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THE BUA GROUP NOUN CLASS SYSTEM: LOOKING FOR A HISTORICAL INTERPRETATION

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Abstract: The way Bua languages express number on nouns mostly consists of alternating suffixes that bear witness of a former classification system. However, Kulaal is the only present-day language where these markers are not frozen but actually trigger agreement with free, optional determiners that follow the noun and may show some formal affinity with its suffix. For several reasons, previous attempts at reconstructing a historical noun morphology common to all Bua languages considered the sole suffixes and neglected the determiners present in Kulaal. But, as is argued in the present paper, more recent data show that, in some cases, present-day suffixes may result from the association of a former suffix with an element similar to one of the Kulaal determiners. In such cases the former determiner has simply lost its independence and been historically stacked onto the noun form.

Key words: historical linguistics, morphology, noun classes, agreement, suffix, determiner, stacking, Bua languages, Adamawa languages

1. The Bua languages

The Bua languages are spoken by small groups living in southern Chad. They comprise some 13 units, some of which are now extinct but known through limited wordlists collected in the 1970s (see the map on Figure 1).¹ These languages are as follows, see Table 1. Endonyms are in italics; extinct languages are indicated in square brackets; a rough estimate of the number of speakers is given in the right column.²

Table 1

The Bua languages	
Language name	Number of Speakers
<i>Lua</i> or Nielim, Niellim	5.000
[<i>Cini</i>]	–
<i>Tun</i> or Tunya, Tounia	2.000
[<i>Perim</i>]	–
[<i>Lɔɔ</i> or Noy]	–
<i>Ba</i> or Bua, Boua	8.000
<i>Kawãwãy</i> or <i>Korom</i> (?)	60
<i>Kulaal</i> or Iro Gula, Goula d'Iro	3.500
<i>Kulaale</i> or <i>Eyle</i> , Fanya, Fanian	1.000
Zan Gula, Goula de Zan (<i>Mɔɾɛ</i>)	3.200
Bon Gula, Goula de Bon (<i>Eeni</i>)	1.200
Bolgo (including <i>Tereu</i> , <i>Bolgo</i> , <i>Bormo</i>)	2.800
Koke	600

Endonyms — for which some uncertainty may remain — often differ from the most widespread language names. Differences between

¹ For a more detailed presentation of the Bua Group languages, see Boyeldieu, Kastenholz, Kleinewillinghöfer & Lionnet (2018).

² The authors are grateful to the editors and reviewers of the present paper for their careful reading as well as for their advices, suggestions, and support.

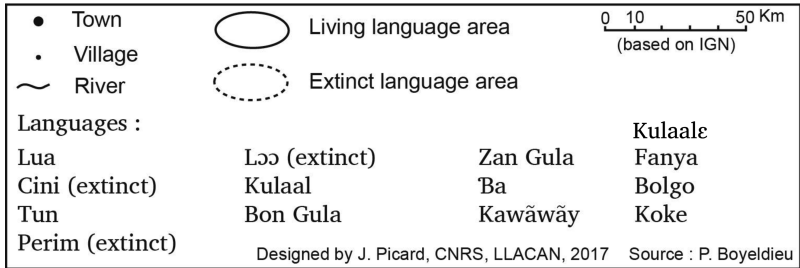
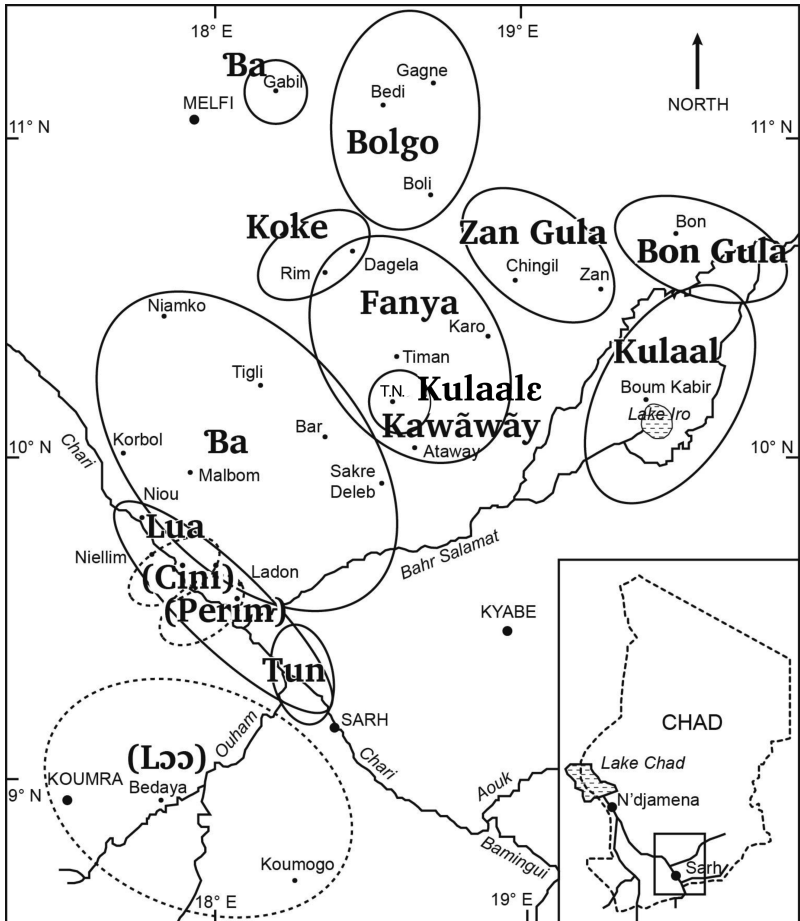


Figure 1. Distribution of the Bua languages in Southern Chad

dialects and separate languages may also be uncertain. Thus, Kawāwāy might represent a variety of 'Ba. Also Bolgo and Koke might constitute two (or more) variants of the same language.

Although used in two neighbouring but different languages, the similarity of the two endonyms *Kulaal* and *Kulaale* is not fortuitous. The first one — the full form of which should be read *kùláláá* (ɛ̃) (see footn. 5) — refers to the language spoken by the Iro Gula (see also *kùláláá* (kò) /pl. *kùléé* (kì) 'human being, Iro Gula'). The second one — [*kùlálá:lè*] /pl. [*kùlálá:rò*], which might be an adjective? — refers to the language also known as *Fanya*. As will be shown in §4 below, the latter, in fact, results from the historical fixation of a former postposed agreement determiner — (l)ɛ̃ — that is still free in the former.

The Bua languages as a whole are poorly documented. The relatively best known languages are Kulaal, Lua, 'Ba, Bolgo, Zan Gula, and Kulaale. Sources, of uneven quantity and quality, partially consist of unpublished data. They mainly concern lexicon and morphology, with limited information on syntax. Our transcriptions usually respect the conventions adopted in the different sources.

Geographically these languages represent the easternmost extension of the Adamawa languages, a situation which is of special interest from both linguistic and historical points of view.

2. Reconstructing the noun class system: the 2018 attempt and its limits

Bua languages as a whole show morphological traces of a former noun class system. Indeed, in every language, a more or less important part of the noun lexicon may display various alternating, internal and/or final segments that chiefly express a contrast of number and clearly represent altered forms of a previous system of suffixed markers. Examples from Tun are illustrated in (1):

(1) Tun (Palayer 1975)

sg.	<i>tēē</i>	pl.	<i>tēm</i>	‘country, village’
	<i>jéélé</i>		<i>jíílí</i>	‘filter’
	<i>tōy</i>		<i>tōn</i>	‘ear’

Only one present-day language, namely Kulaal, has, in addition, a system of separable, independent concord markers, also termed ‘determiners’, that may follow the noun and, to some extent, show phonic affinities with the presumably older suffixes (therefore, Kulaal is the only Bua language that may be regarded as a class language in the strict sense). This situation is illustrated in (2) (agreement determiners are transcribed in brackets):

(2) Kulaal (Pairault 1966; 1969)

sg.	<i>fòm</i> (<i>mè</i>)	pl.	<i>fòrè</i> (<i>kì</i>)	‘flour’	(gender <i>mè/kì</i>)
	<i>húl</i> (<i>lè</i>)		<i>hún</i> (<i>tù</i>)	‘head’	(gender <i>lè/tù</i>)
	<i>kánnò</i> (<i>kù</i>)		<i>kónnè</i> (<i>kì</i>)	‘dugout canoe’	(gender <i>kù/kì</i>)

An early attempt to reconstruct the historical noun morphology of the Bua languages (Boyeldieu 1983; 2014) concentrated on the presumed suffixes only and totally disregarded possible cognate forms of the Kulaal concord markers that were in fact not detectable, at that time, in the data available for the other languages of the Group.

