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Evidence for Banana Cultivation and Animal Husbandry During the First Millennium BC in the Forest of Southern Cameroon

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The faunal and botanical data from the first millennium BC site of Nkang, Southern Cameroon, are presented in this paper. The analysed material, retrieved from refuse pits, comprises charcoal, phytoliths, molluscs and animal bones, which allow a reconstruction of the former environment. In addition, the site provides new insights into the emergence of food-producing communities in the African rainforest. Food procurement strategies at the site involved gathering, hunting, fishing, as well as small livestock keeping and banana cultivation. This is the earliest evidence for such practices in Central Africa.

Keywords: ARCHAEOZOOLOGY, ARCHAEOBOTANY, RAINFOREST, PALAEOECOLOGY, FOOD PRODUCTION, CHARCOAL, PHYTOLITHS, CENTRAL AFRICA.

Introduction

The transition from foraging to food producing communities in Central Africa has received increasing attention in recent years. The main issue has been to understand the processes that initiated agriculture and animal breeding and to assess their social, economic and ecological repercussions.

In almost every central African country a limited number of archaeological excavations have been carried out. Although in several cases they were restricted to a few test pits, caves and rockshelters as well as open air settlements have been explored. In general, caves and rockshelters tend to offer better conditions for the conservation of organic materials, which rarely survive in the archaeological record of open air sites, due to the acidity of equatorial soils (Phillipson, 1985: 135; Van Neer, 1990: 195; Eggert, 1993: 325; Schwartz & Lanfranchi, 1993: 38; Iliffe, 1995: 16). Archaeological data from the sites of Matupi (Van Noten, 1977; Van Neer, 1989), Ishango (Brooks & Smith, 1987; Peters, 1990), Ngovo (de Maret, 1986) in Congo (Kinshasa), Shum Laka and Abeke (de Maret, Clist & Van Neer, 1987), Fiye Nkwi, Mbi (Asombang, 1988) in Cameroon, Tchissanga (Denbow, 1990) and Ntadi Yomba in Congo-Brazzaville (Van Neer & Lanfranchi, 1986) and Otumbi in Gabon (Oslisly, 1992) have permitted some palaeoecological and palaeoeconomic reconstruction.

The latest research into the available evidence concerning early human activities in Central Africa presents a picture of foraging communities. The earliest traces of animal husbandry occur only in very late archaeological contexts dated to the second millennium AD (Van Neer, 1990). Although numerous sites occupied in the second and first millennium BC show signs of exploitation of palm nuts (*Elaeïs guineensis*) and canarium nuts (*Canarium schweinfurthii*) in southern Cameroon (de Maret, 1985*a*) and Gabon (Clist, 1995: 154), no remains of cultivated crops or domestic animals have so far been retrieved for that period.

The purpose of this paper is to present the archaeozoological and archaeobotanical data from the Nkang site in Southern Cameroon. This site yields accurate information on human activities and allows an assessment of past human adaptation to the rainforest. Many aspects of the Nkang site shed new light on the lifestyle of ancient villages in Central Africa. In addition, they also contribute to the study of regional palaeoecology.

Site Description and Excavation

Nkang (11° 19′E, 4° 16′N) is a rural settlement located about 10 km east of Monatelé, the administrative town of the Lekié division, and 70 km to the north-west of

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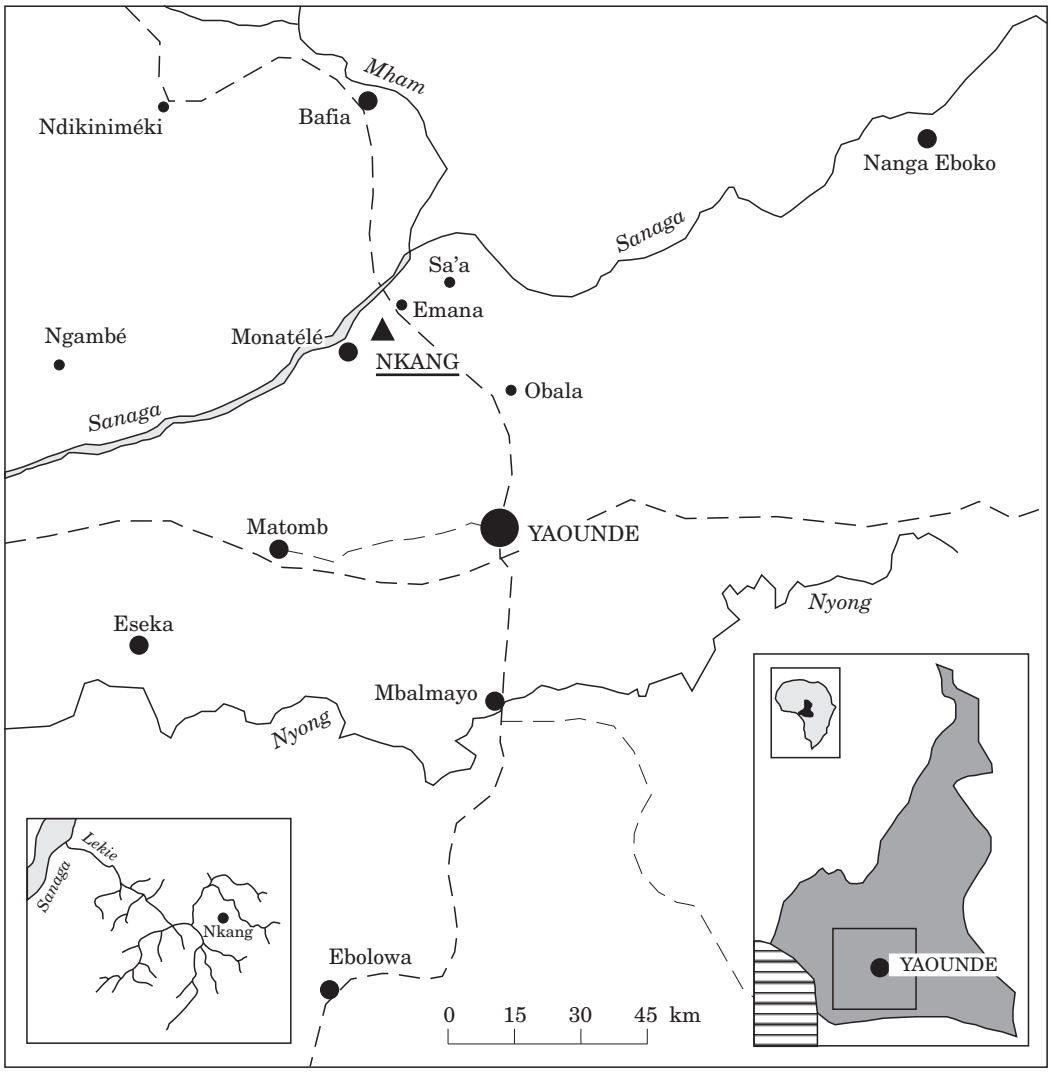

