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## The earliest iron-producing communities in the Lower Congo region of Central Africa: new insights from the Bu, Kindu and Mantsetsi sites

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### ABSTRACT

In 2015 the KongoKing research project team excavated the Bu, Kindu and Mantsetsi sites situated in the Kongo-Central Province of the Democratic Republic of Congo (DRC). All are part of the Kay Ladio Group. This is the first detailed publication on this cultural group, to which no contemporary ones can currently be linked, either from the Atlantic coast of Congo-Brazzaville or from along the Congo River and its tributaries upstream of Kinshasa. Dated to between cal. AD 30 and 475, these settlements mark the presence of what are so far the oldest known iron-producing communities south of the Central African equatorial forest. Evidence for metallurgy is associated with remnants of polished stone axes, which were perhaps being used for ritual purposes by this point in time. The charcoal remains found at the sites indicate a savanna environment that was more wooded in Kindu and Mantsetsi than in Bu.

### RÉSUMÉ



L'équipe du projet de recherches KongoKing a fouillé en 2015 les sites de Bu, Kindu et Mantsetsi situés dans la Province du Kongo-Central de la République Démocratique du Congo (RDC). Tous représentent la culture dite 'Kay Ladio'. Le présent article est la première étude détaillée publiée sur cet ensemble culturel auquel ne peut être relié aucun des groupes culturels contemporains connus à ce jour sur le littoral Atlantique du Congo ou en RDC en amont de Kinshasa autour du fleuve Congo et de ses affluents. Datés entre cal. 30 et 475 ap. J.-C., ces anciens villages marquent la présence des plus anciennes communautés métallurgistes au sud de la forêt équatoriale de l'Afrique Centrale. Les preuves pour la métallurgie y sont associées aux restes de haches polies, peut-être utilisées pour des raisons rituelles à cette époque. L'identification des charbons de bois trouvés dans ces sites indique un milieu de savane qui était plus boisé à Kindu et Mantsetsi qu'à Bu.

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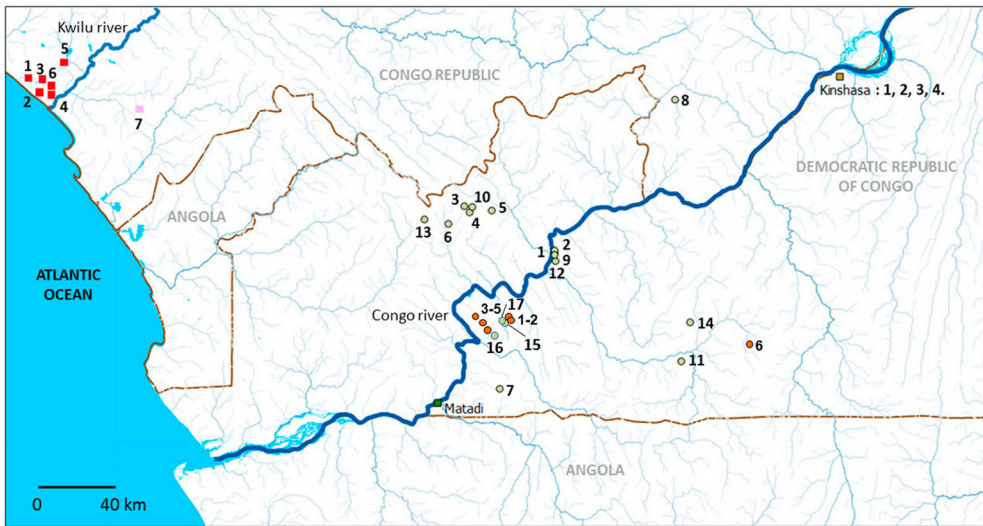
## Introduction

After some thirty years of field and laboratory work in Central Africa (Lanfranchi and Clist 1991: 147–258; Clist 1994/95, 1997, 2006a, 2012, 2013, Clist *et al.* 2018a; de Maret 1994/95, 2003, 2013; Eggert 1994/95, 2014a, 2014b; Van Noten 1982: 57–99), our understanding of its earliest village communities and their adoption of iron metallurgy is still insubstantial. To fill this and other gaps in our knowledge, the KongoKing research project was undertaken between 2012 and 2016 in order to provide better documentation of the archaeology of the westernmost province of the Democratic Republic of Congo (Congo-Kinshasa), i.e. of the Kongo-Central Province (formerly Lower-Congo or Bas-Congo).<sup>1</sup> Focused on the origins and early history of the Kongo kingdom, this project was mainly concerned with increasing our understanding of the Late Iron Age, i.e. the period between cal. AD 1300 and 1800 (Clist *et al.* 2018b). Our current paper, which has been a branch of this research, is part of a renewed interest in combining archaeology and multi-proxy palaeoenvironmental studies in Central Africa (Bostoen *et al.* 2015; Clist 2006b; Delneuf *et al.* 2003; Eggert *et al.* 2006; Höhn *et al.* 2007; Kalheber *et al.* 2009, 2014a, 2014b; Maley *et al.* 2018). With this perspective, we present here new Early Iron Age data from the Bu, Kindu and Mantsetsi sites that we attribute to the so-called Kay Ladio Group. We begin by discussing the background of this group and then briefly outline the geography and environment of the study area, before presenting new archaeological data for the sites just mentioned, a new chronology for the Kay Ladio Group as a whole and a synthesis of new palaeoenvironmental and subsistence information. Our concluding discussion situates these new finds within both a local and a regional context.

## History of the Kay Ladio Group

As part of a regional pottery study based on the Georges Mortelmans archaeological collection, Pierre de Maret created a ‘Kay Ladio Group’ representing clusters of surface-collected potsherds from the Kay Ladio, Kibula and Mongo sites, all situated south of the Congo River in the present-day Kongo-Central province of the DRC (de Maret 1972: 69–70, 101, 1982: 80; Kanimba Misago 1991: 213; see [Figure 1](#)). Without excavations, the chronology of this ceramic group remained unknown, even though de Maret (1982: 80) believed it to date back to the Early Iron Age.

A systematic study of the archaeological material collected by Maurits Bequaert (1956) during his 1950–1951 fieldwork in the region led to the identification of seven new sites yielding ceramics of the Kay Ladio Group, i.e. Kimbala Solele, Kindu 2, Kinkenge, Kintadi-lez-Lukuti, Mantsetsi, Sumbi and Kongo Dia Vanga (Clist 1982: 147–158). All are likewise located in Kongo-Central, but the first six lie north, rather than south, of the Congo River ([Figure 1](#)). At different times, Bequaert excavated the northern hilltop sites of Sumbi (8–14 January 1951), Kindu 2 (24 January – 5 February and 28–31 March 1951) and Mantsetsi (5 February – 28 March 1951), as well as the site of Kongo dia Vanga (6–18 June 1951) (Clist 1982). Analysis of Bequaert’s excavations redefined the Kay Ladio Group with a new typology relating to shapes and decoration, but still without radiocarbon dates (Clist 1982: 147–158). Only a probable link to the ceramics from the lower level of the Gombe site, dated to the fourth century AD (Cahen 1981), suggested that Kay Ladio pottery did indeed also date back to the Early Iron Age (Clist 1982: 156).



**Figure 1.** Map of the research area showing the distribution of Early Iron Age archaeological sites of the Kay Ladio Group, the Gombe Type, the Kitala Group and the Herringbone Group. Individual sites are numbered as follows: *Kay Ladio* (green circles) 1 Kay Ladio, 2 Kibula, 3 Kimbala Solele, 4 Kindu, 5 Kin-kenge, 6 Kintadi-lez-Lukuti, 7 Kongo-dia-Vanga, 8 Loukoko 1, 9 Mabulu and Kondo, 10 Mantsetsi, 11 Mongo, 12 Sakuzi, 13 Sumbi, 14 Tumba, 15 Bu 3, 16 Kazu 1, 17 Kulu; *Kitala and Kitala-related* (orange circles) 1 Bu 2, 2 Bu 4, 3 Kazu 2, 4 Kazu 4, 5 Kazu 5, 6 Kitala, 11 Mongo; *Gombe Type* (green squares): 1 Citas, 2 Gombe, 3 Lemba, 4 Ile des Mimosas; *Herringbone Group* (including *Carinated Broadly Grooved Ware*) (red squares) 1 BP113, 2 Kayes, 3 Lake Ndembo, 4 Madingo Kayes, 5 Meningue, 6 Tandou Yombi, 7 Les Sarahs (in pink to denote it is an iron smelting site).

