

# THE VALUE OF “TRIANGULATION” IN DETERMINING PHYLOGENETIC RELATIONSHIP: ON THE AREAL AND GENETIC CONNECTIONS OF THE BERTA LANGUAGES

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**Abstract:** In this paper, I argue against a recent attempt at re-classifying the small group of Berta languages, spoken in Ethiopia, as being closely related to the geographically adjacent East Jebel group, based on numerous lexical similarities between the two taxa. It is suggested that the best method to determine if these similarities are due to common genetic descent or intense contact is to “triangulate” the lexical data by introducing another possible linguistic relative into the comparison. A simple lexicostatistical test shows that the Jebel languages show at least as strong a link with Nilotic languages as they do with Berta, while Berta and Nilotic, on the contrary, have very little in common. This is a significant argument that Jebel languages belong together with Nilotic in the East Sudanic family, while most of the lexical matches between Jebel and Berta are due to the latter’s strong lexical influence on the former.

**Key words:** Berta languages, East Jebel languages, East Sudanic languages, areal contact, lexicostatistics, consonantal class method

## 1. Introduction

One of the reasons why distant phylogenetic connections of a language isolate (or a small, recently formed cluster of languages) tend to be more difficult to establish than those of an extended language family is that language isolates may easily accumulate secondary, areal

influences which are difficult to weed out due to lack of immediate comparative evidence. One need only remember the case of, e.g., the Armenian language, which was for a long time thought to be closely related to Iranian languages, until rigorous linguistic analysis showed that this connection was caused by mistaking secondary borrowings from Persian for inherited Indo-European lexicon (Campbell & Poser 2008: 80). Clearly, with languages spoken in any region whose early linguistic history is even less known, this issue gets progressively more and more complicated.

In situations when linguistic contact between two languages or language groups may have been so intense that loans began to infiltrate such “core” layers of the recipient language as grammatical morphemes and basic lexicon, binary comparison of such languages or language groups, taken outside of a larger context, may not be sufficient in order to determine whether the observed similarities are indeed due to secondary areal contact or result from a shared linguistic ancestor for both units. One relatively simple procedure that may be helpful in such cases (provided, of course, that we possess sufficient data to do so) is a sort of linguistic “triangulation”, in which a third language or language group, related to the alleged “donor” language, is introduced into the comparison. Thus, for Armenian the issue of its proximity to Persian could theoretically be solved by introducing data from some Eastern Iranian language, such as Pashto: it can be easily shown that the number of similarities between Persian and Pashto is much greater than between Persian and Armenian, and even greater than between Armenian and Pashto — *ergo*, Persian and Pashto are likely to be close relatives, whereas the “extra” Armenian-Persian connections are more likely to be due to large scale borrowing.

## 2. The classificatory status of Berta

A good example of such a situation in Africa is provided by Berta (Bertha), a linguistic isolate which may be defined as a “macro-language” or a small language cluster, consisting of several closely

related dialects spoken in the Benishangul-Gumuz Region of Ethiopia. The language itself had been known to researchers since the early 19<sup>th</sup> century. Based on a variety of brief grammatical sketches and wordlists, summarized in Cerulli (1947), Joseph Greenberg (1966) classified Berta early on as a separate member of his “Chari-Nile” family, itself a submember of the even deeper and more controversial “Nilo-Saharan” phylum. A very similar position, albeit with minor taxonomic adjustments, was expressed in works by M. Lionel Bender (see, e.g., Bender 1997a), one of the two principal explorers of the Nilo-Saharan hypothesis in post-Greenbergian times.

An alternate point of view was originally presented by Christopher Ehret in his own classification of the Nilo-Saharan languages (Ehret 2001). Ehret prefers to group Berta much closer to the “core” of this macrofamily, including it in his “Kir-Abbaian” (= Greenberg’s “East Sudanic”) family as the closest relative of the West Jebel group of languages (which includes Gaam, or Ingassana, as well as several small languages — Aka, Molo, and Kelo — commonly grouped together as Central Jebel). Although Ehret recognizes that “there are indeed loanwords from the Western Jebel subgroup in Bertha”, he nevertheless insists that “there remains a core of lexical and other innovations shared by the Gaam languages and Bertha that cannot be explained as loans” (Ehret 2001: 71).

