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## Reflexes of a Labiovelar Series in Central Sudanic

Pascal Boyeldieu (CNRS/LLACAN, France)

### 1. INTRODUCTION

The *Central Sudanic [CSD]* languages are spoken in central Africa over parts of the D.R.C., Uganda, Sudan, C.A.R. and Chad. They comprise six subgroups of unequal size (representative languages are indicated in parentheses):

- [MMD] *Moru-Madi* (Moru, Avokaya, Logo, Lugbara, Ma'di),
- [LND] *Lendu* (Ngiti, Lendu),
- [MAS] *Mangbetu(-Asua)* (Asua, Mangbetu, Meje, Lombi),
- [MEF] *Mangbutu-Efe* (Mangbutu, Ndo, Mamvu, Lese, Efe),
- [KRS] *Kresh* (Kresh, Dongo, Aja ?),
- [SBB] (*Sara-*)*Bongo-Bagirmi* (Modo, Baka, Bongo, Yulu, Gula dialects, Ndoka, Bagiro, Na, Kenga, Bagirmi, Sara languages).

SBB is the most important subgroup in respect to both number of languages and geographical extension (see map).

While Tucker & Bryan (1956, 1966) divided these languages in two different 'larger units' (Moru-Mangbetu vs Bongo-Bagirmi) despite their lexical and grammatical affinities, Greenberg (1963) grouped them together as the Central Sudanic branch of his Nilo-Saharan phylum.

Both Bender (1992) and Ehret (1992) tried to establish regular phonetic correspondences for these languages but in a rather unconvincing way.<sup>1</sup> The aim of this paper is to provide some evidence for correspondences involving articulations of the labiovelar type with the help of more recent data.<sup>2</sup>

### 2. DOCUMENTATION AND COMPARATIVE SERIES

Despite gaps and unevenness in the documentation, most of the subgroups of Central Sudanic are relatively well documented by published data, for at least two languages (e.g. Mamvu and Lese for MEF). Nevertheless the documentation on the KRS languages is rather scanty and the position of Aja within the subgroup is uncertain. Therefore Kresh, Dongo and Aja forms will

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<sup>1</sup> To say things in a short way, Bender accepts more variations of sound and meaning than should be allowed in this kind of work. He namely identifies four series illustrating a CSD \*kp formula: 71. \*kpa 'big, long', 127. \*kpa 'bone', 128. \*kpa-gba 'hard' and 155. \*ekpi 'cough' (his numbering) while only the second one seems to be relevant to me (see comparative series n° 2, 13, 14 and 15 below). Ehret (whose 1992 work has not been published) is not reliable as a whole, although he recognizes the \*kw and \*gw reflexes of MMD and may suggest some relevant cognations, like 'white' and 'moon' (see n° 25 below), for which I am indebted to him. Of course I took advantage of new data, published in the last decade.

<sup>2</sup> I am very grateful to Raymond Boyd, Gerrit Dimmendaal, Robert McKee and Okoth Okombo for their reactions to a first draft of this paper. Some of their comments will be cited below.

be quoted as a reminder but they will neither be commented upon nor interpreted.

The data sources are indicated in Table 1 (see complete references at the end of this section). Note that Vorbichler (1969) made some phonemic corrections for Lese (involving the frequent replacement of an original **gb** with **qp**) which are marked in the comparative series by (69).

For reasons of space, the SBB languages are illustrated as a whole by reconstructions cited from Boyeldieu (2000) and Boyeldieu, Nougayrol & Palayer (in preparation) (see the former for details of the consonant reflexes). The ‘distribution level’ ([1] to [5]) refers to the distribution of the lexical reflexes and probable antiquity of the SBB lexical series, [1] being the highest value.

Roughly speaking, CSD words seem to derive mainly from \*VCV shapes (sometimes also \*CV ?) which have become either CV or (C)VCV in the modern languages. Therefore the correspondence formulas concern consonants which, in most cases at least, were – and still are – intervocalic.

Table 2 displays the reflexes of four likely labiovelar correspondence formulas at the CSD level, **\*kp**, **\*gb**, **\*ngb** and **\*ɲm**, not only for modern languages but also for intermediate stages, defined as later levels which are historically common to each subgroup, MMD, LND, MAS, MEF and SBB.

The remaining tables show different comparative series (numbered from 1 to 35), most of which illustrate the correspondence formulas. Uncertain cognates are given in parentheses, followed by a ‘?’. As will be seen, some of these series seem to be relatively consistent with regard to vowels, while others are much more problematic, without even taking tones into account. Another problem is the fact that very few comparative series have clear cognates throughout all the subgroups; most of them show gaps. Consequently the identified formulas have to be regarded as working hypotheses rather than as accurate reconstructions, at least for the time being.

Although nothing sure can yet be said concerning vowels, it seems likely that the labiovelar formulas as a whole were, already at the CSD level, mainly followed by front or central vowels (like **i**, **e**, **ɛ**, **a**). Mergers or neutralizations respectively with **\*k**, **\*g**, **\*ng** and **\*ɲ** or **\*m** may have occurred before back vowels at an earlier time. Similar tendencies could also justify some cases of *osculation*, where labiovelars seem to alternate, in an irregular way, with other consonants in the same series (see **\*kp/\*k** in 8 and 11, **\*gb/\*g** in 19-21, **\*ɲm/\*m** in 33).

### 3. REFLEXES OF **\*kp**

The best series illustrating a CSD **\*kp** formula are 1.clean, 2.bone, 3.man, male, 4.play/game/song, 7.tree, 8.bowels and 9.seed, grain.

In MMD, reflexes of **\*kp** are **kw/tsw** (before **a/ɛ~i**) in Miza and Moru-ägi, **hw/kw** (before **a/ɛ~i**) in Ug. Ma'di and **f** in all other languages. The most likely form of a common reconstruction at the MMD level is **\*kw**.

