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Classification and description of the Chadic languages of the Guéra (East Chadic B)

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ABSTRACT

East Chadic B is a subbranch composed of twenty languages of the Chadic family (Afroasiatic phylum) located in and around the Guéra region in the Republic of Chad. This paper draws attention to this underdocumented group of languages by looking back over the history of taxonomical, descriptive and comparative studies. Data gathered in past studies are compiled together with data from recent field work into the most comprehensive comparative study to date. An updated internal classification, based on the results of this study, is presented. Among other modifications proposed, a currently unclassified language, Kujarge, is shown to be a member of the East Chadic B subbranch. Finally, information from grammatical studies of sixteen languages is compiled into a first step towards a typological overview of East Chadic B languages.

# Contents

1. Introduction[1]

Chadic is a language family in the Afroasiatic phylum. The East branch of Chadic consists of thirty-six of the 195 Chadic languages listed in the 16th edition of the Ethnologue: Languages of the World (Lewis 2009). These languages are all located in the Republic of Chad. They are divided into two subbranches corresponding to geographic clusters. One subbranch is labeled A, and its languages are located in the Chari-Logone area of southern Chad. The other is labeled B, and its languages are located in and around the Guéra region (*région*) near the center of Chad. This study focuses on the Chadic languages of the Guéra region (East Chadic B).

   Much of what has been published in the name of historical and typological Chadic linguistics gives very little, if any, attention to the East branch of the Chadic family. This paper draws attention to the Guéra subbranch, in particular, by compiling past and recent studies into a convenient general overview. This compilation of information from many different sources provides a base camp for linguists wanting to explore this group of languages. It also revisits the sub-classification of the subbranch and provides an updated working hypothesis based on the lexical evidence available.

   Section 2 reviews previously published and unpublished studies concerning the Guéra subbranch, including the history of their classification, descriptive works and comparative works. Section 3 presents the results of a lexicostatistical analysis done by compiling information from previous comparative studies and adding data from recent field research. It compares the lexical similarity of all languages in the Guéra subbranch except one. This is the most complete comparative study of the subbranch to date. This section proposes four changes to the current classification found in the 16th edition of the Ethnologue (Lewis 2009): 1) move Mawa and Ubi to B3, as has been suggested by several other linguists, 2) move Birgit and Toram to B1.1, 3) move Baraïn from B3 to its own group in the subbranch, 4) include the currently unclassified Kujarge in a new subgroup B1.3. Section 4 presents a synthesis of descriptive studies covering the phonemes and CV structures commonly found in the Chadic languages of the Guéra. Section 5 briefly looks at the pronominal systems found in these languages. Section 6 is a final summary and conclusion.

Map 1. Chadic languages of the Guéra region: East Chadic B (SIL)
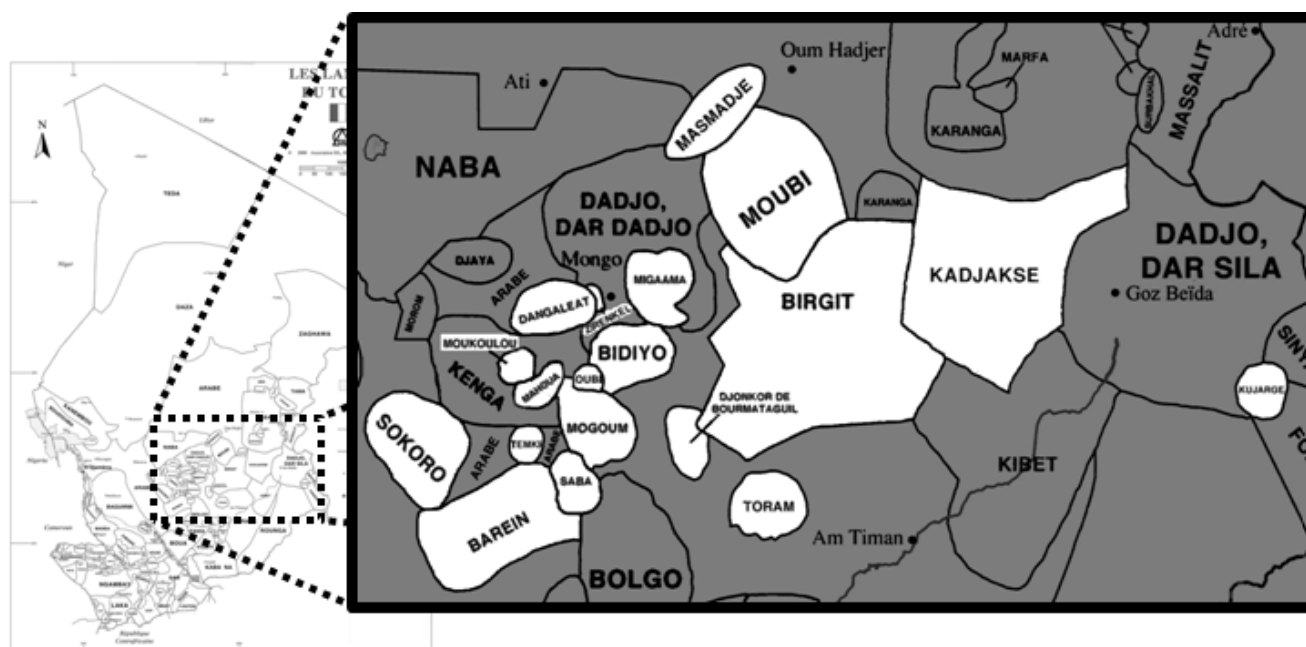
2. Background

This section reviews past linguistic works involving the Chadic languages of the Guéra including taxonomical, descriptive and comparative works.
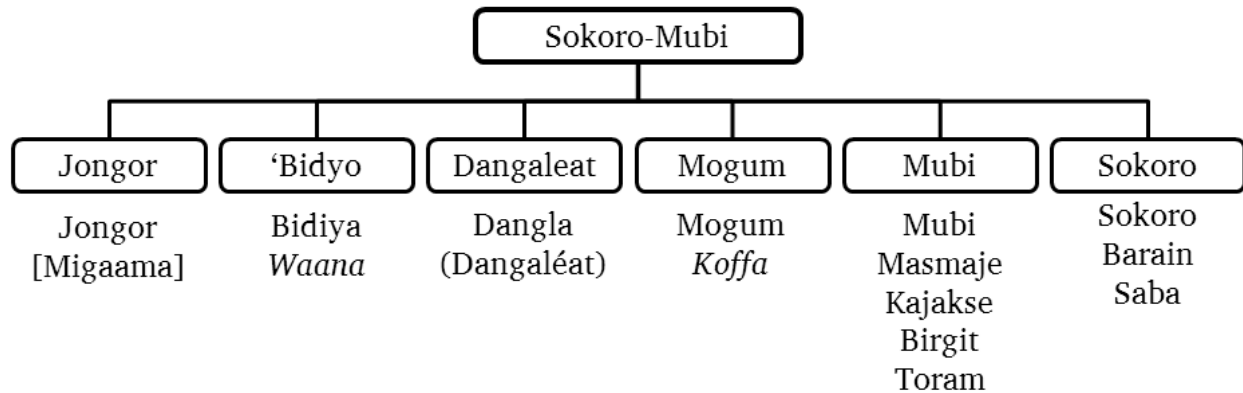
2.1. Classifications

The history of the classification of Chadic languages through 1978 is clearly laid out in Barreteau and Newman (1978). There are five prominent linguists who have been primarily responsible for shaping the current classification of the Chadic languages of the Guéra.

2.1.1. Johannes Lukas

Some of the earliest documentation of Chadic languages of the Guéra is found in the work of Johannes Lukas (e.g., Lukas 1936, Lukas 1937). His efforts at classification of these languages are no longer cited, since he promoted the concept of Hamitic languages, now considered obsolete. His classification scheme was published in Westermann and Bryan (1952).[2] Their work in classifying the East Chadic languages was, in their own wording, "tentative" (1952:153). In the list of Chado-Hamitic languages, the Chadic languages of the Guéra are called the Sokoro-Mubi group. The internal organization is a flat structure of six languages or "dialect clusters" (1952:168). All but two of the so-called dialects are now considered languages. The five languages which Lukas called Mubi and the three languages he called Sokoro are still grouped together in the current classification.[3]

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[2] In the introduction, Lukas is thanked for drafting "several sections." Newman and Ma (1966:footnote 4) makes explicit that he drafted the chapters on Chadic and Chado-Hamitic. This is also confirmed by Barreteau and Newman (1978:294).

[3] However, the current study indicates that the categorization of three of those languages (Birgit, Toram, and Baraïn) is erroneous.

Chart 1. Lukas' classification in Westermann and Bryan (1952)[a]

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                        ┌─────────────────┐
                        │   Sokoro-Mubi   │
                        └─────────────────┘
   ┌─────────┬───────────┬────────────┬───────────┬─────────┬─────────┐
┌──────┐ ┌────────┐ ┌───────────┐ ┌────────┐ ┌────────┐ ┌─────────┐
│Jongor│ │ 'Bidyo │ │ Dangaleat │ │ Mogum  │ │  Mubi  │ │ Sokoro  │
└──────┘ └────────┘ └───────────┘ └────────┘ └────────┘ └─────────┘
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| Jongor [Migaama] | Bidiya *Waana* | Dangla (Dangaléat) | Mogum *Koffa* | Mubi Masmaje Kajakse Birgit Toram | Sokoro Barain Saba |

[a] The spelling of some language names has been modernized. Brackets indicate the current name if the other name is out of use. Parentheses indicate an alternate name. Italics indicate a dialect in the current Ethnologue classification (Lewis 2009).
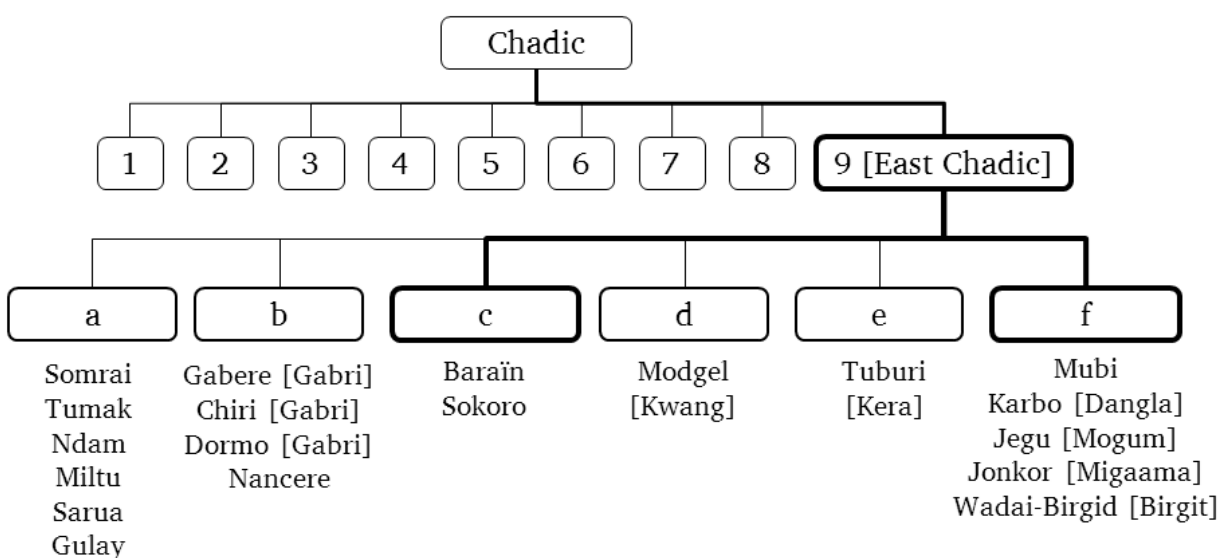
2.1.2. Joseph Greenberg

Joseph Greenberg was the linguist who crystalized the modern concept of the Chadic family as part of the Afroasiatic phylum during his work on classification in the 1950's and 1960's (Greenberg 1963).[4] His work effectively removed the "cryptoracial" concept of Hamitic from linguistic classification (Blench 2006b:140). The concept of the Chadic family as a distinct unit in the Afroasiatic phylum has been widely accepted.[5] Greenberg's classification organizes the Chadic languages into nine "ill-defined" groups (Blench 2006b:147).

