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The subgrouping of East Chadic

Abstract

A genetic subgrouping of 16 East Chadic languages is proposed in this paper. Contrary to the popular lexicostatistical approach, and in order to take into account potentially different rates of lexical evolution in the individual languages, it is attempted here to rely on the identification of common innovations. A practical method is presented how to apply the notion of common innovation when working with lexical isoglosses. This new method can also serve as a model for the subgrouping of language families other than East Chadic.

Keywords

Chadic, subgrouping, genetic tree, language classification, phylogenetics, lexicostatistics.

The scope of this paper is twofold: First, I propose a refined genetic subgrouping of the East Chadic languages, the Eastern branch of the Chadic linguistic stock, which is in turn a part of Afro-Asiatic. Second, this is an exemplification of a new method of linguistic subgrouping, which intends, if not to replace, but to complement the existing methods that have been used for this purpose, in particular lexicostatistics.

There is a striking disagreement between the ubiquitous recognition of common innovation as the only valid criterion for establishing genetic relationships on the one hand, and the wide-spread practical lack of actually using it on the other. The most usual method of subgrouping has in fact been lexicostatistics, which has also repeatedly been applied to Chadic, even to East Chadic in this journal (Blažek 2008). I do not want to generally dismiss the use of this method, since it is easy to apply and relies on a relatively solid amount of data (typically 100 core lexical items per language). As is well known, the essential premise of lexicostatistics is the assumption of an equal lexical replacement rate for all languages considered. In reality, the lexical

replacement rates of most languages are indeed likely to cluster around an average value, which brings them at least close to this premise, but it is also to be expected that certain languages evolved at considerably higher or lower speed. As a result, those languages whose lexical replacement rates are either much higher or much lower than the average will most likely be misclassified. Languages that evolved considerably faster than most others will be mistakenly assigned a peripheral position in the tree, whereas highly conservative languages will end up in a more central position than where they should be.

There have in recent years been various attempts at applying phylogenetic or cladistic methods, which are much used in biology, and which can be very sophisticated mathematically, to historical linguistics with the goal of avoiding the necessity of identifying innovations.[1] While these methods may have some advantages over traditional lexicostatistics, I argue that the fundamental flaw of the latter has not been overcome even by the most advanced phylogenetic approaches. This can be demonstrated by a very simple thought experiment. Assume a language family consisting of three members *A*, *B*, and *C*, where *A* and *B* form a subgroup as opposed to *C*. Assume further that *A* experienced an enhanced rate of development, to the effect that the number of remaining cognates is higher between *B* and *C*. It is evident that any purely statistical method, whatever mathematical calculus may be used, will cluster *B* and *C* together rather than *A* and *B*. Any conceivable procedure of establishing the real family tree must include some kind of originality statement, such as the identification of at least one innovation common to *A* and *B*. My claim therefore is that there is simply no way around the classic requirement of identifying common innovations in order to find the correct tree. What we can do, however, and this is the core idea of the new method proposed here, is to reduce the number of innovations required to be identified to the absolute minimum.

Common innovations are generally hard to identify. With respect to lexical isoglosses in particular, it is very often impossible to know which of two different lexical representatives is original and which one is innovative. This is the reason why this requirement, while widely recognized in theory, is so rarely applied in practice.

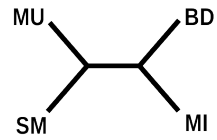
I am proposing here a solution to this problem, which has been described more thoroughly in Peust (2012) to which the reader is referred for more details. The idea is to split the task into two steps. In the first step, the requirement of distinguishing between retentions and innovations is simply dropped. This still allows for the construction of a tree, though of an unrooted tree that does not show the direction of development. The construction of an unrooted tree is relatively easy and secure since one just has to identify isoglosses with no need to make originality statements at this point. Only in a second step, we

[1] The literature is abundant; let me only refer to Bowern & Atkinson (2012) as one example of a sophisticated application of computational phylogenetics to a little-researched language family.

need to find at least one directionality argument by which the unrooted tree can be suspended from one point and turns into a rooted tree. This is where the requirement of identifying innovations comes in. The method proposed here cannot eliminate the delicate task of making originality statements altogether. But it requires such statements only one or a few times at the very end of the procedure rather than over and over again during the whole process of building the tree, which is what was deemed necessary in classic historical linguistics.

Consider the following four East Chadic representatives of the concept "to jump" (see below for the two-letter language codes employed throughout this paper): MU *hòról* – SM *pâr* – BD *bēr-ēŋ*[2] – MI *kááwó*. I assume that the forms of SM and BD are cognate, while the two others are not. In a purely quantitative approach such as lexicostatistics, this would count as an indication for a closer relationship between SM and BD. In the qualitative approach pursued here, this type of evidence (1–2–1) is considered insignificant, because it remains open whether the cognate is a common innovation or a common retention.[3] In this approach, single attestations can never contribute anything to the reconstruction of the tree, neither to the positive nor to the negative.

What, however, does count is 2–2 evidence as in the following example featuring the concept of "moon": MU *tírí* – SM *dúrù* – BD *kōyā* – MI *kóóyò*. It would be mistaken to count this as evidence for two subgroups MU-SM and BD-MI, as classic lexicostatistics would have it, since one of these terms may well be a retention.[4] But the 2–2 evidence indicates that *at least one* of the two terms is most likely a common innovation. This follows from the reasonable assumption that Proto-East-Chadic probably had a single most common term for "moon", and that the promotion of another term into this role in two (or more) languages is unlikely to have taken place independently, but was rather an innovation of their common ancestor. This kind of evidence can be graphically represented by an unrooted tree fragment as follows:



The essential point of the unrooted tree fragment is that it leaves open which of the two terms is innovative, it is only stated that (at least) one of them must be innovative.

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[2] As far as possible, I cite verbs in the infinitive. If the infinitive includes a consonantal suffix, as *-eŋ* in BD, it will be separated from the root by a stroke.

[3] In fact, a retention is likely in this particular case, since Jungraithmayr & Ibriszimow (1994, I: 104) reconstruct a root **p-r* "to jump" at the Proto-Chadic level.

[4] In fact, **t-r* most probably is, as to judge from its broad representation in all branches of Chadic.

