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The Bua Group noun class system: Looking for a historical interpretation

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1. The Bua languages - Presentation

Geographical situation (see Map 1)
Inventory
Documentation (and limits)
Easternmost Adamawa languages

2. Reconstructing the noun class system

The 2018 attempt and its limits (see Table 9):
"[…] 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 Kastenholz, 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." (Boyeldieu, Kastenholz, Kleinewillinghöfer & Lionnet, henceforth PB, RK, UK & FL 2018: 79)

Genders **-l/*-n* and **-lE/*rU* in complementary distribution according to languages (PB, RK, UK & FL 2018: 103).

Not satisfactory. Looking for a better understanding of the historical system and its development.

Kulaal being the only class noun Bua language, i.e. with active class agreement, it is also considered as the best representative of the proto-Bua class system.

2. Kulaal noun number marking and class agreement

If we except some rare cases of invariable forms (e.g. *tɛ̀m (kɛ̀)* /pl. *tɛ̀m (kì)* 'African misteltoe, *Loranthus sp.*', *pɔ̀rɔ̀àsíí (kɛ̀)* /pl. *pɔ̀rɔ̀àsíí (kì)* 'type of pot'), nouns are marked for number by the 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.[5] As illustrated in (1) this *Umlaut* is sometimes the only one device involved, i.e no suffixation is present. Note that, in accordance with Pairault (1966, 1969), the transcription of nouns in isolation is followed by their agreement determiner in parentheses (see below).

(1)	kʊ̂ùp (kɛ̀)	/pl.	kʊ́ʊ̀p (kì)	'crocodile'
	lɔ̀ɔ̀m (kɔ̀)		lɔ̀ɔ̀m (kì)	'*Parkia biglobosa*' (tree)
	mààtí (kɛ̀)		mɔ̀ɔ̀tí (kì)	'throwing knife'
	hírɪ́kɛ̀ (kɛ̀)		hírɪ́kɛ̀ (kì)	'pagne, women's cloth'
	ŋàñ (kɛ̀)		ŋɔ̀ñ (kì)	'chief, headman'
	kórɔ̀ɔ̀m (kɔ̀)		kúrɛ̀ɛ̀m (kì)	'watchtower'

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

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[5] Pairault (1966: 422; 1969: 44-46) presents the Kulaal vowel system as contrasting */i, ɪ, e, ɛ, a, ɔ, o, ʊ, u/*, augmented with two correlations of length and nasality, the nasal contrasts being, however, limited to */ɐ, ą, ǫ/*.

ii.) The plural form may be marked by alternating final segments that have the nature of a suffix (and may be *Ø*). This device more frequently works alone, i.e. without *Umlaut*, as in (2):

(2)	hààpá (kɛ̀)	/pl.	hààpé (kì)	‘fish’
	mórù (kʊ̀)		mórì (kì)	‘*Clarias sp.*’ (fish)
	wál (lɛ̀)		wán (ṭʊ̀)	‘gourd, flask’
	lɔ̀píl (lɛ̀)		lɔ̀pún (ṭʊ̀)	‘mud’
	nèèl (ɛ̀)		nèè (kì)	‘tooth’
	lòm (mɛ̀)		lòṭè (kì)	‘vegetable salt’

iii.) In most cases, however, the two processes, *Umlaut* and suffix, are combined, as in (3):

(3)	kɔ̀là (kɛ̀)	/pl.	kòlè (kì)	‘*Ficus thonningii*’ (tree)
	tààlʊ̀ (kʊ̀)		tʊ̀ʊ̀lì (kì)	‘molar’
	hɛ̀l (-ɛ̀)		hèn (ṭʊ̀)	‘African rock python’
	máál (ɛ̀)		móó (kì)	‘breast’
	hm̩̀m (mɛ̀)		hóṭí (kì)	‘beer’

Note that in the preceding examples (2-3) the alternating sg./pl. suffixes are easily identified as *-a/-e, -u/-i, -ʊ/-i, -l/-n, -ɪl/-ʊn, -l/-Ø*, and *-m/-ṭe~ṭi* according to cases. But there are no detectable suffixes in (1) where the final segments do not alternate. And what about such cases as in (4) below, where a former vocalic suffix possibly merged with a root vowel into an indivisible, short or long vowel phoneme?

(4)	há (kʊ̀)	/pl.	hó (kì)	‘year’
	tó (kʊ̀)		tú (kì)	‘ear’
	kǹ̩ǹ̩ (kɛ̀)		kǹ̩ǹ̩ (kì)	‘heron’
	kɛ́ɛ́ (kɛ̀)		kɛ́é (kì)	‘*Maerua angolensis*’ (tree)
	póʊ̀ (kɛ̀)		púù (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 (5):

(5)	kóóp (kɛ̀)	/pl.	kóóp (kì)	‘drinking metal cup’ (< Arabic)
	kúpúk (kʊ̀)		kúpík (-kì)	‘strip of woven cotton’ (< origin?)
	kásáás (kɛ̀)		kásées (kì)	‘bottle’ (< Arabic)
	ásèkàr (kɛ̀)		ásèkèr (kì)	‘soldier’ (< Arabic)
	mòntòlóós (kʊ̀)		pàntèlées (kì)	‘(european) trousers’ (< French)

iv.) Moreover, and as illustrated in the preceding examples, Kulaal has a system of agreement postposed 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 1 below summarises the organisation of the determiners in classes and genders and indicates their respective frequence.