Greenberg's group 9 is what is known today as the East Chadic languages. It is divided into six subgroups. The Chadic languages of the Guéra (Lukas' Sokoro-Mubi group) are split into subgroups 9c and 9f. This is an attempt to delineate the internal structure of this geographic cluster of languages by separating the southernmost languages (9c, Lukas' Sokoro languages) from the other Chadic languages of the Guéra (9f). However, by maintaining a flat structure of six subgroups, Greenberg implies that the Chadic languages of the Guéra should not be considered a linguistic unit anywhere in the hierarchy. In this classification, Baraïn and Birgit are given full language status. Bidiya mysteriously disappears.

[4] Blench remarks that, half a century before Greenberg, Leo Reinisch made the link between several languages that make up Afroasiatic, which he called "Chamitische" (Blench 2006b:142).

[5] The history and validity of the Chadic family is discussed in Barreteau and Newman (1978), Ruhlen (1991), Newman (1978), Newman (1980), and Blench (2006b), among other works.

Chart 2. Greenberg's classification of East Chadic languages (1963)[a]


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                              ┌──────────┐
                              │  Chadic  │
                              └──────────┘
    ┌────┬────┬────┬────┬────┬────┬────┬──────────────────┐
  ┌───┐┌───┐┌───┐┌───┐┌───┐┌───┐┌───┐┌───┐┌──────────────────┐
  │ 1 ││ 2 ││ 3 ││ 4 ││ 5 ││ 6 ││ 7 ││ 8 ││ 9 [East Chadic]  │
  └───┘└───┘└───┘└───┘└───┘└───┘└───┘└───┘└──────────────────┘
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a	b	c	d	e	f
Somrai Tumak Ndam Miltu Sarua Gulay	Gabere [Gabri] Chiri [Gabri] Dormo [Gabri] Nancere	Baraïn Sokoro	Modgel [Kwang]	Tuburi [Kera]	Mubi Karbo [Dangla] Jegu [Mogum] Jonkor [Migaama] Wadai-Birgid [Birgit]

[a] Brackets indicate the current name of the language or the language of which the speech variety is currently considered a dialect.

After Greenberg cleared the fog of the Hamitic fallacy, Paul Newman and Roxana Ma (Newman) were the first to closely examine the internal relationships of the Chadic languages (Newman and Ma 1966). They organized Greenberg's nine groups into two branches: Biu-Mandara (groups 2 through 8) and Plateau-Sahel (Groups 1 and 9). Plateau-Sahel is subdivided into West (group 1) and East (group 9). Their paper makes no comment on the internal structure of the East Chadic languages.

2.1.3. Carl Hoffman

Carl Hoffman accepts Newman and Ma's two-branch scheme in his "provisional" list of languages (1971). He makes a few minor changes related to the Chadic languages of the Guéra. Kajakse and Masmaje are considered languages, not dialects of Mubi. Bidiya is restored to the list. The Sokoro dialect Bedanga and the Dangla dialect Karbo are elevated to language status. Today, both are classified as dialects (Lewis 2009). Baraïn is placed with Greenberg's subgroup 9f, leaving Sokoro and Bedanga in their own unit. Though this proposal is ignored in later classifications, the current study indicates that Hoffman was right in claiming that Sokoro is the most unique (at least in terms of its lexicon) of the languages included in his list, and that Baraïn is no more similar to Sokoro than to any other Chadic language in the Guéra.

Chart 3. Hoffman's classification (1971) based on Newman and Ma (1966)[a]
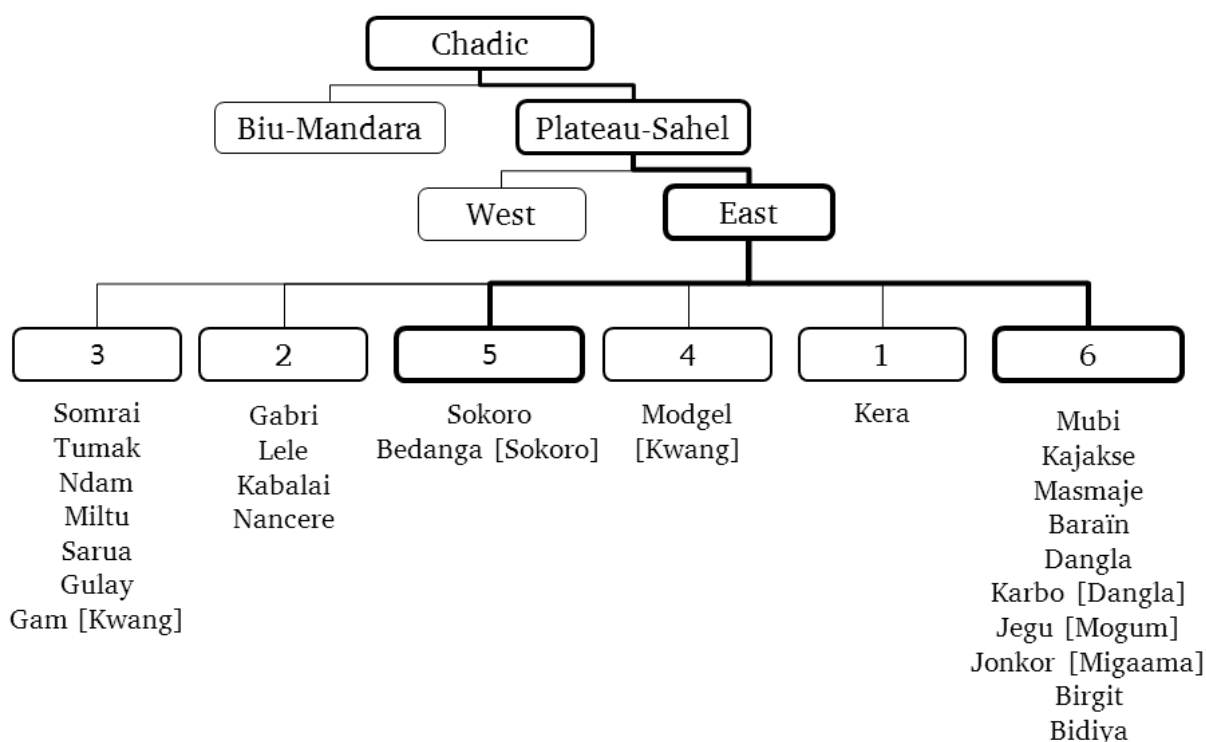
[a] Brackets indicate the current name of the language or the language of which the speech variety is currently considered a dialect.

2.1.4. Herrmann Jungraithmayr

Jungraithmayr prepared a list of Chadic languages in 1972, to be published almost a decade later in Jean Perrot's reference book: *Les langues dans le monde ancien et moderne* (Jungraithmayr 1981a). A selected list (only Chadic languages spoken in Chad) was published in 1973 using the same framework (Caprile and Jungraithmayr 1973).[6] In Jungraithmayr's scheme, Chadic languages are divided into three groups: West-East (Newman's Plateau-Sahel), Center-East (Biu-Mandara), and Center-West (Masa). The West-East group is made up of fourteen subgroups with no intermediate level in the hierarchy, in contrast to Newman and Ma (1966) and Hoffman (1971), who had distinguished West Chadic languages from East Chadic languages. Subgroups eleven through fourteen make up the Chadic languages of the Guéra.

Saba and Toram are considered languages for the first time, and the previously unmentioned Mukulu, Mawa, and Jonkor Bourmataguil find a place in the classification. Mukulu is given its own group. Mawa and Jonkor Bourmataguil are grouped together with Dangla. These three languages, together with Migaama,[7] are now split off from the other languages of Greenberg's subgroup 9f

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[6] It should be kept in mind that "Chadic" is a language family spread across several African countries including Nigeria and Cameroon, as well as Chad. The adjective for languages spoken in the Republic of Chad (Chadic or not) is "Chadian." There was some discussion about this terminology and its translation into French and German in the Chadic Newsletter (No. 4 1972, No. 5 1973). At that time, some Francophone and Germanophone scholars preferred to revert to more antiquated terminology (i.e., Hamitic) instead of coining a new term to make the distinction. The term "tchadique" is now in common use in French.

[7] Jungraithmayr also includes "Doge" as a language. It is now considered a dialect of Migaama known as Dooga (Lewis 2009).

(Hoffman's 6). The remaining group (Mubi-Toram) is identical to Lukas' Mubi "dialect-cluster" except for the addition of Mogum.[8]

There is a discrepancy between the 1972 list (Jungraithmayr 1981a) and the 1973 list (Caprile and Jungraithmayr 1973). The earlier classification lists Bidiya in the Mubi-Toram group and the later with Dangla. The 1973 classification of Bidiya with Dangla is confirmed by Jungraithmayr in two later publications (Jungraithmayr and Shimizu 1981, Barreteau and Jungraithmayr 1993).