In LND, the reflexes are **kp** (series 1-4, 6) in all languages but apparently also **ts**, if the forms cited in the series 7-9 are reliable cognates (note that parallel reflexes of **dz** and **nz~ndz** also occur in the cases of **\*gb** and **\*ngb**, see below). The conditioning of these variants is unclear. It may have been of a vocalic nature (alveolar affricates before front or high vowels? see the

situation in Miza and Moru-ägi above) but then it must have occurred at an earlier stage, prior to vowel changes, since the current vowels observed after **ts** (and **dz**, **nz~ndz**) are not quite consistent with this explanation. In any case, the common formulas at the LND level have to be reconstructed as **\*kp** and **\*ts** respectively.

The reflexes of CSD **\*kp** are less obvious in MAS. I suggest that the **kp**'s occurring throughout MAS in series 2.bone are not instances of regular reflexes; these should rather be sought from other series, none of which is complete for this subgroup. However, series 12.hen, though limited to MAS only, gives a full set of the likely reflexes which are **kw** in Aka, Asua and Lombi D, **xw** (/h before o?) in Lombi L and **w/ø** (ø before a under certain conditions?) in Mangbetu. Therefore the common reconstruction at the MAS level has to be characterized as **\*kw**.

In MEF, the reflexes are clearly Mamvu **f** and Lese **gb** (**qp** 69),<sup>3</sup> which can probably be reconstructed as a common **\*kp** at the MEF level.<sup>4</sup>

Finally the SBB common reconstruction is **\*kp**, whose reflexes are **kp**, **k**, **t**, **p** or **ø** (sometimes with compensatory nasalization of the vowel) in the modern languages.

CSD **\*kp** alternates with **\*k** in series 8 and 11.

As is the case for MAS in series 2 (see above), series 13-15, which I consider irregular, show different occurrences of **kp** both in MMD and in MAS (maybe also **qb** in MEF, see series 15?) but I suggest that these **kp**, although they do belong to the phonological systems of the languages, are not historical reflexes of the CSD formula **\*kp**.

#### 4. REFLEXES OF **\*gb**

The evidence for a CSD **\*gb** formula, mainly provided by the series 16-17 (and 20?), is less obvious and some of its reflexes are unclear.

MMD has reflexes parallel to those of **\*kp**, namely Miza **dzw/dzɔw** and Moru-ägi **dz/dɔ** (both before **ɛ/i**), Ug. Ma'di, Lokai and Lulu'ba **gw**, other languages **v**. It is unclear whether the instances of **g** before **u** (all languages) occurring in series 20 have to be regarded as a reflex of **\*gb** in this vocalic context or as a result of a **\*gb/\*g** osculation. The common MMD reflex may be given as **\*gw**.

LND has parallel reflexes which are **gb** (series 16, 20-21) and most probably **dz** (series 17, 19) for all languages. Consequently the LND common reconstructions are **\*gb** and **\*dz**.

In MAS, Asua D, Mangbetu and Lombi D (other languages are not documented) usually show **g** (series 16-17, 19, 21) but again it is not clear whether these **g**'s are reflexes of **\*gb** or a result of CSD **\*gb/\*g** osculations, such as the ones observable at least in SBB in series 19 and 21.

<sup>3</sup> Vorbichler (1969: 144) distinguishes three voiceless back phonemes for Lese, namely /**kp**/ ('voiceless explosive', for which he cites 4 instances), /**qb**/ ('voiceless labio-postvelar implosive', 4 instances) and /**qp**/ ('voiceless labio-postvelar explosive', 6 instances). Do they really contrast in the language?

<sup>4</sup> Note that MEF is characterized on the basis of Mamvu and Lese only, two closely related languages. It could be revised if one considered other languages like Mangbutu and Ndo, for which I could not find available data.

The MEF situation is unclear and insufficiently documented: series 16 gives Mamvu **g** and Lese **gb** (**kp** 69), but series 19 gives **g** (< **\*g**?) for both languages.

SBB as a whole has a **\*gb** reconstruction (16-17, 20) but shows osculations with **\*g** in 19 and 21. Modern languages have **gb**, **g**, **d** or **b** as reflexes of **\*gb**.

Finally, I consider series 22-23 as irregular, as Mangbetu and MMD **gb** are not historical reflexes of CSD **\*gb** (in both series, the reflexes of SBB **\*gb** are themselves irregular).

## 5. REFLEXES OF **\*ngb**

The CSD formula **\*ngb** is somewhat better documented by series 23-26.

MMD reflexes, parallel to those of **\*kp** and **\*gb**, appear as **ngw/ndʒw~ndzw** (before **a/ε**) in Miza and Moru-ägi, **ngw** in Ug. Ma'di, Lokai and Lulu'ba, and **mv** elsewhere. The common reflex for MMD is characterized as **\*ngw**.

The LND languages again have either **ngb** or **nz~ndz**, both reflexes appearing in the sg. and pl. forms respectively of series 24.child. LND reconstructions are given as **\*ngb** and **\*ndz**.

In MAS, all languages have **ngw~ngw** (before **a** and **ε**, 24-25) and **ng(w)** (before **o**, 26), which can be reconstructed as MAS **\*ngw**.

For MEF, series 24-26 show Mamvu **ng** (before back vowels) and Lese **gb**.<sup>5</sup> Mamvu **ngb** (series 28) might be understood as a complementary variant of **ng** before **a** but uncertain cognates in series 27 and 29 are not consistent with this idea. Therefore the characterization of a common MEF reconstruction as **\*ngb** is tentative.

The only clear instance of SBB **\*ngb** appears as an uncertain cognate in series 27, so that reflexes of CSD **\*ngb** in this subgroup, though probable, are not firmly established (SBB reflexes of **\*ngb** are **ngb~ɲb**, **ng**, **nd** or **mb**).