Class/gender determiners	Main final segments in nouns (mostly historical suffixes) and realisation of determiner	Lexical tokens
kὸ/kì	-ɔ/-e, (-ɔ/o,) -o/-e, -u/-i, -ʊ/-i, (-ʊ/-u,) -a/-e, (-a/-o,) -N/-N, -p/-p	332
kὲ/kì	-a/-e, (-ɛ/-e,) -e/-e, -N/-N, -C/-C, (-ɔ/-o, -u/-i, -ʊ/-i)	240
lὲ/ṭὸ	-Vl(-lὲ) / -Vn(-ṭὸ) -VVl(-ὲ) / -VVn(-ṭὸ) -VVṭ(-ὲ) / -VVn(-ṭὸ)	144 (227?)[6]
kὲ/– (sg. only)		120
kὸ/– (sg. only)		69
lὲ/– (sg. only)		36 (67?)
–/kì (pl. only)		35
–/ṭὸ (pl. only)		17
lὲ/kì	-Vl(-lὲ) / -Vn(-kì), (-Vṭe[-kì]) -VVl(-ὲ) / -VV(-kì)	9
mὲ/kì	-Vm(-mὲ) / -VVm(-ὲ) / -V(V)(n)Ri~e(-kì)	7
kὸ/ṭὸ		4
mὲ/– (sg. only)		4
sɔ̀/mὲ ?	?/-m	2
–/mὲ ? (pl. only)		1
kɪ́/mὸ	?/-m	1
kὲ/mὸ	?/-m	1
unknown		236 (122?)
total		1258

Table 1. Kulaal noun classes, genders, and agreement determiners (PB, RK, UK & FL 2018 [revised])

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 *lὲ*, pl. *-n* and *ṭὸ*, sg. *-m* and *-mὲ*, and pl. *-Ri~e* and *kì* that represent the most conservative – and morphologically stable – classes/genders. By contrast, sg. *kὲ* mostly agrees with noun final *-a*, *-ɛ* or *-e* but also with a final consonant (*-N* for *-m, -n, -ñ, -ŋ* or *-C* for *-k, -p, -r, -s, -t, -ṭ, -y*), more rarely with a final back vowel (*-ɔ, -u, -ʊ*). Sg. *kὸ* mostly agrees with a back vowel (*-ɔ, -o, -ʊ, -ʊ*) but very often also with an *-a* (just as *kὲ*!), 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 sg. *kὲ* or *kὸ* agree with. As already mentioned, classes *kὲ*, *kὸ*, and *kì* – as well as genders *kὲ/kì* and *kὸ/kì* – turn out to be the most active and changing ones, possibly involving historical class/gender shifts and obviously welcoming items of foreign origin.

Kulaal and other languages

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

– Group A: Zan Gula, Fanya, and Kulaalɛ

– Group B: Lua, Bon Gula, and Bolgo

The argumentation developed in coming sections 3 and 4 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/ƀ/w(V)*, **?/*-m_2*, and **?/*-m_3* are not treated in this paper. As for the vowel raising – or *Umlaut* –, it will not be mentioned any more and its presence is omitted in the reconstructed class/gender forms cited below but reintroduced (as *{↑}*) in Table 9 at the end.

[6] Pairault's data contain many nouns, the determiners of which are not mentioned. This is often the case for nouns ending en sg. *-l*/pl. *-n* (or sg.-only *-l*) that presumably belong to gender *lὲ/ṭὸ* or to singular-only class *lὲ/–*.

3. Group A languages

The general assumption is that these languages underwent a process of stacking and fixation (or lexicalization) of a former agreement element similar to the present-day determiners of Kulaal. It follows that establishing regular correspondences in the noun morphology requires to compare the current suffixes of languages not with the mere suffixes of Kulaal but with the groups of suffix+determiner that may be observed in the latter.

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.

Class *-l_lɛ *(sg.)*

As illustrated in CS 1-7 and 12-13, Group A languages display complementary sequences of the *[V]-**llɛ*** or *[V]-**lɛ*** type[7] that parallel the Kulaal *[V]-l-lè, [VV]-l-è, or [VV]-ṭ-è* realizations. CS 8-9 and 14, however, are irregular and unexplained so far with instances of Group A *[V]-**lɛ*** corresponding to Kulaal *[V]-l-lè*. Reflexes of **-l_lɛ* are illustrated in CS 10.

Class *-n_ɗu *(pl.)*

Similarly Group A languages have complementary sequences of the *[V]-C**Cu*** or *[VV]-**Cu*** type[8] paralleling Kulaal *[V]-n-ṭò* and *[VV]-n-ṭò* (CS 1-7). Again CS 8-9 are irregular and unexplained with presumed reflexes that have a *[V]-**Cu*** form. Reflexes of **-n_ɗu* are illustrated in CS 11. Note that in some cases, both **-n_ɗu* and **-I_ki* may represent, according to languages, the historical plural of a singular **-l_lɛ* (CS 3, 13, and 15, for Kulaal and Group A languages, at least).

Class *-m$_1$_mɛ *(formally sg.)*

CS 16-17, 19, and 21-24 illustrate correspondences of Kulaal sequences *[V]-m-mè* and *[VV]-m-è* with Group A languages forms of the *[V]-m**i/e*** or *[VV]-m**i/e*** type. Although no case of geminated *-mm-* is attested here (except Fanya in CS 19), we assume that the final vowel *-i/e* again results from the historical fixation of a former determiner similar to the Kulaal one. The same probably holds for CS 20 and 22-23 although no cognate form is attested in Kulaal. Reflexes of **-m$_1$_mɛ* are illustrated in CS 26.