Chart 4. Jungraithmayr's 1972 classification (Jungraithmayr 1981a)
with modification by Caprile and Jungraithmayr (1973)
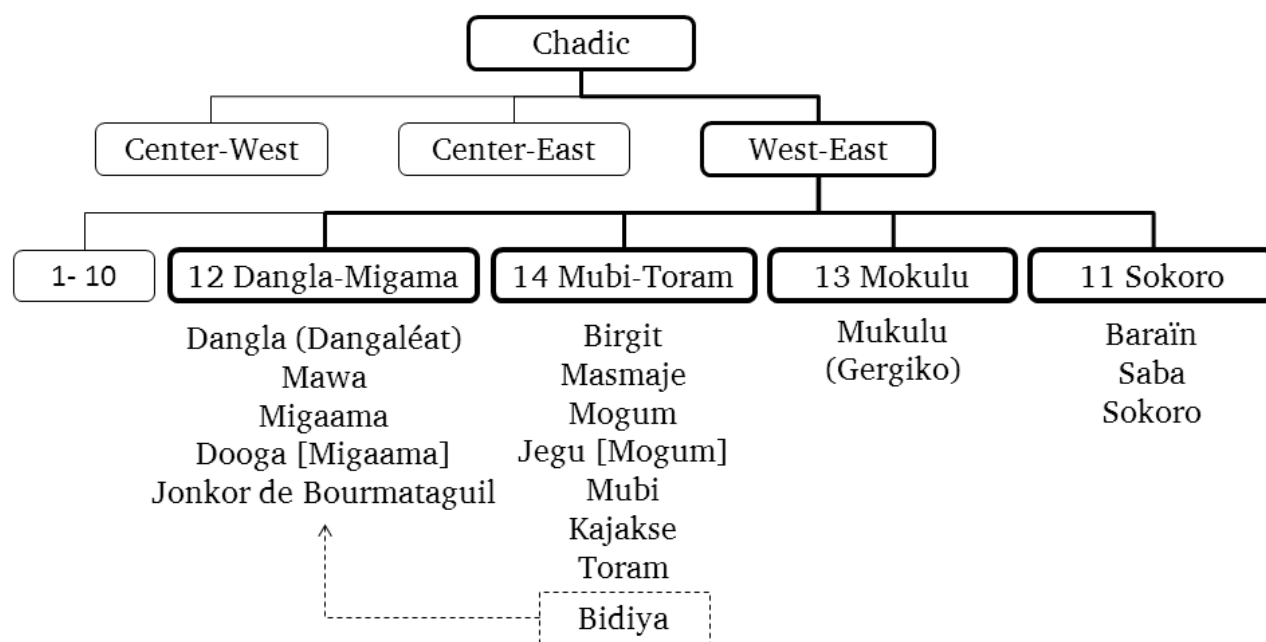
The creation of the Mukulu group and the splitting of the "Dangla-Mubi" group were significant innovations still reflected in the classification of the Guéra subbranch.

2.1.5. Paul Newman

A decade after his original classification, Newman doubled the number of Chadic branches from two to four (1977a). The new classification elevates the West and East subbranches of the former Plateau-Sahel branch to full branch status and, as suggested by Jungraithmayr, divorces the Masa languages from the Biu-Mandara (Central) branch. There has been a fair amount of debate over some of these divisions, especially the classification of the Masa languages (Blench 2006b:147, Shryock 1997, Tourneux 1990). None of this debate has involved the integrity of the East Chadic languages, which remain aligned with Greenberg's group 9. Only Jungraithmayr (1981a) suggested that the East Chadic languages not be grouped together into one unit at any point in the hierarchy—a point he concedes in later classifications (Jungraithmayr and Shimizu 1981, Barreteau and Jungraithmayr 1993).

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[8] Jungraithmayr (1981a) lists both Kofa-Mogum and Jegu as closely related languages instead of two dialects of the same language, as they are currently classified (Lewis 2009). The classification of Mogum with Mubi is challenged by Newman (1977a) and Blažek (2008). The current study indicates that the classification of Mogum with Mubi is unlikely.

Chart 5. Newman's classification (1977a)
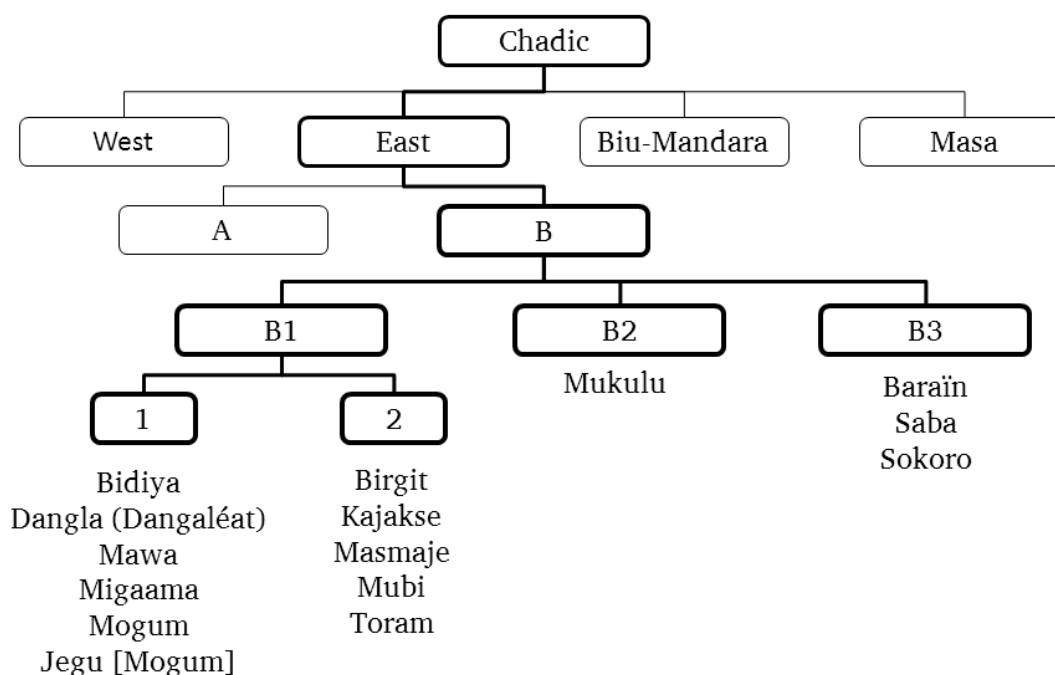
Newman's innovation is to add a layer to the internal organization of Greenberg's group 9 (East Chadic branch) by clustering his six subgroups into two subbranches. The division of the East Chadic branch into two units is supported by the geographic separation of the Guéra languages and by two recent lexicostatistical studies (Barreteau and Jungraithmayr 1993, Blažek 2008). Newman's subbranch A is in the Chari-Logone area in the southwest of Chad.[9] Subbranch B is in the Guéra region in the center of Chad.[10] Thus, in 1977, the Chadic languages of the Guéra are recognized as a unit in the classification for the first time since Lukas' Sokoro-Mubi group. Newman preserves the internal divisions proposed by Greenberg (1963), Hoffman (1971) and Jungraithmayr (1981a) by adding another layer to the hierarchy. Newman retains Greenberg's subgroup 9c, as did Jungraithmayr. He calls it B3. Yet another layer to the hierarchy allows the reunification of Greenberg's subgroup 9f, now B1, while still preserving the split made by Jungraithmayr, now B1.1 and B1.2. He moves Mogum from being grouped with Mubi (B1.2) to being grouped with Dangla, Bidiya and Migaama (B1.1). He follows Jungraithmayr in defining a separate unit for Mukulu (Gergiko, B2). Newman does not mention Jonkor Bourmataguil.[11]

Newman's classification synthesizes the insights of past linguists by adding several layers to the taxonomy, but the membership of each final node is based on limited data. While he is quite confident about the division of East Chadic into two subbranches, Newman qualifies his own internal classification

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[9] The Chari-Logone subbranch has three groups: A1, Greenberg's subgroup (a), A2, Greenberg's (b), and A3, which combines Greenberg's (d) and (e). Newman adds another layer to the classification by subdividing A1 and A2.

[10] James Roberts points out that the geographic names are a much more useful nomenclature than the letters A and B (Roberts 2009). I use "Guéra subbranch" to refer to the Chadic languages of the Guéra, or East Chadic B. The reader should keep in mind that the Guéra region of Chad includes Nilo-Saharan and Niger-Congo (Adamawa) languages.

[11] A subsequent publication claims that Jonkor Bourmataguil is another name for Mogum/Jegu (Barreteau and Newman 1978). This claim, for which no support is given, undoubtedly arises from the use of the derogatory term "Jonkor" (meaning "heathen") to refer to several different language groups including Migaama and Mogum (Roberts 1993). James Roberts did field research to confirm that Jungraithmayr was correct in labeling Jonkor Bourmataguil a separate language. The speakers he found called their language [duŋ], which is also the name of their village. Others called them "karakir" which means "cave-dweller" (Roberts 1993).

of East Chadic languages: "…the exact relationship among the groups making up each subbranch is much less clear; and I have, therefore, refrained from indicating further internal structure until fuller data on these languages become available" (1977a). Nonetheless, Newman's work serves as the basis of the current Ethnologue classification (Lewis 2009).

2.1.6. More recent classifications

Since 1977, more data have become available and several modifications have been proposed. There are several languages currently listed in Ethnologue that were not included in Newman's classification.

Ubi was first recognized in 1983 in a short note by Khalil Alio in the Chadic Newsletter. He later published a preliminary sketch of the language (Alio 2004a). The language was also the subject of an SIL sociolinguistic survey in 2001 (Hutchinson and Johnson 2006). The 2001 survey reveals that Ubi has a closer relationship to Mawa than to any other B1.1 language and classified it together with Mawa. The study did not include any B3 languages. Two linguists have independently proposed the same reclassification of Mawa and Ubi. Their proposal is that Mawa and Ubi should be moved from the B1 group to the B3 group because of their lexical similarity with Sokoro (Blažek 2011, Roberts 2009). The suggested classification is followed by at least one other Chadicist (Stolbova 2007, 2009).[12] The current study supports their analysis.

Zerenkel was previously considered a dialect of Mubi. Its status was changed in 2001[13] after a research team gathered data and completed a lexicostatistical analysis (Johnson 2005). Mabire remained undocumented until field notes from James Roberts lead to an SIL research trip to visit the last few speakers of this endangered language in 2001 (Johnson and Hamm 2002). It was added to the Ethnologue database that same year.

An SIL sociolinguistic survey was done in 1995 and Tamki was redefined as a language in the Ethnologue in 1999 (Dakouli et al. 1996). The Tamki consider themselves ethnically identical to the Sokoro. As late as 1999, Tamki was still considered a dialect of Sokoro by an SIL member living among the Sokoro (Martin 1999).

Although Newman (1977a) overlooked Jonkor Bourmataguil, the language is found in Jungraithmayr's classification (1981a, Caprile and Jungraithmayr 1973). Since the Ethnologue classification was based on Newman's work, Jonkor Bourmataguil was left out of the Ethnologue until Jungraithmayr's classification was recommended by SIL in 1995.[14]

In one publication, Jungraithmayr proposes that Mukulu be grouped together with Dangla and Migaama (Jungraithmayr and Ibriszimow 1994). However, Mukulu definitely stands alone in the Guéra subbranch, at least lexically. There is no debate. Jungraithmayr's earlier classification classes Mukulu in its own group, and he has since confirmed his earlier classification (Caprile and Jungraithmayr 1973, Jungraithmayr 1981a, Jungraithmayr and Shimizu 1981, Barreteau and Jungraithmayr 1993, Takács 2009a). The current study supports the current classification of Mukulu.

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[12] In an earlier classification, Stolbova listed Ubi with the B1.1 subgroup (2005).

[13] All dates of when a language was added to the Ethnologue database come from personal communication with Charles Fennig, Managing Editor of the Ethnologue.

[14] See footnote 11.

