



HAL
open science

Central Sudanic Languages

Pascal Boyeldieu

► **To cite this version:**

Pascal Boyeldieu. Central Sudanic Languages. Rainer Vossen & Gerrit J. Dimmendaal. The Handbook of African Languages, Oxford University Press, pp.408-418, 2020. halshs-03097024

HAL Id: halshs-03097024

<https://shs.hal.science/halshs-03097024>

Submitted on 23 Nov 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Central Sudanic Languages Pascal Boyeldieu

1. Introduction

The label *Central Sudanic* traditionally applies to a group of some 60 languages that are spoken in the center of the African continent and cover parts of Chad, Sudan, C.A.R., D.R.C., and Uganda (see Map). With the exception of the Sara languages of Chad and Moru of Sudan/D.R.C. (more than 1 million each)¹ most languages have less than 100.000 speakers and many of them, just a few thousands. Several languages are declining, namely under the influence of Chadian or Sudanese Arabic.

[Map 'The Central Sudanic Languages' somewhere here]

Typological features include short word shapes (V, CV, VCV, and CVCV), frequent \pm ATR vowel feature (in the south-eastern part of the area), widespread glottalized consonants (see section 4), and tone systems that may include up to four contrastive levels. Word order is diverse (see section 6).

Tucker & Bryan (1956, 1966) divided these languages in two 'larger units' (1. Moru-Mangbetu, 2. Bongo-Bagirmi) despite some similarities in lexicon and morphology (1956: 141-143). Greenberg (1963) coined the term Central Sudanic (henceforth CSD) and brought all the languages together —first as a part of Chari-Nile, then directly (Greenberg 1971)— within his Nilo-Saharan family. Finally Bender (1992) divided Central Sudanic (renamed 'Family F') in two subgroups ('Peripheral' and 'Central') that roughly correspond to Tucker & Bryan's 'larger units'. These classifications are summarised in Table 1.

[Table 1 somewhere here]

The aim of this paper is to evaluate the situation of these languages in the light of several criteria. I will argue that they probably constitute a genetic, historical unit, made of five, more or less equidistant subgroups, with the exception of some indeterminate languages, the situation of which remains uncertain for the time being. I will not address the relation of CSD with other Nilo-Saharan languages.

2. Inventory

CSD includes the following subgroups that basically correspond to those identified by earlier scholars (some representative languages are indicated in brackets):

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

Every subgroup is relatively well documented for at least two languages. Given its linguistic coherence, each one can be assumed to constitute a historical unit. SBB, that represents the largest and most diversified subset, is also the best established genetic unit (Boyeldieu 2000b; Boyeldieu, Nougayrol & Palayer 2006). The tricky question that

¹ Estimations from Bender (2000: 51).

is addressed in this paper then concerns the historical unity of Central Sudanic as a whole.

Lastly, and although they are usually considered as Central Sudanic, I provisionally regard the following languages as indeterminate outsiders. Despite obvious similarities, Kresh, Dongo, Woro, Aja, and Birri (Santandrea 1965/66, 1976) do not show lexical and sound correspondences that are significant enough with the above mentioned subgroups. On the basis of limited data (Doornbos & Bender 1983), Sinyar has been counted among the SBB subgroup. However, recent fieldwork of my own shows that Sinyar also differs from SBB in many important features, notably the existence of a case marking system. The specific development of Sinyar therefore remains an open question.

3. Lexical evidence

Two types of estimates have been made regarding the lexicon.

Tables 2a-b provide the results of a lexicostatistical study for a sample of 29 languages (based on a 100-word Swadesh list; Branch Average).² MAS shows an internal similarity rate of 70%, MMD, LND, and MEF a rate of 60%, while the internal rate of SBB is markedly lower (30%). The similarity rates between subgroups vary from 20% (MMD with LND) to 05% (all subgroups). While the general figure clearly indicates five coherent subgroups, the higher connections between the latter rely on rates that are much less distinctive. As for the indeterminate languages, Sinyar is close to SBB (25%). Kresh, Dongo, Aja, and Birri also stand closer to SBB, although with a low rate of 10%.

