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The History of Ovicaprines in Central Africa: Historical-Linguistic Insights from West-Coastal Bantu

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Thank you all for reading.

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Abbreviation	**Terminology**	**Addition**
AD	Anno Domini	calibrated, calendar years after Christ, year 0 (Degryse et al., 2009).
BC	Before Christ	calibrated, calendar years before Christ, year 0 (Degryse et al., 2009).
BLR	Bantu Lexical Reconstruction	See (Bostoen & Bastin, 2015)
BP	Before Present	calibrated, from 1950 based on C14 radiocarbon dating (Degryse et al., 2009).
BS	Bantu Spirantization	Targeted stop undergoes fricatization triggered by the PB high vowels *i and *u, positioned right of the targeted stop, see (Bostoen, 2008)
c.	Circa	
C	consonant	
C1	First consonant of the root	
C2	Second consonant of the root	
Cl	Class	
CWB	Central-Western Bantu	
DRC	Democratic Republic of the Congo	

F	Falling tone	Indicated with ^, formed as a contour of a high tone immediately followed by a low tone
FV	Final Vowel	
FVL	Final Vowel Loss	See (Pacchiarotti & Bostoen, 2020b)
H	High tone	Indicated with ´
KLC	Kikongo Language Cluster	
L	Low tone	Indicated with `
N	Homorganic nasal	
NC	Noun class	
NWB	North-Western Bantu	
PB	Proto-Bantu	
R	Rising tone	Indicated with ˇ, formed as a contour of a low tone immediately followed by a high tone
SWB	South-Western Bantu	
V	Vowel	
V1	First vowel of the root	
V2	Second vowel of the root	
WCB	West-Coastal Bantu	Also known as West-Western Bantu see (Grollemund et al., 2015)

YBP	Years Before Present	Same principles as BP, calibrated, from 1950 based on C14 radiocarbon dating (Degryse et al., 2009).

1. Introduction

Goats and sheep, in archaeology known under the common denominator ‘ovicaprines’ or ‘ovicaprids’, were probably introduced after a journey through the African continent in West-Central Africa around 3.000 years ago. Their journey was facilitated by Holocene climate changes and specialized pastoralist populations (MacDonald & MacDonald, 2000; Mbida et al., 2000; Van Neer, 2000a, 2002). Since ovicaprines have been domesticated, whether it before or after their introduction into the African continent, these animals were in close relationship with human populations. Up until today, these animals are of great importance in the subsistence strategies in many African communities. Therefore, through the study of their distribution, a better knowledge could be generated about the movement of human populations across the African continent (Badenhorst, 2018; Clutton-Brock, 2000; Van Neer, 2002).

Even though these animals are believed to have carried sufficient importance in the day-to-day life of Central African Holocene pastoralists, only scanty faunal evidence was found on these animals in Central African archaeological sites. This gap in the knowledge on the presence of goats and sheep in this region is due to many factors, including the acidic soil of the equatorial rainforest which makes the good preservation of faunal data less likely, and the dense canopy of the rainforest that lowers the accessibility of the archaeological sites in the region (Cornelissen, 2015; Van Neer, 2000b).

The goal of this research therefore is threefold. Firstly, by analysing and comparing linguistic data on ovicaprines a clearer picture will be drawn on the presence and spread of these animals in the Central African region. Through the study of the distribution of these animals, secondly, the spread of Bantu-speaking populations south of the equatorial rainforest will become clearer. Lastly, more knowledge will be gained on the subsistence economy of these populations.

In §2.1 I will summarise what is already known on the history of ovicaprines in Central Africa specifically and the continent more generally from an archaeological point of view. As I will emphasise on the importance of interdisciplinary research in §2.2 I will discuss the gaps in archaeological knowledge on the presence and propagation of ovicaprines in Central Africa and how historical linguistic research can partially fill this gap. Concluding the chapter, in §2.3 I will present the historical linguistic research already carried out on ovicaprines in Africa.

In §3 I introduce the West-Coastal Bantu (WCB) languages on which my research focuses. The languages belonging to this branch of the Bantu language family are spoken in Central Africa and more specifically in parts of the Democratic Republic of the Congo (DRC), the Republic of the Congo (Congo-Brazzaville) and the Gabonese Republic (Gabon).

The lexical data comes from 27 different WCB languages, namely Punu (B43), Lumbu (B44), Nzebi (B52), Nduumo (B63), Yaa (B73c), Eboo-Nzikou (B74), Fumu (B77b), Boma Yumu (B80z), North Boma (B82), Mfinu (B83), Yans (B85a), East Yans (B85b), Nsong (B85d), Mpur (B85e), Nsambaan (B85F), Ding (B86), Ngwi (B861), Lwel (B862), Mpiin (B863), Ngong (B864X), Mbuun (B87), Hangala (H111), Sikongo (H16a), Manganga (H16b), Yombe (H16c), Ntandu (H16g), Yaka (H31) and Hungan (H42).

The choice for these WCB language varieties, spoken in the Central Africa region, is based on a sufficient knowledge of the WCB diachronic phonology, a good insight of the internal classification of WCB and in general a wealth of data to eventually compare (Van Acker et al., 2020). These aspects create the ideal situation in order apply the Comparative Method, which will be discussed in §4. In §4, moreover, I discuss the used conventions, used methodology and used sources on which this research is relying. This is eventually in order to provide a further insight in the spread of domesticated goats and sheep in Central Africa.

My own historical-comparative linguistic research concentrates on seven common WCB term for ovicaprines, four referring to ‘goat’, which will be discussed in §5, and three referring to ‘sheep’, which will be discussed in §6. Terms for ‘goat’ and ‘sheep’ will be synchronically compared, analysed, and discussed. The analysis will be on the basis of their distribution within WCB, their geographical distribution, their noun stems and (regular) sound changes, their noun classes and their semantic meanings. Where possible, an attempt will also be made to propose diachronic reconstructions of each term. The outcome will afterwards be compared and cross-checked with the archaeological data available for ovicaprines in §7. Concluding remarks are offered in §8.

2. The history of ovicaprines in Africa

2.1 Archaeological evidence for the spread of ovicaprines in Africa

Area		Time period	Source
The Levant		11.000-9.000 BP	(Blench & MacDonald, 2011; Luikart et al., 2001)
Northern Africa - Egypt		7.000- 6.500 BP	(Hassan, 2000; MacDonald, 2000; Muzzolini, 2000)
1. Red Sea coast	Sudan & Nile Delta	6.000 BP	(Clutton-Brock, 2000; Hassan, 2000)
	Ethiopian Highlands	6.500-5.000 BP	(Clutton-Brock, 2000; Hassan, 2000)
	East Africa - Interlacustine	4.500 BP	(Clutton-Brock, 2000; Hassan, 2000)
	Southern Africa	2.000 BP	(Badenhorst, 2018; Orton, 2016)
2. West Mediterranean coast	Capeletti, Algeria	6.500-3.000 BP	(Hassan, 2000; Lesur-Gebremariam, 2010; Smith, 1984)
	Sahel – Northern Mali	5.000 - 4.000 BP	(Clutton-Brock, 2000; Hassan, 2002; Smith, 1984; Van Neer, 2000b)
	Central Africa	3.000 BP	(Clutton-Brock, 2000; Hassan, 2002; Smith, 1984; Van Neer, 2000b)

Table 1: Summary of the introduction and spread of ovicaprines through Africa, see also Figure 1 for a worldwide overview.

2.1.1 The domestication and spread of ovicaprines in the Near East

When and where the wild bezoar goat (*Capra aegagrus*) and a species of wild sheep, the mouflon (*Ovis gmelini*) were domesticated is not clear and highly controversial. The taxonomy places wild and domestic goats (*Capra hircus*) within the *Bovidae (Cetartiodactyla, Ruminantia)* family and these animals belong to the *Caprinae* subfamily (Pereira & Amorim, 2010, p. 1).

At the end of the Pleistocene (approximately 10.000- 11.000 years Before Present (BP)[1]), a change in climate triggered the formation of the Neolithic Revolution, characterised by the emergence of agriculture, the domestication of plants and also of animals. The earliest centres of domestication were the Fertile Crescent

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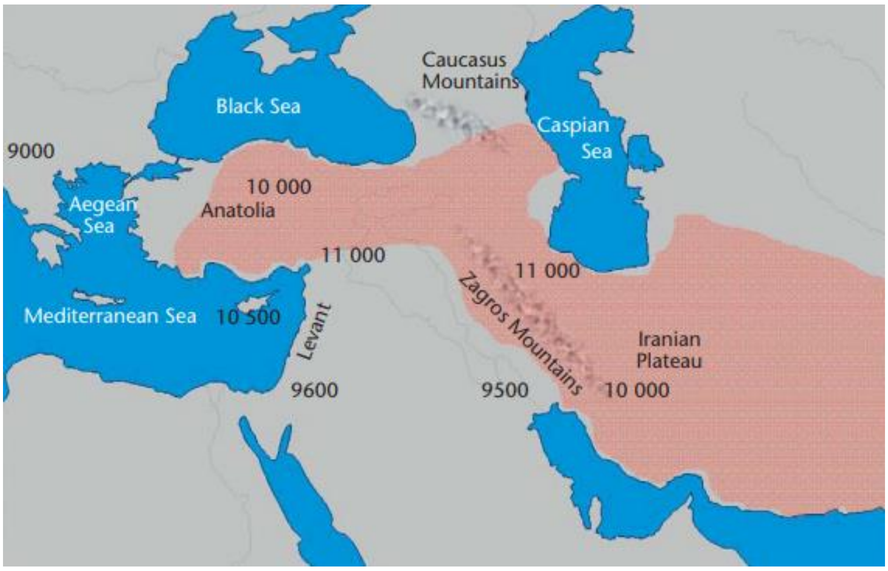
[1] calibrated, from 1950 based on C14 radiocarbon dating (Degryse et al., 2009).

and Southeast Asia (Pereira & Amorim, 2010, pp. 1–2).

However, Legge (1996) situates the domestication of goats by 9.000 BP in the Levant (i.e. present day Syria, Lebanon, Jordan, Israel, Palestine and most of Turkey) where these animals were somewhat restricted to a small area before their spread around 8.500 BP. Gerrard et al. (1996), on the contrary, states that before 8.500 BP, no evidence can be found for the domestication of ovicaprines (Blench, 2006; Hassan, 2000). It could thus be that there were multiple independent domestications of the wild goat in a broad area and "during a long transitional period in which the intense hunting of bezoar goats gradually evolved into their management." (Pereira & Amorim, 2010, p. 5)

From these areas the domestic goat spread fast around the world (Blench & MacDonald, 2011; Luikart et al., 2001) (see Map 1), as a result of “different activities, including commercial trade, thieving, warfare, or the migration of people with their livestock” (Pereira et al., 2009, p. 1). Goats are consistently associated with human migratory movements because of the adaptability of goats to various environments and climates, their flexible diet and "the possession of tractable behaviour make them suitable for domestication." (Pereira & Amorim, 2010, p. 1)



Map 1: The origin and dispersal of domestic goats worldwide. Approximate dates (years before present) for the first appearance of domestic goats in a specific region and the main routes of their initial diffusion are indicated (Pereira & Amorim, 2010, p. 4)

Sheep would have been introduced somewhat later in the area of the Levant i.e. at c. 8.600 BP, coming from the north and the east. The moment and place of transition of the mouflon (*Ovis gmelini*) to the domesticated sheep (*Ovis aries*) is one of the most controversial hypotheses on animal domestications. Muzzolini (2000) suggests that if wild sheep, at the Pleistocene/Holocene transition (i.e. 11.000 BP), could have recolonized the northern part of the Levant, there is no reason that they could not also have spread independently into North Africa (Hassan, 2000; MacDonald, 2000).

Domestic ovicaprines are reported closely to the African continent in layers from c. 7.000 BP at Holocene sites such as Qatif, near Gaza in Palestine (Hassan, 2000). It is estimated that between 7.700 BP and 6.500 BP, cattle had already gradually spread across North Africa[2]. By this period, West-Asiatic contact had become much more frequent, which resulted in a very rapid spread and presence of small domesticated goats and/or sheep across the coast of North Africa between 7.000 – 6.000 BP (MacDonald, 2000; Muzzolini, 2000; Pereira et al., 2009).

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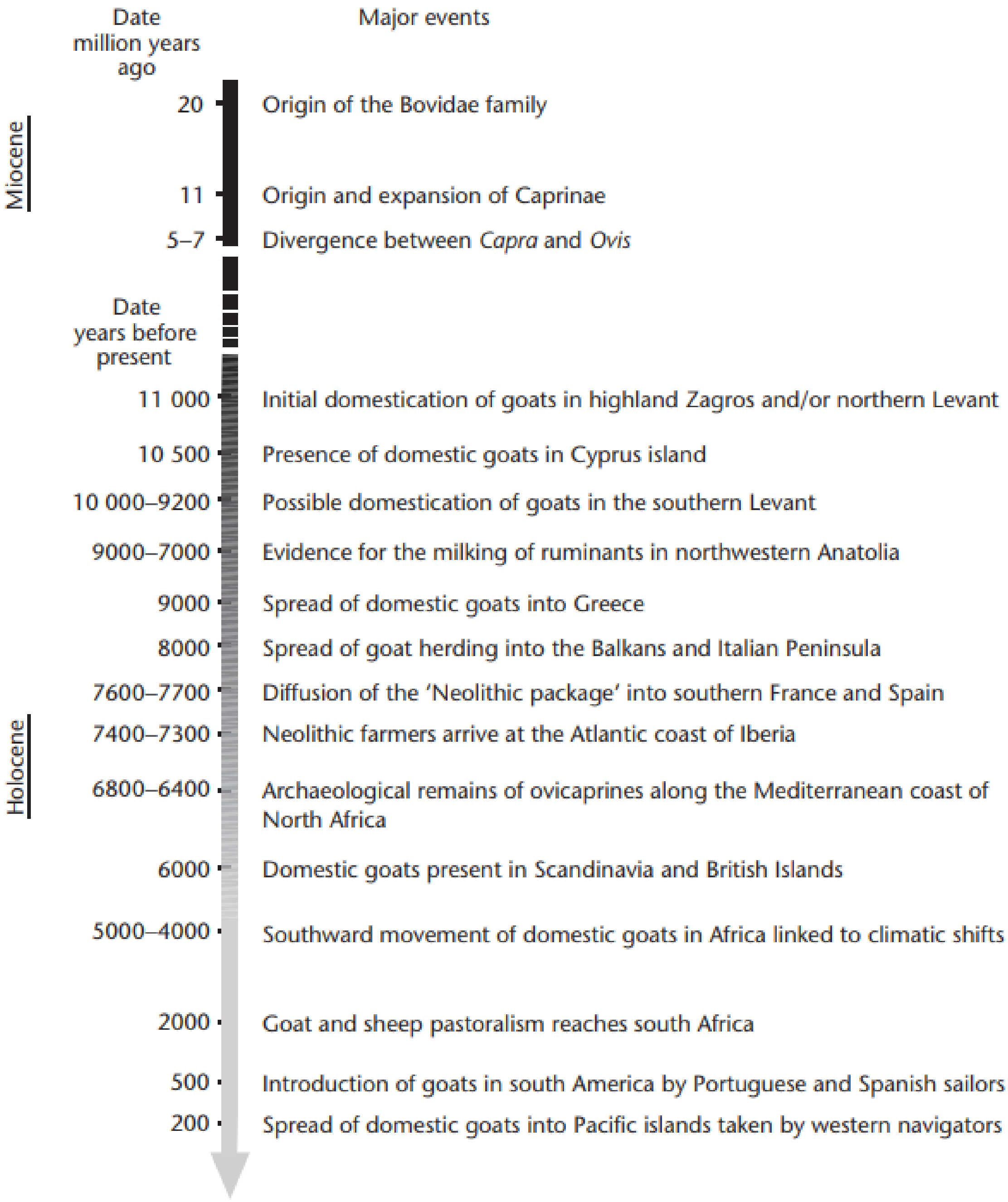
[2] Supposedly with the introduction of sheep and goat stock, cattle keeping progressed from western Egypt to the region of Tibesti, present-day Lybia and Chad by at least 7.000 BP onwards into Tassili and Tadrat Acasus, present-day Lybia and Algeria by c. 6.500 BP (MacDonald, 2000).



Date million years ago	Major events
20	Origin of the Bovidae family
11	Origin and expansion of Caprinae
5–7	Divergence between *Capra* and *Ovis*

Date years before present	
11 000	Initial domestication of goats in highland Zagros and/or northern Levant
10 500	Presence of domestic goats in Cyprus island
10 000–9200	Possible domestication of goats in the southern Levant
9000–7000	Evidence for the milking of ruminants in northwestern Anatolia
9000	Spread of domestic goats into Greece
8000	Spread of goat herding into the Balkans and Italian Peninsula
7600–7700	Diffusion of the 'Neolithic package' into southern France and Spain
7400–7300	Neolithic farmers arrive at the Atlantic coast of Iberia
6800–6400	Archaeological remains of ovicaprines along the Mediterranean coast of North Africa
6000	Domestic goats present in Scandinavia and British Islands
5000–4000	Southward movement of domestic goats in Africa linked to climatic shifts
2000	Goat and sheep pastoralism reaches south Africa
500	Introduction of goats in south America by Portuguese and Spanish sailors
200	Spread of domestic goats into Pacific islands taken by western navigators

Figure 1: Dates (calibrated YBP) and events associated with the origin and diffusion of goat pastoralism worldwide (Pereira & Amorim, 2010, p. 6)

2.1.2 The introduction of ovicaprines in North Africa

Introduced from the Near East, the Mediterranean coast and the Red Sea hills, flocks of small livestock appeared in northern Africa around 7.000 BP. When arrived in the African continent, ovicaprines turned out to be vital resources to the subsistence economy of many people in the continent, as these animals were reared for both their meat and their secondary products such as milk and skin (Pereira & Amorim, 2010; Van Neer, 2000b). Moreover, due to their greater ability to adapt to desert conditions and because of the diffusion of drier conditions in the area, ovicaprines rapidly spread into the interior of North Africa and Sahara (Hassan, 2000; Lesur-Gebremariam, 2010; Van Neer, 2000b) (see Appendix 4).

Based on mtDNA of goat breeds situated in the African continent today, goat races seem to have been constantly exchanged between populations, causing diversity in breeds. Moreover, it seems that the spread of goats was facilitated by human intervention as they were part of extensive intercontinental transportation in different ways in contrast to cattle, namely by boats and even on the back of camels. The diversity in goat lineages thus, can suggest regular transportation of the animals for either commercial trade or during migratory movements of populations (Hassan, 2000; Luikart et al., 2001).

Ovicaprines turn up in as domesticates in archaeological records of both the eastern part of the Sahara at 7.000 BP and Haua Fteah in North Africa at 6.800 BP. According to Vermeersch et al. (1996) sheep and/or goats are recorded just after 7.000 BP at the the Sodmein Cave near the Red Sea Hills, in Egypt. Around c. 6.700 BP ovicaprines first appear in the site of Nabta Playa, southern Egypt (Hassan, 2000; Lesur-Gebremariam, 2010) (see Appendix 4).

However, on the basis of rock art depictions of the 'ornamented rams' of the Atlas, Muzzolini (2000) places the appearance of sheep there somewhat later, i.e. around 6.000 BP (Hassan, 2000; Muzzolini, 2000). Based on many faunal depictions in Saharan rock art, Muzzolini (2000) finds that around the early Holocene ovicaprines might have been introduced on the African continent by means of natural migration from south-west Asia, through either the Bab-el-Mandeb or Sinai desert, rather than by human interference. These early ovicaprines thus could have been wild and few in number rather than domesticated before arriving in northern Africa around 6.000 BP. (Muzzolini, 2000).

Either way, by 6.000 BP, cattle and small livestock reached the Nile Delta and the central Nile Valley. From there on out, cattle, sheep and goats spread further into the Ethiopian Highlands between 6.500 – 5.000 BP and reached East Africa around c. 4.500 BP (Clutton-Brock, 2000). As a consequence of the increasing drier climate in North Africa the tsetse barrier moved southward, which allowed herders and their livestock to migrate into southern parts of the continent (Pereira et al., 2009). In these regions it seems that domestic cattle and livestock were kept by hunting and gathering populations as economic supplement (Hassan, 2000).

Cattle and small livestock also spread through the central Sahara by 6.500 BP following a more western route. Here also a specialised form of herding developed in certain habitats, such as mountain massifs and depressions. This herding also had an emphasis on small livestock, which is suggested by faunal records from Capeletti site, in Algeria (see Appendix 4). Here the assemblage is dominated by sheep and goat faunal remains. From there on out, pastoralists spread westwards from the central Sahara and joined hunter-gatherer and fishing communities. Around 3.500 BP pastoralists appear at Dhar Tichitt (i.e. present-day Mauritania), which suggests that the west-ward expansion lasted well until 3.000 BP (Hassan, 2000).

These almost simultaneous appearances of cattle and ovicaprines in this broad region suggest a very rapid rate of movement by small groups of herding peoples with their livestock. A demic population expansion as a consequence of a growing population in the parent region, after which a part of the population moves and daughter colonies are established, would entail a slower dispersion rate. Therefore, a built-up population growth is less likely to be the factor of the rapid rate of movement of ovicaprines in North Africa (Hassan, 2000).

A more plausible factor for these movements could be the precarious climatic conditions between 7.800 – 5.900 BP and severe droughts recorded between 7.000 – 6.000 BP. Small groups involved in specialised herding and pastoralism were reported along the Mediterranean coast, as in Capeletti (i.e. present-day Algeria) after 6.500 BP and in the central Sudan at about the same time. These arid conditions in the Sahara after 4.500 BP caused surface water resources to become scarce, which pressured herders to move southward. Further southwards, different, but equally specialised forms of pastoralism developed independently within the savanna areas in East Africa after 3.000 BP. Nomadic pastoralism, later on also developed in West Africa, during a second dry phase in the late Holocene (Hassan, 2000; Lesur-Gebremariam, 2010; Smith, 1984).

After 3.700 BP, the Intertropical Zone (ITCZ), bringing rain to the interior of West Africa, seemed to move southwards due to drier climatic conditions. The tsetse barrier moved along southwards, since the tsetse fly, that needs the tropical climate to thrive, followed the ITCZ. This caused the movement of cattle and small livestock to reach northern Nigeria and southern parts of Lake Chad, as well as southern Ghana.

Moreover, in northern Niger and Mali, clear north-south diachronic trends illustrate the southwards migration of pastoralists from the Sahara towards the Sahel. Hence, sheep and goats followed the southward movement of the tsetse barrier (Clutton-Brock, 2000; Hassan, 2002; Smith, 1984; Van Neer, 2000b).

Thus, throughout this period of movement across the Sahara into either East or West Africa, numerous spreads by very small groups were recorded. These, in their turn, joined pre-existing host communities creating different situations for each individual community and area where these small groups landed. Moreover, it is clear that hunting, gathering and fishing were practiced besides this nomadic pastoralism, creating a “colourful kaleidoscope of developments” (Hassan, 2000, p. 62). All these different subsistence strategies and combinations varied according to the region. These pastoralists did indeed search for areas where hunting and fishing was also possible, which probably allowed them to survive and overcome certain periods of food insecurity and environmental stress (Van Neer, 2000b).

2.1.3 Goats and sheep in West and Central Africa

As was established before, by 6.000 BP, cattle and small livestock had been introduced in large parts of northern Africa and were already spreading to the Western Sahara and the Sahel. Not until 2.500 Before Christ (BC)[3] (this is equal to 5000 BP in Map 3) did cattle or small livestock reach West-Africa’s main river basins. As a consequence of Holocene dry conditions in the Sahel at 2500-2000 BC, humidity-released diseases such as trypanosomiasis were countered. These diseases caused by parasites are carried around and transferred by the tsetse fly onto humans and animals alike. The demographic move southwards was facilitated by these droughts, as tsetse-free corridors opened up due to these drier periods (MacDonald & MacDonald, 2000).

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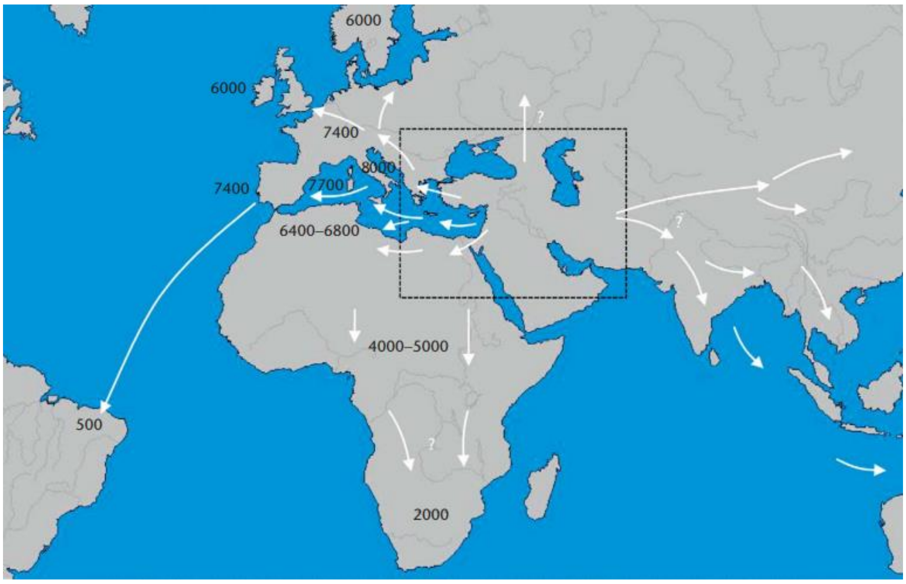
[3] calibrated, calendar years before Christ, year 0 (Degryse et al., 2009).



Map 2: The origin and dispersal of domestic goats worldwide. Approximate dates (years before present) for the first appearance of domestic goats in a specific region and the main routes of their initial diffusion are indicated (Pereira & Amorim, 2010, p. 4)

Smith (1984) sees the presence at Kintampo, (i.e. present-day Ghana) of dwarf goats around c. 4.000 - 3.599 BP as an indication for this movement. Alternatively, the tsetse challenge might also have been overcome by a development of tsetse trypanotolerant breeds of cattle and ovicaprines between 5.000 - 4.000 BP (MacDonald & MacDonald, 2000; Pereira & Amorim, 2010). According to MacDonald and MacDonald (2000), the dwarfing of sheep, goats and cattle breeds could suggest a certain acquisition of trypanotolerance. However “the development of resistance to humidity-related diseases in African livestock is not restricted to dwarf populations. Thus, while dwarf cattle, sheep and goat breeds today are normally trypanotolerant and resistant to other humidity-related diseases, it is not impossible that dwarf-prehistoric breeds may have lacked this tolerance, or that non-dwarf breeds may have possessed it”. (MacDonald & MacDonald, 2000, p. 128)

As discussed before, the change in climatic conditions made way for the emergence of a diverse way of nomadic herding, intertwined with cultivation and hunting-gathering. Particularly in the savanna zone, a shift to cultivation happened, stimulated by the presence of proper cultigens and the droughts between 4.500-4.300 BP, which also caused the Sahara to change rapidly into the present-day desert. Through the dry years, small migrating populations were moved rapidly southwards, eventually mingling with local hunting-gathering communities. The cultural landscape of Africa was changed by these specialised herders and farmers that spread further southwards, together with the spread of iron metallurgy, causing a shift in economic, political and linguistic dynamics (Hassan, 2000; Sowunmi, 2002).

This phenomenon is partly reflected in archaeological data. Throughout the few sites of West and Central Africa, records show a potential southward movement of small livestock in the savanna belt and a southward migration of pastoralists emerging from the Sahara (Mbida et al., 2000; Van Neer, 2000b). The oldest evidence of ovicaprines in West Africa was found in the Nkang site in Cameroon. This site is dated to be inhabited between 8000-2000 BC. Five bones were found in pit structures dating back to 1000 BC representing the presence of small livestock in Nkang. The findings of both the sheep and goats could be from a small dwarf sized breed, which could be compared to breeds found today in equatorial Africa. The same goes for Nsereso and Kintampo (i.e. present-day Ghana) where goat bones were found that were linked to a dwarf breed. Moreover, no archaeological evidence is found for the presence of domestic livestock in the Oveng site in Gabon, which is the only early site with fauna in West-Central Africa (Van Neer, 2000b).

As for Central Africa, along the main rivers of the equatorial forest, the Nkile site is witness to low preservation chances of faunal data in the acidic circumstances of the forest soils. Hence, evidence goes back to only the seventeenth century Anno Domini (AD)[4]. Some fragments of ovicaprines remains were found, but overall these layers point to the reliance on fishing rather than on small livestock. In the Ngovo and Dimba sites in Lower DRC domestic fauna evidence is lacking. In another Lower DRC site of Mashita Mbanza was occupied between the sixteenth and twentieth centuries AD and in which ovicaprines remains were found (Mbida et al., 2000; Van Neer, 2000b)

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[4] calibrated, calendar years after Christ, year 0 (Degryse et al., 2009).

This archaeological data is quite scanty in the Central African region. A number of factors have contributed to this problem and gap in the information on the presence of ovicaprines in the region. Firstly, the denseness of the equatorial rainforest limits the access possibilities into the forest in order to reach and excavate the known archaeological sites (Cornelissen, 2015). Secondly, the soil of the rainforest is very acidic, which lowers the preservation chances of faunal remains to a minimum (Van Neer, 2000b). In order to have higher chances of finding some faunal data, one must rely on rock shelters, for instance Kintampo in Ghana, pit structures, for instance Nkang in Cameroon, or along waterways as in Nkile in the DRC (Van Neer, 2000b) Even when some faunal remains are found despite the mentioned obstacles the archaeozoological data is in most cases less specific. It is fairly impossible to distinguish between sheep and goat bones in most sub-Saharan sites (Blench, 2007; Van Neer, 2000b).