My classification will propose a subgrouping of 16 East Chadic languages for which I have sufficient documentation at my disposal. They will be abbreviated by two-letter codes. A brief list of these 16 languages follows, for each of which I indicate the approximate number of speakers according to Ethnologue (www.ethnologue.com), as well as my main lexical source. All lexical items for which no reference is given have been drawn from this main source. Quotations will only be provided for items retrieved from secondary sources.[5] My particular thanks go to the scholars who shared vital unpublished materials with me, most prominently to Herrmann Jungraithmayr, without whose published and unpublished documentation of numerous East Chadic languages the present study would have been impossible, as can be easily read off the bibliographical references at the end of this paper.

BA: Barain, 4 100 speakers (1993). Main source: Lovestrand (2015, documenting the Jalkiya dialect).
BD: Bidiya, 14 000 speakers (1981). Main source: Alio & Jungraithmayr (1989).
BG: Birgit, 10 400 speakers (2000). Main source: Jungraithmayr (2004).
DA: Dangla, 60 000 speakers (2005), in three dialects. I draw from the Eastern dialect. Main source: de Montgolfier *et al.* (1976).
KA: Kajakse, 10 000 speakers (1983). Main source: Alio (2004: 229–248).
KE: Kera, 50 500 speakers (1993). Main source: Ebert (1976).
KW: Kwang, 16 800 speakers (1993), in three dialects. I draw from the Mobu dialect unless indicated otherwise. Main source: Jungraithmayr (1976a).
LE: Lele, 26 000 speakers (1991). Main source: Simons Cope (2010).
MI: Migama, 20 000 speakers (2000). Main source: Jungraithmayr & Adams (1992).
MO: Mokilko, 12 000 speakers (1990). Main source: Jungraithmayr (1990).
MU: Mubi, 35 300 speakers (1993). Main source: Jungraithmayr (2013).
NA: Nancere, 81 000 speakers (2007). Main source: Hamm (2002: 23–27)[6]. The documentation of this language is weak, but I decided to include it in this study because it is the largest of all East Chadic languages. I also cull a few words out of the Nancere New Testament translation (Ogekob Ku Herua), citing book and

[5] I use the following diacritics: *à* low tone, *ā* mid tone, *á* high tone, *â* falling tone, *ǎ* rising tone, *ã* nasal vowel.

[6] In that source, all verbs are cited along with the 3rd sg. masc. subject proclitic *ba-*, which will be omitted here.

verse number in a footnote. Tones of this language have not been researched and cannot be indicated.

SK: Sokoro, 5 000 speakers (1994). Main source: Marba (1990). For verbs, I prefer the records by Jungraithmayr (2005).

SM: Sumray, also called Sibine, 7 410 speakers (1993). Main source: Jungraithmayr (1976b).

TU: Tumak, 25 200 speakers (1993). Main source: Caprile (1975).

UB: Ubi, 1 100 speakers (1995). Main source: Alio (2004: 264–276).

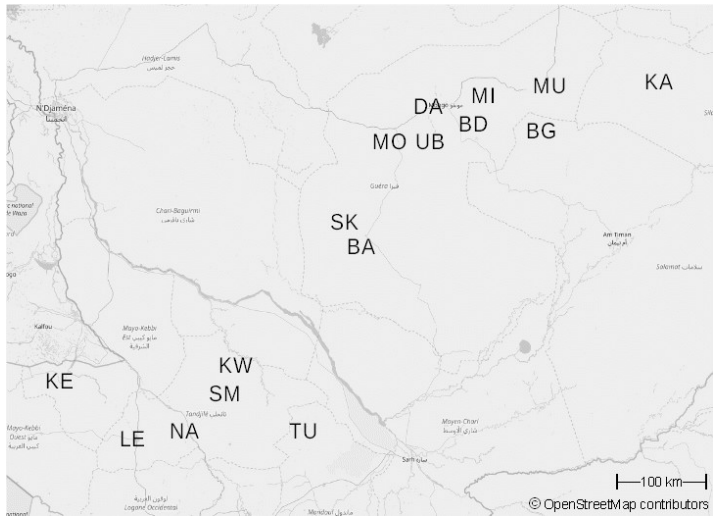

Figure 1. Location of the East Chadic languages

Here is my suggested unrooted tree, which I have composed from multiple 2–2 unrooted tree fragments:

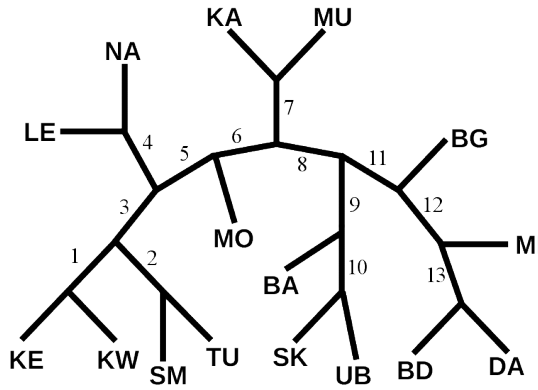

Figure 2. Unrooted tree of the East Chadic languages

The tree contains 13 edges. Each of these needs to be justified by at least one 2–2 item, i.e. a notion that has distinct representations on both sides of the edge, each of which is supported by at least two (better more) languages. I will present three such items for justifying each edge. Usually, not all languages will be mentioned, partly due to gaps in the documentation, and partly because languages that have isolated terms, not related to any of the two, can be freely ignored. It must only be made sure that there are no contradictions, or if there are, that they can somehow be explained away, either as borrowings or as independent parallel developments.

Edge 1: "flour" KE *kūntí* = KW *kúdú* ≠ SM *bùrɑ̃* = TU *bàṛ* = LE *kùbrà* = NA *kubəra*[7] = MU *bùt* = SK *bita(n)*[8] = BG *bùtà* = MI *bíttá*. A root **n-t* on one side of this edge as against **b-t* (> **b-r*) on the other, with a fossilized gender prefix *k-* in some of the western languages.[9] Even if **n-t* should derive through **m-t* from **b-t*, as suggested by Jungraithmayr & Ibriszimow (1994, I: 69), this divergence would probably be irregular and would count as a non-trivial replacement, unlikely to occur independently. • "long" KE *kīmbílí* (m.), *tēmbélá* (f.) = KW *ɲèmbəlè* (m.), *ɲèmbəlà* (f.) ≠ SM *syɑ̃rē* = MO *sòʔùrú* = KA *sīgàr* = MU *sàgár* = UB *jāggà* = BG *sìrká*[10]. KE and KW clearly share a term on their own, whose first radical was displaced by gender prefixes in KE. • "to hear" KE *əskí* = KW *sēgē* ≠ SM *dwʌ̀jə̀* = TU *dõ* = LE *dẽŋlí* = NA *dəŋgəl* = KA *dúggìyà* = MU *jègé* = BA *jíí*. I assume that the various words in *ɗ-* (*d-*, *j-*) belong to one root that might have been approximately **ɗ-ŋg-*. The nouns for "ear" of a few more languages (BG *údúŋgì*, BD *dɛ́ŋgà*, DA *dẽŋgè*) clearly belong here, too, probably having been derived from the verb. The oscillation between *ɗ-* and *d-* might be in part due to imprecise documentation rather than real. The root **s-k* of KE+KW is evidently a root on its own. The close relationship of KE and KW, even though geographically considerably apart, is already well-established (Ebert 1987).