[Tables 2a and 2b somewhere here]

Table 3a displays the distribution patterns of 267 likely cognates between the five subgroups.³ Two remarks should be made here. First, the number of likely cognates shared by all the five subgroups (20) or even by four of them (51) is noticeably low. Second, the number of cognates shared by two subgroups (Table 3b) vary from 71=26,6% (MEF with LND, and SBB with LND) to 109=40,8% (MAS with LND), thus revealing no clear-cut predominance in their distribution. Here again the overall figure does not bring out clearly any marked proximity between some of the subgroups, that rather appear as more or less equidistant.

[Tables 3a and 3b somewhere here]

4. Sound correspondences

Establishing regular sound correspondences proves to be a difficult task given the restricted number of general cognates, the variety of likely reflexes (especially for vowels and tones), and the shortness of the word shapes to be reconstructed (mostly *VCV). Bender (1992) fairly tried his hand at it, although his results are not quite convincing in my opinion.⁴ In a very limited way Boyeldieu (2006) establishes regular correspondences for labial-velar consonants (intermediate reflexes are summarised in Table 4). Glottalized consonants also show persuasive series of regular reflexes (Boyeldieu, in progress). LND languages display an uncommon contrast of

² I am indebted to Thilo Schadeberg for his LEXISTAT software.

³ The counting is based on a personal database. An occurrence in one language is considered enough to represent a subgroup. Indeterminate languages are not taken into account.

⁴ For instance, out of his four series illustrating a *kp formula, only one is valid for me (Boyeldieu 2006). As for the glottalized consonants, the author disregards the important voiceless/voiced contrast that characterizes the LND languages (see below).

voiceless/voiced glottalized consonants (Dimmendaal 1986; Kutsch Lojenga 1991) that must be assigned to the likely CSD sound system. This contrast was lost and reflexes have merged in all other subgroups (intermediate reflexes are summarised in Table 5).

[Tables 4 and 5 somewhere here]

5. Morphology

Tucker & Bryan (1956, 1966) pertinently pointed up morphological similarities that can be observed in most CSD subgroups. This regards the three following verbal prefixes:

T(V)-: Verbal intensive (Tucker & Bryan 1956: 142)

[MMD] e.g. Logo **tV-** (Vallaey 1986: 284)

'di	‘percer’	ti'di	‘percer (répétitif/intensif)’
------------	----------	--------------	----------------------------------

[LND] No evidence

[MAS] e.g. Mangbetu: possible remnants of **-Vt-** ? (after Larochette 1958, *passim*)

-etápú	‘s'évanouir, anéantir’	cp. -ɔpú	‘tuer, détruire, anéantir’
---------------	---------------------------	-----------------	-------------------------------

[MEF] e.g. Mamvu **ṭi-/ṭi-** (Vorbichler 1971: 194-195, *passim*)

ḍma	‘schlagen’	ṭima	‘schlagen (viele, Pl.)’
------------	------------	-------------	----------------------------

[SBB] e.g. Gula **t-** (Nougayrol 1999: 116-117)

èhè	‘nommer’	téhè (Gula Koto)	‘nommer à plusieurs reprises’
------------	----------	-------------------------	----------------------------------

K(V)-: Deverbative- (Tucker & Bryan 1956: 142)

[MMD] e.g. Moru Miza **k-**: formative of adjectives, e.g. in contrast with Avukaya Ojila (Tucker 1940: 286)

kḍzi	(cp. Avukaya Ojila ɔnzí)	‘bad’
-------------	----------------------------------	-------

[LND] No evidence

[MAS] e.g. Mangbetu **k(u)-**: verbal nouns (Larochette 1958: 30-31)