Figure 1. Location of the Nkang site. (– – –) roads; (——) rivers.

Yaounde, the capital of Cameroon (Figure 1). Nowadays, the local inhabitants of the area are the Eton who live in permanent villages along the roads. They are farmers, growing cacao, plantain, groundnut, cassava and maïze, and practising poultry farming and ovicaprine breeding. Hunting, fishing and collecting are secondary activities.

The climatic pattern of the study area is equatorial of the guinean type (Amou'ou Jam *et al.*, 1985: 81). Annual precipitation is 1360 mm, falling mostly between March and June, and September and November. Mean annual temperature ranges between 23 and 25°C. The vegetation is a degraded rainforest. The landform is characteristic of the region, consisting of innumerable whale-back hills (Kadomura, 1977) around 500 m above sea level, gently sloping down towards the Sanaga valley. Nkang village stretches along the top of a hill called Nkol Belibi Ndomo. The cutting of a new tarred road exposed the substructure of ferralitic soils, resulting from *in situ* weathering of a deep regolith, derived from garnet-mica-schists migmatized with two micas of the Precambrian era.

Roadwork cutting exposed many refuse pits on the embankment slopes (Elouga, 1985) which were not related to any other archaeological structure (Figure 2). They were either bottle-like, ovoid or cylindrical in shape, and their volumes ranged from 3 to 15 m^3 (Figure 3). A systematical study of the infilling processes of three pits was carried out. One of them, F9, yielded clear pedological and chemical evidence showing that it had initially contained standing water. Other shafts, close to F9, whose filling processes were not thoroughly analysed, shared some common characteristics. Their volumes were over 6 m^3, their basal deposits were bedded and reduced and the bones contained within were well preserved due to neutral or slightly alkaline pH. The primary uses of F13 and F14 are subject to conjecture. F13 may have been a pit for the processing of organic products and F14 may have been a trap (Mbida, 1996). When the primary