Finally, series 29-30, which I consider irregular, show some instances of MMD **mgb~ngb** (MMD **\*ngb**?) which are not historical reflexes of CSD **\*ngb**.

## 6. REFLEXES OF **\*ɲm**

Though scanty and deficient, series 31-33 seem to offer some evidence of a CSD **\*ɲm** formula.

In MMD (see also 34-35), reflexes are **ɲ(w)** in most languages and **ny~ɲ** in Keliko (but 35 **ɲ**), Lugbara, Lugbara C and Ug. Ma'di. The instances of **m** before **u** (series 32) could be regarded as variant reflexes of MMD **\*ɲw** in this particular vocalic context.

The available reflexes in LND are usually **m**, except for Ddradha, which has **ɲ** (series 33), thus strongly suggesting **\*ɲm** as a common LND reconstruction.

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<sup>5</sup> The correspondences of Mamvu prenasalized voiced obstruents with Lese plain voiced obstruents are regular and well attested.

In MAS, Asua D and Mangbetu **mu~mw** and Lombi D **ɲw** are illustrated by the same incomplete series and suggest a common MAS reconstruction **\*ɲw**. Robert McKee (*pers. comm.*) very kindly completed these data for a subdialect of Meegy (or Meje), another MAS language, with **nóɲ<sup>w</sup>ɛ ~ nóm<sup>w</sup>ɛ** ‘fly-whisk’ and **nóɲ<sup>w</sup>à ~ nóm<sup>w</sup>à** ‘spoil, rot (intr.)’, which emphasize the phonetic affinities and alternations between [ɲ<sup>w</sup>] and [m<sup>w</sup>].

There are no available MEF data concerning possible reflexes of CSD **\*ɲm**.

Finally SBB has **\*ɲm** (31), partially alternating with **\*ng** (32), but **\*m** everywhere in (33), indicating an **\*ɲm/\*m** osculation at the CSD level. Reflexes of SBB **\*ɲm** in modern languages are **ɲm, ɲ, m** or **ṽ**.

## 7. THE PHONETIC NATURE OF CSD LABIOVELARS

CSD labiovelar formulas have thus far been characterized as **\*kp, \*gb, \*ngb** and **\*ɲm** respectively.

Yet the question of the exact phonetic nature of these consonant formulas remains open. It has been shown that they may be identified, at intermediate levels, either as *labialized velar stops* (**\*kw, \*gw**, etc.) or as *doubly articulated labial-velar stops* (**\*kp, \*gb**, etc.) according to the different subgroups.<sup>6</sup> Reflexes show a remarkable parallelism in the sense that MMD and MAS are throughout characterized with articulations of the first type, while LND, MEF and SBB show articulations of the second type. Subgroup formulas are summarized in the following table:

CSD	<b>*kp ~ *kw ?</b>	<b>*gb ~ *gw ?</b>	<b>*ngb ~ *ngw ?</b>	<b>*ɲm ~ *ɲw ?</b>
MMD	<b>*kw</b>	<b>*gw</b>	<b>*ngw</b>	<b>*ɲw</b>
LND	<b>*kp / *ts</b>	<b>*gb / *dz</b>	<b>*ngb / *ndz</b>	<b>*ɲm</b>
MAS	<b>*kw</b>	( <b>*g ?</b> )	<b>*ngw</b>	<b>*ɲw</b>
MEF	<b>*kp</b>	<b>*?</b>	<b>*ngb ?</b>	
SBB	<b>*kp</b>	<b>*gb</b>	( <b>*ngb ?</b> )	<b>*ɲm</b>

How should we characterize these formulas at the CSD level? In other words, which is the most likely source, **[kp]** or **[kw]**, for both labialized velar stops and labial-velar stops? There seem to be two kinds of approach to this question.

The first one is of an articulatory nature. Okoth Okombo (*pers. comm.*) argues that the coarticulations of **kp**, which do not share any common feature (**k** ‘velar’, **p** ‘labial’), are “not so peaceful (more marked)” while the ones of **kw**, which do share a common feature (**k** ‘velar’, **w** ‘labial+velar’), are “a bit more peaceful (less marked)”. The change **kp > kw** seems to him more likely than **kw > kp** and he therefore suggests a **\*kp** proto-form.

The second approach is of a more areal-comparative and historical-sociolinguistic nature. Commenting on some areal features of African languages, Greenberg (1983: 8) claims that “[...] coarticulated labiovelars [i.e. sounds of the **kp** type] are basically a Niger-Congo feature” and he later suggests that “from Niger-Congo these sounds spread at an early date to

<sup>6</sup> These articulatory definitions are taken from Ladefoged & Maddieson 1996.

Central Sudanic in the Nilo-Saharan family probably from Adamawa-Eastern”. This is also the opinion of Gerrit Dimmendaal (*pers. comm.*), who argues that “hardening processes of this type [i.e. **\*kw** > **kp**, **\*gw** > **gb** and **\*ɲw** > **\*ɲm**] are also attested in Eastern Nilotic languages belonging to the Bari group as well as Western Nilotic Alur. [... labial-velars...] emerged in these Nilotic languages under strong influence (and bilingualism) with neighbouring Central Sudanic languages”. He finally suggests that similar changes may have occurred within Central Sudanic through contact with Adamawa-Ubangi.

I agree with the idea that Central Sudanic labial-velar stops may have originated in contact with (pre-)Adamawa-Ubangi languages but, if so, I would claim that this change occurred, as Greenberg says, “at an *early* date” (my emphasis). Greenberg also states that “the sounds under discussion are surely not to be posited for proto-Nilo-Saharan although they may well be proto-Central Sudanic”. Indeed I find it hard to reconcile the hypothesis of relatively recent, individual changes from a CSD **\*kw** to **\*kp** in any subgroup with the fact that the MMD and MAS languages, which are closer to neighbouring Ubangi languages (Mundu, Zande, Mayogo, Mba), have **\*kw** reflexes while LND, which is not in contact with Ubangi, has **\*kp** reflexes. It seems to me more likely that the common Central Sudanic system already had labial-velar stops (**\*kp** etc.), which then ‘softened’ to labialized velar stops (**\*kw**) in MMD and in MAS. Both subgroups nevertheless show instances of labial-velar stops which are not reflexes of the common formulas and may be due to lexical rebuildings or innovations.

