

Pearl millet and little else. Archaeobotanical evidence of plant food consumption at Nok culture sites, Nigeria (2nd/1st millennium B.C.)

Vegetation History and Archaeobotany

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ESM 1: Site catalogue

Site Catalogue

This catalogue provides archaeological and archaeobotanical details and absolute dates for all 50 sites for which analyses of carpological plant remains are presented in this paper (Table 1). Most sites excavated by the Nok project are included. Excavation sizes vary considerably, from only extending existing looting holes to smaller test excavations to medium- and large-scale excavations with individual find recording by total station (i.e. Ifana, Pangwari, and Ungwar Kura). Though several Common Era sites were excavated, only one – Janruwa C – is presented in this catalogue. It serves as example of the differences between the archaeobotanical assemblages of Nok and Common Era sites. Three sites (Ishau 2, Kaguni 1, and Kushe 8) were not excavated but archaeobotanical samples were taken from looting holes or artefacts left behind by looters.

Sites are listed in alphabetical order. The header contains a consecutive number, the site name, site number, and Nok occupation phases present at the site according to material culture and/or absolute dates. A brief description of the site and its archaeological interpretation is followed by radiocarbon and luminescence dates available. Radiocarbon dates are calibrated using OxCal4.4 and IntCal 20 (Ramsey, 2009; Reimer et al., 2020). The archaeobotanical information includes a summary of the analysis results and a table listing the results of each analysed sample as well as frequency and ubiquity of carpological remains at the site. The first column gives a consecutive number for each analysed sample per site (#). The next column displays the archaeobotanical sample number (AB) which was assigned during the excavation. In cases where several numbers are given, one sample consisted of several buckets of sediment, which had received separate AB-numbers for processing reasons. Archaeological information on excavation unit, depth and find numbers are given whenever they were recorded. Sample context and phase have been added according to the archaeological and chronological analyses (based on Franke 2016; Franke et al. 2020). Within the archaeobotanical data sets bold numbers mark those counts that went into the total sums. The abbreviation MNI stands for ‘Minimum Number of Items’; of which the calculation is explained in ‘Material, methodology and sampling’ in the main paper. Analyses done by Stefanie Kahlheber, and then verified by Louis Champion are marked ‘LC/SK’, those analysed solely by Louis Champion are marked ‘LC’. Alexa Höhn has identified several handpicked as well as dating samples, which are not part of these tables. Frequency calculations have been rounded to one decimal point, ubiquity values to whole numbers and were in both cases not corrected to full 100%.

An Excel-file containing all information on archaeobotanical samples recovered within the frame of the Nok project is archived at Goethe University and can be accessed through the authors.

ESM 1 Table 1. Sites listed in this site catalogue and the chronological phases for which archaeobotanical material is present. ‘Mixed’ indicates archaeobotanical samples from archaeological contexts which cannot be clearly assigned to one chronological phase but may contain material from various phases.

	Site	Early Nok	Mixed E	Middle Nok	Mixed L	Late Nok	Mixed CE	Common Era
1	Akura			x				
2	Ankoro 1	x						
3	Baidesuru Furnace				x			
4	Daji Gwana			x				
5	Daji Gwana Furnace			x			x	
6	Dakko 1					x		
7	Dogon Daji 1			x				
8	Doguwa 1	x		x				x
9	Gidan Danazumi			x				
10	Ido 1		x	x				x
11	Ifana			x			x	
12	Intini			x				
13	Ishau 2			x				
14	Janjala A			x				
15	Janjala Furnace 1					x	x	
16	Janruwa C						x	x
17	Kabusu 2			x				
18	Kachama 1			x				
19	Kachama 2	x		x				
20	Kaguni 1						x	
21	Kangale			x				
22	Kasangwai 2			x				
23	Kolin Kuchimi Furnace			x				x
24	Kudu 3			x				
25	Kurmin Uwa 1			x				
26	Kurmin Uwa 2			x				
27	Kushe 3			x				
28	Kushe 7			x				
29	Kushe 8			x				
30	Kusuma			x				
31	Mashikin Kadun			x				
32	Pabeki 1			x				
33	Pangwari	x	x	x	x		x	x
34	Pantaki 1		x					
35	Pantaki 3	x						
36	Pulu Furnace			x				
37	Puntun Dutse 1	x	x					
38	Rafin Abutu			x				
39	Rafin Adada 1			x				
40	Rafin Pah 1			x				
41	Rafin Pah 2	x						
42	Ruga Fulani 1 Furnace			x				
43	Sabon Janruwa			x				
44	Taka Lafiya 1		x	x				
45	Tsaunim Bakka 1			x				
46	Tsaunim Gurara			x				
47	Tsaunim Maganda	x						
48	Tudun Dosa			x			x	
49	Ungwar Kura			x	x			
50	Utak Kamuan Garaje Kagoro			x			x	

Akura lies about 4 km northeast of the Janjala research station in flat terrain covered by open woodland. It is bordered by a flat granite hill with far-reaching views. The site is heavily damaged by looting. If the extent of looting holes is an indication of the size of the site, then it had a size of at least 0.85 hectares. The potential for excavation was tested by extending looting holes and collecting cultural material (272 holes in total, numbered AK 1-272). One hole (AK 12) became excavation unit AK A (2×3 m), three smaller excavation units were laid out between the looting holes (AK B-D). The quantity and quality of finds varies substantially; while some holes contain only a few terracotta and/or pottery fragments, other feature large amounts of cultural material. A small iron axe was recovered from AK 12/ AK A.

Absolute dates

5A72 (Rathgen)	2899±172	1064-720 BC	Terracotta fragment	OSL / AK 72, 70cm
Beta-599991	2540±30 bp	796-547 BC	<i>Cenchrus americanus</i>	AB 29
BRAMS Nok037	2479±26 bp	771-481 BC	Lipid residue potsherd	AK 165
KIA 30266	2354±39 bp	726-363 BC	<i>Cenchrus americanus</i>	AB 29

In total, seven AB samples were taken, four from extended looting holes and three from excavation unit AK A. Four of these have been analysed, one from AK 130 and three from the excavation unit AK A. The botanical data set (75 plant remains) is dominated by pearl millet (93% in frequency); several fragments of *Canarium schweinfurthii* endocarp were present in both contexts, while AK A also furnished one probable cowpea (cf. *Vigna unguiculata*) and a *Vitex* sp. seed.

#	Archaeobotanical sample no (AB)	Excavation unit	Depth below surface (cm)	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucre/bristle	Immature	Total	Cenchrus americanus	cf. Vigna unguiculata	Canarium schweinfurthii	Vitex sp.	TOTAL	Processed by	Date on sample (month & year)		
1	25 AK 130			M	30	5	20					25			3	1		26	LC/SK		
2	28 AK A	80		M	10	10	10					20			10	1	1	22	LC/SK		
3	29 AK A	90-100		M	10	8	11					19	1		1	1		21	LC/SK	796-547 BC*	
4	30 AK A	100		M	10		6					6						6	LC/SK		
				MNI TOTAL		23	47					70	1		14	3		75			
				Frequency		30.7	62.7					93.3	1.3			4.0		1.3			
				Ubiquity		75	100					100	25			75		25			
				Total volume	60																
				*and 726-363 BC																	

2 Ankoro 1 (2011/38) – Early and Middle Nok, Common Era

Ankoro lies about 25 km north of the Janjala research station. The site is located on a prominent mountain range of almost 850 m a.s.l. at its highest point. It is heavily damaged by looting. During a survey in 2006 Nok terracotta and pottery were collected from illegal digging holes on the slopes. Stone circles (probably recent house remains) were also recorded. The 2011 excavation took place about 300 m east of the 2006 collection point at 830 m a.s.l. (about 250 m higher than the plain to the west). Three units (A-C; up to 2×3 m) were excavated in artificial layers of 10-20 cm, ca. 20 and 40 m apart. While the excavation yielded Early Nok pottery and no Nok terracotta in pit-like structures (which is in line with the radiocarbon dates), the 2006 survey indicates activities during the Middle Nok phase (as evidenced in the terracotta) and in the Common Era (stone circles). This is supported by the pottery material found. It is known from other sites as well that Early and Middle Nok and later Common Era activities took place at the same site.

Absolute dates

MAMS 14879	3176±40 bp	1517-1318 BC	<i>Cenchrus americanus</i>	AB 510
MAMS 13629	2849±32 bp	1117-921 BC	<i>Cenchrus americanus</i>	AB 511

Archaeobotanical information

Six archaeobotanical samples totalling 86 litres of soil were analysed, all of them belong to the Early Nok phase. The botanical data set (55 plants remains) is dominated by pearl millet (56% in frequency) followed by *Nauclea latifolia* (20%). The single cowpea (*Vigna unguiculata*) find is one of just two from Early Nok contexts. The larger number of finds in AB 512 derives from the presence of *N. latifolia* seeds, which, if present, are always represented by several finds.

										Cenchrus americanus		Indet. seeds		Vigna unguiculata		Nauclea latifolia		Undet. endocarps		TOTAL		Processed by		Date on sample (Oxcal, 2 sigma)	
#	Archaeobotanical sample no (AB)	Excavation unit	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)	Caryopsis <1 mm	Caryopsis >1 mm	Frag.	Involutres/bristle	Immature	Total	Seeds	Frag.	Seed	Mineralized	Charred	Total	Frag.	MNI	MNI			
1	512 A		70	layer 6	E	15		4	2				6		5	1	10	1	11	15	2	25	LC		
2	513 A extension		30-40	pit	E	10			5				5						0			5	LC		
3	515 A extension		70-80	pit	E	16							0						0	2	1	1	LC		
4	510 A extension		100	pit (bottom)	E	15		1	5				6		3				0			9	LC/SK	1517-1318 BC	
5	514 C		40	feature 1	layer 2	E	15	2	2				4						0			4	LC		
6	511 C		50-60	feature 1	layer 5	E	15	3	7				10		1				0			11	LC/SK	1117-921 BC	
MNI TOTAL								10	21				31		9	1	10	1	11	17	3	55			
Frequency								18.2	38.2				56.4		16.4	1.8	18.2	1.8	20.0		5.5				
Ubiquity								67	83				83		50	17	17	17	17		33				
Total volume								86																	

3 Baidesuru Furnace (2013/2) – Middle to Late Nok

Site with remains of several iron reduction furnaces visible on the surface, located next to a small water course. In 2013, six furnaces were excavated in a trench of ca. 3×9 metres, a seventh furnace was excavated nearby in 2016, exposing a furnace pit below the furnace walls. The size and the almost absence of slag assign the furnaces to the Nok Culture as do the few potsherds found which belong to the Tsaunim Gurara pottery group that is in general associated with the later Middle Nok period and iron production.

One radiocarbon date may indicate that iron production started no later than the 6th century BC, but all other dates range between 400 and 200 BC, placing the activity in the Late Nok period.

Absolute dates

MAMS 19289	2545±23 bp	796-565 BC	<i>Vitex</i> sp.	AB 152
Beta-434510	2270±30 bp	398-208 BC	Charcoal	Furnace H
MAMS 19288	2257±26 bp	393-208 BC	<i>Cenchrus americanus</i>	AB 151
Beta-419675	2230±30 bp	387-200 BC	Charcoal	Furnace E
Beta-434511	2230±30 bp	387-200 BC	Charcoal	Furnace H

Archaeobotanical information

Four archaeobotanical samples totalling 18 litres of soil were analysed. Typically for furnace contexts, find numbers were low, one sample was even devoid of any plant remains. Besides eight pearl millet caryopses, three *Vitex* sp. fruits fragments are present.

														Cenchrus americanus				Vitex sp.		TOTAL		Processed by		Date on sample (Oxcal, 2 sigma)	
#	Archaeobotanical sample no (AB)	Find number	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Frag.	MNI	MNI									
1	150			furnace A	furnace infill	Mixed L	4						0			0	LC								
2	151			furnace B	furnace infill	Mixed L	2		5				5			5	LC	393-208 BC							
3	152			furnace D	furnace infill	Mixed L	6		1	1			2	3	1	3	LC	796-565 BC							
4	153			furnace F	furnace infill	Mixed L	6		1				1			1	LC								
				MNI TOTAL					7	1			8	3	1	9									
				Frequency					77.8	11.1			88.9		11.1										
				Ubiquity					75	25			75		25										
				Total volume			18																		

Nine archaeobotanical samples totalling 56 litres of soil were analysed, six samples from feature 1 and two from feature 2. The sample from outside the features as well as one sample from feature 1 were devoid of any plant remains. The botanical data set (68 plant remains) consists almost exclusively of pearl millet (90% in frequency). Two caryopses of not further identifiable Poaceae species and few unidentifiable seed fragments complement the assemblage.

5 Daji Gwana Furnace (2013/4) – Middle Nok

The Daji Gwana Furnace site is located ca. 100 m from the Daji Gwana site (2011/40) and was discovered in 2011 when the outline of a furnace was found on a dirt road. A total of three furnaces (labelled A-C) was excavated in 2013 (trench size 4.5×6.5 m), with furnace C being cut by the western profile wall. The sediment surrounding the furnaces was almost sterile, only the infilling contained a few finds of potsherds, stone artefacts, tuyère fragments, charcoal, and iron slag. The radiocarbon dates are inconsistent and do not allow a clear classification. Fonio found in the archaeobotanical sample of furnace B confirms the early first millennium AD radiocarbon date on pearl millet from the same sample and indicates a human presence at this site at the time. Nok cultural material, however, found in furnaces A and B supports the date in the Middle Nok phase. Plant roots that destroyed the furnace walls and present in the infillings indicate disturbances. The furnaces themselves, however, resemble very closely all other Nok furnaces excavated where a classification is possible based on dates and cultural material. The Daji Gwana Furnace site is thus attributed to the Middle Nok phase and is possibly contemporaneous with the later Middle Nok activity phase at the neighbouring Daji Gwana site (see Junius 2016).

Absolute dates

MAMS 19291	2508±24 bp	776-544 BC	<i>Cenchrus americanus</i>	AB 144
MAMS 19290	1891±31 bp	75-231 AD	<i>Cenchrus americanus</i>	AB 143

Archaeobotanical information

Three archaeobotanical samples totalling 20 litres of soil were analysed. The botanical data set consists of seven plant remains, six pearl millet caryopses and one fonio (*Digitaria exilis*) that corresponds with the radiocarbon date from the same sample. It is possibly related to the disturbances at the site.

#	Archaeobotanical sample no (AB)	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Cenchrus americanus	Digitaria exilis	TOTAL	Processed by	Date on sample (Oxcal, 2 sigma)		
1	142	furnace A	furnace infill	M	7		1				1			1	LC			
2	143	furnace B	furnace infill	Mixed CE	6	1	2				3		1	4	LC	75-231 AD		
3	144	furnace C	furnace infill	M	7	1	1				2			2	LC	776-544 BC		
		MNI TOTAL				2	4				6	1	7					
		Frequency				28.6	57.1				85.7	14.3						
		Ubiquity				67	100				100	33						
		Total volume				20												

6 Dakko 1 (2011/41) – Late Nok

A test excavation (two units of 3×3 metres each) was conducted at a site which was actively looted just before our visit. It lies at the western fringe of the key study area. Unit 1 had almost no finds, while Unit 2 featured some potsherds and a small Nok figurine. Finds occurred only in the upper 30-40 cm, then the soil turned sterile. It remains unclear if the finds were in situ or in a disturbed, surface-near context. Potsherds (also well-preserved potsherds left behind by the looters) and the radiocarbon date put the site in the Late Nok phase. It is one of very few Nok sites that date after 400 BC.