Ehret’s classification and reconstruction of Proto-Nilo-Saharan has not generally been well received even among those Africanists who are sympathetic to Greenberg’s (1966) classification (let alone the skeptics), and most existing models of the Eastern Sudanic family (Bender 1997a; Rilly 2009; Starostin 2017) consistently exclude Berta from it, ascribing Berta’s specific similarities with the Jebel languages to areal contact. Nevertheless, given the relatively low level of our knowledge on the grammar and lexicon of the Berta cluster throughout the 20<sup>th</sup> century, it would seem reasonable that any taxonomic hypotheses on Berta formulated during that period might be subject to significant amendment in light of further research on this macro-language, particularly that of a comparative-historical nature.

In recent years, such research has been conducted by Nate D. Bremer, who, based on his own survey of six linguistically differing Berta-speaking communities (Bremer 2016) and a historical comparison of his new data with all the earlier sources on the language, performed a new lexicostatistical survey and found (or, at least, claimed to have found) a significantly higher percentage of potential lexical matches between Berta and the East Jebel languages (the same group that is called “Western Jebel” by Ehret) than previously assumed. Thus, Bender finds 17% common items between Aka-Molo-Kelo (AMK) and Berta, 14% common items between Gaam and Berta on the 100-item wordlist; conversely, Bremer’s assessment is 31.1% in common between AMK and Berta, 24.5% between Gaam and Berta (Bremer 2015: 334). Based on this re-evaluation, as well as assorted historical observations on comparative phonology and grammar of East Jebel and Berta languages, Bremer concludes that “this data... suggests a genetic relationship between Berta and the East Jebel languages... a shared history that extends beyond mere contact” (Bremer 2015: 338). This conclusion has already received serious attention from scholars; e.g., in a recent survey of Eastern Sudanic languages, G. Dimmendaal and A. Jakobi (2020) include Berta as closely related to the Jebel group, based exclusively on Bremer’s observations.

Upon serious consideration, Bremer’s conclusion, albeit stated in a cautious and exploratory manner, seems to have rather grave implications not just for the taxonomic status of Berta, but for the overall level of trust one could feel justified to place in the classificatory judgements of Africanists from the previous century — even judgements on such relatively shallow levels of classification as the ones involving Jebel and Berta languages. While it is true that early data on these taxa, such as reflected in the works of Tutschek (1850), Evans-Pritchard (1932), Cerulli (1947), etc., were limited in scope and not very reliable in quality, later research by such scholars as M. L. Bender (1989 on Berta; 1997b; 1998 on East Jebel), Torben Andersen (1993), and others (e.g. the extensive dictionary of the Maiyu dialect prepared by A. and S. Neudorf (2007)) certainly advanced the level of our knowledge on

the lexicon, phonology, and grammar of Jebel and Berta to the stage where it became possible to make informed and well-argued judgements on their genetic and areal characteristics. If Bremer's new conclusions, based on the re-application of diachronic analysis to somewhat larger and more accurately recorded datasets, do indeed overturn and discredit Bender's earlier results, this begs the question of precisely how "fine-grained" does one's data need to be in order to be able to avoid such serious historical mistakes.

Unfortunately, Bremer's own published results hardly allow to find an answer to this question. In his main work on the subject (Bremer 2015), he does not publish the full comparative data between Berta and Jebel, nor does he properly explain the criteria underlying his scoring of potential cognates (e.g. whether the judgements follow perceived patterns of regular and recurrent phonetic correspondences, or strictly / loosely defined patterns of phonetic similarities). The good news is that at least the wordlists themselves, assembled by Bremer for six different varieties of Berta, are publicly available (published as Bremer 2016), meaning that both Bender's and Bremer's statistical results can be easily cross-checked against the actual data by anybody willing to do the honors.