## 8. CONCLUSION

Despite the gaps in most comparative series and the unsolved problems involving vowels, there seem to be some solid arguments in favor of reconstructing labiovelars from cognates in MMD, LND, MAS, MEF and SBB, thus supporting the historical unity of these subgroups at a CSD level.

However instances of labial-velar stops in the modern languages do not necessarily represent reflexes of the CSD formulas **\*kp**, **\*gb**, **\*ngb** and **\*ɲm**, which may have given labialized velars, labial fricatives or alveolar affricates according to language and phonemic environment.

Lastly the characterization of these formulas as labial-velar rather than labialized velar stops seems to me the best way to account for the nature and distribution of their current reflexes.

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CSD	<b>CENTRAL SUDANIC</b>
MMD	<b><i>Moru-Madi</i></b>
Miza	Tucker 1940 / Boone & Watson 1996-98 (BW)
Moru-ägi	Tucker 1940 / Boone & Watson 1996-98 (BW)
Moru-ändri	Tucker 1940 / Boone & Watson 1996-98 (BW)
Ojila	Tucker 1940 / Boone & Watson 1996-98 (BW)
Avokaya V	Vallaes 1986
Logo	Tucker 1940 / Boone & Watson 1996-98 (BW)
Logo V	Vallaes 1986
Keliko	Tucker 1940 / Boone & Watson 1996-98 (BW)
Lugbara	Tucker 1940 / Boone & Watson 1996-98 (BW)
Lugbara C	Crazzolaro 1960
Ugandan Ma'di	Boone & Watson 1996-98 (BW)
Lokai	Tucker 1940 / Boone & Watson 1996-98 (BW)
Lulu'ba	Tucker 1940 / Boone & Watson 1996-98 (BW)
LND	<b><i>Lendu</i></b>
Ngiti	Kutsch Lojenga 1994
Djadha	Kutsch Lojenga 1994
Lendu D	Dhejju 1978
Ddradha	Kutsch Lojenga 1994
MAS	<b><i>Mangbetu(-Asua)</i></b>
Aka	Larochette 1958
Asua L	Larochette 1958
Asua D	Demolin 1992
Mangbetu L	Larochette 1958
Mangbetu D	Demolin 1992
Lombi L	Larochette 1958
Lombi D	Demolin 1992
MEF	<b><i>Mangbutu-Efe</i></b>
Mamvu	Vorbichler 1971
Lese	Vorbichler 1965, 1969
KRS	<b><i>Kresh</i></b>
Kreish B	Boyd (n.d.)
Kreish S	Santandrea 1976
Dongo	Santandrea 1976
Aja	Santandrea 1976
SBB	<b><i>(Sara-)Bongo-Bagirmi</i></b>
	Boyeldieu 2000 / Boyeldieu, Nougayrol & Palayer (in preparation)

Table 1. Language grouping and sources

CSD	*VCV	*kp	*gb	*ngb	*ɲm
MMD	*(V)CV	*kw-a/E/i	*gw-ε/i, (*g-u ?)	*ngw	*ɲw-a/u
Miza	((C)V)CV	kw-a, tsw-ε/i	dzw-ε, dʒw-i, (g-u ?)	ɲgw-a, ndʒw-ε	ɲw-a, m-u
Moru-ägi	((C)V)CV	kw-a, tsw-ε/i	dz-ε, dʒ-i, (g-u ?)	ɲgw-a, ndzw-ε	? , m-u
Moru-ändri	((C)V)CV	f	v, (g-u ?)	mv	ɲw-a, m-u
Ojila	((C)V)CV	f	v, (g-u ?)	mv	
Avokaya V	((C)V)CV	f	v, (g-u ?)	mv	ɲ-a, m-u
Logo	((C)V)CV	f	v, (g-u ?)	mv	ɲw-a, m-u
Logo V	((C)V)CV	f	v, (g-u ?)	mv	? , m-u
Keliko	((C)V)CV	f	v, (g-u ?)	mv	? , ny-u
Lugbara	((C)V)CV	f	v, (g-u ?)	mv	ny
Lugbara C	((C)V)CV	f	v, (g-u ?)	mv	ɲ
Ug. Ma'di	((C)V)CV	hw-a, kw-ε/i	gw, (g-u ?)	ɲgw ?	ɲ-u ~ m-u
Lokai	((C)V)CV	kw	gw, (g-u ?)	ɲgw	ɲ
Lulu'ba	((C)V)CV	kw	gw, (g-u ?)	ɲgw	ɲ
LND	*VCV	*kp (/ts ?)	*gb (/dz ?)	*ngb (/ndz ?)	*ɲm
Ngiti	(V)CV	kp, (ts ?)	gb, (dz ?)	ngb, (nz ?)	m
Djadha	CV	kp, (ts ?)	gb	ngb, (nz ?)	m
Lendu D	CV	kp, (ts ?)	gb, (dz ?)	ngb, (ndz ?)	m
Ddradha		kp, (ts ?)	gb	ngb	ɲ
MAS	*VCV	*kw-a/ε	*g ?	*ngw-a/ε	*ɲw-a/ε ?
Aka	((C)V)CV	kw-ε		ɲgw-a/ε	
Asua L	((C)V)CV	kw-ε		ɲgw-a/ε	
Asua D	((C)V)CV	kw-a/ε	g ?	ngw-a/ε	mw ?
Mangbetu L	(C)V)CV	w/ø-a	g ?	ngw-a/ε	mu ?
Mangbetu D	(C)V)CV	w/ø-a	g ?	ngw-a/ε	mw ?
Lombi L	(C)V)CV	kw-a/ε		ɲgw-a/ε	
Lombi D	(C)V)CV	xw-a/ε, (h-o ?)	g ?	ngw-a/ε	ɲw ?
MEF	*(C)V)CV	*kp	*? / *g-u ?	*ngb ?	
Mamvu	(C)V)CV	f	? / g-u ?	ngb/ng (-a/-U) ?	
Lese	(C)V)CV	gb (qp 69)	? / g-u ?	gb ?	
KRS					
Kreish B	(C)V)CV	kp ?			ɲ ?
Kreish S	(C)V)CV	kp ?	gb ?		ɲ ?
Dongo	(C)V)CV	kp ?	b ?		ɲ ?
Aja	(C)V)CV	c-i ?	j-i ?		
SBB	*(C)V)CV	*kp	*gb (/g-u ?)	(*ngb ?)	*ɲm