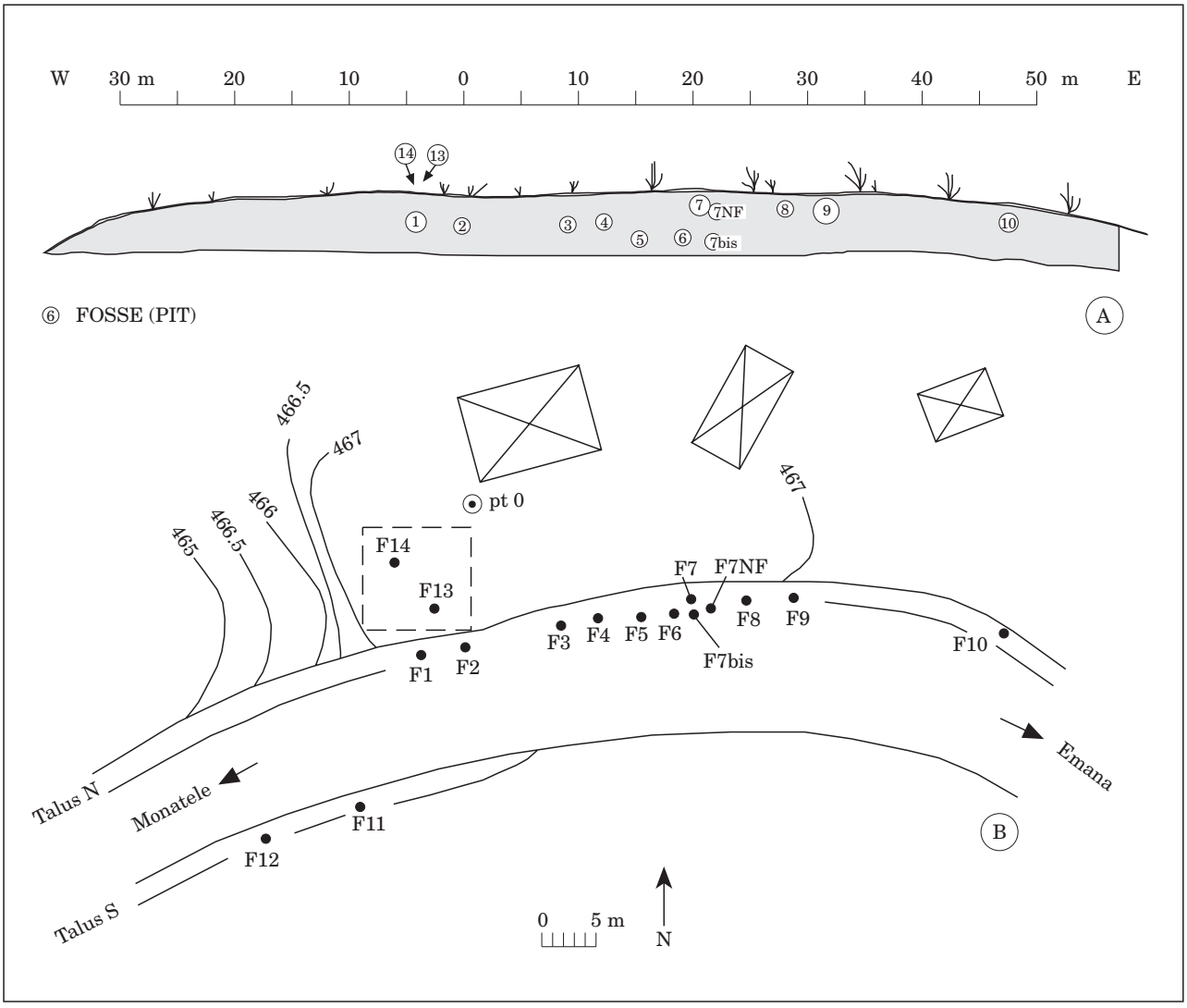

Figure 2. General view of the Nkang site. A, vertical section of the northern talus; B, plan of the site. Numbers refer to pits.

functions were abandoned, these features served as refuse pits and were filled with local soil, broken ceramics and stone tools, iron slags, charcoal and faunal remains.

The study material presented here comes from the excavated pit fill. The features were bisected along one axis, and both halves of the filling were removed in artificial strata of between 5 or 50 cm, depending on the thickness of the horizons. All visible ceramic, lithic and faunal material was retrieved and stored in marked plastic bags and boxes. Charcoal fragments larger than 2 mm were systematically hand picked with pincers. Eight charcoal samples from six pits were taken for radiocarbon dating and soil samples were collected from all visible horizons in the pit profiles.

Nkang possibly corresponds to the northern limit of the "Obobogo tradition" (Claes, 1985; de Maret, 1991). The pottery from Nkang is characterized by spherical, ellipsoid and ovaloid vessels, the majority of which have a collar or a neck. The rims are generally thickened in vessels with a neck. The proportion of the different forms and the greater average thickness of the vessels distinguishes the Nkang pottery from that of other sites of the Obobogo group in the region. The lithic material consists mainly of fragmented objects made of quartz, quartzite, gneiss, granite, micaschist and dolerite. The recovered tools comprise grinders, grinding stones, hammerstones, whetstones and a polished axe. About 1 kg of iron slag was buried in pits F7NF and F7bis, indicating that iron working was also practised during this period (Mbida, 1996).

Material and Methods

The pit sediments comprise dumped refuse and runoff deposits. Their pH, neutral to alkaline, offers good preservation conditions for organic remains. Samples