2.1.4 Ovicaprines in Eastern and Southern Africa

The introduction and migration of ovicaprines in Central Africa is very complex and poorly understood due to an almost complete lack of archaeological evidence as a consequence of the many practical restrictions mentioned above. The presence of ovicaprines in Southern Africa is better known through archaeological data. Ovicaprines seem to have arrived in the southern part of the continent by the eastern route around 2.000 BP (Figure 1) (Badenhorst, 2018; Orton, 2016). Two caprine teeth from northern Namibia have been dated to the last centuries BC. The earliest sheep bone is from Spoeg River Cave in South Africa, dated at around 2.105 BP. The second earliest is from the Blombos cave site on the southern coast of South Africa, directly dated at around 1.960 BP (Orton, 2016). Nevertheless, it is unclear on whether livestock accompanied migrating Khoekhoe herders or whether sheep diffused amongst hunter-gatherers in Southern Africa before the arrival of herders during the second millennium AD. Sadr (2003) suggests that “both sheep and pottery reached the Khoe prior to the incursions of Bantu-speakers in the area.” (Blench, 2007, p. 623)

During the Early Iron Age (200 - 900 AD) Bantu-speakers keeping goats, sheep, cattle, dogs and chickens, are believed to have reached these regions (Badenhorst, 2018, pp. 79–80). Badenhorst (2018) suggests that faunal evidence on sheep outnumber goat in most of the southern Africa sites from that period. The dominance in Early Iron Age sites of faunal evidence on sheep “reflects the desire to keep these animals in large numbers.” (Badenhorst, 2018, p. 82) Reasons for this desire could be that sheep were valued quite highly due to their scarcity and their tranquillity. However, during the Middle and Late Iron Age, thus after Bantu-speaking populations had reached Southern Africa, the archaeological evidence on goats increases.

This may be linked to many factors favouring the herding of goats. Climate is one of these factors. During the Early Iron Age warmer and wetter conditions might have attracted these Bantu-speaking populations to Southern Africa as these were good farming and goat-herding conditions, since goats are tougher animals than sheep. This was also the case sometime later around the transition between the Middle and Late Iron Age. Moreover, goats are versatile in their feeding habits and even thrive under unfavourable grazing conditions as was the case for these areas. Lastly, goats seem to be more trypanotolerant and are thus not as gravely affected by humidity-related diseases as sheep, which could also have been in the favour for the usage of goats (Badenhorst, 2002, 2018) .

Lastly, there have been many speculations to what the benefits were of livestock-keeping and based on data from southern Africa a clearer picture is formed. Van Neer (2000) suggests that sheep had a cultural role in some herding societies, as they must have played a special role in ceremonial contexts, for instance during marriage ceremonies (Badenhorst, 2018; Van Neer, 2002). Goats were also supposedly used for diagnosing human illness and divination (Badenhorst, 2018). Smith (1992) suggests, based on the predominance of the fat-tailed sheep that ovicaprines provided more fat-enriched meat than that of the wild herbivores (Clutton-Brock, 2000). Skins were also used primarily for clothing, whereby for instance among the Pedi “sheep skins are fashioned as garments for royal sons during initiation, and goats skins for the sons of commoners” (Mönnig, 1967, p. 171)[5]. Lastly, both sheep and goats are used to settle legal disputes or even create bonds between neighbouring villages through exchange parts of the flocks and as part of marriage negotiations (Badenhorst, 2018, pp. 80–81). So, these animals both had purely subsistence related value as well as more socially and perhaps even politically related value, based on wealth and status that came with the possession of large herds of livestock (Clutton-Brock, 2000).

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[5] Supposedly, the sheep in southern Africa had long legs and hair instead of wool, since indigenous sheep today are hairy. There is uncertainty on whether the sheep were fat or thin-tailed.

2.2 Summary

In the previous sections it became clear that ovicaprines were introduced about 7.000 years ago from the Levant into Northern Africa. After a journey through the African continent, they were possibly introduced between 5000-3.000 BP in the West-Central African region. This is only visible in archaeological records of the Nkang site (i.e. present-day Cameroon), which holds the oldest evidence of ovicaprines in West Africa. They were preceded by changes in climate and their journey was facilitated by specialised pastoralist populations. Even though, these animals are believed to have carried sufficient importance in the day-to-day life of West-Central African Holocene pastoralists, only scanty faunal evidence was found on these animals in archaeological records on Central Africa. This gap in the knowledge on the presence of goats and sheep in this region is due to many factors (Hassan, 2000, 2002; Van Neer, 2000b).

It would seem that there are three obstacles that cause that gap in information. The data from Central Africa is scanty, due to on one hand the denseness of the forest canopy, which makes it almost impossible to excavate thoroughly the known archaeological sites in the region (Cornelissen, 2015). On the other hand the equatorial soils are too high in acid, which causes the preservation chances of faunal remains to be extremely low (Van Neer, 2000b). Lastly, even when faunal remains are found despite the mentioned obstacles, archaeozoological data is less specific, since it is fairly impossible to distinguish between goat and sheep bones from archaeological sites across the world and more specifically in Sub-Sahara (Blench, 2007; Van Neer, 2000b).

It is clear that archaeology alone will not entirely answer the question on how, where and when ovicaprines spread over the African continent. A more interdisciplinary approach seems therefore more productive and interesting. A similar approach was used for the research on the Bantu Expansion in which archaeology, evolutionary genetics, and historical linguistics each brought their own view and methodology to the foreground to construct a more complete picture (Bostoen, 2007, 2018). More on this research will be discussed in §3.1.

An interdisciplinary approach seems attractive, since archaeology, history, linguistics and genetics, all in their own way, aim to classify and reconstruct human populations and look at how these classifications reflect historical processes (Güldemann, 2008). Therefore, goal of this research is threefold. Firstly, by analysing and comparing linguistic data on ovicaprines a clearer picture will be drawn on the presence and spread of these animals in the Central African region. Through the study of the distribution of these animals, secondly, the spread of Bantu-speaking populations south of the equatorial rainforest will become clearer. Lastly, more knowledge will be gained on the subsistence economy of these populations.

By the addition of historical linguistics the history which languages share will be examined through the comparison of synchronic language data and through the analysis of shared retentions and shared innovations in order to possibly reconstructed its origin and evolution. Obviously, historical linguistics is not fail-proof and it contains certain restrictions one must acknowledge (Van Acker et al., 2020). Its restrictions lie in the size and vastness of the African continent and the high language diversity. Niger-Congo is the largest African language phylum and the Bantu languages are known to behave as a dialect continuum rather than as individual and clear defined languages. This makes it much harder to interpret on a historic linguistic level, as it is more ambiguous. (Blommaert, 2008; Pacchiarotti et al., 2019) Next to this, many languages are not as well (enough) documented or analysed as would be ideal. Therefore, genealogical classifications of language families and a description of the population dynamics underlying the language spread are sometimes lacking (Power et al., 2019; Van Acker et al., 2020).

Due to the above restrictions, it is more viable to focus on one specific branch within the African languages. Central Africa is part of the Bantu domain where, for the most part, WCB languages are spoken. The choice for this branch is because its internal structure and genealogical unity is well established (see Bastin et al., 1999; Pacchiarotti et al., 2019; Vansina, 1995), there is a good knowledge on the diachronic sound changes (see Bostoen & Muluwa, 2014; Hyman, 2019; Koni Muluwa & Bostoen, 2010; Muluwa & Bostoen, 2012; Pacchiarotti & Bostoen, 2020d, 2020c, 2020a, 2020b) and there is a well-founded "hypothesis on the population dynamics underlying the spread of WCB" (Van Acker et al., 2020, p. 4). This more specific and narrowed scope creates the ideal situation in order apply the Comparative Method, namely a sufficient grasp of its diachronic phonology, a good knowledge of the internal classification of WCB and in general a wealth of data to compare (Van Acker et al., 2020). The application of the Comparative Method will be discussed in §4.2.

A description of the WCB branch will be covered in §3, but first the next section will discuss the already existing linguistic research and evidence on ovicaprines in African languages. The goal of this research is, however, to examine synchronic vocabulary on two domestic animals, goats and sheep in 27 WCB languages, which will be covered in §5 an §6.

2.3 Linguistic evidence for ovicaprines in Central Africa

Linguistic data seems to support the diverse and complex history of goats since their domestication, as many different terms for goat can be found across the African language phyla. The root *k-r- is spread and supposedly deeply embedded across southern Afro-Asiatic branches and borrowed in Nilo-Saharan branches (Blench, 2006).

However, in Niger-Congo and certainly in its largest subbranch Bantu another distinctive root for ‘goat’ was reconstructed to Proto-Bantu (PB), namely *bʊ́dì. This would mean that right from the onset Bantu speakers would have known goats, since the term *bʊ́dì is attested in all subbranches of Bantu (Ricquier & Bostoen, 2009; Van Neer, 2000b). This root can also be found in several WCB languages, as will be discussed in §5.1.

Terms for sheep occur in all language phyla on the African continent. According to Blench (2006, 2007), linguistic evidence could point to an introduction of sheep by Berber populations, around 6000 years ago (Blench, 2007). In Niger-Congo languages however, the names for sheep are diverse and vary across the main branches of the phylum, perhaps pointing to the possibility that the main Niger-Congo branches would already have become established before the introduction of the animal into that area (Blench, 2000, 2006, 2007).

As is mentioned in Vansina (2004), sheep are in some language varieties called by the ideophone *meme*. In Bantu many names referring to animals, are onomatopoetically derived from the animals’ sounds and cries. Koni Muluwa (2010) lists some of these supposedly lexicalised ideophones, such as *-tàmbòì ‘lion’, *-gòmbè ‘cow’, *jénjé ‘cricket’ and *-méémé ‘sheep’.

As for Southern Africa, Güldemann (2008) and Blench (2006) both claim that *t-m-k and *ku are possible reconstructed terms for ‘sheep’ in Central Khoisan (Blench, 2007), or *gu as a Proto-Khoe-Kwadi reconstruction (Güldemann, 2008), which would correlate with the early dates for sheep findings in Namibia. Khoe populations kept mostly fat-tailed sheep coming from Arabia and North-East Africa. Both this race of animal as the practice of herding would have been transferred by Cushitic speakers from the region of what would today be Zambia, about 2.000 years ago. By reviewing rock-paintings and excavated sites in Southern Africa, Sadr (2003) established that “both sheep and pottery reached the Khoe prior to the incursions of Bantu-speakers in the area” (Blench, 2007, p. 623). The word *gu is however so widespread in southern Bantu languages, that a borrowing of the word into these Bantu languages seems unmistakable. For Güldemann (2008) it seems that “the transfer probably involved other KhoeKwadi donor languages” since it “is unlikely to have been borrowed exclusively from the historically attested Khoekhoe.” (Güldemann, 2008, p. 110).

Vansina (2004), besides other historians and linguists alike, also made historical claims based on linguistic data concerning ovicaprines. As was noted by Westermann (1927), the root * bʊ́dì in some cases also means ‘sheep’ besides the meaning of 'goat' (Blench, 2006). Vansina (2004) made a similar claim, stating that “the diffusion of sheepherding also helps to date some of the major language splits in the Njila group. For this, one must examine what happened to the term for "goat." In western Angola, the terms for sheep are direct loans from San everywhere as far north as the border of Umbundu. There Umbundu and the whole Kimbundu Block applied *mbudi*, the old term for goat, to sheep. They therefore had to invent a new word for goat, namely, *kombo/hombo* and that was then adopted by people farther to the north of them, such as Kongo speakers. But speakers of Eastern Block languages adopted the term *-pembe* for goat and called sheep by the ideophone *meme*.” (Vansina, 2004, p. 281-282)

Apart from this, to Vansina (2004) it so appears that ceramics arrived twice in the Central African region, together with the sheep-herding coming from the South and along with the horticulture and goats from the North. This idea is supported by Haacke (2007), who suggests that sheep-herding indeed was adopted by Bantu-speaking communities from Khoisan and in return goat-keeping was adopted by Khoisan from Bantu-speakers (Ricquier & Bostoen, 2009).

Vansina (2004) continues to find that on the one hand, even though archaeological data is poor from any of the Central-Africa sites, the linguistic evidence is enough for him to state that horticulturalist communities kept goats. On the other hand, these goats did not contribute enough to their subsistence economy, so he suggests they were kept in small flocks as they were seen as a mere curiosity or “a substitute for the common goat-sized antelopes.” (Vansina, 2004, p. 37)

As for sheep, Vansina (2004) suggests that ceramics and sheep followed mostly the eastern route and arrived at 200 BC in Zimbabwe. From there on out they spread further south towards the Cape where they were reported in the first century AD. He goes further by stating that they settled also northward into “southern Angola where ancestors of today's Njila speakers acquired them from Khoisan herders and borrowed the Khoisan term to designate sheep as far north as the southern part of the planalto, that is, once again more or less as far as the climatic boundary between the two halves of West Central Africa. Eventually sheep would be adopted farther north and goats would be south of the boundary, but not in large flocks and without pastro-foraging.” (Vansina, 2004, pp. 39–40)

3. The WCB languages

As discussed in §2.2, the main goal is the examination of synchronic vocabulary for two domestic animals, namely goat and sheep. Chapter 5 and 6 aim at studying their diachronic evolution and maybe even propose reconstructions to Proto-West-Coastal Bantu (PWCB) level, which is the most recent common ancestor of the WCB languages. By analyzing and comparing linguistic data on ovicaprines a clearer picture will be drawn on the presence and spread of these animals in the Central African region. This historical-comparative study is based on a sample of 27 present-day languages. The distribution of these languages within the branch will be discussed in §3.3 after an overview is given on the research done on the WCB languages in §3.2.

The second goal, derived from the main goal, is to map the spread of West-coastal Bantu-speaking populations. The WCB languages are part of the Bantu languages that spread during the Holocene from the Bantu homeland in Cameroon across the African continent. This spread is called the Bantu Expansion. As interdisciplinary research is fruitful when attempting to construct a history of a population with their cultures and languages, interdisciplinary insights were consulted concerning the research on the Bantu Expansion. Different disciplines shed their own light on this significant period in the history of the African continent, which will be discussed in the following section.

3.1 The Bantu Expansion

Change in climate is one of the major driving factors behind all the movements of populations as well as small groups of animals and people. The end of the Last Glacial Maximum (LGM) (24.000 – 11.650 BP) marked the beginning of the Holocene period. During this period, arid conditions caused the Sahara to slowly extend and the equatorial rainforest to shrink and/or break up into small refuges (Hassan, 2000).

Dry and wetter spells alternated during the Holocene and changed according to the area. For instance, during the drier phase of 4.500-3.500 BP, the Shum Laka region in Cameroon underwent a cooler spell with a high level of water, which in expense of the savanna, meant a recovery for forest vegetation. Lake Barombi Mbo, also in Cameroon, however, did undergo a drier phase with an increase of woodland or grassy savannas and a reduction and fragmentation of the forest canopy (Sowunmi, 2002).

This climate induced deforestation around 2.500 years ago in West-Central Africa gave a boost to the Bantu Expansion. This term is usually used to refer to the “initial spread of the Bantu languages and the communities speaking them over large parts of Central, Eastern, and Southern Africa, which took place between approximately 5.000 and 1.500 years ago." (Bostoen, 2018, p. 2) This migration began in the Grassfields region in Cameroon that is seen as an ancestral homeland of the Bantu-speaking people. Their spread stands out in three aspects, namely its rapidness, its vastness and its longitudinal orientation (Bostoen, 2018).

The Bantu languages have a rather shallow dime depth in comparison to the whole of the Niger-Congo phylum, which has an age of about 10.000 to 12.000 years old, whilst Bantu languages are no older than 4.000-5.000 years. For its spread, the Bantu Expansion can be divided in two phases based on both archaeological and linguistic data. As Bostoen (2018) states "the internal diversity within the Bantu language family suggests that an initial phase of slow fragmentation and expansion over small distances was followed by a second phase of rapid large-scale dispersal." (Bostoen, 2018, p. 3)

This would mean that at first the Bantu-speaking people migrated slowly and developed locally around the Grassfields of Cameroon for at least 2.000 years, between 6.000-7.000 and 4.000-5.000 years ago (Bostoen, 2018, p. 3). Only at 3.500 years ago did they reach Yaoundé (i.e. present-day capital of Cameroon) and from that moment the expansion built up momentum. After this, about 2.500 years ago, Bantu-speaking populations bridged the distance from Cameroon to South Africa in less than two millennia. Moreover, Bantu-speaking communities moved in a north-south orientation. This made the process even more challenging, since it involved more differences in climate, day length, rainfall and droughts. This required more adaptation from the migrants to their new habitats (Bostoen, 2018).

These challenges could have been insurmountable if it were not for the climate changes that impacted the rainforest, creating savanna corridors. This began at the rainforest's periphery at 4.000 years ago and hit the core of the forest at 2.500 years ago, the same time as the Bantu Expansion had its peak. These savanna corridors, as they cut through the rainforest, facilitated the migration of Bantu speaking populations through the equatorial forest, eventually reaching the southern savannas (Bostoen, 2018; Cornelissen, 2015).

Nevertheless, from 5.000 to 1.500 years ago, Bantu-speaking communities did seem to spread over Central, Eastern and Southern Africa. They left archaeological traces such as pottery, rubbish pits, animal remains and even metallurgy, as well as a linguistic and genetic traces. As for the archaeological data on the Bantu presence in Central Africa, it seems to coincide with the north to south spread of iron metallurgy around 2.800 years ago. However, not much iron is recorded in the archaeological layers of that period. In some soils, like the acid rich soils of the rainforest, iron does not preserve as well and even more so, it could be that iron was not that quicky disposed since it could be recycled. As for pottery, many pit structures from the Inner Congo Basin are evidence of an upstream motion of pots, where the most recent pots are the farthest upstream. This could also be an indication for the movement of Bantu-speaking peoples going upstream (Cornelissen, 2015).

Lastly, archaeologic records also provide insights on cultivation. Pearl millet (*Pennisetum glaucum*) and *Musa sp*. (banana) both need human interaction and cultivation in order to grow and reproduce. Moreover, pearl millet needs some drier conditions in order to thrive (Bostoen, 2018; Mbida et al., 2000; Van Neer, 2002). Sowunmi (2002) also suggests that through the reduction of the rainforest ideal conditions were created that enhanced the sudden distribution of the oil palm. Moreover, Sowunmi (2002) notes the peculiar "pattern of occurrence of oil palm pollen, which strongly suggests that humans contributed to the expansion and spread of this economically important tree". (Sowunmi, 2002, p. 103)

Next to archaeology, genetics also contributed to the research on the Bantu Expansion. In present-day Bantu-speaking communities, low Y-chromosome (i.e. points to the paternal line) diversity point clearly to the fact that the Bantu Expansion is one major demic dispersal. They spread their languages and cultures from their homeland in the Grasslands of Cameroon all to Southern Africa. There is, however, genetic evidence for spread-over-spread events between different Bantu-speaking populations, since Y-chromosome diversity remained stable throughout the whole Bantu region, whereas one would expect that when a group spreads and diversified, the genetic evidence would also weaken the more the distance increased between the group and the homeland (Bostoen, 2018).

Genetic studies on the diverse present-day Bantu-speaking mitochondrial DNA or mtDNA (i.e. DNA that a mother passes to her offspring) points to intense contact and interaction with native populations. This suggest that initial Bantu-speaking communities lived in a patrilocal and polygamic society. Moreover, the mtDNA haplogroups carry more characteristics of present-day hunter-gatherer groups (Bostoen, 2018).

Lastly, linguistic research attempt to classify Bantu languages, related to the spread of the Bantu populations. The Bantu Expansion is characterised by a slow initial dispersal of Bantu languages and speech communities in the North-West of the Bantu domain (i.e. present-day Cameroon and northern Gabon), where one finds several clades of what Grollemund et al. (2015) label as 'North-Western Bantu'. The majority of the Bantu area can be divided under four major branches. In the western half of the Bantu domain, three branches are spoken, namely 'Central-Western Bantu', 'West-Coastal Bantu' and 'South-

Western Bantu'. Next to this, the Eastern branch is spoken in East and South-Eastern Africa (Bostoen, 2018).

This means that the western half of the Bantu domain is more linguistically diverse than the 'Eastern Bantu' domain. This difference in diversity within the Bantu branches is a witness of the late split of the Bantu languages. The late split theory relies on the theory of emerging savanna corridors created by drier climatic conditions. These corridors cut through the rainforest and made the way southwards somewhat easier for the Bantu-speaking communities. Bostoen (2018) states that "the Eastern branch only emerged as the most recent subgroup subsequent to southward expansion through the rainforest and internal diversification in the West." (Bostoen, 2018, p. 5)

The present-day Bantu languages are thus a result of an initial slow and eventually rapid language and cultural dispersal of Bantu speaking communities emerging from their homeland in Cameroon and covering Central, Eastern and Southern Africa in a relatively short period of time when one considers the longitudinal north-south orientation, its vastness and its rapidness. Moreover, until today, Bantu languages are widely used as first and/or secondary languages all over the Bantu domain (Bostoen, 2018). The following sections will discuss one of the Bantu subbranches, namely the West-Coastal Bantu branch as part of the wider Bantu Expansion.

3.2 The classification of the WCB branch

The West-Coastal branch is one of the major subbranches of the Bantu language family. This in its own terms is part of the Niger-Congo language phylum, the largest language phylum of the African continent. The WCB branch consists of several languages belonging in Guthrie's (1967-1971) alphanumeric classification of the Bantu language family. As all the 27 sample languages are part of the WCB branch and thus inherently of the Bantu branch, each individual language received an alphanumeric code referring to their Guthrie zone and internal classification (see Appendix 1).

For a long time, lexicostatistics was the main quantitative method to make a genealogical classification of the Bantu language branch. Based on the Swaddesh-100 'basic vocabulary' list, Bastin et al. (1999) calculated "the degree of similarity among related languages on the basis of a limited set of 'basic vocabulary'" (Pacchiarotti et al., 2019, p. 175). According to Bastin et al. (1999) the B50-80 languages together with most of the languages from Guthrie's (1967-1971) zones C, H, K and R as well as groups B20 and B40 and the L21 and L22 languages, form the 'Western Bantu" cluster (Pacchiarotti et al., 2019).

Like Bastin et al. (1999), Grollemund et al. (2015) also conducted research based on a large sample of the Bantu language family. They also established a lexicon-based quantitative classification based on a short list of 100 basic vocabulary items, but they used phylogenetic methods this time. These items were inferred trough the Bayesian MCMC method that drew a consensus tree and evolutionary relationships between the sample languages. From this consensus tree it became clear that 'West-Western Bantu', their label for WCB (Bostoen and de Schryver, 2018) is sister to a clade containing 'South-Western' as well as 'Eastern' clades, whereas the first major spit off is the 'North-Western' clade, as can be observed in Figure 2 (Bostoen, 2018; Pacchiarotti et al., 2019).

Grollemund et al. (2015) also established probable relationships within West-Western Bantu. Together with the B40, H10, and H30 groups and Hungan (H42) and Sakata (C43), the B50-80 form this West-Western clade. Then the West-Western Bantu groups splits in three subclades. The first is constructed from B50-70 languages. Secondly, the B80 languages and Sakata (C34) form a subgroup. At last the third subclade is made up of B40, H10 and H30 languages and Hungan (H42) (Grollemund et al., 2015; Pacchiarotti et al., 2019).

Changing the name of the third subclade to 'Kikongo Language Cluster' (KLC), de Schryver et al (2015) conducted an internal classification of the KLC and added Samba (L12a) to this subclade as well. This subclade of the WCB branch consists of B40, H10, H42, and L12a varieties and is sister to 15 South-Western Bantu languages. All the research discussed indeed expresses the existence of a distinct WCB branch within the Bantu language family. These discussions are however incomplete and rather unclear at some stages.

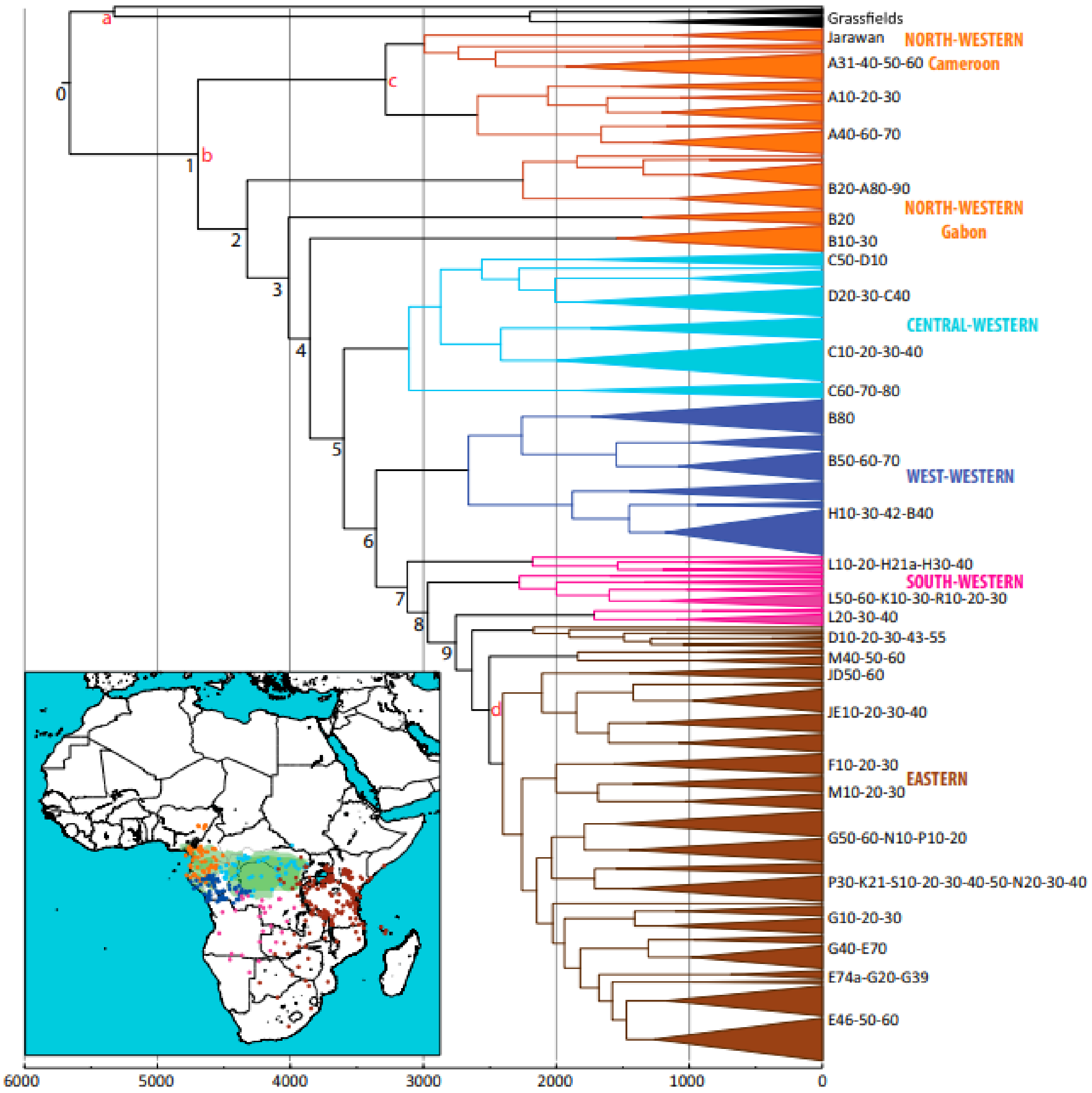


Figure 2: Consensus tree by Grollemund et al. (2015)

All quantitative lexicon-based classifications discussed above confirm indeed the existence of a distinct WCB branch within the Bantu language family. These classifications are, however, quite partial and incomplete. Therefore Pacchiarotti et al. (2019) based their lexicon-based phylogenetic classification on a much more representative sample of WCB language data. They constructed a new WCB phylogenetic tree (Figure 3) as well as a map (Map 3) with its geographical distribution. Several conclusions could be drawn from this research. In the context for this research, two major conclusions will be discussed.

The first conclusion is concerned with the phylogenetic tree below. Pacchiarotti et al. (2019) distinct three subbranches within WCB. The first conclusion is concerned with the establishment of a second major subclade next to the KLC branch that unites all B50-70 and the B81-84 languages, which Pacchiarotti et al. (2019) call the Kasai-Ngounie Extended clade. The second conclusion is concerned with the geographical location of the WCB homeland. This is not located somewhere in between the Bateke Plateau and the Bandundu region, "but rather further east, possibly in the area delimited by the Kamtsha and Kasai Rivers." (Pacchiarotti et al., 2019, p. 194) The following parts will be in line with the conclusions drawn by Pacchiarotti et al. (2019) in Figure 3.