In 1984, excavations on Sakuzi Hill (27 August – 3 September), a few kilometres to the southwest of Luozi north of the Congo River and once again in Kongo-Central, led to the discovery of Kay Ladio pottery in a well-defined archaeological context associated with evidence for *in situ* iron smelting (de Maret and Clist 1985). These finds were found close to other features containing Neolithic pottery from the Ngovo Group (de Maret 1986: 118–121), dated to between 430 cal. BC and cal. AD 130 (cf. de Maret 1986, Clist 2005: 752–758). Gosselain (1988) studied the Kay Ladio pottery with the exception of that from structures 19 and 22. Gosselain (1988: 161) and de Maret (1990: 450) then published three related radiocarbon dates, all of them ranging between AD 50 and 170 (see below), that confirmed the previous Early Iron Age estimations. The 1984 mission also resulted in the discovery of Kay Ladio artefacts on the nearby hills of Mabulu (de Maret and Clist 1985: 41) and Kondo (site 84/6, unpublished field notes, B. Clist).

Surveys conducted in 2013 and 2014 in the centre and east of Kongo-Central identified several more new sites yielding Kay Ladio pottery, namely Kazu 1 and Bu 1, as well as several others containing another old pottery type similar to the Kay Ladio group (Clist *et al.* 2013; Matonda *et al.* 2014). It was decided to follow up on Bequaert's 1951 work on Kindu and Mantsetsi by undertaking new excavations there from 4–9 August 2015 (Clist *et al.* 2015). We also revisited the sites discovered in 2014 on the south bank of the Congo in the hope of finding diagnostic material in context.

The Mantsetsi and Kindu sites were relocated with the help of M. Bikandu and M. Malasa, both of whom witnessed Bequaert's excavations as children. The large

Kindu Hill stands approximately halfway between Kimbala Solele (4°55'22"S, 13°36'30"E) and the Protestant mission of Kinkenge. Rising to 800 m above sea level (a.s.l.), it dominates the immediate surroundings. Mantsetsi is smaller and lower (748 m a.s.l.). The immediate environment is a wooded savanna, supplemented by forest galleries along the area's small streams while small forests cover some of the nearby slopes. For the traveller, the quartzite and schist hills present steep slopes on which walking is awkward (Gerards 1963).

### Excavations at Mantsetsi

At Mantsetsi (4°57'17"S, 13°37'40"E), we used Bequaert's 1951 excavation plan to complete the old field data, recording locations with GPS and making stratigraphic observations. Four 1 m<sup>2</sup> units were excavated on the hilltop near Bequaert's earlier trenches 1, 15, and 17 and were numbered 30 to 33 (Figure 2). Trench 31 contained pottery in its first 10 cm, but earlier Stone Age quartz artefacts dominated the upper levels of Trenches 30, 32 and 33. The hilltop was thus unsuitable for further study. Even in 1951, severe erosion was evident in Bequaert's Trench 1 with a humic layer present in only a few places. The same observation was made in Trench 3 where quartz artefacts lay on the surface. Remains of the Iron Age occupation were registered in Trench 7 on the southern slopes where a pit was identified at a depth of approximately 50 cm below the surface and in Trench 16 on the northern slopes where Kay Ladio potsherds were found scattered between 10 and 50 cm below the surface.

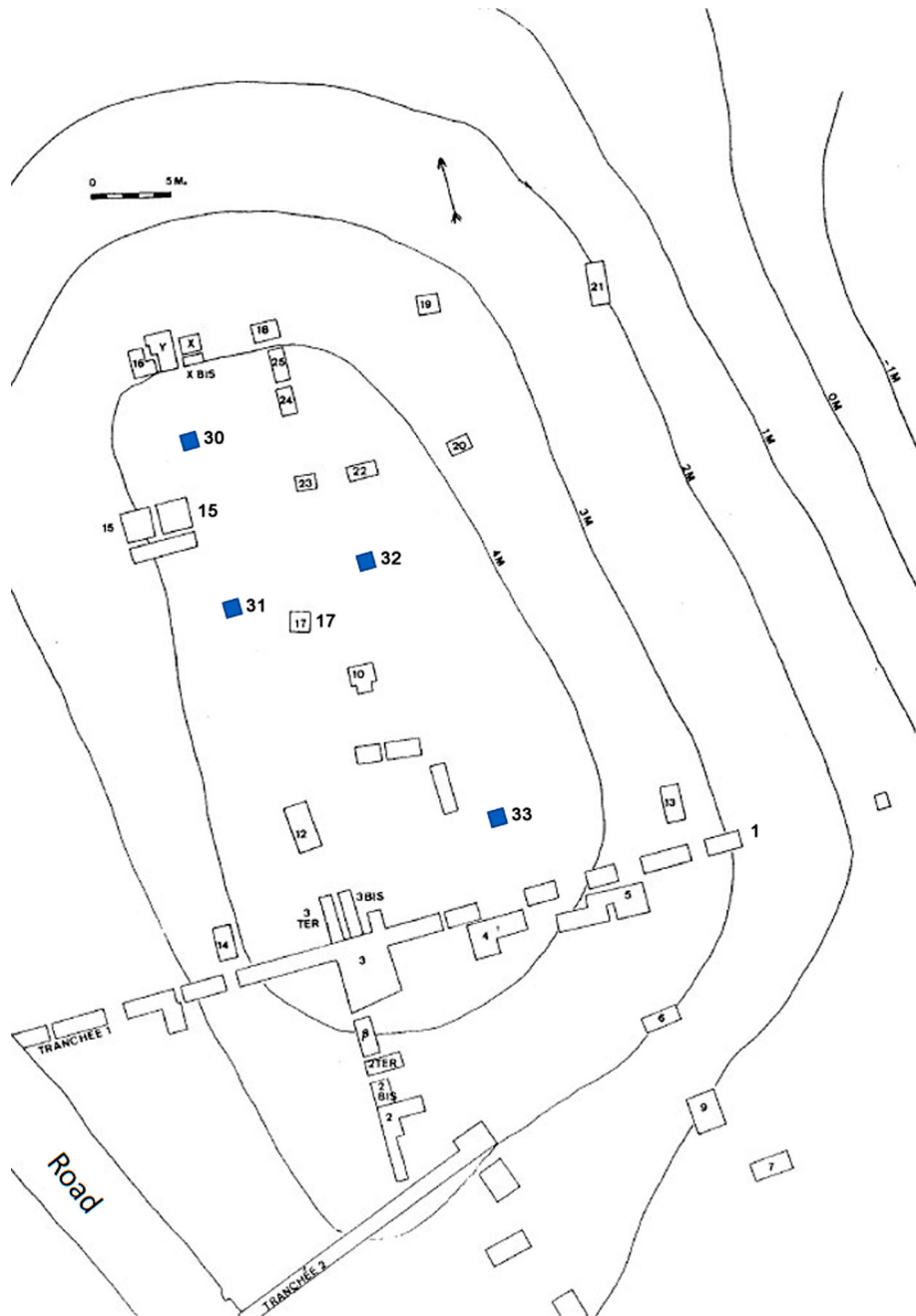
In Mantsetsi, Bequaert also discovered two polished axes made from dolerite (Celis 1972) that we discuss further below. One is certainly associated with Kay Ladio pottery and the other is also likely to be (Clist 1982).

### The Kindu site

In 1951, Bequaert located the site of Kindu II (4°57'3"S, 13°36'48"E) on the summit of Kindu Hill (Figure 3). Kindu I was a concentration of stone artefacts on the eastern slope. The 1951 natural stratigraphy was confirmed during our 2015 fieldwork: a sandy clay material 25 to 50 cm thick (Layer 1) on the summit that thickened to 80 cm between our Units 6 and 7 (Figure 4) lay on top of scattered laterite blocks (Layer 2) that in turn covered a well-cemented laterite.

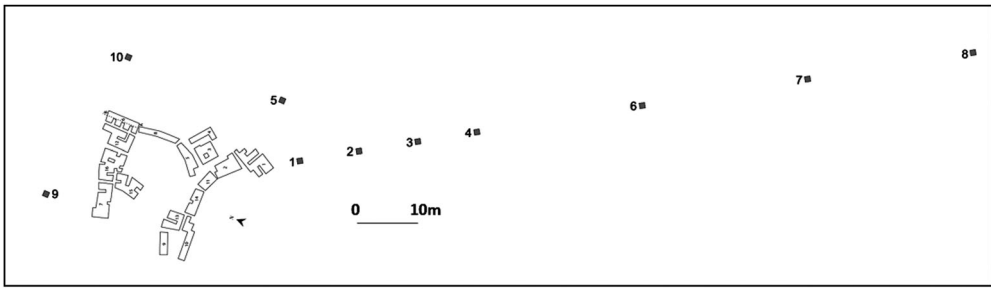
In 2015, we established a 127 m-long transect on a 148° axis 4.50 m from the southwest corner of Bequaert's Trench 1 and placed seven 1 m<sup>2</sup> excavation units along it: Units 1 to 4 every 10 metres (Figure 3) and Units 4 to 8 every 30 metres. Two other units, each with an area of 1 m<sup>2</sup>, were dug to the east of Bequaert's excavations: Unit 9 was placed 5 m north of Bequaert's Trench 7 and Unit 10 10 m east of his Trench 6. In 1951, Bequaert identified the highest concentrations of Kay Ladio pottery in his Trenches 6 and 7, as well as a polished stone axe in Trench 6.