Class *-(m$_1$-)ri_ki *(formally pl.)*

CS 17-18 and 25 show that the Kulaal sequences *-ṭi-kì* and *-(n)ṭe-kì* correspond to Zan Gula *-de**y*** or *-dɛ**y*** (no attestation is available for the two other Group A languages, Fanya and Kulaale). We assume here that Zan Gula *-de-* or *-dɛ-* 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 **-(m$_1$-)ri_ki* are illustrated in CS 27. In several cases (CS 18 and 24-25 but also other instances like *fə̀m (mè) / fə̀ṭì (kì)* 'milk', *fə̀m (mè) / fə̀rè (kì)* 'flour', as well as plural-only *ɛ̀ɛ̀ṭé (kì)* 'tears', *hə̀rè (kì)* 'cuvée' (= must + marc)', and *tínṭè (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 **-(m$_1$-)ri_ki*.

Class *-A_kɛ *(sg.)*

In CS 28-32, Zan Gula and Kulaalɛ (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_kɛ*: in CS 33-34, Kulaale forms with final long vowels *CVC**a:*** could result from the integration of a former **kɛ*

[7] The actual vowel reflexes vary between *ɛ* and *e*. Zan Gula *d* and Fanya-Kulaalɛ *r* usually correspond to Kulaal *ṭ* (CS 6-7): most probably the historical class should be characterized with two complementary forms, i.e. **-l_lɛ* and **ɗ_dɛ*.

[8] *-CC-* may represent *-nn-*, *-ɲŋ-*, *-ll-*, *-nd-*, or *-nɖ-*. *-C-* may represent *-l-*, *-r-*, or *-ɽ-*. The vowel is usually *u*, and may also be *ʊ*, *o* or *ɔ* in Kulaalɛ.

determiner after the loss of the velar stop. In CS 35 also the trace of the same determiner would show up, with possible assimilation to and gemination of the root final consonant (or suffix?) *-m*, in forms of the *ɲam**(m)e/ɛ/a*** type. Reflexes of **-A_kɛ* are illustrated in CS 37.

Class *-U_ku *(sg.)*

In CS 39-46 again, Group A languages display forms (*CV(V)Cu/o/ɔ/a*) that are chiefly parallel to the Kulaal nouns without the determiner **kʊ̀*. But once again a velar element (*-w* or *-u*) may show in cases where the Kulaal noun ends with an *-ɛ*, an *-a*, a consonant (CS 47-50), or even an *-o* (CS 39): Kulaalɛ *hwɛːw* ‘moon’, Zan Gula *rāáw* and Kulaalɛ *rāːw* ‘sky, rain’, Zan Gula *aaw* ‘grass’ and *sāābù* ‘wind’, Kulaalɛ *tow*. We assume that these segments are a reflex of the determiner **ku*, the initial velar stop of which was lost. Reflexes of **-U_ku* are illustrated in CS 52.

Class *-U_kɛ *(sg.)*

The few illustrations of presumed reflexes of a **-U_kɛ* class are illustrated in CS 53-56. The Zan Gula examples are too limited to be commented but Kulaalɛ nouns consistently display a final syllable *-wɛ* that clearly parallel the Kulaal *kɛ̀* determiner: *hyàwwɛ̀* ‘dog’, *ɲṵ́wɛ̀* ‘bird’ (no Kulaal cognate available), *hỹ̰ɣ̰ːlwɛ̀* ‘guinea fowl’, and *ɓōwɛ̀* ‘goat’. Reflexes of **-U_kɛ* are illustrated in CS 57.

Class *-I_ki *(pl.)*

Illustrations of this class are numerous since it works as a plural class in the four genders **-l_lɛ/*-I_ki* (CS 12-13), **-A_kɛ/*-I_ki* (CS 28-36), **-U_ku/*-I_ki* (CS 39-49 et 51), and **-U_kɛ/*-I_ki* (CS 53-56). Fanya is poorly illustrated with CS 12, 14, 35, and 46 that deserve the same comments as the similar Kulaalɛ forms (see below).

Kulaalɛ 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 29 *hỹ̰ɣ̰ːbè*, 43 *wéllé*, or 46 *ʔúwé* – but in many cases a final palatal element may show up as in CS 14 *nɑ̰̂**y***, 35 *nyʊ̌m**mì***, or 56 *bū**yì*** (other examples in CS 39, 47, and 53-55). 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 33 *ɓòlè:* and 34 *hyèlè:* might call for the same explanation (see comment concerning the parallel singular forms in Class **-A_kɛ* above).

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 *maa**y***, 28 *kore**y***, 35 *nyom**i***, 39 *tʊ**y***, or 56 *b**ii***. Exceptions are limited to CS 40 *ɟili*, 55 *suuli* (both contrasting with 41 *tʊkiy*), and CS 51 *láá*.

Reflexes of **-I_ki* are illustrated in CS 38. Remember that reflexes of the same historical determiner **ki* have also been commented on the occasion of class **-(m₁-)ri_ki* above.

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 **lɛ*, **mɛ*, and **dʊ*. 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 observed. The following remarks can be made:

1. The reflexes of **kɛ* always have the form ***-(m)e/ɛ/a*** (perhaps also lengthened ***-aː***?) (in case of class **-A_kɛ*), or ***-wɛ*** (for class **-U_kɛ*). The reflexes of **ku* show as ***-w*** or ***-u*** (maybe also ***-o*** in CS 46?). Lastly reflexes of **ki* have the form ***-y***, ***-i***, ***-(m)i***, or ***-yi*** (perhaps also lengthened ***-eː***?). In other words, after having got 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/ɛ/a***, ***-wɛ***, ***-(m)i***, ***-yi***) but, in most cases, totally lost, a phonetic change that is not infrequent trans-linguistically. Indeed, a quick search on the Web showed that a regular loss or deletion of intervocalic *-k-* is attested in such languages as Sanskrit (Pant: 356) or Prakrit (Ollett: 136), in the Papua New Guinea languages Manambu (Aikhenvald: 56) or Kyaka (Franklin: 145), in Turkish (Sanders: 202-207), and in the Oapan variety of Nahuatl (Amith: 2). Morever, the historical change **-k- > Ø* 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).