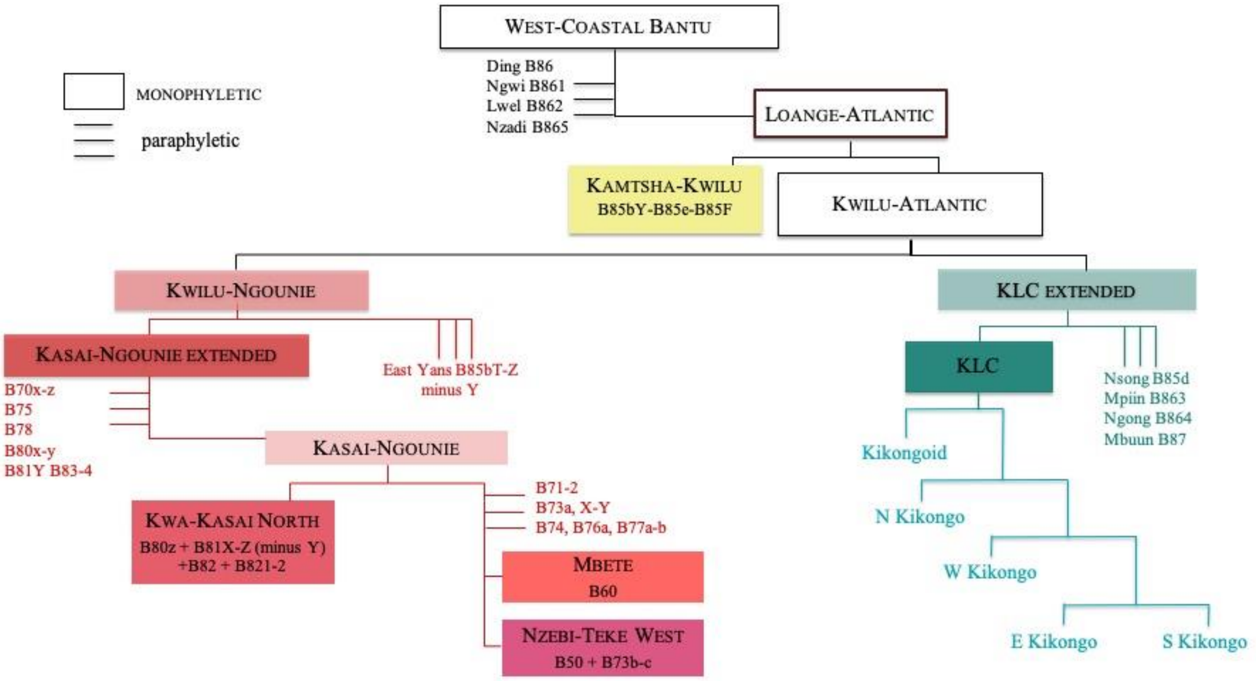
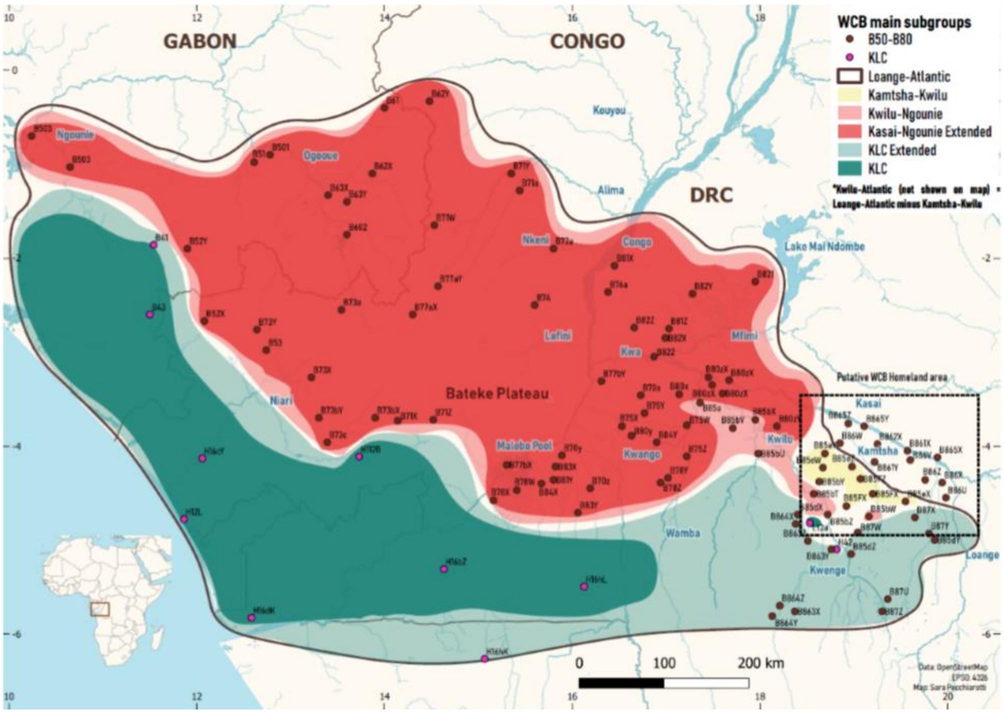


Figure 3: Internal phylogenetic structure of West-Coastal Bantu (Pacchiarotti et al., 2019, p. 38)

3.3 The WCB phylogenetic tree and its geographical distribution

In this section, the phylogenetic tree (Figure 3) constructed and based on the research of Pacchiarotti et al. (2019) will be discussed in detail regarding the 27 languages considered in this research and the sources used. Starting at the top of the tree, the first languages that split of are part of a paraphyletic group (or paraphyly) and do not form a monophyletic group. The term 'paraphyly' refers to a group that consists of the most common recent ancestor, but not all its descendants (Pacchiarotti et al., 2019; Memorial University of Newfoundland s.d.). This paraphyly includes only B86 languages, which are spoken in the region of the southern bank of the Kasai River (DRC), and three of them will be considered in this research.

Ding (B86) is the first language in the paraphyly, and three varieties will be discussed. Examples for East Ding (B86U) are from Koni Muluwa & Bostoen (2015), West Ding (B86Y) is discussed by Ebalantshim Masuwan (1978, 1980) and West Ding (B86T) is described by Mertens (1939). Based upon recent fieldwork of the BantuFirst project, Pacchiarotti (p.c.) has collected a lot of new Ngwi (B861) data and Lwel (B862) data is based on Khang Levy (1979).



Map 3: Geographical distribution of WCB and its main subgroups (Pacchiarotti et al., 2019, p. 40)

3.3.1 Loange-Atlantic and the Kamtsha-Kwilu node

Looking further down, the B85-87 varieties cluster together into a superclade called Loange-Atlantic. This superclade the immediately splits off into Kamtsha-Kwilu and Kwilu-Atlantic (Figure 3). Two languages will be discussed further of the Kamtsha-Kwilu node, which are Nsambaan (B85F) and Mpur (B85e). Nsambaan (B85F) was described elaborately by Koni Muluwa (2014) as a part of a postdoctoral project. This language variety is spoken in the centre of the Kwilu district (DRC), in the territory of Bulungu.

The other language variety in the Kamtsha-Kwilu node is Mpur (B85e), which is described by Mbwetete (1984). He locates the Mpur speakers in the Bandundu region and Kwilu sub-region of the DRC, limited and surrounded by the Mateko, Nkara, Kwilu and Sedzo communities (Mbwetete, 1984, p. 6).

3.3.2 Kwilu-Atlantic and the Kwilu-Ngounie subbranch

Next to the Kamtsha-Kwilu node, there is the Kwilu-Atlantic node which also immediately splits off into the Kwilu-Ngounie node and the KLC Extended (Figure 3). Considering the Kwilu-Ngounie node, firstly another paraphyly splits off that contains Yans (B85) varieties. West Yans (B85a) is described by Mayanga (1985) and Swartenbroeckx (1948) whereas East Yans (B85b) is described by Nguma (1986) and Rottland (1977) among others. It is spoken in “the groupement Mbe”, which Nguma (1986) locates “in the zone of Bagata, community Kwango-Kasai.” (Nguma, 1986, p. 4)

The Kwilu-Ngounie thus splits into the Kwilu-Ngounie paraphyly and the Kasai-Ngounie Extended subbranch (Figure 3). This subbranch in its turn splits off in another paraphyly and the Kasai-Ngounie node (Figure 3). When first taking into consideration the Kasai-Ngounie extended paraphyly, the language variation of Mfinu (B83) will be discussed in this dissertation. Mfinu (B83) is described in Daeleman's archive (Mfinu).

The monophyletic group of Kasai-Ngounie than again splits off into Kwa-Kasai North (Figure 3) and another paraphyly. The Kwa-Kasai North node includes two languages that will be discussed further on, namely Boma Yumu (B80z) and North Boma (B82). The former was described by Burssens (1999) who based his work of that of Hochegger (1972). Both erroneously assign this language variety to the Guthrie code B82, which is the same code for North Boma. However, as Pacchiarotti et al. (2019) clear out “the two doculects cannot be considered the same language, and not even regiolectal verieties of a single language”. (Pacchiarotti et al., 2019, p. 166) Boma Yumu (B80z) was not inventoried in Guthrie (1948, 1953, 1971) or in Maho (2003, 2009) and was assigned to the code B80z. Since it is a distinct language, it got assigned with its own alphanumeric code ('z' in B80z) within the B80 group. The latter is based on the geographical location of Boma Yumu (B80z) which is south of the Kasai River in the DRC in the current province of Kwilu (Pacchiarotti et al., 2019, p. 165).

According to Stappers (1986) North Boma (B82) is spoken in the DRC around Mushie, in the current province of Mai-Ndombe, “on the north bank of the R[iver] Fimi and the R[iver] Kwa”. (Guthrie, 1953; Stappers, 1986; Pacchiarotti et al., 2019, p. 165).

Next to the Kwa-Kasai North node, another paraphyly splits off from the Kasai-Ngounie node (Figure 3). Two language varieties of the paraphyly are a part of the sample of languages for this research. The first language is Eboo-Nzikou (B74) which is described by Raharimanantsoa (2019). According to Raharimanantsoa (2019) the Teké language, is spoken in the Plateaux Department (districts of Ngo, Djambala, Mbon and Mpouya) and in the north of the Ngabe district, in the Republic of Congo (Raharimanantsoa, 2019, p. vii).

Secondly, in Makouta-Mbokou (1960; 1976) Fumu (B77b) is described. Fumu-speakers are spread over northern and north-western districts of Brazzaville in Congo-Brazzaville. This area is suggested to be small and limited by natural borders such as the Batéké plateau to the north and the Congo river to the east (Makouta-Mboukou, 1976, pp. 6–9).

As for the Mbete node (Figure 3), Nduumo (B63) was selected. This language variety was described by Biton (1969). He focussed on the Kuya dialect for his dictionary, as some previous research was already done on this dialect.

The last node in the Kasai-Ngounie subbranch is called the Nzebi-Teke-West node (Figure 3). From this node, two language varieties will be discussed further on. The first language is Nzebi (B52) and is described by Marchal-Nasse (1989) among others. He situates the speakers on Nzebi (B52) in Gabon and Congo-Brazzaville south of Lastourville.

The second language of the Nzebi-Teke-West node that will be discussed is Yaa (B73c). According to Mouandza (2001) the speakers of Yaa (or Iyaa as spelled in Mouandza, 2001) can be located in various places in the administrative region of Lékoumou.

3.3.3 Kwilu-Atlantic and the KLC extended subbranch

Next to the big Kwilu-Ngounie subclade, the Kwilu-Atlantic branch splits off into another subclade, namely the KLC Extended (Figure 3). This subclade splits off into a paraphyly and a subbranch called KLC (Figure 3). When firstly considering the paraphyly, Nsong (B85d), Mbuun (B87), Ngong (B864X) and Mpiin (B863) were selected. These four paraphilic languages have been described and studied extensively by sources like Bostoen & Muluwa (2014), Koni Muluwa & Bostoen (2015) and Mundeke (1979) among others. According to Koni Muluwa & Bostoen (2015), Nsong (B85d), Ngong (B864X) and Mpiin (B863) are spoken in the centre of the Kwilu district, in the territory of Bulungu. Mbuun (B87) however is spoken the South of the Kwilu province, in the territory of Gungu.

Based on the phylogenetic research of De Schryver et al. (2015) several conclusions can be drawn on the internal as well as an external classification of the KLC branch. They based their research on languages of Guthrie's zone H, with special focus on Kikongo varieties (H10) and groups B40-80. They used historical Kikongo data like the *Vocabularium Latinium, Hispanicum, e Congonse* (Van Gheel, 1652) and new collected Kikongo data from their recent fieldwork in the DRC.

The KLC is a distinct clade within West-Coastal Bantu and are closely related to languages spoken in the Lower Congo region. Even more so, additional to the H10 languages, the B40 languages (spoken in Gabon) are included in the clade as well as the 'Kikongoid' languages which are spoken in the Kwilu-Kwango region, like Hungan (H42) described by (Bostoen & Koni Muluwa, 2011) and Yaka (H31) described by (de Schryver et al., 2015; Ruttenberg, 2000).

According to De Schryver et al. (2015) the KLC fragments into four subgroups, being North Kikongo (KK), East KK, South KK and West KK, as shown in Figure 3 (De Schryver et al., 2015). As for the geographical distribution of the KLC, it is agreed upon that the Congo and Inkisi Rivers divide the Kikongo varieties within the subgroups. The North KK and West KK are situated north of the Congo river. The language varieties of these subclades important for this dissertation are Punu (B43) described by (Blanchon, 2008), Lumbu (B44) described by Mavoungou and Plumel (2010), and Hangala (H111) described by Nkouanda (1997).

Based on De Schryver et al. (2015), East KK is situated to the east of the Inkisi River. Of this subclade, Ntandu (H16g) is considered in this research, which is described by Daeleman (1983). South KK is in its turn strictly situated to the south of the Congo River of which Sikongo (H16a) described by Van Wing and Penders (1928) and Narciso Cobe (2010), and South-Western variety of which Yombe (H16c) is important and is described by (De Grauwe, 2009). Lastly, there is a Central KLC convergence zone of whichh Manyanga (H16b) is of importance to this research and is described by Laman (1936).

4. Methodology

4.1 Used conventions

This research aims at a better understanding of the spread of terms for 'goat' and 'sheep' for a sample of 27 languages. All of these language varieties belong to the WCB branch of the Bantu language family and are spoken in Central Africa in parts of Gabon, Congo-Brazzaville, the DRC and northern Angola.

In Appendix 1, all language varieties included in this research are listed with their corresponding alphanumeric code, the lowest phylogenetic subgroup to which they belong (see Figure 3) and the sources from which the data were obtained. The sources range from grammars, to dictionaries and lexicons. All of them were selected on containing a high possible number of zoonyms. These sources are, unfortunately, often not transcribed phonetically but orthographically. This may hinder the possibility of identifying certain proto-sounds. For greater comparability, understanding and uniformity, certain graphemes of value to this research were transcribed and replaced by International Phonetic Alphabet (IPA) symbols (see Table 2).

Variety	**Grapheme**	**IPA**	**Source**
Boma Yumu (B80z)	ë	e	(Hochegger, 1972)
Yans (B85)	aa	a:	(Mayanga, 1985)
Mpur (B85e)	ü	y or ʉ	(Mbwetete, 1984)
West Ding (B86T)	α	a	(Mertens, 1939)
West Ding (B86Y)	ü	y or ʉ	(Ebalantshim Masuwan, 1980)
West Ding (B86Y)	ö	ø	(Ebalantshim Masuwan, 1980)
West Ding (B86Y)	Ö	œ	(Ebalantshim Masuwan, 1980)
Hangala (H111)	ë	e	(Nkouanda, 1997)

Table 2: Grapheme-IPA correspondences

Moreover, secondary sources are not uniform in their tone notation either. Absence of tone notation in the sources consulted can either mean that the source in question does not provide tone or that the syllable in question has a low tone. Some sources do not note tone at all (e.g. Biton, 1969; Makouta-Mboukou, 1960; Mertens, 1939 & Nguma, 1986). Lexical data from these sources are left unmarked for tone. Other sources only note high tones and leave low tones unmarked (e.g. De Grauwe, 2009; Hochegger, 1972; Khang Levy, 1979; Mundeke, 1979; Raharimanantsoa, 2019 & Ruttenberg, 2000). To lexical data retrieved from these sources I added low tone marking by using the conventional grave accent, i.e. à, as opposed to the acute accent for the high tone, i.e. á. Adding tone marking in this way should make it easier to read, comprehend and compare the tone patterns for each language. For instance, Khang Levy (1979) notes only high tones for Lwel (B862) and thus writes *bur* 'he-goat', as opposed to high tone marked *búr* 'comrade'. Hence, I note here *bùr* 'he-goat' instead of *bur* ''he-goat'.

Besides these sources, data and additional examples were acquired from the WCBLex database. Within this database, reconstructions are classified on their index number and are also given a reliability code going from 0 to 5. 0 indicates that the reconstruction was no longer seen as a valid one by the editors of Bantu Lexical Reconstruction 2 (BLR2). Numbers 1-5 refer to the reliability and time depth of the reconstruction, whether it could be reconstructed to PB level or later in the phylogenetic tree. In this research some terms have a code 6, which means that the BantuFirst project team has added a new reconstruction (Bostoen & Bastin, 2015; Pacchiarotti et al., 2019; Pacchiarotti & Bostoen, 2020d).

For the alphanumeric codes indicating a language variety, I followed Pacchiarotti et al. (2019), who assigned 'modified' alphanumeric codes to certain language varieties. When lowercase 'x, y, z' appears after the decimal code of which the second digit is 0, it means that the variety is not yet inventoried in Guthrie (1971) or Maho (2009). By doing so, Pacchiarotti et al. (2019) tentatively place these language varieties in one of Guthrie's groups. For instance, lowercase 'x' in 'B80x' indicates that Boma Nkuu (Monkana) is a language variety that is un-inventoried in Guthrie (1971) or Maho (2009). As for the 'B80' in 'B80x' it means that Boma Nkuu is placed within Guthrie's B80 group, based on the geographical location of its speakers. By doing so these language varieties are considered as distinct languages rather than dialectal variants of one and the same language (Pacchiarotti et al., 2019).

When uppercase 'X, Y, Z' appears after a decimal code of which the second digit is 0, Pacchiarotti et al. (2019) indicate to have data on a certain variety which can be inventoried in Guthrie (1971) and/or in Maho (2009). This can be from more than one geographical location that are considered to be regiolectal varieties of one and the same language. For instance, Mbuun (Mayungu) (B87X) and Mbuun (Mwilambongo) (B87Y) are considered as two dialects of Mbuun (B87). Moreover, this convention was also used when additional dialectal information was gathered on a variety from one single geographical location as is the case for East Lwel (B862X). Here 'X' stands for the eastern variety of the language (Pacchiarotti et al., 2019).

These conventions can also be combined as is the case for Boma Yumu (Saio) B80zY and Boma Yumu (Pentane/Mondai) B80zX. As established before, 'B80z' places both varieties as belonging to the un-inventoried 'Boma Yumu', whereas the uppercase 'X' and 'Y' following 'B80z' indicate that each is a distinct dialectal variety of Boma Yumu. These conventions can be combined with Gurthrie (1971) and/or Maho (2009) codes (Pacchiarotti et al., 2019).

Lastly, codes for the KLC have been copied from Maho (2009) except for when these codes end with an uppercase ranging from 'V' to 'Z'. This would mean that they are not mentioned in Maho (2009) thus codes according to the phylogenetic classification of Bostoen and de Schryver (2018) had to be used (Bostoen & de Schryver, 2018; Pacchiarotti et al., 2019).

4.2 Used methods

4.2.1 The Comparative Method

In order to understand what happened with each term for both ‘goat’ and ‘sheep’, this research relied on the Comparative Method, which is based on regular sound correspondences and on similarities in meaning and form. For the application of this method, cognate sets were composed for both ‘goat’ and ‘sheep’ (see Appendix 2). These sets were ordered according to the WCBLex proto-form number (lower to higher) of which they are believed to be a reflex. Each cognate set starts with the WCBLex index number, form and meaning, followed by the synchronic reflexes that could be identified. Each reflex is proceeded with a bolded alphanumeric code, referring to its specific language variety. Since for some language varieties multiple sources were consulted, the source is indicated each time.

At the beginning of the discussion of each term for ‘goat’ (§5) or ‘sheep’ (§6), their synchronic reflexes are enlisted according to the position of each variety in the WCB branch. The meaning of the reflex is only written down if they differ from meaning(s) assigned to the corresponding proto-form in WCBLex. The reflexes of a PB noun may not include a clear indication of a noun class prefix. When they do, the prefix is segmented as was indicated by the source.

The compilation of these lists of cognates allows a comparison of synchronic daughter languages in order to establish regular sound correspondences and eventually reconstruct possible proto-sounds and proto-forms for the lexical items involved. This forms the basis of the Comparative Method on which this research is based. This method is used in historical linguistics to a) identify shared ancestry among languages through establishing regular sound correspondences, b) reconstruct, based on shared retentions, a language on lexical and grammatical level and, c) establish, by means of shared innovation, an internal language classification (Bostoen, 2018; Dimmendaal, 2011).

Based on the principle of shared inheritance, a reconstruction for a word can be made on either the Proto-Bantu level or any subgroup level as long as the term has a significant distribution among the different subgroups in question. Even though this reconstruction is a hypothesis and an approximation of the actual happenings, this reconstruction of a word is of value when attempting to hypothesise about a culture or the speakers of the language varieties under study (Bostoen, 2007). Vansina (2004) adds that this created hypothesis can be “tested in the future by the addition of further evidence derived from archaeological evidence and from further linguistic analysis.” (Vansina, 2004, p. 13)

Based on a comparison of seven WCB cognate sets for either 'goat' or 'sheep', conclusions will be drawn on how these terms spread over the WCB branch or its subbranches and when possible a reconstruction on the PWCB level will be made. This reconstruction must be the most plausible, logic and economic hypothesis, which is based in three guidelines: frequency, directionality and economy (Dimmendaal, 2011).

However, many issues and pitfalls occur when using the Comparative Method. Bantu languages are known to behave as a dialect continuum rather than as individual and defined languages. This 'wave model' is however much harder to interpret on a historic linguistic level, as it is more ambiguous. For this reason the term 'language variety' will be used as a more neutral term to refer to any kind of language, without overdrawing language boundaries (Blommaert, 2008; Pacchiarotti et al., 2019). Besides this, in order to achieve desirable and reliable results as much data from as many language varieties as possible must be collected (Bostoen, 2007). However, the researched data in this dissertation ended up to be attested in a rather patchy and uneven distribution over the WCB sample languages. Hence, no real definitive conclusions could be drawn for the reconstruction of certain zoonyms.

4.2.2 The 'Words and Things' Method

As discussed before, archaeological data can have gaps in information about certain periods in time or locations due to acidic soils in which no organic based material is sustained. In attempting on filling the archaeological gap on information about the presence and spread of ovicaprines in Central-Africa, it must be acknowledged that direct archaeological evidence cannot provide the whole answer and is thus in need of indirect evidence, in this case in the form of language and words, as discussed in §2.2. Historical linguistics rely on the comparative study of synchronic vocabulary for technologies, tools, plants and animals, which can offer a diachronic view into the past of a people. This is the underlying idea to the 'Words and Things' method (Ricquier, 2017). This method was used by Vansina (2004) who correlates, collects and analyses linguistic data with technological information and the social developments that were needed for certain words to be used. Bostoen (2007) also relied on the 'Words and Things' in order to diachronically study cultural vocabularies on pottery.

The 'Words and Things' method is based on the assumption that language reflects a community's culture, which could be shared between other languages when the concepts have a certain significance. This idea of a shared vocabulary between two or more languages can be evidence of a shared history between populations. This vocabulary can, as stated by Bostoen (2007) have two clear-cut sources, namely "[o]ne language may have borrowed a word from the other or both from a third language, or both languages may have inherited a word from a common ancestor language.” (Bostoen, 2007, p. 175) In her article, Ricquier (2017) clearly points out the steps on how to apply the method by combining comparative linguistic research and ethnographic observation. This is mainly the course that this research follows.

Firstly, one must gather linguistic data about the subject in question and these words must be collected into cognate sets (for cognate sets on ovicaprines, see Appendix 2). Based on the comparison of these cognates, one must look for sound changes which are specific to the language. The outcome of this comparison shows regular sound correspondences between the respective languages. For instance, for the reflexes of *bʊ́dì (§5.1), the sound correspondences of PB *d are t ~ r ~ d. Once these sound correspondences are established it is necessary to examine whether these are regular or not for the respective languages. If regular it is possible to find an immediate common ancestor based on the shared cognates. Which then can indicate the age of the word by plotting the most recent common ancestor on a consensus tree (e.g. Figure 2).

If the correspondences are irregular, one might assume that the word is a loan word which typically displays irregularity. This is not always the case. So, other checks must be done to fully establish the loan as valid. Besides this, loan words can also be distinguished based on their geographical distribution. Since it is possible that when words “occur in a continuous region, it is likely that the distribution is the result of borrowing, especially when crosscutting linguistic boundaries.” (Ricquier, 2017, p. 262) Loanwords are nevertheless important indicators for language contact by which new words and thus concepts were adopted from neighbouring communities (Ricquier, 2017).

After establishing the most recent common ancestor of the word, semantic fields must be studied. In many cases, cognates belong to different semantic groups. Through the study of semantics, the history of the meaning of the cognates and consequently the concept can be set. The next step is going from the history of the word to the history of the idea or concept behind the word. If the ancestors were familiar with the concept, they possibly had a word for its indication and “[w]hen an inherited word underwent a semantic shift, or when a new word was created, this may point to the introduction or invention of a new reality.” (Ricquier, 2017, p. 262) Lastly, the historical interpretations based on the comparative linguistic research has to be crosschecked and integrated with known historical events and context.

A similar approach to the ‘Words and Things’ method and also based on comparative linguistics, is the culture-history method, by Heine and König (2008). This method also tries to apply historical linguistics in an attempt to reconstruct the history of language and culture spread. It depends “on the profile of the reconstructed lexicon of a proto-language and the possible conclusions that can be drawn from it for the culture of its speakers and their natural environment.” (Güldemann, 2008, p. 6)

It is, however, important to realise that the ‘Words and Things’ method is not fail-proof, since it is based on synchronic language data and can only indicate possible explanations for the historical occurrence of techniques, tools, plants, animals and cultural concepts. Moreover, according to Ricquier (2017), the origins of the concept behind the word will never be fully revealed, as this method only indicates when the concept became popular and had to be denominated. Despite these obstacles, the ‘Words and Things’ method based on the Comparative Method can offer “valuable insights into matters for which archaeological data cannot be consulted.” (Ricquier, 2017, p. 263)

4.3 Used sources

Besides many used sources being written by authors with African roots, some of the sources used in this research were written by Europeans and date back to the colonial period of Belgian Congo. During this period the goal of language documentation was to prescribe and standardise the language and its people. These standardisation were based on how Europeans thought a language should be written down, spoken, categorised and studied during and even some time after the colonisation of the respective regions (Blommaert, 2008; Gilmour, 2006; Irvine & Gal, 2000).

By writing down African languages in specific regiments such as texts, dictionaries and grammars, European missionaries gained control over a people and an area they wished to exploit. For the Europeans, language was only tangible in the shape of books, and they found that when a language was not written down in a dictionary or grammar, the language was not considered as real. When a language was written down, it became official, less ambiguous and an instrument for identification and categorisation of its speakers (Blommaert, 2008; Gilmour, 2006; Irvine & Gal, 2000).

Blommaert (2008) calls this process ‘artefactualisation’ by which he means “the extraction of essential ‘form’ out of text, and the representation of such form as ‘language’. They fit into an inductivist paradigm which, through philology, has dominated the emergence of African linguistics.” (Blommaert, 2008, p. 1) To standardise and prescribe a language is to gain authority over the language and the original speakers of that language. Eventually, the prescribed language in the dictionaries and grammars becomes an artefact of the original language[6] (Blommaert, 2008).

These varieties of gathered oral linguistic data from the speakers themselves were reduced to books. However, no credits were assigned to the speakers themselves and the ones that provided the data (Blommaert, 2008; Gilmour, 2006). The authority and the knowledge on a language that once lied with the speakers themselves is so directly reversed to lie with the Europeans that wrote down the language and by this had physical proof of his ‘full’ knowledge on the language, which could again be used to supress those speakers and people (Gilmour, 2006).

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[6] For a more detailed insight see Blommaert, 2008

However, this gathered data is still usable and valuable, since many colonial sources do provide a range of data that can be used in a comparative manner. It is nevertheless important to acknowledge and reflect on the precarious background of some of the used sources in this research. The data in these colonial sources, and even sources dating after independence, can be coloured or even false, directly colouring the results in this research. Certain words for ‘goat’ or ‘sheep’, for instance, could have been favoured above other during the prescription of a certain language. It is important to be aware of the possibility that the data used is (partially) coloured. Nevertheless, for now we just have to make do with the data we have and from this awareness on we can attempt to broaden future research opportunities for all linguists alike to improve existing lexical data of African languages.

5. The historical linguistic analysis of terms for goat

Branch	**Subbranch**	**Variety**	***bʊ́dì**	**Meaning**	***kómbò**	**Meaning**	***tàbà**	**Meaning**	**gobo**	**Meaning**
WCB		**East Ding (B86U)**	*mbùt*	goat						
		West Ding (B86T)	*m-but*	goat						
		West Ding (B86Y)								
		Lwel (B862)	*-bùr*	he-goat					*ngànk`ɔb*	goat, he-goat
		Ngwi (B861)	*Ø-mbûr*	goat						
Kamtsha-Kwilu		**Mpur (B85e)**					*ntáb, ntáp*	goat, he-goat	*ng`ɔ`ɔb*	goat
		Nsambaan (B85F)					*ntáb*	goat		
		East Yans (B85b)							*ngɔb*	goat
Kwilu-Ngounie		**Yans (B85a)**					*ntab, -tàp*	goat		
	Kasai-Ngounie Extended paraphyly	**Mfinu (B83)**			*´ŋkòòmù, báŋkòòmù*	goat				
	Kasai-Ngounie	**Eboo-Nzikou (B74)**					*ntaba*	goat, small goat		
		Fumu (B77b)					*nkali antaba*	goat		
	Kwa-Kasai North	**Boma Yumu (B80z)**					*ntab*	goat, he-goat	*n-g`ɔb, n-gòb*	goat, he-goat
		North Boma (B82X)					*ntaba*	goat		
	Mbete	**Nduumo (B63)**					*ntaba, taba*	goat		
	Nzebi-Teke West	**Nzebi (B52)**					*tàbà*	goat		
		Yaa								

		(B73c)								
KLC	KLC – Extended	**Mbuun (B87)**			*n-kóóm, nkombo, nkɔɔm*	goat				
		Ngong (B864X)			*ngóòm/bákóòm, nkɔ̂m*	goat, he-goat				
	KLC – Kikongoid	**Hungan (H42)**			*kɔ̂mb*	goat, he-goat				
		Yaka (H31)			*khóòmbò*	goat (1a/2), goat meat (9/10)				
	KLC – North	**Hangala (H111)**	*mvúdì*	*goat*	*kóómbò*	goat				
	KLC – South	**Sikongo (H16a)**			*ki-nkombo-kombo ka kisundi*	goat, small he-goat				
	KLC - Central	**Manyanga (H16b)**			*khómbo, nkombo, kyankombo*	goat, small or big goat	*ntaba*	goat		
	KLC – East	**Ntandu (H16g)**			*nkóombo, nkoombo ntaba*	goat	*nkoombo ntaba*	goat		
	KLC – West	**Lumbu (B44)**			*ø-koombu*	goat, small goat				
		Punu (B43)					*tabəmu pusə, tabə tsi mipusə*	*goat*		
		Yombe (H16c)			*khóómbó*					

*Table 3: Comparative overview of *bʊ́dì, *kómbò, *tàbà and gobo*

5.1 *bʊ́dì (BLR 303)

5.1.1 Distribution within WCB

(1) WCB attestations of *bʊ́dì (BLR 303)

<u>WCB</u> B86U ***mbùt*** (Koni Muluwa & Bostoen, 2015); B86T ***m-but*** (Mertens, 1939); B862X ***ngàmbúr, mbúr*** (Koni Muluwa & Bostoen, 2015), ***-bùr*** ‘he-goat’ (Khang Levy, 1979), B861 ***Ø-mbûr/Ø-mbûr*** (Sara Pacchiarotti, p.c.)