### **3. "Triangulating" Berta data with Jebel and Nilotic**

That said, simply conducting another binary comparison between Berta and Jebel will hardly be sufficient to settle, once and for all, the issue of the nature of their historic relationship. Both Bender's and Bremer's results may clearly be interpreted in several different ways: the quantity and quality of Jebel-Berta lexical matches are such that neither a contact nor a genetic explanation can be immediately swept off the table. In situations like these, one technique that can offer progress is the above-mentioned procedure of "historical triangulation". In exactly the same manner as, for instance, the hypothesis of a genetic connection between Chinese and Tai languages may be disproven by showing the much closer connections (in the area of basic lexicon) between Old Chinese

and Tibeto-Burman, so could the Jebel-Berta issue, at least in theory, be settled by introducing a third component — another potential relative of either Jebel, Berta, or both these units — and observing how its own matches with those two units correlate with the results of the Jebel-Berta comparison.

While Berta itself is currently considered a relative isolate within the hypothetical Nilo-Saharan macrofamily, East Jebel languages have always been specifically linked to the unit that Joseph Greenberg (1966) called “Eastern Sudanic”; this large family, while still not openly supported by every single Africanist or historical linguist, seems to find more and more support as time goes by, with important elements of historical research on the hypothesis published by such scholars as M. L. Bender (2005), C. Rilly (2009), G. Dimmendaal (2011), and G. Starostin (2014). For the sake of the test undertaken in this paper, it will not be necessary to regard “Eastern Sudanic” as a family demonstrated beyond reasonable doubt; in fact, it would even be methodologically incorrect to treat it as a single unit, since being able to cherry-pick potential cognates with Jebel out of the large number of Eastern Sudanic subgroups would give the comparison an unfair advantage over the Jebel-Berta comparison.

We shall, therefore, limit ourselves to data from one of the best established, best described, and (seemingly) most archaic members of Eastern Sudanic — the Nilotic family, consisting of three clearly related branches (West, East, and South), all of which have received comparatively significant attention from historical linguists and for all of which at least partial or preliminary reconstructions of their phonological systems and basic lexica have been published over the past half-century (our main points of reference will be Dimmendaal 1988 for general and West Nilotic; Vossen 1982 for East Nilotic; and Rottland 1982 for South Nilotic). Data from these three branches (Proto-West Nilotic, Proto-East Nilotic, Proto-South Nilotic) will then be compared with data for Jebel and Berta, according to the following rules:

(A) Main data will be limited to *core basic lexicon* — the 50-item subset of the standard 100-item Swadesh list, selected in accordance with

the criterion of average historic stability (S. Starostin 2007; G. Starostin 2010) and, therefore, not specifically tailored to the purposes of this particular comparison, excluding bias. (Additional elements of the Swadesh wordlist may be used as supporting auxiliary material.)

(B) In order to reduce the number of potential accidental matches, or those due to recent contact between isolated members of the concerned taxa, only properly *reconstructible* items will be taken into comparison. For Berta, this means that any potentially “Proto-Berta” item has to be encountered in at least two varieties of this macro-language, preferably not the closest ones according to Bremer’s classification. For Jebel, this means either presence across both branches of the family (Gaam and Aka-Molo-Kelo), or at least a firm presence in one of the two branches with no clear evidence of the item in question being a lexical innovation in that branch. For Nilotic, only those items will be taken into consideration which can be clearly reconstructed to the top levels of at least one of the three branches (West, East, South).

(C) In between Berta, Jebel, and Nilotic, only those items will be considered as matches which (a) are fully semantically equivalent, i.e. reliably identified as the main carriers of the required Swadesh meanings, (b) satisfy the criterion of *phonetic compatibility*, i.e. can at least theoretically be explained as the result of regular phonetic evolution from the same original prototype. In this particular case, this means that they either have to pass the requirement of the “Dolgopolsky consonantal class” matching (Dolgopolsky 1986; see more on this method of establishing phonetic similarity in Turchin et al. 2010), or at least be explainable as the result of development that follows a recurrent pattern.