Absolute dates

MAMS 14876 2160±45 bp 361-53 BC Charcoal **AB 382**

Archaeobotanical information

Two archaeobotanical samples totalling 15 litres of soil were analysed from both units. In Unit 1 only one pearl millet caryopsis was recovered. In Unit 2 (31 plants remains) *Nauclea latifolia* dominates the assemblage (65% in frequency), and is accompanied by pearl millet and unidentifiable fruit remains.

						Cenchrus americanus						Nauclea latifolia				Indet. fruit		TOTAL	Processed by	Date on sample (Oxcal 2 sigma)
#	Archaeobotanical sample no (AB)	Excavation unit	Depth below surface (cm)	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Minerilazed	Charred	Total	Frag.	MNI	MNI			
1	381	Unit 1	20-30	L	5		1				1						1	LC		
2	382+383	Unit 2	30-40	L	10		6	2			8	20		20	3	3	31	LC	361-53 BC	
			MNI TOTAL			7	2			9	20		20	3	3	32				
			Frequency			21.9	6.3		28.1	62.5		62.5		9.4						
			Ubiquity			100	50		100	50		50		50						
			Total volume	15																

7 Dogon Daji 1 (2011/42) – Middle Nok

A test excavation (two units at 3×3 metres each) was conducted at a massively looted site on a flat hilltop plateau. Unit DD 1A contained some finds to a depth of 40 cm, when the soil turned sterile. Unit DD 1B featured more finds; in a depth of 60-80 cm, a pit was identified with potsherds, terracotta fragments and charcoal. Finds continued to a depth of 120 cm. The pottery is classified as Tsaunim Gurara group, assigning the site to the later Middle Nok phase. Finds of tuyère fragments and slag point to iron production, but may be intrusive younger material as are some Common Era potsherds.

Absolute dates

MAMS 13632	2562±30 bp	805-566 BC	<i>Cenchrus americanus</i>	AB 506
MAMS 14874	2552±27 bp	801-554 BC	<i>Cenchrus americanus</i>	AB 478

Archaeobotanical information

Four archaeobotanical samples totalling 18 litres of soil were analysed from unit DD 1B. The botanical data set (66 plants remains) is dominated by pearl millet (92% in frequency). The find concentration was highest in the small two litres sample from the charcoal concentration. The other plant remains are fragments of tree fruit endocarps and seeds.

#	Archaeobotanical sample no (AB)	Excavation unit	Depth below surface (cm)		Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Cenchrus americanus	Seeds	Indet. seeds	Frag.	Indet. fruit	MNI	TOTAL	Processed by	Date on sample (Oxcal, 2 sigma)
1	497	B	40-60	charcoal concentration	M	2	6	27					33									
2	478	B	60-80	tuyère find	M	6		5					5		1							801-554 BC
3	479	B	60-80	pit	M	8	9	10					19		2							
4	506	B	80-100	pit	M	2		4					4		1							805-566 BC
				MNI TOTAL				15	46				61		4		1	1		66		
				Frequency				22.7	69.7				92.4		6.1		1.5					
				Ubiquity				50	100				100		75		25					
				Total volume			18															

8 Doguwa 1 (2010/1) – Early and Middle Nok, Common Era

The site is located on a granite hilltop, about 20-30 m high and covered with dense bush vegetation. Looting had taken place in the upper part of the site. Three trenches were excavated. DOG1 measured 13×4.5 m; DOG2 and DOG3 were smaller test pits (2×2 m each) about 100 m north of DOG1, further up the hill. Doguwa 1 was the first site of the Nok project where different time periods could be clearly distinguished, which is also reflected in the radiocarbon dates. The upper layer in all three trenches contained slag and Common Era pottery, which is attributed to the Gimba pottery group of the late first and second millennium AD. Below the Common Era material, a pit was excavated in DOG1 (feature 1) which contained a complete Nok terracotta head in a depth of 80 cm; the bottom of the pit was reached at 160 cm. In DOG3, a large number of Early Nok potsherds was recovered below the Common Era layer and dated by pearl millet to the late second millennium BC. DOG2 features only Gimba group pottery. The radiocarbon dates confirm activities at the site during the Early and Middle Nok phase as well as in the Common Era, for which the two radiocarbon dates indicate several occupation events.

Absolute dates

MAMS 11155	2936±26 bp	1224-1020 BC	<i>Cenchrus americanus</i>	AB 294
MAMS 11152	2428±26 bp	747-406 BC	Charcoal	DOG1, near terracotta
MAMS 11153	1991±24 bp	44 BC - 110 AD	Charcoal	AB 293
MAMS 11151	1279±24 bp	665-777 AD	Charcoal	DOG1, upper layer
MAMS 11154	373±23 bp	1452-1631 AD	Charcoal	DOG3, upper layer

Archaeobotanical information

Four archaeobotanical samples totalling 44 litres of soil were analysed from unit DOG1. Three samples come from the context of the terracotta find and belong to the Middle Nok phase. The very small botanical data set (18 plants remains) is dominated by pearl millet, concentrated in only one sample at a depth of 100 cm. A single undetermined seed fragment was recovered from the Common Era sample. One archaeobotanical sample of 13 litres of soil was analysed from unit DOG3. The botanical data set is much larger (348 plants remains) and is dominated by pearl millet (91% in frequency). The other plant remains are *Canarium schweinfurthii* endocarp fragments and some (further) unidentifiable Poaceae and seed fragments. The radiocarbon date was done on pearl millet caryopses and places the sample in the Early Nok phase.

#	Archaeobotanical sample no (AB)	Excavation unit	Find number	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis > 1mm	Frag.	Involucres/bristle	Immature	Total	Cenchrus americanus	Poaceae sp.	Indet. seeds		Canarium schweinfurthii	TOTAL	Processed by	Date on sample (Oxcal 2 sigma)
1	284	1	4922	60		sediment with iron slag	CE	12														
2	285	1	5125	80	feature 1	pit with terracotta	M	6			1			1			1			1	LC	
3	287	1	5241	100	feature 1	pit with terracotta	M	14		16				16						16	LC	
4	293	1	6396	160	feature 1	pit with terracotta (bottom)	M	12						0						0	LC	44 BC - 110 AD
5	294	3	8104	100			E	13	103	189	25			317	19	19	10	8	2	348	LC	1224-1020 BC
					MNI TOTAL				103	205	26			334	19	11	8	2	366			
					Frequency Ubiquity				28.2	56.2	7.1			91.5	5.2	3.0		0.5				
					Total volume			57	20	40	40			60	20	40		20				

9 Gidan Danazumi (2010/2) – Middle Nok

A trench of ca. 8.5×6 m was excavated in a flat terrain close to the village of Gidan Danazumi in open bush vegetation. The excavation yielded only about 500 mostly poorly preserved finds, of which 80% were charcoal and undiagnostic potsherds. Three features were identified as darker discolourations with a lot of charcoal and a few terracotta and pottery fragments. The character of the features remains unclear, since they occur not too deep in the ground and may be disturbed by looting activities attested in the vicinity. Nevertheless, the few decorated potsherds and the radiocarbon date place the occupation in the later Middle Nok phase (Tsaunim Gurara pottery group).

Absolute dates

MAMS 11156 2495±26 bp 775-540 BC *Cenchrus americanus* **AB 229**

Archaeobotanical information

Three archaeobotanical samples totalling 20 litres of soil were analysed. The botanical data set (11 plant remains) is dominated by pearl millet (64% in frequency). One caryopsis of *Digitaria* cf. *ciliaris* and one endocarp fragment of *Canarium schweinfurthii* were also identified.

#	Archaeobotanical sample no (AB)	Find number	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Cenchrus americanus	Digitaria cf. ciliaris	Indet. seeds	Canarium schweinfurthii	Indet. fruit	TOTAL	Processed by	Date on sample (Oxcal, 2 sigma)	
3	228	370	feature 1	charcoal-rich area	M	5	1					1	1			1	1	3	LC		
2	229	371	feature 1	charcoal-rich area	M	6	1	1				2						2	LC/SK	775-540 BC	
1	230	477	feature 3	charcoal-rich area	M	9		4				4			1		1	6	LC		
				MNI TOTAL			1	6				7	1		1	1	1	1	11		
				Frequency			9.1	54.5				63.6	9.1		9.1		9.1		9.1		
				Ubiquity			33	100				100	33		33		33		33		
				Total volume	20																

10 Ido 1 (2009/1) – Early and Middle Nok, Common Era

The site extends over two hilltops based on the distribution of deep looting holes. The excavation area was laid out at the foot of the smaller hill between such looting holes. In 2009, a trench of 10×13 m was excavated and yielded a mixture of material from different time periods (ID A). While iron and copper artefacts, slag, bones and potsherds in the upper 20-40 cm belong to a Common Era activity and may indicate a grave, Nok material in form of a few terracotta fragments, pottery, grinding stones and other stone artefacts, and charcoal is found down to 120-140 cm below the surface, exclusively in pit features. In addition, the excavation revealed stone settings consisting of natural and grinding stones. In one such feature, two complete vessels were found next to the stones with stone beads arranged as if on a string; the feature is interpreted as a grave. For these features, a date between ca. 900-800 BC is suggested. In addition, the excavation revealed a number of Early Nok potsherds, but no clear Early Nok features. They confirm that at Ido 1, several activity episodes had taken place between the second millennium BC and the second millennium AD.

In 2016, we returned to the site to test the hypothesis of a connection between stone settings (graves) and terracotta depositions. A second trench (8.5×5 m) was opened adjoining the 2009 trench at its northern side, where most features had been found in 2009 (ID B). The result was almost the same – pit features and stone settings. But this time, one stone setting contained a terracotta head and a large body part on top and a vessel below, showing the relation between terracotta figurines and burials. The same mixture of material between Early Nok, Middle Nok and Common Era was present. XRF analysis of soil samples from the 2016 features did not yield conclusive results regarding the presence of decayed bodies (Schmidt 2016).

Absolute dates

MAMS 13664	3036±26 bp	1396-1214 BC	<i>Cenchrus americanus</i>	AB 185
MAMS 27395	3029±26 bp	1395-1203 BC	<i>Cenchrus americanus</i>	AB 235
Beta-434506	2930±30 bp	1222-1016 BC	Seed frag.	AB 239
MAMS 27393	2800±25 bp	1042-848 BC	<i>Cenchrus americanus</i>	AB 238
MAMS 10703	2768±13 bp	978-837 BC	Charcoal	ID A, test pit
Beta-434507	2730±30 bp	928-810 BC	<i>Cenchrus americanus</i>	AB 232
MAMS 10702	2708±13 bp	900-813 BC	Charcoal	ID A, #1039
MAMS 10742	2704±23 bp	901-809 BC	<i>Cenchrus americanus</i>	AB 190
MAMS 10741	2408±23 bp	725-402 BC	Charcoal	AB 176
MAMS 27394	1920±24 bp	30-207 AD	<i>Cenchrus americanus</i>	AB 227

Archaeobotanical information

16 archaeobotanical samples totalling 251 litres of soil were analysed. The botanical data set (1481 plants remains) is largely dominated by pearl millet (97.9%). Other plant remains are *Canarium schweinfurthii* endocarp fragments, *Nauclea latifolia* and *Spermacoce* sp. seeds, *Brachiaria* type, *Eleusine indica*, and *Digitaria exilis* caryopses in extremely low frequencies. Most of the archaeobotanical samples come from the pit features dated to the Middle Nok period. Two features (09-5/16-7 and 09-A/16-8) contained plant material with Early Nok radiocarbon dates, proving a mixture of Early and Middle Nok material. Three samples are from the context of a large stone with three grooves, which probably belongs to a Common Era context – one contains fonio (*Digitaria exilis*) remains and another yielded a very early Common Era date.

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11 Ifana (2011/48) – Middle Nok

The site of Ifana is located near Janjala village and the Nok research station, on the lower southern slope of a large granite hill. In 2011, we opened two trenches (IFA1 9×6 m; IFA2 7×5 m) in a spot with fewer looting holes than in the surrounding area. In IFA1, we found a large terracotta deposition consisting of several large bodies and heads; in addition, there were some other pit features and stone arrangements. IFA2, 85 metres SW of IFA1, contained two deep pit features with a large number of finds, while the surrounding soil was almost sterile. In 2016 we returned to the site to test the hypothesis of a spatial relation between terracotta depositions and grave features. We were looking for grave features and found them. Trench IFA3 (30×31 m around the 2009 IFA1 trench) yielded three large terracotta depositions and more than 20 grave features (stone settings with complete vessels and occasionally stone beads and terracotta parts) – the first Nok burial ground was discovered. Between the features, the soil was almost sterile from -60 cm down. The upper 60 cm were disturbed by farming activities and looting, confirmed by some radiocarbon dates dating in the Common Era. Almost no organic material was recovered in the features. Based on the majority of radiocarbon dates and the decoration of the excavated vessels, a period between 800 and 550 BC is suggested for the use of this burial ground. The radiocarbon dates falling in the second millennium BC come from below the features; since none of the early dates is exclusively on pearl millet, thus attesting human presence, the dates must be regarded with caution. They may date the horizon into which the features were embedded. In 2017, we intended to continue excavation of IFA3 with a 450 m² extension (IFA4) and, in addition, an extension of IFA2 (IFA5 7×10 m), but an ambush a few days into the excavation stopped the work.