Table 2. Intermediate and actual reflexes of CSD main word-shapes and labiovelar formulas

	1. clean, (shave) <sup>7</sup>	2. bone <sup>8</sup>	3. man, male <sup>9</sup>	4. play/game/song <sup>10</sup>
CSD	<b>*kp</b>	<b>*kp</b>	<b>*kp</b>	<b>*kp</b>
MMD	<b>*kw</b>	<b>*kw</b>		
Miza	ɔkɔ (BW)	kɔwà		
Moru-ägi	akwa (BW)	kwa		
Moru-ändri	ɔfa (BW)	fà		
Ojila		fà		
Avokaya V	a. fā ; b. fò(à)	fà		
Logo	fa	fà		
Logo V	a. fā ; b. fò(à)	fà		
Keliko	fa	fà		
Lugbara	ufa	fa		
Lugbara C	a. fā ; b. òfā ; c. fā ; d. òfá	fà ~ fàlá(-kó)		
Ug. Ma'di		hwa (BW)		
Lokai	kwá	kwà		
Lulu'ba		kwà		
LND	<b>*kp</b>	<b>*kp</b>	<b>*kp</b>	<b>*kp</b>
Ngiti	a. ìkpà ; b. ìkpá	a. -kpā ; b. -kpḏ	a. ākpā ; b. -ākpà	ìkpā
Djadha		a. -kpà ; b. -kpā		kpà
Lendu D	kpà 'raser'	a. kpà ; b. kpā	kpà	a. kpā ; b. kpà
Ddradha		-kpālā		
MAS	(*kw ?)	(*kp ?)	*kw	*kw
Aka		(kpɔè ?)		
Asua L		(kpɔ́ɔ̀è ?)		
Asua D		(kpɔ̀è/kpɔ́ ?)	àkwàè	
Mangbetu L	(a. -èéwó /nééwèèwò ?) ; b. -òwá/nòwòwà	(nékpɔ̀è/èkpɔ́ ?)		-òwà/nòwà
Mangbetu D		(nékpò/ékpó ?)		(nɔ́và 'jouer' ?)
Lombi L		(nékpɔ̀è ?)	nákwáákpò	
Lombi D		(nékpò/èkpò ?)	nàxwáákpò /àxwáákpó	a. nòxwà/òxwà ; b. nóxwà/òxwá
MEF	<b>*kp</b>	<b>*kp</b>	<b>*kp</b>	
Mamvu	ɬàfā	ífū	áfū	
Lese	àgbá (àqpa 69)	úgbī ~ ígbī (úqpī ~ íqpī 69)	àgbī (áqpī 69)	
KRS				
Kreish B	(kpó (òkpó ?))	kpòkpó		
Kreish S		kpòkpó		
Dongo		kpokpó		
Aja				
SBB	<b>*kp</b> <b>*ukpe</b> (*C~*D1~*D2?) 'ébrancher, effeuiller, raser'			<b>*kp</b> <b>*(?)ukpa</b> (*OCC*12) 'chant'
distribution	[1]			[3]

<sup>7</sup> Avokaya V/Logo V: a. 'gratter, raser', b. 'gratter, érafler'; Lugbara C: a. 'cut (hair), grub (up), scrape, rake', b. 'scrape, rasp, scratch and clean away', c. 'clean, cut, trim, dress surface of something', d. 'clean off (all surface unevenness of sth.)'; Ngiti: a. 'weed', b. 'dig up with the hoe'; Mangbetu L: a. 'balayer, nettoyer', b. 'faire disparaître, effacer'; Mamvu/Lese: 'fegen'; Kreish B: 'gratter'.

<sup>8</sup> Compare 3.man, male? Ngiti/Djadha: a. 'os', b. 'fruit'; Lendu D: a. 'os', b. 'graine'.

<sup>9</sup> Ngiti: a. 'husband', b. 'male, long'.

<sup>10</sup> Ngiti: 'play, game'; Djadha: 'play'; Lendu D: a. 'jouer', b. 'jeu'; Mangbetu L: 's'ébattre, jouer, pagayer'; Lombi D: a. 'danser', b. 'jeu'; SBB: 'chant'.