We stopped most excavations at the top of the solid laterite: Unit 1 at a depth of 60 cm, Units 2 to 6 at 40 cm, Unit 7 at 80 cm, Unit 8 at 87 cm (Figure 4) and Unit 10 at 90 cm. Unit 2 only yielded a fragment of an upper grinding stone that was quadrangular in cross-section (at a depth of 20–30 cm) and a non-diagnostic sherd (at a depth of 30–40 cm). Unit 4 yielded seven sherds and a fragment of a quartz block between 20 and 30 cm

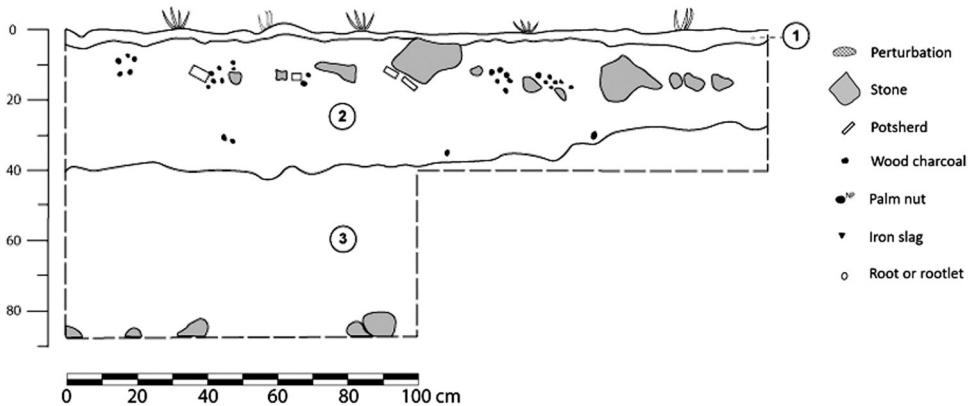


**Figure 2.** Mantsetsi: plan of the 1951 excavation trenches (Clist 1982: 74, Figure 23) with the 2015 excavation units 30-33 superimposed.

below the surface, while four sherds and fragments occurred at a depth of 30–40 cm. Unit 7 yielded only stone chips, while Unit 8 exposed a late thirteenth- to fourteenth-century occupational horizon.



**Figure 3.** Kindu: plan of the 1951 excavation trenches (Clist 1982: 85, Figure 26) with the 2015 excavation units superimposed.



**Figure 4.** Kindu: section drawing of Unit 8: 1 blackish, humic sandy-clay layer; 2 brownish (10YR 4/4) sandy-clay layer with Iron Age deposits at a depth of 10–30 cm below the surface; 3 light brown (10YR 6/8) sandy-clay layer with laterite blocks at its base.

We expanded Unit 9 from an area of 1 m<sup>2</sup> to one of 16 m<sup>2</sup> to reveal a Kay Ladio horizon (Layer 3) lying 10–20 cm below the surface that contained a pit (Figures 5 and 6). A thin slightly humic brown (10YR 4/6) layer containing the rootlets of the hilltop's grassy vegetation (Layer 1) covered the top. Layer 2 consisted of laterite gravel with large blocks; it sealed the pit and allowed the preservation of both the occupation horizon and the pit. Layer 2 also contained unaltered sherds of Kay Ladio pottery, indicating that this deposit is roughly contemporaneous with the habitation level (Layer 3). That layer itself contained laterite blocks, as well as charcoal, endocarps of *Elaeis guineensis* and *Canarium schweinfurthii* and numerous sherds of Kay Ladio pottery (Table 1). It also contained tuyères, iron slag and a few iron objects.

The pit (in Squares A'1, B'1, 4, 10, 11 and 12) is of special interest. It extended into the laterite, reaching a maximum depth of 60 cm (Figures 5 and 6, Layer 5). Erosion may have caused some of the deposits to disappear (see the western section in Squares 4 and 10; Figure 6). At the time of excavation, the pit was roughly oval, measuring 2.50 m north-south and 2.00 m west-east. Its opening was marked by an interruption in Layer 2. Its northern (Figure 5) and western (Figure 6) profiles make it possible to follow the stratigraphy. In the western section, wood charcoal was

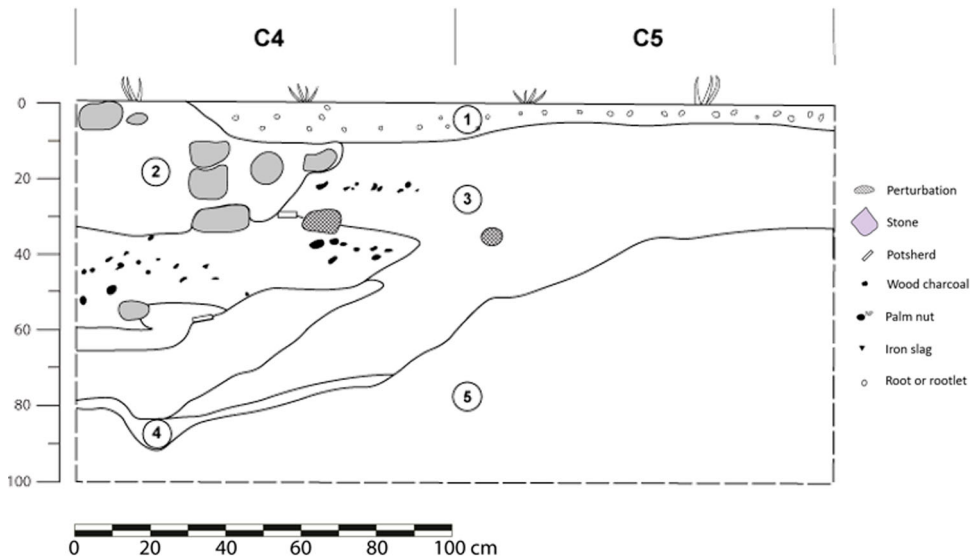
**Table 1.** Kindu Trench 9: fragmentation and importance of decoration on the Kay Ladio pottery.

Size range	Undecorated sherds	Decorated sherds	Total of all sherds by size class	
Chips and chunks	N/a	N/a	<b>169</b>	N/a
30 × 30 mm	257	121	378	53.8%
70 × 70 mm	160	139	299	42.5%
120 × 120 mm	8	17	25	3.5%
200 × 200 mm	0	1	1	0.2%
<b>Total</b>	425 (60%)	278 (40%)	<b>703</b>	

spread over the depression, colouring Layer 3A black (7.5YR 2/1 and 10YR 2/1). Thereafter, a thicker reddish (10YR 3/6) layer of burned earth formed Layer 3B and from 50 cm Layer 3C was a brown to reddish brown (10YR 4/4 to 5YR 4/6) earth containing large pieces of charcoal that darkened the deposit in some places (to 10YR 2/1). This pit yielded Kay Ladio sherds, charred endocarps of *E. guineensis* and *C. schweinfurthii*, iron slag and an iron blade. It also contained a fragment of a polished axe like that in Trench 6.

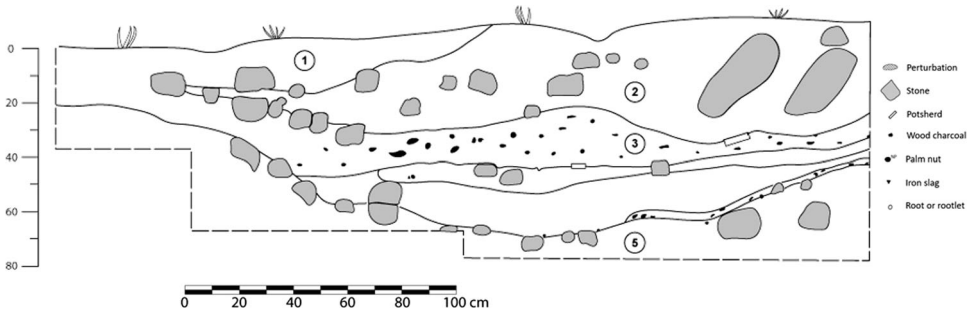
Several potsherds could be refitted, for example, in Square 4 from depths of 20 to 40 cm and in Square 11 between 40 and 60 cm below the surface. They link the archaeological layer and the pit and, together with the sherds in Layer 2, indicate the relative contemporaneity of all three contexts. Overall, the archaeological materials found in the habitation level and the pit are identical. Radiocarbon dates confirm the synchronicity of the deposits. They include Poz-76921 (1810 ± 30 BP) from the pit and Poz-76920 (1750 ± 30 BP) from the occupation horizon.

We first thought that the pit had been used for disposing refuse. Layer 2 closed the depression (Figure 6, Layer 2), however, and the pit's shape, dimensions and position



**Figure 5.** Kindu: north section of Unit 9, Squares 4 and 5: 1 sandy-clay layer covering the hilltop; 2 laterite gravel; 3 archaeological level (7.5YR 4/6) and second pit filling layer (5YR 4/6); 4 first fill layer of the pit; 5 sterile laterite layer.