Chart 6. Ethnologue classification (Lewis 2009) based on Newman (1977a)
with recommended modification (Blažek 2011, Roberts 2009)[a]
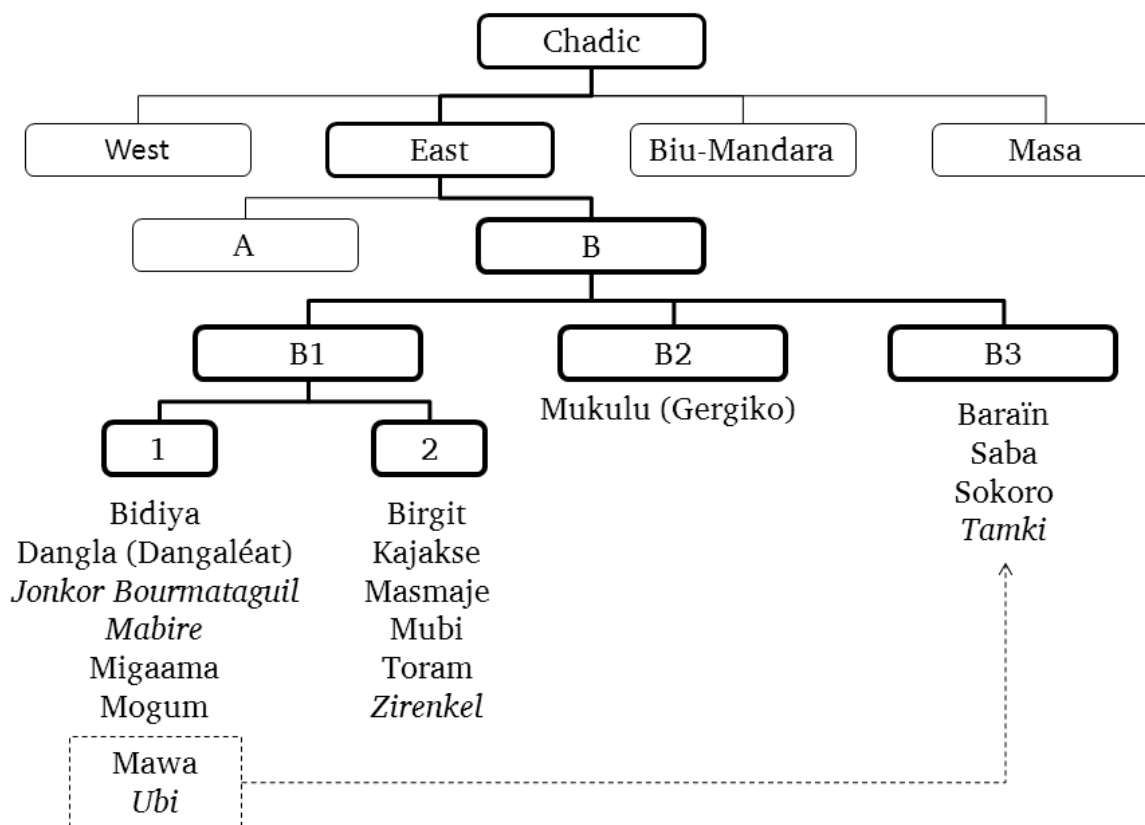
[a] Parentheses indicate an alternate name. Italics indicate a language that is not included in Newman (1977a) but that does appear in the Ethnologue (Lewis 2009).

One final language must be mentioned. An unpublished classification system for all Afroasiatic languages has been circulated by Roger Blench (2006a). Concerning the Guéra subbranch, his classification is similar to the current Ethnologue classification (Lewis 2009).[15] The crucial contribution of his list is to propose that the currently unclassified language, Kujarge, may also be a part of this subbranch. The current study supports previous suggestions that this is most likely the case.

2.2.   Descriptive works

Among the Chadic languages of the Guéra, Dangla (*Dangaléat* in the French tradition) has been the subject of the highest number of publications. Early on, this language group was visited by Johannes Lukas (1937). Multiple short works on the language have been published by Carl Ebobissé (1978, 1979, 1980, 1985, 1987) and Jacques Fédry (1969, 1971a, 1971b, 1971c, 1974, 1977, 1981, 1990), a dictionary (Montgolfier, de 1973), a thesis by Lawrence Burke (1995), as well a dissertation and research

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[15] Like Jungraithmayr, and unlike Newman, Blench does not combine the "Dangla" and "Mubi" units under a separate node but presents a flat structure of four groups (five including Kujarge). The current study supports Newman's classification. Blench accepts moving Mawa to his "Sokoro" group, otherwise equivalent to B3. However, he does not move Ubi. The current study suggests that both should be moved. He also mentions "Jelkung" as another language in the "Mubi" group. This has now been confirmed to be a dialect of Baraïn known as Jalking (Lovestrand 2011).

by Erin Shay (1994, 1999, 2008), among other works. The publications on this language cover phonology, morphology and syntax and have examined all three dialects of the language.

Herrmann Jungraithmayr is the most prolific producer of materials from the Guéra subbranch—including a plethora of short articles in lesser-known journals and hard-to-find publications. He has published or helped publish lexicons with short grammatical sketches for Migaama (Jungraithmayr and Adams 1992), Bidiya (Alio and Jungraithmayr 1989), and Mukulu (Jungraithmayr 1990, also: 1977a, 1977b, 1977c, 1977d, 1982, 1983, 1987a, 1987b, 2004b). Mukulu is also the subject of linguistic papers by Johannes Lukas (1974, 1977). Jungraithmayr has published shorter works on Mubi[16] (1968, 1978a, 1978b, 1987a, 1991), Birgit (2004a, 2005a), Sokoro (2005b), Mogum (1961, 1964) and Mawa (1981b). Unpublished lexicons for Mubi and Birgit have been circulated among some linguists, presumably originating from Jungraithmayr's field work. Mawa has been studied by James Roberts—a Chad-based SIL linguist. Most of his work (including a 1000-word lexicon) remains unpublished, except for an overview of the phonological segments (Roberts 2009).

Besides collaborating with Jungraithmayr on the Bidiya lexicon, Khalil Alio has published several short articles and a book-sized description of Bidiya (1986, 1987a, 1987b, 1988a, 1988b, 1988c, 2009). He more recently published a collection of texts in Bidiya (2004b). With the support of Jungraithmayr, he published preliminary sketches and short wordlists for Kajakse, Toram, Ubi, and Masmaje (Alio 2004a).

One of the oldest collections of linguistic data from the Guéra was gathered sometime between 1909 and 1912, but published forty years later (Rendinger, de 1949). A few pages of grammatical data are presented for Saba, Sokoro, Baraïn, Mogum and Bidiya, which he calls Dionkor. Wordlists have been collected for these languages, some early on by Johannes Lukas (Sokoro and Baraïn), and also more recently in the course of SIL sociolinguistic surveys (Bagwell et al. 1992, Chesley and Faris 1994, Dakouli et al. 1996, Lukas 1937, Maass et al. 1996).

SIL linguists have made some steps toward more complete linguistic descriptions of these languages. Though not yet completed, there will soon be a general description of the phonology, morphology, and syntax of Baraïn (Lovestrand forthcoming). There is a short description of the phonology of each dialect already available (Lovestrand 2011). Other SIL studies, not yet made available to the public, include preliminary analyses of Mogum, Saba and Sokoro (Kuipers 2010b, Sauer 2007, Martin 1999). A fourth language, Zerenkel, has been analyzed by a member of the *Fédération des Associations pour la Promotion des Langues du Guéra* (FAPLG) in cooperation with SIL (Ramat 2007, 2011).[17] Tamki, Kujarge, and the nearly-extinct Mabire have only been documented in short wordlists and have otherwise never been studied (Dakouli et al. 1996, Doornbos and Bender 1983, Johnson and Hamm 2002). I do not have access to any data for Jonkor Bourmataguil, except for a narrative description of a research trip to their homeland (Roberts 1993).

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[16] The earliest refernce to Mubi appears to be Lukas (1937).

[17] FAPLG is a community organization dedicated to the development and preservation of the Guéra languages and cultures through mother-tongue literacy. SIL partners with local communities through organizations like FAPLG in their efforts to maintain their cultures and languages through language development.

Table 1. Quantity of documentation and description

| more than lexicon and grammatical sketch: | (B1) Dangla (Dangaléat) [daa] |
	(B1) Bidiya [bid]
lexicon with grammatical sketch:	(B1) Migaama [mmy]
	(B2) Mukulu (Gergiko) [moz]
grammatical sketch/ lexicon in progress:	(B3) Baraïn [bva]
	(B1/B3) Mawa [mcw]
wordlist with preliminary sketches:	(B1) Birgit [btf]
	(B1) Masmaje [mes]
	(B1) Kajakse [ckq]
	(B1/B3) Ubi [ubi]
	(B1) Mubi [mub]
	(B1) Toram [trj]
unpublished preliminary analyses:	(B3) Saba [saa]
	(B3) Sokoro [sok]
	(B1) Zerenkel [zrn]
	(B1) Mogum [mou]
wordlist:	(B3) Tamki [tax]
	(B1) Mabire [muj] (nearly extinct)
	(B1) Jonkor Bourmataguil [jeu]
	Kujarge [vkj]

2.3. Comparative works

Comparative Chadic works have often suffered from limited data from East Chadic languages—particularly from the Guéra subbranch. In a relatively recent attempt to reconstruct Proto-Chadic roots, Stolbova complains of not being able to reconstruct any intermediary stages in Proto-Eastern Chadic "because of the dearth of material" (Stolbova 1996:5). Ten East Chadic languages (five from the Guéra subbranch: Mubi, Mukulu, Dangla, Migaama, Bidiya) were included in a "lexicostatistical and glottochronological" study of Chadic languages (Barreteau and Jungraithmayr 1993).

Lexicostatistical studies have been done by Blažek, focusing specifically on East Chadic languages (1994, 2008, 2011). As mentioned above, his research suggests placing Ubi and Mawa in the southern group B3. Alio has published a comparative study focusing on consonant shifts in Bidiya and Dangla (2009). Gábor Takács published a study of "sibilant affricates" in Bidiya (based on Alio and Jungraithmayr 1989) in an attempt to reveal the Afroasiatic roots of the language (2009a). He published a similar study involving the "Mubi-Toram" group (2009b).

Lexicostatistical studies have been done by SIL for small groups of languages. Most of these are published electronically on the SIL website. They include: comparison of Ubi, Mawa, Mabire, Mogum (Jegu), Dangla, Migaama and Bidiya (Hutchinson and Johnson 2006), Mubi and Zerenkel compared with Dangla (Johnson and Mbernodji 2006, Johnson 2005), comparison of Birgit, Kajakse, Masmaje and Mubi (Marti et al. 2007), Baraïn compared with Sokoro and Saba (Maass et al. 1996) and Saba compared with Sokoro, Tamki, Mogum and Baraïn (Dakouli et al. 1996).