Absolute dates

Beta-562730	4260±30 bp	2921-2706 BC	Charcoal	IFA 1, AB 366
Beta-451382	3520±30 bp	1931-1749 BC	Charcoal	IFA 3, #2395
Beta-445973	3480±30 bp	1888-1696 BC	<i>Cenchrus americanus</i> + plant fragment	IFA 3, AB 27
Beta-445775	3420±30 bp	1873-1622 BC	Plant fragment	IFA 3, AB 9
Beta-481115	3340±30 bp	1735-1532 BC	Charcoal	IFA 3, #2507
Beta-445972	3210±30 bp	1519-1422 BC	Plant fragment	IFA 3, AB 18
MAMS 13624	2632±34 bp	896-772 BC	<i>Cenchrus americanus</i>	IFA 1, AB 364
MAMS 13634	2586±25 bp	810-760 BC	<i>Cenchrus americanus</i>	IFA 2, AB 362
MAMS 13635	2550±25 bp	801-555 BC	<i>Cenchrus americanus</i>	IFA 2, AB 375
Beta-445970	2530±30 bp	794-544 BC	<i>Cenchrus americanus</i> /plant	IFA 3, AB 21
Beta-445971	2520±30 bp	789-544 BC	Plant fragment	IFA 3, AB 16
BRAMS-3030	2513±18 bp	775-548 BC	Organic remains in vessel	IFA 3, #3013
BRAMS-3511	2513±25 bp	779-544 BC	<i>Cenchrus americanus</i>	IFA 3, AB 23
Beta-451380	2500±30 bp	778-520 BC	Charcoal	IFA 3, AB 10
Beta-481114	2500±30 bp	778-520 BC	Charcoal	IFA 3, #2083
Beta-451383	2490±30 bp	775-486 BC	Charcoal	IFA 3, AB 22
Beta-562731	2470±30 bp	766-422 BC	Charcoal	IFA 3, #2186
Beta-481110	2460±30 bp	758-416 BC	Charcoal	IFA 3, AB 14
Beta-481111	2440±30 bp	751-408 BC	Charcoal	IFA 3, AB 17
Beta-481113	2390±30 bp	725-394 BC	Charcoal	IFA 3, AB 4
BRAMS-3510	1953±25 bp	36 BC - 129 AD	<i>Cenchrus americanus</i>	IFA 1, AB 349
Beta-481116	1360±30 bp	607-774 AD	Charcoal	IFA 3, #2509
Beta-481112	650±30 bp	1281-1395 AD	Seed fragment	IFA 3, AB 8
Beta-451381	120±30 bp	1679-1941 AD	Charcoal	IFA 3, #2311

Archaeobotanical information

47 archaeobotanical samples totalling 321 litres of soil were analysed. Eight samples, mostly from IFA3, the burial ground, were devoid of any plant remains. The botanical data set (1178 plant remains) is dominated by pearl millet (64%) followed by *Nauclea latifolia* (9.2%) and *Canarium schweinfurthii* endocarp fragments (c. 1%). The other plant remains are several caryopses in IFA2 feature 3 (Poaceae), and unidentifiable seeds, as well as seed and fruit fragments. The three samples from IFA1 feature 6 contain material dated to the Common Era, as does the sample from IFA3 feature 13, a Middle Nok burial. From IFA3 feature 29, another burial, a date in the early second millennium BC was received on a mix of pearl millet and other plant material. A second radiocarbon date on pearl millet only from the same feature (AB 23) dates in the Middle Nok phase and proves that the early date is erroneous and does not date the burial activity at the site.

#	Archaeobotanical sample no (AB)	Excavation unit	Find number	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Cenchrus americanus	Poaceae sp.	Indet. seeds	Frag.	Mineralized	Charred	Total	Frag.	MNI	Frag.	MNI	Total indet.	TOTAL	Processed by	Date on sample (Oxcal, 2 sigma)
1	366	1	876	85	feature 1	deep pit	M	7	6		1			7				3								3	13	LC	*2921-2706 BC
2	354	1	778	60	feature 1 (outside)	layer	M	6	1		1			2			1		1		1	5	2			1	7	LC	
3	363	1	869	70	feature 1 (outside)	layer	M	7	1	1	2			4								8	2	2	1	1	8	LC	
4	364	1	883	80	feature 2	terracotta deposition	M	7	1	2				3			1							3	1	2	7	LC/SK	
5	369	1	900	80	feature 2	terracotta deposition	M	7	7	12	15			34										3	1	1	36	LC	896-772 BC
6	357	1	262	20	feature 2 and feature 6 (between)	layer	M	3	1				6	7					1		1	4	1			9	LC		
7	352	1	416	30	feature 6	charcoal concentration	Mixed CE	8	3	7	4		1	15			1		10	1	11			4	2	3	32	LC	
8	349	1	699	50	feature 6	charcoal concentration	Mixed CE	8	25	6	12		2	45					7	1	8	6	2			55	LC	36 BC - 129 AD	
9	345	1	771	60	feature 6	charcoal concentration	Mixed CE	8	13	7	8		5	33					5		5			2	2	2	42	LC	
10	375	2	554	60	feature 2	deep pit	M	8	7	22	5			34			1		10		10			3	1	2	48	LC/SK	801-555 BC
11	370	2	398	70	feature 2	deep pit	M	9	7	17	9			33			1	7	8		8					8	57	LC	
12	374	2	658	70	feature 2	deep pit	M	8	1	12	3			16					10	2	12					28	LC		
13	367	2	170	30	feature 3	deep pit	M	10	12	58	21			91			23	4	14	1	15			7	2	29	164	LC	
14	368	2	172	30	feature 3	deep pit	M	8	4	3	8			15												15	LC		
15	371	2	247	40	feature 3	deep pit	M	8	7	12	6			25	7		2	2	20	1	21			3	1	5	63	LC	
16	365	2	306	40	feature 3	deep pit	M	7	34	60	27		1	122										4	1	1	124	LC	
17	372	2	353	60	feature 3	deep pit	M	6	15	25	18		1	59			13	25	14		14					38	149	LC	
18	401	2	486	70	feature 3	deep pit	M	1						0													0	LC	
19	362	2	449	80	feature 3	deep pit	M	8	25	72	17			114				1							1	116	LC/SK	810-760 BC	
20	5	3	2056	60	east of IFA1	layer	M	6	5					5				10							10	25	LC		
21	24	3	3067	110	feature 11	burial	M	4	0																	0	LC		
22	8	3	2400	80	feature 13	burial	Mixed CE	2	1	1				2				1							1	4	LC	1281-1395 AD	
23	17	3	2591	90	feature 14	burial	M	8	4					4				3				2	1		3	11	LC	*751-408 BC	
24	7	3	2415	80	feature 17	burial	M	2	0																	0	LC		
25	9	3	2417	80	feature 17	burial	M	2	0																	0	LC	*1873-1622 BC	
26	2	3	1654	40	feature 17 (south of)	layer	M	13	7				7													7	LC		
27	20	3	3018	below finds	feature 18	burial	M	6	0																	0	LC		
28	13	3	2510	90	feature 19	terracotta deposition	M	5										5						5	1	6	12	LC	
29	21	3	3035	below finds	feature 19	terracotta deposition	M	8	1					1												1	LC	794-544 BC	
30	19	3	3038	below finds	feature 22	burial	M	10										1						3	1	2	4	LC	
31	22	3	2536	90	feature 22	burial	M	2	0																	0	LC	*775-486 BC	
32	23	3	3053	80	feature 29	burial	M	10	3	3				6										3	1	1	8	LC	779-544 BC
33	27	3	3076	90	feature 29	burial	M	12	1	4				5												5	LC	(*)1888-1696 BC	
34	1	3	1548	40	feature 3	terracotta deposition	M	10	7					7			1	12				3	1		13	34	LC		
35	3	3	1990	60	feature 3	terracotta deposition	M	9	3	2	9		1	15			3									3	21	LC	
36	14	3	2501	90	feature 3	terracotta deposition	M	8	4	1				5										2	1	1	7	LC	*758-416 BC
37	16	3	3009	below finds	feature 3	terracotta deposition	M	12	4					4				4								4	12	LC	*789-544 BC
38	29	3	3082	90	feature 30	burial	M	6	1					1												1	LC		
39	28	3	3078	90	feature 31	burial	M	14	2					2												2	LC		
40	30	3	3083	90	feature 33	burial	M	6	1	2				3												3	LC		
41	4	3	2025	60	feature 4	burial	M	2										1							1	2	LC	*725-394 BC	
42	10	3	2435	80	feature 7	burial	M	6	6	9				15					1	1	2			9	1	1	19	LC	*778-520 BC
43	15	3	2524	90	feature 7	burial	M	6	3	3			1	7			1	5				3	1	1	1	7	22	LC	
44	25	3	2010		feature 7	charcoal concentration	M	1	0																		0	LC	
45	26	3	2209		feature 7	charcoal concentration	M	1	0																		0	LC	
46	18	3	3036	below finds	feature 9	terracotta deposition	M	12	0									2									0	LC	*1519-1422 BC
47	6	3	2418	80	near feature 7	layer	M	5	1					1				2								2	5	LC	
MNI TOTAL									224	341	166	18	749	7	48	86	101	7	108	31	10	58	18	152	1178	*on wood charcoal or unidentifiable plant material			
Frequency									19.0	28.9	14.1		1.5	63.6	0.6	4.1	7.3	8.6	0.6	9.2		0.8		1.5	12.9				
Ubiquity									74	49	36		17	74	2.1	23	34	26	13	26		15		32	59.6				
Total volume									321																				

12 Intini (2010/3) – Middle Nok

Nok presence is attested at the site by large terracotta parts collected from looting holes on a granite crest with a steep slope towards a riverbed and by several furnaces found about 200 metres east at the base of the crest. Excavation in 2010 started with the remains of a furnace visible on the surface (IN1). Test trenches IN2-5 were intended to reveal a Nok presence in the immediate surroundings, but only few finds were made and they may not be in situ, but from the spoil of looting holes. Next to the furnace in IN1, another furnace was excavated (IN6). Radiocarbon and luminescence dates and Nok pottery belonging to the transition of the later Middle Nok to Late Nok period confirm the affiliation of these iron-reduction furnaces with the Nok Culture – these were the first Nok furnaces clearly identified by the Nok project. Based on the OSL date and radiocarbon dates, the furnaces are not older than the mid-7th century BC. The survey and excavation in 2016 confirmed the presence of several more furnaces of which one was excavated (IN7), providing technical details about the furnace construction (Junius 2016). The radiocarbon date on a plant fragment from IN7 falls in the Early Nok phase and may point to a presence at the site, which would not be surprising given that Early and Middle Nok presences are attested at several other sites. No cultural material, however, could be attributed to the Early Nok phase.

Absolute dates

Beta-434508	3120±30 bp	1492-1291 BC	Plant fragment	IN 7, 30-40 cm
MAL 10095	2500±200	687-287 BC	Furnace wall fragment	OSL / IN 6
MAMS 11159	2421±25 bp	743-404 BC	Charcoal	IN 6, #1356
Beta-434509	2420±30 bp	748-402 BC	Charcoal	IN 7, 50-70 cm, AB 226
MAMS 11157	2392±25 bp	658-398 BC	Charcoal	IN 1, #544, AB 218
MAMS 11158	151±22 bp	1668-past 1907 AD	Charcoal	IN 5, #628

Archaeobotanical information

Ten archaeobotanical samples totalling 81 litres of soil were analysed. Six samples were devoid of any plant remains, which is not surprising considering that the excavation was in a furnace site, but they did contain datable charcoal as would be expected near furnaces. The botanical data set is extremely poor (11 plant remains) and consists mostly of pearl millet. One cowpea (*Vigna unguiculata*) seed and one *Eleusine indica* caryopsis were also found.

																					Cenchrus americanus	Eleusine indica	Indet. seeds	Vigna unguiculata	TOTAL	Processed by		Date on sample (Oxcal, 2 sigma)
#	Archaeobotanical sample no (AB)	Excavation unit	Find number	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Caryopsis	Seeds	Frag.	Seed	MNI									
1	220	3	268		feature 1	discolouration	M	9											0	LC								
2	221	5	628		feature 2	discolouration	M	9											0	LC								
3	226	7		50-70	furnace	furnace infill	M	10	3	1	1			5					5	LC			748-402 BC					
4	218	1	544		furnace 1	furnace context	M	10										1	1	LC/SK			658-398 BC					
5	219	1	396		furnace 1	furnace context	M	9											0	LC								
6	222	1	903		furnace 1	furnace context	M	1											0	LC								
7	224	1	830		furnace 1	furnace context	M	7											0	LC								
8	223+227	6	1384		furnace 2	furnace context	M	16	4	3				7	1				8	LC								
9	235	1	1191		furnace 2	furnace context	M	4											0	LC								
10	226	6	1257		furnace 2	furnace context	M	6									2		2	LC								
					MNI TOTAL					7	4	1		12	1		2	1	16									
					Frequency					43.8	25.0	6.3		75.0	6.3		12.5	6.3										
					Ubiquity					20	20	10		20	10		10	10										
					Total volume				81																			

13 Ishau 2 (2013/130) – Middle Nok

No excavation was performed at this site. A local worker collected some terracotta fragments and the lower part of a vessel after looting had taken place. The sediment collected from the vessel was screened and a radiocarbon date was obtained, placing the occupation in the Middle Nok phase. This is supported by the vessel's decoration that is attributed to the later Middle Nok Tsaunim Gurara group.

Absolute dates

Beta-419676	2540±30 bp	796-547 BC	<i>Cenchrus americanus</i> + charcoal
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Archaeobotanical information

The infilling of the vessel, a total of three litres of soil, was analysed. The botanical data set consists of two pearl millet caryopses. Some more pearl millet seeds, however, had been directly dated to the Middle Nok period.

[illegible]

14 Janjala A (2006/3) – Middle Nok

Janjala A lies in flat terrain with dense bush vegetation, northwest of the Janjala research station on the way to Ido 1 site. The site is cut by a dirt road and looting holes are distributed over a large area on both sides of the road. Based on the spread of the looting holes, the site had an extension of ca. 3.8 hectares. A total of ten units (JAN A 1-10), varying between one and six square metres, were excavated in undisturbed areas between the looting holes. Most units contained cultural material in the form of terracotta fragments, pottery and charcoal. JAN A 5 contained a complete terracotta figurine broken in two pieces, while a pit feature was identified in JAN A 6 reaching to a depth of 120 cm below the surface. It is unclear whether the pit belongs to the Nok Culture or is the remains of a refilled looting hole. Only a few diagnostic potsherds were found placing the site in the later Middle to Late Nok phase, towards the younger end of the radiocarbon date. As with many other excavated Nok sites, it is not clear whether the site was a settlement and/or had a ritual function.

Absolute dates

KIA 30265 2431±45 bp 755-402 BC *Cenchrus americanus* JAN A5, AB 15

Archaeobotanical information

In total, 17 samples were taken from six test holes, of which seven samples from three test holes were analysed. At first glance, the pit context seems richer in number of plant remains, but larger volumes were processed. A total of 126 litres yielded 244 plant remains. The assemblage is dominated by pearl millet (72%). Several seeds of (probable) cowpea are present, as well as *Canarium schweinfurthii* endocarps and *Vitex* sp. fragments. The assemblage contains some undifferentiated Poaceae, unidentifiable seed fragments and unidentified endocarp fragments.

[illegible]

15 Janjala Furnace 1 (2013/5) – Late Nok

Two furnace outlines were exposed on a dirt road leading through the Nok site of Janjala A (2003/3). Their size (diameter ca. 1 m) and the near absence of slag suggested an affiliation with the Nok Culture. An excavation trench of 5.5×4.5 m was laid out around the furnaces; during excavation a third furnace was exposed which was partly destroyed by large stones. Two Common Era potsherds, one radiocarbon date, as well as several OSL dates possibly put the site into the Common Era. But the form of the furnaces, the presence of a few terracotta fragments and of one Nok potsherd, and one radiocarbon date assign the furnace with more probability to the Late Nok phase (Junius 2016).