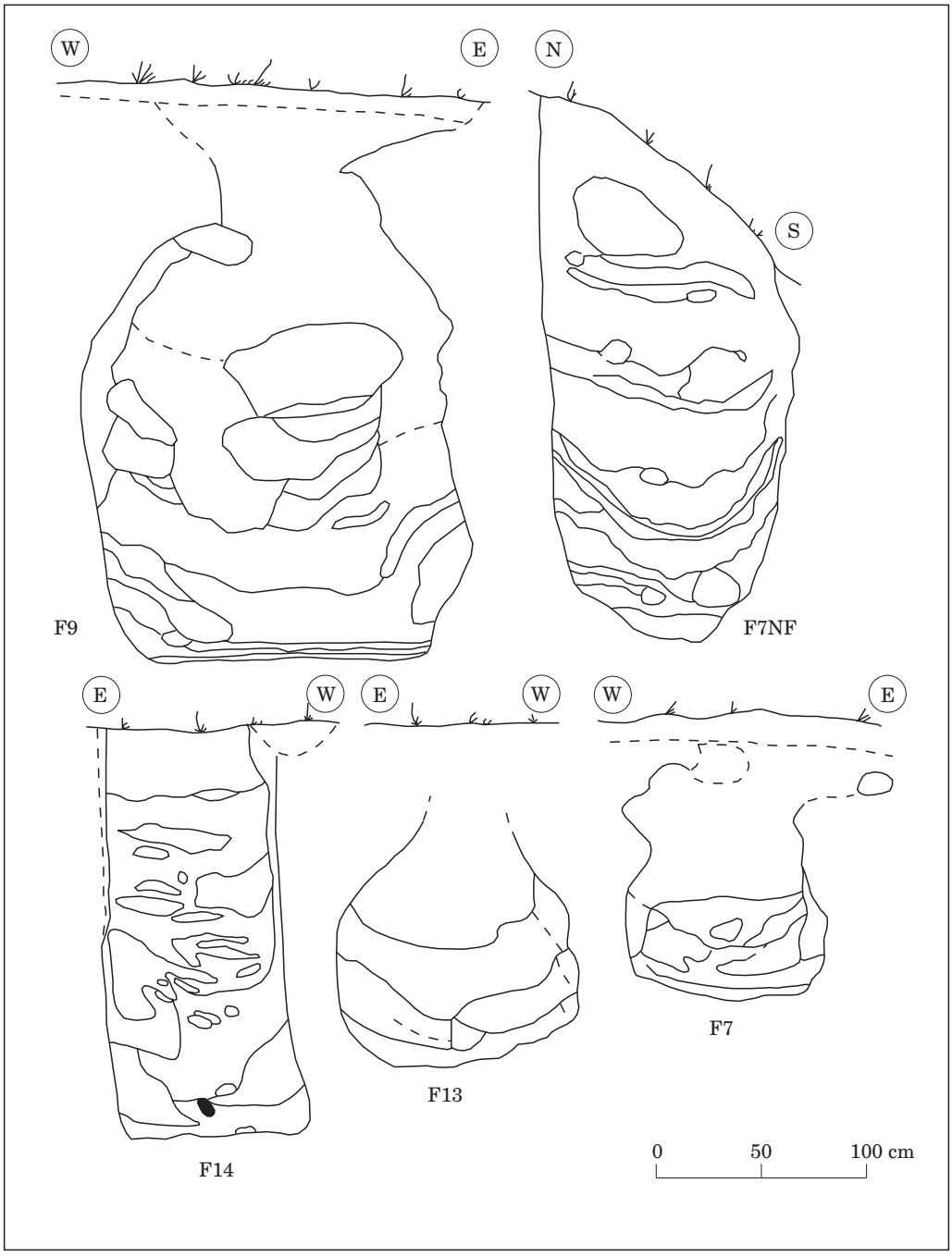

Figure 3. Cross-section of five pits from the Nkang site.

were processed by wet sieving (2 mm–32 μm) to recover macro- and microbotanical and faunal remains. Contexts sampled for phytolith analysis included sediments and charred residues on pottery fragments. The latter were cleaned with distilled water, scraped off and processed chemically to get rid of the organic material. Sediment fractions between 150 and 75 μm, between 75 and 32 μm and <32 μm were prepared for phytolith analysis by the classical methods as described by Rovner (1971), Powers & Gilbertson (1987) and Piperno (1988). Observations were made at magnifications of 400 and 1000 × .

Identification of the charcoal and phytolith material was carried out with the aid of the modern reference collections and the identification keys of the Laboratory of Wood Biology and Xylarium (Royal Museum of Central Africa, Tervuren). For the banana phytolith identifications, the reference material of the INIBAB Transit Center (Katholieke Universiteit Leuven) was used. In addition, several monographs

Table 1. Radiocarbon dates and 2 S.D. calibrations (OxCal version 2·15)

Structure	Depth (cm)	Lab. code	C-14 date (years BP)	cal-BC
Pit 6	?	Lv-1940	2580 ± 110	850–410
Pit 9	300–350	Lv-1944	2490 ± 110	840–370
Pit 9	250–300	Lv-1943	2490 ± 80	790–400
Pit 9	200–250	Lv-1942	2400 ± 60	770–350
Pit 3	?	Lv-1939	2420 ± 70	770–350
Pit 7 bis	?	Lv-1941	2340 ± 70	800–150
Pit 13	140–170	Lv-1945	2310 ± 90	800–100
Pit 14	190–210	Lv-1946	2170 ± 80	390–AD 1

and articles with figured material and identification keys were consulted (Metcalfe & Chalk, 1950; Metcalfe, 1960–1971; Twiss, Suess & Smith 1969; Piperno, 1988; Pearsall & Dinan, 1992; Rapp & Mulholland, 1992; Runge, 1996)

The faunal remains were identified through comparison with the reference collections of the Royal Museum of Central Africa and facilitated by the use of literature on the postcranial osteomorphology and osteomorphometry of African mammals (Walker, 1985; Peters, 1988; 1989; Van Neer, 1989). The body size of the fishes was reconstructed through comparison of the fish bones with modern skeletons of known length.

Results

Table 1 lists the radiocarbon dates that were obtained from the eight charcoal samples. Calibrated ages (2 S.D.) situate the occupation in the last millennium BC (Mbida, 1996: 474). The results of the anthracological analysis are listed in Table 2 and the phytolith identifications are given in Table 3. The hand-collected faunal remains are listed in Table 4, whereas the bones retrieved through sieving are given in Table 5.

Discussion

Palaeoecology

Numerous plant taxa found at the site are indicators of a semi-evergreen, guineo-congolian rainforest with mean rainfall above 1200 mm per year: *Albizia ferruginea*, *Anthostema senegalensis, Carapa procera, Chrysophyllum pruniforme, Entandrophragma* sp., *Lannea antiscorbutica, Newtonia* sp., *Piptadeniastrum*