<u>Kamtsha-Kwilu</u>

<u>Kwilu-Ngounie</u>

<u>KLC</u>

N H111 ***mvúdì*** (Nkouanda, 1997)

Within WCB *bʊ́dì has reflexes in the earliest offshoots of WCB, namely East (B86U) and West Ding (B86T), Lwel (B862) and Ngwi (B862). Another reflex was found in Hangala (H111) that belongs to the KLC subbranch. This can be seen in (1).

5.1.2 Noun Stem

In the reflexes in the different languages attesting *bʊ́dì, the PB *b in the first consonant (C1) often remains /b/ in all Ding (B86) varieties, as well as in Lwel (B862), as can be seen in (2), (3) and (4) and in some cases in Ngwi (B861), as can be seen in (3) and (4). This /b/ is preceded in all cases by the homorganic nasal N of class pairing 9/10.

(2) BLR 282 *bʊ́à 'dog' > B86Y *mbwá* (Elabantshim Masuwan, 1980): B861 *Ø-mvúá/Ø-mvúá* (Sara Pacchiarotti, p.c.); B862Y *mbvɛ́* (Khang Levy, 1979)

(3) BLR 316 *bʊ́gà 'open space; threshing-floor; village, path' > B86 *mbwóó* (Elabantshim Masuwan, 1980); B861X *Ø-mbûʁ/Ø-mbûʁ* (Sara Pacchiarotti, p.c.); B862X *mbɔ́k* (Koni Muluwa & Bostoen, 2015)

(4) BLR 275 *bóngó 'knee, genou (Fr.)' > B86X *eboŋ* (Koni Muluwa & Bostoen, 2015); B861 *ì-bwɔ́ŋ/à-bwɔ́ŋ* (Sara Pacchiarotti, p.c.); B862X *bɔ́ŋ* (Koni Muluwa & Bostoen, 2015)

The Hangala (H111) reflex the *b appears to have undergone fricatization to the voiced labio-dental fricative /v/. However, when checking reflexes, /vu/ did not appear to be a regular reflex of *b followed by *ʊ in Hangala (H111) as shown in (5), (6) and (7). Rather PB *b followed by *u would be expected to result in /vu/. This would be a form of Bantu Spirantisation (BS), which is triggered by the PB high vowels *i and *u, positioned right of the targeted stop. However, it is important to note that in some WCB languages, voiceless stops, i.e. reflexes of *t, *k and *g, can also shift to [ts], [tʃ] or even [s] in front of second-degree PB *ɪ (Pacchiarotti & Bostoen, 2020c, p. 15). In an attempt to search for a possible similar effect for second-degree PB *ʊ, spirantisation was not attested in Hangala (H111), as compared to Boma Yumu (B80zX), North Boma (B82Y), Ngwi (B861), or Lwel (B862), as can be seen in (5). BS is only found in Hangala (H111) for reflexes including *b followed by a first degree *u as shown in (6) and (7).

(5) BLR 282 *bʊ́à 'dog' > B80zX *mvá* (Hochegger 1972); B82Y *m̀vá* (Bastin et al. 1999); B861 *Ø-mvúá/Ø-mvúá* (Sara Pacchiarotti p.c.); B862 *mbvɛ́* (Khang Levy, 1979); H111 *bwá* (Mabiala, 1999)

(6) BLR 357 *bú ‘year’ > H111 *vú* (Nkouanda, 1997)

(7) BLR 360 *bùá ‘nine’ > H111 *vwá* (Nkouanda, 1997)

PB *d in the second consonant (C2) position usually has /r/ and/or /l/ as possible reflexes in the WCB languages where this sound was not lost in this phonotactic position. In Ding B86 varieties, *d in C2 usually undergoes lambdacism or rhotacism as can be seen in (8), (9) and (10). However, Mertens (1939), Daeleman (1977) and Koni Muluwa and Bostoen (2015) report *m-but* in Ding (B86) varieties. No additional examples could be found where *d > t. Conceivably, the final [t] might be a dialectical variant of /l/ or /r/ which gets devoiced in word-final position.

(8) BLR 49 * bádí ‘open space’ > B86X *mbɛl* (Bastin et al. 1999)

(9) BLR 3284 *jédì ‘moon, month’ > B86X *mwer* (Bastin et al. 1999)

(10) BLR 3971 *túdì ‘smith’ > B86U *mutsül* (Koni Muluwa & Bostoen, 2015)

In Lwel (B862) and Ngwi (B861), *d also underwent lambdacism and/or rhotacism as can be seen in (11) and (12).

(11) BLR 1561 *jàdí ‘thunder’ > B861 *Ø-ndzar* (Sara Pacchiarotti, p.c.)

(12) BLR 1674 *kádí ‘woman, wife’ > B861 *ò-ŋkéàr/à-ŋkéàr* (Sara Pacchiarotti, p.c.); B862 *ŋ̀kál/bə-kál, ŋkyál/mi-kyál* (Khang Levy 1979)

In Hangala (H111), PB *d either underwent rhotacism, as in (16) and (17) or BS under the influence of the high *i, as in (13), (14) and (15). Both are (regular) attestations in this language. The correspondence *d > d in the reflex of *bʊ́dì is irregular in Hangala (H111).

(13) BLR 133 *bèèdí 'knife' > H111 *béésí* (Mabiala, 1999)
(14) BLR 1098 *dòòdí 'dream' > H111 *dòsí* (Mabiala, 1999)
(15) BLR 1300 *gàdí ' oil-palm; nut of oil-palm' > H111 *gásì* (Mabiala, 1999)
(16) BLR 1166 *dʊ̀dì 'bitterness' > H111 *dúrì* (Mabiala, 1999)
(17) BLR 2102 *kúɪ́dì 'death' > H111 *fwíírì* (Mabiala, 1999)

When looking at the first vowel (V1), *ʊ > u in all attested languages. This is a logical change for Hangala (H111), as most KLC varieties underwent a 7>5 vowel reduction (see Appendix 3). However, outside the KLC, many WCB languages did not undergo this reduction, even more so, some languages, such as Ding (B86) have a larger vowel system up to 12 vowels according to Ebalantshim Masuwan (1978) (see Appendix 3). In comparison to the PB vowel system however, the semi mid-closed front and back vowels *ɪ and *ʊ shifted and underwent a lowering to the mid-open front and back vowels /ɛ/ and /ɔ/ for Ding (B86) (Ebalantshim Masuwan, 1978). This is also the case for Lwel (B862) and for Ngwi (B861) (Khang Levy, 1979; Sara Pacchiarotti, p.c.) (see Appendix 3).

By contrast, the second vowel (V2) has undergone final vowel loss (FVL) in the WCB paraphyletic languages (see Pacchiarotti & Bostoen 2021 for details) as can be seen in (1). Additional examples of this diachronic sound change in these varieties are in (18), (19) and (20). In Hangala (H111), V2 was preserved as expected, since none of the KLC varieties underwent FVL.

(18) BLR 49 *bádí ‘open space’ > B86X *mbɛl* (Bastin et al., 1999)
(19) BLR 1674 *kádí ‘woman, wife’ > B86Y *mùkyáy/bàkyáy* (Elabantshim Masuwan 1980); B862 *ngəkál* (Koni Muluwa & Bostoen, 2015); B861 *ò-ŋkéàr/à-ŋkéàr* (Sara Pacchiarotti, p.c.)
(20) BLR 973 *dɪ́mì ‘tongue, language, flame’ > B86 *lulém* (Koni Muluwa & Bostoen 2015); B861 *è-lâm* (Sara Pacchiarotti, p.c.); B862 *ləlám* (Koni Muluwa & Bostoen 2015)

The reconstructed *HL tone of * bʊ́dì can only be checked for Ding (B86) in Ebalantshim Masuwan (1978, 1980), as Mertens (1939) does not note tone. Ebalantshim-Masuwan (1978, 1980), nevertheless, only reconstructs *ntàb* as a possible translation for ‘goat’. Besides this, the use of a *HL > HL tone pattern in Ding

(B86) does not seem regular, based on Ebalantshim-Masuwan (1978, 1980). When FVL occurs and the segmental element of the vowel is lost, like in Ding (B86), the suprasegment of the tone does not get lost but is relocated to V1. If the tone on V2 was a low tone, one would expect the tones to form a falling (F) contour tone on V1 after FVL occurred. This does not happen however, which makes the *HL > HH more plausible, as is illustrated in (21), (22) and (23).

(21) BLR 316 *bʊ́gà 'open space; threshing-floor; village, path' > B86Y *mbwóó* (Ebalantshim Masuwan, 1980)

(22) BLR 3104 *túkʊ̀ 'day (24 hours)' > B86Y *èlúú* (Ebalantshim Masuwan, 1980)

(23) BLR 9300 *káíntʊ̀ 'femme' > B86Y *mù-káár/bà-káár* (Ebalantshim Masuwan, 1980)

For Lwel (B862) Khang Levy (1979) describes the word for ‘goat’ in Lwel with a low tone, namely *-bùr*. This he contrasts with *-búr* ‘comrade’. Based on Khang Levy (1979), the *HL > H(H) tone pattern seems more plausible, which can be explained as in Ding (B86), and is illustrated in (24), (25) and (26). The correspondence *HL > L(L) as in the reflex of *bʊ́dì is also regular, which illustrated in (27) and (28).

(24) BLR 1720 *kángà 'bird: guinea-fowl' > B862X *káŋ* (Khang Levy, 1979)

(25) BLR 2642 *pʊ́kʊ̀ 'rodent: rat; mouse' > B862X *pú* (Khang Levy, 1979)

(26) BLR 3350 *jíkɪ̀ 'bee' > B862X *níí* (Khang Levy, 1979)

(27) BLR 1828 *kígè 'eyebrow; eyelash; eyelid' > B862X *kìì* (Khang Levy, 1979)

(28) BLR 2048 *kʊ́ndè 'herbaceous: bean: *Fabaceae: Phaseolus sp*.' > B862X *kwàn* (Khang Levy, 1979)

In the Ngwi (B861) reflex of *bʊ́dì the L tone on V2 underwent a shift towards the first vowel resulting in the F contour tone as seen in (2). This is a logical and regular attestation influenced by the FVL, where the tone hosted on the lost final vowel is realized on the remaining first vowel as is discussed in Pacchiarotti and Bostoen (2020b) and can be seen in (29) and (30).

(29) BLR 1093 *dóbò ‘hook’ > B861 *ndôβ (Ø-/Ø-)* (Sara Pacchiarotti, p.c.)

(30) BLR 2042 * kʊ́nì ‘rewood’ > B861 *kûɲ (è-/Ǹ-)* (Sara Pacchiarotti, p.c.)

In the Hangala (H111) reflex of *bʊ́dì the *HL tone is preserved as such and seems a regular attestation of the PB *HL pattern, as in (31), (32) and (33). This is based however on sources that are not so trustworthy when it comes to tone description. Therefore, one must be cautious on discussing tone in this language variety.

(31) BLR 260 * bókò ' arm; hand; front paw' > H111 *ókò* (Mabiala, 1999)

(32) BLR 350 *bʊ́tò 'relative' > H111 *bútà* (Mabiala, 1999)

(33) BLR 413 *cádʊ̀ 'work' > H111 *sálù* (Mabiala, 1999)

In sum, formally speaking, the WCB reflexes of *bʊ́dì in the first paraphyletic offshoots of WCB are all apparently regular. The Hangala (H111) reflex, however, is irregular and seems to be a regular reflex of BLR 370 *bùdì ‘kudu antelope: *Tragelaphus sp*.’

5.1.3 Noun Class

Ngwi (B861) places its reflex of *bʊ́dì in class (7/8) with the morpheme pair (Ø/Ø). Besides this, the other reflexes of *bʊ́dì belong to class pairing 9/10 used for animal names in many Bantu languages. This class pairing is reconstructed in PB as indicating animal names with the morpheme pair *N/N (Dimmendaal, 2011). The homorganic nasal is indicated in (1) with the voiced bilabial nasal /m/, which is in sound correspondence with the stem-initial voiced bilabial stop /b/.

5.1.4 Meaning

Only one of the WCB paraphilic languages, Lwel (B862) attested not only the general term for goat, but also ‘he-goat’. All other reflexes attest the general meaning ‘goat, chèvre (Fr.)’. Since the term *bʊ́dì is reconstructed as PB and suggested as the most commonly used Bantu term to refer to ‘goat’ (Blench, 2007; Ricquier & Bostoen, 2009), the general meaning is therefore most plausible.

5.1.5 Discussion

The reconstructed form *bʊ́dì is mentioned by many sources as being a PB reconstruction for goat (Blench, 2006). The term can be found in almost all Guthrie zones in the Bantu area, even toward the Indian coast, where it has for instance reflexes in present day Swahili (G42). Within WCB, the term is only attested in the paraphyletic languages at the top of the phylogenetic tree, spoken in the branch’s homeland area. For these three regular attestations a possible reconstruction *N-bur/N-bur* (9/10) could be made based on the principles of the Comparative Method.

Elsewhere within the WCB no attestations have been found except for Hangala (H111). This could indicate that *bʊ́dì went out of use soon after WCB languages started to spread westwards. This could have been caused by the emergence of other terms such as *kómbò (§5.2) and *tàbà (§5.3). However, lack of attestations in other branches can simply be due lack of documentation.

For the attestation in Hangala (H111) it seems that *mvúdì* is an irregular reflex of *bʊ́dì, based on the irregular sound changes for its cognates /v/ and /d/ as discussed before. This could possibly be due to borrowing and/or the archaization of the term.

However, m*vúdì* could also possibly be a reflex of BLR 370 *bùdì 'kudu antelope: *Tragelaphus sp*.' *bùdì has a reflex *vúrì* in Hangala (H111). This does seem like a regular reflex for this language since *bu > vu, and *d > r are both regular correspondences. Moreover, even though one must not fully trust the tone description in Hangala (H111) sources, the reflex of PB *LL > HL in Hangala (H111) does seem quite regular when consulting with other WCBLex data, as in (34), (35) and (36).

(34) BLR 438 *càmbʊ̀ 'seven' > H111 *sá:mù* (Nkouanda, 1997)
(35) BLR 1166 *dʊ̀dì 'bitterness' > H111 *dúrì* (Mabiala, 1999)
(36) BLR 1318 *gànò 'tale, proverb' > H111 *gánà* (Mabiala, 1999)

Lastly, the meaning of BLR 370 is a specific type of antelope. We know that metonymical associations are the most common semantic change in Bantu languages (see Bastin, 1985). Thus, perhaps the reflex came to be used for 'goat' since the meat of both animals is commonly consumed in this area. Moreover, Nkouanda (1997) both noted *mvúdì* and *mvúrì* as possible translations for 'goat' in Hangala (H111). All this makes one wonder if *mvúrì* (Nkouanda, 1997) could be either just a reflex of *bùdì or if it could imply a possible merge of terms for 'goat' and 'antelope' in Hangala (H111). On the other hand, it could also be a case of semantic split in which a word has developed a new meaning that remains linked to the original meaning (Dimmendaal, 2011). Even more so, since BLR 303 *bʊ́dì and BLR 370 *bùdì only have sightly different forms and a meaning both pointing to a ruminant, this could be a case of 'osculant' (Pacchiarotti & Bostoen, 2020d, p. 5). Without a trustworthy tone description of Hangala (H111), however, all this will be hard to determine with certainty.

The fact that the reflex of 'goat' could also be a reflex of 'antelope' can be partially explained by a possible socio-cultural context described by Vansina (2004). According to him, horticulturalists arriving in West-Central Africa kept goats, but were not kept in great numbers since they did not contribute enough to their subsistence economy, which was based upon hunting-gathering for the most part. Therefore, he suggests that these animals were kept in small flocks by women and children and were seen as a curiosity and perhaps even as a "a substitute for the common goat-sized antelopes." (Vansina, 2004, p. 37)

5.2 *kómbò (BLR 1926)

5.2.1 Distribution within WCB

(37) WCB attestations of *kómbò (BLR 1926)

WCB			B86U ***nkyààm*** (Koni Muluwa & Bostoen 2015); B86X ***ŋkɛɛm***; B86T ***ŋ-kjaam*** (Mertens, 1939)
Kamtsha-Kwilu			
Kwilu-Ngounie			B83 ***´ŋkòòmù /ŋkoomu, bàŋkóómù/baŋkoomu/báŋkòòmù*** (Daeleman, 1985)
KLC Extended			B87 ***n-kóóm, nkombo, nkɔɔm*** (Mundeke, 2011); B864X ***ngóòm/bákóòm*** ‘he-goat’ (Ngulu Kibiakam 1986), ***nkɔ̂m*** (Koni Muluwa & Bostoen 2015)
	KLC – KK		H42 ***kɔ̂mb*** (Koni Muluwa & Bostoen, 2015; Fieldwork JKM), H31 ***khóòmbò*** ‘goat (1a/2), goat meat (9/10)’ (Ruttenberg, 2000)
	N		H111 ***kóómbò*** (Mabiala 1999)
	S		H16a ***ki-nkombo-kombo ka kisundi*** ‘small goat, small he-goat’ (Van Wing & Penders 1928), ***nkombo*** (Narciso Cobe, 2010)
	C		H16b ***khómbo, nkombo*** ‘small goat’***,*** ***kyankombo*** ‘big goat’ (Laman, 1936)
	E		H16g ***nkóòmbò, nkòòmbò ntàbà*** (Daeleman, 1983)
	W		
		N-W	B44 ***ø-kó:mbù*** ‘goat, small goat’ (Mavoungou & Plumel, 2010)
		S-W	H16c ***khóómbó*** (De Grauwe, 2009)

*kómbò has reflexes almost exclusively in the KLC subbranch of WCB. All KLC subgroups have a reflex of this term. Outside of the KLC, reflexes of *kómbò are attested amongst the earliest offshoots of the WCB family tree, i.e. in different paraphyletic varieties of Ding (B86), as well as in Mfinu (B83), which belongs to the paraphyly of the Kwilu-Ngounie subbranch.

5.2.2 Noun Stem

PB *g and *k merged into *k in Proto-WCB (PWCB), both in C1 and C2 position. This is a shared retention within WCB. In post-nasal position, however, the voicing opposition was maintained, as can be observed in (38) and (39) (Pacchiarotti and Bostoen, 2020). This retention of *g and *k > k can be observed for instance in Ding (B86) varieties in (40) and (41).

(38) BLR 1904 *kókó ‘chicken’ > B86Y *nkɔ́ɔ́* (Ebalantshim Masuwan, 1980)

(39) BLR 1334 *gàngà ' medicine' > B86U *búngaŋ* (Koni Muluwa & Bostoen, 2015)

(40) BLR 1939 *kòndò ‘banana: Musaceae’ > B86T *ikɔɔn* (Mertens, 1939), B87W *ɩkɔ̂n* (Koni Muluwa & Bostoen, 2015)

(41) BLR 1398 *gìdá 'blood' > B86Y *màkíl* (Ebalantshim Masuwan, 1980)

Discussing the C2, two attestations become visible. In Lumbu (B44), Hangala (H111), Sikongo (H16a), Yaka (H31), Yombe (H16c), Ntandu (H16g) and Manyanga (H16b) the PB nasal consonant cluster *mb is preserved. On the contrary, in Ding (B86) varieties, Mfinu (B83), Ngong (B864) and Mbuun (B87) the nasal consonant cluster is reduced to the bilabial nasal /m/. This cluster reduction from *NC > N regularly occurs in these language varieties, as shown in (42) and (43). The loss of the plosive within the nasal cluster *mb is normally also the case in Hungan (H42) as can be seen in (42). However, the term *kɔ̂mb* for ‘goat’ in Hungan (H42) seems to be an exception. This same irregularity Is found in the Mbuun (B87) reflex *nkombo*.

(42) BLR 265 *bòmbó ‘forehead, head’ > B83X *mbwˋɔmˋɔ* (Bastin et al., 1999; Burssens, 1990); B86T *mbɔɔm* (Daeleman, 1977; Mertens, 1939); B86U *mbwam, mbŏm* (Koni Muluwa & Bostoen, 2015); B86V *mbòm* (Bastin et al., 1999; Burssens, 1990); B86X *mbwòm* (Bastin et al., 1999; Mundeke, 1990); B86Z *mbwœm* (Bastin et al., 1999; Mundeke, 1990); B864X *m-bɔ̂m* (Koni Muluwa, 2010); B87U *ḿbóòm* (Bastin et al. 1999; Burssens, 1990); H42 *mbɔ̂m* (Fieldwork JKM)

(43) BLR 655 *còmb ‘borrow; lend’ > B83Z *swóómo* (Daeleman's archive (Mfinu)); B86U *kusɔɔm* (Koni Muluwa & Bostoen 2015); B864X *kɔsɔ́m* (Koni Muluwa & Bostoen

2015); B87W *kasɔ̂m* (Koni Muluwa & Bostoen 2015)

As for V1, the PB *o was preserved in Sikongo (H16a) and Manyanga (H16b) as well as in some cases in Mbuun (B87). Next to this, Mfinu (B83), Mbuun (B87), Ngong (B864X), Yaka (H31), Hangala (H111), Ntandu (H16g), Lumbu (B44) and Yombe (H16c) regularly attest an automatic vowel lengthening of the V1 in VNC position, as is illustrated in (44), (45) and (46) (Hyman, 2019).

(44) BLR 265 *bòmbó 'forehead; bridge of nose; nose' > B864X *mbóòm* (Bastin et al., 1999); B87 *mbɔɔm* (Bastin et al., 1999); H111 *bóómbò* (Nguimbi-Mabiala, 1999); H16g *mbòòmbó* (Daeleman 1983); H31 *mbóómbò* (Ruttenberg, 2000)

(45) BLR 655 *còmb 'borrow, lend' > B44 *ù-sóómb-à* (Mavoungou & Plumel, 2010); B83 *-swóómò* (Daeleman's Archive (Mfinu)); H111 *sòòmpá* (Nguimbi-Mabiala, 1999); H16g *-sòòmp-L* (Daeleman's Archive (Mfinu))

(46) BLR 1112 *dómb 'ask for' > B44 *ì-lóómbì* (Mavoungou & Plumel, 2010); H111 *lóómbá* (Nguimbi-Mabiala, 1999); H16c *lóómbá* (De Grauwe, 2009); H16g *-lóomb-* (Daeleman, 1983); H31 *-lóómbá/ lóómbèlè* (Ruttenberg, 2000)

The most intriguing sound change for V1, however, can be detected in Ding (B86) varieties. The changes, *o > ɛ and *o > ya, seen in (37) *nkyààm* (B86U) (Koni Muluwa & Bostoen 2015), *ŋ-kjaam* (B86T) and *ŋkɛɛm* (B86X) (Mertens, 1939) are not supported by additional data showing the same change. As for the first sound change, some examples were found where this correspondence was a case of umlaut when *o > ɛ/_V2[e]. Usually, Ding B86 displays umlaut, whereby *o > ɛ/_V2[e] (Koni Muluwa and Bostoen 2013), but not when V2 is a back vowel as is the case in *kómbò.

In Ding B86, *o followed by a nasal cluster usually results in a diphthong and a nasal, as shown in (47). On the development *o > ya, no additional examples were found. It therefore remains unexplained at present.

(47) BLR 6691 *kondi 'antilope' > B86X *unkwɔŋ* (Mertens, 1939)

In V2 position, the final vowel was lost as expected in Ding (B86), Mbuun (B87), Ngong (B864) and Hungan (H42) (Pacchiarotti and Bostoen, 2020). This is reflected for the most part in the reflexes for *kómbò in (37), with the exception for *nkombo* in Mbuun (B87). Moreover, this attestation is not regular on the basis of its C2 as discussed earlier. We could perhaps suggest that this cannot be a native Mbuun (B87) word, but rather a borrowing described by Mundeke (1979).

In languages where FVL did not occur, PB *o was preserved as in Sikongo (H16a), Manyanga (H16b), Yombe (H16c), Ntandu (H16g) and Yaka (H31), which inherited a five vowel system from Proto-KLC. Next to this, vowel heightening occurred regularly in Lumbu (B44) and in one other example in Mfinu (B83) where *o > u, as illustrated in the reflexes for *kómbò in (37) and in (48), (49), (50) and (51). This last example in (51) is, however, not enough to say for certain that the vowel heightening in Mfinu (B83) is a regular attestation.

(48) BLR 350 *bʊ́tò 'relative' > B44 *ì-bùr-ù* (Mavoungou & Plumel 2010)

(49) BLR 2677 *púdò 'foam' > B44 *í-fùlù* (Mavoungou & Plumel 2010)

(50) BLR 2741 *tákò 'buttock, rear part; back' > B44 *dì-ràghù* (Mavoungou & Plumel 2010)

(51) BLR 3405 *jícò 'eye' > B44 *dí-ísù* (Mavoungou & Plumel 2010); B83Y *dyų̂, myų̂* (Bastin et al. 1999: Mutyeene / Daeleman 1975)

As for the tone pattern for *kómbò, the *HL pattern has different attestations. Many sources are less or not trustworthy when it comes to their tonal descriptions, therefore only the ones with certainty will be discussed. Previously, the *HL attestations in Ding (B86) varieties were discussed for *bʊ́dì. From a comparison of data by Ebalantshim Masuwan (1980), is seemed plausible that *HL > HH is regular for Ding (B86) varieties. This because not all sources note tone or are as trustworthy for tone notations. It is therefore hard to say whether the tone pattern for the reflexes of *kómbò in Ding (B86) are regular.

Daeleman (1958) notes tone for Mfinu (B83) and for the attestation of *kómbò in Mfinu (B83) both notes it with and without tone. As for the tones he did describe, as in *báŋkòòmù* and *´ŋkòòmù* in (37), the *HL > HL(L) correspondence seems the most plausible one. This is also based on other evidence in (52), (53) and (54).

(52) BLR 351 *bʊ́tò ‘seed’ > B83Y *ḿburu* (Bastin et al. 1999: Mutyeene / Daeleman 1975)

(53) BLR 1558 *jádà ' finger-nail; toe-nail; claw' > B83Y *lí-nzaa* (Bastin et al. 1999: Mutyeene / Daeleman 1975)

(54) BLR 1889 *kódò 'heart; breastbone; breast' > B83Y *mú-koo* (Bastin et al. 1999: Mutyeene / Daeleman 1975; Gt CS 1115)

The correspondence *HL > HH is possibly regular in Mundeke (1979) for Mbuun (B87) and in De Grauwe (2009) for Yombe (H16c), as can be seen in (55)-(58). Whereas in Yaka (H31) and Ntandu (H16g) the correspondence *HL > HL is seemingly regularly attested, as can be noted from (58)- (61) (Daeleman, 1983; Ruttenberg, 1999).

(55) BLR 125 *béèdè 'breast, udder' > B87 *ìbéél* (Mundeke, 1979)

(56) BLR 368 *búdà 'rain' > B87 *mbvúl* (Mundeke, 1979)

(57) BLR 77 *bámbà 'poisonous snake sp.' > H16c *lùbáámbá* (De Grauwe, 2009)

(58) BLR 82 *bámbè 'reptile: monitor lizard; iguana; crocodile' > H16c *mbáámbí* (De Grauwe, 2009); H16g *mbáàmbì* (Daeleman, 1983)

(59) BLR 555 *céngò 'horn' > H31 *n-sééngò* (Ruttenberg, 1999)

(60) BLR 664 *cónì 'shame' > H31 *tsónì* (Ruttenberg, 1999)

(61) BLR 147 * béénè 'breast' > H16g *béénò* (Daeleman, 1983)

In conclusion, the KLC reflexes and the Mfinu (B83) reflex of *kómbò can be considered regular with some exceptions of *kɔ̂mb* in Hungan (H42) and *nkombo* in Mbuun (B87). The Ding (B86) reflex in the first paraphyletic offshoot of WCB has and irregular attestation of V1.

5.2.3 Noun Class

*kómbò is reconstructed in BLR3 as belonging to noun class pairing 9/10, where both classes consist of a homorganic nasal. This is clearly morphologically indicated in the reflex *n-kóóm* (B87) and *ŋ-kjaam* (B86T) in (37). This nasal, however, is easily dropped in front of voiceless stops in Bantu, regardless of having triggered the aspiration of the stem-initial consonant (see Kerremans, 1980). This happens in many varieties of the KLC, as in *kɔ̂mb* (H42), *and kóómbò* (H111). The deletion of the nasal also caused in some cases an aspirated consonant as in *khóòmbò* (H31) and *khóómbó* (H16c) as a way of compensating the deletion of the voicing of the nasal (Dimmendaal, 2011).

5.2.4 Meaning

In several KLC languages, *kómbò, seems to have archaic leftovers of a more specified meaning than the reflexes of *bʊ́dì. The meaning of the Lumbu (B44), Sikongo (H16a) and Manyanga (H16b) reflexes could refer to the height, weight or age of the animal, e.g. *nkombo 'small goat'* in Manyanga (H16b) (Laman, 1936). Besides this, in Yaka (H31) *khóòmbò* means 'goat' when it is put in class 1a/2, but 'goat meat' when it is put in class 9/10 (Ruttenberg, 2000). Perhaps the meat of a particular sized or aged goat was considered better than the other, as is the case with for instance lamb meat?

5.2.5 Discussion

The KLC reflexes of *kómbò seem regular with the exception of *kɔ̂mb* in Hungan (H42) and *nkombo* in Mbuun (B87), which could however be borrowings. As for the *kómbò reflexes in Ding (B86) the attestations seem regular on the consonant and tone level. However, the vowel correspondence does point to irregularity. This was confirmed by a native Ding-speaker that did not recognised the terms for Ding (B86) in (37) (Koen Bostoen, p.c.).

Since the reflexes of *kómbò in Ding (B86) do not seem to be regular, and the data on the distribution of *kómbò are rather patchy in the WCB paraphyly, it is impossible to say with certainty whether this term can be reconstructed to PWCB level. There is however the possibility that the term could have been partially lost in the first subbranches and was preserved in the KLC as an archaism. The archaic leftovers in the meanings of *kómbò could be further evidence. Moreover, *kómbò could possibly be reconstructed to Proto-KLC level as *kombo. In this scenario, PWCB speakers had two or more terms for ‘goat’ and that, once the expansion away from the homeland westwards started, these terms were then subsequently lost in some major subgroups of WCB and preserved in others. Moreover, it could be that goats at one point lost their importance and that only one instead of multiple terms had to be used for ‘goat’, which could explain the archaization of the specialised meanings of some *kómbò reflexes.