Absolute dates

MAMS 19293	2144±24 bp	350-54 BC	Plant fragment	AB 136
MAL 10130	1700±150 BP	164-464 AD	Furnace wall fragment	OSL / Furnace B
MAL 10129	1650±150 BP	214-514 AD	Furnace wall fragment	OSL / Furnace A
MAL 10131	1450±150 BP	414-714 AD	Furnace wall fragment	OSL / Furnace C
MAMS 19294	1101±25 bp	888-995 AD	<i>Cenchrus americanus</i>	AB 137

Archaeobotanical information

Four archaeobotanical samples totalling 40 litres of soil were analysed. As expected at a furnace site, the botanical data set is extremely poor (12 plants remains). Besides the unknown number of pearl millet submitted to dating from furnace A, the assemblage contains *Eleusine indica*, *Spermacoce* sp. and not further identifiable Poaceae.

							Cenchrus americanum	Eleusine indica	Spermacoce sp.	Poaceae sp.	TOTAL	Processed by	Date on sample (Oxcal, 2 sigma)
#	Archaeobotanical sample no (AB)	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)		Caryopsis	Seed	Caryopsis	MNI		
1	137+138	40-60	furnace A	furnace infill	Mixed CE	6	x					SK/LC	888-995 AD
2	136	40-60	furnace B	furnace infill	L	8				1	1	LC	*350-54 BC
3	131+132	20-40	furnace C	furnace infill	L	17					0	LC	
4	134+141	40-60	furnace C	furnace infill	L	9		3	3	5	11	LC	
				MNI TOTAL			x	3	3	6	12	* on unidentified plant remain	
				Frequency				25.0	25.0	50.0			
				Ubiquity				25	25	50			
				Total volume		40							

16 Janruwa C (2010/4) – Possible Middle Nok, Common Era

The site was chosen for excavation since it is close to a perennial river, with a steep slope of up to 5 m, and some possible terracotta fragments were collected from the surface indicating a Nok presence. Janruwa C was, compared to the trench size of 8×12 metres, a very rich site with more than 10,000 total station recordings. Pottery made up 80% of all finds. Nine features were identified, being stone concentrations or dark discolourations and containing the highest find concentrations. Only Common Era pottery was identified and no Nok terracotta fragment was recovered from the excavation. This, together with the majority of the radiocarbon dates, places the site after the end of the Nok Culture. It is the earliest site with attested fonio in the Nok region. One radiocarbon date on pearl millet falls into the Nok period, indicating – together with the terracotta fragments found on the surface – a possible Nok occupation at the site, but no additional evidence was recovered during excavation. The cultural material is very consistent with a dominance of carved wooden roulette patterns, a new decoration technique introduced in this region after the Nok period.

Absolute dates

MAMS 11160	2709±27 bp	906-808 BC	<i>Cenchrus americanus</i>	AB 232
Beta-278001	1800±40 bp	129-352 AD	<i>Digitaria exilis</i>	AB 250
MAMS 11162	1799±24 bp	210-334 AD	Charcoal	#5803, slag concentration (feature 9)
Beta-297287	1740±30 bp	245-402 AD	<i>Digitaria exilis</i>	AB 239 , feature 8
MAMS 11161	1719±24 bp	252-410 AD	Charcoal	#3156, burnt clay conc. (near feature 8)

Archaeobotanical information

Out of 25 samples, 16 totalling 122 litres of soil were analysed. The botanical data set is extremely rich (4754 plant remains) and largely dominated by fonio (*Digitaria exilis*, 83.7% in frequency) followed by pearl millet (caryopses and involucres, 9.5%). The other plant remains are *Vigna unguiculata* and *Elaeis guineensis*, but only in very low frequency. All archaeobotanical samples belong to the Common Era, though in AB 232, at least the dated pearl millet grains should be intrusive from the Nok period and feature 6 is accordingly assessed as mixed.

17 Kabusu 2 (2014/16) – Middle Nok

A test excavation by local team members took place in an area where reportedly Nok terracotta parts are found occasionally. The site was not disturbed by looting; however, looting took place after the excavation revealed an almost complete Nok terracotta figurine. Two features were identified in the trench of 1.6×1.6 m; feature 1 contained the terracotta in a depth of 40-60 cm, feature 2 was a pottery and charcoal concentration between -70 and -100 cm. The potsherds collected during excavation and after the looting are assigned to the later Middle Nok phase (Tsaunim Gurara pottery group), which is confirmed by the radiocarbon date.

Absolute dates

Beta-419677	2450±30 bp	754-412 BC	Seed	AB 201
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Archaeobotanical information

Two archaeobotanical samples totalling only five litres of soil were analysed. The sample from feature 2 was devoid of any plant remains. The botanical data set from the other sample is extremely poor and contained 5 pearl millet caryopses and some fragments of undetermined fruit endocarps. The paucity of botanical remains is in line with other Nok sites containing burial features or terracotta depositions; usually the surroundings are void of finds.

#	Archaeobotanical sample no (AB)	Excavation unit	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	frag.	involucres/bristle	Immature	Total	Cenchrus americanus	Frag.	MNI	MNI		Processed by	Date on sample (Oxcal, 2 sigma)
1	201	B	60-80	feature 1	terracotta context	M	3	2	3					5	6	1	6	LC	754-412 BC	
2	202	B	80-100	feature 2	potsherd concentration	M	2										0	LC		
				MNI TOTAL				2	3				5	6	1	6				
				Frequency				33.3	50.0			83.3		16.7						
				Ubiquity				50	50			50	50	50						
				Total volume			5													

18 Kachama 1 (2009/3) – Middle Nok

Kachama designates an area around a small gneiss hilltop, about 3 km west-northwest of Janjala research station. The Kachama 1 site is located south and southwest of the hilltop in a woodland area. Based on the distribution of illegal digging holes, the site has an extent of almost 3.5 hectares. One 60 m² excavation trench (KA 1A) and five small test units were opened. The latter only yielded a few finds. Except for a find- and charcoal-rich concentration with natural and grinding stones (feature 1) in the SW corner, KA 1A trench also contained only few finds. While the radiocarbon date places the site in the early Middle Nok phase, the few diagnostic potsherds belong to the later Middle to Late Nok phase. Since even feature 1 reached only 50-60 cm in the ground, the cultural material may be mixed since the whole area is very rich in Nok sites and finds. Possibly, the area was occupied during the entire Nok period.

Absolute dates

MAMS 13665 2621±25 bp 818-777 BC *Cenchrus americanus* KA 1A, **AB 143**

Archaeobotanical information

Eight samples were taken during the excavation, but only the one sorted for dating material was later analysed. It contains a few pearl millet caryopses, an unidentifiable seed fragment and one *Canarium schweinfurthii* endocarp fragment.

[illegible]

19 Kachama 2 (2009/4) – Early and Middle Nok

The Kachama area contains several Nok sites on and around a gneiss hilltop. The Kachama 2 site is located north of the hilltop. Six excavation units were opened along a dirt road on a N-S axis to investigate the extent of the site. KA 2A and KA 2B are the largest trenches with 10×5 m and 7×8 m respectively. Preservation of cultural material is generally poor, but several features were identified. The few diagnostic potsherds indicate that the site was occupied during the Early Nok phase around 1500 BC and again during the Middle Nok phase, which is reflected in the radiocarbon dates. While KA 2A is obviously a Middle Nok spot, KA 2B contains mixture of Early and Middle Nok material. The attempt to date the Middle Nok layer at KA 2B failed – a plant fragment gave a recent date. Some finds may be in secondary position, because of damage through looting in the area. Nevertheless, Kachama 2 provides very early evidence for a Nok presence with dates around the middle of the second millennium BC.

Absolute dates

MAMS 10701	8791±18 bp	7951-7745 BC	<i>Canarium schweinfurthii</i>	KA 2C, #24
MAMS 13667	3282±22 bp	1613-1504 BC	<i>Cenchrus americanus</i>	KA 2B, AB 135
MAMS 15423	3230±22 bp	1533-1441 BC	<i>Cenchrus americanus</i>	KA 2B, AB 135
Beta-320723	3150±30 bp	1500-1314 BC	<i>Cenchrus americanus</i>	KA 2B, AB 135
MAMS 10700	3094±14 bp	1421-1297 BC	<i>Canarium schweinfurthii</i>	KA 2B, #558
Beta-382622	2530±30 bp	794-544 BC	<i>Cenchrus americanus</i>	KA 2A, AB 148
MAMS 13666	2491±28 bp	775-516 BC	Charcoal	KA 2A, AB 150
Beta-382623	190±30 bp	1649-past	Plant fragment	KA 2B, AB 184
		1916 AD		

Archaeobotanical information

Three archaeobotanical samples from unit KA 2B, totalling 129 litres of soil, were analysed. The botanical data set (230 plant remains) is dominated by pearl millet (92% in frequency) and complemented by *Canarium schweinfurthii* endocarp fragments and *Nauclea latifolia*. One single cowpea (*Vigna unguiculata*) was also found. Two samples from pit feature 5 belong to the Early Nok phase, one sample (feature 1) comes from a stone accumulation containing terracotta fragments and potsherds, which produced a modern date.

#	Archaeobotanical sample no (AB)	Excavation unit	Find number	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Cenchrus americanus	Poaceae sp.	Indet. seeds	Vigna unguiculata	Nauclea latifolia	Canarium schweinfurthii	Indet. fruit	TOTAL	Processed by	Date on sample (Oxcal, 2 sigma)						
1	178	B	167	feature 1	stone accumulation	M	24	1					1							2	1	3	LC						
2	132+136+137	B	259-1	feature 5	pit	E	75	15	22	10			47	1		1	4	34	9	1	1	63	LC						
3	135	B	479	feature 5	pit	E	30		148	15			163					0	4	1		164	LC/SK	*1530-1447 BC					
MNI TOTAL								16	170	25			211	1		1	1	4	38	10	3	2	230						
Frequency								7.0	73.9	10.9			91.7	0.4		0.4	0.4	1.7	1.7	4.3		0.9							
Ubiquity								67	67	67			100	33		33	33	33		67	67			*R. combine date					
Total volume								129																					

20 Kaguni 1 (2011/24) – Late Nok

No excavation took place at this site which had been destroyed by looting not long before our visit in 2011. An archaeobotanical sample was collected from one looting hole to date the site and the terracotta and pottery finds left behind by the looters. A clear pottery classification is not possible because of poor preservation but the radiocarbon date suggests an occupation in the later Middle Nok or Late Nok phase. Eight other sites, also labelled Kaguni, were recorded within a radius of 4 km, which may have formed a settlement cluster during the Middle Nok period. None was excavated but most are severely damaged by looting which must have revealed numerous Nok terracotta figurines based on the amount of spoil left behind.

Absolute dates

Beta-313506 2240±30 bp 390-202 BC *Cenchrus americanus* **AB 524**

Archaeobotanical information

A single archaeobotanical sample of 6 litres of soil was collected and analysed. The botanical data set (72 plants remains) is dominated by *Nauclea latifolia* (54.2% in frequency) followed by pearl millet (38%) and by *Canarium schweinfurthii* endocarp fragments (1.4%). The sample was directly dated on pearl millet caryopses and is attributed to the Late Nok phase.

[illegible]

21 Kangale (2011/52) – Middle Nok, Common Era

The low hilltop site with a few looting holes lies in slightly undulating terrain with some rock crests. Nearby we recorded some large slag heaps. Two trenches (KN1 and KN3, 2×2 m each) were opened in spots where testing showed cultural material, one trench (KN2, 2×7 m) was laid out around a well-preserved stone circle. The latter trench features Common Era pottery, which puts the stone circle possibly in relation to the iron reduction traces found. The pottery in KN1 and KN3, however, clearly belongs to the Middle Nok phase (Tsaunim Gurara pottery group), which is confirmed by the radiocarbon date from a feature with a vessel, stones and charcoal in KN3. As seen in other sites, places used during the Nok period were also used in later times.

Absolute dates

MAMS 13637 2538±23 bp 793-551 BC *Cenchrus americanus* **AB 473**

Archaeobotanical information

Three archaeobotanical samples totalling 16 litres of soil were collected and analysed from KN1 and KN3. The botanical data set (11 plants remains) is dominated by pearl millet caryopses (71.4%) followed by *Canarium schweinfurthii* endocarp fragments (14.3%).

[illegible]

22 Kasangwai 2 (2011/53) – Middle Nok

Kasangwai 2 is located in flat, open terrain next to the small village of Kasangwe. Only a few looting holes were observed. The main trench KAS 2A (6×12 m) was opened between the village and the looting holes. KAS 2B was laid out in a spot where the magnetic survey showed an anomaly which could not be confirmed. KAS 2A contained many finds which concentrated in seven features from -40 cm down. Only features 1 and 5 continued below -80 cm; and only feature 1 seems to have been a larger pit with a variety of cultural materials. Some complete vessels were found in features 2 and 4, but preservation was poor and almost no decorations could be identified. The pottery is assigned to the Middle Nok phase, which is confirmed by the radiocarbon date.

Absolute dates

MAMS 13638 2655±29 bp 899-787 BC *Cenchrus americanus* **AB 431**

Archaeobotanical information

Out of 24 archaeobotanical samples ten samples, totalling 59 litres of soil, were analysed from unit KAS 2A. One sample was devoid of any plant remains. The botanical data set (85 plant remains) is dominated by pearl millet (85%). The other plant remains are *Eleusina indica* and *Brachiaria* sp., as well as unidentifiable seed and fruit fragments.

[illegible]

23 Kolin Kuchimi Furnace (2013/3) – Middle Nok, Common Era

Furnace remains were found in a flat area at the foot of an inselberg. Their sizes resemble Nok furnaces. Two units were laid out – KOL1 (4×4 m) included three similar furnaces (A-C) and KOL2 (3×3 m), ca. 30 m away, which contained only one furnace, whose form and size differed from the ones at KOL1. No diagnostic potsherds were found for classification. One radiocarbon date places the furnaces of KOL1 into the Middle Nok period, consistent with furnaces at other sites. The other radiocarbon date is probably intrusive. (Junius 2016, p. 121) suggests that the furnace at KOL2 may be much more recent and may date into the second half of the second millennium AD.

Absolute dates

MAMS 19297	2445±18 bp	749-413 BC	Seed fragment	AB 146
MAMS 19298	Bomb C14	after 1955 AD	Seed fragment	AB 147

Archaeobotanical information

Five archaeobotanical samples totalling 30 litres of soil were analysed, three from KOL1 (one for each furnace) and two from different depths from the furnace in KOL2. Only few plants remain were found, which is to be expected at a furnace site. The sample from furnace A was devoid of any plant remains; the other two samples from KOL1 contain unidentifiable seed fragments. The botanical dataset of KOL2 contains 11 plants remains, 10 pearl millet caryopses and one *Nauclea latifolia* seed. While KOL1 can be attributed to the Middle Nok phase based on one radiocarbon date, KOL2 could be recent.