Edge 2: "meat" SM *dònī* = TU *dòn* ≠ KE *kúsúkí* = KW *késú* = LE *sìí* = NA *sĩ* = MO *séy* = BA *sùù* = BG *súɗɗî* = MI *súúdú* = BD *sūūɗò*. Opposition of **d-n* versus **s-(d)*, the latter having been augmented by a gender prefix *k-* in the KE-KW subbranch. • "place" SM *mánà* = TU *mán* ≠ KE *kō* = KW *kòò* =

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[7] Ogekob Ku Herua Mt 13:33.

[8] Jungraithmayr & Ibriszimow (1994, II: 145).

[9] We will encounter many more instances of gender prefixes (usually *k-* masc. and pl.; *t-* fem.) below. A detailed study of the East Chadic gender prefixes is still a desideratum, but see Schuh (1983: 171–175) for a preliminary discussion.

[10] Translated as "long" by Marti et al. (2007) and as "haut" by Jungraithmayr (2004). Both meanings can very well be correct at the same time.

LE *kūr* = NA *koro*[11] = MU *wèr* = MI *wèré* = DA *wēr*. The second root is **w-r*, which adopted the gender prefix in the western languages and, as I assume, lost its final radical in KE and KW. SM+TU clearly share a different root. • "with" SM *gánd-* = TU *kāàn* ≠ KE *də̀* = KW *də̀-* = NA *də*[12] = MO *tí* = MU *tí* = BD *tí*. Several East Chadic languages share a preposition **d-* (~ *t-*) which is widely used elsewhere in Chadic and even beyond, e.g. Hausa *dà*, Common Berber *d-* "with, and". SM+TU innovated this term.

Edge 3: "his (possessive suffix 3rd sg. masc.)" KE *-u*[13] = KW *-u*[14] = SM *-u*[15] = TU *-o*[16] ≠ LE *-iy*[17] = NA *-i*[18] = MO *-ì*[19] = SK *-i*[20]. It is less certain, but irrelevant for this tree fragment, whether also forms from further east such as BA *-jì*[21], BD *-y(ī)* ~ *-jī*[22] or MI *-tì*[23] can be identified with *-i*; it suffices to be convinced that they do not belong to *-u* (which would contradict the tree). • "one" KE *mənà* = KW *mən* = SM *mən* = TU *məən* ≠ LE *pìnà* = NA *pəna* = KA *fīnē* = MU *fíní* = BA *pániŋ* = UB *pīndārì*. While Jungraithmayr & Ibriszimow (1994, I: 131) keep these roots entirely apart, I consider it more likely that this is a phonetic rather than a lexical isogloss. It is nonetheless suitable for subgrouping.[24] • "he-goat" KW *cúwī*[25] = SM *gùwā* = TU *gəwí* ≠ LE *bùlóbùló* = NA *ɓal* "mouton"[26] = MO *báàlè* "grand (bouc)" = SK *bàl*[27] = MI *bòòlîyyú* "bélier".

While I assume that KE-KW-SM-TU belong together in the unrooted tree, there is a striking feature that unites a different quadruple KE-KW-LE-NA, namely the frequent addition of gender prefixes to nouns, which can most probably be regarded as frozen former determiners. Since these prefixes occur in SM and TU to a much lesser extent, there might seem to be evidence in favour

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[11] Lami (1942: 150).
[12] Lami (1942: 134).
[13] Ebert (1979: 130).
[14] Ebert (1987: 63).
[15] Jungraithmayr (1978: 184).
[16] Caprile (1975: 29).
[17] Frajzyngier (2001: 63).
[18] Hoffmann (1971: 8).
[19] Jungraithmayr (1990: 38).
[20] Lukas (1937: 27).
[21] Lovestrand (2012: 76).
[22] Alio & Jungraithmayr (1989: 38).
[23] Jungraithmayr (1992: 42).
[24] A similar phonetic irregularity recurs in the numeral "four", which has initial *w-* in the westernmost languages: KE *wāādẽ* = KW *ùdày* = SM *wādə̄* = TU *wərī*, contrasting with *p-* (~ *f-*) in all remaining East Chadic as well as most other Chadic languages, e.g. LE *pōrīŋ* = NA *pərĩ* = MO *pìdé* = MU *fádà* = BA *púdú* = MI *póódí* = DA *pōōdì* = Hausa *húdú* ~ *fúdú*.
[25] Ngam dialect. The form of the Mobu dialect is not attested.
[26] Lami (1942: 109).
[27] Jungraithmayr & Ibriszimow (1994, II: 169).

of a node KE-KW-LE-NA rather than the KE-KW-SM-TU node proposed here. Examples include "mouth" KE *kū* = KW *kùū* = LE *kùb* = NA *kwobə* = SM *bǐ* = TU *bə̀g*, "blood" (see edge 10 below), and "moon" (see edge 12 below). But some of these isoglosses cut through well-established subgroups, such as "smoke" with the prefix missing in NA (KE *késé* = KW *kīsé*[28] = LE *kūsá* = NA *usiyə* = SM *sàwē* = TU *hàw*)[29], or "hunger" with the prefix missing in KW (see edge 10 below). To make it worse, prefix variation is found even within KW dialects: "name" Mobu dialect *sěm* vs. Ngam dialect *kásə̄m*; "egg" Mobu dialect *sēēgá* vs. Ngam dialect *tásāynká*. This leads me to the conclusion that the fusion of determiners and nouns used to be an areal phenomenon particularly within the KE-KW-LE-NA region at some not so very remote time in the past, rather than proving a common genetic ancestor of these four languages.