Reflexes of *kómbò are found outside the WCB branch in Guthrie zones B, H, K and R which belong to South-Western Bantu (SWB) and WCB. Therefore, the possibility exists that SWB and WCB speakers could be closely related, since both language groups use *kómbò for ‘goat’. This is also suggested by Vansina (2004). *kómbò could be a lexically innovation originating in SWB, which then spread to the KLC language through contact. Vansina (2004) claims that *kómbò was invented by SWB speakers. He states that SWB speakers shifted the meaning for the PB term *bʊ́dì from ‘goat’ to ‘sheep’[7], therefore needing a new term for ‘goat’, namely *kómbò. This term was then through language contact adopted by WCB speakers north of them “such as Kongo speakers” (Vansina, 2004, p. 281-2). This scenario is not certain however, since the attestations of *kómbò outside WCB are also patchy and do not give decisive evidence.

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[7] possibly because sheep were more numerously herded in southern Africa, see Badenhorst (2010)

5.3 *tàbà (BLR 2712)

5.3.1 Distribution within WCB

(62) WCB attestations of *tàbà (BLR 2712)

WCB			B86T ***n-tsap*** (Mertens, 1939); B86U ***ntab, ntsap, ntap*** (Koni Muluwa & Bostoen, 2015); B86Y ***ntab*** (Ebalantshim Masuwan, 1980); B862X ***ntáb*** (Koni Muluwa & Bostoen, 2015); B861 ***Ø-ntâβ/Ø-ntâβ*** (Sara Pacchiarotti, p.c.)
Kamtsha-Kwilu			B85e ***ntáb*** (Koni Muluwa & Bostoen, 2015)***, ntáp*** (Mbwetete, 1984)***, u dúm a ntáb*** 'he-goat', ***u kyák a ntáb*** 'she-goat' (Kibwenge India'ana Passy, 1985); B85F ***ntáb*** 'goat, he-goat' (Adiate Mfum Ekong, 1979)
Kwilu-Ngounie			B85b; ***ntab,*** (Koni Muluwa & Bostoen, 2015) ***-tàp*** (Rottland, 1977); B85a ***ntab*** (Swartenbroeckx, 1948)
	Kasai-Ngounie		B74 ***ntàbà*** (Raharimanantsoa, 2019); B77b ***nkali antaba*** (Makouta-Mboukou, 1960)
	Kwa-Kasai N		B80zX ***ntàb*** 'he-goat' (Brussens, 1999; Hochegger, 1972)***, mukér a ntàb*** 'she-goat', ***ntàb mukér*** 'she-goat' (Hochegger, 1972); B82X ***ntaba*** (Stappers, 1986)
	Mbete		B63 ***ntaba, taba*** (Biton, 1969)
	Nzebi-Teke W		B52 ***tàbà*** (Marchal-Nasse, 1989)
KLC			
	C		H16b ***ntaba*** (Laman, 1936)
	E		H16g ***nkòòmbò ntàbà*** (Daeleman, 1983)
	W		
		N-W	B43 ***tabəmupusə*** (ALGAB), ***tabə tsi mipusə*** (Blanchon, 2008)

*tàbà has reflexes in all major subgroups within WCB. In the Kamtsha-Kwilu, Kwilu-Ngounie and KLC branch, *kómbo and*tàbà seem to be in complementary distribution with each other, as can be seen clearly in Table 4. With the exception of Yaa (B73c) these two terms cover all the main subbranches of WCB except for its earliest offshoots in the paraphyly. Two language varieties, Manyanga (H16b) and Ntandu (H16g) have both terms for 'goat'.

Branch	**Subbranch**	**Variety**	***kómbò**	**Meaning**	***tàbà**	**Meaning**
Kamtsha-Kwilu		**Mpur (B85e)**			*ntáb, ntáp*	goat, he-goat
		Nsambaan (B85F)			*ntáb*	goat
Kwilu-Ngounie		**Yans (B85b/a)**			*ntab, -tàp*	goat
	Kasai-Ngounie Extended paraphyly	**Mfinu (B83)**	*´ŋkòòmù, báŋkòòmù*	goat		
	Kasai-Ngounie	**Eboo-Nzikou (B74)**			*ntaba*	goat, small goat
		Fumu (B77b)			*nkali antaba*	goat
	Kwa-Kasai North	**Boma Yumu (B80z)**			*ntab*	goat, he-goat
		North Boma (B82X)			*ntaba*	goat
	Mbete	**Nduumo (B63)**			*ntaba, taba*	goat
	Nzebi-Teke West	**Nzebi (B52)**			*tàbà*	goat
		Yaa (B73c)				
KLC	KLC – Extended	**Mbuun (B87)**	*n-kóóm, nkombo, nkɔɔm*	goat		
		Ngong (B864X)	*ngóòm/bákóòm, nkɔ̂m*	goat, he-goat		
	KLC – Kikongoid	**Hungan (H42)**	*kɔ̂mb*	goat, he-goat		
		Yaka (H31)	*khóòmbò*	goat (1a/2), goat meat (9/10)		
	KLC – North	**Hangala (H111)**	*kóómbò*	goat		
	KLC – South	**Sikongo (H16a)**	*ki-nkombo-kombo ka kisundi*	goat, small he-goat		
	KLC - Central	**Manyanga (H16b)**	*khómbo, nkombo, kyankombo*	goat, small or big goat	*ntaba*	goat
	KLC – East	**Ntandu (H16g)**	*nkóombo, nkoombo ntaba*	goat	*nkoombo ntaba*	goat

	KLC – West	**Lumbu (B44)**	*ø-koombu*	goat, small goat		
		Punu (B43)			*tabəmupusə, tabə tsi mipusə*	*goat*
		Yombe (H16c)	*khóómbó*			

*Table 4: *kómbò and *tàbà in complementary distribution over the Kamtsha-Kwilu, Kwilu-Ngounie and KLC subbranches.*

5.3.2 Noun Stem

The first consonant of the root *t has three attestations in the sample languages. The most common one is /nt/. *tàbà is not reconstructed in BLR3 as belonging to class 9/10, it could however be that *tàbà shifted to class 9/10 in some or all WCB languages where this noun cluster occurs. From (62) we can only see a morphologic indication in *-tàp* in East Yans (B85b) (Rottland, 1977), since also *ntab* is suggested as a reflex from East Yans (B85b) (Koni Muluwa & Bostoen, 2015) and does have an root initial nasal. Mertens (1939) also suggests morphological indication for *n-tsap*. In some languages the homorganic nasal could also have been reanalysed as part of the root. This shift from a consonant to a consonant-nasal cluster (*t > nt) does seem regular in the sample languages, as can also be noted in (63)-(68) for Eboo-Nzikou (B74), Fumu (B77b), Boma Yumu (B80z), North Boma (B82Y), Mpur (B85e), Nsambaan (B85F), Manyanga (H16b), Ntandu (H16g), East Ding (B86U), Lwel (B862), Ngwi (B861), Yans (B85a), East Yans (B85b).

(63) BLR 3004 *tótò 'soil' > B77b *ntóro* (Bastin et al. 1999; Vansina 1964); B80z *ntɔ̀r* (Burssens 1999); B82Y *ntɔ̀rɔ́* (Bastin et al. 1999; Mobanga / Angenot); B85e *ntóre* (Bastin et al. 1999: Lime - Mboko / Daeleman 1976); H16b *ntoto* (Laman 1912); H16g *ǹtotó* (Daeleman 1983)

(64) BLR 3660 *tètè 'grain, seed' > B80z *mantɛt* (Koni Muluwa & Bostoen, 2015); B86U *ntsɛt* (Koni Muluwa & Bostoen, 2015); B862 *ntɛ́r* (Koni Muluwa & Bostoen, 2015); B85a *ntèt a lébudh* (Swartenbroeckx 1948); B85e *ntɛr a lɩpáy* (Koni Muluwa & Bostoen 2015); B85F *ntɛ́r* (Koni Muluwa & Bostoen 2015)

(65) BLR 8427 *tàmbòì 'lion: *Panthera leo'* > B80z *ntámbɔ* (Koni Muluwa & Bostoen, 2015); B85b *ntaam* (Koni Muluwa & Bostoen, 2015); B85e *nsɛŋ á ntám* (Koni Muluwa & Bostoen, 2015); B85F *ntaam* (Koni Muluwa & Bostoen, 2015)

(66) BLR 2963 * tòdó 'sleep' > B74 *ntwɔlɔ* (Bastin et al. 1999: Ngouamba / Ndamba 1989)

(67) BLR 3030 *tʊ́ì 'ear' > B74 *ntwi* (Bastin et al. 1999: Ngouamba / Ndamba 1989)

(68) BLR 4152 *tʊ́mé ~ BLR 4156 tʊ́mʊá 'messenger' > B861 *ntûm (Ø-/Ø-)* (Sara

Pacchiarotti, p.c.)

Three exceptions are Nduumo (B63), Nzebi (B52) and Punu (B43) in which *t is regularly preserved. Lastly, in East Ding (B86U), the stem initial consonant has undergone fricatization, resulting in the fricative /ts/. This could have been a case of BS, but BS is not caused by *a following the consonant. In this phonological context, this reflex does not seem to be regular in the East Ding (B86U) variety, as is illustrated in (69), (70) and (71).

(69) BLR 2720 *tádà 'platform; rack; granary' > B86U *ital* (Koni Muluwa & Bostoen, 2015)

(70) BLR 2727 *tádè 'iron-ore; iron; wire' > B86U *butal* (Koni Muluwa & Bostoen, 2015)

(71) BLR 2733 *tààdɪ́ 'snake' > B86U *ntyə́əy, nteal* (Koni Muluwa & Bostoen, 2015)

In Ding (B86U), Lwel (B862X), Mpur (B85e), Nsambaan (B85F), Yans (B85a), East Yans (B85b), Eboo-Nzikou (B74), Fumu (B77b), Boma Yumu (B80z), North Boma (B82X), Nduumo (B63), Nzebi (B52), Manyanga (H16b), Ntandu (H16g) and Pumu (B43), *b in C2 was preserved as shown in (62). Based on (72), (73) and (74) it seems that the preservation of *b is regular for these language varieties.

(72) BLR 1861 *kóbá ' skin; strap; girdle' > B63X *-kɔbɔ* (Bastin et al. 1999: Marchal-Nasse 1987); B82Y *ǹkùbò* (Bastin et al. 1999: Mobanga / Angenot); B86U *kikob* (Koni Muluwa & Bostoen 2015); B862X *kəkɔ́b* (Koni Muluwa & Bostoen, 2015); B85FZ *ekob, bikob* (Bastin et al. 1999: Adiate Mfum Ekong / Daeleman 1976); B85bY *ekob, bekob* (Bastin et al. 1999: Lukere / Daeleman 1980)

(73) BLR 1274 *gàb ‘divide; give away; make present’ > B43 *ùghăbà* (Mavoungou & Plumel 2010); B52Z *u-kàbà* (Marchal-Nasse, 1989); B63Y *gi-kabaha* (Biton, 1969); B77bX *u-kaba* (Makouta-Mboukou, 1960); B80z *ókàb* (Brussens, 1999); B82X *kɔ-kàbà* (Stappers, 1986); B85bT *kukab* (Koni Muluwa & Bostoen, 2015); B85eW *ókáb* (Mbwetete, 1984); B85F *kakáb* (Koni Muluwa & Bostoen, 2015); H16b *-kaba* (Laman & Meinhof 1928-9); H16g *-kàb-* (Daeleman 1983)

(74) BLR 10289 *tɪab ‘swim’ > B74 *otsaba* (Bastin et al. 1999: Ngouamba / Ndamba 1989)

In West Ding (B86T), East ding (B86U), Mpur (B85e) and East Yans (B85b) *b in C2 seems to have undergone a partial of full devoicing from *b > p, as in (75), (76) and (77). No additional examples were found for Mpur (B85e).

(75) BLR 1093 *dóbò ‘fish-hook’ > B86U *ndzɔp* (Koni Muluwa & Bostoen 2015)

(76) BLR 1532 *gùbʊ́ ‘hippopotamus: *Hippopotamus amphibius’* > B86U *ŋɣup* (Koni Muluwa & Bostoen 2015)

(77) BLR 1274 *gàb ‘divide; give away; make present’ > B86U *kukap* (Koni Muluwa & Bostoen, 2015)

Lastly, in Ngwi (B861) *b in C2 is generally retained, as is illustrated in (78)-(81), and is realized phonetically as [β].

(78) BLR 1274 *gàb ‘divide; give away; make present’ > B861 *kǎβ* (Sara Pacchiarotti, p.c.)

(79) BLR 1615 *jʊ́bò ‘house’ > B861 *ndzûβ (Ø-/Ø-)* (Sara Pacchiarotti, p.c.)

(80) BLR 957 *dɪ̀bò ‘small bell’ > B861 *ndə̂β (Ø-/Ø-)* (Sara Pacchiarotti, p.c.)

(81) BLR 1093 *dóbò ‘fish-hook’ > B861 *ndôβ (Ø-/Ø-)* (Sara Pacchiarotti, p.c.)

In all sample languages *a was preserved as such in V1 position. Similarly, in V2 position *a was retained in all the languages which did not undergo FVL, i.e. North Boma (B82X), Nzebi (B52), Nduumo (B63), Fumu (B77b) and Ekoo-Nzikou (B74), Manyanga (H16b), Ntandu (H16g) and Punu (B43). The other languages, namely Ding (B86) varieties, Lwel (B862) Ngwi (B861), Yans (B85), East Yans (B85b), Mpur (B85e) and Nsambaan (B85F) (62) underwent regular FVL (Pacchiarotti & Bostoen, 2020b).

As for the *LL tone in Ding (B86). Mertens (1939) does not note tone, whereas Ebalantshim Masuwan (1980) does note H tone. Therefore, based on (82) and (83), it could be possible that the correspondence *LL > LL is a regular one. However, the correspondence *LL > HH is also possible in Ebalantshim Masuwan (1980), which can be seen in (84).

(82) BLR 70 *bàkàdà ‘man, male’ > B86Y *èbààl* (Elabantshim Masuwan 1980)

(83) BLR 1607 * jògù ' elephant: *Loxodonta africana'* > B86Y *ndzòò* (Elabantshim Masuwan 1980)

(84) BLR 551 *cèngà ' sand; sandy ground ' > B86Y *-nsɛ́ɛ́ŋ* (Ebalantshim Masuwan, 1980)

For the reflexes in Ngwi (B861), the tone correspondence seems to be *LL > HL. In Ngwi, the PB *LL usually became HL. This can also be realised as a F tone due to FVL, when V2 is deleted, through which the L tone on the suprasegmental level was reanalysed in the V1 as falling. This is the case for the Ngwi reflex of *tàbà in (62) and in the examples (85) and (86) below.

(85) BLR 897 *dèdù ‘beard; chin’ > B861 *è-lêy/n-dêy* (Sara Pacchiarotti, p.c.)

(86) BLR 7983 *kéèkéè ‘small’ > B861 *kyâʁ* ‘thin’ (Sara Pacchiarotti, p.c.)

In the Mpur (B85e) reflex for *tàbà, Mbwetete (1984) describes also the correspondence *LL > HH, of which only one additional example could be found (87). The *LL > HH correspondence also seems regular for the reflex in Nsambaan (B85F), as in (88).

(87) BLR 261 *bòmà ‘snake, python’ > B85e *mwám* (Mbwetete, 1984)

(88) BLR 1939 *kòndò ‘banana: Musaceae’ > B85F *é-kwáán/má-kwáán* (Adiate Mfum Ekong, 1979)

The *LL tone pattern reconstructed for *tàbà is also attested in the Nzebi variety (B52Z) described by Marchal-Nasse (1989) where *LL > LL seems like a regular correspondence as can be observed in (89) and (90). Also in East Yans (B85bV) described by Rottland (1977), the *LL was preserved as shown in (91), (92) and (93).

(89) BLR 7089 *dògì ‘witch’ > B52Z *mù-lòxì/bà-lòxì* (Marchal-Nasse, 1989)

(90) BLR 3527 *jògà ‘mushroom sp. eatable’ > B52Z *bɔ-ɔ̀xɔ̀* (Marchal-Nasse, 1989)

(91) BLR 1939 *kòndò ‘banana: *Musaceae*’ > B85bV *-kwàn*` (Rottland 1977)

(92) BLR 2368 *pàkàcà ‘buffalo: *Syncerus caffer’* > B85bV *pɛ̣à:y*` (Rottland 1977)

(93) BLR 70 *bàkàdà ‘man, male’ > B85bV *bɛ̣à:l*` (Rottland 1977)

The correspondence of *LL > LL tone is also regularly attested in the reflexes of *tàbà in Eboo-Nzikou (B74), Boma Yumu (B80z) and Ntandu (H16g). This can be seen in (94) and (95) for Eboo-Nzikou (B74), in (96) and (97) for Boma Yumu (B80z) and in (98) and (99) for Ntandu (H16g).

(94) BLR 1106 *dògò ‘witchcraft’ > B74 *ndòʊ*` (Raharimanantsoa, 2019)

(95) BLR 2368 *pàkàcà’ buffalo: Syncerus caffer’ > B74 *mpàà* (Raharimanantsoa, 2019)

(96) BLR 8983 *bàdì ‘antelope: reedbuck: *Reduncinae: Redunca arundinum’* > B80z *m-bèr* (Hochegger, 1972)

(97) BLR 1607 *jògù ‘elephant: *Loxodonta africana’* > B80z *n-zò* (Brussens, 1999; Hochegger, 1972)

(98) BLR 44 *bàdì ‘the next day/ the before day; yesterday; tomorrow’ > H16g *mbàsì* (Daeleman, 1983)

(99) BLR 70 *bàkàdà ‘man, male’ > H16g *mbàkàlà* (Daeleman, 1983)

In sum, the reflexes of *tàbà within the WCB branch seem to be overall regular and based on many retentions, seeing that only a few varieties attest some innovations.

5.3.3 Noun Class

In BLR3 *tàbà is reconstructed as belonging to class 1a/2 (*Ø/*ba-) and 7/8 (*kì-/*bì-). In Eboo-Nzikou (B74) and Nduumo (B63), the reflexes of *taba belong to class 1a/2 (see Raharimanantsoa 2020 and Biton 1969, respectively). Evidence for *tàbà belonging to class 3/4 was found for Fumu (B77b) and Punu (B43) (see Blanchon, 2008 and Makouta-Mboukou, 1960 respectively). Evidence for *tàbà belonging to class 9/10 Is found in Mpur (B85e), East Yans (B85b), Boma Yumu (B80z) and North Boma (B82X) (see Brussens, 1999; Mbwetete, 1984; Rottland, 1977; Stappers, 1986, respectively). Lastly, Swartenbroecks (1948) suggests that the reflex of *tàbà in Yans (B85a) belongs to class 5/6. Based on this patchy evidence, it is not possible to reconstruct one clear noun class pairing for *tàbà in Proto-WCB.

5.3.4 Meaning

Next to the more general meaning of this term for ‘goat’, *tàbà reflexes form compounds with other words as for *mukér a ntàb* or *ntàb mukér* both meaning ‘she-goat’ in Boma Yumu (B80z). However, these meanings are not encompassed in the reflexes of the word *tàbà.

In other cases, attestations of *tàbà do encompass meaning that points towards the gender of the goat. For instance, in Nsambaan (B85F) and in Boma Yumu (B80z) the internal meaning, without the use of a compound noun, of *ntáb/ntab* is ‘he-goat’, as can be seen in (62).

Another element that is of importance for understanding the spread of terms for ‘goat’ in WCB is that in terms of geographical spread and even in some cases meaning specificity, *tàbà stands in complementary distribution with *kómbò, as reflected in Table 4. For *tàbà there are some traces of a more specific meaning concerning the gender of the animal left in the Kamtsha-Kwilu branch for Nsambaan (B85F) and in the Kwilu-Ngounie branch for Boma Yumu (B80zX). The rest of the reflexes, however, is merely translated with the general term ‘goat’. The only exception for this would be for Lwel (B862) for which *ntáb* does not have any specific meaning, but the reflex of *bʊ́dì does, meaning ‘he-goat’. For *kómbò very specific meanings concerning the physical aspects of the animal, are randomly spread over some KLC reflexes.

5.3.5 Discussion

BLR3 reconstructs *tàbà within Guthrie zones A, B, C and H, which would mean that the term can be found in North-Western Bantu (NWB), Central-Western Bantu (CWB) and WCB. This is in complementary distribution with *kómbò that is attested in WCB and South-Western Bantu (SWB).

Overall, the reflexes of *tàbà within the WCB branch seem to be based on many retentions, seeing that only a few varieties attest some innovations. The V1 *a > a correspondence, for instance can be found in all the attestations. The preservation of *b is also found in all the attestations with the exception on some additional sound changes in for instance East Yans (B85b) where both /b/ and /p/ are possible attestations of *b. As for the *t in C1 position it seems that in many of the reflexes all over the WCB branch, the consonant noun cluster became lexicalised wherein the noun /n/ became part of the C1. With the exception of East Yans (B85b) described by Rottland (1977), Nduumo (B63) described by Biton (1969), Nzebi (B52) described by Marchal-Nasse (1989) and Punu (B43) described by Blanchon (2008). The FVL attestation is in all targeted reflexes regularly attested.

Even though the distribution of *tàbà within WCB is still somewhat patchy, an attempt could be made on reconstructing some proto-forms for its subbranches resulting in the reconstruction *taba for PWCB. However, there is still much that is uncertain on the basis of tonal description and the fact that the term is still in a patchy way spread over the WCB branch.

5.4 *gobo*

5.4.1 Distribution within WCB

(100) WCB attestations of gobo (BLR 10329)

WCB	B862X ***ngànkɔ̀b*** ‘goat, he-goat’ (Khang Levy, 1979)
Kamtsha-Kwilu	B85e ***ngɔ̀ɔ̀b*** (Mbwetete, 1984)***;*** B85b ***ngɔb*** (Nguma, 1986)
Kasai Ngounie	
Kwa-Kasai North	B80zX ***n-gɔ̀b, n-gòb*** ‘goat, he-goat’, ***n-gòb mùkár*** ‘she-goat’, ***n-gòb mùlúm*** ‘he-goat’, ***n-gòb mùlém*** ‘he-goat, ***mùkắr à n-gòb*** ‘she-goat’, ***n-gòb mùkắr*** ‘she-goat’, ***n-gɔ̀b mùl`ɛm*** ‘he-goat’ (Hochegger, 1972; Brussens, 1999)

Gobo has reflexes only in Boma Yumu (B80zX), Lwel (B862), Mpur (B85e) and Yans (B85). These varieties attesting the term are spoken in geographically contiguous areas. Moreover, the reconstruction *gobo* does not have an index number as it is not present in BLR3, but its reconstruction is based on comparative West-Coastal Bantu data which was collected during the KongoKing (2012-2016) and BantuFirst (2018-2022) projects.

5.4.2 Noun Stem

As previously discussed, PB *g was preserved in Proto-WCB in postnasal position, as can be seen in all reflexes in (100) except Lwel (B862) *ngankɔb*, where *g unexpectedly has /k/ as a reflex despite the postnasal position. This could be a contact-induces sound change, explained by the fact that Lwel (B862) and Nzadi (B865) speakers live in interaction with Sakata (C34) speakers and with whom they even intermarry. In zone C languages, such as Sakata (C34) “the voicing contrast between PB *g and *k in postnasal position was not maintained”. (Pacchiarotti & Bostoen, 2020c) This is certainly the case for Tiene (B81) varieties, where *ng in C1 positions has a /ŋk/ reflex. The conservation of the voicing contrast in postnasal position is, thus, lost because of language contact, in this case with the Sakata cluster (C34), as can be seen in (101). In (102) this can also be observed for Lwel (B862) and Nzadi (B865) where /nk/ is used where once would expect /ng/ (Pacchiarotti & Bostoen, 2020c).

(101) BLR 1332 *gàngà ‘medicine man’ > B81 (Dya) *ngaa* (Ellington, 1977); B81 (Nkɛtɛ) *ŋka* (Mangulu, 2004)

(102) BLR 1446 *gòndé ‘crocodile’ > B862 *nkwaan* (Khang Levy, 1979); B865 *ŋkwăn* (Crane et al., 2011)

In C2 position, the /b/ is retained in all attestations. This is regular in all varieties, as is previously discussed for reflexes of *tàbà in §5.3.2 and which can be observed in (103)- (106)**.**

(103) BLR 1274 *gàb ‘divide; give away; make present’ > B80z *ókàb* (Brussens, 1999); B85bT *kukab* (Koni Muluwa & Bostoen, 2015); B85eW *ókáb* (Mbwetete, 1984); B862X *kàb* (Khang Levy, 1979)

(104) BLR 597 *dɪ̀bò 'small bell' > B85bT *lib* (Koni Muluwa & Bostoen, 2015); B85eX *lib* (Koni Muluwa & Bostoen, 2015); B862X *ndəb* (Koni Muluwa & Bostoen, 2015)

(105) BLR 1088 * dób 'fish with line' > B85bT *kulɔb* (Koni Muluwa & Bostoen, 2015); B85eX *ulɔ́b* (Koni Muluwa & Bostoen, 2015); B862X *olɔ́b* (Koni Muluwa & Bostoen, 2015)

(106) BLR 1532 * gùbʊ́ 'hippopotamus: *Hippopotamus amphibius'* > B80zX *ngub* (Koni Muluwa & Bostoen, 2015); B85bT *ngub* (Koni Muluwa & Bostoen, 2015); B862X *ngəb* (Koni Muluwa & Bostoen, 2015)

In V1 position, the close-mid back vowel /o/ has two different notations. For Boma Yumu (B80zX) the vowel is noted with either /o/ and /ɔ/, as illustrated in (107) and (108). V1 for Mpur (B85e) and East Yans (B85b) is noted only with the open-mid back vowel /ɔ/. All these attestations seem to be regular based on (107) and (108). However, this could also merely be a case of different notations by different sources, as could be the case for Brussens (1999) and Hochegger (1972). As for the reflex in Lwel (B862), the most regular attestation of *o in V1 is /ə/, although in some cases /ɔ/ is attested as well, as illustrated in (109) - (112)

(107) BLR 1607 *jògù ‘elephant: *Loxodonta africana’* > B80z *n-zo* (Hochegger, 1972), *n-zɔ* (Brussens, 1999); B85b *+zɔ* (Rottland, 1977); B85e *ndzɔw* (Koni Muluwa & Bostoen, 2015)

(108) BLR 265 *bòmbó ‘forehead; bridge of nose; nose’ > B80z *mvwom* (Hochegger, 1972), *mbwɔm* (Brussens, 1999); B85b *-bɔ̀ɔ̀m* (Rottland, 1977); B85e *mbɔm* (Koni Muluwa & Bostoen, 2015)

(109) BLR 2286 *nók ‘rain’ > B862X *nwə* (Khang Levy, 1979)

(110) BLR 1904 *kókó ‘chicken’ > B862X *kwə́* (Khang Levy, 1979)

(111) BLR 1100 *dòg ‘bewitch; (curse)’ > B862X *lwə* (Khang Levy, 1979)

(112) BLR 7371 *bògò ‘stone’ > B862X *bɔ́k* (Khang Levy, 1979)

FVL caused the deletion of V2 in all varieties attesting a reflex of gobo. FVL is regular in Boma Yumu (B80z), East Yans (B85b), Mpur (B85e) and Lwel (B862). Based solely on the evidence from these four language varieties, the reconstruction *gob* would be expected instead of gobo. There, thus, must be other language varieties not belonging to this WCB sample that have a reflex of gobo and that not attest FVL, since the V2 is reconstructed as /o/.

5.4.3 Noun Class

When looking at (100), most of the reflexes of *gobo* are already morphemically analysed. In the BLR3, *gobo* belongs to class 9/10. Therefore, we could say that, as placed in its class pairing, gobo could be morphemically analysed as *N-gobo/N-gobo*. In this context, the homorganic nasal, influencing the velar stop to remain voiced as discussed by Pacchiarotti and Bostoen (2020b).

5.4.4 Meaning

Both in Lwel (B862) and Boma Yumu (B80zX), *gobo* can be used as the general term for goat or as the term for ‘he-goat’. Therefore, the word *ngob* in both Lwel (B862) and Boma Yumu (B80z) could encompass intrinsically the meaning ‘he-goat’. In Boma Yumu (B80zX), *ngɔb* also forms compounds with words such as ‘mukɛ́r’ (BLR 1674 *kádí) meaning woman, wife, as well as ‘mulúm’ (BLR 1282 * dʊ́mè) meaning male, husband.

5.4.5 Discussion

The four varieties attesting the term *gobo* are spoken in geographically contiguous areas. Since the term is only attested in four geographically close languages, *gobo* is perhaps a regional attestation. It has no attestations outside of WCB. This would mean that the term *gobo* emerged relatively late and its spread could then be contact-induced, since the term is restricted to a small geographical area and occurs in more or less neighbouring languages (see Map 4).