Chart 7. Languages compared in previous lexicostatistical studies
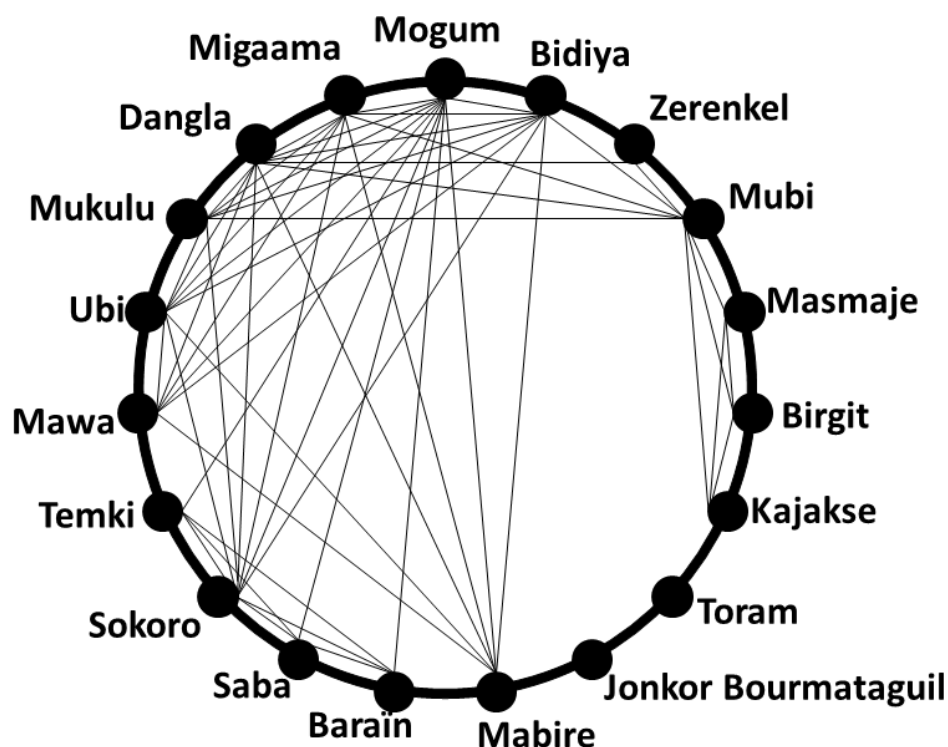
3. Lexicostatistical analysis

Lexical similarity between dialects and languages is measured by calculating the percentage of words that are phonologically similar. Since there is no objective method for determining phonological similarity, the resulting figure is subjective in nature. The subjectivity of the measurement is partially mitigated when the judgment of similarity is made by the same person throughout the study, resulting in an approximation of the relative similarities of languages and dialects. It would be a mistake to compare the raw numbers of one lexicostatistical analysis with another.

Some comparative studies show much higher raw figures than older sociolinguistic studies (e.g., Blažek 2011). Higher raw figures can be attributed to a looser definition of "phonological similarity" or to more in-depth studies of sound correspondences which allow the linguist to find traces of cognates that might not be immediately apparent. The current study is not a historical study and does not document the sound correspondences between languages. A more in-depth knowledge of the phonology of each language, and, in many cases, more reliable data would be required for such a study.

The SIL sociolinguistic surveys tend to give actual figures that are lower than the results of other comparative studies. This is natural since the sociolinguistic studies are concerned with intercomprehensibility and the later studies are concerned with historical and genetic relationships. Nonetheless, the relative similarities between languages are remarkably constant in all the studies.

The disadvantage of a lexical comparison is that it can easily overlook the effects of borrowing through language contact. Two languages with a close genetic relationship can appear to be only distantly related, if one or both have adopted many loanwords from a third language. Likewise, two languages that are only distantly related may appear to have a closer genetic relationship, if recent contact has led to an exchange of lexical items. Nonetheless, our knowledge in any other area of these languages is limited, and the comparisons that can be drawn are sporadic. We are, therefore, dependent

on the lexical data to establish a working hypothesis regarding the relationships between the Chadic languages of the Guéra.

3.1. Data sources

The data on the nineteen languages (excluding Jonkor Bourmataguil) in this study come from several different sources. The data on Mubi, Mawa, Mabire, Bidiya (Tounkoul dialect), Dangla (East dialect), Migaama (Baro dialect), Mogum (Jegu dialect) and Ubi are from an SIL sociolinguistic survey examining the position of Ubi (Hutchinson and Johnson 2006). The data on Zerenkel and Mubi, as well as Birgit, Masmaje, and Kajakse, are taken from two other SIL sociolinguistic survey reports (Johnson and Mbernodji 2006, Marti et al. 2007). The data for Sokoro, Saba, Tamki and Toram are taken from unpublished wordlists elicited by SIL. The data on Mukulu are taken from Jungraithmayr's lexicon (1990). The Kujarge data are from the field notes of Paul Doornbos. The data on Baraïn come from my field notes while in Chad in 2010.

The 160 item wordlist used in this study was once the standard of SIL sociolinguistic research. It was chosen because the data available for many of the languages are limited to this list. Due to several items not being included in one list or another, the actual number of words compared between most languages ranges from 137 to 153. The Kujarge list did not elicit the same items as the other lists, so it only provides between 89 and 95 comparisons.

Table 2. Number of words available for comparison between languages

Kujarge	Zerenkel	Mubi	Masmaje	Kajakse	Birgit (Abgué)	Mogum (Jegu)	Toram	Dangla (East)	Bidiya (Tounkoul)	Migaama (Baro)	Mabire	Ubi	Sokoro	Tamki	Saba	Mawa	Baraïn (Jalkiya)	Mukulu
89	Zerenkel																	
90	142	Mubi																
91	140	141	Masmaje															
91	141	142	144	Kajakse														
91	142	142	144	145	Birgit (Abgué)													
90	143	143	141	142	142	Mogum (Jegu)												
95	143	144	144	145	145	144	Toram											
90	144	143	141	142	143	144	144	Dangla (East)										
90	144	143	141	142	143	144	144	145	Bidiya (Tounkoul)									
90	141	141	139	140	140	142	142	142	142	Migaama (Baro)								
89	142	141	139	140	141	142	142	143	143	140	Mabire							
90	144	143	141	142	143	144	144	145	145	142	143	Ubi						
94	143	142	142	143	144	143	152	144	144	141	142	144	Sokoro					
93	140	140	140	141	142	140	150	141	141	138	139	141	149	Tamki				
95	144	144	144	145	146	144	154	145	145	142	143	145	153	151	Saba			
89	142	142	140	141	141	143	143	143	143	141	141	143	142	139	143	Mawa		
93	138	138	137	138	139	138	146	139	139	136	137	139	145	143	147	137	Baraïn (Jalkiya)	
93	140	140	140	141	142	140	149	141	141	139	139	141	148	146	150	139	143	Mukulu

The data was compiled and analyzed in the software known as WordSurv.[18] This program allows the linguist to simultaneously examine entries from every language in the database for a particular gloss, and to group the words according to their phonological similarity. The program then calculates the percentage of words that each language has in the same group with each other language.

3.2. Results

The percentages of phonologically similar words resulting from the comparison of nineteen Chadic languages of the Guéra are in the following table. Thicker black lines indicate where the statistics show a natural cluster of languages with relatively higher percentages of phonologically similar words. The clusters highlighted in the table closely reflect the current Ethnologue classification. There is a cluster that corresponds with the current B1.2 (Kajakse, Masmaje, etc.). Another cluster corresponds to B1.1 (Dangla, Migaama, etc.). These two clusters are slightly more similar to each other than to a third, which corresponds with B3 (Saba, Sokoro, etc.). The average percentage of phonologically similar words between the first two groups is approximately 35 percent. The average percentage of phonologically similar words of each of the first two groups with the third is 25 percent.

Table 3. Percentage of phonologically similar words

Kujarge

26	Zerenkel

26		Zerenkel
28	66	Mubi
24	51	62	Masmaje
30	53	56	60	Kajakse
25	37	39	40	41	Birgit (Abgué)
26	35	38	35	37	55	Mogum (Jegu)
20	31	31	31	32	57	57	Toram
27	38	38	37	38	50	52	42	Dangla (East)
23	33	35	35	37	45	45	42	57	Bidiya (Tounkoul)
24	38	40	36	36	46	50	44	56	56	Migaama (Baro)
19	27	30	31	31	45	48	42	41	42	44	Mabire
16	26	27	24	24	22	26	21	27	26	27	29	Ubi
14	24	23	23	25	20	24	24	24	23	23	26	47	Sokoro
15	27	26	24	28	23	28	26	26	25	25	28	45	70	Tamki
12	26	24	24	28	24	26	27	23	25	25	26	46	61	67	Saba
11	25	27	28	28	22	29	22	25	24	28	26	46	41	44	48	Mawa
20	27	26	27	31	27	30	29	28	31	31	28	27	31	28	33	29	Baraïn (Jalkiya)
9	16	16	14	16	13	15	11	16	16	14	12	14	15	14	17	15	15	Mukulu

This pattern supports the concept of subgroups within the B1 group found in the current classification. However, two languages in the B1 group, Toram and Birgit, might be currently classified in the wrong subgroup. In addition, the percentage of similar words that Kujarge shares with the B1

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[18] This software is developed by SIL in partnership with Taylor University. It is available for free download online at http://www.sil.org/computing/survey/wordsurv.htm (accessed December 2011).

group is higher than the percentage shared with other languages in the subbranch. This suggests that Kujarge could be most closely related to the B1 languages.

The consistently low percentage of phonologically similar words between Mukulu and every other language confirms its classification in a separate group, B2.[19] Even though the percentage of similar words between Baraïn and other languages is significantly higher than Mukulu, Baraïn is similar to Mukulu in that it does not show a particularly close relationship with any one language or cluster of languages. These issues, and other discrepancies between the current study and the Ethnologue classification, are discussed below.

3.3.   Mawa and Ubi (B3)

The current study confirms the proposal that Mawa and Ubi should be moved from the B1 group to the B3 group (Blažek 2011, Roberts 2009, Stolbova 2007, 2009). Although Sokoro, Tamki, and Saba are more closely related to each other than to Mawa and Ubi, the latter have percentages of phonological similar words with the B3 languages that are double the percentage of phonologically similar words they have with any B1 language. Hypothetically speaking, future comparative studies could show this lexical similarity to be a false indicator of genetic relationship, but given the fact that Mawa and Ubi, especially Ubi, are somewhat separated geographically from Tamki, Sokoro and Saba, it is unlikely that this lexical similarity is the result of recent borrowing through contact.

It is, therefore, reasonable to assert that Jungraithmayr was in error when he classified Mawa in his Dangla-Migama group (B1.1) (1981a, Caprile and Jungraithmayr 1973). The SIL sociolinguistic survey which placed Ubi in the same group as Mawa noted that Ubi was significantly more closely related to Mawa than to any other B1 language included in their study (Hutchinson and Johnson 2006). However, since they failed to include a B3 language in their study, they missed the explanation for this fact: Mawa and Ubi belong in a different group. Another proposed modification to the B3 group is the removal of Baraïn discussed in section 3.6.

3.4.   Birgit and Toram (B1.1)

In the early classification by Lukas, Birgit and Toram were considered dialects of Mubi. Although no longer considered dialects, Birgit and Toram have been associated with Mubi ever since, in spite of the absence of any linguistic evidence to support the claim. Birgit was recently compared with Mubi, Kajakse, and Masmaje in a lexicostatistical analysis (Marti et al. 2007). That study clearly demonstrated that Mubi, Kajakse, and Masmaje are much closer related to each other than any of them are to the three dialects of Birgit surveyed.

