripen in the dry season, between September and February. Hence it is probable that the site was occupied during the winter months. Charcoal has been found from some species whose fruits ripen exclusively during the rainy season, but fruits of these - equally edible and well-tasting - species are absent. This indicates that the people of Tin-Akof spent the rainy season elsewhere. Since this is the most important period of the cultivation cycle we conclude that they did not cultivate pearl millet on the site. It seems that their way of life was quite mobile.

Additional evidence that agriculture was not practised at Tin-Akof, comes from the charcoal samples. We have identified about 2000 charcoal fragments,

and the species can be arranged into three ecological groups. In the savannas on the dunes, *Terminalia*, *Pterocarpus*, *Maerua crassifolia* and some other species represented with small numbers were growing. In the riverine forest at the foot of the dune, *Prosopis africana*, *Anogeissus leiocarpus*, *Khaya*, *Dalbergia melanoxylon*, Rubiaceae and *Combretum micranthum* were found. The third group consists of species which are constituents of natural savannas but become dominant on fallows in an agricultural system with shifting cultivation, since they are able to produce suckers after having been cut: Bauhinieae, *Combretum glutinosum* and *Guiera senegalensis*. These species make up only 2 percent of the total sum of identified fragments which indicates that they were rare in the surrounding vegetation, and that no fields and fallows were present. From the two dominant species, *Terminalia* was collected in the dune savannas and *Prosopis africana* in the riverine forest. Obviously people selected these species for their fuelwood quality, which would mean that good firewood was abundant and the vegetation was quite dense.

Even though the archaeobotanical data are consistent with the archaeological results, there is a contradiction with the above mentioned pollen diagram of Oursi. Our interpretation of the pollen diagram was that agriculture started 3000 years ago around 1000 BC, and that fields and fallows dominated the landscape from that time onwards. But the archaeological data indicate that the area was left during this period, as all Final Stone Age sites are dated between 2000 and 1000 BC. In addition, the archaeobotanical data point to only small scale agriculture. This question is still open and remains to be solved.

## Conclusion

At the end of the Stone Age (between 2000 and 1000 BC) the Sahel Zone of Burkina Faso was occupied by highly mobile groups – either pastoralists or, more likely at the moment, hunters and gatherers. In the dry season their camps were set up close to the lakes, which were probably the only permanent sources of open water. So far, we only discovered these dry seasonal camps. The rainy season camps apparently did not leave any cultural remains traceable by archaeological means, maybe because mobility was even more intensive than in the dry season. The economy was predominantly based on fishing, gathering and small-scale farming at the end of the period (around 1000 BC). In contrast to known examples of early farming communities from other continents, early agriculture in the Sahel of Burkina Faso did not lead to a sedentary way of life.

Soon after the introduction of agriculture the Final Stone Age Complex disappears, making way for a “*dark millennium*” almost devoid of archaeological remains. What has happened? We suppose that climatic change was

the major factor. After 1000 BC increasing drought in the Sahel is indicated by paleoecological data (see SALZMANN this vol.). Climatic change in the Sahel of Burkina Faso is documented by the composition of fish species from archaeological sites, indicating that the lakes where the fish was caught apparently ceased to be permanent (WIM VAN NEER, pers. com.). Even this alone might have caused the collapse of the sensitive cultural and economic equilibrium in the second millennium BC, which was strictly based on seasonality.

In the Sahel Zone of Burkina Faso, plant cultivation was added to a mobile subsistence based on hunting, fishing and gathering. Another example for the transition to food production has been studied by our team in the area of Gajiganna in northeastern Nigeria (BREUNIG & NEUMANN in press). In the Final Stone Age Gajiganna Culture, occupation started with a pastoral economy to which agriculture and a sedentary way of life was added after some hundred years. These processes also took place during the second millennium BC. The only similarity seems to be that all these early food producing complexes came into troubles in the first millennium BC. Most of them disappeared, and there are no connections with subsequent traditions.

Comparison of our two case studies with other West African Final Stone Age complexes show that the basic cultural patterns are as follows:

- There is no relation between the first appearance of pottery and the transition from hunting and gathering to food production. In the whole of West Africa pottery is preceding food production.
- Food production emerges simultaneously in different areas of West Africa during the second millennium BC.
- The cultural context and the sequence of pastoral and farming activities differ from one region to the other.

Our future research will be stimulated by the interregional variability, which seems to be more pronounced than in the European or Near Eastern equivalent. However, we need more case studies to understand the conditions of this variability in the transition to food production.

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