6. The historical linguistic analysis of terms for sheep

Branch	Subbranch	Variety	*kòòkò	Meaning	*méémé	Meaning	ndombo	Meaning
WCB		**East Ding (B86U)**						
		West Ding (B86T)	*mukɔɔ, mukɔɔk*	sheep				
		West Ding (B86Y)						
		Lwel (B862)						
		Ngwi (B861)	*ò-kɔ̀kɔ̀/è-kɔ̀kɔ̀*	ram				
Kamtsha-Kwilu		**Mpur (B85e)**						
		Nsambaan (B85F)			*lúmɛ́m*	sheep		
Kwilu-Ngounie		**Yans (B85b/a)**			*lemɛmɛ*	sheep		
	Kasai-Ngounie Extended paraphyly	**Mfinu (B83)**						
	Kasai-Ngounie	**Eboo-Nzikou (B74)**			*imɛɔ, imɛ̃ɛ̃́*	sheep		
		Fumu (B77b)			*mene*	sheep	*ndono*	sheep
	Kwa-Kasai North	**Boma Yumu (B80z)**			*kèmèmè*	sheep		
		North Boma (B82X)						
	Mbete	**Nduumo (B63)**					*gin-dombo*	sheep
	Nzebi-Teke West	**Nzebi (B52)**						
		Yaa (B73c)					*índɔ´mbɔ`*	*sheep*
KLC	KLC – Extended	**Mbuun (B87)**	*ɔ́kɔ́k*	sheep	*iméèm, mɛ́m*	sheep		
		Ngong (B864X)			*mɛ́m*	sheep		
		Mpiin (B863)			*mɛ́m*	sheep		
		Nsong (B85d)	*mɔ́kɔ́k*	sheep	*mɛ́m*	sheep		

	KLC – Kikongoid	**Hungan (H42)**			*mɛ́m*	sheep, she-sheep		
		Yaka (H31)			*méémà*	sheep, aries		
	KLC – North	**Hangala (H111)**			*méémè*	sheep		
	KLC – South	**Sikongo (H16a)**			*e-meme*	sheep, she-sheep		
	KLC - Central	**Manyanga (H16b)**			*méeme*	sheep, she-sheep	*di-ndomba/ di-ndombe*	kind of sheep, ram
	KLC – East	**Ntandu (H16g)**			*mèèmé*	sheep		
	KLC – West	**Lumbu (B44)**					*dìndɔ́mbà*	sheep, goat
		Punu (B43)					*-ndomba/ -ndombu*	sheep, ram, ewe
		Yombe (H16c)			*mámèèmè*	sheep		

*Table 5: Comparative overview of *kòòkò, *méémé and ndombo*

6.1 *kòòkò (BLR 1905)

6.1.1 Distribution within WCB

(113) WCB attestations of *kòòkò (BLR 1905)

WCB	B86T ***mukɔɔ, mukɔɔk*** (Mertens, 1939), B861 ***ò-kɔ̀kɔ̀/è-kɔ̀kɔ̀*** ‘ram’ (Sara Pacchiarotti, p.c.)
Kamtsha-Kwilu	
Kwilu-Ngounie	
KLC Extended	B87T ***ɔ́kɔ́k*** (Mundeke, 1979), B85d ***mɔ́kɔ́k*** (Bostoen & Muluwa, 2014)

This term is distributed in a very patchy way across WCB. It seems to only have attestations in the earliest paraphyletic offshoots of the branch, i.e. in the West Ding (B86T) and Ngwi (B861) and in the KLC Extended i.e. Mbuun (B87) and Nsong (B85d). It does not have attestations in the Kamtsha-Kwilu and Kwilu-Ngounie branches.

6.1.2 Noun Stem

In C1 position, *k is regularly retained in all four languages, as shown by Pacchiarotti and Bostoen (2020c/d). Concerning C2, *k gets regularly lost in Ding (B86), as illustrated in (114)-(117) below. Loss of *k in C2 can also happen in other paraphyletic languages at the top of the WCB phylogeny, such as Ngwi (B861) as can be seen in (118). However, most often *k is not lost in C2 in Ngwi (B861), as shown in (117)-(121). *k regularly shifts to /ʁ/ in C2. Hence, the retention of *k in the Ngwi (B861) reflex of *kòòkò is not regular in C2 position.

On the contrary, the correspondence *k > k in C2 seems regular in Mbuun (B87T) and Nsong (B85d), even though only three relevant examples could be found i.e. (122), (123) and (124).

(114) BLR 70 *bàkàdà ‘man, male’ > B86U *ebaal* (Koni Muluwa & Bostoen, 2015); B86Y *èbààl* (Elabantshim Masuwan 1980)

(115) BLR 2368 *pàkàcà ‘buffalo: *Syncerus caffer’* > B86U *naa mpay* (Koni Muluwa & Bostoen, 2015); *B861* Ø-mpàkàsà/Ø-mpàkàsà (Sara Pacchiarotti, p.c.)

(116) BLR 1685 *kààká ‘grandparent; grandfather; grandmother; older brother/ sister’ >

B86U *ŋkaa* (Koni Muluwa & Bostoen, 2015); B86Y *nkǎ* (Ebalantshim Masuwan 1980)

(117) BLR 1904 *kókó ‘chicken’ > B86U *nkɔɔ* (Koni Muluwa & Bostoen, 2015); B86Y *nkɔ́ɔ́* (Ebalantshim Masuwan 1980), B861 *Ø-ŋkɔ́ʁ/Ø-ŋkɔ́ʁ* (Sara Pacchiarotti, p.c.)

(118) BLR 647 *còká ‘axe’ > B861 *ì-ʃúà/à-ʃúà* (Sara Pacchiarotti, p.c.)

(119) BLR 7983 *kéèkéè ‘small’ > B861 *kyâʁ* ‘thin’ (Sara Pacchiarotti, p.c.)

(120) BLR 9605 *pákù ‘honey’ > B861 *mpâʁ (Ø-)* (Sara Pacchiarotti, p.c.)

(121) BLR 5467 *kúk ‘cover’ > B861 *pfûʁ (è-/Ǹ-)* ‘door’ (Sara Pacchiarotti, p.c.)

(122) BLR 2374 *pàkò ‘tree-hollow’ > B85dZ *mpák* (Koni Muluwa & Bostoen, 2015)

(123) BLR 648 *còkó ‘monkey, *Ceropithecus spp*.’ > B85dZ *sɔkɔ́-múnd* (Koni Muluwa, 2014); B87W *sɔ́k-mûr* (Koni Muluwa 2014)

(124) BLR 3541 *joko ‘arm’ > B85dZ *kɔ́-ɔ/mí-ɔ* (Koni Muluwa, 2010); B87U *kô, myô, kɔ, myɔ* (Bastin et al. 1999)

As for the V1 position, most attestations seem to be regular. For Mbuun (B87) it can be noted in (126) and (127) that the *o > ɔ is regular, which is also the case for Nsong (B85d) in (125), (128) and (130), and also for Ngwi (B861) in (129). For the reflexes of *kòòkò in these three language varieties can also be noted that the vowel length is lost. Even though not many additional examples could be found, the loss of vowel length seems regular in Mbuun (B87) as illustrated in (130) and in Ngwi (B861) as illustrated in (131). On the contrary, in Nsong (B85d) the vowel length is preserved as shown in (130), which could indicate irregularity for its reflex of *kòòkò.

The reflex for *kòòkò in West Ding (B86T) did regularly preserve the vowel length, even though not many additional examples could be found, as seen in (130). However, in West Ding (B86T) vowel lengthening, also from PB short vowels, is regular, as illustrated in (125), (132) and (133).

(125) BLR 265 *bòmbó 'forehead; bridge of nose; nose' > B85d *m-bɔ̂m/(m)a-m-bɔ̂m* (Koni Muluwa & Bostoen, 2010); B86T *m-bɔɔm* (Daeleman, 1977a; Mertens, 1939)

(126) BLR 258 *bògó 'buffalo: *Syncerus caffer* ' > B87 *íbɔk* (Mundeke, 1979)

(127) BLR 275 *bóngó 'knee' > B87 *ibɔŋ* (Mundeke, 1979)

(128) BLR 261 *bòmà 'snake: python' > B85d *mbɔ́m* (Koni Muluwa & Bostoen, 2014)

(129) BLR 1904 *kókó ‘chicken’ > B861 *Ø-ŋkɔ́ʁ/Ø-ŋkɔ́ʁ* (Sara Pacchiarotti, p.c.)

(130) BLR 638 *cóod ‘choose’ > B85d *kɔ́sɔ́:l* (Koni Muluwa & Bostoen 2015); B86U *kusɔɔl* (Koni Muluwa & Bostoen 2015); B87X *kasɔ́l* (Koni Muluwa & Bostoen 2015)

(131) BLR 1147 *dóótì ‘dream’ > B861 *ndôy (Ø-/Ø-)* (Sara Pacchiarotti, p.c.)

(132) BLR 1939 *kòndò 'banana: Musaceae ' > B86T *ikɔɔn, iŋkɔɔn* (Mertens, 1939)

(133) BLR 6702 *pòndó 'millet: Graminaceae' > B86T *m-pwɔɔn* (Mertens, 1939)

In V2, regular FVL can be observed in the Ding (B86), Mbuun (B87) and Nsong (B85d) reflexes of *kòòkò (cf. Pacchiarotti and Bostoen, 2020b). However, this phenomenon is also regular in Ngwi (B861), whose reflex of *kòòkò does not manifest it, which is another indication that it cannot be a regular reflex.

The reconstructed *LL tone of *kòòkò can only be checked for Ding (B86) in Ebalantshim Masuwan (1980), as Mertens (1939) does not note tone. The examples in (134) and (135) show that the correspondence *LL > LL does occur in Ding (B86) as also discussed above for *tàbà (§5.3). However, the correspondence *LL > HH is also attested in Ebalantshim Masuwan (1980), which can be seen in (136).

(134) BLR 70 *bàkàdà ‘man, male’ > B86Y *èbààl* (Elabantshim Masuwan 1980)

(135) BLR 1607 * jògù ' elephant: *Loxodonta africana'* > B86Y *ndzòò* (Elabantshim Masuwan 1980)

(136) BLR 551 * cèngà ' sand; sandy ground ' > B86Y *-nsέέŋ* (Ebalantshim Masuwan, 1980)

According to Sara Pacchiarotti (p.c.) most PB tone schemes for disyllabic noun stems results in a HL or F tone pattern in Ngwi (B861), which is illustrated in (137) and (138). The F tone is due to the deletion of the V2, resulting in the combination of H and L into F. However, the reflex of *kòòkò in Ngwi (B861) is *ò-kɔ̀kɔ̀* in which the *LL pattern seems to be irregularly preserved and is yet another indication that it is an irregular reflex.

(137) BLR 1168 *dʊ̀dʊ̀ ‘bitterness’ > B861 *lúù (ò-)* (Sara Pacchiarotti, p.c.)

(138) BLR 369 *bùdì 'hairs on body' > B861 *fûr (ì-/à-)* ‘hair (body)’ (Sara Pacchiarotti, p.c.)

Lastly, the tone correspondence *LL > HH for the Mbuun (B87) reflex of *kòòkò seems regular. Mundeke (1979; 2011) discusses this tone correspondence, which can be seen in (139) and (140). No sufficient tone analysis is available to check the tonal regularity of the Nsong (B85d) reflex.

(139) BLR 1490 *gʊ̀dʊ̀ 'leg, hind leg' > B87U *kúwúl* (Bastin et al. 1999); B87X *kwóól* (Mundeke, 1979)

(140) BLR 3527 *jògà ‘mushroom, sp. eatable’ > B87T *bóó* (Mundeke, 2011)

In sum, formally speaking, all attested WCB reflexes of *kòòkò seem to be regular, except the one in Ngwi (B861), which is most likely a borrowing even though it is not entirely clear from where Ngwi (B861) could have borrowed it. Possibly it could be borrowed from Vernacular Kikongo or Lingala, two lingua franca spoken in the same region.

6.1.3 Noun Class

BLR3 reconstructs for *kòòkò class 3/4. The reflex *ɔ́kɔ́k* for Mbuun (B87) is put in class 3 with prefix *ɔ́-* (Mundeke, 1979). No other sources place their reflexes in a class pairing. However, based on what is known of the Bantu class pairing, the reflexes of *kòòkò in West Ding (B86T) and Nsong (B85d) also belong to class 3. Both *mukɔɔ* and *mɔ́kɔ́k* have retained the bilabial nasal /m/ of the PB prefix *mu-* which is in many Bantu languages the prefix for class 3 (Dimmendaal, 2011). The regular reflexes for *kòòkò in WCB thus all belong to class pairing 3/4 as is reconstructed in BLR3.

6.1.4 Meaning

Mbuun (B87), Nsong (B85d) and West Ding (B86T) all attest the same one meaning, namely ‘sheep’. Ngwi (B861) has the more specialised meaning ‘ram’. This could be a further indication for the borrowing of the term for sheep in Ngwi (B861).

6.1.5 Discussion

The West Ding (B86T) attestation of *kòòkò seems formally regular, as do the attestations of Mbuun (B87) and of Nsong (B85d) on the basis of the sound changes for the consonants, vowels and for the most part tone. As for the Ngwi (B861) reflex however, it is clear that *ò-kɔ̀kɔ̀/è-kɔ̀kɔ̀*, is irregular and could possibly be a borrowing. Three sound changes occurred irregular for the language variety, namely that FVL did not occur, which is a phenomenon that usually does occur in this language. Secondly, in C2, the *k did not become /ʁ/. Lastly, the tone pattern is irregular since in Ngwi PB *LL tone becomes HL.

BLR3 reconstructs this PB term in Guthrie zones C, D, H, K and L. This term is therefore clearly rooted in Western Bantu with reflexes in Central-Western Bantu (CWB) and South-Western Bantu (SWB). Now zone B can be added to the distribution with some certainty, since *kòòkò does have regular attestations within WCB.

6.2 *méémé (BLR 2166)

6.2.1 Distribution within WCB

(141) WCB attestations of *méémé (BLR 2166)

WCB			
Kamtsha-Kwilu			B85F ***lúmɛ́m*** (Koni Muluwa, 2014)
Kwilu-Ngounie			B85a ***lemɛmɛ*** (Mayanga, 1985)
	Kasai-Ngounie		B74 ***imɛɔ*** or ***imɛ̃ɛ̃́*** (Raharimanantsoa, 2019); B77b ***mene*** (Makouta-Mboukou, 1960)
	Kwa-Kasai N		B80z ***kèmèmè*** (Hochegger, 1972)
KLC			B87 ***iméèm*** (Mundeke, 1979), ***mɛ́m*** (Koni Muluwa & Bostoen, 2010), B864X ***mɛ́m*** (Koni Muluwa & Bostoen, 2010), B863 ***mɛ́m*** (Koni Muluwa & Bostoen, 2010); B85d ***mɛ́m*** (Koni Muluwa & Bostoen, 2010)
	KLC - KK		H42 ***mɛ́m*** 'sheep, she-sheep', ***mwăn ú mɛ́m*** 'lamb' (Fieldwork JKM), **lu-*mèm*** 'she-sheep' (Kasuku-Kongini 1984); H31 ***méémà*** 'sheep, aries' (Ruttenberg, 2000)
	N		H111 ***méémè*** (Mabiala, 1999)
	S		H16a ***e-meme*** 'sheep, she-sheep'(Van Gheel, 1652)**,** ***meme*** (Narciso Cobe, 2010)
	C		H16b ***ki-mèeme*** 'character, habits, manners, similar to (those) of the sheep: ram with horns', ***améeme, méeme*** 'sheep, she-sheep' (Laman, 1936)
	E		H16g ***mèèmé*** (Daeleman, 1983)
	W		
		S-W	H16c ***mámèèmè*** (De Grauwe, 2009)

Even though *mèème is not represented in the earliest offshoots of WCB, the term is almost fully represented in its three major subbranches, Kamtsha-Kwilu, Kwilu-Ngounie and KLC.

6.2.2 Noun Stem

The correspondence *m > m in C1 position is shared by all languages that attest a reflex of *méémé. As for C2 most languages, namely Nsambaan (B85F), Yans (B85a), Boma Yumu (B80z), Mbuun (B87), Ngong (B864X), Mpiin (B863), Nsong (B85d), Hungan (H42), Yaka (H31), Hangala (H111), Sikongo (H16a), Manyanga (H16b), Ntandu (H16g) and Yombe (H16c) attest the correspondence *m > m regularly, as can be seen in (142). The reflex of *méémé in Eboo-Nzikou (B74) is *imɛɔ* of which the correspondence *m > Ø seems regular for this language as can be noted in (143) and (144) . As for *mene* in Fumu (B77b), however, the correspondence *m > n is not regular, as can be seen in (143), (144) and (145).

(142) BLR 261 * bòmà ' snake: python' > B80z *mbɔm* (Koni Muluwa & Bostoen, 2015); B85bT *mbɔm* (Koni Muluwa & Bostoen, 2015); B85dZ *mbɔ́:m* (Koni Muluwa & Bostoen, 2015); B85FX *mbɔ́m* (Koni Muluwa & Bostoen, 2015); B863Y *mbɔ́:m* (Koni Muluwa & Bostoen, 2015); B864X *mbɔ́m* (Koni Muluwa & Bostoen, 2015); B87W *mbɔ́:m* (Koni Muluwa & Bostoen, 2015); H111 *bòmá* (Mabiala, 1999); H16a *mboma* (Van Wing & Penders 1928); H16c *mbòómà* (De Grauwe, 2009); H16g *mbòmà* (Daeleman, 1983); H31 *mbómá* (Ruttenberg, 2000); H42 *mbɔ́ːm* (Fieldwork JKM)

(143) BLR 3180 *nyàmà 'animal; meat' > B74 *ɲɔ̃, aɲɔ̃* (Bastin et al. 1999: Ngouamba / Ndamba 1989); B77bX *ɲama* (Bastin et al. 1999: Biansele / Polak 1989)

(144) BLR 5492 *dɪ́mù ' tongue' > B74 *lilyɔ̃* (Raharimanantsoa, 2019); B77bX *lulimu* (Bastin et al. 1999: Biansele / Polak 1989)

(145) BLR 1182 * dʊ́mè 'male' > B77bX *lùmì* (Daeleman, 1977a)

When considering V1, two reflexes of *e can be noticed. In Hangala (H111), Sikongo (H16a), Manyanga (H16b), Yombe (H16c), Ntandu (H16g) and Yaka (H31) *e was preserved. This is logical and regular, since all KLC varieties underwent 7>5 vowel merger (see Appendix 3). Hungan (H42), however, after undergoing the 7>5 vowel merger, underwent a phonemic split, that resulted in the vowel system in Appendix 3. This split is a vowel assimilation that are established in the conditioning context in (146) (Bostoen & Koni Muluwa, 2011). Under influence of the PB close-mid vowel *e in *méémé, the *e in V1 underwent a lowering *e > ɛ.

(146) *o > o, *e > e / __ *i, *ɩ, *u, *ʊ
*o > ɔ, *e > ɛ / __ *e, *a, *o

As for the remainder of the languages, for Nsambaan (B85F), Yans (B85a/b), Ngong (B864), Mpiin (B863) and Nsong (B85d) the correspondence *e > ɛ is a regular one, as can be seen in (147), (148) and (149). The correspondence *e > e is also regular for Mbuun (B87) as in (147) and (148). As for Boma Yumu (B80z) the correspondence *e > e also seems regular as in (148), even though more examples could be found for the correspondence *e > ɛ.

(147) BLR 522 * cèk 'laugh, joke' > B85a *sɛ* (Mayanga, 1985); B85b *sɛ̀* (Rottland, 1977); B85d *kɔʃɛ́:* (Koni Muluwa & Bostoen, 2015); B863 *ʃɛ́ː* (Koni Muluwa & Bostoen, 2010); B864 *kɔsɛ́y* (Koni Muluwa & Bostoen, 2015); B87 *káʃéé* (Mundeke, 1979)

(148) BLR 1339 *gé 'egg' > B80z *ikye* (Koni Muluwa & Bostoen, 2015); B85b -*kyɛ̀*` (Rottland, 1977); B85d *ɛ́kyɛ* (Koni Muluwa & Bostoen, 2015); B85F *ɛkiɛ* (Koni Muluwa & Bostoen, 2015); B863 *kyɛ* (Koni Muluwa & Bostoen, 2015); B864 *kyɛ* (Koni Muluwa & Bostoen, 2015); B87 *íkyè* (Bastin et al. 1999: Kapumbu / Mukash-Kalel)

(149) BLR 897 *dèdù 'beard; chin' > B85b *ndɛy* (Koni Muluwa & Bostoen, 2015); B85d *ndɛts* (Koni Muluwa & Bostoen, 2015); B85F *ndɛy* (Koni Muluwa & Bostoen, 2015); B863 *kilɛ́ts* (Koni Muluwa & Bostoen, 2015); B864 *kɛ́lɛ́ts* (Koni Muluwa & Bostoen, 2015)

Lastly, the *e > e correspondence in V1 for Fumu (B77b) is regularly preserved as in (150) and (151). The correspondence *e > ɛ is also regularly attested in V1 position in Eboo-Nzikou (B74), as can be noted in (150) and (152).

(150) BLR 125 *béèdè ' breast, udder' > B74 *byɛɛlɛ, abyɛlɛ* (Bastin et al. 1999: Ngouamba / Ndamba 1989); B77bX *ibyelu* (Bastin et al. 1999: Nganyono / Vansina 1964); B85b *byɛl* (Bastin et al. 1999: Burssens 1990: 34)

(151) BLR 556 *cèp 'laugh' > B77b -*ʃebe* (Daeleman, 1956, 1977b)

(152) BLR 2448 *pémbé 'white clay; white colour' > B74 *mpɛ̃* (Bastin et al. 1999: Ngouamba / Ndamba 1989)

The /e/ in V2 position is a more diverse reflexes which are spread over the sample languages. For Hangala (H111), Sikongo (H16a), Manyanga (H16b), Yombe (H16c) and Ntandu (H16g) the *e was preserved or coincided with /i/ for Sikongo (H16a) and /o/ for Ntandu (H16g) as in (153). The correspondence of *e > i of *e > o are examples of a common process in the KLC of vowel heightening.

(153) BLR 147 *béénè 'breast' > H111 *bééné* (Mabiala, 1999); H16a *e-yene* (Van Wing & Penders 1928), *diyeni* (Craven & Barfield 1883); H16b *bene* (Bastin et al. 1999); H16c *(di)bééne* (De Grauwe, 2009); H16g *mabeno* (Butaye 1909), *yééne/mayééne* (Koelle 1854), *mabenu* (Bastin et al. 1999); H31 *yéno* (CBOLD); H42 *bêni/bɛ̂n* (Fieldwork JKM)

Nsambaan (B85F), Mbuun (B87), Ngong (BB64X), Mpiin (B863), Nsong (B85d) and Hungan (H42) regularly attest FVL in V2 in their reflexes of *méémé, which can also be seen in (154) and (155) (Pacchiarotti & Bostoen, 2020b). However, Yans (B85a) and Boma Yumu (B80z) normally also attest FVL as in (154) and (155). However, for their reflexes of *méémé, Yans (B85a) irregularly attests *e > ɛ and Boma Yumu (B80z) irregularly attests *e > e.

(154) BLR 893 *ndédé 'white man' > B80z *mundɛl* (Brussens, 1999); B85b *mundɛl* (Koni Muluwa & Bostoen, 2015); B85d *mɔ́ndɛl* (Koni Muluwa & Bostoen, 2015); B85FX *mándɛl* (Koni Muluwa & Bostoen, 2015); B863Y *múndɛl* (Koni Muluwa & Bostoen, 2015); B87W *úndɛl* (Koni Muluwa & Bostoen, 2015); H111 *ndéle* (Mabiala, 1999); H16a *mundele/mindele* (Bentley 1887); H16b *mundele/mindele* (Laman 1912); H16c *múndeela* (De Grauwe, 2009); H16g *mu-ndéle* (Daeleman, 1983); H42 *múndɛl* (Fieldwork JKM)

(155) BLR 1182 *dʊ́mè 'male' > B80zX *mulúm* (Koni Muluwa & Bostoen, 2015); B85b *mudim* (Koni Muluwa & Bostoen, 2015); B85a *mudim/badim* (Swartenbroeckx, 1948); B85d *módím* (Koni Muluwa & Bostoen, 2015); B85FX *mádím* (Koni Muluwa & Bostoen, 2015); B863Y *mʊdím* (Koni Muluwa & Bostoen, 2015); B864X *módim* (Koni Muluwa & Bostoen, 2015); B87W *údím* (Koni Muluwa & Bostoen, 2015)

Yaka (H31) underwent an individual regular innovation wherein *e > a, as can be noted in (156), (157) and (158).

(156) BLR 543 *céndé ‘thorn’ > H31 *luséénda* (Ruttenberg, 2000)

(157) BLR 674 *còngè ‘point’ > H31 *tsóónga* (Ruttenberg, 2000)

(158) BLR 1434 *gòmbè ‘cattle’ > H31 *ngóómbá* (Ruttenberg, 2000)

Lastly, Fumu (B77b) and Eboo-Nzikou (B74) are also irregular in their attestations of *e in V2 position so much so that there is not one attestation more regular that the other ones, as illustrated in (159)-(162).

(159) BLR 7983 *kéèkéè 'little, small; few' > B74 *okyɛkyɛ* (Bastin et al. 1999: Ngouamba / Ndamba 1989); B77bY *kyekye* (Bastin et al. 1999: Nganyono / Vansina 1964)

(160) BLR 739 *cʊ́ngé 'moon; month' > B74 *nsẅi, ansẅi* (Bastin et al. 1999: Ngouamba / Ndamba 1989); B77bY *ncwii* (Bastin et al. 1999: Nganyono / Vansina 1964)

(161) BLR 2448 *pémbé ' white clay; white colour' > B74 *mpɛ̃* (Bastin et al. 1999: Ngouamba / Ndamba 1989); B77b *mpɛmɛ* (Bastin et al. 1999: Biansele / Polak 1989)

(162) BLR 518 *cégé 'grassland' > B74 *ntsjóʊ* (Raharimanantsoa, 2019); B77bX *Ø-ntseɣe/ma-ntseɣe* (Makouta-Mboukou, 1960)

When looking at the tone patterns for the reflexes of *méémé, only a handful of language varieties can be discussed, since not all sources are reliable or complete when it comes to tonal description. One that can be trusted is Rottland (1977) for East Yans (B85b). Even though Rottland (1977) does not mention any translation for ‘sheep’, we can rely on it for its tonal description which can be compared to the tone on the *méémé reflex in Mayanga (1985). However, these sources have *lèmɛ̀mɛ̀* as a reflex, which is low in tone, whereas Rottland (1977) only describes the correspondence *HH > HH for East Yans (B85b) as in (163), (164) and (165).

(163) BLR 9576 *kácá ‘leaf’ > B85b *-káý* (Bastin et al. 1999: Rottland)

(164) BLR 2797 *tángó 'sun' > B85b *-táː́* (Bastin et al. 1999: Rottland)

(165) BLR 820 *dáká 'tongue; language; jaw' > B85b *dáḱ* (Rottland, 1977)

In contrast to Yans (B85), Boma Yumu (B80z), Yaka (H31), Hangala (H111), Manyanga (H16b) and Ntandu (H16g) do seem to be regular in their tone reflex of PB *HH tone of *méémé. Buma Yumu (B80z) regularly attests *HH > LL (Hochegger, 1972), as can be seen in (166) and (167). For Yaka (H31) the *HH > HL correspondence is also regular (Ruttenberg, 2000) as in (168)-(171).

(166) BLR 1845 * kíngó 'neck; nape; voice' > B80z *lè-kìɛ̀* (Hochegger, 1972)

(167) BLR 5455 *túká 'banana: fruit of tree: *Musaceae: Musa sp*.' > B80z *kètshùˈkà* (Hochegger, 1972)

(168) BLR 97 *bánjá 'dwelling-place; courtyard; family; meeting; affair; law-court; fault' > H31 *mbáandza* (Ruttenberg 2000:139)

(169) BLR 274 *bóngó 'knee' > H31 *bóongo* (Ruttenberg, 2000)

(170) BLR 820 *dáká 'tongue; language; jaw' > H31 *luláki, ndáki* (Ruttenberg, 2000)

(171) BLR 1664 *kádá 'crab' > H31 *khála* (Ruttenberg, 2000)

Manyanga (H16b) and Hangala (H111) also attest the *HH > HL correspondence which is described by Laman (1936) and Mabiala (1999) respectively, as in (172) and (173) for Manyanga (H16b) and in (174) and (175) for Hangala (H111). For Ntandu (H16g) the opposite reflex can be observed of which the *HH > LH correspondence is regular (Daeleman, 1983), as can be noted in (176) and (177).

(172) BLR 486 *cángʊ́ 'millet, eleusine; maize, small seed' > H16b *ma-sángu* (Laman, 1936)
(173) BLR 518 *cégé 'grassland' > H16b *nséke* (Laman, 1936)
(174) BLR 108 *bángá 'jaw' > H111 *bááŋgà* (Mabiala, 1999)
(175) BLR 212 *bɪ́ndá 'calabash' > H111 *bííndà* (Mabiala, 1999)
(176) BLR 49 *bádí 'open space' > H16g *mbasí* (Daeleman, 1983)
(177) BLR 108 *bángá 'jaw' > H16b *baangá* (Daeleman, 1983)

The attestation of Yombe (H16c) does not have a regular tone pattern, however. Based on De Grauwe (2009) the correspondence of *HH > LL is irregular whereas *HH > HH is usually attested in Yombe (H16c). This can be seen in (178)-(180).

(178) BLR 892 *dédé 'coth' > H16c *nléélé* (De Grauwe, 2009)
(179) BLR 97 *bánjá ‘dwelling-place; courtyard; family; meeting; affair; law-court; fault’ > H16c *mbáánzá* (De Grauwe, 2009)
(180) BLR 478 *cángá ‘bead’ > H16c *nsáángá* (De Grauwe, 2009)

In sum, formally speaking, the WCB reflexes of *méémé in Nsambaan (B85F) and the KLC subbranch seem to be regular. The reflexes of Yans (B85a) and Boma Yumu (B80z) are irregular in V2 which is also the case for the reflex in Eboo-Nzikou (B74). Lastly, the reflex in Fumu (B77b) is almost completely irregular in V1, C2 and V2. This could perhaps be a borrowing.

6.2.3 Noun Class

This term for sheep is reconstructed to belong to class 5/6 or class 7/8 in BLR 3. As for the WCB varieties that attest *méémé only four sources clearly describe the class for their synchronic data. Mayanga (1985) assigns *lemɛmɛ* to class 5 (le- ma) for Yans (B85a). Makouta-Mboukou (1960) assigns class 7/8 to *mene* in Fumu (B77b). Lastly, Mundeke (1979) assigns *iméem* also to class 5. Raharimanantsoa (2019), on the contrary, assigns *imɛɔ* to class 7/8 for Eboo-Nzikou (B74). Since this data is not complete and patchy, it is therefore not possible to reconstruct the class for *méémé on any proto-WCB level.