Table 2. Plant taxa from Nkang identified by charcoal analysis

Plant taxa	Pit F 1	F 3	F 6	F 7	F7NF	F 9	F 13	F 14
Anacardiaceae								
Antrocaryon micraster	–	–	–	–	–	×	–	–
Lannea antiscorbutica	–	–	–	–	–	×	–	–
Lannea welwitschii	–	–	–	–	–	–	–	×
Apocynaceae								
Strophantus intermedius	–	–	–	–	–	–	–	×
Arecaceae								
Elaeis guineensis	×	×	×	×	×	×	×	×
Burseraceae								
Canarium schweinfurthii	×	×	×	×	×	×	×	×
Euphorbiaceae								
Anthrostemma senegalensis	–	–	–	–	–	–	–	×
Spondianthus preussii	–	–	–	–	–	–	–	×
Uapaca sp.	–	–	×	–	–	–	–	–
Flacourtaceae								
Caloncoba welwitschii	–	–	–	–	–	–	–	×
Meliaceae								
Carapa procera	–	–	–	–	–	–	–	×
Entandrophragma sp.	–	–	–	–	–	×	–	–
Trichilia prieuriana	–	–	–	–	–	–	–	×
Mimosaceae								
Albizia ealaensis	–	–	–	–	–	×	–	–
Albizia ferruginea	–	–	–	–	–	–	–	×
Newtonia sp.	–	–	–	–	–	×	–	–
Piptadeniastrum africanum	–	–	–	–	–	×	–	–
Ochnaceae								
Ochna multiflora	–	–	×	–	–	–	–	–
Sapindaceae								
Chytranthus macrobotrys	–	–	–	–	–	–	–	×
Sapotaceae								
Chrysophyllum pruniformis	–	–	–	–	–	–	–	×

Table 3. Plant taxa from Nkang identified by phytolith analysis

Plant taxa	Pit F7NF	F7bis	F 9	F 13
Monocot families				
Commelinaceae	–	–	×	×
Cyperaceae	–	×	–	–
Musaceae (*Musa* sp.)	×	–	×	–
Palmae	×	×	×	×
Poaceae	×	×	×	×
Zingiberaceae	–	–	×	×
Dicot families				
Borraginaceae	–	–	×	×
Moraceae	–	–	×	×
Ulmaceae	–	–	×	×

africanum and *Trichilia prieureana*. *Antrocaryon micraster, Canarium schweinfurthii, Lannea welwitschii* and *Strophantus intermedius* occur in old secondary forest, whereas *Albizia ealaensis* and *Caloncoba welwitschii* grow in pioneer secondary forest. These secondary forest species suggest a more open habitat. Some of the trees, *Ochna multiflora, Spondianthus preussii* and *Uapaca* sp. prefer a more humid environment (swamps or riparian forest). *Chytranthus macrobotrys* is found either in waterlogged sites or in upland forest. The taxonomic diversity of wood species varies from pit to pit (Table 2). Most species occur in F14 and F9 whereas F1, F2, F6, F7, F7NF and F13 contain only a limited number of taxa. In addition to their occurrence as charcoal, *Elaeïs guineensis* and *Canarium schweinfurthii* are represented in all the pits by charred nuts. All identified species are typical of the semi-evergreen lowland and gallery forests that may be observed today in the region of Nkang.

Table 5. Faunal remains retrieved from sieved samples in pit F9. Figures indicate number of specimens

Alestes/*Brycinus*	2
Cyprinidae indet.	3
Perciformes indet.	1
Unidentified fish	13
Unidentified small lizards	2
Unidentified small rodents	7

The overall pattern of phytolith occurrence in the Nkang samples (Table 3) suggests an open air habitat

Table 4. Animal taxa identified among the hand-collected faunal remains from Nkang. Figures indicate number of specimens

Animal taxa	Pit F 1	F 3	F 5	F 6	F 7	F7bis	F7NF	F 9	F 13	Total
Freshwater gastropods										
Lanistes libycus	–	–	–	2	–	–	–	–	–	2
Potadoma cf. *freethii*	–	–	–	1	–	–	1	3	–	5
Terrestrial gastropods										
Achatina sp.	1	–	–	–	2	–	–	7	–	10
Limicolaria sp.	–	–	–	–	–	2	1	2	–	5
Marine gastropod										
Trochidae indet	–	–	–	–	–	–	–	1	–	1
Bivalves										
Aspatharia sp.	–	–	–	1	–	–	–	2	–	3
Crustaceans										
Freshwater crab (Decapoda indet.)	–	–	–	–	–	1	–	–	–	1
Fish										
Catfish 1 (*Chrysichthys* sp.)	–	–	–	–	–	1	–	–	–	1
Catfish 2 (Clariidae)	–	–	–	1	–	–	–	–	–	1
Nile perch (*Lates niloticus*)	–	–	–	–	–	1	–	–	–	1
Wild mammals										
Small rodents	–	4	–	–	–	–	–	–	3	7
Cane rat (*Thryonomys* sp.)	–	–	–	1	1	–	–	1	–	3
Hippopotamus (*Hippopotamus amphibius*)	–	–	–	–	–	1	–	–	–	1
Bushbuck (*Tragelaphus scriptus*)	–	–	–	–	1	–	–	–	–	1
Waterbuck (*Kobus ellipsiprymnus*)	–	–	–	–	–	7	1	–	–	8
Kob (*Kobus kob*)	–	–	–	–	–	5	–	–	–	5
Medium-sized duikers (*Cephalophus* sp.)	–	–	1	2	–	7	–	–	–	10
Forest buffalo (*Syncerus caffer nanus*)	–	–	–	1	–	2	–	1	–	4
Domestic mammals										
Goat (*Capra aegagrus* f. hircus)	–	–	–	1	–	–	–	–	–	1
Sheep (*Ovis ammon* f. aries)	–	2	–	–	–	–	–	–	–	2
Sheep or goat	–	1	–	–	–	1	–	–	–	2
Total identified	1	7	1	10	4	28	3	17	3	74
Unidentified gastropods	–	–	–	–	–	1	1	3	–	5
Unidentified mammals	–	–	1	8	–	15	–	1	–	25

in a secondary rainforest environment, from a qualitative as well as from a quantitative point of view. The abundance of the phytoliths varies between less than 2 and 2% on the basis of the table of visual estimation of the mineral component quantities (Bullock *et al.*, 1985). These low quantities point towards a forested environment (Twiss, Suess & Smith, 1969; Twiss, 1992). Botryoidal concretions (opal grains) are also indicative of a heavily wooded environment whereas a number of other phytoliths point towards the presence of open spaces. This is the case for the Zingiberaceae, *Musa* sp., the Palmaceae and the Poaceae identifiable as panicoid grasses.