**Figure 6.** Kindu: west section Unit 9, through the pit on its north-south axis, from left to right in Squares A'1, 4 and 10: 1 humic layer (10YR 4/6); 2 laterite gravel and blocks (10YR4/4); 3A fill layer of the pit (10YR 2/1) with a high density of small wood charcoal; 3B reddish (10YR 3/6) and rubified fill layer of the pit; 3C fill layer of the pit (10YR 2/1) partly on a natural laterite gravel layer; 4 first fill layer of the pit with large pieces of wood charcoal; 5 natural laterite gravel.

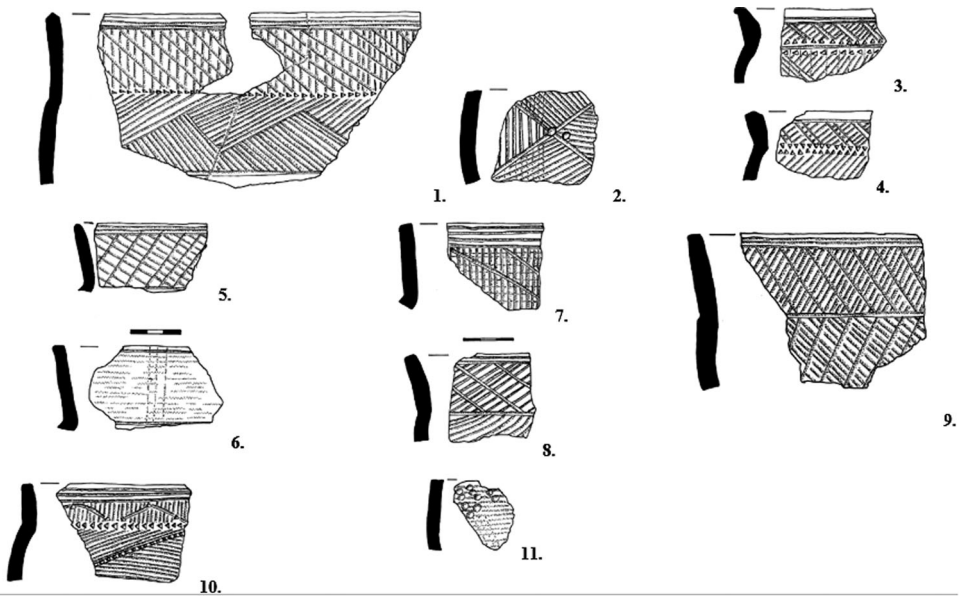
on the hilltop, dominating the landscape, suggest that it might also have contained a burial. The absence of human bones is not unexpected, given leaching and the acidity of the local soils. Poor preservation has been well documented from our excavations at the Kindoki and Ngongo Mbata sites where human and animal bones older than 350 years had completely disappeared (Linseele 2018; Polet 2018; Polet *et al.* 2018). Furthermore, rubbish could more easily be discarded on the steep hill slopes than into a relatively small and shallow pit. New research is needed to test this hypothesis.

### Kay Ladio ceramics

The fragmentation of the ceramics found in Unit 9 is significant (Table 1) and similar to those found in Unit 8. There, a late thirteenth/fourteenth-century AD settlement horizon had a ceramic assemblage in which 60% of the sherds fell into the 30 × 30 mm size range, 39.1% into the 70 × 70 mm range and just 0.9% into the 120 × 120 mm range (see Clist *et al.* 2018c for further details), a pattern suggesting that they had been lying on the surface and had been trampled. On the other hand, the high number of sherds from Unit 9 that had not been eroded hints at rapid infilling. The high frequency of decorated sherds (40%) contrasts markedly with the assemblage from Unit 8, where only 1.4% of the sherds were decorated.

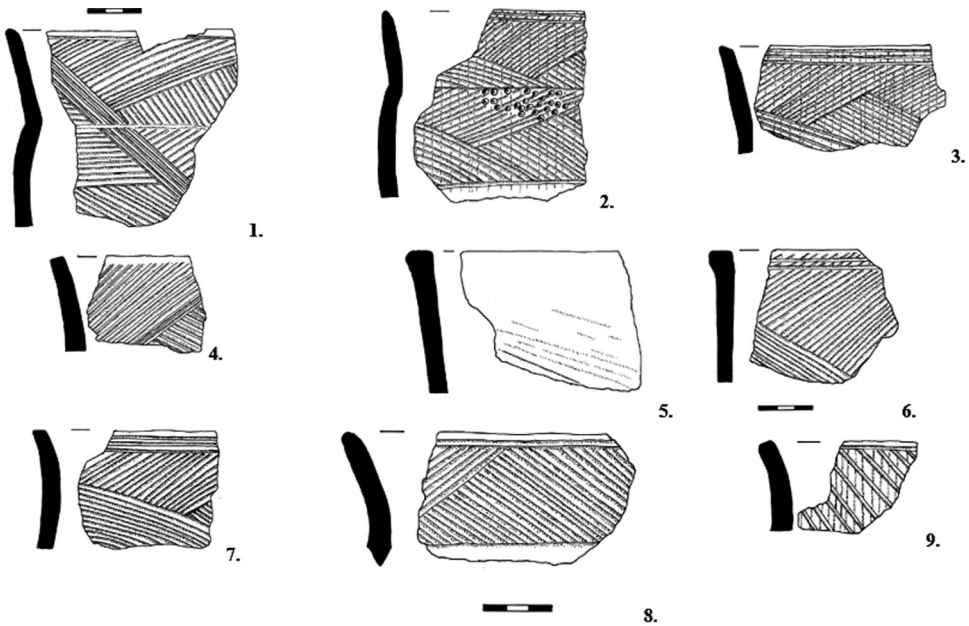
Preliminary typological analysis shows that the 2015 Kay Ladio pottery was identical to that from the 1951 excavations (Figures 7–9; see also Clist 1982: 85–90, 99–106). We used the 2015 assemblage from Kindu to fill the gaps of the previous typology (Clist 1982) regarding new decorative elements and morphological attributes and to analyse the clays, something that was not done in 1982. The protocol used followed that described by Orton *et al.* (1993) for temper sorting, density, roundness and sherd profiles; other typological aspects are taken from Clist (2005), who adapted previous approaches into a single protocol for the study of Central African pottery.

Surface colours were measured on a sample of 94 sherds of bottoms, bodies, shoulders and necks using the Cailleux code. The outer colours range from light to dark, moving from 10YR 6/6 (brown yellow, for just three sherds) up to 7.5YR 5/8 (bright brown)

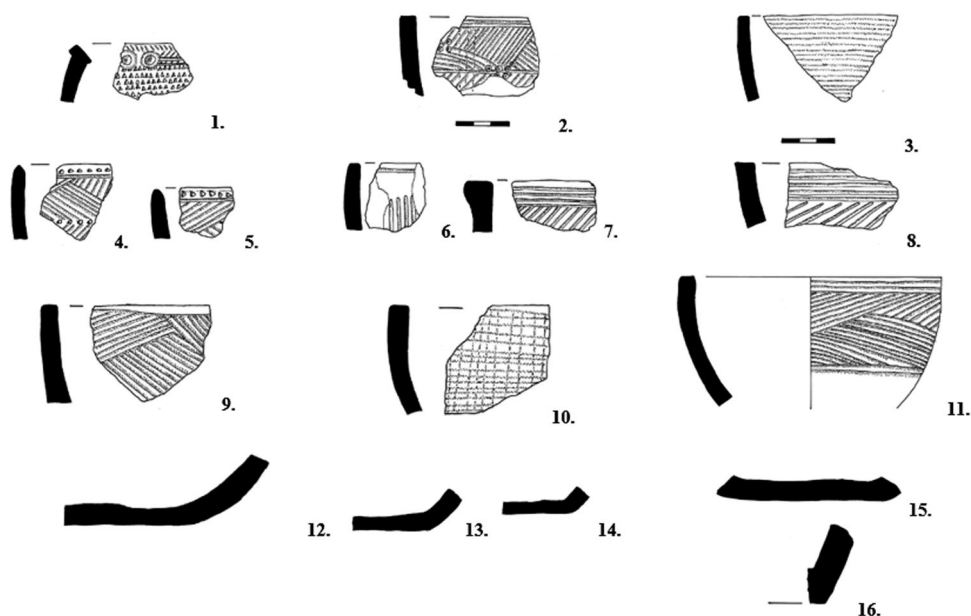


**Figure 7.** Kindu: restricted vessel shapes from the 2015 excavations (drawings by B. Clist).

and 5YR 3/4 (dark red brown) to reach 5Y 4/2 (olive grey). Most of the sherds (N = 86, 91.5%) are around 10YR 4/4 (dark yellow brown). Interior colours range from 10YR 6/6 (brown yellow) to 5Y 4/2 (dark grey), with most being around 10YR 5/1 (grey). As for clay composition, five different recipes can be distinguished:



**Figure 8.** Kindu: further restricted vessel shapes from the 2015 excavations (drawings by B. Clist).



**Figure 9.** Kindu: open vessel shapes and bases from the 2015 excavations (drawings by B. Clist).

Recipe 1: section of type 2 (dark core, outer and inner parts light), with grains ranging from 0.5 to 1 mm, but rarely as large as 2 mm, a density of 10% and good sorting. The components are a few small grains of laterite and a myriad of matte white dots and some small mica plates. The section has a very dense aspect in cross-section;

Recipe 2: section of type 2, with grains ranging from 0.5 to 2 mm, a density of 5% and good sorting. The components are grains of laterite, a little sericite and angular grains of various rocks. Overall, this recipe gives a laminated appearance in cross-section;

Recipe 3: section of type 2, with grains ranging from 0.5 to 3 mm, a density of 10% and average sorting. The components are grains of laterite, a little sericite and angular grains of various rocks. The whole gives a laminated appearance in cross-section;

Recipe 4: section of type 2, with grains ranging from 0.5 to 3 mm, a density of 10% and poor sorting. The components are grains of angular quartzite, laterite, black components in small point shapes and crushed sherd temper. This recipe is associated with thicker vessels ('cooking pots');

Recipe 5: section of type 4 (dark throughout), with grains ranging from 0.5 to 2 mm, a density of 10% and average sorting is average. The components are fragments and small plates of sericite in large number, giving a soapy touch to the surfaces. The whole gives a laminated appearance in cross-section.

The first four recipes range from fine to coarse. Recipe 3 is the most common with 72% of sherds, followed by Recipe 2 (14%), Recipe 4 (10%) and Recipe 1 (4%). Recipe 5 is restricted to a single bowl that was discovered at a depth of 60–70 cm at the bottom of the pit in Square 12. This bowl stands out due to its unique shape, decoration and clay recipe. A long internal flattening created a 6.4 mm-thick bevelled lip, while lower down the profile the shoulder thickens to 8 mm (Figure 9: 1). Apart from its unique use of

Recipe 5, which created a soapy touch, the bowl's black colour is also relatively rare within the Kay Ladio group. Its decoration is also unusual. On the outer bevel this consists of a row of short oblique incisions (oriented left) on the periphery that surmounts a 2 cm-high field filled with triangular comb impressions. Two incisions separate the comb impressions from oblique incisions above. Finally, two large circular impressions just under the lip could have been made with the pointed end of a palm nut. The shape of the lip is known from other Kay Ladio specimens (Gosselain 1988: Figure 24: 4).

As for the other pottery fragments, the decoration layout present is sometimes extensive, from lip to the base, as shown by two bases (Square 12, at a depth of 20–40 cm), while five other bases from Unit 9 lack decoration. This shows that not all vessels were completely decorated, consistent with the 40% ratio of decorated sherds upon which we remarked above (Table 1).

### Late Iron Age ceramics and Stone Age artefacts

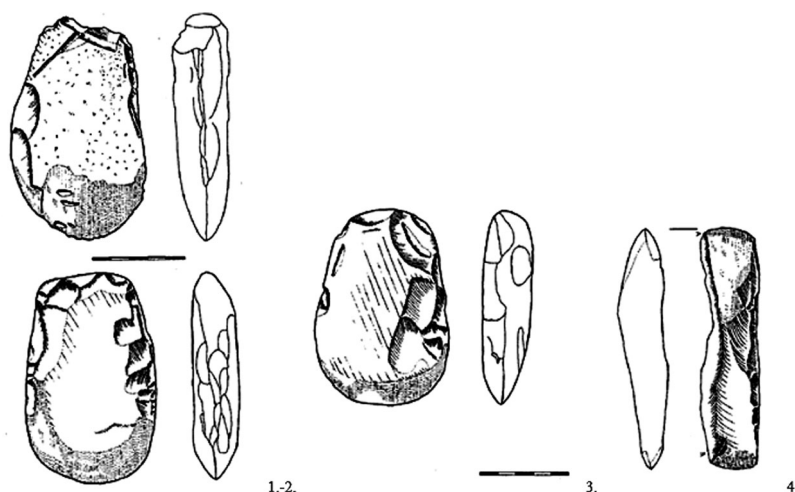
The non-Kay Ladio pottery recovered at Kindu was mostly found in Unit 8, where an interesting occupation horizon (10 to 30 cm below the surface) consisted of sherds, stones and upper and lower grindstones (Figure 4). The charcoal sample collected in Square A1 at a depth of 20–30 cm was dated to  $725 \pm 30$  BP (Poz-80292), which calibrates to cal. AD 1275–1388 at two-sigma. The relationship of this Late Iron Age pottery to the overall cultural sequence of the Kongo kingdom is discussed elsewhere (Clist *et al.* 2018c, 2018d).

The 1951 excavations at Kindu also identified Post-Acheulean Stone Age artefacts from a disturbed context, which sometimes resulted in a mix of lithic material with pottery and other Iron Age artefacts (Cahen 1978; Clist 1982: 87, 90; Lavachery 1990: 142). In 2015, we found the same situation in the upper part of the hill, mainly in Unit 9 where several squares contained quartz chips, debris, cores and rare tools at depths of between 10 and 50 cm (Cornelissen 2018: 38–39). This material does not correspond to the lithic component in Ngovo Group villages that predate Kay Ladio (Clist 2006a, 2006b) and is unrelated to the Early Iron Age occupation.

### The polished stone axes from Kindu, Mantsetsi and other village sites

In all, three complete polished stone axes were discovered associated with Kay Ladio pottery at the Kindu and Mantsetsi sites (Celis 1972: Kindu, Catalogue No. 157, Mantsetsi Catalogue Nos 160 and 161; Clist 1982: 83–84, 90) (Figure 10). At Kindu, one axe rested at a depth of 16 cm below the surface in Trench 6 (Clist 1982: 86, 1986: 224); there, as in all the trenches, the artefacts are a mixture of the Post-Acheulean Industrial Complex and the Early Iron Age (Clist 1982: 87; Lavachery 1990: 142). The association with the pottery is, however, strengthened by the axe fragment from the pit.

At Mantsetsi, two axes were discovered: one in Trench 3 at a depth of 28 cm and associated with Kay Ladio sherds and weathered stone tools (Clist 1982: 78), the other in Trench 1 at 50 cm below the surface (Clist 1982: 83–84; 1986: 224–225). The vertical distribution of objects in Trench 16 at Mantsetsi suggests the presence of a Kay Ladio concentration a depth of between 20 and 40 cm, i.e. the general context from which the axe in Trench 3 was recovered.



**Figure 10.** Mantsetsi (n°1–2), Kindu (n°3), and Kondo-dia-Vanga (n°4): polished stone axes (drawings by B. Clist).

Furthermore, while excavating a Kay Ladio settlement at Kongo dia Vanga, Bequaert found a cluster of three buried pots with a polished stone axe in its centre (Clist 1982: 113, Plates 53–54; 1986: 225; our Figure 10: 4). This association suggests a ritual deposit of some kind. The recurring association of Kay Ladio pottery and polished stone tools at Kindu, Kongo dia Vanga and Mantsetsi increases the probability that these polished stone tools were indeed used by the producers of Kay Ladio pottery alongside their iron tools.

A few other village sites have also yielded polished axes. In 1925–1927, Bequaert (1938) excavated the Gombe Point site in Kinshasa, work that was followed in 1974 by further test excavations directed by Daniel Cahen (1976, 1978, 1981; Cahen *et al.* 1983; de Maret and Stainier 1999). There, several deep and narrow pits were found, of which four contained intact or large pottery fragments at the bottom (Bequaert 1938: 82, Figure 15 and Plate XIII: 5 and 16; Cahen 1981: 128, Figure 1). One polished stone axe similar to the Kindu and Mantsetsi examples was collected in the occupation horizon from which these pits were dug (Bequaert 1938: 82, Figure 12 [stratigraphy] and Plate XIII: 6 [artefact]). The four pits were grouped near the northwestern edge of the Point overlooking the Congo River. To Cahen (1981: 129), this location and the contents together suggested a ritual function. The type of pottery, dated by thermoluminescence to AD 205–450 (Cahen 1981: 131), was later labelled the Gombe Type (de Maret and Stainier 1999). Gombe was contemporaneous with the last phase of the Kay Ladio Group, but in a different area.

Our last example of a polished stone axe in an Early Iron Age context comes from the neighbouring Republic of Congo (Congo-Brazzaville). There, at Tandou-Youmbi near the Atlantic coast, excavations uncovered a shallow pit dated to 358–279 cal. BC (2110 ± 60 BP; Tx-6183, at a depth of 30–35 cm) containing three Early Iron Age ‘Herringbone’ pots, a single ‘phallus-like’ terracotta object and an intact polished stone axe (Denbow 2014: 57, 72). This axe is one of only two such artefacts found thus far on the Congolese coast (Denbow 2014: 117), although others are known as surface finds in southern Congo (Lanfranchi 1991).