6.2.4 Meaning

In comparison to *kòòkò, a section of varieties that use a reflex of *méémé attest some more specific meanings than just the general term ‘sheep’. Hungan (H42) assigns both ‘sheep’ and ‘ewe’ as meaning of the term *mɛ́m* as well as for *e-meme* in Sikongo (H16a) and *méeme* in Manyanga (H16b), which also have the meaning ‘sheep’ and ‘ewe’. In Yaka (H31) *mééma* has the meaning of both ‘sheep’ and ‘ram’ as in (141). These more specific meanings concerning the gender of the animal are only attested in the KLC branch and even there in a patchy manner. One could however note that the most frequently used meaning for *méémé in the KLC is the one referring to ‘ewe’.

6.2.5 Discussion

BLR3 reconstructs *méémé in Guthrie zones B, C, H, K and L. This term is therefore, just as *kòòkò, clearly rooted in Western Bantu with reflexes in Central-Western Bantu (CWB), South-Western Bantu (SWB) and WCB. The term *méémé appears to be the most frequently used term for ‘sheep’ across the 27 WCB sample languages. It is also described by Vansina (2004) as a frequently used lexicalised ideophone to refer to the animal in Bantu languages.

No reflex of *méémé could be found in the three samples of the earliest paraphyletic offshoots of WCB, Ding (B86), Lwel (B862) and Ngwi (B861). However, in Nzadi (B865), a language not part of the sample languages but one that does belong to the WCB first offshoots, does have a reflex of *méémé, namely *imɛ́mɛ̀*. Besides this and despite some irregularities in the Kwilu-Ngounie branch, *méémé is (somewhat) regularly attested in all major monophyletic branches of WCB. Therefore, this term could possibly be reconstructed to the most recent common ancestor of each branch and possibly even to PWCB.

For the KLC subbranch possible reconstructions can be suggested. Firstly, for the KLC an almost certain proto-KLC reconstruction can be made that has the form of *méémè. Mbuun (B87), Ngong (B864), Mpiin (B863), Nsong (B85d), Hangala (H111), Sikongo (H16a), Manyanga (H16b), Yombe (H16c), and Ntandu (H16g) all regularly attest *m in C1 and *m in C2. Moreover, in V1 the attestation of *e seems most likely, since the correspondence *e > ɛ in V1 for Mbuun (B87), Ngong (B864), Mpiin (B863), Nsong (B85d) and Hungan (H42) does not seem most probable in the basis of the frequency principle. As for the regular correspondence *e > a in V2 in Yaka (H31), this is an independent innovation restricted to this language variety. The FVL in Hungan (H42) is a contact-induced innovation also attested in Ngong (B864), Nsong

(B85d) and Mpiin (B863). When considering the tone, the HL pattern seems the most frequent recurring tone pattern as it regularly appears in the reflex of Yaka (H31), Hangala (H31) and Manyanga (H16b).

6.3 ndombo

6.3.1 Distribution within WCB

(181) WCB attestations of *ndombo*

WCB			
Kamtsha-Kwilu			
Kwilu-Ngounie			B77b ***ndono*** (Makouta-Mboukou, 1960)
	Mbete		B63 ***gin-dombo*** (Biton, 1969)
	Nzebi-Teke W		B73c ***índɔ´mbɔ`*** (Mouandza, 2001)
KLC			
	C		H16b ***di-ndomba/di-ndombe*** ‘kind of sheep, ram’ (Laman, 1936)
	W		
		N-W	B43 ***-ndomba*** ‘sheep, ram, ewe’ (5/6), ***-ndombu*** ‘sheep, ram’ (7/8) (Blanchon, 2008); B44 ***dìndɔómbà*** *(5/6)* (Mavoungou & Plumel, 2010)

Spread across five WCB language varieties, reflexes of another term for ‘sheep’ were found. However, these terms do not correspond belong to any BLR Index. It is notable that the term is spread quite in a patchy way across both the Kwilu-Ngounie subbranch, including Fumu (B77b), Nduumu (B63) and Yaa (B73c) and the KLC subbranch, including Punu (B43), Lumbu (B44) and Manyanga (H16b).

6.3.2 Noun Stem

In the C1 position of all the five attestations the nasal-consonant cluster /nd/ is found. For all six language varieties, this is a regular sound correspondence with PB *d, as can be seen in (182)-(186).

(182) BLR 820 *dáká ' tongue; language; jaw' > B63y *ndaha* (Biton, 1969); B73c *nda̋a̋/mà-nda̋a̋* (Mouandza 2001); B77b *Ø-ndaɣa/o-ndaɣa* (Makouta-Mboukou, 1960)

(183) BLR 1175 *dʊ̀gʊ́ 'brother or sister (same sex); relative; friend' > B73c *ndúː/bá-ndúː* (Mouandza 2001); B77b *i-ndùú/bi-ndùú* (Makouta-Mboukou, 1960)

(184) BLR 859 *dàndʊ́ ' debt; fault; affair; penalty' > H16b *ndandu* (Laman, 1936)

(185) BLR 1036 *dìdim 'shiver' > B43 *nduungu* (Mavoungou & Plumel 2010)

(186) BLR 1098 *dòòdí 'dream' > B43 ndoosi/bandoosi (Mavoungou & Plumel 2010); B44 *n-dòòsì* (Mavoungou & Plumel 2010)

It would seem that the five out of the six language variations attest the noun-consonant cluster /mb/ in C2 position. Based on the principle of frequency, for Punu (B43), Lumbu (B44), Yaa (B73c) and Manyanga (H16b) can be stated that the /mb/ cluster might be in regular correspondence with the PB *mb, as can be noted from (187)-(189). Nduumo (B63) also attests /mb/ in C2, however, as can be seen in (189) and (190), the /mb/ in Nduumo (B63) does not regularly correspond with PB *mb.

The reflex in Fumu (B77b) does not attest /mb/ in C2, but rather /n/. Based on (188) and (189), it does not seem like a regular attestation from *mb. Rather *mb has as reflex /m/ in Fumu (B77b). This makes one wonder whether the proto-sound might be something different. The irregular attestation of /n/ in Makouta (1960) however is registered in the case of *méémé as well, as discussed in §6.2.

(187) BLR 1506 *gʊ̀mbá 'rodent: porcupine: *Hystricides*' > B43 *nguumba/banguumba* (Mavoungou & Plumel 2010); B44 *n-gúúmbà* (Mavoungou & Plumel, 2010); B73c *ngúùmbú/bá-ngúùmbú* (Mouandza, 2001); H16b *ngumba* (Laman, 1936)

(188) BLR 2448 *pémbé 'white clay; white colour' > B43 *peembi* (Mavoungou & Plumel 2010); B44 *Ø-pèèmbì* (Mavoungou & Plumel 2010); B73c *u-hɛmbuha* (Bastin et al. 1999: Bouka 1989); B77b *mpɛmɛ* (Bastin et al. 1999: Biansele / Polak 1989); H16b *mpembe* (Laman & Meinhof 1928-9)

(189) BLR 2036 *kʊ́mbʊ́ 'nickname, name' > B43 *kuumbu/bakuumbu* (Mavoungou & Plumel 2010); B44 *ø-kùùmbù* (Mavoungou & Plumel, 2010); B63X *kumu* (Marchal-Nasse 1987); B73c *kuumbu* (Bastin et al. 1999: Bouka 1989); B77b *nkumi* (Bastin et al. 1999: Biansele / Polak 1989); H16b *nkumbu* (Laman, 1912)

(190) BLR 8480 *kamba 'cassava sp.' > B*43 dikǎmbə* (Blanchon, 2008); B44 *dì-kámbà* (Mavoungou & Plumel, 2010); B63 *lékama* (Raponda-Walker & Sillans 1961)

As for the V1, in most attestations, namely Punu (B43), Lumbu (B44) Fumu (B77b), Nduumo (B63) and Manyanga (H16b), the close-mid back vowel /o/ is regularly attested. Next to this, in Yaa (B73c) the open-mid back vowel /ɔ/ is attested, as in (191) and (192). Based on the principle of frequency and economy and this scanty evidence, it seems most likely that the proto-sound for V1 would be *o.

(191) BLR 275 * bóngó 'knee' > B73c *bɔɔngɔ* (Bastin et al. 1999: Bouka 1989); B77b *bwònɔ* (Bastin et al. 1999: Biansele/ Polak 1989)

(192) BLR 1100 * dòg ' bewitch; (curse)' > B63 *gi-loho* (Biton, 1969); B73c *ù-lɔ́ɔ́* (Mouandza, 2001); B77b *ú-lòɣò* (Makouta-Mboukou, 1960); H16b *-loka* (Laman & Meinhof 1928-9)

When lastly considering V2, more attestations are possible. Fumu (B77b) and Nduumo (B63) both attest /o/, whereas Yaa (B73c) attests /ɔ/. Manyanga (H16b) attest numerous final vowels, namely /a/, /e/ and /o/. Punu (B43) attests /a/ and /u/ in V2. Lastly, Lumbu (B44) only attests /a/ as final vowel. Based on these divided attestations it is hard to say which form the proto-sound might have taken. The fact that different final vowels are attested might suggests that some of these reflexes are deverbative nouns.

When considering the tone pattern, both Makouta-Mboukou (1960) for Fumu (B77b) and Biton (1969) for Nduumo (B63) do not note tone. Moreover, Blanchon (2008) for Punu (B43) does note tone in general, but not for the reflex for ‘sheep’. Mavoungou & Plumel (2010) do note HL tone for the reflex in Lumbu (B44). Laman (1936) for Manyanga (H16b) also normally notes tone, but does this in a patchy way for the reflexes of ‘sheep’, namely only one reflex out of three is noted with a LL tone. The other two do not have any tonal indication. Since the data on tone for these reflexes is so scanty, a reconstruction of a tone pattern is not possible.

6.3.3 Noun Class

Three out of the five sources place the reflex for ‘sheep’ in a class pairing. Makouta-Mboukou (1960) puts *ndono* into class pairing 7/8 for Fumu (B77b). This is also the case in Mouandza (2001) for the reflex *índɔ´mbɔ`* in Yaa (B73c). Furthermore, Blanchon (2008) places the reflexes for ‘sheep’ *-ndomb-* in class 5/6 (di-/ma-) and in class 7/8 (i-/bi-). The reflex in Manyanga (H16b) is not described but could probably be placed in class 5/6 (Laman, 1936), which is also the case for the Lumbu (B44) reflex. Whereas *gin-* in *gin-dombo* could be a prefix of class 7 in Nduumo (B63).

6.3.4 Meaning

Most of the reflexes did not have an additional meaning, other than ‘sheep’. For Manyanga (H16b) ‘sheep, ram’ is given. This meaning is also provided for Punu (B43) when -*ndombu* is placed in class pairing 7/8, and has the additional meaning of ‘sheep, ram, ewe’ when the noun is placed in class 5/6.

6.3.5 Discussion

For these relatively regular reflexes, no clear reconstruction could be made on PWCB level, as the patchy distribution is restricted to two subbranches of WCB. The reconstructed term ndombo is made in order to address and categorise the reflexes of a possible third term for sheep, but it is uncertain whether this is a valid one. Since this term cannot be reconstructed with certainty to any level the only thing that can be said for these reflexes in (175) is that they are geographically very restricted as can be seen in Map 5. There is a possibility, as with gobo in §5.4, that this is a contact-induced spread. The supposed term for the reflexes in (175) then recently emerged in the hinterland of the Atlantic coast (Koen Bostoen, p.c.).

7. Discussion

In order to partially fill the gap on archaeological information about the presence and spread of ovicaprines in the Central African region I relied on historical linguistics and the Comparative Method to analyse four terms for 'goat' and three terms for 'sheep'. As goats and sheep are consistently associated with human spread across the world since the dawn of their domestications, the historical analysis of their denominations could provide more insight in their spread and indirectly in the spread of Bantu-speaking populations. This section is concerned with the last step of the 'Words and Things' method suggesting to interpret, crosscheck and integrate the comparative linguistic research with known historical context (Ricquier, 2017).

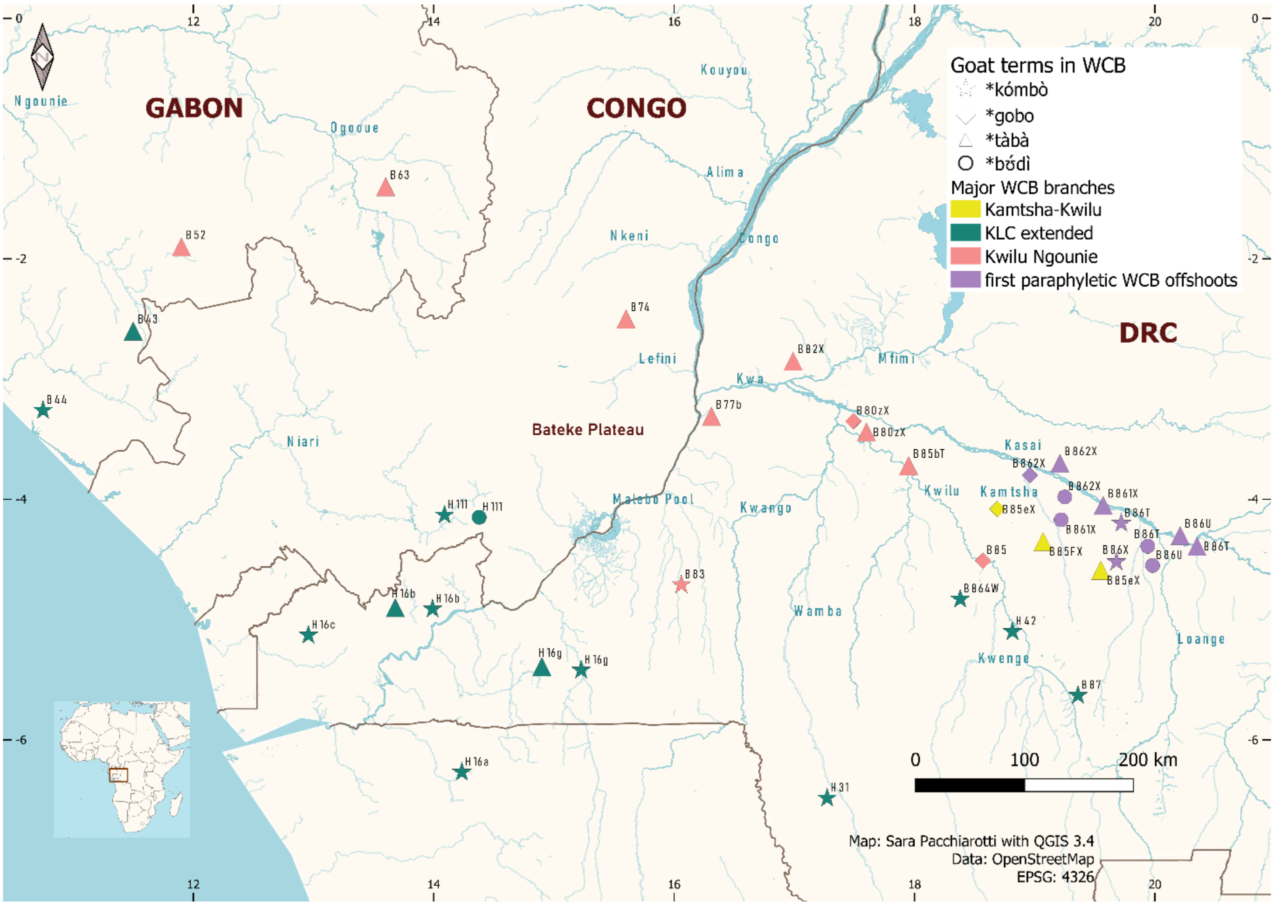
Four terms for ‘goat’ were found in the WCB sample languages although they are distributed across the branch in a very patchy way. By applying the Comparative Method on WCB goat terms, at least three distinct goat terms could possibly be reconstructed to PWCB. The fourth term, i.e. *gobo*, seems to be a relatively new term for 'goat'. It occurs in more or less neighbouring languages belonging to two major WCB subbranches and could thus be due to a contact-induced spread restricted to one geographical area as can be seen in Map 4 below.

As is discussed in §5.1 *bʊ́dì has been proposed as a PB reconstruction as it can be found in almost all Guthrie zones, hence it is almost certainly older than WCB and is probably attested as a retention within many Bantu languages. It is described by many sources as a frequent used term for ‘goat’ (cf. Blench, 2006, 2007; Ricquier & Bostoen, 2009; Vansina, 2004).

Within WCB, the term is only attested in the paraphyletic languages at the top of the phylogenetic tree, spoken in the branch’s homeland area. These reflexes of *bʊ́dì can be considered regular, based on its analysis in §5.1. Elsewhere within the WCB no attestations have been found except in Hangala (H111). However, this reflex is considered as an irregular reflex of *bʊ́dì ‘goat’, but it could possibly be a reflex of BLR 370 *bùdì ‘kudu antelope: *Tragelaphus sp.*’

Besides these four reflexes, it is clear that the usage of *bʊ́dì became less recurrent and frequent. The question is why it got lost in most of WCB and why it got replaced by other terms. Perhaps once in the area of the homeland goats were very important and people, therefore, needed more than one term to refer to the animal. It seems that *bʊ́dì must have co-existed with other terms in certain (ancestral) languages in the WCB homeland area. Possibly, more specific terms were used to refer to the gender of the animal like *tàbà, or to the height of the animal like *kómbò. *bɔ́dì would have become less productive, since other terms were used in a more specific way to refer to the animal. However, lack of attestations of *bɔ́dì in other WCB subbranches can simply be due lack of documentation.

Based on the geographical (Map 4) and lexical (Table 4: *kómbò and *tàbà in complementary distribution over the Kamtsha-Kwilu, Kwilu-Ngounie and KLC subbranches. distribution in WCB, *kómbò and *tàbà are clearly in a more or less complementary distribution in present-day WCB. *kómbò has its reflexes for the most part in the KLC whereas *tàbà is mostly represented in Kamtsha-Kwilu and Kwilu Ngounie. These two terms cover all the main subbranches of WCB and with the exception of Yaa (B73c) all the sample languages belonging to these WCB subbranches. Two language varieties, Manyanga (H16b) and Ntandu (H16g) have both terms for 'goat'. Both *kómbò and *tàbà have attestations in the first paraphyletic offshoots, although some reflexes seemed to be irregular. For the reflexes of *kómbò, for instance, only irregular reflexes in Ding (B86) were found. Moreover, the data on the distribution of *kómbò is rather patchy in WCB, which makes it rather difficult to say with certainty whether this term can be reconstructed to PWCB level.



Map 4: Geographical distribution of goat terms in WCB branch

There is however the possibility that the term could have been partially lost in the first subbranches and was preserved in the KLC as an archaism as could be reconstructed to proto-KLC as *kombo. Moreover, KLC data on the meaning of *kómbò pointing towards the height or age of the goat are scattered all over the KLC domain, which makes it likely for it to be considered as archaic (Bostoen & Bastin, 2015, p. 12). *tàbà has reflexes in all WCB subbranches, which seem to be based on many retentions. This term could be reconstructed to PWCB as *ntaba. However, on the basis of tonal description and the fact that the term is spread in a rather patchy way over the WCB branch, there is still much uncertainty. The specialised meaning of *tàbà referring to the specific gender of the animals is scattered across the WCB branch and could possibly also be interpreted as an archaic feature.

Reflexes of *kómbò are found outside the WCB branch in Guthrie zones B, H, K and R which belong to South-Western Bantu (SWB) and WCB. While BLR3 reconstructs *tàbà within Guthrie zones A, B, C and H, which would mean that the term can be found in North-Western Bantu (NWB), Central-Western Bantu (CWB) and WCB. Outside of WCB, these two terms also seem to be in complementary distribution.

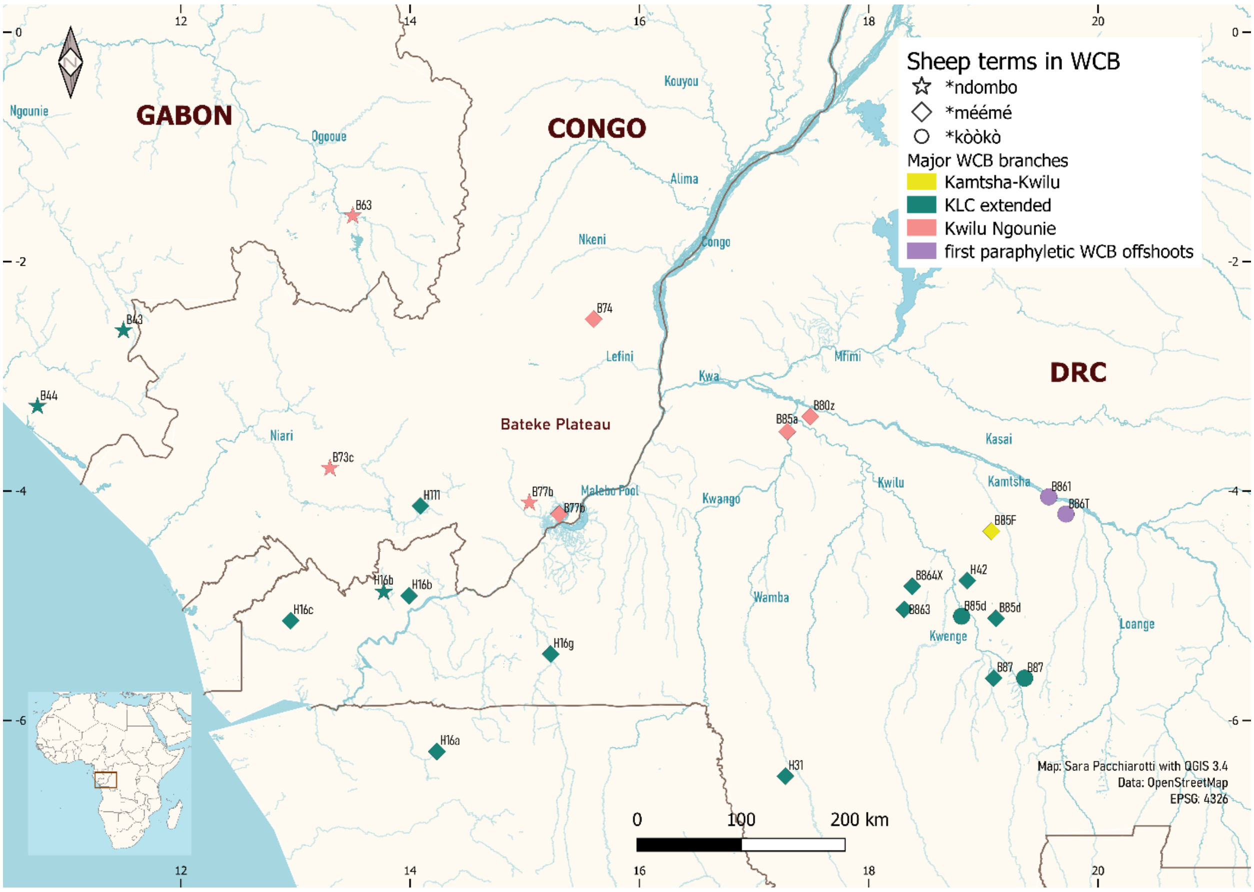
Based on the analysis, it could be that PWCB speakers had two or more terms for ‘goat’, when the Bantu expansion reached the southern areas of the equatorial rainforest and PWCB speakers settled in the WCB homeland area delimited by the Kasai and Kamtsha Rivers, as was concluded by Pacchiarotti et al. (2019). From there on out, WCB speakers expanded west towards the Atlantic coast in two major waves, i.e. the KLC and the Kwilu-Ngounie (Map 3). The complementary distribution for *kómbò in the KLC and for *tàbà in Kwilu-Ngounie follow more or less the same trajectory of the two major WCB subbranches westwards (see Map 4). However, once the westward expansion away from the homeland started, the PWCB terms for 'goat' were subsequently lost in some major subgroups of WCB and were preserved in others. Hence, it could be that goats at this point lost their importance and that only one instead of multiple terms had to be used for ‘goat’, which could explain the archaization of the specialised meanings of some *kómbò and *tàbà reflexes.

The possibility to reconstruct multiple distinct terms at PWCB or a relatively later WCB level indicates that the goats were indeed notably present and seem to have been of great importance as part of the subsistence economy of the first Bantu speakers south of the rainforest. This may be linked to many factors favouring the herding of goats. Climate is one of these factors, as goats easily adapt to their environment and changes in climate. Besides this, goats are easy to transport, for instance to cross the equatorial rainforest, and are versatile in their feeding habits and even thrive under unfavourable grazing conditions as was the case for some southern regions. Lastly, goats seem to be more trypanotolerant and are thus not as gravely affected by humidity-related diseases as sheep, which could also have been in the favour for the usage of goats by Bantu-speakers expanding south (Badenhorst, 2002, 2018; Hassan, 2000, 2002; Luikart et al., 2001; Pereira & Amorim, 2010).

This theory is reflected in the little archaeological evidence there is on goats south of the rainforest. Badenhorst (2018) suggests that goats were present in minimal numbers in comparison to sheep in the Early Iron Age (200 - 900 AD) layers in Southern Africa sites. In this same period, Bantu-speaking populations that kept goats, sheep, cattle, dogs and chickens were arriving in those areas. Moreover, after their introduction and during the Middle and Late Iron Age, the archaeological evidence on goats strikingly increases. This could suggest that Bantu-speaking populations did indeed have goats and introduced them in large numbers in the region. Together with the found linguistic data that at least three terms can possibly go back to PWCB and one that can be reconstructed with certainty to PB, it can be claimed that goats indeed were an important part of the subsistence economy of PWCB speaking populations that arrived south of the rainforest. Even more so, Bantu-speakers probably knew goats during their expansion through the rainforest and perhaps even before that.

Three terms for ‘sheep’ were found in the WCB sample languages in a very patchy way. By applying the Comparative Method on WCB terms for ‘sheep’, only one distinct term could possibly be reconstructed to PWCB. The third term, i.e. *ndombo*, has probably spread through contact since it is relatively new and geographically quite restricted, as it occurs in more or less neighbouring languages belonging to two major WCB subbranches as can be seen in Map 5.

As discussed in §6.1, *kòòkò has one regular attestation in the first offshoots of WCB, i.e. in West Ding (B86T) and two in the KLC, i.e. in Mbuun (B87) and in Nsong (B85d). The Ngwi (B861) reflex is irregular and could possibly be a borrowing. Based on this scanty evidence, no certain claim can be made to any possible PWCB reconstruction.



Map: Sara Pacchiarotti with QGIS 3.4
Data: OpenStreetMap
EPSG: 4326

Map 5: Geographical distribution of sheep terms in WCB branch

On the contrary, *méémé has the most reflexes in WCB languages and is represented in all WCB subbranches. It is also described by Vansina (2004) as a frequently used lexicalised ideophone to refer to the animal in Bantu languages. However, no reflex of *méémé could be found in the three sample language varieties of the earliest paraphyletic offshoots of WCB. The WCB reflexes of *méémé in Nsambaan (B85F) and the KLC subbranch seem to be regular. The reflexes of Yans (B85a) and Boma Yumu (B80z) have irregular attestations, which is also the case for the reflex in Eboo-Nzikou (B74). Lastly, the reflex in Fumu (B77b) is almost completely irregular.

Besides the scanty evidence of terms for 'sheep' in WCB languages, BLR3 reconstructs *kòòkò in Guthrie zones C, D, H, K and L. This term seems to be rooted in the Western Bantu branch with reflexes in CWB and SWB. Now zone B can be added to the distribution with some certainty, since *kòòkò does have some regular attestations within WCB. *méémé is reconstructed in Guthrie zones B, C, H, K and L. This term is therefore, just as *kòòkò, clearly rooted in Western Bantu with reflexes in CWB, SWB and WCB. These two terms thus seem to cover more or less the same Guthrie zones. Overall, within WCB these two terms seem to cover a large part of the WCB sample languages when looking at the major WCB subbranches, with the exception of some overlap for Mbuun (B87) and Nsong (B85d) as can be seen in Table 5 and no attestation in North Boma (B82), Mfinu (B83), Mpur (B85e) and Lwel (B862).

It must be noted that both *kòòkò and *méémé seem to go back some time in the Western Bantu branch. The term cannot, however, be reconstructed in NWB or to PB. This could mean that sheep were probably introduced to Bantu speakers during or after their arrival south of the rainforest. Terms for sheep in WCB seem much more randomly scattered across the branch in comparison to the distribution of goat terms (Map 5). According to Blench (2006, 2007) terms for sheep have been scattered across the whole Niger-Congo phylum. It is thus not unlikely that the major Niger-Congo subbranches, and most of the Bantu subbranches, were established before the term for sheep, and with it the animal, would have been subsequently introduced its regions.

There is still much controversy about how sheep have spread across the African continent and about when and where sheep were introduced in West-Central Africa. On the one hand, it could be possible that sheep have indeed followed a more eastern route south before being introduced to Bantu-speakers. Sadr (2003), for instance, suggests that "both sheep and pottery reached the Khoe prior to the incursions of Bantu-speakers in the area." (Blench, 2007, p. 623) Haacke (2007) supports this by stating that sheep-herding was adopted by Bantu-speaking peoples from Khoisan-speaking communities. This theory can be supported by archaeological data as Badenhorst (2018) suggests that in most of the southern Africa sites faunal evidence on sheep outnumber goat during the Early Iron Age (200 -900 AD) and so before the arrival of Bantu-speakers. The dominance in Early Iron Age sites of faunal evidence on sheep "reflects the desire to keep these animals in large numbers." (Badenhorst, 2018, p. 82) Reasons for this desire could be that sheep were valued quite highly due to their scarcity and their tranquillity (Badenhorst, 2018). However, Badenhorst (2018) suggests that Bantu-speaking populations arriving in Southern Africa during the Early Iron Age already knew sheep. This could imply that sheep could have been introduced to Bantu-speaking populations in Southern Africa more than once, on different occasions and in different regions.

8. Conclusion

This dissertation attempted on offering an overview of the presence and spread of ovicaprines in Africa and more specifically in Central Africa. Goats and sheep are animals that live in close interaction with human populations and in this case Bantu-speaking populations. Their spread was visible in faunal evidence from North, East and South African archaeological sites. However, Central African archaeological sites were not enough to provide satisfying evidence to fully construct the spread of goats and/or sheep in that region.