A more recent attempt (Boyeldieu, Kastenholz, Kleinwillinghöfer & Lionnet 2018, henceforth BKKL 2018) was made by the authors of the present paper who could integrate a fair amount of new data on several languages, in particular Zan Gula and Kulaale/Fanya, that contain vital clues for a different analysis of the historical Bua Group noun morphology. However, the full consequences of these new pieces of information were not totally clear — or understood — at the time of writing and the following extract gives evidence of our unsureness:

“[...] there is currently no sign that any other language than Kulaal has a set of free, separable agreement markers justifying the status of a noun class language. On the other hand, it is not excluded that traces

of such concord morphemes can still be detected in some cases: as first observed by Raimund Kastenholtz, one wonders whether, for some languages, a number of forms might not have been transcribed together with elements that (diachronically or synchronically) probably correspond to Kulaal determiners.” (BKKL 2018: 79)

In particular, and as shown in Table 11 at the end, we considered the two reconstructed genders **-l/*-n* and **-lE/*-rU* as in complementary distribution depending on the language (BKKL 2018: 103) whereas, with the benefit of hindsight, we will regard them here as one and the same gender **-l_E/*-n_{du}*.

Nevertheless, before going into the details of this new analysis, it is necessary to present the system of Kulaal (Pairault 1966; 1969; Boyeldieu 1986; Kleinewillinghöfer 2017; BKKL 2018), which is probably, with respect to noun morphology, the most conservative and consequently the best witness of the historical noun class system common to all Bua languages.

3. Kulaal noun number marking and class agreement

If we except some rare cases of invariable forms (e.g. *tēm (kè)* /pl. *tēm (kì)* ‘African mistletoe, *Loranthus sp.*’, *pòròàsí (kè)* /pl. *pòròàsí (kì)* ‘type of pot’), and abstracting from the optional concord markers that will be treated later under iv.), Kulaal nouns are marked for number by way of various and numerous devices that belong to two main types, possibly combined.

i) The noun plural form may be marked by a raising of the root vowel.³ As illustrated in (3) this *Umlaut* is sometimes the only one device involved, i.e. no suffixation is present. Note that, as mentioned above, and in accordance with Pairault (1966; 1969), the transcription

³ Pairault (1966: 422; 1969: 44–46) presents the Kulaal vowel system as contrasting /i, ɪ, e, ε, a, ɔ, o, ʊ, u/, augmented with two correlations of length and nasality, the nasal contrasts being, however, limited to /ɛ̃, ɑ̃, ɔ̃/.

of nouns in isolation is followed by their agreement determiner in parentheses (see below).⁴

(3) sg. <i>kûp</i> (kè)	pl. <i>kûp</i> (kì)	‘crocodile’
<i>lòm</i> (kù)	<i>lòm</i> (kì)	‘ <i>Parkia biglobosa</i> (locust bean tree)’
<i>mààtí</i> (kè)	<i>mòòtí</i> (kì)	‘throwing knife’
<i>híríkè</i> (kè)	<i>híríkè</i> (kì)	‘pagne, wrapper, women’s cloth’
<i>ḡàñ</i> (kè)	<i>ḡòñ</i> (kì)	‘chief, headman’
<i>kúrààm</i> (kù)	<i>kúrèèm</i> (kì)	‘watchtower’

Obviously, this raising of the root vowel resulted from the presence of a former high — probably +ATR — vowel in the plural suffix (see ii) below) but most likely the process later extended to other nouns under the pressure of analogy.

ii) The plural form may be marked by alternating final segments that have the nature of a suffix (and may be \emptyset). This device, which is slightly more frequent, may work alone, i.e. without *Umlaut*, as in (4).

(4) sg. <i>hààpá</i> (kè)	pl. <i>hààpé</i> (kì)	‘fish’
<i>mórù</i> (kù)	<i>mòrì</i> (kì)	‘ <i>Clarias sp.</i> ’ (fish)
<i>wál</i> (lè)	<i>wán</i> (tù)	‘gourd, flask’
<i>lòpíl</i> (lè)	<i>lòpún</i> (tù)	‘mud’
<i>nèèl</i> (è)	<i>nèè</i> (kì)	‘tooth’
<i>lòm</i> (mè)	<i>lòtè</i> (kì)	‘vegetable salt’

iii) In most cases, however, the two processes, *Umlaut* and suffix alternation, are combined, as in (5).

(5) sg. <i>kòlà</i> (kè)	pl. <i>kòlè</i> (kì)	‘ <i>Ficus thonningii</i> ’ (tree)
<i>tààlù</i> (kù)	<i>tòòlì</i> (kì)	‘molar’
<i>hèl</i> (è)	<i>hèn</i> (tù)	‘African rock python’
<i>máál</i> (è)	<i>móó</i> (kì)	‘breast’
<i>hám</i> (mè)	<i>hótí</i> (kì)	‘beer’

⁴ For the sake of legibility, however, we introduce a space between the noun itself and its determiner, e.g. sg. *kûp* (kè) /pl. *kûp* (kì) ‘crocodile’ instead of the original sg. *kûp(kè)* /pl. *kûp(kì)*.

Note that in both (4) and (5), the five alternating sg./pl. suffixes are easily identified as *-a/-e*, *-u/-i*, *-o/-i*, *-l/-n*, *-il/-un*, *-l/-Ø*, and *-m/-te~ti*. But there are no detectable suffixes in (3) where the final segments do not alternate. And what about such cases as in (6) below, where former vocalic suffixes possibly merged with the root vowel into an indivisible, short or long vowel phoneme?

(6) sg. <i>há</i> (kù)	pl. <i>hó</i> (kì)	‘year’
<i>tó</i> (kù)	<i>tú</i> (kì)	‘ear’
<i>káǵǵ</i> (kè)	<i>kóǵǵ</i> (kì)	‘heron’
<i>kéé</i> (kè)	<i>kéé</i> (kì)	‘ <i>Maerua angolensis</i> ’ (tree)
<i>púù</i> (kè)	<i>púù</i> (kì)	‘goat’

One should in fact consider that the notion of suffix is above all historical. If in many cases present-day reflexes of former suffixes are still obvious and transparent, for some nouns they seem to be closely amalgamated with the root. And further nouns probably never had a suffix, namely those whose final segments do not distinctly fit their agreement determiner (see below). This is clearly the case, at least, for recent borrowings that nevertheless fall into the agreement system and may even display an *Umlaut* that they necessarily acquired through analogical alignment. See illustrations in (7):

(7) sg. <i>kóóp</i> (kè)	pl. <i>kóóp</i> (kì)	‘drinking metal cup’ (< Arabic)
<i>kúpúk</i> (kù)	<i>kúpúk</i> (kì)	‘strip of woven cotton’ (< origin?)
<i>kásáás</i> (kè)	<i>káséés</i> (kì)	‘bottle’ (< Arabic)
<i>ásèkàr</i> (kè)	<i>ásèkèr</i> (kì)	‘soldier’ (< Arabic)
<i>mòntòlòós</i> (kù)	<i>pàntèléés</i> (kì)	‘(European) trousers’ (< French)

iv) Moreover, and as already illustrated in the preceding examples, Kulaal has a system of postposed agreement determiners that usually come in sg./pl. pairs and are clearly, although not absolutely, correlated with the final segment(s) — i.e. suffixes — of the noun they modify.

These non-obligatory *déterminatifs classificatoires* (Pairault 1966: 421–437; 1969: 261–278) may add a definite or deictic value to the noun. They also work alone as deictic substitutes (Houis 1967: 125–129). Clearly, they are representative of noun classes, even if some of these prove to be reduced and vestigial.

Table 2 below summarizes the organisation of the determiners in classes and genders and indicates their respective frequency. Note that sequences of identical consonants being excluded after long vowels, determiners *kè*, *kì*, *lè*, and *mè* have respectively *è*, *ì*, *ê*, and *ê* allomorphs in this context. By convention, graphic vowels following hyphens may represent here short or long final vowels (e.g. *-ɔ* (*kù*) for both *-ɔ* (*kù*) and *-ɔ* (*kù*)). ^[V] and ^[VV] symbolize preceding short or long vocalic context.