Intact tools in good contexts show that the Ngovo Group in the Democratic Republic of Congo (430 cal. BC to cal. AD 130: de Maret 1986; Clist 2005: 752–758) and the Okala Group in Gabon (500–100 cal. BC: Clist 1997, 2005: 489–531) both used polished stone axes. In the case of the Kay Ladio associations, it is also necessary to consider the possibility that the preceding Ngovo Group produced the axes (de Maret 1986) and that iron-using Kay Ladio ‘people’ reused them for ritual and symbolic reasons. This practice may even have originated during the Ngovo Group period.

## Excavations at Bu

Bu Hill (423 m a.s.l.) stands to the south of the Congo River (5°26’56”S., 13°47’03”E) some 2 km from the village of Mbanza Manteke. The sheet erosion that exposed archaeological remains here also created conditions for the development of grassy vegetation with a few small trees. In 2014, our survey identified a concentration of Kay Ladio sherds at the base of the hill (Bu 1). In 2015, the survey was extended to the hill slopes, its summit and other hilltops running along a 2 km-long ridge, identifying the Bu 2 to Bu 5 sites (Clist *et al.* 2015: 130).

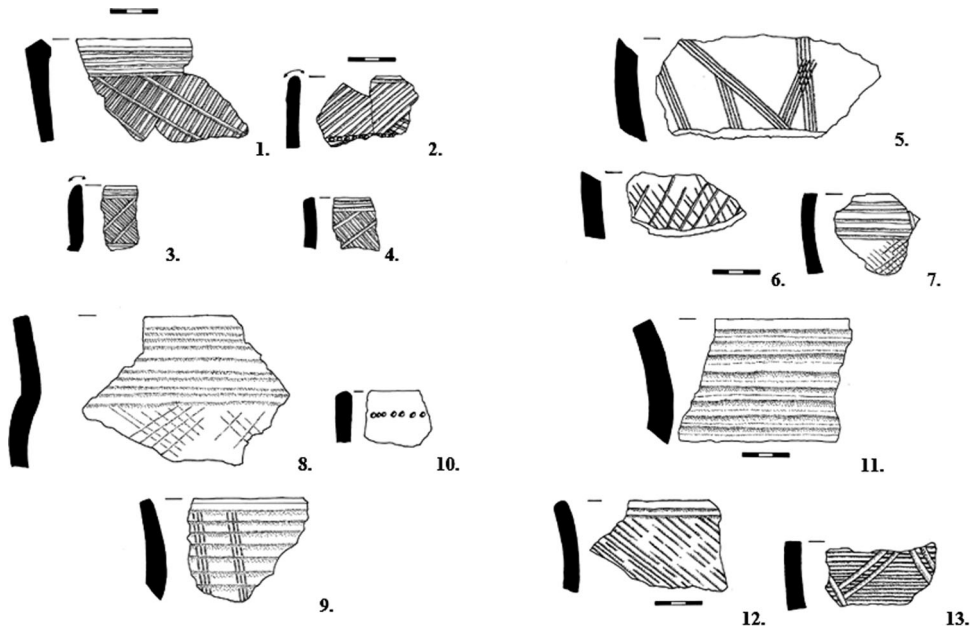
Bu 3 is a rather flat area near the hilltop where Kay Ladio pottery had eroded out of the visible village horizon. A test unit of 1 m<sup>2</sup> was opened on and adjacent to the sherd concentrations; it was then enlarged to cover an area of 3 m<sup>2</sup> once *in situ* artefacts were discovered. The stratigraphy, the depth distribution of the sherds, their surface wear (Table 2, 80% undecorated) and the numbers of sherds visible all indicate that our trench exposed the remains of a settlement horizon damaged by erosion. Because Square A’1 was sterile below a depth of 30 cm, with only a few sherds occurring 20 to 30 cm below the surface (Table 2), we conclude that the original settlement level ranged from the surface or slightly above to some 20 cm below. Some fragments of oil palm endocarps recovered at a depth of between 10 and 20 cm in Square B1 returned a radiocarbon date of 1700 ± 30 BP (Poz-80293).

All of the potsherds from within the excavated trench belong to the Kay Ladio Group (Figure 11: 1–4 and Table 2). The most characteristic decorative elements and shapes, as well as unique features such as thickened bevelled lips (Figure 11: 1), are illustrated.

The surface material collected on and around the test trench includes 91 undecorated sherds, 81 decorated sherds and four iron rings. All of the material belongs to the Kay Ladio Group except for a series of 42 sherds (i.e. 24% of the surface finds) belonging to at least three very thick vessels (Figure 11: 5, 8, 9, 11). They are easily distinguishable from classic Kay Ladio pottery as found at Kindu, Mantsetsi (Clist 1982 and our discussion above) and Sakuzi (Gosselain 1988) since they were made using Recipe 4. Decorative elements in the form of broad horizontal lines cover the necks and at least the shoulder

**Table 2.** Bu 3 : vertical distribution of the sherds from the test trench.

Depth below surface	Squares			Undecorated sherds	Decorated sherds	30 × 30 mm			Total
	A1	A’1	B1			70 × 70 mm	120 × 120 mm		
0–10 cm	31	12	4	41	6	32	11	4	47
10–20 cm	28	4	37	53	16	30	39	1	69
20–30 cm	0	2	7	6	3	8	1	0	9
<b>Total</b>	<b>59</b>	<b>18</b>	<b>48</b>	<b>100 (80%)</b>	<b>25 (20%)</b>	<b>70 (56.0%)</b>	<b>51 (40.8%)</b>	<b>5 (3.2%)</b>	<b>125</b>



**Figure 11.** Bu 3: pottery from the test trench (1–4) and the surface of the site (5–13) (drawings by B. Clist).

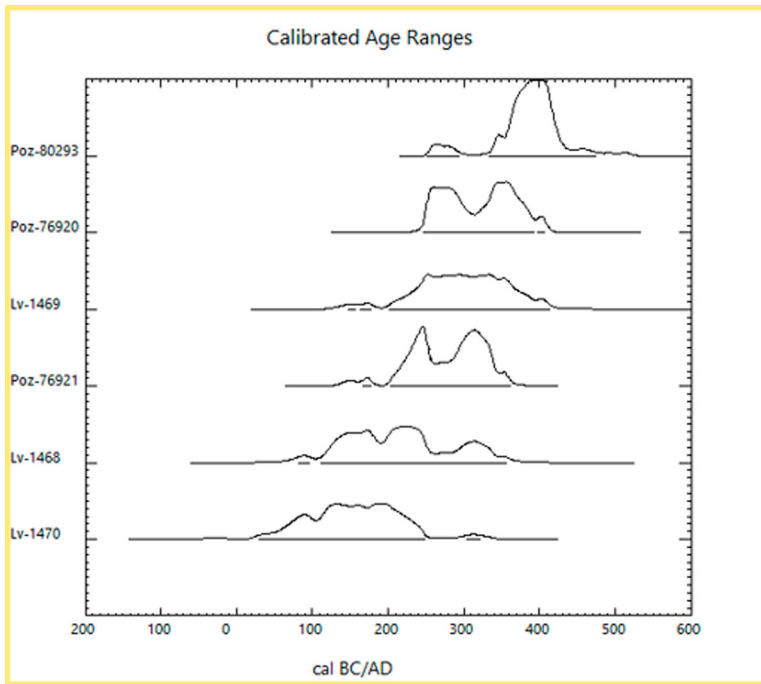
and upper body parts. The vessels were made by coiling as frequent coil breaks are present, often showing oblique twin breaks that hint at their thickness (up to 25 mm; [Figure 11: 5](#)) and the way in which they were constructed. A large sherd from pit 42 at Sakuzi bears the same horizontal neck decoration ([Gosselain 1988: Figure 32: 6](#)) and belongs to Kay Ladio C pots (Clist 1982: 152–156; our [Figure 13: 4b](#)). The Sakuzi structure is dated at two-sigma to cal. AD 147–414 (Lv-1469;  $1780 \pm 50$  BP). Many features of these surface-collected pots are similar to those found on the Kitala Group pottery dated to cal. AD 250–524 and roughly contemporaneous with the Bu 3 Kay Ladio pottery (Clist *et al.* 2018a: 50). New research will be needed to clarify whether the thick pottery belongs to the Kitala Group or whether it belongs to a different pottery tradition.

As for the metal items found, the four rings are all composed of an iron rod the section of which is either round (in three cases) or flat (in one) and are formed by bending it into a ring-shape by hammering. These objects could be contemporaneous with the Kay Ladio pottery or they may be more recent in age.