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 35 *-mɛ* / *-mi*, 50 *-bu*), or as an approximant following a vowel (e.g. CS 14 *-ey/ai/ay*, 39 *-ow*, 47 *-ɛːw*, 48-49 *-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 *maa**y***, 15 *lɛ**y***, 28 *kore**y***, 39 *tɔ**y***, and even 41 *tɔki**y***).

3. The traces of historical stacking look rather random in relation with series and languages so that it seems difficult to identify confidently 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*, a back vowel in the case of **-U_ku*, and a front vowel 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.

4. Group B languages

Although represented here by Lua, Bon Gula, and Bolgo only, Group B languages are more numerous and, for what concerns 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 from the fact that class/gender shifts as well as analogical morphological changes most probably occurred in many cases. If agreement is not any more functional in Zan Gula, Fanya and Kulaalɛ, the three languages 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.

Gender *-l_lɛ/*-n_ɗu

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 *nírí* might also represent a plural-only form). There is a 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 *ʔáːn / ə́nngɨ́* historically results from a former **ʔáːl / ə́n-ngɨ́*, CS 13 *maːn* from **maːl*, and CS 5 *siàːl / sèːl, sìːl* from **siàːl / sèːn, sìːn*. 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 *baːl / bəːn* ‘post, pole, cp. Kulaal *páál (è) / páán (ṭò)*). 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). It is not excluded that CS 6 *nīr* represents a plural-only form. CS 3 *íí* ‘eyes’ obviously derives from **-I_*ki* (just as Bolgo *gī* and probably Lua *jí*) but in *iiri* ‘face’, suffix *-ri* represents a further reflex of **-n_ɗu*.

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), the latter corresponding with final/suffix *-ṭ* in Kulaal. Considering that *-di* and variants are likely to represent reflexes of **-n_ɗu* rather than bare suffix **-n*, historical stacking would have taken place in the plural forms – but not in the singular ones?

Reflexes of gender **-l_lɛ/*-n_ɗu* are summarised in CS 10-11.

Gender *-m_1_mɛ/*-(m_1-)ri_ki

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 *nɨ́m* and, not illustrated here, *hùm* ‘flour’). Plural forms (25-25bis) are commented below. Historical stacking might have occurred in the singular *-ma* forms.

Bon Gula reflexes of **-m_1_mɛ* always have the form *-m* (CS 16-17, 22, 24) and plural shows as *-rɛ* (CS 18). No historical stacking is obvious. The form *-rke* (CS 25) is commented below.

Bolgo has consistently sg. *-m* (CS 16-17, 19-21, 22-24), and plural forms appear as *-ri* (CS 18, 25bis). Here also there is no indication of a process of historical stacking.

The three languages display further plural forms of a *-rke* or *-rgi* type (CS 25-25bis that in fact represent the only plural forms attested in Lua). Although it is not totally excluded that these sequences historically originate 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 (PB, RK, UK & FL 2018: 116-117).

Reflexes of gender *-*m*$_{1}$*_mɛ/*-(*m*$_{1}$-)*ri_ki* are summarised in CS 26-27.

Class *-A_kɛ

In the three languages, examples mainly show reflexes -*a* (Bolgo -*a/ʌ*) (CS 29-30, 32-34) or -*m* (CS 35) that are similar to the bare final/suffix of Kulaal.

However, unlike CS 35 *ɲàm*, final -*a* in Lua *cìbà* (CS 36) might be explained as a trace of the determiner *kɛ (cp. Kulaal cognate *kíìp (kè)*). Remember that *CVCa* nouns reflecting both *-*l_lɛ* and *-*m*$_{1}$*_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 37.

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 39-42, 44, but no evidence in Lua), or -*a* (CS 46, 51), or a labial stop in Lua (CS 50). In 51, 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 52.

Class *-U_kɛ

The few presumed reflexes of a *-*U_kɛ* class are not coherent enough to deserve a serious comment (see limited summary in CS 57).

Class *-I_ki

Lua and Bon Gula usually have a final -*i* or -*e* that is similar to the final/suffix vowel of Kulaal. Bolgo has mainly -*iɲ* (CS 28-29, 32-33, 40, 55), the origin of which is unknown. Specific comments are as follows:

– In Lua, CS 30 *kiaːngo͡ / kiːngo͡* is apparently suffixed both in the sg. and in the pl.; CS 35 *ɲàm* and 36 *cìbì* display the same contrast like the corresponding singular forms, *ɲàm* and *cìbà*: only the latter seems to reflect the historical determiner, here **ki*; CS 47 *píːngī* includes a plural suffix (cp. CS 4, 16, 25-25bis above).

– Bolgo CS 35 *ɲèmí*, unlike other languages, displays a final -*i* that suggests historical stacking.

– In CS 53 the plural forms of the three Group B languages, ending with -*w/u*, do not show any trace of historical stacking.

Reflexes of Class *-*I_ki* are illustrated in CS 38.

Stacking or not stacking?