Table 4. Lexical similarity of B1.2 languages (Marti et al. 2007)

Birgit (Abgué)					
74	Birgit (Agrab)				
62	62	Birgit (East)			
45	38	37	Mubi		
39	36	37	69	Masmaje	
39	35	35	63	68	Kajakse

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[19] The explanation for this remarkable neutrality is unknown. A study by Blažek (1994) indicates that Mukulu is even less similar lexically to the Chari-Logone languages (East Chadic A). Mukulu has not been strongly influenced lexically by its Nilo-Saharan neighbor, Kenga. Only half a dozen words in the 160 item wordlists are likely cognates between Mukulu and Kenga.

Another comparative analysis has shown that Birgit is more closely related to Mogum (B1.1) than to any other language in the study (Blažek 2008, 2011).[20] These two previous studies are confirmed in the present study. Birgit has 55 percent lexical similarity with Mogum and 50 percent lexical similarity with Dangla. The figures for the comparison of Birgit and any B1.2 language are not higher than 41 percent. Though the data sample is limited and non-lexical factors have not been taken into account, this is the third study suggesting that Birgit is incorrectly classified.

This interpretation is reinforced by the data for Toram, a closely related language. Toram has 57 percent lexical similarity with Mogum (B1.1) and 55 percent lexical similarity with Birgit. A previous study, which examined 40 Toram words, also suggested the language may be more closely related to Mogum (B1.1) than any of the B1.2 languages (Blažek 2008, 2011). If we take these three languages (Toram, Birgit and Mogum) as a group, they average a lexical similarity of 36 percent with the B1.2 languages (Zerenkel, Mubi, Masmaje, and Kajakse) and a 46 percent lexical similarity with the B1.1 languages (Dangla, Bidiya, Migaama, and Mabire). Though non-lexical factors may someday prove otherwise, the lexical data available clearly points to Birgit and Toram being classified together with Mogum and Dangla in subgroup B1.1.

3.5.   Kujarge (B1.3)

Though geographically isolated from other Chadic languages, Kujarge has been described as a Chadic language since its earliest documentation (Doornbos and Bender 1983:59, 76). The people are described as "Chadic speakers" who may have very well been taken as slaves from the western boundary of the Daju sultanate, viz., the Guéra region. An unpublished list of two hundred Kujarge words from the field notes of Paul Doornbos has recently been circulated among linguists. While there are some words on the list that point to links with other Afroasiatic families, Kujarge shares more lexical similarities with East Chadic than any other group (Blench 2008, Blažek 2010). It is suggested that these cross-family similarities may be retention of archaic forms and more evidence of the links between Afroasiatic families.

The limited data available renders any attempt at classification of Kujarge tentative at best. Nonetheless, the lexical comparison in this study supports what other linguists have proposed: Kujarge is most likely a member of the Chadic languages of the Guéra. The percentage of similar words between Kujarge and B1 languages averages at about 25 percent. The percentage of similarity with B3 languages averages at about 14 percent. This supports the suspected connection between Kujarge and B1 (Dangla-Mubi group), suggested by Paul Newman (Blažek 2011). Based on this data, it is proposed that a new subgroup be created for Kujarge in the B1 group: B1.3. This subgroup allows the classification to reflect that Kujarge is an East Chadic language most closely associated with the B1 group, but not particularly closely related to either of the B1 subgroups. The full list of likely Kujarge-East Chadic B cognates is given in Appendix 2.

3.6.   Baraïn (B4)

The pioneer in Chadic linguistics, Johannes Lukas, was one of the earliest researchers to document Baraïn (1937). This early publication includes two pages on the language presenting a list of one hundred glossed words, as well as some numbers. Lukas classified it as a dialect, together with Sokoro and Saba, in a cluster arbitrarily named Sokoro (Westermann and Bryan 1952). When Greenberg established the basis for the modern classification of Chadic languages, he elevated Baraïn to full language status, but followed Lukas in leaving the language in a group together with Sokoro (9c) split from the other Chadic languages of the Guéra (9f) (Greenberg 1963). Hoffman looked at the classification of these languages and decided that Baraïn did not belong in the so-called Sokoro group (Hoffman 1971). His observation was ignored by Jungraithmayr and Newman who reunited Baraïn with

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[20] Birgit is said to have a surprisingly high 81 percent lexical similarity with Mogum. The figures for the comparison of Birgit and the B1.2 languages in the study (Mubi and Kajakse) are not given.

Sokoro (Jungraithmayr 1981a, Newman 1977a). This is the classification that serves as the basis for what appears in the sixteenth edition of the Ethnologue (Lewis 2009).

The two previous lexicostatistical studies that were done as part of the SIL sociolinguistic surveys of Baraïn and Saba reveal that Baraïn is not as closely related to Saba, Sokoro, and Tamki as the three are to each other (Maass et al. 1996, Dakouli et al. 1996). The earlier of the two studies, which focused on the dialects of Baraïn, found a predictably high percentage of lexical similarity between the dialects of Baraïn, but a very low percentage of lexical similarity between any of the three dialects studied and Sokoro and Saba. Baraïn is said to have between 13 and 19 percent lexical similarity with Sokoro and Saba, while Sokoro and Saba have a significantly higher lexical similarity of 52 percent.

Table 5. Lexical similarity (Maass et al. 1996)

Baraïn (Jalkiya)

92	Baraïn (Giliya)			
70	70	Baraïn (Jalking)		
15	13	19	Sokoro	
13	13	18	52	Saba

In the sociolinguistic survey focused on Saba, the data from the Jalking dialect of Baraïn was again compared with Saba and Sokoro, as well as Tamki (once considered a dialect of Sokoro) and Mogum. In this study, it is shown that Tamki, a language with a relatively high lexical similarity with Saba and Sokoro, is no closer related to Baraïn than those two languages are. By including Mogum in their statistical analysis, the researchers demonstrate that the lexical similarity of Baraïn with Saba, Tamki, and Sokoro is no higher than the relationship between Mogum (B1) and the B3 languages.

Table 6. Lexical similarity (Dakouli et al. 1996)

Saba

62	Tamki			
50	55	Sokoro		
16	16	13	Mogum	
15	13	13	14	Baraïn (Jalking)

Previous lexicostatistical studies have demonstrated that there is no lexical evidence to support the current classification of the language. This current study attempts to find another language among the Chadic languages of the Guéra with a closer relationship to Baraïn than the B3 languages. However, Baraïn, like Mukulu, is remarkably neutral. Among the eighteen other languages in the study, not a single language shows a significantly higher relationship to Baraïn than the others. The percentage of words that are judged to be phonologically similar between Baraïn and the other Chadic languages of the Guéra ranges between 26 and 33 percent, with the exception of Kujarge (20) and Mukulu (15).

The reason for this apparently neutral lexicon is unknown. The oral history of the Baraïn recounts the story of a man named Jalki who left from somewhere north to establish the first Baraïn village in the southern part of the Guéra. Their stories include the list of all the villages established in the order of their founding. Nowhere in their history is there any mention of the Saba or Sokoro. If we are to believe that the oral tradition reflects reality, then the Baraïn people represent a wave migration distinct from the arrival of the Sokoro or Saba to the southern part of the Guéra. In that case, their current geographic proximity is in no way a sign of a particularly close ethnic or linguistic relationship.

The current classification is an assumption of linguistic proximity based on geographic proximity. All of the comparative studies done involving Baraïn have reinforced that there is no linguistic evidence for the current classification. Since the lexical evidence does not reveal a particular close relationship with any other language, it seems most reasonable to create a separate subgroup for Baraïn. This would affirm

its unique position among the Chadic languages of the Guéra, instead of perpetuating past assumptions based on geography.

3.7. Updated classification

Based on the current study, four changes are recommended for the current classification of the Guéra subbranch. The first is to accept the now thrice-repeated proposition that Mawa and Ubi be moved from B1 to B3 (Blažek 2008, Roberts 2009). The second recommendation is to move Toram and Birgit from B1.2 to B1.1, as was recently suggested by another linguist (Blažek 2008, 2011). The third proposal is to list Kujarge as an East Chadic language in a new subgroup B1.3 (similar to the proposal of Blench 2006a). The fourth is to create a separate group for Baraïn—a language which has yet to show a particularly close linguistic relationships with any other language of the subbranch.

Chart 8. Current working hypothesis for the classification of the Guéra subbranch[a]
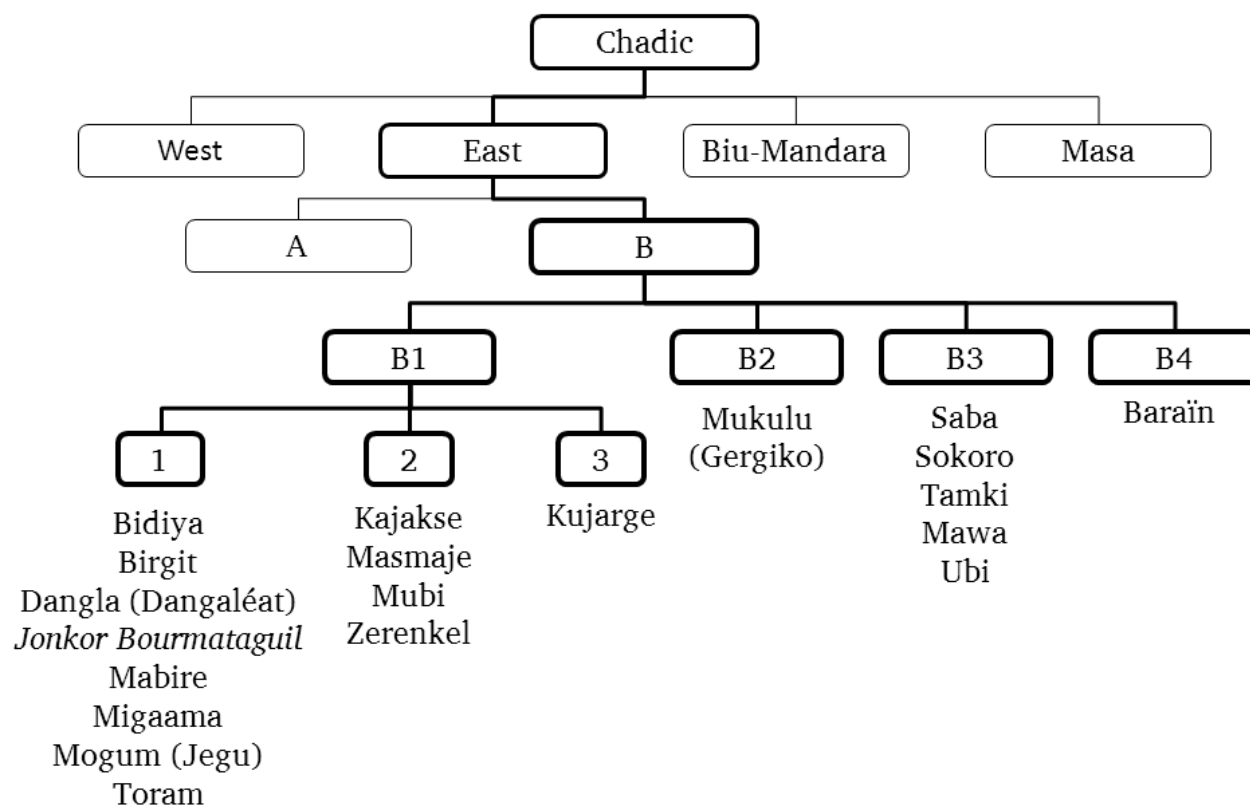
[a] Italics represent a language not included in the current study and still in need of verification in regards to its classification. Parenthesis indicate an alternate name.