Table 2

**Kulaal noun classes, genders, and agreement determiners
(BKKL 2018: 75 [revised])**

Class / gender determiners	Main final segments in nouns (mostly historical suffixes) and realisation of determiner	Lexical tokens
<i>kù/kì</i>	<i>-ɔ</i> (<i>kù</i>) / <i>-e</i> (<i>kì</i>), <i>-o</i> (<i>kù</i>) / <i>-e</i> (<i>kì</i>), <i>-u</i> (<i>kù</i>) / <i>-i</i> (<i>kì</i>), <i>-u</i> (<i>kù</i>) / <i>-i</i> (<i>kì</i>), <i>-a</i> (<i>kù</i>) / <i>-e</i> (<i>kì</i>), <i>-ɔ</i> (<i>kù</i>) / <i>-o</i> (<i>kì</i>), <i>-u</i> (<i>kù</i>) / <i>-u</i> (<i>kì</i>), <i>-a</i> (<i>kù</i>) / <i>-o</i> (<i>kì</i>), <i>-N</i> (<i>kù</i>) / <i>-N</i> (<i>kì</i>), <i>-p</i> (<i>kù</i>) / <i>-p</i> (<i>kì</i>)	332
<i>kè/kì</i>	<i>-a</i> (<i>kè</i>) / <i>-e</i> (<i>kì</i>), <i>-e</i> (<i>kè</i>) / <i>-e</i> (<i>kì</i>), <i>-N</i> (<i>kè</i>) / <i>-N</i> (<i>kì</i>), <i>-C</i> (<i>kè</i>) / <i>-C</i> (<i>kì</i>), <i>-ɛ</i> (<i>kè</i>) / <i>-e</i> (<i>kì</i>), <i>-ɔ</i> (<i>kè</i>) / <i>-o</i> (<i>kì</i>), <i>-u</i> (<i>kè</i>) / <i>-i</i> (<i>kì</i>), <i>-u</i> (<i>kè</i>) / <i>-i</i> (<i>kì</i>), ^[V] - <i>k</i> (<i>kè</i>) / ^[V] - <i>k</i> (<i>kì</i>), ^[VV] - <i>k</i> (<i>è</i>) / ^[VV] - <i>k</i> (<i>ì</i>)	240
<i>lè/tù</i>	^[V] - <i>l</i> (<i>lè</i>) / <i>-n</i> (<i>tù</i>), ^[VV] - <i>l</i> (<i>è</i>) / <i>-n</i> (<i>tù</i>), ^[VV] - <i>t</i> (<i>è</i>) / <i>-n</i> (<i>tù</i>)	144 (227?) ⁵
<i>kè/-</i> (sg. only)		120

⁵ Pairault's data contain many nouns, the determiners of which are not mentioned. This is often the case for nouns ending in sg. *-l* / pl. *-n* (or sg.-only *-l*) that presumably belong to gender *lè/tù* or to singular-only class *lè/-*.

End of Table 2

Class / gender determiners	Main final segments in nouns (mostly historical suffixes) and realisation of determiner	Lexical tokens
<i>kò</i> /– (sg. only)		69
<i>lè</i> /– (sg. only)		36 (67?)
–/ <i>kì</i> (pl. only)		35
–/ <i>tò</i> (pl. only)		17
<i>lè</i> / <i>kì</i>	^[VI] - <i>l</i> (<i>lè</i>) / – <i>n</i> (<i>kì</i>) ~ – <i>tè</i> [<i>kì</i>], ^[VV] - <i>l</i> (<i>è</i>) / – \emptyset (<i>kì</i>)	9
<i>mè</i> / <i>kì</i>	^[VI] - <i>m</i> (<i>mè</i>) / –(<i>n</i>) <i>Ri</i> ~ <i>e</i> (<i>kì</i>) ^[VV] - <i>m</i> (<i>è</i>) /	7
<i>kò</i> / <i>tò</i>		4
<i>mè</i> /– (sg. only)		4
<i>sò</i> / <i>mè</i> ?	?/– <i>m</i> (<i>mè</i>)	2
–/ <i>mè</i> ? (pl. only)		1
<i>kí</i> / <i>mò</i>	?/– <i>m</i> (<i>mò</i>)	1
<i>kè</i> / <i>mò</i>	?/– <i>m</i> (<i>mò</i>)	1
Unknown		236 (122?)
Total		1258

As may be observed, the sound correlation between the final segments/suffixes and the determiners is clear and regular in the cases of sg. –*l* and *lè*, pl. –*n* and *tò*, sg. –*m* and –*mè*, and pl. –*Ri*~*e* and *kì*, which represent the most conservative — and morphologically stable — classes / genders. By contrast, sg. *kè* mostly agrees with noun final –*a*, –*ε* or –*e* but also with a final consonant (–*N* for –*m*, –*n*, –*ñ*, –*ŋ* or –*C*

for *-k*, *-p*, *-r*, *-s*, *-t*, *-ʈ*, *-y*), more rarely with a final back vowel (*-ɔ*, *-u*, *-ʊ*). Sg. *kò* mostly agrees with a back vowel (*-ɔ*, *-o*, *-ʊ*, *-u*) but very often also with an *-a* (just like *kè!*), and sometimes with a consonant (*-m*, *-ŋ*, *-p*). As for pl. *kì*, it mainly agrees with the final vowels *-e* or *-i* (rarely *-o* or *-u*) but also with the same final consonants as sg. *kè* or *kò*. As already mentioned, classes *kè*, *kò*, and *kì* — as well as resulting genders *kè/kì* and *kò/kì* — turn out to be the most active and changing ones, possibly involving historical class/gender shifts and obviously welcoming items of foreign / recent origin.

In relation to Kulaal's forms, we distinguish two groups of Bua languages that are illustrated here as follows (see the map on Figure 1):

- Group A: Zan Gula, Fanya, and Kulaale⁶
- Group B: Lua, Bon Gula, and Bolgo

The argumentation developed in the coming §4 and §5 refers to the comparative series (CS) displayed in the Appendix and presenting noun forms usually paired by number 'sg. / pl.'. Note, however, that the vestigial classes/genders **?/*-b/ʃ/w(V)*, **?/*-m₂*, and **?/*-m₃* (see BKKL 2018: 103) are not treated in this paper. As for the vowel raising – or Umlaut –, it will not be mentioned any further and its presence is omitted in the reconstructed class/gender forms cited below but reintroduced (as {/}) in Table 11 at the end.

4. Group A languages

The general assumption is that these languages underwent a process of stacking and fixation (or lexicalization) of a former postposed agreement element similar to the present-day determiners of Kulaal. As a result, establishing regular correspondences in the noun morphology requires comparing the current suffixes of languages not with the mere suffixes of Kulaal, but with the different sequences of suffix+determiner that may be observed in that language.

⁶ We preserved here the two names Fanya and Kulaale in relation with two distinct sources that most probably refer to the same language (see Appendix).

However, if the correspondences are obvious in certain cases, they are more disputable in other ones. The different situations will be commented below according to the different classes.

4.1. Class **-l̥lɛ* (sg.)

As illustrated in CS 1-7 and 12-13, Group A languages display complementary sequences of the ^[V]*-llɛ* or ^[VV]*-lɛ* type⁷ that parallel the complementary Kulaal ^[V]*-l* (*l̥*), ^[VV]*-l* (*ɛ̃*), or ^[VV]*-t̥* (*ɛ̃*) realizations. In both cases the complementarity is conditioned by the fact that geminated or, respectively, sequences of the same consonants are excluded in the context of a preceding long vowel. However, Group A languages contravene this principle in CS 8-9 and 14-15 (Group A ^[V]*-lɛ* = Kulaal ^[V]*-l* *l̥*). These series then behave in an irregular way that is unexplained so far.

Reflexes of **-l̥lɛ* are illustrated in CS 10.

4.2. Class **-n̥d̥u* (pl.)

Similarly, Group A languages have complementary sequences of the ^[V]*-CCu* or ^[VV]*-Cu* type⁸ paralleling Kulaal ^[V]*-n̥-t̥ù* and ^[VV]*-n̥-t̥ù* (CS 1–6). Again, most Groupe A languages are irregular in having an unexplained single consonant after a short vowel (^[V]*-Cu*) in CS 8-9.

