

## The environment of the Nok sites, Central Nigeria – first insights

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**Summary:** Charcoal analysis points to savanna woodlands as the prevalent vegetation in the Nok region. Fabaceae s.l. and Phyllanthaceae dominate the assemblages. Within these groups identification to genus or species level is difficult, but unambiguous savanna taxa (e.g. *Faidherbia albida*) point to woodland vegetation. Further investigations are needed in order to clarify if this woodland was of anthropogenic origin or natural and if its composition was influenced and changed by human impacts.

**Key words:** archaeological charcoal, vegetation reconstruction, savanna, Nigeria

### INTRODUCTION

The Nok-culture in Central-Nigeria is famous for its impressive terracottas, but until recently only few things were known about Nok: the sites date between 500 BC and 200 AD and besides the terracottas, slag and furnaces were found, putting the Nok-people among the earliest societies that mastered iron-production in West Africa. However, their socio-economic background remained obscure. At the Goethe-University, Frankfurt, research on the Nok-culture started in 2005, aiming at unveiling the society behind the art (Rupp *et al.*, 2008).

The sites excavated so far are located in the hilly foreland of the Jos Plateau, northeast of the Nigerian capital of Abuja. Relief is undulating with granite outcrops and elevations between 300 and 900 meters. The region receives annual rainfall of 1300-1400 mm (Adefolalu, 2003) and belongs to the Southern Guinea vegetation zone (Keay, 1953).

The vegetation consists of a mosaic of secondary savannas, semi-evergreen rain forest and *Isoberlinia* woodland. At the border of rivers denser gallery forests are present, often with *Terminalia* sp. Where cultivation is possible, the natural vegetation has been profoundly modified to farmed woodland, with fields including useful trees and bush fallows in various stages of regeneration (Keay, 1953).

In the vicinities of the sites pearl millet (*Pennisetum glaucum*) and fonio (*Digitaria exilis*, *D. iburua*) are widely grown. The cultivation of yams seems to be confined to profound soils. Manioc, rice and sugar cane are mainly found in depressions and at river banks. Maize and sorghum are acknowledged to be cultivated but were not observed during the archaeobotanical field seasons. The spectrum of crop plants is diversified by various other legumes. Land use includes animal husbandry and the gathering of wild plants like wild yams and tree fruits.

From archaeobotanical studies at various sites a plant exploitation system based on mixed cropping of pearl millet and cowpea (*Vigna unguiculata*) can

tentatively be reconstructed. This system is also known from the Nigerian Chad Basin in the same period. Fruits of tree species in the archaeobotanical assemblages stress the importance of wild resources. The combination of cropping systems based on cereals and pulses with oleaginous fruit exploitation is characteristic for the prehistoric economy of the Sahel and Sudan zones. It was probably present all over the West African savannas at the beginning of the Iron Age.

### DATA AND RESULTS

Two families are present in all sites: Fabaceae s.l., which constitute the largest number of fragments, and Phyllanthaceae. In one sample from Janjala, *Parinari* type is dominating over Phyllanthaceae and Fabaceae wood types. The other sample from this site consists almost entirely of fragments of *Terminalia* type.

The wood of many taxa of the Fabaceae lacks discrete, non-overlapping characters and thus renders it difficult to define wood types down to species or even genus level. In many cases we can only establish wood types that comprise several genera, like Detarieae 1, a type that is present in all sites. Apart from typical family characteristics (small vessel groups, vested pits and crystals in chambered parenchyma cells) the fragments of this type have mostly uniseriate rays and aliform parenchyma. The woods of *Isoberlinia* and *Berlinia* species belong to this group as well as, among others, *Anthonota*, *Monopetalanthus* and *Gilbertiodendron*. The type Detarieae 2 is quite similar but has broader rays, it includes the wood of *Azelia* and *Guibourtia* species. Among the Phyllanthaceae *Uapaca* type is present in four sites and Phyllanthaceae 1 type in three sites. Wood of the Phyllanthaceae 1 type has scarce paratracheal parenchyma, broad rays, simple perforations, enlarged vessel-ray pits, septate fibres and crystals in rays. It includes at least *Antidesma* species, *Spondianthus preussii* and *Margaritaria discoidea* (syn. *Phyllanthus discoideus*). The latter has occasional scalariform perforations, but should still be taken into consideration when recognizing Phyllanthaceae 1 type, because they are often not visible in smaller fragments. *Uapaca* type also has broad rays and enlarged vessel-