To summarise what concerns 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_ɗu*, and probably Lua -*la*, -*ma*, and -*a* as non systematic reflexes of the three singular classes *-*l_lɛ*, *-*m*$_{1}$*_mɛ*, and *-*A_kɛ*). A few further, isolated cases have been mentioned but at least for the time being, and unlike was said of Group A languages, there are no reasons here to think that historical stacking applied systematically, even with effects that are not any more perceptible. In fact Group B languages require a thorough analysis where every comparative series will be treated and analysed case by case, with respect of the different devices displayed by each language.

5. Conclusions

The essential consequences of the preceding remarks are as follows:

1. The classes and genders as reconstructed in PB, RK, UK & FL (2018) have to be reduced (see Table 9): i.) there are no distinct singular classes *-*l* and *-*lE* but only one and the same class *-*l_lɛ*; ii.) the two 'complementary' genders *-*lE/*-*rU* and *-*l/*-*n* are one and the same gender *-*l_lɛ/*-*n_ɗu*; 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_lɛ/*-*n_ɗu*.

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, at least at a first step.

Nevertheless we can at least show that the representativeness of the different classes/genders was not the same. Table 2 below 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 importance of the different types at a proto-Bua stage.[9]

sg.	/	pl.	nb. of CS
*-A_kɛ	/	*-I_ki	22
*-U_ku	/	*-I_ki	28
*-l_lɛ	/	*-n_ɗu	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. Representativeness of identified classes/genders in the current proto-Bua CS database

Table 1 above showed that most frequent genders of Kulaal are *kò/kì*, *kɛ/ki*, and *lɛ̀/ṭò* (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_ɗu* was markedly predominant. Indeed present-day *kò/kì* and *kɛ/ki* represent the most (the only?) active genders of Kulaal that namely work as reception genders for recently borrowed items (see Section 2 above).

3. Regarding the noun class morphology, Kulaal, Zan Gula, Fanya, and Kulaalɛ clearly represent the closest and most consistent subgroup within the Bua languages. Interestingly this situation conforms with the lexical distances calculated by Raimund Kastenholz (Kastenholz 2017: 2, PB, RK, UK & FL 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).

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[9] 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.

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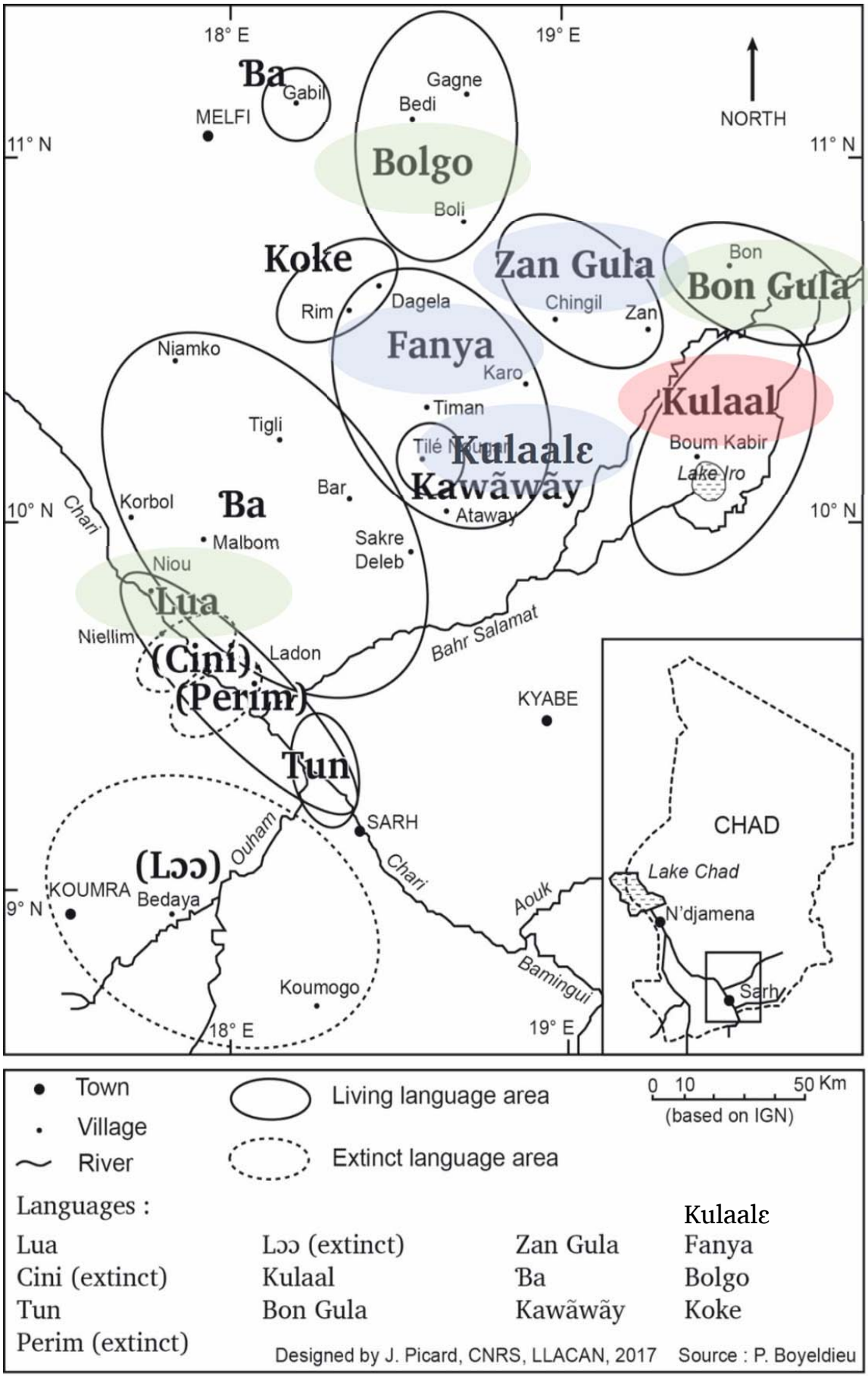