Reflexes of **-n̥d̥u* are illustrated in CS 11. Note that in some cases, both **-n̥d̥u* and **-l̥ki* may represent, according to languages, the historical plural of a singular **-l̥lɛ* (CS 3, 13, and 15, for Kulaal and Group A languages, at least).

4.3. Class **-m̥mɛ* (formally sg.)

CS 16-17, 19, and 21–24 illustrate correspondences of Kulaal sequences ^[V]*-m* (*m̥*) and ^[VV]*-m* (*ɛ̃*) with Group A languages forms of the ^[V]*-mi/e*

⁷ The actual vowel reflexes vary between *ɛ* and *e*. Zan Gula *d* and Fanya-Kulaale *r* usually correspond to Kulaal *t̥* (CS 6-7); most probably the historical class should be characterized with two complementary forms, i.e. **-l̥lɛ* and **-d̥dɛ*.

⁸ *-CC-* may represent *-nm-*, *-ɲɲ-*, *-ll-*, *-nd-*, or *-nd̥-*. *-C-* may represent *-l-*, *-r-*, or *-t̥-*. The vowel is *u* or *ɔ* (Zan Gula, Kulaale) and *u* or *o* (Fanya).

or ^[VV]-*mi*/*e* type. Although no case of geminated *-mm-* is attested here (except for Fanya in CS 19 and the problematic Kulaale *tómmú* in CS 22), we assume that the final vowel *-i/e* again results from the historical fixation of a former determiner similar to the Kulaal one (*mè~è*). The same probably holds for CS 20 and 22–23 although no cognate form is attested in Kulaal.

Reflexes of **-m₁mɛ* are illustrated in CS 27.

4.4. Class **(m₁-)ri₁ki* (formally pl.)

CS 17–18 and 25 show that the Kulaal sequences *-ṭi* (*kì*) and *-(n)ṭe* (*kì*) correspond to Zan Gula *-dey* or *-ḍey* (no attestation is available for the two other Group A languages, Fanya and Kulaale). We assume here that Zan Gula *-de-* or *-ḍe-* is cognate with the Kulaal suffix *-ṭi* or *-(n)ṭe* while the final vowel *-y* is cognate with the Kulaal determiner *kì*. If, as is likely, the historical determiner itself contained a velar stop (**ki*), the evolution towards Zan Gula *-y* entails a total lenition of this consonant, a sound change that will be confirmed, as a result of historical stacking, for all historical determiners containing a velar stop, i.e. **kè*, **kò*, and **kì* (see below).

Reflexes of **(m₁-)ri₁ki* are illustrated in CS 28. In several cases (CS 18 and 24–25 but also other instances like *fām* (*mè*) / *fòṭi* (*kì*) ‘milk’, *fôm* (*mè*) / *fòrè* (*kì*) ‘flour’, as well as plural-only *èḗṭé* (*kì*) ‘tears’, *hàrè* (*kì*) ‘cuvée’ (= must + marc), and *túntè* (*kì*) ‘dregs of must (malt drink)’), a nasal feature — vowel or consonant *n* — shows just before the Kulaal suffix *-ṭi/e*, suggesting that the latter may have been added — rather than substituted — to the sg. prefix *-m*. Hence the reconstruction of this class as **(m₁-)ri₁ki*.⁹

⁹ This peculiar plural formation is a strong argument for considering the historical **m₁mè* ‘mass / abstract’ noun class not as a singular but as a *trans-numeral* class, originally constituting a *single class* gender.

4.5. Class **-A_ke* (sg.)

In CS 29–33, Zan Gula and Kulaale (no cognate is attested for Fanya) mostly display *CV(V)Ca* forms that correspond to the bare noun in Kulaal, i.e. *CV(V)Ca* without the determiner *kè*. However we cannot exclude that, in some cases at least, historical stacking also happened with class **-A_ke*: in CS 34–35, Kulaale forms with final long vowels *CVCa:* could result from the integration of a former **ke* determiner after the loss of the velar stop. In CS 36 also the trace of the same determiner would show up, with possible assimilation to and gemination of the root final consonant (suffix?) *-m*, in forms of the *nam(m)e/ε* type. Finally CS 37 Kulaale *kɛ̀ɛ̀bè* clearly preserves a vocalic trace of the determiner **kè*.

Reflexes of **-A_ke* are illustrated in CS 38.

4.6. Class **-U_ku* (sg.)

In CS 40–47 again, Group A languages display forms (*CV(V)Cu/o/ɔ/a*) that are chiefly parallel to the Kulaal nouns without the determiner *kù*. But once again a velar element (*-w* or *-u*) may show in cases where the Kulaal noun ends with an *-ε*, an *-a*, or a consonant (CS 48–51): 48 Kulaale *hwè:w* ‘moon’, 49 Zan Gula *rā́áw* and Kulaale *rā́w* ‘sky, rain’, 50 Zan Gula *aaw* ‘grass’ (but 52 Zan Gula *láá* and Kulaale *lá:* are counterexamples), 51 Zan Gula *sā́ábù* ‘wind’. We assume that these segments are reflexes of the determiner **ku*, the initial velar stop of which was lost.

Reflexes of **-U_ku* are illustrated in CS 53.

4.6. Class **-U_ke* (sg.)

The few illustrations of presumed reflexes of a **-U_ke* class are illustrated in CS 54–57. Fanya data are missing and Zan Gula examples are too limited to be reasonably commented. But Kulaale nouns consistently display a final syllable *-wε* that clearly parallel the Kulaal *kè* determiner: *hyàwwè* ‘dog’, *ɲúwè* ‘bird’ (no Kulaal cognate available), *hyǔ:lwè* ‘guinea fowl’, and *búwè* ‘goat’.

Reflexes of **-U_ke* are illustrated in CS 58.

4.7. Class **-I_ki* (pl.)

Illustrations of this class are numerous since it works as a plural class in the four genders **-I_ɛ/*-I_ki* (CS 12–15), **-A_kɛ/*-I_ki* (CS 29–37), **-U_ku/*-I_ki* (CS 40–50 and 52), and **-U_kɛ/*-I_ki* (CS 54–57). Fanya is poorly illustrated with CS 12, 14, 36, and 47 that deserve the same comments as the similar Kulaale forms (see below).

Kulaale may display forms that are similar to the Kulaal bare noun — i.e. they do not reveal any clear trace of the **ki* determiner, e.g. CS 30 *hỹ̀ð̀:bè*, 44 *wéllé*, or 47 *?úwé* — but in several cases a final palatal element may show up as in CS 14 *nây*, 36 *nyõmmì*, 37 *kũ̀bì*, or 57 *búyì* (other examples in CS 40 and 48; the analysis of 54–56 is uncertain). Most probably these palatal segments have to be taken as reflexes of the **ki* determiner after elision of the velar stop. The final vowel length in CS 34 *bòlè:* and 35 *hyèlè:* might call for the same explanation (see comment concerning the parallel singular forms in §4.5).

As for Zan Gula forms, they nearly systematically display a final *-y* or *-i* that is evidence of the historical presence of **ki*, e.g. CS 13 *maay*, 29 *korey*, 36 *nyomi*, 40 *tuy*, or 57 *bii*. Exceptions are limited to CS 41 *jili* and 56 *suuli* (both contrasting with 42 *tukiy*).

Reflexes of **-I_ki* are illustrated in CS 39. Remember that reflexes of the same historical determiner **ki* have also been commented on the occasion of class **(m_)-ri_ki* above.

4.8. Historical stacking and **kV* type determiners

Regardless of limited exceptions or irregularities, historical stacking may be viewed as a general explanation for the Group A reflexes of determiners **ɛ*, **mɛ*, and **du*. In the case of **kɛ*, **ku*, and **ki* on the other hand, indications of historical stacking are often absent, and one may doubt whether the process occurred systematically. It is useful, however, to look into the precise contexts and conditions where reflexes of the historical determiner may be detected. The following remarks can be made.

1. Reflexes of **kε* always have the form *-(C)e/ε/a* (perhaps also lengthened *-a:?*) (in case of class **-A_kε*), or *-wε* (for class **-U_kε*). Reflexes of **ku* show as *-w* or *-u* (maybe also *-o* in CS 47?). Lastly reflexes of **ki* have the form *-y*, *-i*, *-(m)i*, or *-yi* (perhaps also lengthened *-e:?*). In other words, after occupying a stable intervocalic position as a consequence of historical stacking, the original voiceless velar stop **k-* of the determiner is sometimes assimilated or weakened (*-(m)e/ε/a*, *-wε*, *-(m)i*, *-yi*) but, in most cases, totally lost, a phonetic change that is not infrequent cross-linguistically.