	5. paddle (v.) <sup>11</sup>	6. warana (lizard)	7. tree	8. bowels
CSD	<b>*kp</b>	<b>*kp</b>	<b>*kp</b>	<b>*kp/*k ?</b>
MMD Miza Moru-ägi Moru-ändri Ojila Avokaya V Logo Logo V Keliko Lugbara Lugbara C Ug. Ma'di Lokai Lulu'ba		<b>*kw</b> 'WARANA' letswe tswa lufe lefe	<b>*kw</b> kyè ~ tswè tswe fè fe fe, fa fa fe, fa fa fe fè kwe (BW) kwe kwe	<b>*kw</b> utswí utsí ufí, ofí fí fí(á) fí fí(á) (t)fí fí, ífí fí ìkwí (BW) ìkwí ukwí
LND Ngiti Djadha Lendu D Ddradha		<b>*kp</b> ũkpé 'alligator'  kpé 'pangolin'	<b>*ts</b> ĩtsū tsú tsú tsɔw	<b>*ts</b> -tsū
MAS Aka Asua L Asua D Mangbetu L Mangbetu D Lombi L Lombi D	<b>*kw</b>  -òwà/nòwà		( <b>*kw</b> ?)     (nèhò/éhó ?)	<b>*k</b> ? ekyü èkyü ìkí/ìkí nèkí/ékí nèkí/èkí ékí nèkí/èkí
MEF Mamvu Lese	<b>*kp</b> (òfà ?) (ògbà (òqpà 69) ?)		<b>*kp</b> òfà ògbà (òqpà 69)	
KRS Kreish B Kreish S Dongo Aja			kpīkpī kpikpi kpikpi cící	(tòfò ?) (tòfo ?)
SBB  distribution	<b>*kp</b> <b>*ukpa</b> ? (*OCC*AB ?) 'conduire une pirogue' [5/+gs] ([2a] ?)			<b>*kp</b> <b>*tikpi/*tukpe/</b> <b>*tEkpE</b> (*12)  [1]

<sup>11</sup> Mangbetu L: 's'ébattre, jouer, pagayer'; Mamvu/Lese: 'abzweigen vom Weg, um einzukehren' but see also Lese òfà 'das Boot mit Stangen stossen', which does not agree with **\*kp**!

	9. seed, grain <sup>12</sup>	10. give <sup>13</sup>	11. bite, gnaw	12. hen, chicken
CSD	<b>*kp</b>	<b>*kp ?</b>	<b>*kp/*k</b>	
MMD	<b>*kw</b>	<b>*kw</b> 'GIVE' / 'PAY'	<b>*kw</b>	
Miza	<b>ketswi</b>		<b>ɔ-kwa</b>	
Moru-ägi	<b>ketswi</b>	<b>(ɛ)tse / atswɛ</b>		
Moru-ändri	<b>efi</b>	<b>- / ɔfɛ</b>	<b>ɔ-fá</b>	
Ojila	<b>efula</b>	<b>afɛ / fɛ</b>		
Avokaya V	<b>ífi</b>	<b>- / fɛ</b>		
Logo	<b>(nya)kífya</b>	<b>fɛ / fɛ</b>		
Logo V	<b>kífi ~ kísí</b>	<b>- / fɛ</b>		
Keliko	<b>tft</b>	<b>fɛ / ufɛ</b>	<b>fa</b>	
Lugbara	<b>(ànya)tft</b>	<b>ufɛ / ufɛ</b>		
Lugbara C		<b>fɛ ~ èfɛ / -</b>		
Ug. Ma'di	<b>éhwí (BW)</b>	<b>hwe / - (BW)</b>		
Lokai	<b>(kwě)kwí</b>	<b>eke / úkwe</b>		
Lulu'ba	<b>kweníákwí</b>	<b>ekwé / -</b>		
LND	<b>*ts</b>		<b>*k</b>	
Ngiti	<b>ĩtsē</b>		<b>ōkā</b>	
Djadha	<b>tsī</b>		<b>kà</b>	
Lendu D	<b>tsē</b>		<b>kà</b>	
Ddradha	<b>tsī</b>		<b>kà</b>	
MAS	<b>(*kw ?)</b>	<b>(*kw ?)</b>	<b>*k</b>	<b>*kw</b>
Aka				<b>àkwélè</b>
Asua L				<b>àkwéléè</b>
Asua D		<b>(òkjòkjò/kòkjò ?)</b>	<b>kókàè</b>	<b>ákwéléè/ákwélé</b>
Mangbetu L		<b>(-òwò/nówò ?)</b>	<b>-ò'ká/nó'kó'ká</b>	<b>nálé/álé</b>
Mangbetu D		<b>(nòò/kùò ?)</b>	<b>nòkà</b>	<b>nálé/álé</b>
Lombi L				<b>nákwéléédre</b>
Lombi D	<b>(nixübù/ixübù ?)</b>	<b>(nòhò ?)</b>	<b>nòkà</b>	<b>nàxwéléé/ àxwéléé</b>
MEF	<b>*k-i ?</b>		<b>*k</b>	
Mamvu	<b>sésí</b>		<b>òqò</b>	
Lese	a. <b>héhí ~ éhí ;</b> b. <b>tísí</b>		<b>ràhó ; tãhó</b>	
KRS				
Kreish B				
Kreish S				
Dongo				
Aja				
SBB distribution				

<sup>12</sup> Lese: a. 'Frucht, Kern', b. 'Semen virile, menschlicher Same'.

<sup>13</sup> MMD: two different verbs (derived from each other?): 'give' / 'pay'.



	13. cough (v.)	14. strong/hard/firm <sup>14</sup>
CSD		
MMD Miza Moru-ägi Moru-ändri Ojila Avokaya V Logo Logo V Keliko Lugbara Lugbara C Ug. Ma'di Lokai Lulu'ba	*kp ? ēkpī ā kpī ēkpē kpu ūkpú  kīkpí	*kp ?  kpəkpo 'difficult'  ðkpò 'strength, power'  ɔkpó 'hard, strong, difficult'
LND Ngiti Djadha Lendu D Ddradha	*kp īkpè kpì kpè (hwì ?)	kpākpà 'dureté, force' ; kpákpá 'fort'
MAS Aka Asua L Asua D Mangbetu L  Mangbetu D  Lombi L Lombi D	*k  kékìjè -è'kí/né'kìè'kì  nèkjéki/kéki  nèkítíki/èkítí	*kp ?  -èkpwára/nèkpwèkpwàrà 'être fort, fortifier' ; -èèkpwá/ nèèkpwèèkpwò 'résister' ; mèkpwákpwára 'dur' ; nèkpwákpárá 'force' ; -èkpwákálá 'être obstrué, impraticable, difficile' ; - àákpwáága/náákpwààkpwààgà 'devenir difficile, impossible' mèkpwákpáálá 'difficile' ; mèkpwákpáárà 'fort' ; nèkpwákpáárá 'force'
MEF Mamvu Lese		(gbāngá ?) (hègbā ?)
KRS Kreish B Kreish S Dongo Aja	ékpé	aka
SBB distribution		

<sup>14</sup> Compare 2.bone and 3.man, male? Mamvu/Lese: 'gross, gewaltig'.