#### 4. Comparative data

Below I shall separately list the results of comparison between Berta and Jebel (Table 1), Jebel and Nilotic (Table 2), and, finally, completing the “triangle”, Berta and Nilotic (Table 3). Proto-Berta reconstructions in the table largely follow Starostin (2017: 37–67), with a few minor

amendments (they somewhat differ from the system in Bremer 2015 in terms of phonetic interpretation of specific phonemes, but not substantially). Proto-Jebel (or, more accurately, Proto-Aka-Kelo-Molo) reconstructions follow Bender (1997b; 1998), with a few amendments for individual forms following Starostin (2014). Sources for Nilotic reconstructions are indicated above, also with a few specific amendments following Starostin (2014).

Items that represent straightforward Dolgopolsky consonantal class matches between Berta and any of the compared items are marked as such (CCM) in the Notes section.

Table 1

**Potential basic lexical matches  
between Berta and the East Jebel group**

Item	Proto-Berta	AKM	Gaam	Notes
‘bird’	*mic’e	*mije	mi:	CCM; status of Gaam form unclear (possibly regular deletion of original *-j-).
‘blood’	*k’apa	*gefa-	afa-d	CCM; possibly regular development in Gaam if the original consonant was *ǵ-.
‘claw/nail’	*ma:(n) cu	*mVsV	mási	CCM.
‘dog’	*gali	*kal-		CCM.
‘drink’ (?)	*me:r-	*mVt-	mát-	Not clear whether root-final consonants correspond to each other. Dubious.
‘egg’	*kulkul-		kóló-d	Most Berta dialects, except for Abegu, preserve the contracted form *kukul-; in any case, can be considered as a CCM with Gaam.
‘eye’	*are	*edi	éd	Similar, but not exactly the same, correlation as in ‘drink’; somewhat dubious.

## Continuation of Table 1

Item	Proto-Berta	AKM	Gaam	Notes
‘fire’	* <i>mu</i> :	* <i>maʔa</i>	<i>m̄</i> :	CCM.
‘head’	* <i>alu</i>	* <i>ola</i>	<i>ól</i>	CCM.
‘I’ (?)	* <i>ali</i>	* <i>ay-</i>	<i>a:-n</i>	CCM only if the Berta form can be segmented as * <i>a-li</i> , which is hard to prove.
‘kill’ (?)	* <i>pi/y-</i>	* <i>pɔz(i)</i>		Unclear correspondence in root-final consonant.
‘louse’	* <i>d̄i:ni</i>	* <i>ɣəɲ-</i>	<i>ɟɪŋ-d</i>	Could be a specific development in Berta (e.g. assimilation * <i>k'i-</i> → * <i>d̄i-</i> before a front vowel?). Unclear.
‘meat’	* <i>uɔuɲ</i>	* <i>oɔo</i>	<i>ɔɲ</i>	CCM.
‘mouth’	* <i>ndu</i>	* <i>udu</i>	<i>ɔɭ-g</i>	Unique, but possible correspondence between at least Berta and AKM (the latter does not have prenasalized initial segments).
‘nose’	* <i>amuɲ</i>	* <i>mu:-di</i>	[ <i>mu:</i> ‘face’]	CCM.
‘rain’	* <i>ro:</i>	Molo <i>a:ro</i>		CCM, but only between Berta and Molo (Molo could theoretically reflect Proto-AKM).
‘stone’	* <i>bele</i>	* <i>pela</i>		CCM.
‘tail’	* <i>abaro</i>	* <i>pori</i>		CCM (provided * <i>a-</i> in Berta is a fossilized prefix).
‘tongue’	* <i>kal-</i>	* <i>kala</i>	<i>kálá-d</i>	CCM.
‘tree’	* <i>(i)</i> <i>ɲgole</i>		<i>gūldū</i>	CCM (partial, since initial and final components in Berta and Gaam require explanation).
‘what’	* <i>naN</i>	* <i>ni</i>	<i>ni</i>	CCM if the root morpheme in Berta is * <i>na-</i> .