								Cenchrus americanus						Indet. seeds		Nauclea latifolia				TOTAL	Processed by	Date on sample (Oxcal 2 sigma)
#	Archaeobotanical sample no (AB)	Excavation unit	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Seeds	Frag.	Mineralized	Charred	Total	MNI			
1	145	1	40	furnace A	furnace infill	M	5													0	LC	749-413 BC after AD 1955
2	146	1	40	furnace B	furnace infill	M	8								2					2	LC	
3	147	1	40	furnace C	furnace infill	M	7								2					2	LC	
4	148	2	20-40	furnace	furnace infill	CE	2	2	2				4							4	LC	
5	149	2	40-60	furnace	furnace infill	CE	8	1	5				6				1	1		7	LC	
					MNI TOTAL			3	7				10		4		1	1		15		
					Frequency			20.0	46.7			66.7	26.7		6.7	6.7						
					Ubiquity			40	40			40	40		20	20						
					Total volume		30															

24 Kudu 3 (2011/55) – Early and Middle Nok

Kudu 3 is located in flat terrain with dense bush vegetation next to a low granite hill. A trench of 3×5 metres trench was laid out where cultural material had been found during testing. Several well-preserved potsherds and a large amount of charcoal were found in a supposed pit feature. The potsherds and the radiocarbon date assign the site to the Middle Nok phase. One potsherd from the -60 to -80 cm layer is typical of the Puntun Dutse pottery group of the Early Nok phase, indicating an earlier occupation at the site.

Absolute dates

MAMS 14873	2570±27 bp	818-777 BC	<i>Cenchrus americanus</i>	AB 481
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Archaeobotanical information

A single archaeobotanical sample of 2 litres of soil was analysed for radiocarbon dating by S. Kahlheber. Only two pearl millet caryopses were found and yielded a date associated with the Middle Nok period.

25 Kurmin Uwa 1 (2010/5) – Middle Nok, Common Era

Kurmin Uwa 1 is an almost undisturbed site on the slope of a low granite hill, sloping ca. 80 cm from north to south. Common Era potsherds are found on top of the hill. The site was a yams field at the time of excavation and the finds are a mixture of Common Era and Nok cultural material. Especially the southern part of the trench of 6×10 metres is disturbed. Only features 3 and 4 reach deeper than ca. 50 cm, but it is not clear if the finds are all in situ. While feature 2 consists of only a complete vessel and an archaeobotanical sample from which the radiocarbon date was taken, feature 3 contains some larger vessel and terracotta parts. The diagnostic potsherds belong to the later Middle Nok phase, in line with the radiocarbon date. So, while a Nok presence at the site is attested, its character is not clear.

Absolute dates

MAMS 11163 2464±25 bp 758-421 BC *Canarium schweinfurthii* **AB 276**

Archaeobotanical information

Out of the seven samples recovered, four archaeobotanical samples from features 2 and 3, totalling 24 litres of soil, were analysed. The botanical data set (275 plants remains) is dominated by unidentifiable seeds and seed fragments but followed closely by pearl millet 44%. The other plant remains consist of *Nauclea latifolia*, *Canarium schweinfurthii* fragments, *Digitaria* cf. *ciliaris* and *Spermacoce* sp.

[illegible]

26 Kurmin Uwa 2 (2010/6) – Middle Nok

Kurmin Uwa 2 encompasses an area of c. 400×400 m in undulating terrain with granite outcrops, which features several find spots recorded between 2010 and 2016. Four spots were excavated, three (KU 2A-C) in 2010 and one (KU 2D) in 2016. KU 2A and 2C contained almost no finds and those in KU 2C are assigned to the Common Era, as confirmed by the radiocarbon date. To the contrary, KU 2B was one of the first sites where we excavated a so-called stone-pot arrangement with two complete vessels, interpreted as a grave feature. Next to the grave feature was a deep pit with a lot of cultural materials, from which several archaeobotanical samples were taken. A radiocarbon date and the diagnostic pottery place this trench in the Middle Nok period. In 2016, a hole from recent looting was extended to a trench of 2×2 m since we found stones in a depth of ca. 60 cm. A stone-pot arrangement was exposed at ca. 100 cm depth, consisting of two stones and two complete vessels. A pit was discernible around this grave feature; the surrounding soil was sterile as to be expected. The radiocarbon date is identical to the one from KU 2B and shows that grave features were obviously distributed over an area of around 300 metres.

Absolute dates

MAMS 11164	2523±24 bp	787-547 BC	<i>Cenchrus americanus</i>	KU 2B, AB 277
Beta-451384	2520±30 bp	789-544 BC	Charcoal	KU 2D, Stone-pot arrangement
MAMS 11165	1406±23 bp	603-660 AD	Charcoal	KU 2C, #79

Archaeobotanical information

Nine archaeobotanical samples totalling 52 litres of soil were analysed from Kurmin Uwa 2, two from KU 2D and seven from KU 2B. Four samples were devoid of any plants remains – the two from KU 2D which is not surprising for a grave context and two from the infill of small ceramic vessels. All samples containing plant material come from a deep pit feature in KU 2B, which is next to the grave feature. The botanical data set (245 plants remains) is largely dominated by pearl millet (91.8%). The other plant remains are composed of *Nauclea latifolia*, *Canarium schweinfurthii* and *Vitex* sp. fragments.

#	Archaeobotanical sample no (AB)	Excavation unit	Find number	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Seeds	Frag.	Minerilized	Charred	Total	Frag.	MNI	Frag.	MNI	MNI	TOTAL	Processed by	Date on sample (Oxcal, 2 sigma)
1	263 B	193			feature 1	pit	M	13	9	18				27		1	3		3						33	LC	787-547 BC
2	264 B	387			feature 1	pit	M	13	30	43	5			78					2	1		5	2	79	LC		
3	268 B	279			feature 1	pit	M	10	12	87	5			104		2	5	1	6	15	3	5	1	116	LC		
4	277 B	326			feature 1	pit	M	7	5	4				9										9	LC		
5	279 B	268			feature 1	vessel infill	M	2	2	5				7						2	1			8	LC		
6	280 B	283			grave	vessel infill	M	1																0	LC		
7	281 B	163			grave	vessel infill	M	1																0	LC		
8	12 D			100	grave		M	2																0	LC		
9	11 D			100-120	grave		M	3																0	LC		
MNI TOTAL									58	157	10			225		3	8	1	9	19	5	10	3	245			
Frequency									23.7	64.1	4.1			91.8		1.2	3.3	0.4	3.7		2.0		1.2				
Ubiquity									56	56	22			56		22	22	11	22		33		22				
Total volume									52																		

27 Kushe 3 (2010/7) – Middle Nok

Kushe 3 belongs to a group of six sites (Kushe 1-6) located on a granite inselberg; another site (Kushe 7) is located in the plain south of the inselberg. Kushe 8 is further away and may not belong to the same occupation complex. Most sites on the inselberg are destroyed by looting, and well-preserved terracotta parts were collected from the spoil. The spot for excavation at Kushe 3 (1×2 m) was chosen because of little destruction. Some Nok material was found in the upper layers, but no feature was recorded. Radiocarbon date and pottery place the site in the Middle Nok phase.

Absolute dates

MAMS 11166	2437±24 bp	749-408 BC	Charcoal	AB 297
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Archaeobotanical information

One archaeobotanical sample of 9 litres of soil was analysed. The botanical data set (12 plant remains) exclusively consists of pearl millet.

														Cenchrus americanus							
#	Archaeobotanical sample no (AB)	Depth below surface (cm)		Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	MINI		SK		Date on sample (Oxcal, 2 sigma)				
1	297	50-60	charcoal-rich area	M	9	5	6	1				12	12			749-408 BC					
			Frequency			41.7	50.0	8.3				100.0									
			Total volume			9															

28 Kushe 7 (2010/8) – Middle Nok

Kushe 7 lies in the plain, south of the group of six sites (Kushe 1-6) located on a granite inselberg. Kushe 8 is further away and may not belong to the same occupation complex. Most sites on the inselberg are destroyed by looting, and well-preserved terracotta parts were collected from the spoil. The spot of Kushe 7 was shown to us by a farmer who gave us Nok terracotta parts he found. It was almost undisturbed. The trench of 5×1.5 m was extended by 2.5×2.5 m when a feature with two incomplete, broken terracotta figurines was found. Sediment outside the feature was almost sterile and no diagnostic potsherds were recovered. A single stone near the terracotta feature may indicate that a grave feature could be located in greater depth. The radiocarbon date is consistent with the ones from Kushe 3 and 8, and suggests contemporaneity, possibly in the later Middle Nok phase.

Absolute dates

MAMS 11167 2443±27 bp 751-410 BC *Canarium schweinfurthii* **AB 295**

Archaeobotanical information

Three archaeobotanical samples totalling 39 litres of soil were analysed, all from the context of the terracotta figurines. The botanical data set (52 plant remains) is dominated by pearl millet (86.5%), complemented by some *Canarium schweinfurthii* endocarp fragments.

#	Archaeobotanical sample no (AB)	Excavation unit	Depth below surface (cm)		Context	Phase	Volume (litres)								Cenchrus americanus				Canarium schweinfurthii			
								Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total		Frag.	MNI	MNI		Processed by	Date on sample (Oxcal 2 sigma)		
1	296	B	30-40	terracotta context	M	14		5	16	4			25	5	2	27	LC					
2	298	B	30-40	terracotta context	M	12		1	1	7			9		2	11	LC					
3	295	B	70	terracotta context (below)	M	13			10	1			11	8	3	14	LC		751-410 BC			
				MNI TOTAL				6	27	12			45	13	7	52						
				Frequency				11.5	51.9	23.1			86.5		13.5							
				Ubiquity				66	100	100			100		100							
				Total volume				39														

29 Kushe 8 (2010/38) – Middle Nok

Kushe 8 is located about 3-4 km away from the Kushe 1-7 complex on an extensive hill crest in open farmland. A few looting holes were observed in 2011 when the site was first visited. In January 2016, extensive looting completely destroyed the site. Judging on the amount and quality of the finds that were left behind by the looters, their booty must have been enormous. Witnessing such an active destruction without any possibility to prevent it hurts tremendously. The material collected after the looting was inventoried. Sediment from two vessels and a figurine was screened for botanical remains. The well-preserved pottery places the site into the later Middle Nok phase (Tsaunim Gurara and/or Pandauke pottery group), which fits the radiocarbon date and corresponds to the Kushe 3 and Kushe 7 sites.

Absolute dates

MAMS 27397 2475±27 bp 769-426 BC *Cenchrus americanus* **AB 231**

Archaeobotanical information

Three archaeobotanical samples totalling 5 litres of soil were analysed from the soil inside two vessels and one terracotta figurine recovered from the looting. The botanical data set (68 plant remains) exclusively consists of pearl millet.

#		Archaeobotanical sample no (AB)	Context	Phase	Volume (litres)							Cenchrus americanus			
						Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	MNI		Processed by	Date on sample (Oxcal 2 sigma)
1	229	looted site, vessel infill (snake pot)		M	1	2	3				5	5	LC		
2	230	looted site, vessel infill (pot with handles)		M	2		4				4	4	LC		
3	231	Looted site, infill terracotta		M	2	19	28	12			59	59	LC	769-426 BC	
		MNI TOTAL				21	35	12			68	68			
		Frequency				30.9	51.5	17.6			100.0				
		Ubiquity				66	100	33			100				
		Total volume			5										

30 Kusuma (2010/9) – Middle Nok

The site is located on flat farmland and disturbed by looting. We collected several terracotta fragments from the spoil. Two trenches were laid out (KM1 18×3 m and KM2 2×4 m) in spots where testing showed cultural material, about 100 m apart from each other. KM2 contained a darker feature with cultural material reaching into the profile wall; after extending the trench by 3 m, the circular pit structure became clearer. KM1, to the contrary, features three possible stone-pot arrangements, with the surrounding soil being almost sterile. Diagnostic potsherds were only found in KM1; they are classified as later Middle Nok pottery, which is in line with the radiocarbon dates. Based on vessel forms and decorations, the site may date younger than the “typical” grave features at the sites of Ifana or Pangwari.

Absolute dates

MAMS 11169	2581±34 bp	812-568 BC	<i>Cenchrus americanus</i>	AB 288
MAMS 11168	2516±32 bp	790-541 BC	<i>Cenchrus americanus</i>	AB 262

Archaeobotanical information

Four archaeobotanical samples totalling 50 litres of soil were analysed. The botanical data set (197 plant remains) is largely dominated by pearl millet (88.8%), the largest number by far being found in the sample of KM1, feature 3. Other plant remains are *Eleusine indica*, *Vigna unguiculata* and some undifferentiated Poaceae.

#	Archaeobotanical sample no (AB)	Excavation unit	Find number	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Cenchrus americanus	Eleusine indica	Poaceae sp.	Indet. seeds	Vigna unguiculata	cf. Vigna unguiculata	TOTAL	Processed by	Date on sample (Oxcal, 2 sigma)	
1	269	2	138	50	feature 1	pit	M	13		2	1			3							8	LC		
2	288	2		65	feature 1	pit	M	13	1	5	3			9						1	10	LC/SK	812-568 BC	
3	262	1	556	50	feature 2	stone-pot arrangement?	M	13	12	2				14		1					15	LC/SK	790-541 BC	
4	261	1	552	50	feature 3	stone-pot arrangement?	M	11	69	65	15			149	2	1		10	2		164	LC		
						MNI TOTAL			82	74	19			175	2	2		15	2	1	197			
						Frequency			41.6	37.6	9.6			88.8	1.0	1.0		7.6	1.0	0.5				
						Ubiquity			75	100	75			100	25	50		25	25	25				
						Total volume			50															

31 Mashikin Kadun (2011/60) – Early and Middle Nok

Mashikin Kadun lies on a low, flat hilltop, rising 10-20 m above the plain. Only little damage by looting is visible. Two trenches were laid out, ca. 30 m apart – MK1 (4×4 m) and MK2 (2×3 m). MK1 contained a well-preserved later Middle Nok pottery inventory together with some terracotta parts in a dark-coloured pit reaching down to -120 cm. MK2, further down the slope, only featured a few, poorly preserved potsherds attributed to the later part of the Early Nok phase or the transition to the Middle Nok phase (Puntun Dutse, Ido pottery groups). Since the sherds are only found in the upper layers, they may not be in situ but washed down the hill. The radiocarbon dates reflect the pottery classification and point to a beginning of occupation at this site in the mid-9th century BC at the latest.

Absolute dates

MAMS 13657	2783±27 bp	1009-836 BC	<i>Canarium schweinfurthii</i>	MK2, -20 to -40 cm
MAMS 13642	2509±24 bp	776-544 BC	<i>Cenchrus americanus</i>	AB 504

Archaeobotanical information

Four archaeobotanical samples totalling 25 litres of soil were analysed from trench MK1. The botanical data set (249 plants remains) is almost exclusively composed by pearl millet (98%). The other plant remains are a few seed fragments. At MK 2 no archaeobotanical samples were collected, but *Canarium schweinfurthii* endocarp was collected for dating.