## Chronology

The research that we carried out in 2015 has enabled us to process new radiocarbon dates for Kay Ladio ware, two from Kindu and one from Bu 3, to which can be added the three dates obtained in 1984 from Sakuzi ([Figure 12](#)). All of the Kay Ladio radiocarbon dates were processed from charred endocarps of *Elaeis guineensis* or *Canarium schweinfurthii* or from mixed samples of wood charcoal and oil palm endocarps. Calibration was performed with the Calib programme v.7.0.4 using the southern hemisphere correction tables, with an accuracy of two sigma (95.4% confidence).

From the oldest to the youngest we now have the following dates:



**Figure 12.** Calibrated radiocarbon dates of the Kay Ladio Group (Lv = Sakuzi; Poz = Kindu and Bu 3).

1. Lv-1470:  $1900 \pm 50$  BP (cal. AD 30–321), Sakuzi site, structure 12, mixed sample of wood charcoal and *E. guineensis* collected between 80 and 90 cm
2. Lv-1468:  $1850 \pm 50$  BP (cal. AD 83–357), Sakuzi site, structure 20, mixed sample of wood charcoal and *E. guineensis* collected between 10 and 45 cm
3. Poz-76921:  $1810 \pm 30$  BP (cal. AD 167–362), Kindu site, trench 9, pit 1, *C. schweinfurthii* endocarps collected between 50 and 60 cm
4. Lv-1469:  $1780 \pm 50$  BP (cal. AD 147–414), Sakuzi site, structure 42, mixed sample of charcoal and *E. guineensis* collected between 50 and 55 cm
5. Poz-76920:  $1750 \pm 30$  BP (cal. AD 248–406), Kindu site, trench 9, *C. schweinfurthii* endocarps collected between 20 and 30 cm
6. Poz-80293:  $1700 \pm 30$  BP (cal. AD 253–475), Bu 3 site, trench 1, B1 square, *E. guineensis* endocarps collected between 10 and 20 cm

These six dates situate the Kay Ladio Group between cal. AD 30 and 470 (Figure 12). It is thus later than the Ngovo Group, the distribution of which is limited to the Kongo-Central province south of the Congo River (Clist 1982; de Maret 1986). Dated to between 420 cal. BC and cal. AD 130, the Ngovo group is not associated with iron metallurgy (Clist 2005: 755; Clist *et al.* 2018a).

The calibrated radiocarbon dates suggest an east-west gradient from Sakuzi to Bu (see Figure 1). However, given the Kay Ladio Group's small number of dated (three) and recorded sites (17), it is necessary to remain cautious on this point and await further dated sites to confirm this observation.



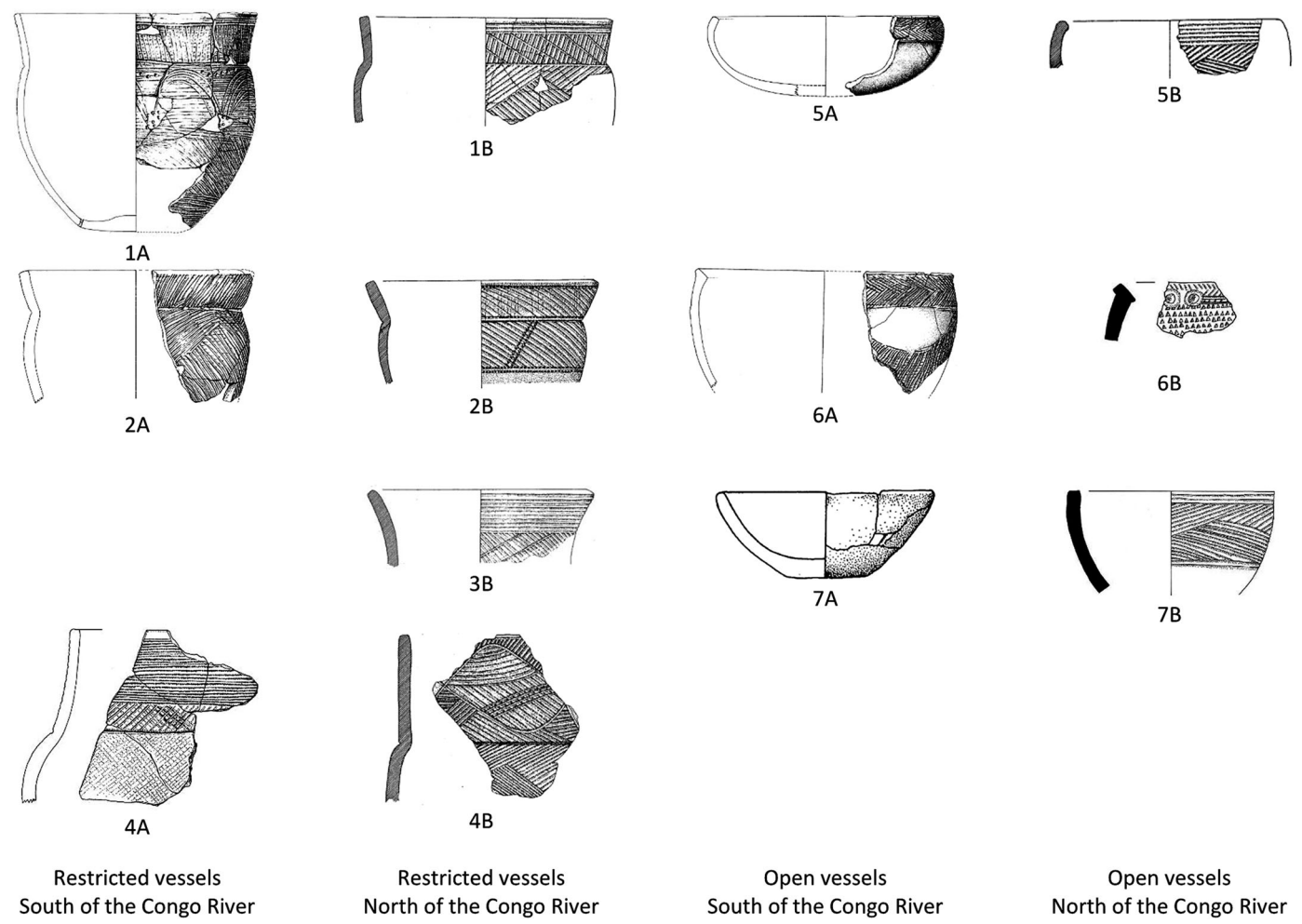


Figure 13. Kay Ladio Group morphological types from sites to the north and south of the Congo River (drawings extracted from Clist 1982 and Gosselain 1988).

## Palaeoeconomy and palaeoenvironment

With regard to the subsistence economy of the Kay Ladio villagers, the macrobotanical remains found point towards arboriculture. Endocarps of *Elaeis guineensis* (oil palm) and *Canarium schweinfurthii* drupes were abundant in both the habitation level and the associated pit at Kindu, but only *E. guineensis* endocarps were found at Bu 3 (see above and Hubau *et al.* 2018). Interestingly, their wood was not found as charcoal, suggesting that people preferred not to cut down these trees. Charcoal identifications provide insights into fuel wood choices as well as the composition of the surrounding vegetation. Such identifications have only been rarely conducted in the area. Thus, with only a handful of published works (de Maret 1986; Schwartz *et al.* 1990; Pinçon and Deschamps 1991; Schwartz and Dechamps 1991; Schwartz *et al.* 1991; Hubau *et al.* 2014), preliminary comparisons are made with due caution.

The charcoal types identified in the Kindu and Bu sites were all found in context, either in the preserved settlement levels of Bu and Kindu or in the Kindu pit. Most of the charcoal fragments from Bu 3 were clearly derived from pioneer species, such as *Vernonia conferta*, *Pycnanthus angolensis*, *Alstonia* spp. and *Milicia excelsa* (Table 3). Today, the Bu 3 area is dominated by dry forests and woodland savannas. Indeed, two charcoal types seem to be derived from typical savanna taxa, i.e. *Ziziphus* spp. and *Uapaca* spp. In contrast, the results from Kindu suggest that the environment there comprised a complex mosaic of regenerating and mature rainforest but also edaphic riverine forests. Although it is dominated by wooded savannas, Kindu is in a more forest-rich environment than Bu 3 since it

**Table 3.** Kindu and Bu : number of identified pieces of charcoal. See Hubau *et al.* (2018) for charcoal identification methods and full results.