	18. wash oneself	19. scratch, (pinch) <sup>17</sup>	20. laugh (v.)	21. steal
CSD	<b>*gb ?</b>	<b>*gb/*g</b>	<b>*gb (/ *g ?)</b>	<b>*g/*gb</b>
MMD Miza Moru-ägi Moru-ändri Ojila Avokaya V Logo Logo V Keliko Lugbara Lugbara C Ug. Ma'di Lokai Lulu'ba		<b>*gw</b>   <b>vè (BW)</b> <b>vè</b> <b>vè (BW)</b> <b>vè</b> <b>vè (BW)</b> <b>vì (BW)</b> <b>vì ~ òvì</b> <b>gwì (BW)</b> <b>gwi (BW)</b>	<b>*g</b> <b>u-gu(gù)</b> <b>u-gu(gù)</b> <b>u-gu</b> <b>gù</b> <b>gū</b> <b>gù</b> <b>gū</b> <b>gù</b> <b>gù</b> <b>gū</b> <b>gū (BW)</b> <b>gu</b> <b>agu</b>	<b>*g</b> <b>kugu</b> <b>kugu</b> <b>ugù</b> <b>ugu</b> <b>ūgù</b> <b>kúgù</b> <b>kūgù</b> <b>úgù</b> <b>úgù</b> <b>ògù</b> <b>ogu (BW)</b> <b>ogù</b> <b>ugu</b>
LND Ngiti Djadha Lendu D Ddradha	<b>*gb</b>   <b>gbǎ</b>	<b>*dz</b> <b>ōdzō</b>  <b>dzà</b>	<b>*gb</b> <b>ōgbó</b> <b>gbò</b> <b>gbō</b> <b>gbù</b>	<b>*gb</b> <b>ōgbō</b> 'theft'  <b>gbò</b> 'vol'
MAS Aka Asua L Asua D Mangbetu L Mangbetu D  Lombi L Lombi D		<b>*g ?</b>   <b>ògògùè</b> <b>-ògù(ndrè)/nógù</b> a. <b>nògù/kùgù</b> ; b. <b>nóvò ?</b>  <b>nògù/ògù</b>		<b>*g ?</b>   <b>égégùè/kégù</b> <b>-ègù/négùègù</b> <b>négwégù/kégù</b>  <b>nègúúgù</b>
MEF Mamvu Lese		<b>*g ?</b> <b>ōgú</b> <b>òkū</b>		
KRS Kreish B Kreish S Dongo Aja				
SBB  distribution	<b>*gb</b> <b>*igbo/*OgbO</b> (*C~*D1~*D2?) 'laver' [2a] ([1] ?)	<b>*g</b> <b>*ugu (*D1)</b> 'gratter, pincer' [1]	<b>*gb</b> <b>*OgbO/*igbo/</b> <b>*EgbE (*A)</b> [1]	<b>*g</b> <b>*fOgO/*mOgO</b> (*D1?) [1]

<sup>17</sup> Ngiti/Lendu D: 'pinch/pincer'; Mangbetu D: a. 'se gratter', b. 'égratigner'; Mamvu/Lese: 'ausgraben, scharren'.

	22. egret	23. bark (v.)	24. child
CSD			<b>*ngb</b>
MMD Miza Moru-ägi Moru-ändri Ojila Avokaya V Logo Logo V Keliko Lugbara Lugbara C Ug. Ma'di Lokai Lulu'ba		<b>*gb ?</b> <b>ogbo, ɔgbɔ</b> (BW) <b>ɔgbɔ</b> (BW) <b>ɔgbɔ</b> (BW) <b>āgbù</b> (BW) <b>āgbù</b> <b>Ágbū</b> (BW) <b>āgbù</b> <b>(āfò, afòfò)</b> (BW) ? <b>àgbò</b> (BW) <b>àgbò ~ ēgbé</b> <b>gbo</b> (BW) <b>gbo</b> (BW) <b>ìgbò</b> (BW)	<b>*ngw</b> <b>ṅgwā</b> <b>drìàngwa</b> <b>m̄vā</b> <b>mva</b> <b>mvá</b> <b>mvá(mv́)</b> <b>mvá</b> <b>mvá</b> <b>mvá</b> <b>mvá</b> <b>mva, bàrángwá</b> (BW) <b>'bàrángwa</b> <b>ṅgwā</b> (BW)
LND Ngiti Djadha Lendu D Ddradha		<b>*gb ?</b>  <b>gbǒ</b> (child language)	<b>*ngb / pl. *ndz</b> <b>ṅgbā / pl. ṅzō</b> <b>ngbā</b> <b>ngbā / pl. ndzō</b> <b>ngbā</b>
MAS Aka  Asua L Asua D Mangbetu L  Mangbetu D Lombi L Lombi D	<b>*gb ?</b>  <b>né'gbà/é'gbà</b> 'héron'  <b>négbà</b> 'héron'		<b>*ngw</b> <b>angyâna ; 'baṅgyâna</b> (ṅgwàà 'bébé') <b>ṅgwángwa, àngyànà</b> <b>ngwángwà/ádzánà</b> <b>nèngónguè~nènguáánguè~</b> <b>náánguè/èdjáándré</b> <b>néngwángwè/édzándré</b> <b>nèngwáángwè</b> <b>nèngwángwè</b>
MEF Mamvu  Lese	<b>(mārìgbángá</b> 'Kranich, Storch' ?)		<b>*ngb ?</b> <b>ūngú (ōngú ?)</b> (pl. èndī, màtù)  <b>ígbi, ígbi (?)</b> (also <b>ádí/pl. àdī</b> )
KRS Kreish B Kreish S Dongo Aja			
SBB  distribution	<b>*gb</b> (irreg.) <b>*Nigbo/*NOgbo</b> <b>(/*?igbo/*?Ogbo ?)</b> <b>(*OCC*11)</b> 'marabou stork' [4] ([2a] ?)	<b>*gb</b> (irreg.) <b>*igbo/*Ogbo/*EgbE</b> <b>(*B)</b> [1] ?	