Map 1. Distribution of the Bua languages in Southern Chad

Appendix: Lexical Comparative Series

Languages ans sources:

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

		1. knee	2. tongue	3. eye	4. neck, nape, throat	5. antelope sp.	6. liver, (heart)
	Kulaal	yúl [lɛ̀] / yún [tɔ̀]	lìl (lɛ̀) / lìn (tɔ̀)	ííl (ɛ̀) / íí(n) (tɔ̀)	ǎ̰ǎ̰l (ɛ̀) / ǎ̰ǎ̰n (tɔ̀)	hɛ̀ɛ̀l (ɛ̀) / hɛ̀ɛ̀n (tɔ̀)	nɛ́ɛ́ṭ (ɛ̀) / nɛ́ɛ́n (tɔ̀)
A	Zan Gula (S)	rūllé / runnu	līllé /līnnú	íílé / iŋŋu	áálɛ́	sɛ̀ɛ̀lɛ̀/pl. sɛ̀ɛ̀rù	ɲiide / ɲiiru
A	Fanya (AK)	rūllè / rūndù	līllè / līllù	ī:lè / (īyē)[10]	ā̰:lè / ā̰:rū		nī:rē / nī:rù
A	Kulaale	rúllè / rúnɖù	líllé / línɖɔ́	ʔí:lè / ʔí:lù	ʔá̰:lɛ̀ / ʔá̰:ɰ̃ɔ̀	hyɛ̀:lɛ̀/pl.hyɛ̀:rɔ̀	nɟ́:rè
B	Lua	(*NL var.* ndúl)	ndɨ́lá	(jí) (pl.?)	ʔá:n / ə́nngɨ́	sià:l / sè:l, sì:l	nírí ‘heart’ (pl.?)
B	Bon Gula		líl	iil / (íí ‘eyes’), iiri ‘face’			nīr
B	Bolgo	rúl / rúdí	le(:)l / ledi	gīl ~ gī:l / (gī)	a:n ~ a:l / ʌndɪ		ned / nedi ‘heart’

Table 3a. Reflexes of gender *-*l_lɛ/*-n_ɗu*

		7. body	8. head	9. skin		10. *-l_lɛ	11 *-n_ɗu
	Kulaal	yɔ̀ɔ̀(ṭ) (ɛ̀)	húl (lɛ̀) / hún (tɔ̀)	ól (lɛ̀) / ón (tɔ̀)		[V]-l-lɛ̀, [VV]-l-ɛ̀, [VV]-ṭ-ɛ̀	-n-tɔ̀
A	Zan Gula (S)	rʊʊdɛ	súlé / súrú	úllɛ́ / unnu		-lle, -le, -llɛ, -lɛ, -de, -dɛ	-ru, -rʊ, -nnu, -nnʊ, -nu, -ŋŋu
A	Fanya (AK)	lū:rè	hīlè / sīlù	ūlè / ūrū		-lle, -le, -lɛ, -re	-ru, -ro, -llu, -lu, -ndu, -ndo
A	Kulaale	ló:rɛ̀	hílè / hílù	ʔólɛ̀ / ʔóɽò		-lɛ̀, -llè, -lè, -rè	-rɔ̀, -ɾ̃ɔ̰̀, -ɽò, -ɽ̃ɔ̰̀, -lù, -lɔ̀, -ndù, -nɖò
B	Lua	ndúlá / ndórí	súl / súrí			-l, -la, (*ˬ)-n, (*ˬ)-na	-n, -ri
B	Bon Gula	ro / rei	hul	ʊl / ʊn		-l, -r	-n
B	Bolgo	lōr ~ lōd / lodi	sú:l, súl / súdí			-l, -d, -r	-di, -dɪ, -ndɪ, -ri

Table 3b. Reflexes of gender *-*l_lɛ/*-n_ɗu*

[10] The Fanya plural form *īyē* is a reflex of *-*I_ki* (cp. gender *-*l_lɛ/*-*I_ki* in Table 4 below).

		12. tooth	13. breast		14. foot, leg	15. sorghum, millet (generic)
	Kulaal	nèèl (ɛ̀) / nèè (kì)	máál (ɛ̀) / móó (kì)		nál (lɛ̀) / nó (kì)	lɛ̀l (lɛ̀) / (làà(n) (ṭʊ̀))
A	Zan Gula (S)		máálɛ́ / maay		nɛ́lɛ́ / ney	lalɛ / lɛy
	Fanya (AK)	nī:lè / nīyè	mā:lē / (mā:rō)		nālè / nái	
	Kulaale	nḭ́:lè / nḭ́:ɛ̰̀	má̰:lɛ̀ / (má̰:ɽ̰̃ɔ̰̀)		ná̰lɛ̀ / nâ̰y	
B	Lua		mā̃:n			yà / yə̀
	Bon Gula	nir ‘molaire’	má(:)l / (mú(:)n)			làl
	Bolgo	nìl / nìì	mál / (mʌdɪ)		na(:)l / nʌɪ	yàl / (yʌ̀rì)

Table 4. Reflexes of gender *-l_lɛ/*-I_ki (var. *-l_lɛ/*-n_du)