-ɛgu	‘voler’	nékegú	‘vol, voleur’
-------------	---------	---------------	---------------

[MEF] e.g. Mamvu **q-**: deverbative function (Vorbichler, 1971: 184-185)

ḍmvu	‘faulen’	qomvù	‘feucht, naß’
-------------	----------	--------------	---------------

[SBB] e.g. Bagiro **k-**: infinitives, and nouns/adjectives (Boyeldieu 2000a: 126-129)

gyḍ	‘il enfante’	k-ḍgyḍ	‘enfanter’	kḍgyḍ	‘parent’
------------	--------------	---------------	------------	--------------	----------

O-/E- or **A-/E-**: a. Itive/Ventive; b. Neuter/Causative (Tucker & Bryan 1966: 34-35)

[MMD] e.g. Moru (Tucker, 1940: 205-211, 360-369)

a.	ɔ-gɔ	‘go back’	ɛgo	‘come back’
----	-------------	-----------	------------	-------------

b.	o-ŋga	‘to get up’	eŋga	‘to raise up’
----	--------------	-------------	-------------	---------------

[LND] e.g. Ngiti (Kutsch Lojenga, 1994: 290-293, 297-299)

a.	otseta	‘to run (itive)’	itsétá	‘to run (ventive)’
----	---------------	------------------	---------------	-----------------------

b.	avhítá	‘to get lost’	ivhítá	‘to lose something’
[MAS] e.g. Mangbetu (Larochette, 1958: 27-28, 183-196)				
a.	-ɔku	‘repartir’	-ekú	‘revenir’
b.	-owú	‘égoutter’	-ewú	‘laisser égoutter’
[MEF] e.g. Mamvu (Vorbichler, 1971: 191, 199)				
a.	ðsi	‘gehen’	ɛsí	‘kommen’
b.	ðfe	‘zu Ende gehen’	ife	‘beenden’
[SBB] No evidence				

Although the distribution of these similarities between the subgroups reveal some gaps (especially in LND, see Table 6), there is no clear indication that a specific subgroup — especially not SBB— should be left out on this point.

[Table 6 somewhere here]

6. Word order

Tucker & Bryan (1956: 141-143) further justified their distinction of two larger units, Bongo-Bagirmi (SBB) and Moru-Mangbetu (other subgroups), by a contrast in word order. However, things are not so straightforward. Table 7 displays a selection of typological features as characterized by Dryer & WALS (2011) for Central Sudanic languages. Notwithstanding clear contrasts of MMD and LND with SBB (features 81B and 85A), Mangbetu (MAS) and Mamvu (MEF) show the same SVO order like SBB (81A), while Moru (MMD) shows the same Noun-Genitive order like SBB (86A). Most probably SBB, that extends into the north-western part of the area, reinforced innovations in this respect but, here again, there is no evidence for a clear-cut contrast between SBB and the other subgroups all together.

[Table 7 somewhere here]

7. Conclusion

The various observations made in the preceding sections lead to the following concluding remarks:

- there is no clear evidence that SBB should be contrasted with the other subgroups as a whole; CSD rather comprises five, more or less equidistant subsets;
- there is some evidence that the five subgroups may well result from the historical splitting of a single language (or dialect group); however, considerable work is still necessary to confirm this assumption and to explain the diversity of the present-day languages, a diversity that seems somewhat contradictory with their geographical proximity;
- lastly the affiliation of some indeterminate languages remains uncertain; their similarities with CSD could turn out to be the result of different types of contact.