Indeed, a quick search on the Web showed that a regular loss or deletion of intervocalic *-k-* is attested in such various languages as Sanskrit (Pant 2000: 356) or Prakrit (Ollett 2016: 136), in the Papua New Guinea languages Manambu (Aikhenvald 2008: 56) or Kyaka (Franklin 2016: 145), in Turkish (Sanders 2003: 202-207), and in the Oapan variety of Nahuatl (Amith n.d.: 2). Moreover, the historical change **-k- > ∅* (through a likely path **k- > h- > ∅*) is typical of several “Sara” languages of Southern Chad (Sar, Mbay, Ngambay, 'Bejond, Kaba of Paoua, Northern and Central 'Dem) that are spoken in the neighbourhood of the Bua Group (Boyeldieu, Nougayrol & Palayer 2006).

Focussing more precisely on Adamawa-Gur, *-k-* deletion is attested in the nominal suffixes of Kusuntu, a Gurunsi language of Togo: two series of class agreement markers, namely 1. *kù*, *-kù*, *kú-*, *ku-*, *-kà*, and 2. *kà*, *-kè*, *ká-*, *ka-*, *-kà* (= Subject pronoun, Object pronoun, Demonstrative, Determiner, Adjective concord), correspond to nominal suffixes 1. *-ô* or *-ôd*, and 2. *-à* or *-∅* respectively (Kleinewillinghöfer n.d.). In Vere, an Adamawa language of Nigeria/Cameroon, noun suffixes of class K are represented by *-k* or *-kp*, as well as by *-a* or *-∅* according to the lexical unit (Kleinewillinghöfer 2018). Similarly, the class K noun markers of Waja (Adamawa, Nigeria) are represented either by *-gù* or by *-ù* depending on the noun (Kleinewillinghöfer 1996: 29). These last cases are significantly reminiscent – both phonetically and functionally – of the situation that may be observed in the Bua languages of Group A.¹⁰

¹⁰ The present argumentation is based on the assumption that the historical determiners under discussion have to be reconstructed with an initial *voiceless*

2. Traces of a historical determiner usually appear in contexts where they contrast with a preceding segment, namely as a vowel after a consonant (e.g. CS 36 *-mɛ / -mi*, 51 *-bu*), or as an approximant following a vowel (e.g. CS 14 *-ey/ai/ay*, 40 *-ow*, 48 *-ɛɹw*, 49-50 *-aaw*). Zan Gula final *-y* appears as the regular reflex of **ki* in nearly all series and it can follow any front, central or back vowel (e.g. CS 13 *maay*, 15 *ley*, 29 *korey*, 40 *tuy*, and even 42 *tukiy*).

3. The traces of historical stacking look rather random in relation with series and languages, which makes it difficult to confidently identify cases where stacking *did not* take place. Considering that the determiner vowel often harmonized with the presumed suffix or final vowel of the noun — namely *-a*, *-ɛ*, or *-e* in the case of **-A_kɛ*, *-u*, *-o*, or *-ɔ*, in the case of **-U_ku*, and *-e* or *-i* in the case of **-I_ki* — it seems quite plausible that, after the loss of **k-*, the determiner vowel simply merged with the noun final vowel with which it came in direct contact. In such a scenario, historical stacking could have actually happened with every noun but not be detectable any more in many cases.

5. Group B languages

Although represented here by Lua, Bon Gula, and Bolgo only, Group B languages are more numerous and, with respect to the number marking of nouns, much more varied than the languages of Group A, a situation that results both from the diversity of marking devices and

velar stop (**kɛ*, **ku*, and **ki*), which is the most plausible hypothesis for now although it rests upon the evidence of Kulaal only. Now, the phonological analysis proposed by Pairault (1966: 422; 1969: 44) for this language might be debatable: while other Bua languages have, in the initial position, a phonological contrast */k-/ vs. /g-/* that is neutralized as *[-g(-)]* in internal and final position, Kulaal is described as having one only velar stop phoneme, */k/*, complementarily realized as *[k-]* and *[-g-]* (*[-g(-)]?*) (see also BKKL 2018: 65). In case the historical determiners proved to be better reconstructed with a *voiced* velar stop (i.e. as **gɛ*, **gu*, and **gi*) the hypothesis of a total lenition of the consonant, without being necessarily excluded, should at least be justified by different arguments.

from the fact that class/gender shifts as well as analogical morphological changes most probably occurred in many cases. While agreement is no longer functional in Zan Gula, Fanya and Kulaale, the three languages nonetheless remain close to Kulaal at least in their form. In contrast, Lua, Bon Gula and Bolgo look more distant and their affiliation to the current reconstruction of historical class markers is much more tentative.

Although these languages often look as if their number markers are better compared to the bare suffixes of Kulaal, some data nevertheless point to likely cases of historical stacking. They are examined in the present section.

5.1. Gender **-l_ɛ/*-n_du*

According to CS 1–2 and 7–8 Lua forms are mainly marked with *-l* or *-la* in the singular vs. *-ri* in the plural (CS 6 *núrí* might also represent a plural-only form). There is partial complementarity between sg. *-l* and *-la*: the latter appears only after closed vowels (*ɨ*, *u*). But the reverse is not true so that the *-la* form is not predictable. In addition comparative data clearly show that CS 4 *ʔán* / *ánngí* historically results from a former **ʔá:l* / *án-ngí*, CS 13 *má:n* from **má:l*, and CS 5 *sià:l* / *sè:l*, *sì:l* from **sià:l* / *sè:n*, *sìn*. Indeed, most Lua instances of a former **-l/-n* alternation have been subject to back formation and aligned with either the sg. or the pl. form (an exception is *bā:l* / *bā:m* ‘post, pole’, cp. Kulaal *páál* (ɛ) / *páán* (tù) ‘door post’). So, Lua has mainly three types of devices reflecting this gender, namely *-l/-n*, *-l/-ri*, and *-la/-ri*. Both *-la* and *-ri* suggest a process of historical stacking.

Bon Gula has mainly *-l/-n* alternations (CS 9, 13), with no trace of the determiners **ɛ/*du*. But CS 6 *nír* (a likely plural-only form) and the CS 3 plural variant *iiri* ‘face’ might represent reflexes of the whole formula **-n_du* and point to isolated cases of historical stacking (?).

Notwithstanding the vowel qualities *i* or *ɪ*, Bolgo has consistently *-l/-di*, *-l/-ndi*, *-l/-ri* (CS 1–2, 4, 8, 13, 15) or *-d/-di* (CS 6-7) when Kulaal has final/suffix alternations *-l/-n* or *-t/-n*, respectively. Con-

sidering that *-di* and variants are likely to represent reflexes of **-n₁đu* rather than the bare suffix **-n*, historical stacking would have systematically taken place in the plural forms — but not in the singular ones?

Reflexes of gender **-l₁le/*-n₁đu* are summarized in CS 10–11.

5.2. Gender **-m₁mε/*-(m₁-)ri₁ki*

CS 16, 18–19, 21 and 24 indicate Lua sg. *-m* or *-ma* that parallel the distribution of *-l* and *-la* above: the vowel *a* appears only in the context of a preceding high vowel (e. g. CS 18 *hímá* and, not illustrated here, *húmá* ‘milk’) but the reverse is not true (e.g. CS 19 *nīm*, CS 24 *sím* ‘smoke’). Plural forms (25–26) are commented below. Historical stacking might have occurred in the singular *-ma* forms.

Bon Gula reflexes of **-m₁mε* always have the form *-m* (CS 16–17, 22, 24) and plural shows as *-rε* (CS 18). No historical stacking is obvious. The form *-rke* (CS 25) is commented below.

Bolgo consistently has sg. *-m* (CS 16–17, 19–21, 22–24), and plural forms appear as *-ri* (CS 18, 26). Here also there is no indication of a historical stacking process.

The three languages display further plural forms of the *-rke* or *-rgi* type (CS 25–26, which in fact represent the only plural forms attested in Lua). Although it is not totally excluded that these sequences historically originated from the stacking of both suffix **-ri* and determiner **ki*, they more likely result from the suffixation of a later plural suffix **-gI?* that does not belong in the class system (BKKL 2018: 116–117).

Reflexes of gender **-m₁mε/*-(m₁-)ri₁ki* are summarized in CS 27–28.