		16. beer, alcoholic drink	17. water	18. blood	19. oil, fat	20. milk	21. sleep (n.)
	Kulaal	há̰m (mɛ̀) / hóṭí (kì)	ím (mɛ̀) / íṭè (kì)	– / hɛ̰́ṭè (kì) (pl.)	nóm (mɛ̀) / nóṭè (kì)		lòòm (ɛ̀) (< v. lóèè)
A	Zan Gula (S)	sámí (pl.) [!?]	(rida) / rídéy	– / sídɛ́y (pl.)	nume	kērmī	lomi
	Fanya (AK)			hīmē	nummɛ		
	Kulaale		rímì / ?	hḭ́mì		térmì (kérmì?)	
B	Lua	hám / hə́mngɨ́		hímá	nɨ̄m		ló:m (< v. lōy))
	Bon Gula	hám	ɽ̰im	– / hɪrɛ			(yom v.)
	Bolgo	sam [sā:m?] / semei	rím	– / sè:rì	núm	kɪrɪm	lem (< v. léw)

Table 5a. Reflexes of gender *-m_1_mɛ/*-(m_1-)ri_ki

		22. ashes	23. flour	24. smoke	25. urine	25bis. saliva		26. *-m_1_mɛ	27. *-(m_1-)ri_ki
	Kulaal			hɛ̰̰́ɛ̰́m (ɛ̀) / hɛ̰̰́ɛ̰́nṭé (kì)	– / hɛ̰̰́ɛ̰̀ṭè (kì)			[V]-m-mɛ̀, [VV]-m-ɛ̀	-(˛)ṭe-kì, -(˛)ṭi-kì
A	Zan Gula (S)	tome	kūmé	siimu	– / síídéy			-mi, me	-dey, -dɛy
	Fanya (AK)							-me, -mmɛ	?
	Kulaale							-mi	?
B	Lua			sí:m	– / ɲírgī	– / hḭ́rgɨ̄		-m, -ma	-r(-) ?
	Bon Gula	tom		sim	– / hirke			-m	-rɛ
	Bolgo	tom	kʊ̀m	sé:m	– / ɲírgɪ	– / sʌ́:rí		-m, (-ɪm ?)	-ri

Table 5b. Reflexes of gender *-m_1_mɛ/*-(m_1-)ri_ki

		28. giraffe	29. fish	30. monkey sp.	31. mosquito	32. scorpion
	Kulaal	kàyà (kɛ̀) / kàyè (kì)	hààpá (kɛ̀) / hààpé (kì)	kéñà (kɛ̀) / kéñè (kì)	nòmá (kɛ̀) / nòmé (kì)	hóóṭà (kɛ̀) / húúṭè (kì)
A	Zan Gula (S)	kara / korey	sāābà / soobey	kúɲá / kúɲéy	numa / numey	sóódā / suudey
	Fanya (AK)					
	Kulaale		hỹ̀ỵ̀ːbà / hỹ̀ỵ̀ːbè	kɟ́ɲà̰ / kɟ́ɲɛ̰̀		
B	Lua	(kuàrì / kòrì ?)		kiàːngō / kīːngō		sūːrā / sūːrī
	Bon Gula			kɪŋa / kiŋe, kuŋe		
	Bolgo	(hàrá / heriŋ ?)	sàːɓá / sèːɓíŋ			sɔ̀r / soriŋ

Table 6a. Reflexes of gender **-A_kɛ/*-I_ki*

		33. elephant	34. hen	35. meat, game, animal	36. crocodile
	Kulaal	pàlá (kɛ̀) / pàlé (kì)	hàlá (kɛ̀) / hàlé (kì)	ñám (kɛ̀) / ñóm (kì)	kúp (kɛ̀) / kíip (kì)
A	Zan Gula (S)	bālá / boley	sila / siley	nyɛ̄mɛ́, ɲāmɛ́ / nyomi	
	Fanya (AK)			ɲāmmè / ɲōmmì	
	Kulaale	ɓàlàː / ɓòlèː	hyàlàː / hyèlèː	nyằmmà / nyŏ̀mmì	
B	Lua			ɲàm / ɲə̀m	cìbà / cìbì
	Bon Gula	pàlá / pole	hala / hele	ɲām / ɲūm	
	Bolgo	ɓɔlʌ / ɓoliŋ	sɛl, sɛlʌ / seːli	ɲằm / ɲèmí	

Table 6b. Reflexes of gender **-A_kɛ/*-I_ki*

		37. *-A_kɛ	38. *-I_ki
	Kulaal	-a-kɛ̀, -C-kɛ̀	-e-kì, -i-kì, -o-kì, -u-kì, -C-kì
A	Zan Gula (S)	-a, -Cɛ	-ey, -uy, -i, -Ci
	Fanya (AK)	-Ce	-e, -iye, -Ci
	Kulaale	-a, -aː, -Ca	-e, -eː, -uy, -ɛy, -Ci
B	Lua	-a, -C, -Ca	-i, -C, -Ci
	Bon Gula	-a, -C	-e, -C
	Bolgo	-a, -ʌ, -ø	-i, -iŋ, -Ci