Pascal Boyeldieu
 CNRS (UMR 8135, LLACAN)
 France
boyeldieu@vjf.cnrs.fr

Abbreviations


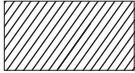
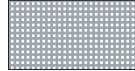

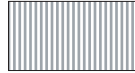

CSD	Central Sudanic
LND	Lendu subgroup
MAS	Mangbetu(-Asua) subgroup
MEF	Mangutu-Efe subgroup
MMD	Moru-Madi subgroup
NS	Nilo-Saharan
Pl.	Plural
SBB	Sara-Bongo-Bagirmi subgroup

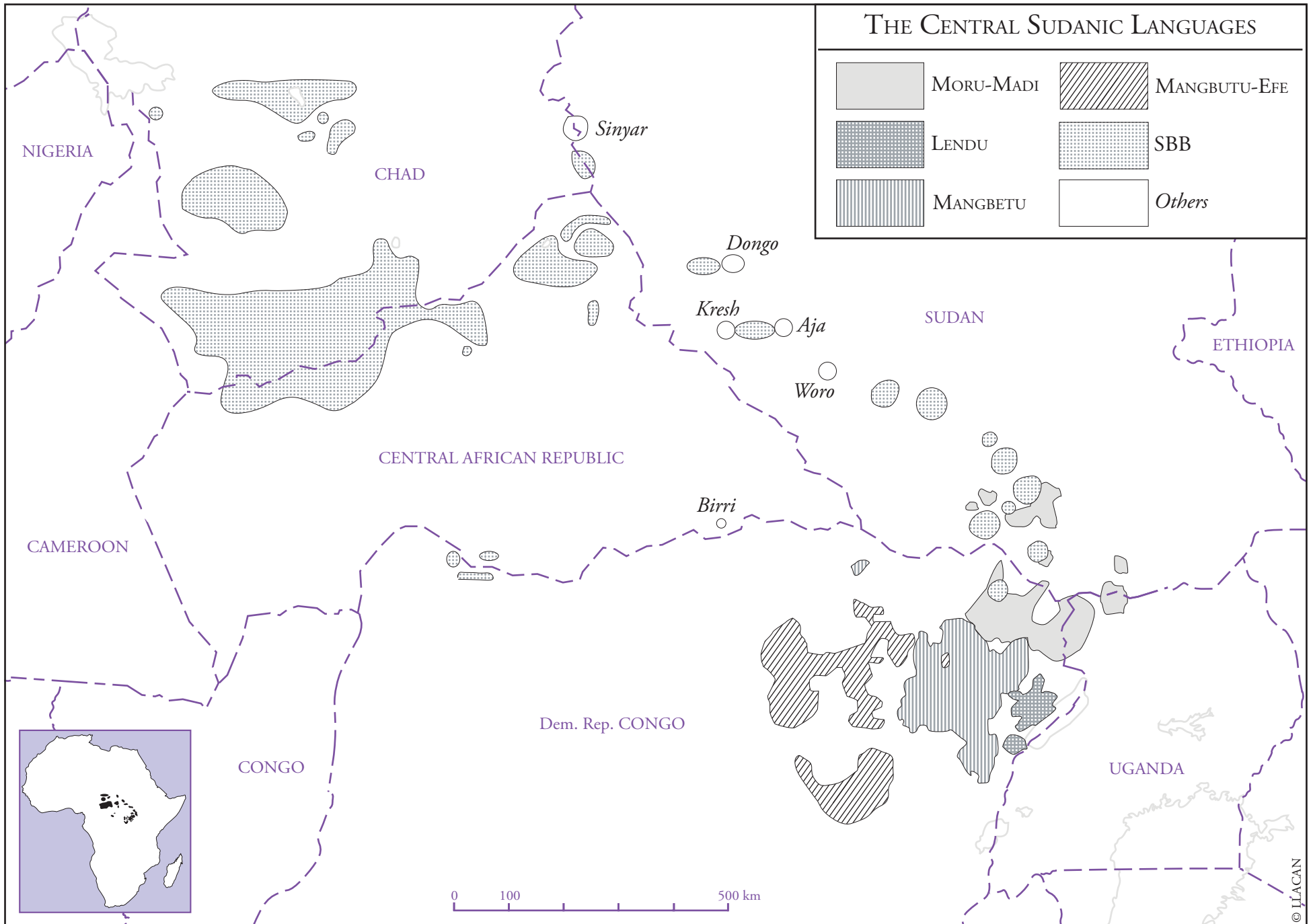
References

- Bender M.L. 1992. Central Sudanic segmental and lexical reconstructions. *Afrikanistische Arbeitspapiere* 29, 5-61.
- Bender L.M. 2000. Nilo-Saharan. In: B. Heine and D. Nurse (eds) *African Languages. An Introduction*. Cambridge: Cambridge University Press, 43-73.
- Boyeldieu P. 2000a. *La langue bagiro (République Centrafricaine). Systématique, textes et lexique*. Frankfurt am Main: Peter Lang.
- Boyeldieu P. 2000b. *Identité tonale et filiation des langues sara-bongo-bagirmiennes (Afrique centrale)*. Köln: R. Köppe.
- Boyeldieu P. 2006. Reflexes of a Labiovelar Series in Central Sudanic. In: A. Abu-Manga, L. Gilley and A. Storch (eds) *Insights into Nilo-Saharan Language, History and Culture*. Köln: R. Köppe, 129-151.
- Boyeldieu P., P. Nougayrol and P. Palayer 2006. *Lexique comparatif historique des langues sara-bongo-bagirmiennes*. Paris: CNRS-LLACAN. Available online at [<http://sumale.vjf.cnrs.fr/SBB/>].
- Dimmendaal G.J. 1986. Language typology, comparative linguistics and injective consonants in Lendu. *Afrika und Übersee* 69, 2, 161-192.
- Doornbos P. and M.L. Bender 1983. Languages in Wadai-Darfur. In: M.L. Bender (ed.) *Nilo-Saharan Language Studies*. East Lansing: Michigan State University, 42-79.