														Cenchrus americanus									
#	Archaeobotanical sample no (AB)	Excavation unit	Depth below surface (cm)		Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	involucres/bristle	Immature	Total	Seeds	Frag.	MNI							
1	505	1	20-40	charcoal-rich area	M	2	2	2	5				9			9	LC						
2	495+502	1	60-80	charcoal-rich area	M	6	17	49	4			1	71		1	72	LC						
3	504	1	80-100	pit	M	4	5	14	3				22		1	23	LC/SK	776-544 BC					
4	476+503	1	100-120	pit	M	13	15	107	19				141		4	145	LC						
				MNI TOTAL				39	172	31		1	243		6	249							
				Frequency				15.7	69.1	12.4		0.4	97.6		2.4								
				Ubiquity				100	100	100		25	100		75								
				Total volume			25																

32 Pabeki 1 (2009/5) – Middle Nok, Common Era

Pabeki 1 lies on a very low rock crest sloping in all directions, with looting visible across the site. Three trenches were laid out (PA1 6×8 m, PA2 6×12 m, and PA3 10×16 m). Finds are generally poorly preserved and although some features were defined, it remains unknown if all finds were in primary position or disturbed by looting, a scenario most likely for PA2 and PA3. The latter unit contained Common Era sherds; a luminescence date on one of them places these sherds in the late first millennium AD. The radiocarbon dates and the few diagnostic potsherds classify the site as Middle Nok; the pottery suggests a later Middle Nok occupation.

Absolute dates

Beta-382624	2520±30 bp	789-544 BC	<i>Cenchrus americanus</i>	PA3, AB 167
MAMS 10743	2414±23 bp	726-403 BC	<i>Cenchrus americanus</i>	PA1, AB 175

Archaeobotanical information

Four archaeobotanical samples totalling 114 litres of soil were analysed from trench PA1. The botanical data set (654 plant remains) is almost exclusively composed of pearl millet (98%). Endocarp fragments of *Canarium schweinfurthii* and *Vitex* sp. were also found but only in very low frequency. The one sample from trench PA3 did not contain any carpological remains besides the pearl millet sent for dating.

[illegible]

33 Pangwari (2012/34) – Early and Middle Nok, Common Era

The site was first visited in 2011, when it was not disturbed by looting yet. It extends from a plain in the west up a slope to a saddle between two granite hills in the east. A small test excavation revealed Nok cultural material; a radiocarbon date on pearl millet places the site in the Middle Nok period. After our visit, the site was slightly damaged by looting. We started the excavation at the end of 2012, conducting here the largest excavation of the project (2617 m²). The excavation, analyses and interpretation are described in detail in (Franke et al. 2020). Ten trenches were opened and a total of 30 features defined, either during excavation or through find concentrations in subsequent analysis. The occupation began around 1500 BC and continued in intervals up to modern times. The main occupation activity took place around 800 BC, when a terracotta deposition, several graves and deep pits were laid out. The terracotta deposition consists of well-preserved terracotta heads and body parts, which had been intentionally deposited below a plaster of hand-sized pieces of local granitic rock (Männel and Breunig 2016). The grave features are stone-pot arrangements similar to those found at other sites. At Pangwari, we realized for the first time the spatial and temporal relation between terracotta deposition and grave features, which we subsequently found at other sites as well.

Absolute dates

In total 63 radiocarbon dates are available for Pangwari, ranging from the middle of the second millennium BC to modern times. A list of all dates has been published in Franke et al. 2020.

Archaeobotanical information

Out of 105 archaeobotanical samples, 46 totalling 412 litres of soil were analysed. In addition, 15 sets of handpicked endocarp fragments of *Canarium schweinfurthii* were retrieved during the excavations. The botanical data set (1641 plants remains) is dominated by pearl millet caryopses (84% in frequency). The other plant remains are composed of endocarp fragments (*Canarium schweinfurthii* and *Vitex* sp.), caryopses from *Eleusine indica*, *Digitaria* sp., not further identifiable Poaceae, and seeds of *Vigna unguiculata* and *Nauclea latifolia*, but only in very low frequency. Most of the archaeobotanical samples belong to Middle Nok contexts, one sample to the Early Nok phase (feature 19),¹¹ have mixed Early/Middle Nok plant material, one contains mixed Middle/Late Nok material, and one a mix of Middle Nok and Common Era plant material. Two samples belong to Common Era contexts.

#	Archaeobotanical sample no (AB)	Excavation unit	Find number	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis > 1mm	Frag.	Involucres/bristle	Immature	Total	Cenchrus americanus	Digitaria cf. ciliaris	Eleusine indica	Poaceae sp.	Indet. seeds	Frag.	Seed	Mineralized	Charred	Total	Frag.	MNI	Frag.	MNI	Frag.	MNI	Indet. fruit	TOTAL	Processed by	Date on sample (Oxcal, 2 sigma)
1	40	B	1013		feature 2	deep pit	Mixed E	8	13	11	16			40					1						5	1					42	LC	1258-1020 BC	
2	43	B	1105		feature 2	deep pit	M	10	12	38	19			69					2		16		1	1	2				1	1	90	LC	756-422 BC	
3	41	B	1278		feature 2	deep pit	M	10	10	69	15			94							1								1	1	96	LC		
4	42	B	1309		feature 2	deep pit	M	8	10	40	15		1	66						1								2	1	68	LC			
5	32	B	1352		feature 2	deep pit	M	11	35	92	42			169						1			1	1			5	1			172	LC	799-771 BC	
6	30	B	855		feature 3	hearth	CE	12	2	5				7					2		1										10	LC		
7	521	B		40-60	test pit		M	4		1				1																		1	LC	
8	522	B		40-60	test pit		M	7		2				2													1	1			2	LC		
9	523	B		60-80	test pit		M	8		8				8											2	1				5	1	10	LC	754-412 BC
10	60	D	3004		feature 8	deep pit	M	6	3	3	9		1	16	1	1									2	1					19	LC		
11	55	D	3246		feature 8	deep pit	Mixed CE	9	5	1			1	7				1								2	1			5	1	9	LC	91 BC - 20 AD
12	54	D	2910		feature 9	deep pit with possible terracotta-pot placement	M	12	3	6				9																		9	LC	771-541 BC
13	59	D	3105		feature 9	deep pit with possible terracotta-pot placement	M	6	7	11	10			28							1											29	LC	
14	58	D	3199		feature 9	deep pit with possible terracotta-pot placement	M	7	5	32	13			50							11											61	LC	
15	123	D	3406		feature 9	deep pit with possible terracotta-pot placement	M	6	3	11	19			33					2		10								1	1	46	LC	804-775 BC	
16	70	D	3753		feature 9	deep pit with possible terracotta-pot placement	M	5	7	24	22			53						20								2	1	74	LC	821-769 BC		
17	57	D	2540		plant con		M	5			5			5					3										2	1	9	LC		
18	76	E	4820		feature 10	terracotta deposition	M	19	2	3				5						1												6	LC	
19	65	E	4924		feature 10	terracotta deposition	Mixed L	7	0	5				5																		5	LC	191-54 BC
20	62	E	5646		feature 10	terracotta deposition	M	6	2	16				18						5					3	1						24	LC	746-422 BC & 781-510 BC
21	116	E	6106		feature 10	terracotta deposition	M	9	7	13	15			35						17						5	1					53	LC	802-772 BC
22	72	E	5346		feature 11	deep pit with possible terracotta-pot placement	M	12		3				3																		3	LC	810-786 BC
23	73	E	5750		feature 11	deep pit with possible terracotta-pot placement	M	12	3	13				16						2												18	LC	413-229 BC
24	112	E	5794		feature 11	deep pit with possible terracotta-pot placement	Mixed E	7		22				22																		22	LC	1045-918 BC
25	130	E	6549		feature 11	deep pit with possible terracotta-pot placement	Mixed E	9	6	10	15			31						1					2	1						33	LC	1519-1422 BC
26	126	E	6636		feature 11	deep pit with possible terracotta-pot placement	M	7	7	5	19			31						10	2	11	3	14	1	1			5	1		59	LC	808-781 BC
27	105	E	5017		feature 12	deep pit (disturbed)	Mixed E	7	1	1				2						4					50	5						11	LC	1498-1415 BC
28	78	E	5224		feature 12	deep pit (disturbed)	Mixed E	12	15	46	16		3	80				1		5					8	1			15	1	88	LC	1382-1055 BC	
29	75	E	5689		feature 12	deep pit (disturbed)	Mixed E	12	6	2				8																		8	LC	
30	109	E	5819		feature 12	deep pit (disturbed)	Mixed E	8	5	8				13																		13	LC	
31	107	E	6240		feature 12	deep pit (disturbed)	M	8	1	11				12																		12	LC	801-770 BC
32	118	E	6454		feature 14	deep pit	M	9	1	5				6						20					7	1						27	LC	789-544 BC
33	104	F	756		feature 21	deep pit	M	8		15				15						2									4	1		18	LC	795-567 BC
34	117	F	761		feature 13	pit (shallow)	Mixed E	9		18				18																		18	LC	
35	122	F	984		feature 13	pit (shallow)	Mixed E	4																		1	1					1	LC	
36	182	H	954		feature 25	pit (shallow)	Mixed E	13													14				2	2						16	LC	1412-1227 BC
37	195	H	1236		feature 26	pit (shallow)	M	10	1	1	3			5						4					2	1						10	LC	794-544 BC
38	180	I	822		feature 17	deep pit with possible terracotta-pot placement	M	15	6	1				7						2					1	1						10	LC	897-781 BC
39	179	I	1050		feature 17	deep pit with possible terracotta-pot placement	M	14																								0	LC	
40	185	I	1409		feature 17	deep pit with possible terracotta-pot placement	M	15	7	24	17			48						5		1	1	2	12	2						57	LC	781-547 BC
41	188	I	1496		feature 17	deep pit with possible terracotta-pot placement	M	12	22	62	10			94				1		2												97	LC	
42	194	I	1643		feature 17	deep pit with possible terracotta-pot placement	M	15	38	104	15			157						3												160	LC	805-563 BC
43	177	I	883		feature 19	pit	E	12	17	25	19			61						23					3	1			50	2	87	LC		
44	37	SK	275		feature 1	stone circle	CE	3		1				1				8														9	LC	after AD 1955
45	44	SK	487		feature 4	deep pit	Mixed E	4	4	22				26																		26	LC	1380-1207 BC
46	129	SK	505		feature 4	deep pit	M	1	1	2				3																		3	LC	803-775 BC
MNI TOTAL									267	792	314		6	1379	1	1	21		181	3	13	6	19	106	22	6	2	94	13	1641				
Frequency									16.3	48.3	19.1		0.4	84.0	0.1	0.1	1.3		11.0	0.2	0.8	0.4	1.2		1.3		0.1		0.8					
Ubiquity									72	91	43		9	93	2	2	20		54	4	7	9	9		35		2		26					
Total volume									412																									

34 Pantaki 1 (2010/1) – Early and Middle Nok

The site lies in flat terrain and is quite damaged by looting. Numerous well-preserved terracotta parts were collected from the spoil. Five test trenches were laid out in a radius of 100 metres to test the potential of the site despite the looting (PT1A-E). None of the trenches measuring not more than 4×4 m contained a significant number of finds or features; preservation was poor and finds mostly occurred in the top 50 cm, leaving it unclear if all finds were in primary position or disturbed by looting. While the few potsherds suggest a classification into the Middle Nok phase, the radiocarbon sample dates to the Early Nok phase. It is not unusual to find evidence for both phases at the same site, but here, the radiocarbon date is the only indication. However, the site of Pantaki 3 is less than 2 km away and has a clear Early Nok presence.

Absolute dates

MAMS 11170	3135±21 bp	1493-1311 BC	Charcoal	PT 1D
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Archaeobotanical information

Two archaeobotanical samples totalling 14 litres of soil were analysed from trenches PD1D and PD1E. The paucity of botanical remains mirrors the low amount of cultural material. The botanical data set (7 plant remains) contains pearl millet, *Nauclea latifolia*, *Canarium schweinfurthii* and *Vitex* sp. Because of the mixture of material, the samples cannot be assigned to a specific Nok phase.

#	Archaeobotanical sample no (AB)	Excavation unit	Depth below surface (cm)		Context	Phase	Volume (litres)	Caryopsis <1 mm	Caryopsis >1 mm	Frag.	Involucres/bristle	Immature	Total	Mineralized	Charred	Total	Frag.	MNI	Frag.	MNI	MNI				
1	291	E	20		Mixed E		6		1				1			0					1	LC/SP			
2	292	D	30	slightly darker soil	Mixed E		8	1	2				3	1		1	1	1	1	1	6	LC			
				MNI TOTAL				1	3				4	1		1	1	1	1	1	7				
				Frequency				14.3	42.9				57.1	14.3		14.3			14.3			14.3			
				Ubiquity				50	100					100	50		50			50			50		
				Total volume			14																		

35 Pantaki 3 (2010/12) – Early Nok

Pantaki 3 is located along the foot of a granite hill, about 2 km southeast of Pantaki 1. It is almost completely destroyed by looting. Two trenches were laid out (PT3A 3×4 m and PT3B 2×3 m) and revealed a single terracotta part; otherwise only Early Nok potsherds were found (Puntun Dutse pottery group). The larger Early Nok vessel parts suggest an Early Nok presence at the site as indicated by the radiocarbon dates. Transitional Ido group pottery is also present and suggests that occupation took place from the Early Nok phase into the Middle Nok phase as attested especially by terracotta parts from the spoil of the looting holes.

Absolute dates

MAMS 11171	2907±21 bp	1201-1012 BC	<i>Canarium schweinfurthii</i>	AB 289
MAMS 11172	2874±21 bp	1124-936 BC	<i>Canarium schweinfurthii</i>	AB 286

Archaeobotanical information

Three archaeobotanical samples totalling 27 litres of soil were analysed. The botanical data set (133 plants remains) is dominated by pearl millet (58%). Exploitation of wild resources is attested by remains of *Nauclea latifolia*, *Canarium schweinfurthii* and *Vitex* sp.

[illegible]

36 Pulu Furnace (2011/62) – Middle Nok

Pulu is a site where the remains of two furnaces were exposed by erosion on and next to a dirt road. A third furnace was found about 20 m away. The form of the furnaces resembles other Nok furnaces, which is confirmed by the radiocarbon date (Junius 2016).

Absolute dates

MAMS 13643	2512±30 bp	786-542 BC	Charcoal	AB 350
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Archaeobotanical information

Two archaeobotanical samples totalling 16 litres of soil were analysed from the infilling of the two excavated furnaces. As to be expected from a furnace site, one sample was devoid of any plant remains, the other only contained two pearl millet caryopses.