Edge 4: "year" LE *ɗīglē* = NA *ɗəgəl* ≠ KE *lé* "passer l'année" = KW *ōlīyē* = SM *ālīyā* = TU *ə̄lāy* = KA *ìlāāg* = MU *ílgí* = BA *wālō* = BG *àláákâw* "année pl." = MI *ìlà* = BD *àlgò* = DA *ìlgò*. The most common East-Chadic root for this concept is **ʔ-l-(g)*, from which also a verb "to spend the year" is formed in several languages (e.g. SM *ālī*, MI *áláw*, BD *àlg-èŋ*, DA *álgé*). LE and NA have a different term in common. • "to count" LE *tīb* = NA *təp* ≠ KW *gə́sé* = SM *āsə̄* = MO *kízè* = SK *àsə́m*[30] = DA *ósé*. I assume that the forms with and without initial velar are related, even though a precise explanation is lacking. Other forms such as KE *ánké* and TU *mbōj* are isolates and neither support nor contradict the tree. • "to hide" LE *làáɲ* = NA *lãy* ≠ KE *mété* = KW *bóɗé* "couvrir" = SM *bwə̄də̄* = MO *òmbìɗá*. LE+NA share a common term (with the development of a nasal vowel in NA as often in this language), as opposed to a root **ʔ-mb-t* which I see in the other four languages cited.

LE and NA are closely related. There is an old study by Lami (1942) which treated both of them at the same time as dialects of a single language. Lami claims that his glossary entries without specification are common to both idioms, but this information seems to be unreliable. When drawing Nancere words from that book, I accept only those as being Nancere that are either explicitly specified as such, or that occur in Lami's Nancere texts.

Edge 5: This edge corresponds to the split between "East Chadic *A*" and "East Chadic *B*" in traditional classifications.[31] Examples: "sun" KE *cə́wá* = KW

[28] Ngam dialect. The form of the Mobu dialect is not attested.

[29] A root **s-w/y* is also attested elsewhere in East Chadic, e.g. UB *sīyò*. The development *s-* > *h-* is regular for TU.

[30] Jungraithmayr (2005: 180).

[31] More details at the end of this paper. The designations "*A*" and "*B*" were coined by Newman (1977: 6). Roberts (2009: 129) refers to both branches as "Chari-Logone" and "Guéra", respectively.

túwá = SM *dāwā* = TU *dēw* = LE *tùwà* = NA *təba*[32] ≠ MO *pèèdɔ́* = KA *fààtī* = MU *fàt* = SK *píʔò* = UB *pūdĩyò* = BG *fòòtó* = MI *páátó* = BD *páátō* = DA *pátó*. While **p-t* is the dominant root for "sun" in the whole of Chadic, **t-w* is originally the noun for "fire" (see edge 8 below), which took over also the meaning "sun" in a part of East Chadic, namely the group known as "East Chadic *A*" (Jungraithmayr & Ibriszimow 1994, I: 161). • "to break" KW *báyé* = SM *bì* = TU *pàj* = LE *bòy* = NA *bi*[33] ≠ MO *dáʔìmá* = BA *dímō* = SK *dɛ̄ɛ̄má*[34] = MI *dĩímó* = DA *ɟíímé*. TU *pàj* with *p-* may be a frozen pluractional, since pluractionals with initial devoicing are in fact formed from this verb in some languages.[35] • "my (possessive suffix 1st pers. sg.)" KE *-n*[36] = KW *-n*[37] = SM *-n*[38] = TU *-n*[39] = LE *-iŋ*[40] = NA *-(ə)ŋ*[41] ≠ MO *-o*[42] = KA *-co*[43] = MU *-jò* ~ *-ɨ́*[44] = BA *-jù*[45] = SK *-du/-tu*[46] = BG *-tù*[47] = MI *-tù*[48] = BD *-dū*[49] = DA *-dù*[50]. The possessive suffix *-n* is an evident innovation whose origin lies in the 1st pers. sg. direct object clitic, which is *-n* (~ *-no*, etc.) in the whole of East Chadic. The UB form *-nò*[51] (homophonous with the 1st pers. sg. direct object clitic of that language) contradicts my tree; I take this as an independent analogical innovation of the same kind that I posit for the whole branch on the left.

Edge 6: "to send" KE *gè* = KW *gʎ̄yē* = SM *gì* = LE *gùúy* = NA *gwi* = MO *ìgíbè* ≠ MU *ɲám* = BG *ɲààmí* = MI *ɲáámó* = BD *ɲāām-èŋ* = DA *ɲáámé* "donner (de main à main), échanger". Two different roots **g-w-y* and **ɲ-m* (with a semantic shift in DA), respectively. • "to moisten" KW *rásé* = MO *òrsé* ≠ MU *bàsé* =

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[32] Lami (1942: 161).

[33] Lami (1942: 133).

[34] Jungraithmayr (2005: 182).

[35] More details at the end of this paper. On the notion of frozen pluractionals see Schuh (2008: 278).

[36] Ebert (1979: 130).

[37] Ebert (1987: 63).

[38] Jungraithmayr (1978: 184).

[39] To be concluded from examples like *yó-n* "ma mère" provided by Caprile (1975).

[40] Frajzyngier (2001: 61).

[41] Hoffmann (1971: 8).

[42] Jungraithmayr (1990: 38f.).

[43] Alio (2004: 233).

[44] Jungraithmayr (2013: 55); Peust (2014: §§20–30).

[45] Lovestrand (2012: 76).

[46] Lukas (1937: 27). I suspect that also some nouns cited by Lukas such as *šintu* "älterer Bruder" in fact include the 1st sg. possessive suffix.

[47] To be concluded from examples like *bìì-tù* "ma bouche" provided by Jungraithmayr (2004).

[48] Jungraithmayr & Adams (1992: 42).

[49] Alio & Jungraithmayr (1989: 38).

[50] Shay (1999: 96).

[51] Alio (2004: 266).

SK *pezo* "naß"[52] = UB *pécò* "humide" = MI *bààsò* = BD *bòòs-èŋ* = DA *bóósé*. • "to hide" MO *òmbìdǎ* etc. (see edge 4 above) ≠ MU *càgál* = MI *kììlò* = BD *cīgīl-ēŋ* = DA *ʃígílé*. Jungraithmayr & Ibriszimow (1994, I: 91) reconstruct the second root as **t-g-l*, assuming that MI *kìì-* derives from **cgil-* < **cigil-* < **tigil-*, and connect herewith a few West Chadic verbs in **t-g*. If this were true, the term to the left would have been identified as an innovation. However, I believe that the West Chadic connections cannot be maintained, since MI *kìì-* is no doubt from **kìgìl-* with a loss of a non-initial radical *-g-*, which is regular for this language,[53] so that the root must be **k-g-l* rather than **t-g-l*.