- Dryer, M.S. and the WALS author team 2011. Language pages for the 26 languages of the subfamily: Central Sudanic (Nilo-Saharan). In: Dryer, M.S. and Haspelmath, M. (eds.) *The World Atlas of Language Structures Online*. Munich: Max Planck Digital Library. Available online at [<http://wals.info/languoid/family/nilosaharan>].
- Greenberg J.H. 1963. Languages of Africa. *International Journal of American Linguistics* 29, 1, part II.
- Greenberg J.H. 1971. Nilo-Saharan and Meroitic. In: Th. Sebeok (ed.) *Current Trends in Linguistics, vol 7: Linguistics in Sub-Saharan Africa*. Paris-La Haye: Mouton, 421-442.
- Kutsch Lojenga C. 1991. Lendu: A new perspective on implosives and glottalized consonants. *Afrika und Übersee* 74, 77-86.
- Kutsch Lojenga C. 1994. *Ngiti, A Central-Sudanic language of Zaire*. Köln: R. Köppe.
- Larochette J. 1958. *Grammaire des dialectes Mangbetu et Medje*. Tervuren: Annales du Musée Royal du Congo Belge.
- Nougayrol P. 1999. *Les parlers gula (Centrafrique, Soudan, Tchad). Grammaire et lexique*. Paris: CNRS Editions.
- Santandrea S. 1965/1966. The Birri Language. Brief Elementary Notes. *Afrika und Übersee* 49, 81-105 and 196-234.

- Santandrea S. 1976. *The Kresh Group, Aja and Baka languages (Sudan)*. Napoli: Istituto Universitario Orientale.
- Tucker A.N. 1940. *The Eastern Sudanic Languages, vol. 1*. London-New York-Toronto: OUP for IALC.
- Tucker A.N. and M.A. Bryan 1956. *The Non-Bantu Languages of North-Eastern Africa*. London-New York-Cape Town: OUP for IAI.
- Tucker A.N. and M.A. Bryan 1966. *Linguistic Analyses. The Non-Bantu Languages of North-Eastern Africa*. London-New York-Cape Town: OUP for IAI.
- Vallaëys A. 1986. *Dictionnaire logo-français, suivi d'un index français-logo*. Tervuren: Musée Royal de l'Afrique Centrale.
- Vorbichler A. 1971. *Die Sprache der Mamvu*. Hamburg: Verlag J.J. Augustin.