Table 6c. Reflexes of gender **-A_kɛ/*-I_ki*

		39. ear	40. horn, (whistle)	41. arm	42. beehive	43. fox, jackal	44. backbone
	Kulaal	tó (kò) / tú (kì)	ílɔ́ (kò) / ílí (kì)	tókɔ́ (kò) / túkí (kì)	fóólò (kò) / fóólè (kì)	wélɔ́ (kò) / wélé (kì)	tìirɔ̀ (kò) / tìirè (kì)
A	Zan Gula (S)	tō / tɒy	ɟílú / ɟili	tōkó / tɒkiy	fɔɔnɔ / fɔɔnɛy	wɛlɔ / wɛlley	diiro / diirey
	Fanya (AK)						
	Kulaale	tów / tű́ykè				wélló / wéllé	
B	Lua	(túlā / tórī)[11]					
	Bon Gula	tó ~ tó / tu	ɪlʊ / ili	tʊkɔ / tuki	hɔːnɔ / hɔːnɛ		dirɔ
	Bolgo	tō / tōī	gʌlʊ / geliŋ				

Table 7a. Reflexes of gender *-*U_ku*/*-*I_ki*

		45. knife	46. bone	47. moon, month	48. sky, rain	49. grass, straw	50. wind
	Kulaal	kə̀ə̀mà (kò) / kə̀ə̀mè (kì)	úkà (kò) / úkè (kì)	fə̀ə̀ (kò) / fə̀ə̀ (kì)	yáá (kò)	áá (kò) / óó (kì)	hààp (kò)
A	Zan Gula (S)	kīīmā / kɪmey	ūwā / uwey	fə̄ə̄ / fɛy	rāáw	aaw / aay	sāābù
	Fanya (AK)		ūwō / úwé				
	Kulaale		ʔúwó / ʔúwé	hwè:w / hè:y	rā:w		
B	Lua			piā̰: / pí:ngḭ̄			sà:b, sà:w
	Bon Gula		ʊwa / uwe			á	
	Bolgo		(ógol / ɔgrɪ ?)	hɛ́ò			(= sǎb ‘dark sky, clouds'?)

Table 7b. Reflexes of gender *-*U_ku*/*-*I_ki*

		51. fire	52. *-U_ku
	Kulaal	lá (kò) / ló (kì)	-ʊ-kò, -o-kò, -ɔ-kò, -ɛ-kò, -a-kò, -C-kò
A	Zan Gula (S)	láá	-ʊ, -o, -ɔ, -ɛ, -a, -aw, -Cu
	Fanya (AK)		-o ?
	Kulaale		-o, -ɔ, -ow, -ɛw, -aw
B	Lua	lā: / lə̄:	-a, -C
	Bon Gula	yaako, yákò	-ʊ, -o, -ɔ, -a, (-ko !?)
	Bolgo	lá [lá: ?]	-ʊ, -o, -ɛʊ

Table 7c. Reflexes of gender *-*U_ku*/*-*I_ki*

[11] Lua *túlā/tórī* most probably represents reflexes of gender *-*l_lɛ*/*-*n_ɗu*.

		53. dog	54. bird	55. guinea fowl	56. goat	57. *-U_kɛ
	Kulaal	hàò (kɛ̀) / hòì (kì)		hóólì (kɛ̀) / húúlì (kì)	póò (kɛ̀) / púù (kì)	-ʊ-kɛ̀, -ɪ-kɛ̀
A	Zan Gula (S)			suulo / suuli	būù / bii	-u, -o
	Fanya (AK)					
	Kulaale	hyàwwɛ̀ / hyòw(w)ì	n̪u̪wɛ̀ / [nyu̪(w)ì]	hỹỹ̰:lwɛ̀ / hyu̪̰:lì	ɓōwɛ̀ / ɓūyì	-Vw(w)ɛ, -lwɛ
B	Lua	sàw / sə̀w		sùlā / sùlī	ɓuày / bù	?
	Bon Gula	haw / how		hʊlʊ / huli		-ʊ/w ?
	Bolgo	sāò / sēù	n̪iw	(= só:rò / só:rɪn̪?)	ɓō / ɓī̄	-o/w ?

Table 8. Reflexes of gender **-U_kɛ/*-I_ki*

Boyeldieu 1983-2014			PB, RK, UK & FL 2018			Current proposal		
sg.	/	pl.	sg.	/	pl.	*Comments*	sg.	/	pl.
*-a	/	*-(↑v)-i	*-A	/	*{↑}-I		*-A_kɛ	/	*{↑}-I_ki
*-u	/	*-(↑v)-i	*-U	/	*{↑}-I		*-U_ku	/	*{↑}-I_ki
*-l	/	*-n	*-l	/	*-n	complementary to **-lE/*-rU*	*-l_lɛ	/	*-n_d̪u
*-l	/	*-ri (*-di ?)	*-lE	/	*-rU	complementary to **-l/*n*; includes body parts			
			*-l	/	*{↑}-rI				
*-m	/	*-ri (*-di ?), *-r̪i (*-d̪i ?) ?	*-m_1	/	*{↑}-rI (*{↑}-m_1-rI?)	exclusively masses and liquids	*-m_1_mɛ	/	*{↑}-(m_1-)ri_ki
–		–	*-wɛ	/	*{↑}-I	includes animals	*-U_kɛ	/	*{↑}-I_ki
–		–	*-lE	/	*{↑}-I	‘tooth’, ‘eye’, ‘breast’, ‘foot/leg’, ‘back’, ‘belly’	*-l_lɛ	/	*{↑}-I_ki
–		–	*?	/	*-b/ɓ/w(V)	vestigial – human beings, kinship terms	*?	/	*-b/ɓ/w(V)
*---		*-m	*?	/	*-m_2	vestigial – kinship/relational terms	*?	/	*-m_2
–		–	*?	/	*-m_3	vestigial – ‘thing’, ‘place’	*?	/	*-m_3

[(↑v), {↑} = raising of the root vowel]

Table 9. Successive attempts of reconstructing Proto-Bua classes and genders