Although less indicative than the botanical evidence, the faunal data from Nkang also contribute to the environmental reconstruction. The fauna comprises elements typical of closed and open environments and is therefore in accordance with the botanical data. Species typical of wooded areas include the land snails *Achatina*, forest buffalo (*Syncerus caffer nanus*), forest duikers (*Cephalophus* sp.), and bushbuck (*Tragelaphus scriptus*). Waterbuck (*Kobus ellipsiprymnus*) typically inhabits woodlands and clearings, whereas kob (*Kobus kob*) prefers savanna country and floodplains (Halthenorth & Diller, 1980). Both species usually occur close to water.

Palaeoeconomy

Looking at the overall pattern of botanical and zoological evidence at the Nkang site, a few observations can be made on the subsistence strategies and the impact of human occupation on the vegetation and the fauna.

The plant remains that were studied comprise mainly charcoal fragments and carbonized endocarps which ended up as refuse in the pits. The charcoal indicates that a wide variety of species were used for fuel and possibly also for construction. Several plants were exploited for their edible fruits, as is indicated by the phytolith evidence for *Musa* sp. and by the endocarp finds of *Antrocaryon micraster*, *Canarium schweinfurthii*, *Chrytranthus macrobotrys* and *Elaeïs guineensis*. Judging from their consistent presence in all the pits, it seems that the fruits of *Canarium schweinfurthii* and *Elaeïs guineensis* were regularly consumed. In addition, it could be demonstrated that canarium nuts were used in the decoration of pottery. Impressions of both the distal and the proximal sides were found on pot sherds from pits F9 and F14. Certain plants may also have been used for purposes other than those mentioned. However, such practices, known from the ethnological record, can in the case of Nkang not be proven archaeologically and the usages listed below remain therefore in the field of speculation. The seeds or the barks of *Carapa procera*, *Chrosophyllum pruniforme* and *Ochna multiflora* traditionally have a medicinal function, while *Carapa procera, Trichilia prieureana* and *Ochna multiflora* are used as dye-plants, providing colourings for the human body or textiles. *Strophantus intermedius* produces well-known poisonous fruits and *Piptadeniastrum africanum* a poisonous sap. The trunk of canarium trees exudes an inflammable resin, and the palm tree not only provides oil from the fruits and the kernels but is also a source of sugary sap, edible palm-heart, fibres and salt. An edible spinach grows on the palm tree and a decaying palm trunk harbours the edible larvae of beetles (*Rhynchophorus phoenicis, Oryctes owariensis*) which are traditionally exploited (Nkouka, 1987; Linares, 1993).

The most important discovery in the archaeobotanical assemblage is the *Musa* sp. phytoliths in the carbon deposit of a pottery fragment (F7 NF C15) and in Pit F9 (horizons 2 and 7) (Figure 4). Stratigraphical observations in Pit F9 exclude major reworking due to bioturbation and the find adhering to the pottery fragment is very conclusive. The *Musa* phytolith came from a crust of charred organic matter. The surface of the crust was removed before further laboratory treatment, thus excluding contamination of the crust content with postdepositional material. Firm morphological differences between modern *Musa* and *Ensete* phytoliths were established using optical and scanning electron microscopy (Doutrelepont *et al.*, 1996). The occurrence of *Musa* sp. at Nkang is the first archaeological indication of a cultivated crop for such an early period in Central Africa. It is not surprising that no other evidence for *Musa* has thus far been found, since its archaeological visibility is low. The banana plant does not produce pollen in Africa and its absence in pollen cores is therefore not significant. The tissues of the stipes or roots are not lignified and have never been found as macrobotanical remains, due to the extremely poor preservation chances. The oldest historical source mentioning the species in Africa dates to the 6th century AD and refers to the port of Adulis at the Ethiopian coast (Vansina, 1991: 77). No wild ancestors of *Musa* sp. occur on the African continent, meaning that it must have been introduced (De Langhe, 1995). The origin of the wild banana and its centre of domestication is thought to be the region that stretches from India to Papua New-Guinea and includes Malaysia and Indonesia. The edible bananas could only have been propagated in other parts of the world through human intervention (De Langhe, 1995: 6). The domestication of *Musa* is a complex process that involved seed sterility, parthenocarpy, interspecific hybridization and polyploïdization. This led to the formation of varieties and cultivars. All the bananas on the African continent are seedless and triploïd, indicating that it was the domesticated form that was introduced. The history of bananas and plantains and their introduction into Africa has so far been poorly documented. It is believed that they were first introduced to the continent via the eastern and north-eastern coast. The occurrence of *Musa* phytoliths at Nkang is clear evidence of cultivation in the last millennium BC and