						Cenchrus americanus										TOTAL	Processed by	Date on sample (Oxcal, 2 sigma)
#	Archaeobotanical sample no (AB)	Find number	Feature	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	MNI						
1	355	31	furnace 1	M	6							0	LC					
2	350	32	furnace 2	M	10		1	1			2	2	LC	786-542 BC				
		MNI TOTAL				1	1				2	2						
		Frequency				50.0	50.0		100.0									
		Ubiquity				50	50		50									
		Total volume			16													

37 Puntun Dutse 1 (2011/63) – Early and Middle Nok

Puntun Dutse is one of the few Nok sites that is located on top of a mountain (ca. 600 m high). A few looting holes were visible but damage was minor; the presence of cow dung showed that the site was disturbed by recent herding activities. Four trenches, PD 1A-D, were laid out just below the highest point, while PD1E was laid out on the top of the hill encompassing two stone structures – a stone circle and a rectangular structure. The whole hilltop was almost free of vegetation. PD 1A (2.5×2 m), PD 1B (2.5×2 m) and PD 1D (2×4.5 m) were located right next to each other, with PD 1B and 1D being the extensions of PD 1A. PD 1C was laid out in a different spot. The large amount of pottery in PD 1A-1D was a mixture between Early Nok material (Puntun Dutse pottery group), the transitional Ido pottery group, and a few pieces of early Middle Nok pottery. Only very few and quite unusual terracotta fragments (mostly arm and leg fragments) were recovered. The two radiocarbon dates from PD 1B and PD 1D confirm this mixture and an early Middle Nok presence at the site. PD 1E, however, located on the top of the hill, only contained Early Nok pottery and the three radiocarbon dates confirm this. The pottery in PD 1E is broken in small pieces which may be caused by the cattle hoofs. It remains open if the stone circle is part of the Early Nok occupation or was erected much later on top of the Early Nok occupation layer. In any case, similar to Ankoro 1 (2011/38), Puntun Dutse may represent the typical Early Nok site located on a mountain top. Unfortunately, before we could continue our investigations, the site was completely destroyed by looting just after the end of our excavation.

Absolute dates

MAMS 19626	3011±37 bp	1391-1124 BC	<i>Cenchrus americanus</i>	AB 451
MAMS 13646	2925±27 bp	1217-1017 BC	<i>Cenchrus americanus</i>	AB 457
MAMS 13645	2918±26 bp	1212-1016 BC	<i>Cenchrus americanus</i>	AB 454
MAMS 13625	2730±29 bp	927-811 BC	<i>Cenchrus americanus</i>	AB 455
MAMS 13644	2580±25 bp	809-596 BC	<i>Cenchrus americanus</i>	AB 441

Archaeobotanical information

23 archaeobotanical samples totalling 143 litres of soil were analysed from the five trenches at Puntun Dutse. Eight archaeobotanical samples come from PD 1E, an undisturbed Early Nok context, 15 samples come from trenches PD 1A-D where Early Nok material was mixed with transitional and Middle Nok material. One sample from PD 1E was devoid of any plant remains. The botanical data set (135 plant remains) is dominated by pearl millet (69% in frequency) followed by *Canarium schweinfurthii* (15%). A few Poaceae caryopses and some unidentifiable fragments from seeds and fruits were present as well.

																						Cenchrus americanus	Poaceae sp.	Indet. seeds		Canarium schweinfurthii		Indet. fruit	TOTAL	Processed by	Date on sample (Oxcal, 2 sigma)
#	Archaeobotanical sample no (AB)	Excavation unit	Find number	Depth below surface (cm)	Feature	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag. involucres/bristle	Immature	Total	Caryopsis	Seeds	Frag.	Frag.	MNI	Frag.	MNI	MNI											
1	437	PD 1A		40		Mixed E	4								5					5	LC										
2	453	PD 1A		50		Mixed E	6		1			1					3	1		2	LC										
3	492	PD 1A		50		Mixed E	4			1		1								1	LC										
4	444	PD 1B		80		Mixed E	7						1				14	2		3	LC										
5	447	PD 1B		80		Mixed E	5		2	1		3								3	LC										
6	448	PD 1B		90		Mixed E	5	2	3	2		7					11	2		9	LC										
7	455	PD 1B		90		Mixed E	7	1	5			6					20	2		8	LC/SK	927-811 BC									
8	441	PD 1B		100		Mixed E	8		3	1		4					12	3		7	LC/SK	809-596 BC									
9	435	PD 1C		40		Mixed E	8			1		1								1	LC										
10	442	PD 1C		60		Mixed E	6										1	1		1	LC										
11	443	PD 1D		60		Mixed E	7		1	1		2					1	1		3	LC										
12	499	PD 1D		80		Mixed E	5	1	1			2					2	1		3	LC										
13	452	PD 1D		90		Mixed E	6	2	3	1		6					5	1		7	LC										
14	456	PD 1D		130		Mixed E	4	1	1	1		3					3	1		4	LC										
15	458	PD 1D		130		Mixed E	6		1	2		3					4	1		4	LC										
16	457	PD 1E	1042		area Ia	E	7	1	10	5		16			7		3	1	1	1	25	LC/SK	1217-1017 BC								
17	451	PD 1E	977		area Ib	E	5	3	3			6			5				1	1	12	LC/SK	1391-1124 BC								
18	474	PD 1E	162		area Ib	E	7	1	2			3					2	1		4	LC										
19	484	PD 1E	1884		area Ib	E	8	1		1		2					2	1		3	LC										
20	485	PD 1E	1857		area Ib	E	7	1	1	1		3	1							4	LC										
21	491	PD 1E	161		area Ib	E	7													0	LC/SK										
22	454	PD 1E	1150		area III	E	8	5	14	2		21					4	1	4	1	23	LC/SK	1212-1016 BC								
23	475	PD 1E	264		area III	E	6		1	2		3								3	LC										
					MNI TOTAL			19	52	22		93	2		17	87	20	6	3	135											
					Frequency			14.1	38.5	16.3		68.9	1.5		12.6		14.8		2.2												
					Ubiquity			48	70	61		83	8.7		13	65	65	13	13												
					Total volume		143																								

38 Rafin Abutu (2011/64) – Middle Nok

Rafin Abutu is located on a low, flat hilltop with light forest and granitic rocks. Looting had taken place but there were some undisturbed areas suitable for excavation. The potential of the site for a larger excavation was tested with a 3×6 m trench. No features were identified but a charcoal-rich area and finds were present. The few diagnostic potsherds are assigned to the later Middle Nok phase (Tsaunim Gurara group), which does not support the early Middle Nok radiocarbon date. Either the site was occupied for a longer time period, which is not reflected in the excavated material, or the finds were not in primary position, due to farming and looting.

Absolute dates

MAMS 13647 2661±28 bp 899-791 BC *Cenchrus americanus* **AB 486**

Archaeobotanical information

Two archaeobotanical samples totalling 10 litres of soil were analysed. The botanical data set (88 plant remains) is dominated by pearl millet (94% in frequency). Two seeds of *Vigna unguiculata*, one Poaceae caryopsis and fragment each from a seed and a fruit were also present.

[illegible]

39 Rafin Adada 1 (2012/4) – Middle Nok

Rafin Adada 1 is located on the flat slope of a low hill and had been damaged by looting. Nok cultural material was collected from the spoil. A test trench of 2×2 m was extended to follow a pit feature reaching down to ca. 100-120 cm containing larger potsherds, terracotta parts (a broken but large part of a snake) and charcoal. The pottery assigns the site to the later Middle Nok to Late Nok period, i.e. towards the younger end of the radiocarbon date range.

Absolute dates

MAMS 15111 2494±21 bp 771-542 BC *Canarium schweinfurthii* **AB 556**

Archaeobotanical information

Five archaeobotanical samples totalling 15 litres of soil were analysed. The two samples from the pit feature in the trench extension contained only one plant remain in total. Most remains come from the charcoal-rich spots in the original trench. The botanical data set (25 plants remains) is dominated by pearl millet (72% in frequency). Some fragments of *Canarium schweinfurthii* endocarps complement the assemblage.

[illegible]

40 Rafin Pah 1 (2011/65) – Middle Nok

Rafin Pah 1 is located in flat terrain with low granite crests, with wide-spread damage by looting. Two 3×3 m trenches were laid out (50 m apart) to test the potential of the site (RP1_1 & RP1_2). Diagnostic Nok pottery is not available, but Nok terracotta fragments and the radiocarbon date assign the site to the Middle Nok phase.

Absolute dates

MAMS 13848	2546±30 bp	799-549 BC	Charcoal	AB 480
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Archaeobotanical information

Four archaeobotanical samples totalling 22 litres of soil were analysed. The botanical data set (34 plants remains) is dominated by pearl millet (94% in frequency). One endocarp fragment of *Canarium schweinfurthii* and one of an unidentifiable fruit fragment complement the assemblage.

													Cenchrus americanus		Canarium schweirfurthii		Indet. fruit		TOTAL	Processed by	Date on sample (Oxcal 2 sigma)
#	Archaeobotanical sample no (AB)	Excavation unit	Depth below surface (cm)		Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	involucres/bristle	Immature	Total	Frag.	MNI	Frag.	MNI	MNI			
4	488	RP1_1	40-60	charcoal concentration	M	2		1	1				2	1	1			3	LC		
3	483	RP1_2	20-40	charcoal concentration	M	8	4	19					23			1	1	24	LC		
2	482	RP1_2	40-60	charcoal concentration	M	6		3	1				4					4	LC		
1	480	RP1_2	80-100	charcoal concentration	M	6		2	1				3					3	LC/SK	799-549 BC	
				MNI TOTAL			4	25	3			32	1	1	1	1	34				
				Frequency			11.8	73.5	8.8		94.1		2.9		2.9						
				Ubiquity			25	100	75		100		25		25						
				Total volume			22														

41 Rafin Pah 2 (2012/26) – Early Nok

The site lies in flat terrain in a spur position, sloping towards the Pah River (“Rafin”), which carries ponding water during the dry season. Two test trenches (RP2_1 & PR2_2) were opened about 20 metres apart, with sizes of 2×3 m and 2×2 m respectively. While RP2_1 contained two features with cultural material and continued to a depth of more than 100 cm, RP2_2 did not contain many finds and sterile ground was reached at -40 cm. Noteworthy during excavation was the absence of terracotta fragments despite the presence of Nok pottery. The radiocarbon date offers an explanation – the occupation lies during the transition from the Early to the Middle Nok phase and thus possibly before the advent of terracotta figurines.

Absolute dates

MAMS 15114	2811±22 bp	1042-903 BC	<i>Canarium schweinfurthii</i>	RP2 1, -20 to -40 cm
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Archaeobotanical information

Two archaeobotanical samples totalling 12 litres of soil were analysed from Rafin Pah 2, unit RP2_1. The botanical data set (66 plants remains) is dominated by pearl millet (87.9% in frequency). Some endocarp fragments of *Canarium schweinfurthii* and four unidentifiable seeds complement the assemblage.

																Cenchrus americanus		Indet. seeds		Canarium schweinfurthii		TOTAL		Processed by
#	Archaeobotanical sample no (AB)	Excavation unit	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Seeds	Frag.	Frag.	MNI	MNI						
1	11	RP2_1	40-60	1	square B	E	8	10	31				41	4			4	2	47	LC				
2	12	RP2_1	60-80	2	square C/F	E	4	8	9				17				5	2	19	LC				
				MNI TOTAL				18	40				58	4			9	4	66					
				Frequency				27.3	60.6				87.9	6.1			6.1							
				Ubiquity				100	100				100	50			100							
				Total volume			12																	

42 Ruga Fulani 1 Furnace (2011/7) – Middle Nok

The site contains three furnaces, two of them were discovered in 2011, one in 2015. In 2013, the two furnaces found in 2011 were excavated in a trench of 7×4 metres. With diameters of ca. one metre and the almost absence of slag, they resemble other Nok furnaces, which is confirmed by the radiocarbon dates. As expected from furnace sites, only little cultural material except for technical ceramics is present. A classification based on pottery is not possible.

Absolute dates

MAMS 19312	2555±27 bp	802-567 BC	<i>Cenchrus americanus</i>	AB 140
MAMS 19310	2425±20 bp	734-408 BC	<i>Cenchrus americanus</i>	AB 139

Archaeobotanical information

Two archaeobotanical samples totalling 16 litres of soil were analysed from the two furnaces at Ruga Fulani 1. The botanical data set (15 plants remains) is dominated by pearl millet (53% in frequency) and complemented by finds of *Nauclea latifolia* and *Eleusine indica*. The two archaeobotanical samples are directly dated to the Middle Nok phase.

#	Archaeobotanical sample no (AB)	Depth below surface (cm)	Feature	Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	Cenchrus americanus	Eleusine indica		Nauclea latifolia	TOTAL	Processed by	Date on sample (Oxcal 2 sigma)	
1	139	40	furnace A	furnace infill	M	8		4				4				0	4	LC	734-408 BC	
2	140	40	furnace B	furnace infill	M	8		4				4	2	5		5	11	LC	802-567 BC	
							MNI TOTAL					8	8	2	5	5	15			
							Frequency					53.3		53.3	13.3	33.3	33.3			
							Ubiquity					100		100	50	50	50			
			Total volume			16														

43 Sabon Janruwa (2011/66) – Middle Nok

Sabon Janruwa is located in flat terrain; damage by looting was moderate. Some modern finds showed that the place is frequented by locals. Two trenches were laid out – SJ1 with 7×14 m in the area where the remains of a furnace were visible and SJ2 with 5×5 m about 20 m from SJ1. Only few diagnostic potsherds were recovered. The furnace in SJ1 is similar to other Nok furnaces – the lower layer forming the pit fill contained the highest amount of slag which was preserved in a large quantity (Junius 2016). A pit filled with charcoal and slag was found south of the furnace. Almost no diagnostic pottery was recovered and the only classification possible is Middle Nok. The two radiocarbon dates from SJ1 (pit) and SJ2 do not overlap and may point to different occupations. The date for the furnace fits other radiocarbon dates of Nok furnaces.

Absolute dates

MAMS 13649	2703±31 bp	907-806 BC	<i>Elaeis guineensis</i>	SJ2, #341
MAMS 13658	2450±27 bp	753-413 BC	Charcoal	AB 340

Archaeobotanical information

Five archaeobotanical samples totalling 54 litres of soil were analysed. One sample is devoid of any plant remains. The botanical data set (83 plant remains) is dominated by *Nauclea latifolia* (57.8% in frequency) followed by *Eleusine indica* (19.3%) and pearl millet (8.4%).

[illegible]

44 Taka Lafiya 1 (2011/67) – Early and Middle Nok

Taka Lafiya is a large site located on a plateau next to a hilltop with dense vegetation and quite destroyed by looting. It probably extends to the other side of the hilltop where Nok material was found in a looted landscape as well. The main excavation trench (TAL 1 9×8m) is located on the plateau; TAL 2 (6.5×3.5 m) is located in the plain where magnetic survey had shown an anomaly. No finds or features were recorded at TAL 2. Several features were defined in TAL 1, the most interesting was an unusually deep pit with an anthropomorphic vessel placed at its bottom at ca. 250 cm below the surface. The other features are shallower. A large quantity of diagnostic pottery was recovered as were grinding stones and terracotta fragments. The pottery belongs mostly to the early Middle Nok pottery groups Ifana and Pangwari, but a few Puntun Dutse (Early Nok) and Ido (transition) sherds are present as well and may indicate the beginning of occupation as indicated by the radiocarbon date in the 11th or 10th century BC. Three radiocarbon dates put at least one occupation episode in the 9th century BC. A luminescence date on the anthropomorphic vessel places it in the Late Nok period, but as with many luminescence dates obtained, the reliability is unclear.