THE CENTRAL SUDANIC LANGUAGES

	MORU-MADI		MANGBUTU-EFE
	LENDU		SBB
	MANGBETU		Others



[Tables to be inserted into the text, where indicated; the Map is in a distinct file]

Tucker & Bryan (1956)	Greenberg (1963)	Greenberg (1971)	Bender (1992)
<p>1. MORU-MANGBETU Moru-Ma'di (LG) Mangbutu-Efe (LG) Mangbetu (LG) Lendu (SU)</p> <p>2. BONGO-BAGIRMI Bongo (LG) Kresh (LG) Sinyar (SU) Kara (SU) Sara (LG) Bagirmi (LG)</p>	<p>CENTRAL SUDANIC (< CHARI-NILE < NS)</p> <p>4. Moru, Avukaya, Logo, Keliko, Lugbara, Madi 5. Mangbetu, Lombi, Popoi, Makere, Meje, Asua 6. Mangbutu, Mamvu, Lese, Mvuba, Efe 7. Lendu</p> <p>1. Bongo, Baka, Morokodo, [...], Sara dialects ([...]), [...], Bagirmi, Kuka, Kenga, [...] 2. Kreish 3. Binga, Yulu, Kara</p>	<p>CENTRAL SUDANIC (< NS)</p> <p>3. Moru-Madi 4. Mangbetu 5. Mangbutu-Efe 6. Lendu</p> <p>1. Bongo-Bagirmi A. Bongo B. Sara, Kara, Bagirmi C. Yulu 2. Kreish</p>	<p>FAMILY F</p> <p>PERIPHERAL F1: Moru-Madi F2: Mangbutu F3: Mangbetu F7: Kresh F8: Baadha (= Lendu)</p> <p>CENTRAL F4a: Bagirmi-Sar F4b: Yulu-Binga F4c: Fongoro F5: Shemya (= Sinyar) F6: Bongoid</p>

(LG = Language group ; SU = Single unit)