5.3. Class **-A₁kε*

In the three languages, examples mainly show reflexes *-a* (Bolgo *-a/ʌ*) (CS 30–31, 33–35) or *-m* (CS 36) that are similar to the bare final / suffix of Kulaal.

However, unlike CS 36 *nàm*, final *-a* in Lua *cìbà* (CS 37) might be explained as a trace of the determiner **kɛ* (cp. the cognates Kulaal *kûp* (*kɛ̀*) and Kulaale *kûbè*). Remember that *CVCa* nouns reflecting both *-*lɛ* and *-*mɛ* classes above always contain a high vowel in the first syllable (*Ci/i/uCa*), a feature that could explain the clear Lua tendency to preserve a final *-a* as a reflex of historical determiners **lɛ* or **mɛ*. The same would then hold here, with *cìbà*, in the case of **kɛ*, a further *ɛ*-vowel determiner.

Reflexes of class *-*A_kɛ* are illustrated in CS 38.

5.4. Class *-*U_ku*

For Class *-*U_ku* also the languages usually display the same final as in the bare form of Kulaal, i.e. a back vowel (CS 40–43, 45, but no evidence in Lua), or *-a* (CS 47, 52), or a labial stop in Lua (CS 51). In 52, Bon Gula *yaako* or *yákò* suggests historical stacking (cp. Kulaal *lá* (*kò*)) but the case is isolated and its interpretation doubtful. Reflexes of class *-*U_ku* are illustrated in CS 53.

5.5. Class *-*U_kɛ*

The few presumed reflexes of a *-*U_kɛ* class are not coherent enough to deserve serious comment (see limited summary in CS 58).

5.6. Class *-*I_ki*

Lua and Bon Gula usually have a final *-i* or *-e* that is similar to the final / suffix vowel of Kulaal (CS 31, 33–35, 41–42, 47, 56). Bolgo has mainly *-in* (CS 29–30, 33–34, 41, 56?), the origin of which is unknown. Specific comments are as follows.

— In Lua, CS 31 *kiāngō* / *kīngō* is apparently suffixed both in the sg. and in the pl.; CS 36 *nàm* and 37 *cìbì* display the same contrast as the corresponding singular forms, *nàm* and *cìbà*: only the latter seems to reflect the historical determiner, here **ki*; CS 48 *pūngī* includes a plural suffix (cp. CS 4, 16, and 25–26 above).

— Bolgo CS 36 *ɲɛmí*, unlike other languages, displays a final *-i* that suggests historical stacking.

— In CS 54 the plural forms of the three Group B languages, ending with *-w/u*, do not show any trace of historical stacking.

Reflexes of Class **-l_ki* are illustrated in CS 39.

5.7. Stacking or not stacking?

To summarize what we can say about Group B languages, there are serious hints for recognising certain cases of historical stacking (in particular Lua *-ri* and Bolgo *-d/ri* as reflexes of plural class **-n_dú*, and probably Lua *-la*, *-ma*, and *-a* as non-systematic reflexes of the three singular classes **-l_ɛ*, **-m_mɛ*, and **-A_kɛ*). A few further, isolated cases have been mentioned but at least for the time being, and unlike what was said of Group A languages, there are no reasons here to think that historical stacking applied systematically, even with effects that are no longer perceptible. In fact, Group B languages require a thorough analysis where every comparative series will be treated and analyzed case by case, with respect to the different devices displayed by each language.

6. Conclusion

The essential consequences of the preceding remarks are as follows.

1. The classes and genders as reconstructed in BKKL (2018) have to be reduced in number (see Table 11):

- i) there are no distinct singular classes **-l* and **-lɛ* but only one and the same class **-l_ɛ*;
- ii) the two “complementary” genders **-lɛ/*-rU* and **-l/*-n* are one and the same gender **-l_ɛ/*-n_dú*;
- iii) lastly, the former **-l/*-rI* gender, whose evidence was essentially based on the plural forms *-ri* and *-d/ri* of Lua and Bolgo, is itself identified as **-l_ɛ/*-n_dú*.

2. In the current situation we assume that the phonic and morphological material that historically generated the sequences observed in

the present-day languages was the same as in today's Kulaal. This is obviously questionable but also unavoidable in this first step.

Nevertheless, we can at least show that the representativeness of the different classes/genders was not the same. Table 3 calculates the number of currently identified CS according to the classes/genders involved. Even if the numbers are rather approximative (they include some poorly illustrated series as well as some cases of class/gender shifts), they give a rough idea of the relative frequency of the different types at a proto-Bua stage.¹¹

Table 3

**Representativeness of identified classes/genders
in the current proto-Bua CS database**

sg.	/	pl.	nb. of CS
*-A_kɛ	/	*-I_ki	22
*-U_ku	/	*-I_ki	28
*-l_lɛ	/	*-n_du	65
*-l_lɛ	/	–	6
*-m_l mɛ	/	*-(m_l-)ri_ki	14
*-U_kɛ	/	*-I_ki	5
*-l_lɛ	/	*-I_ki	3
Total			143

Table 2 showed that most frequent genders of Kulaal are *kò/kì*, *kɛ/ki*, and *lɛ/tù* (respectively 332, 240, and 144 (227?) tokens out of a total of 1022 (1136?) nouns with identified determiners). In contrast, proto-Bua **l_lɛ/*-n_du* was markedly predominant. Indeed, present-day *kò/kì* and *kɛ/ki* represent the most (the only?) active genders of Kulaal, which namely work as reception genders for recently borrowed items (see §2).

¹¹ Class **-l_lɛ/–* represents singular-only CS whose plural is unknown. Gender **-m_l mɛ/*-(m_l-)ri_ki* represents CS whose identity is unambiguous but whose actual reflexes are mostly either singular or plural.

3. Regarding noun class morphology, Kulaal, Zan Gula, and Fanya/Kulaale clearly represent the closest and most consistent subgroup within the Bua languages. Interestingly this situation conforms with the lexical distances calculated by Raimund Kastenholtz (Kastenholtz 2017: 2; BKKL 2018: 60). Furthermore the four languages occupy a central position in the Bua geographical area, around which outer languages, such as Lua, Bon Gula, and Bolgo display more altered and more diversified reflexes of the historical noun morphology, a development that was perhaps favoured by their direct contact with languages from other families (in particular Eastern Chadic, Central Sudanic (SBB), as well as the isolate Laal).

Appendix Lexical Comparative Series

Table 4

Languages and sources

	Kulaal	(Pairault 1966; 1969; unpubl. doc.)
A	Zan Gula	(Sauer & Sauer, unpubl. doc.)
	Fanya	(Khalil, unpubl. doc.)
	Kulaale	(Lionnet, unpubl. doc.)
B	Lua	(Boyeldieu 1985, unpubl. doc.)
	Bon Gula	(Roberts 2004; 2010)
	Bolgo	(Kastenholz 2017)

Table 5

Reflexes of gender **-l_ɛ/*-n_du*

	1. ‘knee’	2. ‘tongue’	3. ‘eye’	4. ‘neck, nape, throat’	5. ‘antelope sp.’	6. ‘liver, (heart)’	
Kulaal	yúl [lɛ̃] / yún [tò]	lìl (lè̃) / lìn (tò̃)	ííl (è̃) / íí(n) (tò̃)	áál (è̃) / áán (tò̃)	hèèl (è̃) / hèèn (tò̃)	néét (è̃) / néén (tò̃)	
A	Zan Gula	rùllé / runnu	lìllé / linnú	ííllé / ijnu, iju	áállé	sèèllé / sèèrù	niide / niiru
	Fanya	rùllè / rùndù	lìllè / lìllù	ííllè / (iyē) ¹²	āllè / ārū		nīrē / nīrù
Kulaale	rúllé / rúndú	lìllé / línqó	rélè / rélù	rállé / rárù	hyè:lè / hyè:rù	nírè	

¹² The Fanya plural form iyē is a reflex of **-l_ki* (cp. gender **-l_ɛ/*-l_ki* in Table 6).