Charcoal taxa	Kindu	Bu
<u>Evergreen and semi-deciduous rainforest taxa:</u>		
Burseraceae cf. <i>Santiria trimera</i>	2	0
Caesalpinioideae cf. <i>Cynometra</i> spp.	4	0
Lauraceae cf. <i>Beilschmiedia</i> spp.	2	0
Caesalpinioideae cf. <i>Guibourtia</i> spp.	4	0
Irvingiaceae cf. <i>Irvingia</i> spp.	21	0
Malvaceae cf. <i>Scaphopetalum</i> spp.	2	1
Mimosoideae cf. <i>Parkia</i> spp.	0	1
Lecythidaceae cf. <i>Napoleonaea</i> spp.	1	0
<b>Total</b>	<b>33</b>	<b>2</b>
<u>Pioneer and secondary forest taxa:</u>		
Annonaceae cf. <i>Xylopia</i> spp.	2	0
Caesalpinioideae cf. <i>Azelia</i> spp.	0	1
Mimosoideae cf. <i>Albizia</i> spp.	6	2
Flacourtiaceae cf. <i>Oncoba</i> spp.	1	1
Apocynaceae cf. <i>Alstonia</i> spp.	0	2
Asteraceae cf. <i>Vernonia conferta</i>	0	3
Myristicaceae cf. <i>Picnanthus angolensis</i>	0	1
Moraceae cf. <i>Milicia excelsa</i>	0	5
<b>Total</b>	<b>9</b>	<b>15</b>
<u>Gallery and riparian forest taxa:</u>		
Anacardiaceae cf. <i>Pseudospondias microcarpa</i>	1	0
Lauraceae cf. <i>Beilschmiedia</i> spp.	2	0
Sapindaceae cf. <i>Eriocoelum</i> spp.	3	0
<b>Total</b>	<b>6</b>	<b>0</b>
<u>Woodland and savanna taxa:</u>		
Rhamnaceae cf. <i>Ziziphus</i> spp.	0	9
Phyllantaceae cf. <i>Uapaca</i> spp.	0	2
<b>Total</b>	<b>0</b>	<b>11</b>

is closer to the Mayombe Forest. This explains the occurrence of mature rainforest taxa such as *Guibourtia* spp., *Cynometra* spp. and *Irvingia* spp. Overall semi-deciduous rainforest taxa were mixed with pioneer and secondary forest taxa at Kindu, while pioneer and secondary forest taxa were mixed with woodland and savanna taxa at Bu 3.

Generally, villagers used wood and charcoal for cooking and heating (due to Kindu's altitude and the cold weather experienced there). However, they also produced charcoal for iron production as indicated by the tuyères, iron slag and iron tools found at Kindu. Most of the taxa identified from inside the two settlements are known to be useful plants in the Lower Congo region, with a wide variety of applications (Latham and Konda ku Mbuta 2010). For example, most are used today for traditional medicine, including *Albizia adianthifolia* (Latham and Konda ku Mbuta 2010: 22-26), *Alstonia boonei*, *Alstonia congensis* (Latham and Konda ku Mbuta 2010: 30), *Oncoba welwitschii* (Latham and Konda ku Mbuta 2010: 235), *Pseudospondias microcarpa* (Latham and Konda ku Mbuta 2010: 253), *Vernonia amygdalina* (Latham and Konda ku Mbuta 2010: 323) and *Xylopia aethiopica* (Latham and Konda ku Mbuta 2010: 330). Others are used in construction (*Albizia adianthifolia*, *Albizia chinensis*, *Oncoba welwitschii*, *Pseudospondias microcarpa* and *Xylopia aethiopica*), for cooking and heating (*Albizia lebbeck*, *Milicia excelsa* (Latham and Konda ku Mbuta 2010: 211), *Pseudospondias microcarpa* and *Vernonia amygdalina*) and for making charcoal (*Albizia ferruginea*, *Albizia lebbeck*, *Oncoba welwitschii* and *Xylopia aethiopica*). Finally, some taxa are used as sources of food, for example the leaves of *Albizia adianthifolia*, the fruits of *Pseudospondias microcarpa* or the caterpillars that live on *Imbrasia* spp. and develop on *Milicia excelsa*. Several of the identified tree taxa are planted and then tended near or inside villages.

## Discussion and conclusion

The Kay Ladio Group now looks to have developed during the first century AD and to have lasted until the end of the fifth century. It occupied a vast area north and south of the Congo River stretching some 150 by 100 km (half the size of modern Belgium) with villages mainly built on ridges and hilltops. Stone tools previously in use with Ngovo Group ceramics were replaced by iron tools produced in or near Kay Ladio villages. The association of polished stone axes with Kay Ladio communities appears to be secure. However, it is possible that they were only used for ritual purposes, having been inherited from previous Ngovo villagers (de Maret 1986) or surface-collected from abandoned sites. This remains a point for future research.

Pottery production from north to south of the Congo River met a strict standard recognisable in shapes, decoration, layout and vessel manufacture (Figure 13). This homogeneity could be due to the presence of a single language that facilitated exchanges over a vast distance, but above all it probably corresponds to the presence of a large community of people sharing space with the same identifying signs and social system as well as language for almost 400 years. Nevertheless, detailed study of Kay Ladio decoration attributes currently being undertaken by one of us (Clist) in collaboration with Pierre de Maret may help to distinguish intra-area styles.

At Kindu and Bu 3, Kay Ladio material occurred at a shallow depth beneath the surface. This is also the case at the Kitala site to the southeast (Clist *et al.* 2018a: 50). In comparison

to the Late Iron Age Kindoki Group, where pottery and other remains were more deeply buried (at depths of 50–60 cm) (Clist *et al.* 2018c, 2018e), the Kay Ladio situation can be explained by local sheet erosion. Extensive surveys, test excavations and large-scale excavations have not led to the unearthing of Kay Ladio pottery along the Inkisi River from its confluence with the Congo River to the north as far as the Angolan border to the south. Based on the distribution map and the four areas relatively well surveyed, we can now hypothesise that the Kay Ladio Group had a nucleated settlement pattern, with communities grouped in specific zones (the Bu, Kinkenge and Sakuzi areas), while absent from others (e.g. Inkisi) (see [Figure 1](#)).

The Kay Ladio Group follows after the Ngovo Group during the first century AD. The differences between Ngovo and Kay Ladio suggest that Kay Ladio pottery represents the influx of new people into the current Kongo-Central province. These newcomers were metalworkers. Furthermore, recent data suggest a shift during the mid-first millennium AD from Kay Ladio to the Kitala Group south of the Congo River (Clist *et al.* 2018a, 2018c). Unlike the sharp Ngovo-Kay Ladio disjunction, this later shift from Kay Ladio to Kitala appears more like a local transition and will be the subject of ongoing research.

From a broader regional perspective, it could be that the Ngovo Group is the southernmost manifestation of a north to south coastal movement of people from Cameroon represented by the River Denis site, the Okala Tradition in Gabon (Clist 1989, 1995: 219, 1997, 2005) and the Ceramic Late Stone Age of Tchissanga in Congo-Brazzaville (Denbow 1990, 2012, 2014: 62; Denbow *et al.* 1988). The more recent Kay Ladio Group could then be the materialisation of a later northeast to southwest movement of people, possibly speakers of Bantu languages belonging to the Kikongo Language Cluster, a discrete subgroup of the West-Coastal Bantu branch (de Schryver *et al.* 2015; Bostoen and de Schryver 2018). If this were the case, then the producers of Ngovo Group and Tchissanga pottery possibly spoke languages that did not belong to West-Coastal Bantu but may have subsequently disappeared under the pressure of the language(s) spoken by Kay Ladio producers, amongst others. Although it is possible to follow pottery styles from southern Cameroon to the Kouilou River in the Congo from before 1000 cal. BC to >400 cal. BC (Clist 2006: 296, 298; de Maret 2013: 632), the later Ceramic Late Stone Age (CLSA B) or Tchissanga Group has more in common with the Ngovo further south than with any other group, while being slightly older.

We have also found it impossible to link Kay Ladio with the Pointe-Noire region to the northwest ([Figure 1](#)). Contemporaneous pottery there, called Herringbone Ware and Carinated Broadly Grooved Ware (Denbow 1990, 2012, 2014), bears no relationship to it in terms of shapes and decoration (Clist *et al.* 2018a: 48). Moreover, no relationships can be found to the northeast, upstream from Kinshasa on the Congo River in the DRC, where a different and unrelated sequence lasted for some 4000 years (Wotzka 1995; Seidensticker 2016).

On the other hand, the Kongo dia Vanga archaeological site of the Kay Ladio Group situated a few kilometres north of the Angolan border does suggest that this cultural group extended southwards ([Figure 1](#)). Furthermore, parallels have recently been observed between the Early Iron Age pottery of the contemporaneous Cabolombo site to the south of Luanda (ex-Benfica II site) and Kay Ladio (Clist *et al.* 2018a: 45–46). The Cabolombo site's inhabitants exploited ocean and littoral resources around cal. AD 128–428, fishing, hunting and collecting shellfish (Clist and Lanfranchi 1992: 249–250; Valdeyron and

Domingos 2012: 116–119); they also seem to have used iron implements (Valdeyron and Domingos 2009: 743).

In order to better understand the relationship of Kay Ladio with neighbouring cultural groups, considerably more research on local cultural sequences covering the last 2500 years throughout Angola, the DRC and the Congo Republic will be required.

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All of the pottery from Sakuzi is in the temporary collection of the Royal Museum for Central Africa, while all the other sites collections are curated at the Institut des Musées Nationaux du Congo in Kinshasa, DRC.

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