This research relied on historical linguistics in order to fill the archaeological gap on information about the presence and spread of ovicaprines in the Central African region. A historical-comparative analysis was made of the seven common WCB terms for ovicaprines in 27 WCB languages, namely Punu (B43), Lumbu (B44), Nzebi (B52), Nduumo (B63), Yaa (B73c), Eboo-Nzikou (B74), Fumu (B77b), Boma Yumu (B80z), North Boma (B82), Mfinu (B83), Yans (B85), Nsong (B85d), Mpur (B85e), Nsambaan (B85F), Ding (B86), Ngwi (B861), Lwel (B862), Mpiin (B863), Ngong (B864X), Mbuun (B87), Hangala (H111), Sikongo (H16a), Manganga (H16b), Yombe (H16c), Ntandu (H16g), Yaka (H31) and Hungan (H42). These languages all belong to the WCB branch, one of the major subbranches of the Bantu language family. They are particularly interesting to study since present-day WCB languages probably descent from languages spoken by the first Bantu speakers that settled south of the equatorial rainforest during the Bantu expansion. These WCB languages are thus all spoken in the Central African region and more specifically in parts of the Democratic Republic of the Congo, the Republic of the Congo and the Gabonese Republic.

The Comparative Method was used in order to synchronically analyse the four terms for goat, i.e. *bʊ́dì, *kómbò, *tàbà and *gobo*, and three terms for sheep, i.e. *kòòkò, *méémé and *ndombo*, in the 27 WCB languages. The terms were synchronically compared, analysed, and discussed on the basis of their distribution within WCB and geographical distribution, their noun stems and (regular) sound changes, their noun classes and their semantic meanings. Where possible the terms were reconstructed to PWCB or any proto level within WCB. The discussion and incorporation of the results into the diachronic and historic perspective was based on the 'Words and Things' method by Ricquier (2017). Through the usage of these methods the following conclusions could be drawn.

It is possible that *bʊ́dì, formally reconstructed to PWCB, must have co-existed with other terms in certain (ancestral) languages because of the importance of goats in the WCB homeland area. It could be that more specific terms were used to refer to the gender of the animal, like *tàbà or to the height of the animal, like *kómbò. Thus, it is possible that *bʊ́dì became less productive since other terms were used in a more specific way to refer to certain aspects of the animal. Moreover, it could be that goats at one point lost their importance again and that only one term, instead of multiple terms, had to be used for ‘goat’ once the West-Coastal expansion away from the homeland westwards started. This would explain why the three terms were subsequently lost in some major subgroups of WCB and preserved in others. The fourth term *gobo* could possibly be a relatively recent contact-induced spread restricted to one geographical area.

Three of the four terms for 'goat' can possibly be reconstructed to PWCB level. The possibility to reconstruct multiple distinct terms at PWCB or a relative later WCB level indicates that the goats were indeed notably present as part of the subsistence economy of the first Bantu speakers south of the rainforest, since they had multiple terms for ‘goat’ at one point. This may be linked to many factors favouring the herding of goats. This is, moreover, reflected in the little archaeological evidence there is on goats south of the rainforest. After the introduction of Bantu-speakers during the Middle and Late Iron Age, the archaeological evidence on goats strikingly increases in comparison with the periods prior. This could suggest that Bantu-speaking populations did indeed have goats and introduced them in large numbers in the region. The fact that *bʊ́dì could even be reconstructed to PB level and *kómbò and *tàbà together are present in NWB, SWB, CWB and WCB, could mean that Bantu-speakers probably had goats during their expansion through the rainforest and perhaps even before that.

On the contrary, the two terms for 'sheep', i.e. *kòòkò and *méémé, are found in WCB, CWB and SWB, which would mean that sheep were probably introduced to Bantu speakers during or after their arrival south of the rainforest. The third term, i.e. *ndombo*, seems to be relatively recent and restricted to only a handful of more or less neighbouring language varieties and one geographical area. The terms for 'sheep' in WCB, thus, seem much more randomly scattered across the branch in comparison to the distribution of goat terms. This could point to a more random and subsequent introduction of sheep after most of the Bantu subbranches were already established.

There is still much controversy about how sheep have spread across the African continent and about when and where sheep were introduced in West-Central Africa. On the one hand, it could be possible that sheep have indeed followed a more eastern route southwards before being introduced to Bantu-speakers. However, it is suggested that Bantu-speaking populations arriving in Southern Africa during the Early Iron Age already knew sheep. Thus, it is possible that sheep have been introduced to Bantu-speaking populations in Southern Africa more than once, on different occasions and in different regions.

Through the study of the distribution of goats and sheep, the spread of Bantu-speaking populations south of the equatorial rainforest have become clearer. It could be stated that goats, thus, followed the western route and followed Bantu-speaking populations when they crossed the equatorial rainforest during the Bantu Expansion. When this expansion reached the southern areas of the rainforest, PWCB speakers settled in the WCB homeland area delimited by the Kasai and Kamtsha Rivers, as was concluded by Pacchiarotti et al. (2019). From there on out, WCB speakers expanded west towards the Atlantic coast in two waves, i.e. The KLC and the Kwilu-Ngounie. This trajectory is also depicted by the spread of the terms *kómbò and *tàbà following more or less the same spread of the two major WCB subbranches westwards. On the contrary, sheep do not seem to have followed Bantu-speaking populations through the rainforest, based on the linguistic and archaeological evidence. Rather, these animals seem to have followed a more eastern route across the continent and were subsequently introduced after the arrival of Bantu-speakers south of the rainforest and during their further migration into Southern Africa.

Lastly, through the study of the distribution of goats and sheep more knowledge has been gained on the subsistence economy of these populations. It seems that ovicaprines were quite important in the subsistence economy of the Bantu-speaking populations south of the rainforest as they provided meat, milk and skin. Moreover, goats were easy to transport and herd, since they had a great adaptability to their environment and were trypanotolerant. Sheep were valued for their tranquillity and scarcity. Whether or not these animals travelled with Bantu-speaking populations, both goats and sheep were and still are of great subsistence value to human populations. Therefore, it is no surprise that since their domestications, these animals have been in the close company of humans throughout their journey across Africa.

In order to fully understand their spread in West-Central Africa, however, more extensive linguistic comparison of these terms in languages in and outside of the WCB is necessary. Whilst this research is limited to only 27 WCB language varieties due to space and time restrictions, future linguistic research on ovicaprines could cover more WCB varieties to gain an even more complete picture on their presence and spread in the Central African region and in Africa in its whole. Besides this, research on other domestic animals such as dogs, chickens, guinea fowls and even cattle, could also provide valuable information on the subsistence economy of the first Bantu-speaking populations south of the rainforest.

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Appendix 1. Language varieties and sources

Code	Variety	Subgroup	Source
B43	Punu	KLC – West	(Blanchon, 2008)
B44	Lumbu	KLC – West	(Mavoungou & Plumel, 2010)
B52	Nzebi	Nzebi-Teke West	(Marchal-Nasse, 1989)
B63	Nduumo	Mbete	(Biton, 1969)
B73c	Yaa	Nzebi-Teke West	(Mouandza, 2001)
B74	Eboo-Nzikou	Kasai-Ngounie	(Raharimanantsoa, 2019)
B77b	Fumu	Kasai-Ngounie	(Makouta-Mboukou, 1960)
B80z	Boma Yumu	Kwa-Kasai North	(Hochegger, 1972)
B82	North Boma	Kwa-Kasai North	(Stappers, 1986)
B83	Mfinu	Kasai-Ngounie Extended	(Daeleman, 1956, 1977b)
B85a	West Yans	Kwilu-Ngounie	(Mayanga, 1985; Swartenbroeckx, 1948)
B85b	East Yans	Kwilu-Ngounie	(Nguma, 1986; Rottland, 1977)
B85d	East Nsong	KLC Extended	(Koni Muluwa, 2015; Koni Muluwa & Bostoen, 2014)
B85e	Mpur	Kamtsha-Kwilu	(Mbwetete, 1984)
B85F	Nsambaan	Kamtsha-Kwilu	(Koni Muluwa, 2014)
B861	East Ngwi	WCB	(Sara Pacchiarotti, p.c.)
B862X	East Lwel	WCB	(Khang Levy, 1979)
B863	Mpiin	KLC Extended	(Koni Muluwa & Bostoen, 2010, 2015)
B864	Ngong	KLC Extended	(Koni Muluwa & Bostoen, 2010, 2015)
B86T	West Ding	WCB	(Mertens, 1939)
B86Y	West Ding	WCB	(Ebalantshim Masuwan, 1978, 1980)
B86U	East Ding	WCB	(Koni Muluwa & Bostoen, 2015)
B87	West Mbuun	KLC Extended	(Mundeke, 1979)
H111	Hangala	KLC – North	(Nguimbi-Mabiala, 1999; Nkouanda, 1997)
H16a	Sikongo	KLC – South	(Narciso Cobe, 2010; Van Wing & Penders, 1928)
H16b	Manyanga	KLC – Central	(Laman, 1936)
H16c	Yombe	KLC – West	(De Grauwe, 2009)
H16g	Ntandu	KLC – East	(Daeleman, 1983)
H31	Yaka	KLC - Kikongoid	(Ruttenberg, 2000)
H42	Hungan	KLC - Kikongoid	(Bostoen & Koni Muluwa, 2011; Koni Muluwa & Bostoen, 2010)

Appendix 2. Cognate sets

BLR3 Index	PB Reconstruction	PB Meaning	Guthrie Index	Variety	Term	Meaning	Translation	Source
303	*bʊ́dì	goat	**B86U**	East Ding	mbùt	goat	chèvre	Koni Muluwa & Bostoen 2015
303	*bʊ́dì	goat	**B86T**	West Ding	m-but	goat	chèvre	Mertens 1939, Daeleman 1977
303	*bʊ́dì	goat	**B862X**	Lwel	ngàmbúr	goat	chèvre	Koni Muluwa & Bostoen 2015
303	*bʊ́dì	goat	**B862X**	Lwel	mbúr	goat	chèvre	Koni Muluwa & Bostoen 2015
303	*bʊ́dì	goat	**B862Y**	Lwel	-bùr	goat, he-goat	chèvre, bouc	Khang Levy 1979
303	*bʊ́dì	goat	**B861**	Ngwi	Ø-mbûr	goat	chèvre	Sara Pacchiarotti, p.c.
303	*bʊ́dì	goat	**H111**	Hangala	mvúrì	goat	chèvre	Nkouanda, 1997
303	*bʊ́dì	goat	**H111**	Hangala	mvúdì	goat	chèvre	Nkouanda, 1997

BLR3 Index	PB Reconstruction	PB Meaning	Guthrie Index	Variety	Term	Meaning	Translation	Source
1905	*kòòkò	sheep	**B86**	Ding	mu-kɔɔ	mouton	sheep	Mertens, 1939
1905	*kòòkò	sheep	**B861**	Ngwi	ò-kɔ̀kɔ̀/è-kɔ̀kɔ̀	mouton	sheep	Sara Pacchiarotti, p.c.
1905	*kòòkò	sheep	**B87T**	Mbuun	ɔ́kɔ́k	mouton	sheep	Mundeke 1979
1905	*kòòkò	sheep	**B85d**	Nsong	mɔ́kɔ́k	mouton	sheep	Koni Muluwa, 2014

BLR3 Index	PB Reconstruction	PB Meaning	Guthrie Index	Variety	Term	Meaning	Translation	Source
1926	*kómbò	goat	**B86U**	East Ding	nkyààm	chèvre	goat	Koni Muluwa & Bostoen 2015
1926	*kómbò	goat	**B86X**	East Ding	ŋkɛɛm	chèvre	goat	Mertens 1939
1926	*kómbò	goat	**B86T**	West Ding	ŋ-kjaam	chèvre	goat	Mertens 1939
1926	*kómbò	goat	**B83**	Mfinu	ŋkòòmù/ ŋkoomu	geit	goat	Daeleman, 1958
1926	*kómbò	goat	**B83**	Mfinu	bàŋkóómù/baŋkoomu	geit	goat	Daeleman, 1958
1926	*kómbò	goat	**B87X**	Mbuun	n-kóóm	chèvre(s)	goat	Mundeke 2011

1926	*kómbò	goat	**B87**	Mbuun	nkombo	chèvre	goat	Mundeke 2011
1926	*kómbò	goat	**B87**	Mbuun	nkɔɔm	chèvre	goat	Mundeke 2011
1926	*kómbò	goat	**B864W**	Ngong	ngóòm/bákóòm	bouc	goat	Ngulu Kibiakam 1986
1926	*kómbò	goat	**B864X**	Ngong	nkɔ̂m	chèvre	goat	Koni Muluwa & Bostoen 2015
1926	*kómbò	goat	**H42**	Hungan	kɔ̂mb	Chèvre; bouc	goat	Koni Muluwa & Bostoen 2015
1926	*kómbò	goat	**H31**	Yaka	khóòmbò	1) Chèvre (1a/2) 2) Viande de chèvre (9/10)	goat	Ruttenberg, 2000
1926	*kómbò	goat	**H111**	Hangala	kóómbò	chèvre	goat	Mabiala 1999
1926	*kómbò	goat	**H16g**	Ntandu	nkóòmbò	Chèvre	goat	Daeleman 1983
1926	*kómbò	goat	**H16g**	Ntandu	nkòòmbò ntàbà	Chèvre mangé à l'occasion	goat	Daeleman 1983
1926	*kómbò	goat	**H16a**	S Kikongo	ki-nkombo-kombo ka kisundi	chevreau ; bokje	goat	Van Wing & Penders 1928

1926	*kómbò	goat	**B44**	Lumbu	ø-koombu	Chèvre, cabri (le petit de la chèvre).	goat	Mavoungou & Plumel 2010
1926	*kómbò	goat	**H16c**	Yombe	khóómbó	chèvre	goat	De Grauwe, 2009
1926	*kómbò	goat	**H16b**	Manyanga	khómbo	chèvre	goat	Laman, 1938
1926	*kómbò	goat	**H16b**	Manyanga	nkombo	petit chèvre	goat	Laman, 1939
1926	*kómbò	goat	**H16b**	Manyanga	kyankombo	grande chèvre	goat	Laman, 1940

BLR3 Index	**PB Reconstruction**	**PB Meaning**	**Guthrie Index**	**Variety**	**Term**	**Meaning**	**Translation**	**Source**
2166	*méémé	sheep	**B85F**	Nsambaan	lúmɛ́m	mouton	sheep	Koni Muluwa, 2014
2166	*méémé	sheep	**B85**	Yans	lemɛmɛ	mouton	sheep	Mayanga, 1985
2166	*méémé	sheep	**B80z**	Boma Yumu	kèmèmè	mouton	sheep	Hochegger, 1972
2166	*méémé	sheep	**B74**	Ekoo-Nzikou	imɛɔ	mouton	sheep	Raharimanantsoa, 2020
2166	*méémé	sheep	**B77b**	Fumu	mene	mouton	sheep	Makouta, 1960
2166	*méémé	sheep	**B87**	Mbuun	iméèm	mouton	sheep	Mundeke, 1979
2166	*méémé	sheep	**B85d**	Mbuun	mɛ́m	mouton	sheep	Koni Muluwa, 2010
2166	*méémé	sheep	**B864X**	Ngong	mɛ́m	mouton	sheep	Koni Muluwa, 2010

2166	*méémé	sheep	**B85d**	Nsong	mɛ́m	mouton	sheep	Koni Muluwa, 2010
2166	*méémé	sheep	**B853**	Mpiin	mɛ́m	mouton	sheep	Koni Muluwa, 2010
2166	*méémé	sheep	**H42**	Hungan	mwǎn ú mɛ́m	agneau	sheep	Fieldwork JKM
2166	*méémé	sheep	**H42**	Hungan	lu-mèm	brébis	sheep	Kasuku-Kongini 1984: 15
2166	*méémé	sheep	**H31**	Yaka	mééma	mouton, bélier	sheep	Ruttenberg 1999:143
2166	*méémé	sheep	**H16c**	Yombe	mámèèmè	mouton	sheep	De Grauwe, 2009
2166	*méémé	sheep	**H16b**	Manyanga	ki-mèeme	caractère, habitudes, manieres, semblables a (ceux) celles du mouton		Laman, 1936
2166	*méémé	sheep	**H16b**	Manyanga	améeme	mouton	sheep	Laman, 1936
2166	*méémé	sheep	**H16b**	Manyanga	méeme	brebis, mouton	female sheep	Laman, 1936
2166	*méémé	sheep	**H111**	Hangala	méémè	mouton	sheep	Mabiala 1999
2166	*méémé	sheep	**H16g**	Ntandu	mèèmé	Mouton	sheep	Daeleman 1983
2166	*méémé	sheep	**H16a**	S Kikongo	e-meme	brebis ; schaap	sheep	Van Wing & Penders 1928

BLR3 Index	**PB Reconstruction**	**PB Meaning**	**Guthrie Index**	**Variety**	**Term**	**Meaning**	**Translation**	**Source**
2712	*tàbà	goat	**B86T**	West Ding	n-tsap	chèvre	goat	Mertens 1939
2712	*tàbà	goat	**B86U**	East Ding	ntab	chèvre	goat	Koni Muluwa & Bostoen 2015; Ebalantshim Masuwan, 1980
2712	*tàbà	goat	**B86U**	East Ding	ntsap	chèvre	goat	Koni Muluwa & Bostoen 2015
2712	*tàbà	goat	**B862X**	East Lwel	ntáb	chèvre	goat	Koni Muluwa &

								Bostoen 2015
2712	*tàbà	goat	**B861**	East Ngwi	Ø-ntâβ	chèvre	goat	Sara Pacchiarotti, p.c.
2712	*tàbà	goat	**B85eX**	Mpur	ntáb	chèvre	goat	Koni Muluwa & Bostoen 2015
2712	*tàbà	goat	**B85eX**	Mpur	ntáp	chèvre	goat	Mbwetete, 1984
2712	*tàbà	goat	**B85eW**	Mpur	u dúm a ntáb	bouc (epoux de chevre)	he-goat	Kibwenge India'ana Passy 1985
2712	*tàbà	goat	**B85eW**	Mpur	u kyák a ntáb	chèvre (epouse de bouc)	she-goat	Kibwenge India'ana Passy 1985
2712	*tàbà	goat	**B85FX**	Nsambaan	ntáb	chèvre, bouc	goat	Adiate Mfum Ekong 1979
2712	*tàbà	goat	**B85bT**	East Yans	ntab	chèvre	goat	Koni Muluwa & Bostoen 2015
2712	*tàbà	goat	**B85bV**	East Yans	-tàp	goat	goat	Rottland 1977
2712	*tàbà	goat	**B85aX**	West Yans	ntab	chèvre	goat	Swartenbroeckx 1948
2712	*tàbà	goat	**B74**	Ekoo-Nzikou	ntàbà	chèvre, cabri	goat	Raharimanantsoa , 2020
2712	*tàbà	goat	**B77b**	Fumu	nkali antaba	chèvre	goat	Makouta-Mbokou, 1960
2712	*tàbà	goat	**B80zX**	Boma Yumu	ntàb	chèvre, bouc	goat, he-goat	Hochegger 1972, Burssens 1999
2712	*tàbà	goat	**B80zX**	Boma Yumu	mukér a ntàb	la chèvre	she-goat	Hochegger 1972
2712	*tàbà	goat	**B80zX**	Boma Yumu	ntàb mukér	la chèvre	she-goat	Hochegger 1972
2712	*tàbà	goat	**B82X**	North Boma	ntaba	Ziege	goat	Stappers 1986
2712	*tàbà	goat	**B63**	Nduumo	ntaba	chèvre	goat	Biton, 1969
2712	*tàbà	goat	**B63**	Nduumo	taba	chèvre	goat	Biton, 1970
2712	*tàbà	goat	**B52**	Nzebi	tàbà	chèvre	goat	Marchal-Nasse, 1989

2712	*tàbà	goat	**H16b**	Manyanga	ntaba	chèvre	goat	Laman, 1936
2712	*tàbà	goat	**B43**	Punu	tabəmupusə	chèvre	goat	ALGAB
2712	*tàbà	goat	**B43**	Punu	tabə tsi mipusə	chèvre	goat	Blachon, 2008
2712	*tàbà	goat	**H16g**	Ntandu	nkòòmbò ntàbà	Chèvre mangé à l'occasion	goat	Daeleman 1983

BLR3 Index	Reconstruction	PB Meaning	Guthrie Index	Variety	Term	Meaning	Translation	Source
10329	gobo	goat	B862X	East Lwel	ngankɔb	chèvre	goat	Koni Muluwa & Bostoen 2015; Khang Levy, 1979
10329	gobo	goat	B85eX	Mpur	ng`ɔ`ɔb	chèvre	goat	Mbwetete, 1984
10329	gobo	goat	B85	Yans	ngɔb	chèvre	goat	Nguma, 1986
10329	gobo	goat	B80zX	Boma Yumu	n-g`ɔb	chèvre	goat	Burssens 1999, Koni Muluwa & Bostoen 2015
10329	gobo	goat	B80zX	Boma Yumu	n-gòb	chèvre, bouc	goat, he-goat	Hochegger 1972; Brussens, 1999
10329	gobo	goat	B80zX	Boma Yumu	n-gòb mukár	chèvre	goat	Hochegger 1972; Brussens, 1999
10329	gobo	goat	B80zX	Boma Yumu	n-gòb mulúm	bouc	he-goat	Hochegger 1972; Brussens, 1999
10329	gobo	goat	B80zX	Boma Yumu	n-gòb mulém	bouc	he-goat	Hochegger 1972; Brussens, 1999
10329	gobo	goat	B80zX	Boma Yumu	mukā́r a n-gòb	la chèvre	she-goat	Hochegger 1972; Brussens, 1999
10329	gobo	goat	B80zX	Boma Yumu	n-gòb mukā́r	la chèvre	she-goat	Hochegger 1972; Brussens, 1999

BLR3 Index	Reconstruction	PB Meaning	Guthrie Index	Variety	Term	Meaning	Translation	Source
	ndombo	sheep	**B63**	Nduumo	gin-dombo	mouton	sheep	Biton, 1969
	ndombo	sheep	**B73c**	Yaa	índɔ´mbɔ`	mouton	sheep	Mouandza, 2001
	ndombo	sheep	**B77b**	Fumu	ndono	mouton	sheep	Makouta, 1960
	ndombo	sheep	**B43**	Punu	-ndomba/ -ndombu	mouton	sheep	Blanchon, 2008
	ndombo	sheep	**B44**	Lumbu	dìndɔómbà	mouton	sheep	(Mavoungou & Plumel, 2010)
	ndombo	sheep	**H16b**	Manyanga	di-ndomba /di-ndombe	esp. De mouton, belier	kind of sheep, aries	Laman, 1936

Appendix 3. Vowel Systems

1) Eboo-Nzikou (B74) - (Raharimanantsoa, 2019)

	Front	Central	Back
Close	i	ɨ ʉ	u
Close-mid	e		o
Open-mid	ɛ		ɔ
Open	a		

2) Fumu (B77b) - (Makouta-Mboukou, 1960)m

	Front	Central	Back
Close	i		u
Close-mid	e		o
Open-mid			
Open	a		

3) Boma Yumu (B80z) - (Hochegger, 1972)

	Front	Central	Back
Close	i		u
Close-mid	e		o
Open-mid			
Open	a		

4) Yans (B85) - (Mayanga, 1985)

	Front	Central	Back
Close	i		u
Close-mid	e		o
Open-mid	ɛ		ɔ
Open	a		

5) Mpur (B85e) - (Mbwetete, 1984)

	Front	Central	Back
Close	i y		u
Close-mid	e ø		o
		ə	
Open-mid	ɛ œ		ɔ
	æ		
Open	a		

6) Ding (B86) - (Ebalantshim Masuwan, 1980)

	Front	Central	Back
Close	i y		u
Close-mid	e ø		o
		ə	
Open-mid	ɛ œ		ɔ
	æ		
Open	a		

7) Lwel (B862) – (Khang Levy, 1979)

	Front	Central	Back
Close	i		u
Close-mid	e		o
		ə	
Open-mid	ɛ		ɔ
Open	a		

8) Ngwi (B861) – Sara Pacchiarotti (p.c.)

	Front	Central	Back
Close	i		u
Close-mid			ɤ
		ə	
Open-mid	ɛ		ɔ
Open	a		

9) Mbuun (B87) - (Mundeke, 1979)

	Front	Central	Back
Close	i		u
Close-mid	e ø		o
		ə	
Open-mid	ɛ œ		ɔ
Open	a		

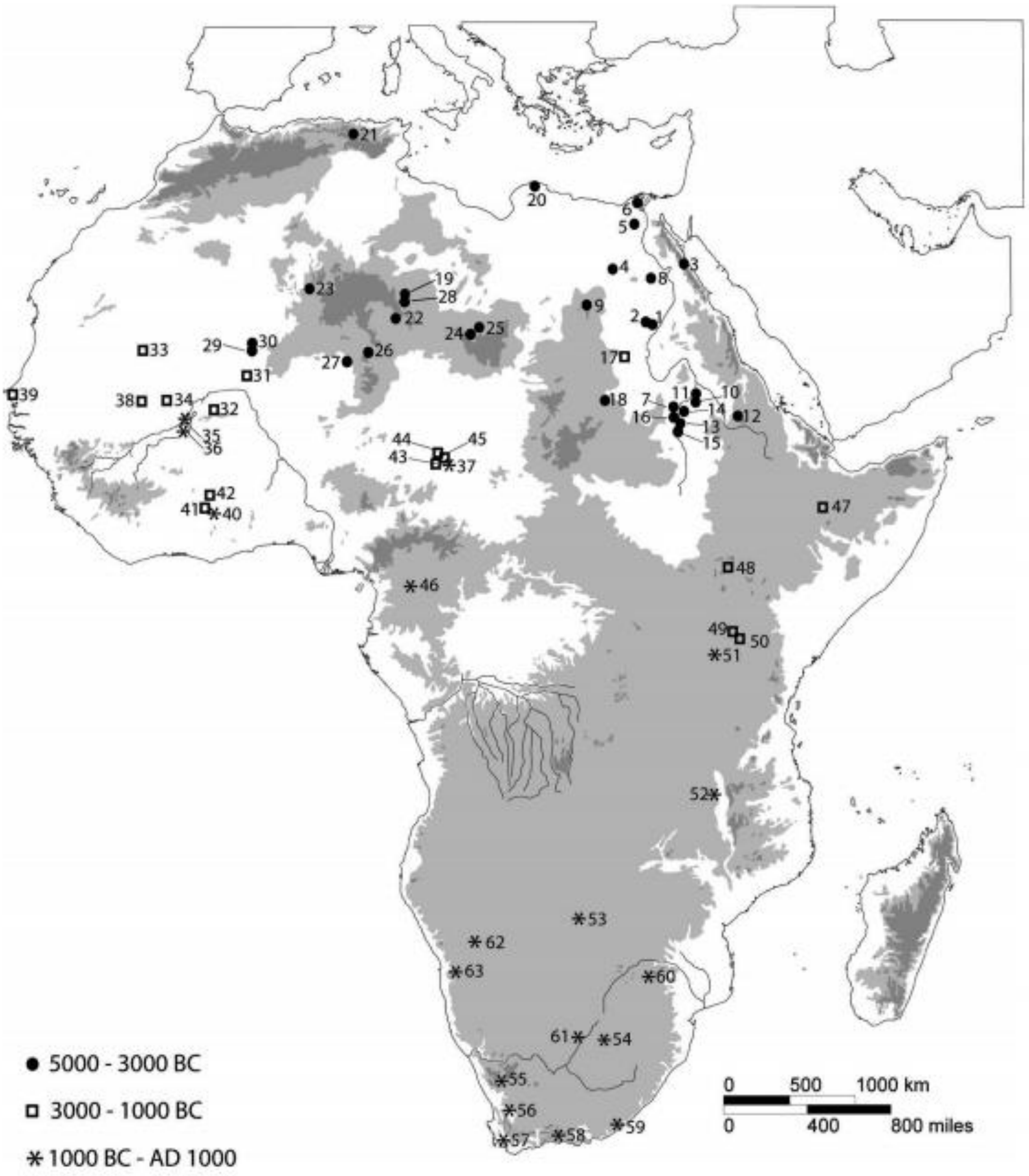
10) Hangala (H111) - (Nkouanda, 1997)

	Front	Central	Back
Close	i		u
Close-mid	e		o
Open-mid			
Open	a		

11) Hungan (H42) - (Bostoen & Koni Muluwa, 2011)

	Front	Central	Back
Close	i		u
Close-mid	e		o
Open-mid	ɛ		ɔ
Open	a		

Appendix 4: Map of the spread of livestock in Africa (cattle, sheep/goat)



The spread of livestock in Africa (cattle, sheep/goat), in broad time slices, based on representative archaeozoological data sets. Sites numbered: 1, Bir Kiseiba; 2, Nabta Playa; 3, Red Sea Hills; 4, Dakleh Oasis; 5, Fayum A sites; 6, Merimda–Benisalama; 7, Esh Shaheinab; 8, Kharga/E-76-7, E-76-8; 9, Gilf el Kebir; 10, Shaqadud; 11, El Kadada; 12, Kashm el Girba; 13, Kadero; 14, El Zakiab; 15, Um Direiwa; 16, El Nofalab; 17, Laqiya; 18, Wadi Howar; 19, Ti-n-Torah; 28, Uan Muhuggiag; 20, Haua Fteah; 21, Grotte Capeletti; 22, Ti-n-Hanakaten; 23, Meneit; 24, Gabrong; 25, Baradigiué; 26, Adrar Bous; 27, Arlit; 29, Asselar; 30, Tessalit; 31, Lower Tilemsi Valley; 32, Windé Koroji; 33, Dhar Tichitt; 34, Kolima Sud; 35, Dia Shoma; 36, Jenne Jeno; 37, Daima; 38, Kobadi; 39, Chami; 40, Boase 6; 41, K6; 42, Ntereso; 43, Gajiganna; 44, Kursakata; 45, Mege; 46, Gaji2, Koobi Fora ridge; 47, Gaji4, Dongodien; 48, Gtji12, Enkapune ya Muto; 49, Guji13, Salasun; 50, Toteng; 51, Wonderwerk; 52, Spoegrivier; 53, Kasteelberg A; 54, Die Kelders; 54, Byneskranskop; 55, Blombos cave; 56, Nelson Bay cave. (Fuller et al., 2011, p. 4)