		1. 'knee'	2. 'tongue'	3. 'eye'	4. 'neck, nape, throat'	5. 'antelope sp.'	6. 'liver, (heart)'
B	Lua	(NL var. <i>ndúl</i>)	<i>ndílá</i>	<i>(jí)</i> (pl.?)	<i>ʔán / ánnǵí</i>	<i>sìàl / sè:l, sùl</i>	<i>nírí</i> 'heart' (pl.?)
	Bon Gula		<i>líl</i>	<i>iíl / (íí 'eyes'), iiri 'face'</i>			<i>nír</i> (pl.?)
	Bolgo	<i>rúl / rúdí</i>	<i>le(:)l / ledi</i>	<i>gíl ~ gùl / (gī)</i>	<i>a:n ~ a:l / andi</i>		<i>ned / nedi</i> 'heart'
		7. 'body'	8. 'head'	9. 'skin'	10. Class *-l_ɛ	11 Class *-n_ɗu	
	Kulaal	<i>yòò(t) (è)</i>	<i>húl (lè) / hún (tò)</i>	<i>ól (lè) / ón (tò)</i>	^{[V]-l (lè), [VV]-l (è), [VV]-t (è)}	<i>-n (tò)</i>	
A	Zan Gula	<i>roude</i>	<i>súlé / súrú</i>	<i>úllé / unnu</i>	<i>-lle, -le, -lle, -le, -de, -de</i>	<i>-ru, -ro, -nnu, -nnu, -nu, -jɣu</i>	
	Fanya	<i>lūrè</i>	<i>hìlè / sīlù</i>	<i>ūlè / ūrū</i>	<i>-lle, -le, -le, -re</i>	<i>-ru, -ro, -llu, -lu, -ndu, -ndo</i>	
	Kulaale	<i>lòrè</i>	<i>hílé / hírú</i>	<i>ʔólé / ʔórú</i>	<i>-lè, -llé, -llè, -lè, -rè</i>	<i>-rò, -rò, -rò, -lù, -lò, -ndú, -rò</i>	
B	Lua	<i>ndúlá / ndórí</i>	<i>súl / súrí</i>		<i>-l, -la, (*)-n, (*)-na</i>	<i>-n, -ri</i>	
	Bon Gula	<i>ro / rei</i>	<i>hul</i>	<i>ol / on</i>	<i>-l, -r</i>	<i>-n</i>	
	Bolgo	<i>lōr ~ lōd / lodi</i>	<i>súl, súl / súdí</i>		<i>-l, -d, -r</i>	<i>-di, -di, -ndi, -ri</i>	

Table 6

Reflexes of gender *-l₁ɛ/*-l₁ki (var. *-l₁ɛ/*-n₁du)

	12. 'tooth'	13. 'breast'	14. 'foot, leg'	15. 'sorghum, millet (generic)'
	Kulaal <i>nèèl</i> (ɛ) / <i>nèè</i> (kì)	<i>máál</i> (ɛ) / <i>móó</i> (kì)	<i>nál</i> (lè) / <i>nó</i> (kì)	<i>lèl</i> (lè) / (<i>làà</i> (n) (<i>tò</i>))
	Zan Gula	<i>máálé</i> / <i>maay</i>	<i>nélé</i> / <i>ney</i>	<i>lale</i> / <i>ley</i>
A	Fanya <i>nūlè</i> / <i>nīyè</i>	<i>mā:lē</i> / (<i>mā:rō</i>)	<i>nālè</i> / <i>nāi</i>	
	Kulaale <i>nūlè</i> / <i>nūè</i>	<i>má:lé</i> / (<i>má:rú</i>)	<i>nālè</i> / <i>nây</i>	<i>làlè</i> / (<i>làrò</i>)
	Lua	<i>mā:n</i>		<i>yà</i> / <i>yè</i>
B	Bon Gula <i>nir</i> 'molaire'	<i>má(:)l</i> / (<i>mú(:)n</i>)		<i>lâl</i>
	Bolgo <i>nīl</i> / <i>nūi</i>	<i>mál</i> / (<i>mλdɪ</i>)	<i>na(:)l</i> / <i>nλɪ</i>	<i>yàl</i> / (<i>yλrì</i>)

Table 7

Reflexes of gender *-m₁mɛ/*-(m₁-)ri₁ki

	16. 'beer, alcoholic drink'	17. 'water'	18. 'blood'	19. 'oil, fat'	20. 'milk'	21. 'sleep (noun)'
	Kulaal <i>hám</i> (mè) / <i>hótí</i> (kì)	<i>ím</i> (mè) / <i>ítè</i> (kì)	- / <i>hétè</i> (kì) (pl.)	<i>nóm</i> (mè) / <i>nótè</i> (kì)		<i>lòòm</i> (ɛ) (< verb <i>lòèè</i>)
	Zan Gula <i>sámí</i> (pl.) ¹³ [!?]	(<i>rida</i>) / <i>ridéy</i>	- / <i>sídéy</i> (pl.)	<i>nume</i>	<i>kērmī</i>	<i>lomi</i>

¹³ Translated as plural although it is a morphologically singular form.

		16. 'beer, alcoholic drink'	17. 'water'	18. 'blood'	19. 'oil, fat'	20. 'milk'	21. 'sleep (noun)'
A	Fanya			<i>hīmē</i>	<i>nummē</i>		
	Kulaale	<i>hyámí</i>	<i>ɾímí</i> /?	<i>hýmí</i>		<i>kérmì</i>	
B	Lua	<i>hám</i> / <i>hámngé</i>		<i>hímá</i>	<i>nēm</i>		<i>lóm</i> (< verb <i>lōy</i>)
	Bon Gula	<i>hám</i>	<i>ɾim</i>	- / <i>hure</i>			(<i>yom</i> verb)
	Bolgo	<i>sam</i> [<i>sām</i>]? / <i>semei</i>	<i>rím</i>	- / <i>sèrì</i>	<i>núm</i>	<i>kırım</i>	<i>lem</i> (< verb <i>léw</i>)

		22. 'ashes'	23. 'flour'	24. 'smoke'	25. 'urine'	26. 'saliva'	27. Class *-m ₁ -mē	28. Class *-(m ₁ -)ri_ki
	Kulaal			<i>héém</i> (è) / <i>héénté</i> (kì)	- / <i>héètè</i> (kì)		^[V] -m (mè), ^[V] -m (è)	-(₁)te (kì), -(₁)ti (kì)
A	Zan Gula	<i>tome</i>	<i>kūmé</i>	<i>siimu</i>	- / <i>súidéy</i>		<i>-mi, -me, -mu</i>	<i>-dey, -dey</i>
	Fanya				(<i>hǐnbè</i>)		<i>-me, -mmē</i>	?
	Kulaale	<i>tómmú</i>		(<i>hámilé</i> / <i>hámɾú</i>) ¹⁴	(<i>hǐnbè</i>)	(- / <i>hyáɾú</i>)	<i>-mi, -mmu</i>	?
B	Lua			<i>sím</i>	- / <i>ńúrgí</i>	- / <i>hǐrgí</i>	<i>-m, -ma</i>	<i>-r(-) ?</i>
	Bon Gula	<i>tom</i>		<i>sim</i>	- / <i>hírke</i>		<i>-m</i>	<i>-re</i>
	Bolgo	<i>tom</i>	<i>kòm</i>	<i>sém</i>	- / <i>ńúrgi</i>	- / <i>sáɾí</i>	<i>-m, (-m) ?</i>	<i>-ri</i>

¹⁴ CS 24: Kulaale results from a shift to *-*l*ɛ/*-*n* dú gender with preservation of the former suffix *-*m*;
CS 26: Kulaale plural-only form is itself a reflex of *-*n* dú.