ray pits, but it lacks septate fibres and has silica in rays instead of crystals. Other Phyllanthaceae are present only in Iddah with single or few fragments. Other wood types identified are: *Allophylos africanus*, *Anogeissus leiocarpa*, *Faidherbia albida*, *Khaya*, *Ochna*, Rubiaceae I and *Terminalia*.

## DISCUSSION

We interpret the results of the charcoal analysis as indicating woodlands in the surroundings of the Nok sites. Taxa with Detarieae wood types are also present in the rainforest, but since the assemblages comprise wood types that point to unambiguous savanna taxa like *Anogeissus leiocarpus* and *Faidherbia albida*, it is concluded that the species comprised in the Detarieae wood types of the Nok sites rather belong to woodland taxa. The wood types found in the charcoal assemblage fit very well the taxa mentioned by Kershaw (1968) in his vegetation descriptions for the Zaria province, his southern sample areas being comparable to where the Nok sites are situated. Especially *Isobertinia doka* and *Parinari curatellifolia* are constituents of two associations he has described. Both associations grow adjacent to inselbergs and profit from the gradual release of water from the hills, which maintains the woodland during the dry season. *Afrormosia laxiflora* (syn. *Pericopsis laxiflora*) is constantly present in these associations as well.

*Anogeissus leiocarpa*, as well as *Khaya* wood type, which were present in Ungwar Kura, Iddah and Janruwa, and *Terminalia* of Janjala and Akura could point to the exploitation of gallery forests.

From the archaeobotanical remains, we have to assume the presence of fields and fallows in the vicinity of the sites. However, evidence of unambiguous woody fallow species is missing from the charcoal assemblage so far. This is not surprising however, since in fallows within *Isobertinia* woodland the major woody taxon is *Isobertinia* itself (Keay, 1953).

## CONCLUSION

The presence of savanna woodland in the vicinity of the Nok sites seems probable. Assemblages with wood from Fabaceae and Phyllanthaceae together with typical Sudanian species like *Faidherbia albida* and *Anogeissus leiocarpa* lead us to presume that wood was collected from *Isobertinia* woodland.

At the moment it is not possible to differentiate between wooded farmland, woodland of anthropogenic origin, or natural, less influenced woodlands. It was not possible to identify unambiguous fallow species so far.

Gallery forests were exploited as well, but possibly not on a regular basis or only for special purposes. Further analysis might clarify the significance of wood types from these taxa in the assemblages.

Semi-evergreen forest might have been present, but cannot be proven by the charcoal assemblages. Climatic data corroborate that forests could have been present: from the middle of the first millennium BC higher precipitations are indicated for the wider region - by a high water level of Lake Bosumtwi (Ghana) around 200 BC (Shanahan *et al.*, 2006) and the expansion of forest in the Dahomey gap of southern Benin (Salzmänn and Hoelzmann, 2005). The Nok area might have received higher rainfall than today during the second half of the first millennium BC as well. Depending on the duration of the dry season and the atmospheric humidity throughout the year, 1300 to 1600 mm annual rainfall would have been sufficient for the development of at least a drier semi-evergreen rain forest, which is present at the borders of the Guineo-Congolian region today (see White, 1983).

Further analysis of charcoal from accurately defined contexts, with secure dating will help to gain a better picture of the woody vegetation of the area and of the dimension of human impact.

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