Edge 7: "bone" KA *kùnōōnò* = MU *kúnóónō* ≠ KE *kəskə́ŋ* = KW *gìsìgí* = SM *gùsʌ̂ŋ* = TU *gùūy*[54] = LE *íìsí* = NA *əsə* = MO *òssé* = BA *āssí* = SK *ɛ̀síŋì* = UB *èsà* = BG *ásó* = MI *àssú* = BD *káskō* = DA *kāāsō*. The root **k-s* "bone" is considered one of the best established Chadic – and even Afro-Asiatic – lexical roots (also Hausa *ƙàshī*), although the representation of the first radical as a velar in some languages and as zero in others has not yet been properly explained (cf. Jungraithmayr & Ibriszimow 1994, I: 17). KA+MU have obviously replaced this term by a shared innovation. • "dog" KA *fúká* = MU *fúgá* ≠ TU *gá* (pl. *gār-ág*) = LE *gìrà* = NA *gra* = MO *gédè* = SK *kúyì* = UB *kūyù* = BG *kájàŋ* = MI *kâŋŋà* = DA *kāŋà*. The numerous Chadic terms for "dog" with *k-* (or *g-*) all seem to be related, even though the subsequent radicals cannot be established with certainty (Jungraithmayr & Ibriszimow 1994, I: 49 reconstruct **k-ɗ-n*). This is even one of the candidates for a Proto-World etymology, cf. e.g. Kanuri *kərì*, Songhay *hansi* as well as various forms subsumed under **kuan* by Bengtson & Ruhlen (1994: 302f.). While there is an initial *k-* also in KE *kóóyá* and KW *kíyé*, these forms cannot belong here, since *k-* is not a part of the root but the masc. gender prefix (cf. KW *táyá* "chienne" with the fem. gender prefix *t-*). A neologism obviously replaced the inherited root in KA+MU, but the original term still survives marginally in MU in the expressions *kŭrkúr* "chiot" and *kórè* "terme utilisé pour appeler un chien". • "guinea-fowl" KA *ɲābùlō* = MU *ɲèbèló* ≠ KE *súlkú* = KW *sùlgó* = SM *síbəə̄ṛí* = TU *hībə́l* = LE *sīmlí* = MO *sùbìló* = BA *jébílé* = UB *sōbīlà* = BG *zòbòló* = MI *zóbíló* = BD *zòbìlò* = DA *zóbíló*. For this animal term, a root **z-b-l* is wide-spread throughout the whole of Chadic (Jungraithmayr & Ibriszimow 1994, I: 84). I assume that also the term of KE+KW is from this root but was expanded by a suffix, so that, e.g., KE *súlkú* derives from **subul-ku*. KA+MU imposed an irregular sound change **z* > *ɲ* on the first radical of this word.

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[52] Lukas (1937: 38).

[53] Cf. BD *àlg-èŋ* = MI *áláw* "to spend the year", BD *ègīy-ēŋ* = MI *éèwò* "to fry", BD *rāgìʃ-ēŋ* = MI *ṛòòcò* "to whip", BD *rēgìm-ēŋ* = MI *rúúmó* "to cook". The loss of *-g-* in MI seems to have proceeded through a stage with *-w-*.

[54] Probably from **gùhūy*; the development *s* > *h* is regular for this language.

Edge 8: "to bite" KW *éndé* = SM *yīdə̄* = TU *gə̄d* = LE *hīr* ~ *yīr* = NA *yər* = MO *áʔìdá* = KA *āādān* = MU *àwàdé* ≠ BA *ómó* = SK *ɔ̀ɔ̀má*[55] = UB *ōōm-ìn* = BG *ùmí* = MI *óómó* = BD *ōm-èŋ* = DA *ómé*. Two roots that Jungraithmayr & Ibriszimow (1994, I: 11) reconstruct as **ƙ-d* and **ʔ-m*, respectively. Since the first one has good parallels outside East Chadic, the second, which does not, can be considered a common innovation. Cf. also "to eat" discussed at the end of this paper. • "fire" KE *cə́wá* = KW *túwá* = SM *dūwā* = TU *də̄w* = LE *tùwà* = NA *tuwa* = MO *ùwwó* = KA *kàwī* = MU *kèwwí* ≠ BA *àkà* = SK *ókò* = UB *ákò* = BG *àkù* = MI *ókkò* = BD *àkō* = DA *ákó*. The nouns on the left side of this isogloss all have feminine gender, where gender has been documented. I therefore surmise that *t-/d-/c-* in KE through NA is the feminine gender prefix which must have been attached to a noun of a form **ʔ-w* resembling the term *ùwwó* still preserved in MO. The root **k-w* of KA+MU is probably identical, with a *k/ø*-alternation as in the noun for "bone" (see edge 7). By contrast, I assume that the root **ʔ-k* to the right of this isogloss is not directly related but either a derivation with some vocalic augment, or even – more likely – an entirely different root. • "front" KE *tīīnə̄* = KW *jǐn* = LE *gìn-* = MU *gìn* ≠ SK *on-*[56] = MI *ún* = BD *ūn-* = DA *ūŋ*. Two roots which can be reconstructed as approximately **gin-* (with the feminine gender prefix in KE) and **un-*, respectively.

Edge 9: "place" BA *dòò* = SK *diin*[57] = UB *dìnà* ≠ **w-r*, a widespread East Chadic root (forms cited above under edge 2). • "wound" BA *guppo* "infection of a wound" = UB *jèpà* ≠ MO *mùttó* "vieille plaie" = MI *múút* = DA *mútú*. The noun for "wound" remains undocumented from many of the relevant languages. Nevertheless, it looks like a reasonably good isogloss based on my limited data. • "to sing" BA *lii* = SK *lē-ŋ́*[58] = UB *lī-n* ≠ KE *kə́rów* "chanson" = KA *rāāw* = MU *ràwwá* = BG *rááyà* = MI *ríyáw* = BD *rē-ŋ* = DA *rēē-ŋ*. These are perhaps not two distinct roots but a single one in which initial *l-* of one group of languages corresponds to *r-* in the other. Depending on the interpretation, we either have a lexical or a phonetic isogloss, but it can serve as evidence for subgrouping in either case. The evidence for the subgroup BA+SK+UB is not quite as firm as I would wish, certainly also due to the meagre state of documentation of these languages, but others established the same subgroup based on independent arguments (Roberts 2009: 129; Blažek 2011: 53).