Table 2

## Potential basic lexical matches between Nilotic and East Jebel languages

Word	Jebel	WN	EN	SN	Notes
‘black’	*ɔrɔ		*=rɔɔ <sup>1</sup>		CCM.
‘die’ (?)	*tugi-r-	*tɔw-	*=twa-		Possible lenition in Nilotic (*tUgV- → *tUYV- → *tUw-) or fossilized suffixation in Gaam. Dubious.
‘drink’	*mVt-	*ma:ɖ-	*mat-		CCM.
‘eat’	*ɲam-		*=/ɲ/am-	*am	Palatal nasal clearly seen in some East Nilotic forms and not easily discarded as an innovation; therefore, formally compatible.
‘fire’	*maɔa	*ma:-c	*=ma	*ma	CCM.
‘hand’	*a-s		*=ay-	*=ʌ:-	CCM.
‘I’	*a/y/	*a:-	*=a-	*a-	CCM.
‘mouth’	*udu	*tɔ-	*=tv-k	*=v:t-	CCM.
‘nose’	*mu:-	*um	*=ume		CCM.
‘rain’	*koyi	*kɔ-	*kuj-		CCM.
‘smoke’	*pur <sup>ɔ</sup> u		*=puri-		CCM.
‘thou’	*i/y/	*i:-	*I-	*i-	CCM.
‘tree’	*ka/y/ ca	*ya:-	*ka=ye	*k=ɛ:-t	CCM (assuming that Jebel *k- goes back to the same fossilized prefix as in Nilotic = Greenberg’s (1966) “moveable k-”).
‘water’	*pe	*pi:	*=pi-	*per-	CCM (at least between Jebel, WN, and EN; SN *-R- requires additional explanation).
‘we’	*ay-ga			*ɛ-ca-	CCM.
‘what’	*ɲi		*ɲo	*ne	CCM.
‘who’	*ɲa	*ɲa	*ɲa	*ɲʌ	CCM.

<sup>1</sup> The = sign denotes the boundary between the root and the preceding prefix.

Table 3

## Potential basic lexical matches between Nilotic and Berta languages

Word	Berta	WN	EN	SN	Notes
‘ashes’ (?)	*bùbùdà	*bu:r	*k=uri-o	*ɔr-	Possible if the Berta form reflects partial reduplication and “Berta -d- : Nilotic *-r-” is recurrent (no further evidence).
‘drink’	*mé:r-	*ma:ḡ-	*mat-		Same problem as in Table 1.
‘fire’	*mû	*ma:-c	*=ma	*ma	CCM.
‘mouth’	*ndu	*ṭɔ-	*=tv-k	*=v.t-	See notes on Table 1.
‘nose’	*àmúnj	*um	*=ume		CCM.
‘water’	*pèrì			*per-	CCM.
‘what’	*naN	*ŋo	*ŋo	*ne	CCM.

## 5. Analysis and conclusion

While it is clear that not all of these comparisons are of equally convincing quality, what is more important at this moment is not their individual evaluation in accordance with some idealized set of criteria, but rather their mutual evaluation respective to one another. Assuming that most of the listed similarities are not accidental (at least the ones between Jebel and Nilotic languages are usually featured in most comparative works on East Sudanic and follow an approximate model of phonetic correspondences between the two units), the following conclusions may be drawn.

1. The number of possible common etymologies between Jebel and Berta (21), on one hand, and Jebel and Nilotic, on the other (17), is comparable. This means that if all three units are genetically related to each other, it would be natural to expect a comparable number of matches between Berta and Nilotic.

2. However, it is quite transparent that the number of such potential matches between Berta and Nilotic is significantly lower (merely 7,

and most of these are problematic in one way or another). This discrepancy can have only one possible explanation: all, or at least most, of the parallels either between Jebel and Berta or between Jebel and Nilotic are secondary, having appeared through mutual borrowing rather than genetic relationship.

3. Comparison of Tables 1 and 2 clearly shows that most of the matching items between Jebel and Berta are *nouns* (with the exception of ‘drink’, ‘kill’, ‘I’, and ‘what’, *all* of which are phonetically problematic), while Table 2 shows a slightly more expectable distribution between nouns, verbs, and pronouns. In particular, there are transparent paradigmatic pronominal matches between Jebel and Nilotic in the sphere of personal pronouns (the East Sudanic *\*a / \*i* opposition for ‘I / ‘thou’) and interrogatives (cf. the presence of the palatal nasal *\*ɲ-* in the word for ‘what?’ and the velar nasal in the word for ‘who?’).