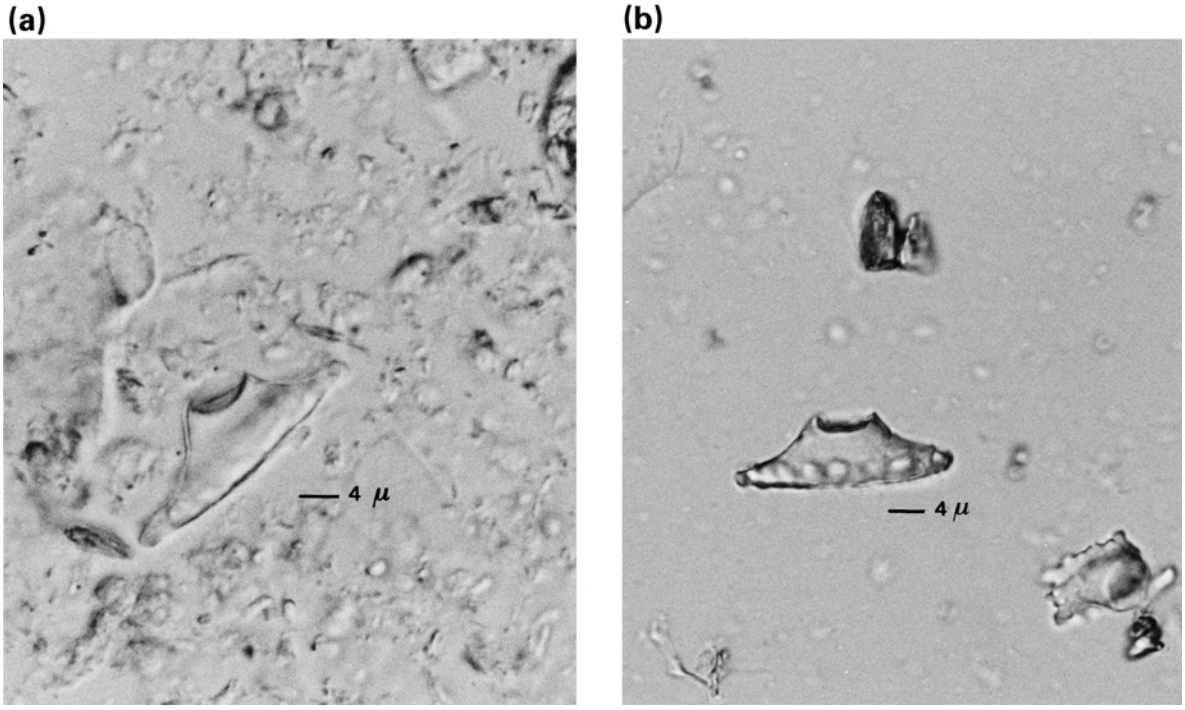

Figure 4. Lateral view of (a) a phytolith from pit F9 and (b) a modern *Musa* phytolith (reference number BS754).

gives further insight into the propagation of the cultivars in Africa. This archaeological finding is consistent with the hypothesis of a very long history of plantain in Africa which is substantiated by the study of its unique diversity in the rainforest and by the collective name applied to plantain in many Bantu language zones (De Langhe, Swenen & Vuylsteke, 1995). The finds from Nkang indicate that agricultural practices in the rainforest are much older than previously assumed. The early presence of banana in Cameroon could explain the observed increase in village density and should improve our understanding of the early stages of Bantu expansion.

The majority of the faunal remains can be considered human food refuse. Exceptions include the small rodents, the lizards and some of the shells. The rodent and small lizard finds of pits F3, F9 and F13 comprise in each case several bones of single individuals indicating that we are dealing with animals that are intrusive. They may represent individuals that fell into the pits while these were still in use, or animals that burrowed in the archaeological layers and died naturally in their burrows. Although *Limicolaria* can be considered edible, there are no indications that these snails served as food at Nkang. They are often found at human habitation sites which they colonize after their abandonment (Gautier, 1983: 95). Since there is evidence that some of the pits had contained standing water (Mbida, 1996: 481), it is likely that the freshwater snails *Lanistes libycus* also represent individuals that lived and died in the pits. The marine gastropod is also not considered to be food refuse.

The anthropogenic faunal remains reflect different economic activities carried out by the inhabitants of Nkang. They practised harvesting of molluscs, fishing, hunting and stock breeding. Both *Achatina* and *Aspatharia* are molluscs that are regularly encountered in African archaeological sites. *Aspatharia* and *Potadoma* cf. *freethii* may have been collected from the nearby small tributary of the Lekie river, whereas *Achatina* are terrestrial, forest species that may have occurred near the site. These molluscs are edible but *Achatina* and *Aspatharia* are also widely used as containers or as raw material for the production of beads. Several perforated discs made of *Achatina* shells were found at Nkang in a single pit (F9). On the basis of ethnological analogies all over Africa, it is supposed that they served either as pendants or as payment units in social exchanges (de Maret, 1985*b*: 166). A marine mollusc shell (*Trochidae* sp.) with a hole drilled near the axis of its basal aperture occurs in the same pit. Both the hole and the basal aperture show signs of wear, probably resulting from rope friction. The marine snail likely had similar uses as the *Achatina*, and was acquired through contacts with the Atlantic coast about 200 km to the west, as the crow flies.

Despite the low number of remains, it is likely that fishing was an important activity. The hand-collected material comprised only a few bones of large species but the sieved samples from F9 all yielded fish remains. More extensive sieving would no doubt have significantly increased the number of fish bones. The available hand-collected material comprises a caudal vertebra of a clariid catfish measuring about 1 m

Figure 5. Goat humerus from pit F6. (a) Dorsal view; (b) medial view. Scale bars are 1 cm.

standard length (SL), as well as remains of a 60–70 cm long *Chrysichthys* catfish and of a 70–80 cm long Nile perch (*Lates niloticus*). The latter species requires deep and well-oxygenated water, conditions which are not met by the small tributary along which the site is located. The Sanaga river, at about 10 km west of Nkang, is the closest locality where *Lates* occurs. The inhabitants of Nkang may have practised fishing there or may have obtained the Nile perch through exchange with people living along the Sanaga. The clariid and *Chrysichthys* catfish, on the other hand, are able to survive in shallow water and may therefore have been captured locally. A pincer of a freshwater crab found in pit F7b further indicates that crustaceans were also collected from the river. The sieved samples from pit F9 yielded several bones of small cyprinids, a percoid fish and characids (Table 4) which may have a local origin. The reconstructed sizes of the corresponding fish are around 5 cm SL. The fish bones were discovered during the treatment of the sediment samples and occurred inside concretions which were rich in calcium and phosphate. They most probably correspond to the contents of human or animal excrements.