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[55] Jungraithmayr (2005: 182).

[56] Lukas (1937: 37): *ontum* "deine Stirn".

[57] Doris Weiss (SIL), personal communication.

[58] Jungraithmayr (2005: 179).

Edge 10: "bee" SK *soŋe*[59] = UB *sōyò* ≠ KE *tùm* = KW *tûm* = SM *dūmbū* = TU *dəm* = LE *tùmbō* = NA *tumbə*[60] = MU *úùm* = BA *jembu* = BG *ìmìyó* = MI *ʃîmbè* = BD *ʃîmbē* = DA *ʃīīmè*. I reconstruct the second root as **ʃ-mb*. Since this is generally a feminine noun,[61] I assume that the initial *t/d-* of the western languages (KE through NA) is the agglutinated gender prefix rather than a direct phonetic correlate of **ʃ-*. SK+UB clearly share a different term. • "hunger" SK *sɔ́ɔ́kò* = UB *cóógō* ≠ KE *táy* = KW *máyá* = TU *māy* = LE *tīmē* = NA *təmə* = MU *mè* = BA *mìì* = BG *màyà* = MI *màyà* = BD *mēyā* = DA *màyà*. Most languages, but not so SK+UB, retain reflexes of the wide-spread Chadic root **m-y*, some of them (KE, LE, NA) again with the feminine gender prefix *t-*. • "blood" SK *sàwʔá*[62] = UB *sēdɛ̀* ≠ KE *kōr* = KW *kúwáár* = SM *bàrē* = TU *bà* = LE *kùbàrò* = NA *kubra* = KA *àbàr* = MU *òbòr* = BA *bāārí* = BG *bàrà* = MI *báárá* = DA *báárì*. Most languages show a root **b-r* (some of them with gender prefix *k-*), whereas SK+UB share a different term, probably with a debuccalisation **ɗ > ʔ* in SK.[63] The close relationship of SK and UB, also seen by others (e.g. Lovestrand 2013: 122), is noteworthy since the two languages are not geographically adjacent.

Edge 11: "star" KE *sēská* = KW *tàsəgá* (pl. *kààsìsì*) = SM *désū* = LE *tèsé* = NA *tisə* = KA *sīsīīwī* = MU *síísùwá* = BA *tíísí* = SK *sèsú* ≠ BG *kààlì* = MI *kààlú* = BD *kāālō* = DA *kààlō*. The first root, approximately **s-*, was either reduplicated or expanded by the feminine gender prefix *t/d-*; KE+KW show a singulative suffix in addition. • "woman" SM *dyʌ̀mé* = TU *dèēm* = LE *tāmá* = NA *tamə* = BA *mèé* = SK *mɛ̀ʔɛ́* = UB *mēyè* ≠ BG *dáátì* = MI *dààté* = BD *dāātē* = DA *dāādì*. The languages to the left share a root **m-*, which was again expanded by a feminine gender prefix in the west. Many more Chadic languages have terms in *m-* (e.g. Hausa *màcà*), which may or may not all be related (negatively Jungraithmayr & Ibriszimow 1994, I: 179). A clearly different root **daat-* appears on the right side of this isogloss. • "stone" MO *mókkòló* = BA *dùkúlò* = SK *búgùl* ≠ BG *dàmbì* = MI *dâmbú* = BD *dàmbō* = DA *dámbì*. I take the three terms on the left side as related in spite of the variable initial consonant.

Edge 12: "moon" KE *kítír* = KW *kìdīr*[64] = SM *dúrù* = TU *dəṛ* = LE *gìdìrè* = NA *kədərə* = MO *térè* = KA *tīīrī* = MU *tírí* = BA *túrú* = BG *tèrè* ≠ MI *kóóyò* = BD *kōyā* = DA *kòyè*. The first root **t-r* is a well-known Pan-Chadic root and

[59] Lukas (1937: 39).
[60] Ogekob Ku Herua Mt 3:4.
[61] Excepted BG where it has been documented as masculine.
[62] Jungraithmayr & Ibriszimow (1994, II: 31).
[63] A parallel debuccalisation occurred in "sun", see edge 5 above.
[64] Ngam dialect. The form of the Mobu dialect is not attested.

has been expanded by the masculine gender prefix *k/g-* in some of the western languages. MI+BD+DA share a different root. • "excrements" KE *kūsī* = KW *kúsíɲ* = SM *əsīɲ* = LE *kāsíɲā* = NA *kəsĩa*[65] = KA *àsày* = MU *àsè* = SK *issi*[66] = UB *īsò* = BG *ìsèy* "déchets" ≠ MI *dóòyú* = BD *dòòyō* = DA *dòòyó*. The root on the left side appears to be **ʔ-s-(ɲ)* and again took the (pluralic) noun prefix in some of the western languages. Jungraithmayr & Ibriszimow (1994, I: 61) reconstruct this root as **ʃ-s-n*, assuming cognates also in various West Chadic languages. The gloss "déchets" of the BG item is somewhat ambiguous, but I assume that it was intended to mean "excrements". The term of MI+BD+DA is evidently an innovation of this subgroup, possibly from a verbal origin (cf. BD *dòòy-èŋ* = DA *dóóyé* "déféquer"). • "long" wide-spread root **s-g-r* (see above under edge 1) ≠ MI *bòlgítà* = BD *bùlóók* = DA *bòlókí*.

Edge 13: BD and DA are relatively closely related, with numerous shared lexical items. Examples include "flour" MI *bíttá* etc. (more forms cited above under edge 1) ≠ BD *kūrgāl* = DA *kùrgàl*. • "thigh" KA *fùùdì* = MU *fùúdí* = BG *fáádì* = MI *pàátè* ≠ BD *túmsē* = DA *tūmkè*. • "to sit" MO *kóndɛ̀* = BG *ùntí* = MI *nùntò* ≠ BD *gòy-èŋ* = DA *gòyē*. The full extension of the root to the left is not quite clear, with phonetically more remote forms such as TU *əɲ* "habiter, rester, être quelque part", LE *jèn*, KA *jóòn*, UB *ūn-ìn* perhaps being related, too. BD *-eŋ* is not a part of the root but the infinitive marker of this language.