Table 1. Previous groupings of Central Sudanic languages

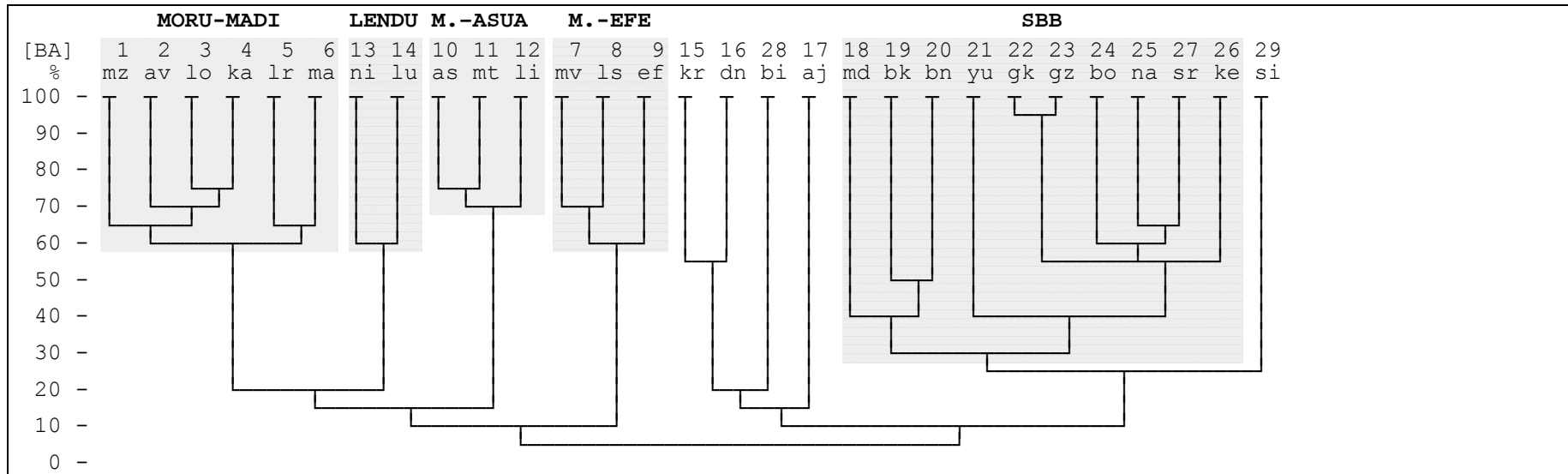


Table 2a. Lexicostatistical distances between 29 CSD languages (based on a 100-word Swadesh list; Branch Average)

MORU-MADI			LENDU		MANGBETU-ASUA			MANGBUTU-EFE			SBB		Indeterminate			
1	mz	Moru Miza	13	ni Ngiti	10	as	Asua	7	mv	Mamvu	18	md	Modo	15	kr	Kresh
2	av	Avukaya	14	lu Lendu	11	mt	Mangbetu	8	ls	Lese	19	bk	Baka	16	dn	Dongo
3	lo	Logo			12	li	Lombi	9	ef	Efe	20	bn	Bongo	17	aj	Aja
4	ka	Kaliko									21	yu	Yulu	28	bi	Birri
5	lr	Lugbara									22	gk	Gula Koto	29	si	Sinyar
6	ma	Ma'di									23	gz	Gula Zura			
											24	bo	Bagiro			
											25	na	Na			
											26	ke	Kenga			
											27	sr	Sar			

Table 2b. Identification of subgroups and languages

distr.	MMD	LND	MAS	MEF	SBB	tot.	tot.
5x	+	+	+	+	+	20	20
4x	+	+	+	+	-	10	51
	+	+	+	-	+	14	
	+	+	-	+	+	7	
	+	-	+	+	+	11	
	-	+	+	+	+	9	
3x	+	+	+	-	-	14	91
	+	+	-	+	-	11	
	+	-	+	+	-	12	
	-	+	+	+	-	7	
	+	+	-	-	+	6	
	+	-	+	-	+	12	
	-	+	+	-	+	3	
	+	-	-	+	+	9	
	-	+	-	+	+	4	
-	-	+	+	+	13		
2x	+	+	-	-	-	23	105
	+	-	+	-	-	16	
	-	+	+	-	-	7	
	+	-	-	+	-	8	
	-	+	-	+	-	3	
	-	-	+	+	-	8	
	+	-	-	-	+	8	
	-	+	-	-	+	8	
	-	-	+	-	+	17	
-	-	-	+	+	7		
					267	267	

Table 3a. Distribution patterns of likely cognates in the CSD subgroups (excluding indeterminate languages) and number of occurrences

	MMD	LND	MAS	MEF
LND	105 39,3%			
MAS	109 40,8%	84 31,5%		
MEF	88 32,9%	71 26,6%	90 33,7%	
SBB	87 32,6%	71 26,6%	99 37,1%	80 30,0%

Table 3b. Absolute occurrences and percentages (out of 267) of shared likely cognates in pairs of subgroups

CSD	*VCV	*kp	*gb	*ngb	*ɲm
MMD	*(V)CV	*kw-a/E/i	*gw-ε/i, (*g-u ?)	*ngw	*ɲw-a/u
LND	*VCV	*kp / *ts	*gb / *dz	*ngb / *ndz	*m ?
MAS	*VCV	*kw-a/ε	*g ?	*ngw-a/ε	*ɲw-a/ε ?
MEF	*(C)VCV	*kp	*? / *g-u ?	*ngb ?	*?
SBB	*(C)VCV	*kp	*gb / *g-u ?	(*ngb ?)	*ɲm