The classification of two of these languages is particularly tentative. Jonkor Bourmataguil was not included in this study due to a lack of data. Kujarge was included, but the amount of data was limited to the point of not having a reasonable number of lexical items to compare (less than 100). Another area of particular interest for further study is the unique position of Mukulu and Baraïn in the subbranch. More in-depth studies would help establish their origins and the reasons for their distinct lexicons.

4. Phonology

This section describes the phonemic segments and CV structures found in the Chadic languages of the Guéra. The individual inventories of each language that were used to compile this overview can be found in Appendix 1. The description covers the eighteen languages for which I have access to sufficient data (excluding Kujarge and Jonkor Bourmataguil).

4.1.   Consonants

The following table presents the phonemic consonants found in the eighteen languages examined. The number in parenthesis represents the number of languages with that phoneme. The consonant inventories in the Chadic languages of the Guéra are relatively homogenous. Phonemes common in other branches of Chadic, but not seen here, include velar and lateral fricatives (Newman 2006:191). The absence of lateral fricatives in East Chadic has been noted previously and studied in some detail (Kraft 1971, Newman 1977c, Stolbova 2007). The labial fricative and alveopalatal fricative are rare here, though common in other Chadic languages.

Table 7. Consonants

	Labial	Alveolar	Palatal	Velar	Glottal
Voiceless plosive	p (13)	t (18)	c (16)	k (18)	ʔ (2)
Voiced plosive	b (18)	d (18)	ɟ (17)	g (18)	
Prenasalized plosive	mb (1)	nd (1)	ɲɟ (1)	ŋg (1)	
Implosive	ɓ (16)	ɗ (17)	ʄ (13)		
Voiceless fricative	f (5)	s (18)	ʃ (1)		h (6)
Voiced fricative		z (11)			
Nasal	m (18)	n (18)	ɲ (18)	ŋ (18)	
Approximants	w (18)		j (18)		
Lateral		l (18)			
Rhotic		r (18)			
		ɾ / ɽ (3)			

We can draw some generalizations about the Guéra subbranch from the above table. They tend to have three series of stops—voiced, voiceless and implosive—at up to four places of articulation. This is the same pattern reconstructed for Proto-Chadic (Newman 1977a, Newman 2006). The major exception to the pattern is the absence of the velar implosive. Most have implosives at the bilabial, alveolar and palatal points of articulation. All of these languages have a voiceless alveolar fricative and most also have a voiced counterpart. They all have nasals at four places of articulation, two approximants, plus an alveolar lateral and rhotic. Not mentioned in the above chart is the existence of a labiodental flap, which has a restricted use ("ideophonic") in Migaama (Jungraithmayr and Adams 1992:17).

4.1.1. *No voiceless bilabial plosive: /p/ to /f/*

Since most languages of the Guéra subbranch conform to the same pattern, it is worthwhile to comment on those languages with distinctive features. Five languages (Birgit, Kajakse, Masmaje, Mubi, and

Toram) [21] have lost their voiceless bilabial plosive. They all have an otherwise nonexistent labial fricative, which appears to have replaced the plosive.[22]

Map 2. Languages with the phoneme /f/
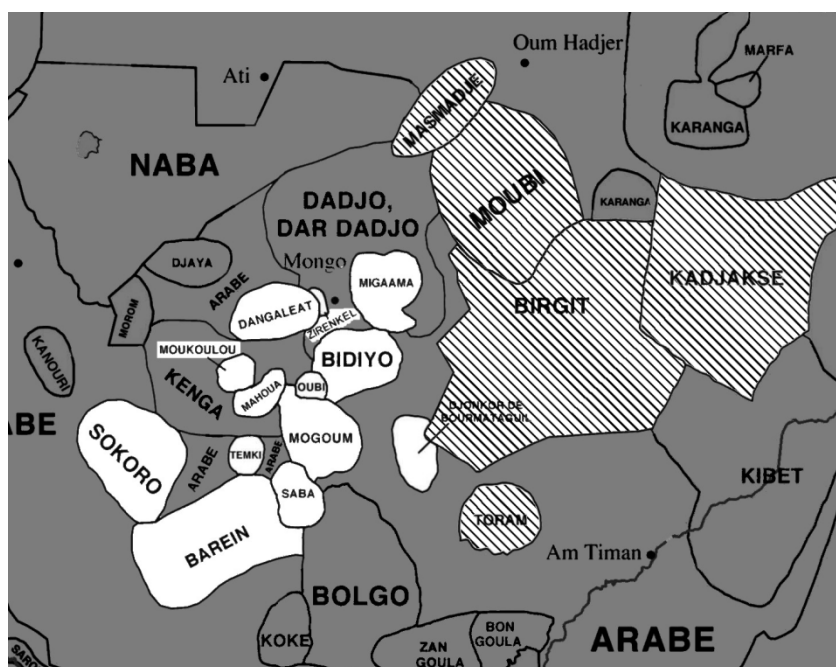
This particular cluster is interesting since it groups Birgit and Toram with the B1.2 languages, while the lexical data suggest that it groups with B1.1. However, it is unlikely that this particular phoneme indicates a historical relationship between these languages. Another B1.2 language, Zerenkel, which is closely related to Mubi, has preserved the bilabial stop /p/ and does not have a phonemic labial fricative. The phonemic status of /f/ in this cluster of languages is more likely an areal phenomenon that occurred sometime after the westward migration of the Zerenkel (or eastward migration of the others). This interpretation would be reinforced if data from Jonkor Bourmataguil confirms Roberts' observation that they also use the labial fricative (1993).

4.1.2. No voiceless/voiced palatal plosive

Saba and Baraïn do not have a voiceless palatal plosive. They are bordering languages. All the languages of the Guéra subbranch have a complete set of voiced plosives with the possibility of one exception. Tamki does not show a voiced palatal stop in the limited data available. It is frequently noted in these languages and beyond that the palatal obstruents may have a phonetic realization closer to that of an affricate (Pullum and Ladusaw 1986:84, Lovestrand forthcoming (Baraïn), Chesley 2003 (Migaama), Kuipers 2010a (Mubi)). Initial wordlists often transcribe these sounds as affricates, only later to see them reanalyzed in the phonological system as plosives.

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[21] I do not have linguistic data for Jonkor Bourmataguil (also known as Dougne or Karakir), but James Roberts (1993) reports that it also appears to have lost its bilabial plosive and could be included in this group.

[22] There is an optional synchronic process in which /p/ is frequently pronounced [f] in at least two other languages (Migaama, Chesley 2003; Baraïn, Lovestrand forthcoming). Since the data for some languages are somewhat limited, it is possible that the person who gave the wordlist consistently applied a process of lenition to this sound, masking its underlying form. For Mubi, Emma Kuipers has been able to confirm that /f/ is now fixed as a phoneme and [p] is only pronounced as an allophone of labial stops in a word-final position (2010a).

4.1.3. Prenasalized plosives

Zerenkel is the only language where prenasalized consonants have been reported (Ramat 2007, 2011). The possibility of prenasalized plosives in the closely-related language Mubi is also being investigated (Emma Kuipers, personal communication). Although these phonemes are foreign to the Chadic languages of the Guéra, Mubi and Zerenkel's Nilo-Saharan neighbor, Daju Dar Daju, does have these phonemes. Their presence in these two languages may be the result of language contact.

4.1.4. No implosives

There is at least one exception to Schuh's claim that the bilabial and alveolar implosives occur in every Chadic language (2003). The bilabial implosive doesn't occur in any dialect of Baraïn. This sound is also missing from the data on Mabire; however, that data is limited to 145 words. The alveolar implosive occurs in one of the four dialects of Baraïn (Lovestrand 2011). In this sense, it is still justifiable to say that the alveolar implosive occurs in every Chadic language. The palatal implosive is less common. Mukulu has a phonetic velar implosive that has been analyzed as an epenthetic phone (James Roberts, personal communication). Wordlists for Birgit, Kajakse, and Masmaje (all B1.2) show occasional transcriptions of a velar implosive, but these rare transcriptions have not been verified.

4.1.5. Alveopalatal fricative /ʃ /

Toram is the only language to give a reasonable amount of evidence for a phonemic alveopalatal fricative. It can otherwise occur in all of these languages through loan words from Chadian Arabic or a phonological process of lenition or palatalization.

4.1.6. Glottal fricative /h/

The glottal fricative appears to have phonemic status in six languages: Bidiya, Masmaje, Migaama, Mubi, Toram and Zerenkel. In some of these languages, the /h/ is quite rare and there seems to be a preference, if not a requirement, that it be word-initial. This phone has been proposed for Birgit as well, but insufficient evidence has been found to verify its phonemic status. All of these languages are classified in the group B1, but not all B1 languages utilize the phoneme. The spread of this phoneme appears to be a relatively recent areal phenomenon, perhaps originating in a similar manner to that proposed by Newman for /h/ in Hausa (1976). The sound can also be found in Chadian Arabic loanwords in all languages of the Guéra subbranch.

Map 3. The phoneme /h/
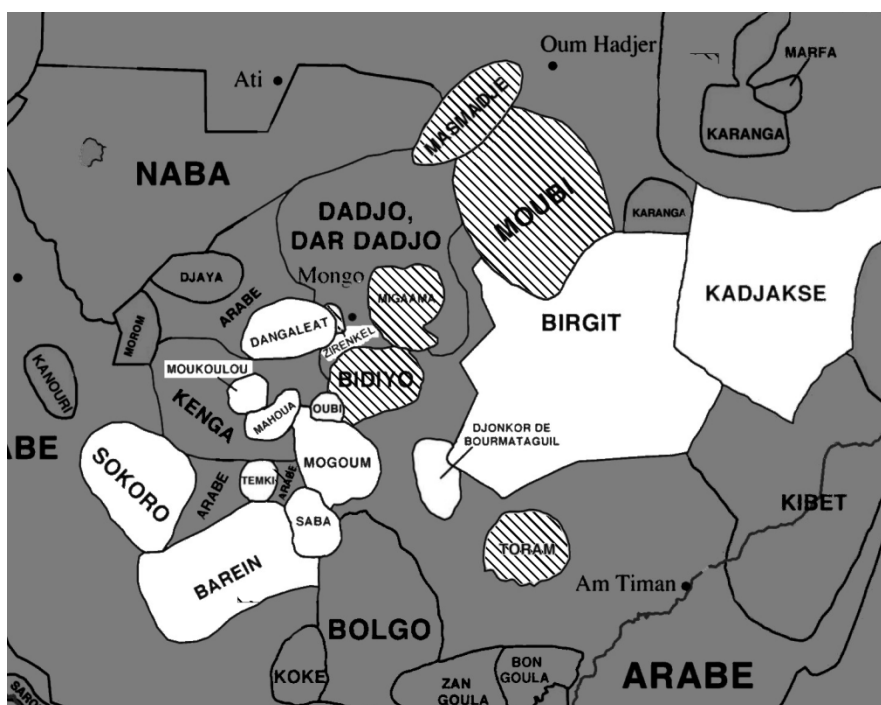
4.1.7. Glottal stop [ʔ]

Herrmann Jungraithmayr and his Chadian collaborators (Abakar Adams and Khalil Alio) have proposed the glottal stop as a phoneme for every language they have studied (Alio 2004a, Alio and Jungraithmayr 1989, Jungraithmayr and Adams 1992, Jungraithmayr 1981b, 1990, 2004a). In most cases, this phone is limited to the word-initial position. The propensity to include the glottal stop as a phoneme may be motivated by a cross-linguistic observation that the prototypical Afroasiatic word is never vowel-initial. Newman argues that this observation does not hold for Chadic languages (Newman 1976, Newman 1977a:10).[23] Those languages, which at least have some evidence of a word-internal glottal stop, are Mukulu, Saba and Bidiya.[24] Even in these languages, it can be argued that the glottal stop is an epenthetic phone (James Roberts, personal communication).