To be sure, there are also terms that contradict my tree, but I believe that they are overall less probative than those on which the tree has been based, reflecting kinds of relationship that are not strictly genetic. In particular, there is a group of words for which some members of my assumed BA-SK-UB subgroup join the languages to the west, which disagrees with the tree. All such cases that I am aware of turn out to be borrowings from Bagirmi. This is a non-Chadic language which is rather small these days, but used to be much more influential in the past by being the major idiom of the Bagirmi empire, and which evidently exerted a strong influence on some Chadic languages that were geographically close. Examples:[67] "donkey" MU *dúrgúl* = UB *dùrkūl* = BG *dúrkùl* = MI *dùrkúl* = DA *dúrkúl* ≠ KW *kùrà* = TU *kòrā* = NA *kura*[68] = BA *kūró* (< Bagirmi *kùrò*). • "louse" MU *ídéedí* = BG *ìtàátì* = MI *ítàátá* = DA *íttà* ≠ KW *ŋgə́rsà* = TU *ŋgírsā* = NA *gərsa* = BA *gírsà* = SK *gə́ṛsà* (< Bagirmi *ŋgɨ́rsā*). • "work" UB *rīyò* = DA *rìyó* ≠ KW *cídá* = BA *kítà* = SK

[65] Ogekob Ku Herua Lk 13:8.

[66] Lukas (1937: 34).

[67] Only a selection of East Chadic languages is cited here. My source for Bagirmi is Keegan & Djibrine (2016).

[68] Ogekob Ku Herua Mt 21:2.

cida[69] (< Bagirmi *cídà*). • "long" root **sgr* (see edge 1 above) ≠ TU *jàmíì* = SK *njam*[70] (< Bagirmi *jàmò*). While the terms to the left of each isogloss may well be inherited Chadic roots, those to the right were borrowed from Bagirmi, where in turn some of them ultimately derive from Kanuri, a major language of West Africa (cf. Kanuri *kórò* "donkey", *cídà* "work").

It also occurs that some terms of individual languages not strictly identifiable as borrowings contradict the tree, but are not strong enough to force a different tree reconstruction. An example is the verb for "to know", essentially represented in East Chadic by two roots **ʔ-s-n* and **ʔ-b-n*, which are by and large divided across edge no. 6, that is, as I will argue below, at the main split within East Chadic: KE *ásé* = KW *ásəné* = SM *ʔwʌ̀jə̀ŋ* ~ *ʔwʌ̀síŋ* = TU *hàn* = LE *sèn* = NA *sən* = MO *sùùné* ≠ KA *yāwāndī* = MU *yán* = BA *wonno* = SK *íbín*[71] = BG *ìbìní* = MI *ìbìnò* = DA *ìbìnē*.[72] There is one striking exception, namely Bidiya (BD) *ìsìn-ēŋ*, which makes an eastern language share the characteristic root of the west. Since Bidiya is otherwise firmly tied to the other languages of the east, we cannot reassign this language based on this single isogloss. The root **ʔ-s-n* can be considered as more original, having good parallels elsewhere in Chadic as well as in Berber (cf. Jungraithmayr & Ibriszimow 1994, I: 107). The other root **ʔ-b-n* may either formerly have had a different meaning that changed into "to know", or may have been borrowed from a non-Chadic source (for potential extra-Chadic links cf. Hoffmann 1970: 7–9). In either case, I have to assume that the promotion of **ʔ-b-n* to the standard term for "to know" spread as an areal phenomenon over most of the eastern half of East Chadic with the exception of Bidiya, in other words, that the distribution of these two roots cannot be explained in a strictly genetic manner.

After an unrooted tree has been established, it is now necessary to proceed to the second step of the tree reconstruction, that is to introduce some directionality arguments in order to turn it into a proper family tree. This task is equivalent to identifying one of the 13 edges of the tree as its root, from which to suspend the whole tree. Edge no. 5 would on first sight seem to be a good candidate for this, since all traditional classifications have seen here a major split within East Chadic, namely between "East Chadic *A*" (= the languages to the left of my edge 5) and "East Chadic *B*" (= the languages to the right).[73] However, I consider it more likely that edge 6 is in fact the root rather than edge 5. This is because I believe to see a few innovations common to all the languages to the left of edge 6. In addition to the three items employed above in order

[69] Lukas (1937: 31).
[70] Lukas (1937: 36).
[71] Jungraithmayr (2005: 178).
[72] In TU, *s* > *h* is regular. For KA+MU, I assume a development **ibˇn-* > **yˇwˇn-*.
[73] See notes 31 and 78.

to establish edge 6 (none of which allowed for an originality statement), I can offer two more such items where the term on the left side is arguably innovative: "to eat" KE *hàmè* = KW *wê* = SM *wʌ̄m* = TU *wə̄m* "manger (de la viande)" = MO *óòmí* ≠ KA *tùwà*[74] = MU *tìyá* = BA *tíí* = SK *tē-ŋ́*[75] = UB *tî-n* = MI *tíyáw* = BD *tē-ŋ* = DA *téé-ŋ*. The root **t-* is considered the most basic root for "to eat" of Chadic as a whole and still provides the most common term for that notion in the languages to the right of this edge. In the other half of East Chadic, this root has been lost and was replaced by a root **w-m*, which exists with the meaning "to bite" in several of those East Chadic languages that have preserved **t-* (see edge 8 above). It appears plausible that a verb for "to bite" was generalized to become the standard term for "to eat" in the western subbranch of East Chadic, making a good case for a common innovation. A second, though weaker case is "to cook" KW *ándə́ré* "cuire" = SM *hāŋdə̄* "cuire" = TU *āŋ* "cuire dans de l'eau" = LE *hīndī* "cuire à l'eau" = MO *ɗóɗɗírè* "cuire" ≠ MU *rígám* "kochen (trans.)"[76] = UB *rūgūm-ìn* "bouillir" = MI *rúúmó* "cuire" = BD *rēgìm-ēŋ* "cuire des graines" = DA *rúgúmé* "faire cuire dans l'eau". According to Rössler (1979: 28), the root **r-k-m* "to cook" is common to Chadic and Berber. This would then identify the term to the left – if the connections are valid – as an innovation. The weak point of this item is that the MO form is phonetically so deviant that its connection with the root to the left remains uncertain.