Table 8

Reflexes of gender *-A_{kε}/*-I_{ki}

	29. 'giraffe'	30. 'fish'	31. 'monkey sp.'	32. 'mosquito'	33. 'scorpion'
Kulaal	<i>kàyà (kè) / kàyè (kì)</i>	<i>hààpá (kè) / hààpé (kì)</i>	<i>kéñà (kè) / kéñè (kì)</i>	<i>nòmá (kè) / nòmé (kì)</i>	<i>húútà (kè) / húútè (kì)</i>
A Zan Gula	<i>kara / korey</i>	<i>sāābà / soobey</i>	<i>kíjńá / kíjńéy</i>	<i>numa / numey</i>	<i>sóúđā / suudey</i>
Fanya					
Kulaale	<i>kàrà / kòrè</i>	<i>hỹǎ:bà / hỹǎ:bè</i>	<i>kíjńá / kíjńè</i>	<i>nòmù / nòmì</i>	<i>hyǎ:rà / hyǎ:rè</i>
B Lua	<i>(kuàrì / kòrì ?)</i>		<i>kiāngō / kíngō</i>		<i>sũ:rā / sũ:rĩ</i>
Bon Gula			<i>kijna / kijne, kujne</i>		
Bolgo	<i>(hàrá / herij ?)</i>	<i>sà:bá / sè:bíj</i>			<i>sòr / sorij</i>

	34. 'elephant'	35. 'hen'	36. 'meat, game, animal'	37. 'crocodile'
Kulaal	<i>pàlá (kè) / pàlé (kì)</i>	<i>hàlá (kè) / hàlé (kì)</i>	<i>ńám (kè) / ñóm (kì)</i>	<i>kûp (kè) / kûp (kì)</i>
A Zan Gula	<i>bālá / boley</i>	<i>silá / siley</i>	<i>nyēmé, ñāmé / nyomi</i>	
Fanya			<i>ñāmmè / ñōmmì</i>	
Kulaale	<i>đàlá: / ðòlè:</i>	<i>hyàlá: / hyèlè:</i>	<i>nyǎmmì / nyǒmmì</i>	<i>kǎbè / kǎbì</i>
B Lua			<i>ñám / ñəm</i>	<i>cibà / cìbì</i>
Bon Gula	<i>pàlá / pole</i>	<i>halá / hele</i>	<i>ñám / ñūm</i>	
Bolgo	<i>ḃɔl / ḃolij</i>	<i>sɛl, sɛl / sɛli</i>	<i>ñám / ñemí</i>	

		38. Class *-A_ke	39. Class *-I_ki
	Kulaal	-a (kè), -C (kè)	-e (ki), -i (ki), -o (ki), -u (ki), -C (ki)
A	Zan Gula	-a, -Cε	-ey, -ey, -iy, -uy, -i, -Ci
	Fanya	-Ce	-e, -iye, -Ci
	Kulaale	-a, -a, -Ca	-e, -e, -ε, -I, -uy, -ey, -Ci
B	Lua	-a, -C, -Ca	-i, -C, -Ci
	Bon Gula	-a, -C	-e, -C
	Bolgo	-a, -A, -∅	-i, -iŋ, -Ci

Table 9

Reflexes of gender *-U_ku/*-I_ki

	40. ‘ear’	41. ‘horn, (whistle)’	42. ‘arm’	43. ‘beehive’	44. ‘fox, jackal’	45. ‘backbone’	
	Kulaal	tó (kù) / tí (kì)	ílú (kù) / ílí (kì)	tókú (kù) / tíkí (kì)	fóólò (kù) / fóólè (kì)	wélís (kù) / wélé (kì)	tùrò (kù) / tùrè (kì)
A	Zan Gula	tō / tuy	jílú / jili	tókú / tukiy	fɔɔɔ / fɔɔey	welɔ / welley	diiro / diirey
	Fanya						
	Kulaale	tó / tíykè			hɔɔnɔ / hɔɔnyɪ	wélís / wélé	
	Lua	(túlā / tórī) ¹⁵					

¹⁵ Lua *túlā* / *tórī* most probably represents reflexes of gender *-I_ε/*-n_du.

		40. 'ear'	41. 'horn, (whistle)'	42. 'arm'	43. 'beehive'	44. 'fox, jackal'	45. 'backbone'
B	Bon Gula	tó ~ tó / tu	ilu / ili	tukɔ / tuki	hɔmɔ / hɔme		dirɔ
	Bolgo	tō / tōi	galu / gelin				
		46. 'knife'	47. 'bone'	48. 'moon, month'	49. 'sky, rain'	50. 'grass, straw'	
	Kulaal	kɛ̀ɛ̀mà (kù) / kɛ̀ɛ̀mè (kì)	úkà (kù) / úkè (kì)	fɛ̀ɛ̀ (kù) / fɛ̀ɛ̀ (kì)	yáá (kù)	áá (kù) / óó (kì)	
	Zan Gula	kīīmā / kīimey	īwā / uwey	fēē / fēy	rāáw	aaw / aay	
A	Fanya		īwō / úwé				
	Kulaale	kīmá / kīmé	?úwó / ?úwé	hwè:w / hè:y	rā:w	(?á:lò) / ?á:y	
	Lua			pīā: / pīngī			
B	Bon Gula		owa / uwe			á	
	Bolgo		(ógol / ɔgrɪ ?)	héù			
		51. 'wind'	52. 'fire'		53. Class *-U_ku		
	Kulaal	hààp (kù)	lá (kù) / ló (kì)		-u (kù), -o (kù), -ɔ (kù), -ɛ (kù), -a (kù), -C (kù)		
	Zan Gula	sāábù	lāá		-u, -o, -ɔ, -ɛ, -a, -aw, -Cu		
A	Fanya				-o ?		
	Kulaale		lā: / lā:		-o, -ɔ, -ow, -ɛw, -aw		
	Lua	sà:b, sà:w	lā: / lā:		-a, -C		
B	Bon Gula		yaako, yáku		-u, -o, -ɔ, -a, (-ko !?)		
	Bolgo	(= sãb 'dark sky, clouds?')	lá [lā: ?]		-u, -o, -ɛu		

Table 10

Reflexes of gender *-U_KE/*-I_KI

	54. 'dog'	55. 'bird'	56. 'Guinea fowl'	57. 'goat'	58. Class *-U_KE	
	Kulaal	<i>hàò (kè) / hòì (kì)</i>	<i>hóúli (kè) / húúli (kì)</i>	<i>póò (kè) / píú (kì)</i>	<i>-u (kè), -i (kè)</i>	
	Zan Gula		<i>suulo / suuli</i>	<i>būù / bii</i>	<i>-u, -o</i>	
A	Fanya					
	Kulaale	<i>hyàwwè / hyòwwì</i>	<i>ɲúwè / ɲúì</i>	<i>hyǔ:lwè / hyǔ:lì</i>	<i>ḃówè / ḃúyì</i>	<i>-Vw(w)ɛ, (-lwe ?)</i>
	Lua	<i>sàw / sèw</i>	<i>sūlā / sūlī</i>	<i>buà y / bù</i>	<i>?</i>	
B	Bon Gula	<i>haw / how</i>	<i>holu / huli</i>		<i>-u, w ?</i>	
	Bolgo	<i>sāò / sèù</i>	<i>ɲiw</i>	<i>(= só:rò / só:rìŋ?)</i>	<i>ḃō / ḃī</i>	<i>-o, w ?</i>

Table 11

Successive attempts of reconstructing Proto-Bua classes and genders

Boyeldieu 1983-2014

sg.	pl.
<i>*-a</i>	<i>*-(ʼv)-i</i>
<i>*-u</i>	<i>*-(ʼv)-i</i>
<i>*-l</i>	<i>*-n</i>
<i>*-l</i>	<i>*-ri (*-di ?)</i>

BKKL 2018

sg.	pl.	Comments
<i>*-A</i>	<i>*{'}-I</i>	
<i>*-U</i>	<i>*{'}-I</i>	
<i>*-l</i>	<i>*-n</i>	complementary to <i>*-lE/*-rU</i>
<i>*-lE</i>	<i>*-rU</i>	complementary to <i>*-l/*-n</i> , includes body parts
<i>*-l</i>	<i>*{'}-rI</i>	

Current proposal 2020

sg.	pl.
<i>*-A_KE</i>	<i>*{'}-l_ki</i>
<i>*-U_ku</i>	<i>*{'}-l_ki</i>
<i>*-l_KE</i>	<i>*-n_du</i>

End of Table 11

Boyeldieu 1983-2014	
sg.	pl.
*-m	*-ri (*-di ?), *-ri (*-di ?) ?
–	–
–	–
–	–
*---	*-m
–	–

BKKL 2018		
sg.	pl.	Comments
*-m ₁	*{'}-rI (*{'}-m ₁ -rI?)	exclusively masses and liquids
*-wε	*{'}-I	includes animals
*-lE	*{'}-I	'tooth', 'eye', 'breast', 'foot/leg', 'back', 'belly'
*?	*-b/ɓ/w(V)	vestigial — human beings, kinship terms
*?	*-m ₂	vestigial — kinship/ relational terms
*?	*-m ₃	vestigial — 'thing', 'place'

Current proposal 2020	
sg.	pl.
*-m ₁ mε	*{'}-(m1-)ri_ki
*-U_kε	*{'}-I_ki
*-l_lε	*{'}-I_ki
*?	*-b/ɓ/w(V)
*?	*-m ₂
*?	*-m ₃

[(^hv), {^h}] = raising of the root vowel]

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