Speaking of pronouns, it is worth mentioning that Bremer (2015: 330–331) includes a lengthy discussion on reconciling the pronominal systems of Jebel languages with those of Berta, most of which feels extremely strained, especially compared to the absolute ease with which the Jebel system fits into the overall model of East Sudanic, unlike that of Berta. Thus, Bremer compares the Jebel 1<sup>st</sup> person pronoun, which frequently (but not always) reflects a word-medial or word-final nasal (Gaam *a:n*, Aka *e:*, Kelo *əŋ*, Molo *ɔŋ*, Beni-Sheko *iŋgi*), with Berta *ali ~ ɛlli ~ ʔɛli?* ‘I’ on the basis of “multiple examples exhibiting alternation between a nasal [N] and a lateral [l] in Berta, and further examples exist between Eastern Jebel and Berta”; however, these “further examples”, listed in a footnote, show anything but regularity and could largely be discarded as accidental resemblances (e.g. Jebel *ŋa* and Berta *alo* ‘who?’, which actually features a *different* nasal consonant in Jebel).<sup>2</sup> Proposed

<sup>2</sup> Probably the only example from that group which can be accepted without reservations, due to an exact semantic match and no fewer than four other phonemic segments in common, is Aka *ha:mon* ‘to yawn’ (= Kelo *ta-ha:mne*, Molo *təʔamudən id.*) = Berta *hamula id.* In this case, the nasal in AKM could easily be the result

scenarios for the 2<sup>nd</sup> person pronoun and the plural forms are even more complicated.

Finally, let us specifically pay attention to the forms which present straightforward CCM matches between Berta and East Jebel (either Gaam, Aka-Kelo-Molo, or both branches) with no issues of phonetic compatibility. These are: ‘bird’, ‘blood’, ‘nail’, ‘dog’, ‘fire’, ‘head’, ‘meat’, ‘stone’, ‘tongue’; to these, from the other half of the 100-item wordlist, we might further add ‘cloud’ (Berta *\*agu.ru* = Kelo *a.gu.yu-*), ‘knee’ (Berta *\*gusunj* = Jebel *\*kuzu-*), ‘skin’ (Berta *\*sapa* = Beni-Sheko *sə:ba*). It may be noticed that not only are all of these items nouns (usually more prone to borrowing than other parts of speech, see Tadmor et al. 2010), but also that only two of these – ‘fire’ and ‘head’ – also figure in the Jebel-Nilotic comparison; to the best of my knowledge, neither do they have any clear parallels in any other subgroups of East Sudanic. The simplest and most efficient explanation is that all, or at least most, of these words represent borrowings from Berta into Jebel, some possibly dating back to Proto-Berta and Proto-Jebel, others more recently loaned from certain Berta dialects into certain lects of Aka-Kelo-Molo. Large scale borrowings of nominal lexemes, even those from core basic lexicon, are rare, but not entirely uncommon in Africa’s Macro-Sudan belt, cf. Northern Songhay and Berber (Souag 2010), Shabo and Omotic (Kibebe 2015).

Analysis of the new lexical data contained in Bremer (2016) unquestionably identifies it as an extremely important new source for the reconstruction of Proto-Berta and a better understanding of the complex and fairly entangled phonetic developments from Proto-Berta to all its modern descendants. However, it adds relatively little to our general knowledge on Berta’s core basic lexical and grammatical morphemes, and, taking into account the little experiment in “triangulation” conducted in this paper, hardly threatens Bender’s (and others’) judgement that the Berta-Jebel connection should be regarded

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of assimilation to the word-medial labial nasal – a situation which is not observed in the 1<sup>st</sup> person pronoun.

as an areal rather than genetic link, and that Berta’s own genetic affiliation should probably be sought elsewhere.

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