In almost all East Chadic languages, the noun for "earth, soil" derives from a root that might be reconstructed as **kiɗ-*[77], e.g. MU *kíɗí* = BA *kídá* = BG *kìɗó* = MI *kíɗà* = BD *kíɗā* = DA *kìɗà*. In the western languages including Mokilko, the initial consonant was palatalized, followed by some further phonetic developments or the attachment of pre- or suffixes in some of them: KE *sēŋgá* = KW *cə̀ɗó* = SM *síɲà* = TU *hə́ɲ* = LE *kūsíɲō* = NA *kəsə* = MO *sììɗó*. While a palatalization of /*ki*/ is certainly nothing exotic and may have taken place more than once independently, I see here at least another candidate for a common innovation of the western branch.

I can also offer a potential grammatical common innovation in what I assume to be the western branch of East Chadic. Numerous Mokilko verbs distinguish a perfective stem beginning with a voiced obstruent from an imperfective stem beginning with the corresponding voiceless obstruent, e.g. *zúyy-* (pf.) ~ *súyy-* (impf.) "to wash" (Jungraithmayr 1977: 73). In several other western languages, a voiceless initial radical has been described as a marker of pluractional verbs: Kera (Ebert 1979: 70, e.g. *gàr-* "pflanzen", pl. *kār-*), Kwang (Lenssen 1984: 48, e.g. *bə́ré* "sauter", pl. *pə̄rē*), Lele (Simons Cope 2010: 23, e.g. *bòy* "casser",

[74] Marti *et al.* (2007: 44).

[75] Jungraithmayr (2005: 179).

[76] Lukas (1937: 185).

[77] Which may in turn derive from the Proto-Chadic root **k̂-ɬ-d* posited by Jungraithmayr & Ibriszimow (1994, I: 54).

pl. *pōy*), and presumably also Nancere (Lami 1942: 155 "*pi* ou *bi*: casser", functional distinction not indicated). If these phenomena can be identified with each other, this would be a good candidate for a grammatical innovation, since a similar initial devoicing has not been reported, as far as I know, from any other Chadic language.

It would also have been desirable to identify some common innovations for the languages on the right side of edge 6, something which I have not yet been able to produce. But neither did I find any common innovation of East Chadic *B* including Mokilko, which would have been a reason to support the traditional bifurcation at edge 5.

These considerations lead me to suspend the tree from edge 6, which results in the following rooted tree of East Chadic:

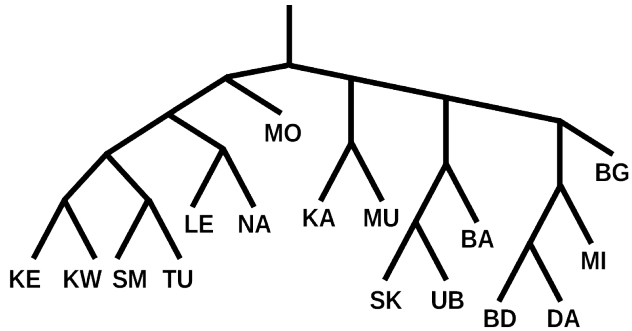

Figure 3. Rooted family tree of the East Chadic languages

Finally, let me briefly compare this tree to the subgroupings previously proposed by others. There is agreement in many details, that is in several of the lower subgroups, which is a welcome confirmation of them as they have been established by entirely different methods. The major discrepancy of my tree compared with the previous classifications concerns the position of Mokilko (MO). Mokilko has for long been considered as belonging to the eastern subbranch ("East Chadic *B*"), a result that has been reaffirmed by all recent studies on the subject.[78] By contrast, I consider Mokilko as a member of "East Chadic *A*", more precisely as the first split-off within this subbranch. How should this difference be interpreted?

On first glance, Mokilko is not very closely related to either any other East Chadic *A* or East Chadic *B* language, being instead quite isolated linguistically.[79]

[78] E.g. Newman (1977: 6-9, who saw a "fairly sharp distinction" between the *A* and *B* subbranches); Newman (2013); Barreteau & Jungraithmayr (1993: 127); Jungraithmayr & Ibriszimow (1994, II: xv); Blažek (1994; 2008: 134f.; 2011: 42); Lovestrand (2013: 122).

[79] Herrmann Jungraithmayr (personal communication) characterizes Mokilko as the "enfant terrible" of East Chadic.

While it is geographically closer to East Chadic *B*, it is spoken within an isolated mountain range, being largely surrounded by speakers of (non-Chadic) Kenga, so that Mokilko might well be a left-over of some ancient wave of migration from which it hence became geographically separated. I assume that one major reason for which Mokilko used to be included in East Chadic *B* is its grammatical structure. As all the other East Chadic *B* languages, also Mokilko has a very complex morphological system including verbal tenses formed by ablaut, extensive nominal plural formations, and clear formal case distinctions (direct object vs. indirect object vs. possessive) of the pronominal clitics. This contrasts with the much more impoverished morphology of typical East Chadic *A* languages. But instead of assigning Mokilko to East Chadic *B*, I suggest that Mokilko is rather a particularly conservative East Chadic *A* language, which has retained many traits from Proto-(East-)Chadic that were lost in its sister languages. In the same way that the grammatical systems of most East Chadic *A* languages suggest a particularly progressive stage of development, it seems plausible to assume an accelerated rate of linguistic change also for their lexicon. This would then have removed the East Chadic *A* languages so much from Mokilko, the most conservative representative of their branch, that Mokilko appeared to be closer to East Chadic *B* in lexicostatistical studies. I assume that these similarities are not due to common innovation but to common retention, thus constituting a typical artifact where lexicostatistics is susceptible to misclassification.

If my reconstruction is correct, we can also read off the tree the different weights that the individual languages can contribute to the reconstruction of Proto-East-Chadic. Mokilko takes a paramount position for being the first branch-off of East Chadic *A*, and at the same time their most conservative representative. On the side of East Chadic *B*, Kajakse and Mubi are particularly important, since they constitute the first branch-off within this group and therefore have the same stemmatic weight as all the other East Chadic *B* languages taken together. At the same time, Mubi also appears to be one of the most conservative Chadic languages, as has been repeatedly argued by Herrmann Jungraithmayr (most recently in Jungraithmayr 2018), and this is most likely true also of Kajakse, a language that is, however, still seriously in need of better documentation.

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[80] I am grateful to Herrmann Jungraithmayr for having shared this manuscript with me. Only parts of these materials are publicly available, particularly through Jungraithmayr & Ibriszimow (1994), Lenssen (1984) and Ebert (1987).

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