	25. (be) white	26. call	27. outside, away <sup>18</sup>	28. body/skin
CSD	<b>*ngb</b>	<b>*ngb</b>	<b>*ngb ?</b>	<b>*ngb ?</b>
MMD	<b>*ngw</b>	<b>*ngw</b>	<b>*ngw</b>	
Miza	ḍndzwe			
Moru-ägi	andzwé			
Moru-ändri	ḍmve		(ivè ?)	
Ojila	amve			
Avokaya V	mve (v.), ēmvé(ro) (adj.)		àmvē	
Logo	(k)emve		amvena	
Logo V	mve (v.), kēmvé(ro) (adj.)		àmvē	
Keliko	(n)imve		àmve	
Lugbara	ímvē-rɔ	mve	àmve	
Lugbara C	mvē	ḍmvē	àmvé	
Ug. Ma'di	ɥgwē (BW)			
Lokai	ɥgwɪ	ɥgwɛ	àɥgwɛ	
Lulu'ba	ɥgwé	ɥgwɛ	àɥgwɛ	
LND		<b>*ndz</b>		<b>*ngb</b>
Ngiti		ānzī		-ngbò 'body, exterior surface of sth.'
Djadha		nzi		
Lendu D		ndzī		
Ddradha				
MAS	<b>*ngw</b> 'MOON'	<b>*ngw ?</b>		
Aka	nɔɥgwê			
Asua L	àɥgwéè			
Asua D	ángwé	òngòè/kùngò		
Mangbetu L	nànguè/ánguè	-òngó/nóngò		
Mangbetu D	nángwé	nòngò/kùngò		
Lombi L	nààɥgwé			
Lombi D	nángwé	nòngwò/kùngwò		
MEF	<b>*ngb ?</b>	<b>*ngb ?</b>		<b>*ngb ?</b>
Mamvu	ḍngḍ (v.), qḍngḍ (adj.)	àngū	(rángá 'Wald' ?)	īngbá 'Haut, Fell'
Lese	ègbà (n. & adj.)		(rùgbā 'hinter (der Hütte), dahinter' ?)	ègbā (ègbā 69) 'Haut, Fell' ; ògbā ~ ìgbā 'Körper'
KRS				
Kreish B	(jóhó ?)			
Kreish S	(jɔhɔ ?)			
Dongo	((a)jɔhɔ ?)			
Aja				
SBB	(*ɥm/*ɥ ? ?) (*aɥmi/*OɥmI/ *api/*OpI ? (*A) 'être clair, blanc' ?)		(*ngb ?) *(?)ingba/*(?)ungba (*OCC*22) 'hôte, voyage, étranger' ?)	
distribution	[1]		[1]	

<sup>18</sup> Avokaya V/Logo V: 'cour, plaine; dehors, dans la cour'.





	33. rot, be rotten	34. honey, (bee) <sup>20</sup>	35. break <sup>21</sup>
CSD	<b>*ɣm/*m</b>		
MMD Miza Moru-ägi Moru-ändri Ojila Avokaya V Logo Logo V Keliko Lugbara Lugbara C Ug. Ma'di Lokai Lulu'ba	<b>*ɣw ?</b>    <b>ɣō(ā)</b>  <b>ɣō(ā)</b>	<b>*ɣw ?</b>     <b>ànyu</b> <b>ànyu</b> <b>àpú 'bee'</b> <b>laju, lamu (BW)</b> <b>làḡó</b> <b>làḡú 'bee'</b>	<b>*ɣw ?</b> <b>(ɔ-ɣḡɔ ?)</b> <b>(ɔ-ɣḡɔ ?)</b> <b>(ɔ-ɣḡɔ ?)</b> <b>ɣɔ</b> <b>ɣò(à)</b> <b>ɣwa</b> <b>nyò, ɣò(à)</b> <b>ɣɔ</b> <b>nyú</b> <b>àpò</b>  <b>ɣò</b> <b>ɣɔɣɔ</b>
LND Ngiti Djadha Lendu D Ddradha	<b>*ɣm</b> <b>ɔmò</b> <b>mò</b> <b>mò</b> <b>ɣò</b>		
MAS Aka Asua L Asua D Mangbetu L Mangbetu D Lombi L Lombi D	<b>*ɣw</b>   <b>mómwà (adj. ?)</b> <b>-òmúá/nómúà</b> <b>mómómwà (adj. ?)</b>  <b>mómḡwà (adj. ?)</b>		
MEF Mamvu Lese			
KRS Kreish B Kreish S Dongo Aja			
SBB distribution	<b>*m</b> <b>*nɖumu (*OCC*D)</b> [4]		

<sup>20</sup> MMD: compare 32.fly? Moru forms of the **(k)omu-epɛ** type are probably to be understood as /fly/honey/.

<sup>21</sup> Avokaya V/Logo V: 'détacher, casser, plier'.