The majority of the faunal remains are derived from wild mammals (Table 4). No archaeological objects related to hunting have been found at Nkang. Smaller species, which may have been captured by snares or traps, include cane rat and forest duikers, although they may also have been caught through active hunt. Larger ungulates include bushbuck, waterbuck, kob, forest buffalo and hippopotamus and may have been captured in pits or hunted by groups using nets and wounding gear.

The presence of domestic sheep and goat is attested by five bones only, suggesting that stock breeding was a subsidiary activity. They were found in the following

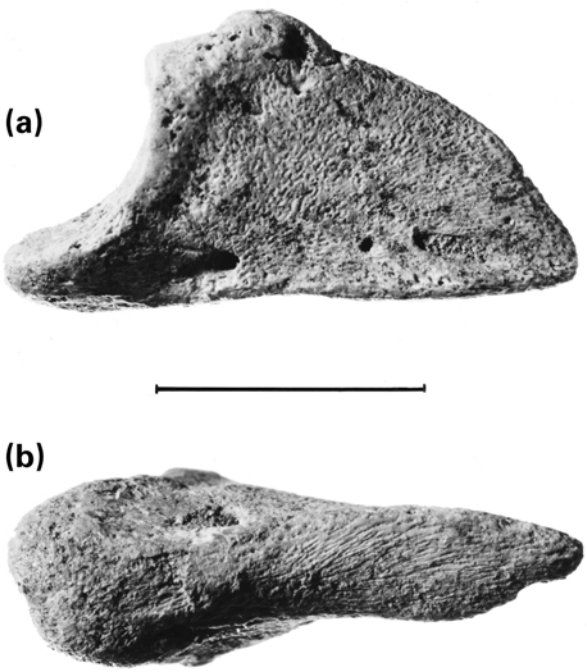

Figure 6. Third phalanx of sheep from pit F3. (a) Peripheral view; (b) distal view. Scale bar is 1 cm.

pit structures: F3 (2 S.D. calibrated dates between 770 and 350 cal BC), F6 (dated between 850 and 410 cal BC) and F7 bis dated to 800–150 cal BC. A goat humerus with its proximal end unfused was found in F6 (Figure 5). Its measurements (Bd 24·2 mm; BT 23·2 mm, taken according to the methods of von den Driesch (1976)) as well as the overall size of the bone, indicate a rather small breed, comparable in size to the dwarf goats found in equatorial Africa today (Epstein, 1971: 211). The presence of sheep is attested in pit F3 by a distal fragment of a metatarsal belonging to a subadult specimen, and by a complete third phalanx (Figure 6) with the following measurements: DLS 21·6 mm; Ld 18·0 mm. Both specimens belong to a small breed comparable to the dwarf breed of thin-tailed hair sheep which is widely distributed today in the tropical forest of Africa (Epstein, 1971: 48). The domestic ovicaprines from Nkang are the earliest evidence of stock breeding in Central Africa, but there are very few other archaeozoological data in the region allowing a precise reconstruction of the propagation of these domesticates (Van Neer, 2000). As a result of the increasing aridity of the late Holocene, a southward migration of pastoralists from the Sahara occurred between roughly 3000 and 2000 BC. This migration, as well as the further southward propagation of domesticates in the savanna belt, is well documented (Gautier, 1987). Small livestock animals dated to the second half of the first millennium BC have been found at Daima in Nigeria, close to the Cameroonian border (Connah, 1976, 1981). More extensive and more securely dated material is available from Gajiganna, Nigeria (Breunig, 1995; Breunig, Neumann & Van Neer, 1996), where the oldest sheep and goat remains occur in levels dated between about 1800 and 1500 cal-BC. Early goat bones have also been reported from Ntereso and Kintampo Rockshelter 6 in Ghana (Carter & Flight, 1972). The levels from which these remains were retrieved date between about 2100 and 1300 BC at Ntereso, and Kintampo Rockshelter 6 would compare closely in date to Ntereso (Stahl, 1985). The goat remains of both sites were described as a dwarf breed but firm morphometric evidence confirming this identification is not given in the original descriptions.

Conclusions

The botanical and zoological remains at the Nkang site yield clear evidence of a food producing economy, with the occurrence of banana or plantain phytoliths (*Musa* sp.) and bones of domestic goat and sheep. Fishing, hunting and collecting remained important sources of food. The inhabitants maintained contacts and exchanges within the immediate vicinity and with regions as distant as the Atlantic coast. Both botanical and zoological evidence indicate a forest environment with open spaces. The vegetation that people of the last millennium BC would have encountered at Nkang was to a large extent similar to that which can be observed today, but the faunal environment has undergone a more drastic change. Many of the wild mammals identified in the archaeological record, such as hippopotamus, forest buffalo, waterbuck, kob and forest duikers, have radically declined in number in the region or have even become extinct locally. More sites will be needed to further document the propagation of domestic species and to obtain additional information on diet, ecology and human adaptation to the African rainforest over the last 3000 years.

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