Table 4. Central Sudanic correspondence formulas for labial-velar consonants

CSD	*VCV	*ɸ	*ɓ	*ɸ	*ɗ	*ɕ	*ɸ	*ʔ
MMD	*(V)CV	*ɓ		*ɗ (/ *ɗw)		*ɸ		*ʔ
LND	*VCV	*ɸ	*ɓ	*ɸ	*ɗ	*ɕ	*ɸ	*ʔ
MAS	*VCV	*ɓ / *ɓ		*ɗ		*ɸ ?		*ʔ
MEF	*(C)VCV	*ɓ		*ɗ		*ɸ		*VØV
SBB	*(C)VCV	*ɓ		*ɗ		*ɸ		*ʔ

Table 5. Central Sudanic correspondence formulas for glottalized consonants

	MMD	LND	MAS	MEF	SBB
t(V)-: Verbal intensive	+	-	?	+	+
K(V)-: Deverbative	+	-	+	+	+
O-/E- or A-/E-: a. Itive/Ventive; b. Neuter/Causative	+	+	+	+	-

Table 6. Evidence of the verbal prefixes through the subgroups

		57A	81A	81B	85A	86A
		Position of Pronominal Possessive Affixes	Order of Subject, Object and Verb	Languages with two Dominant Orders of Subject, Object, and Verb	Order of Adposition and Noun Phrase	Order of Genitive and Noun
MMD	Avokaya	–	No dominant order	SOV or SVO	Postpositions	No dominant order
	Logoti	–	No dominant order	SOV or SVO	Postpositions	Genitive-Noun
	Lugbara	–	No dominant order	SOV or SVO	Postpositions	Genitive-Noun
	Ma'di	–	No dominant order	SOV or SVO	Postpositions	No dominant order
	Moru	Possessive suffixes	No dominant order	SOV or SVO	Postpositions	Noun-Genitive
LND	Lendu	Possessive prefixes	No dominant order	SOV or SVO	Postpositions	Genitive-Noun
	Ngiti	Possessive suffixes	No dominant order	SOV or SVO	Postpositions	Genitive-Noun
MAS	Mangbetu	Possessive suffixes	SVO	–	–	No dominant order
MEF	Lese	–	No dominant order	–	–	No dominant order
	Mamvu	Possessive prefixes	SVO	–	–	No dominant order
SBB	Bagirmi	Possessive suffixes	SVO	–	Prepositions	Noun-Genitive
	Bagiro	Possessive suffixes	SVO	–	No dominant order	Noun-Genitive
	Baka (Sud.)	–	SVO	–	Prepositions	Noun-Genitive
	Binga	Possessive suffixes	–	–	–	–
	Bongo	Possessive suffixes	SVO	–	Prepositions	Noun-Genitive
	Gula (CAR)	–	SVO	–	No dominant order	Noun-Genitive
	Jur Mödö	–	SVO	–	Prepositions	Noun-Genitive
	Kara (CAR)	Possessive suffixes	SVO	–	Prepositions	Noun-Genitive
	Kenga	Possessive suffixes	SVO	–	No dominant order	Noun-Genitive
	Mango	–	–	–	–	Noun-Genitive
	Mbay	Possessive suffixes	SVO	–	No dominant order	Noun-Genitive
	Ngambay	Possessive suffixes	SVO	–	Prepositions	Noun-Genitive
Yulu	Possessive suffixes	SVO	–	Prepositions	Noun-Genitive	
Others	Aja	–	SVO	–	Prepositions	Noun-Genitive
	Kresh	Possessive suffixes	SVO	–	Prepositions	Noun-Genitive
	Birri	–	–	–	–	–

Table 7. A selection of WALS typological features for CSD languages (Dryer and WALS 2011)