Absolute dates

MAMS 13650	2848±24 bp	1109-926 BC	<i>Cenchrus americanus</i>	AB 402
MAMS 14878	2723±27 bp	917-812 BC	<i>Cenchrus americanus</i>	AB 424
MAMS 14877	2665±28 bp	899-792 BC	<i>Cenchrus americanus</i>	AB 408
Beta-477652	2620±30 bp	827-772 BC	<i>Canarium schweinfurthii</i>	AB 378
MAMS 13627	2539±28 bp	795-548 BC	<i>Canarium schweinfurthii</i>	AB 445

Archaeobotanical information

15 archaeobotanical samples totalling 97 litres of soil were chosen for analysis from 26 samples collected. Two samples were devoid of any plant remains. The botanical data set (204 plants remains) is dominated by pearl millet caryopses (77.9% in frequency). Numerous endocarps of *Canarium schweinfurthii* were recovered. In two samples *Vigna unguiculata* was identified.

[illegible]

45 Tsaunim Bakka 1 (2010/13) – Middle Nok

Tsaunim Bakka 1 is located on a small mountain at the border of Kagarko town, damaged by looting. Many terracotta finds were exposed by erosion on the hill slope, suggesting that a large number of terracotta figurines had been found by the looters. A test trench of 3×3 m was excavated on the hill slope. Possibly a shallow pit feature was exposed, but not many finds were made. The pottery shows attributes of the Tsaunim Gurara and/or Pandauke pottery groups placing the site in the latter part of the Middle Nok period, which is supported by the radiocarbon date.

Absolute dates

MAMS 11173 2493±21 bp 771-542 BC *Cenchrus americanus* **AB 282**

Archaeobotanical information

Two archaeobotanical samples totalling 23 litres of soil were analysed. The botanical data set (142 plants remains) quasi exclusively consists of pearl millet caryopses.

#	Archaeobotanical sample no (AB)	Depth below surface (cm)		Context	Phase	Volume (litres)							Cenchrus americanus		Indet. seeds		TOTAL		Processed by		Date on sample (Oxcal, 2 sigma)	
1	283	40	discolouration	M	11	12	31	5				48			1	49	LC					
2	282	60	discolouration	M	12	14	60	19				93				93	LC	771-542 BC				
			MNI TOTAL			26	91	24				141			1	142						
			Frequency			18.3	64.1	16.9				99.3		0.7								
			Ubiquity			100	100	100				100		50								
			Total volume			23																

46 Tsaunim Gurara (2011/68) – Middle Nok

Tsaunim Gurara is a hilltop site on an elongated hillcrest near the Gurara River. The western part of the plateau is destroyed by looting. Two trenches were excavated in areas where testing had shown the presence of cultural material (TG1 4×5 m and TG2 3×3 m). Well-preserved Nok pottery and terracotta was found in a possible pit feature in TG1; TG2 yielded less and non-diagnostic finds. Pottery collected was a mixture of Nok and Common Era pottery. Thus, the slag and the daub pieces in the form of flat bricks found in TG2 may not necessarily belong to the Nok Culture. Tsaunim Gurara is the eponym of the Tsaunim Gurara pottery group of the later Middle Nok phase, in which iron production started.

Absolute dates

MAMS 13651	2560±20 bp	801-591 BC	<i>Cenchrus americanus</i>	AB 465
MAMS 13652	2549±26 bp	799-555 BC	<i>Cenchrus americanus</i>	AB 468

Archaeobotanical information

Three archaeobotanical samples totalling 21 litres of soil were analysed. The botanical data set (18 plants remains) exclusively consists of pearl millet caryopses.

#	Archaeobotanical sample no (AB)	Excavation unit	Depth below surface (cm)		Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involucres/bristle	Immature	Total	MNI		
1	465	1	40-60	pit		M	8	2	5				7	7	LC/SK	801-591 BC
3	472	1	40-60	pit		M	5		3				3	3	LC	
2	468	2	40-60	charcoal concentration		M	8	3	4	1			8	8	LC/SK	799-555 BC
				MNI TOTAL				5	12	1			18	18		
				Frequency				27.8	66.7	5.6			100.0			
				Ubiquity				66	100	33			100			
				Total volume			21									

47 Tsaunim Maganda (2011/69) – Early and Middle Nok

Tsaunim Maganda is located on a mountain top with some plateau areas and almost destroyed by numerous looting holes. A test trench of 3×3 m was excavated in an undisturbed area. A possible pit feature contained only little cultural material and charcoal. Sherds from the excavation and the survey belong to the Early Nok phase and the transitional Ido pottery group, which is supported by the radiocarbon dates. The extensive looting is a sign that terracotta figurines had been present, which would indicate another occupation in the Middle Nok phase. A few terracotta fragments were found and confirm this. Possibly the site was occupied without interruption.

Absolute dates

MAMS 13653	3001±23 bp	1377-1127 BC	<i>Cenchrus americanus</i>	AB 398
Beta-477651	2920±30 bp	1214-1016 BC	<i>Canarium schweinfurthii</i>	Charcoal concentration

Archaeobotanical information

Three archaeobotanical samples totalling 22 litres of soil were analysed. The botanical data set (46 plant remains) is dominated by pearl millet caryopses (82.6% in frequency) complemented by three endocarp fragments from *Canarium schweinfurthii* and further unidentifiable seed fragments. The archaeobotanical samples come from the Early Nok contexts.

#		Archaeobotanical sample no (AB)	Depth below surface (cm)	Context	Phase	Volume (litres)	Cenchrus americanus						Indet. seeds	Canarium schweinfurthii	TOTAL	Processed by	Date on sample (Oxcal 2 sigma)
2	399	20-30	find and charcoal concentration	E	15	Caryopsis <1mm	Caryopsis >1mm	Frag.	Involutres/bristle	Immature	Total	Seeds	Frag.	Frag.	MNI	MNI	LC
1	398	70	find and charcoal concentration	E	7	7	15	5			27		5	1	1	28	LC/SK 1377-1127 BC
			MNI TOTAL			9	18	11			38		5	3	3	46	
			Frequency			19.6	39.1	23.9			82.6		10.9		6.5		
			Ubiquity			100	100	100			100		50		100		
			Total volume		22												

48 Tudun Dosa (2011/70) – Middle Nok, Common Era

Tudun Dosa is about 500 m east of Janjala research station on a rock crest with protruding granitic bedrock. Some looting had taken place on the highest point of the crest. Trench TD1 was laid out on top of the crest next to the looting holes, but only contained a few finds down to a depth of 50 cm. Trench TD2 was located 40 m to the southwest, in an area where testing had shown cultural material. The cultural material is a mixture of Nok and Common Era material, with the Common Era material occurring near the surface and the Nok material occurring in a pit feature reaching down to 100 cm below the surface. The few diagnostic potsherds place the Nok occupation at the site into the later Middle to Late Nok phase, towards the younger end of the radiocarbon date ranges.

Absolute dates

MAMS 13654	2571±26 bp	806-590 BC	<i>Cenchrus americanus</i>	AB 321
Beta-297286	2470±40 bp	769-418 BC	<i>Cenchrus americanus</i>	AB 322
MAL 10092	2140±372	499 BC - 245 AD	Roulette-decorated potsherd	OSL /TD2, #415

Archaeobotanical information

Four archaeobotanical samples totalling 46 litres of soil were analysed, three from TD2 and one from TD1. The upper part in both trenches yielded less material than the lower part. Altogether, the botanical data set (137 plant remains) is dominated by pearl millet caryopses (93%). One sample from TD2 contained *Eleusine indica*. The single sample from TD1 was more diverse; besides *Spermacoce* sp. it contained several fragments from *Canarium schweinfurthii* and *Vitex* sp. as well as unidentified endocarp fragments.

#	Archaeobotanical sample no (AB)	Excavation unit	Find number	Depth below surface (cm)		Context	Phase	Volume (litres)	Caryopsis <1mm	Caryopsis >1mm	Frag.	involucres/bristle	Immature	Total	Cenchrus americanus	Eleusine indica	Spermacoce sp.	Canarium schweinfurthii	Vitex sp.	Undet. endocarps	TOTAL	Processed by	Date on sample (Oxcal, 2 sigma)			
1	321	2	251	30	find concentration	Mixed CE	9		5					5							5	LC/SK	806-590 BC			
2	320	1	137	40	NE find concentration	Mixed CE	12	2	7					9			1	5	2	2	1	15	5	18	LC/SK	
3	323	2	420	60-70	outside pit feature	M	14	10	40					50									50	LC/SK		
4	322	2	495	100	outside pit feature	M	11	20	43					63	1								64	LC/SK	769-418 BC	
					MNI TOTAL				32	95				127	1	1	5	2	2	1	15	5	137			
					Frequency				23.4	69.3				92.7	0.7	0.7		1.5		0.7		3.6				
					Ubiquity				75	100				100	25	25		25		25		25				
					Total volume			46																		

49 Ungwar Kura (2007/1) – Middle to Late Nok

The Ungwar Kura („place of the hyena”) site lies on two flat hill tops separated by a saddle, on the eastern fringe of a mountainous region a few kilometres south of the town of Kwoi, east of the project’s main study area. Looting activities had damaged the site but substantial undisturbed deposits were preserved. The excavation in 2007 was the first large-scale excavation of the project with total station recording of all individual finds and features. A total of 16 trenches (UK1-16) measuring 5×5 metres each were arranged throughout the extension of the site (as visible in the spatial distribution of grinding stones on the surface); a few small testings were done as well (UK17-21). The intention was to capture the size of the site and get information on its structure. Most features and finds were made on the hilltops (where also the largest number of grinding stones was found), they seem to have been the centre of the site. Most features were composed of numerous arranged natural stones in combination with abundant cultural material (terracotta, pottery, burnt clay, stone artefacts, charcoal). Some features reached down to 100 cm or more. Several large terracotta parts and complete vessels were also found. Other than the pit/stone-features, no clear structures could be identified, and the character of the site remains unclear. Most radiocarbon dates fall into the calibration curve plateau between ca. 800 and 400 BC. Two dates in the early Middle Nok period as well as two dates in the Middle to Late Nok transition indicate a possible use of the site over 400 years. The pottery assemblage contains typical Middle Nok pottery as well as some decorations not known in the project's key study area. The latter are attributed to the later Middle to Late Nok transition.

Absolute dates

Erl-12293	9177±56 bp	8550-8285 BC	Charcoal	UK1, #81, next to terracotta head
MAMS 13660	2627±25 bp	823-777 BC	<i>Cenchrus americanus</i>	UK6, AB 123
Beta-382633	2620±40 bp	827-772 BC	<i>Cenchrus americanus</i>	UK16, AB 121
Beta-382626	2580±30 bp	811-574 BC	Seed frag	UK5, AB 84
MAMS 15414	2579±20 bp	805-767 BC	<i>Cenchrus americanus</i>	UK6, AB 123
Beta-382625	2540±30 bp	796-547 BC	<i>Cenchrus americanus</i>	UK1, AB 69
Beta-382627	2540±30 bp	796-547 BC	<i>Canarium schweinfurthii</i>	UK5, AB 85
Beta-282631	2540±30 bp	796-547 BC	<i>Cenchrus americanus</i>	UK9_2, AB 107
MAMS 13662	2531±21 bp	789-551 BC	<i>Cenchrus americanus</i>	UK16, AB 118
Erl-12294	2520±49 bp	800-479 BC	<i>Cenchrus americanus</i>	UK1, AB 81
MAMS 13661	2475±30 bp	770-423 BC	<i>Cenchrus americanus</i>	UK14, AB 120
Beta-382628	2470±30 bp	766-422 BC	<i>Cenchrus americanus</i>	UK7, AB 97
Beta-382629	2460±30 bp	758-416 BC	<i>Cenchrus americanus</i>	UK7, AB 95
Beta-320724	2440±30 bp	751-408 BC	<i>Cenchrus americanus</i>	UK6, AB 123
Beta-384855	2410±30 bp	743-399 BC	<i>Cenchrus americanus</i>	UK12, AB 114
Erl-12294	2374±46 bp	749-376 BC	<i>Cenchrus americanus</i>	UK12, AB 106
Beta-382630	2360±30 bp	540-386 BC	<i>C. americanus</i> + Seed	UK9, AB 99
KIA 36367	2241±53 bp	398-174 BC	<i>Cenchrus americanus</i>	UK9_2, AB 104

Archaeobotanical information

Out of 61 archaeobotanical samples, 45, totalling 515 litres of soil, were analysed. The botanical data set (2717 plant remains) is dominated by pearl millet caryopses (83.3% in frequency). The other plant remains are composed of endocarp fragments (*Canarium schweinfurthii*, and *Vitex* sp.), various Poaceae caryopses (*Eleusine indica*, *Digitaria* sp., and some which are not further identifiable), seeds of *Vigna unguiculata* and *Nauclea latifolia*, in very low frequency. Find densities varied enormously between 323 (309 of pearl millet) in AB 106 and no carpological remains in AB 90 and AB 87.

50 Utak Kamuan Garaje Kagoro (2008/5) – Middle Nok, Common Era

The site is located on the unpaved road of a village of the same name, a suburb of Kafanchan, east of Kwoi and about 80 km east of the project's main study area. About 500 metres from the site, terracotta figurines were found in a compound when a grave was dug in 2008. We were not allowed to dig there but were able to investigate terracotta parts visible as outlines on the surface of a unpaved road. Four trenches (UKG 1-4) were laid out, containing nine features consisting of heaps of natural stones and large terracotta parts in distances of 1.5-2 m to each other. The soil between the features was sterile. After the excavation was stopped by local authorities, the largest feature was put in a gypsum cast and remained as such until 2011, when we returned to the site to expose the feature. It was transported to Germany and the figurines were restored for an exhibition before they were brought back to Nigeria (Munir and Ritter 2014; Rupp 2014). In 2011, three more trenches were laid out in the vicinity, partly in spots where magnetic prospection showed anomalies. Several features with stones were identified but almost no cultural material was found. No heap as in the 2008 excavation was found. Only a few diagnostic potsherds were recovered, pointing to an occupation in the later Middle Nok phase, which is supported by three radiocarbon dates. The fourth radiocarbon date is a bit older, but no corresponding pottery was found. The Common Era pottery in the upper 20-30 cm shows the recent use of the site.

Absolute dates

MAMS 13655	2600±22 bp	806-776 BC	<i>Cenchrus americanus</i>	UKG 6, AB 394
MAMS 13659	2463±30 bp	759-418 BC	<i>Canarium schweinfurthii</i>	UKG 5, #94
MAMS 16184	2463±22 bp	756-421 BC	<i>Canarium schweinfurthii</i>	UKG 1, feature H
KIA 36368	2392±27 bp	719-397 BC	Charcoal	UKG 1, feature H, 60 cm

Archaeobotanical information

Nine archaeobotanical samples totalling 50 litres of soil were analysed from the 2011 excavation. Two samples were devoid of any plant remains. The botanical data set (129 plant remains) consists of pearl millet caryopses (86%). The other plant remains are composed of endocarp fragments (*Canarium schweinfurthii*, and *Vitex* sp.). One caryopsis was identified as potential fonio (*Digitaria exilis*) and a sorghum (*Sorghum bicolor*) spikelet was found, indicating that the mixture with Common Era plant material reached probably below the upper 30 cm.

[illegible]

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