4.1.8. Two rhotics

Three languages are reported to have more than one phonemic rhotic. Zerenkel and Migaama have a retroflex [ɻ] that contrasts with the rhotic trill. This phone might not be present in all dialects of Migaama. One dialect of Dangla has a contrast between a trilled rhotic and a simple flap. The three languages are neighbors encircling the town of Mongo.

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[23] "The presence of glottal stop in current-day Chadic languages is typically a secondary development, emerging from an allophone of /ʔy/ or /ʔw/ or representing a non-distinctive phonetic feature of word onset. Quite often, it is just a linguist's "invention", i.e., the unjustified postulation of a non-existent phoneme based on preconceptions drawn from Arabic" (Newman 2006:192).

[24] The glottal stop in Bidiya does not occur in all dialects. Cognates of the glottal stop in other dialects have a palatal implosive, but those dialects which use the glottal stop also use a palatal implosive in other words (Emma Kuipers, personal communication).

4.2. Vowels

This description of vowel systems of the Chadic languages of the Guéra includes sixteen languages. I have excluded Jongor Bourmataguil, for which I have no data, and the three other languages for which I only have access to wordlists: Kujarge, Mabire and Tamki. I have only ventured to describe the vowels in those languages for which there have been some preliminary phonological studies.

The following table presents the phonemic vowels found in the sixteen languages examined. The number in parenthesis represents the number of languages with that phoneme.

Table 8. Vowels

i (16)		u (16)
e (16)	ə (3)	o (16)
ε (1)		ɔ (1)
	a (16)	

The immediate observation (and not a new one) is that this subbranch is dominated by the universally-unmarked five-vowel system.[25] The East branch is an exception to descriptions like: "Chadic languages typically have many consonants and few vowels" (Newman 2003:304). For example, languages of the Central Chadic branch have been described as having a vowel system of as few as one or two underlying vowels (Roberts 2001). Jungraithmayr attributes this pattern to vowels carrying "less functional load and morphological weight" in Central Chadic languages (Jungraithmayr 1992b:127, quoted in Bow 1999:17).[26] Other branches of the Chadic family commonly have a four-vowel system of three high vowels and one low vowel (Schuh 2003). Newman proposes a three-vowel system for Proto-Chadic (2006).

The front and back open-mid (or low) vowels /ε/ and /ɔ/ have been declared phonemes in Dangla. These vowels occur phonetically in at least six other languages: Mawa, Mogum, Migaama, Saba, Sokoro and Zerenkel. Roberts has provided a detailed explanation of the phonological processes that produce these allophones in Mawa (2009).

The other rare vowel is the mid (or high) central vowel. In-depth phonological studies have given a reasonable amount of evidence for the phonemic status of this vowel in Mawa (Roberts 2009). It has also been proposed as a phoneme for Saba and Sokoro. In Sokoro, the vowel is, at best, a "marginal" phoneme (Martin 1999, Roberts 2009). The linguistic evidence for this vowel as phoneme in Saba has not yet been made available.

4.3. CV structures

As in the above overview of vowels, this overview of CV structures only includes those sixteen languages that have been the subject of phonological studies. An overview of CV structures would be much more profitable if it were illuminated by morphological studies and an understanding of the underlying forms of each word. Etymological insights are also lacking and not trivial, since words are often incorporated from the languages of wider communication (Chadian Arabic and French), as well as neighboring languages of the Niger-Congo and Nilo-Saharan phyla. In want of such details, the following overview can only be put forward as a working hypothesis. I have reinterpreted the data of Jungraithmayr and his collaborators by ignoring all word-initial glottal stops.

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[25] This is also true in the Chari-Logone subbranch (East Chadic A), where most languages have five or six vowels (Mary Pearce, personal communication).

[26] Khalil Alio, a major contributor to East Chadic linguistics, fails to make this distinction in a recent publication concerning consonants in Bidiya and Dangla: "Dans les langues tchadiques les consonnes portent une plus grande charge fonctionnelle que les voyelles. Cela revient au fait que les langues tchadiques font partie de la famille des langues Afro-asiatiques où sont comprises également les langues sémitiques" (Alio 2009).

The following chart displays the syllable types attested in each language by marking an "x" in the appropriate row and column. A number indicates the number of words that have been found with that form when the total number is relatively small. A question mark indicates a structure that would be expected in a symmetrical system and which may only be unattested due to the small amount of data available.

Table 9. CV structures

	Mogum	Kajakse	Toram	Ubi	Zerenkel	Birgit	Dangla	Bidiya	Mawa	Migaama	Mukulu	Saba	Sokoro	Masmaje	Mubi	Baraïn
V	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
VC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
VV	x	x	x	x	x	x	x	x	x	x	x	x	x	x	?	x
VVC	x	x	x	?	x	?	x	x	x	x						
CV	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CVC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CVV	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CVVC	x	x	x	x	?	x	x	x	x	x						
CVCC	3	1	2	1												
CCV					x											
CCVC					x											

There are six syllable types that occur in nearly all sixteen languages: V, VV, VC, CV, CVC, and CVV. These syllable types correspond to Proto-Chadic, which had no consonant clusters or super-heavy syllables (Newman 2006). They can be summarized by the template (C)V(X) where the parenthesis represent optionality and the X represents either a C or V. The VV notation indicates a long vowel (i.e., two moras of identical features). Vowel-initial syllables are restricted to the word-initial position. Vowel clusters (i.e., an open syllable followed by an onsetless syllable in the same word) do not occur. The rare attestations of diphthongs might all be explained by autosegmental palatalization and labialization features (often called "prosodies") (Roberts 2009).

The only two languages which could be said not to have all of those CV types are Baraïn and Mubi. Baraïn only has the VV syllable type in one of its four dialects (Lovestrand 2011). I do not have an example of VV in Mubi, but this may be an accidental gap due to limited data.

Ten of the sixteen languages allow super-heavy syllables, viz., syllables with a long vowel and a coda. In Dangla, these syllables almost exclusively occur in polymorphemic words (Burke 1995:13). In all of the wordlists, super-heavy syllables are the exception rather than the norm. Super-heavy syllables are considered an innovation from Proto-Chadic (Newman 2006). Four languages stray even farther from the Proto-Chadic model. Mogum, Kajakse, Toram and Ubi each appear to have at least one word with a complex coda.

Zerenkel is the only language where complex onsets have been reported. One of the two examples cited is [bla] "vomiting (noun, French: *vomissement*)" (Ramat 2007). Another source transcribes the verb "to vomit" as [aɾbali] [27] (Johnson 2005). Unfortunately, not enough is known about the morphology of this language to know whether the additional vowel is phonemic, epenthetic, or always present except in

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[27] The first syllable, [aɾ], is the third person masculine subject pronoun in Zerenkel and Mubi. Although the gloss is an infinitive verb, it is unlikely that the elicited word is also infinitive.

fast speech. Zerenkel is also peculiar in that it has the structure VVC, but there is not yet any evidence of the structure CVVC.

5. Pronominal system

This brief overview of the pronominal systems of the Guéra subbranch looks at thirteen languages. I have no data for Jonkor Bourmataguil. The wordlists for Kujarge, Tamki and Mabire only include a few pronominal forms. The sketches of Toram and Masmaje do not include any information about pronouns. I do not have full access to the sketch of Birgit.

Seven of the thirteen languages have identical systems and the other six languages can be divided into two groups, each adding or subtracting one element. The most common system consists of nine pronouns.

In the Guéra subbranch, there are always three persons distinguished in number for singular and plural. The second and third person singular pronouns are always distinguished in gender. These eight categories exist in every language. Three languages are limited to these eight pronouns (Bidiya,[28] Mogum and Kajakse[29]). All of the other languages make an inclusive-exclusive distinction in the first person plural creating a ninth pronominal element. Three languages add a tenth element: a first person dual pronoun: Migaama, Zerenkel and Baraïn.[30]

Table 10. Pronominal systems

8 pronouns (no inclusive-exclusive)	9 pronouns	10 pronouns (includes dual pronoun)
Bidiya	Mukulu	Baraïn
Mogum	Dangla	Migaama
Kajakse	Mawa	Zerenkel
	Mubi	
	Saba	
	Sokoro	
	Ubi	

6. Summary and Conclusion

Though the history of the classification of the Chadic languages of the Guéra primarily precedes 1978, most descriptive work was not available and many languages remained undocumented until after this date. All of the classifications are qualified by their authors as being tentative, provisional, or in some way non-comprehensive. Only in recent years are we seeing enough data become available to seriously approach a comprehensive and definitive classification of the Guéra subbranch. This study is the next step towards that goal and recommends four improvements of the current classification scheme: 1) moving Mawa and Ubi to B3, 2) moving Birgit and Toram to B1.1, 3) creating a new subgroup B1.3 for the currently unclassified Kujarge, and 4) moving Baraïn to its own group.

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[28] It may be the case that the inclusive-exclusive distinction occurs in possessive suffixes in Bidiya (Emma Kuipers, personal communication).

[29] Further study of Kajakse may be needed to confirm the absence of an inclusive-exclusive distinction. This information comes via Alio (2004a) who also described Ubi as having only eight prounouns. Notes from a linguistics student (Simon Neuhaus) reveal that there is, in fact, an inclusive-exclusive distinction in Ubi. Bidiya and Mogum have been more thouroughly studied and are yet to reveal a ninth pronoun.

[30] One dialect of Baraïn does not have a dual pronoun (Lovestrand 2011).

Our combined knowledge of the phonological inventories of the Guéra subbranch reveals a group of languages that are indisputably Chadic, yet distinguishable as a unit apart from other Chadic languages. Their consonant inventory is smaller than inventories found in other branches of the Chadic family. They all have at least five vowels, more than seen in the branches of Chadic. Internally, there are clusters of languages that deviate from the basic phonological patterns. Are these small clusters of features evidence of genetic similarity or areal phenomena? Whether genetic or areal, when were these features introduced (or re-introduced)? What are the other relevant phonological, morphological, lexical, and syntactic clusters of features?

Traditionally, the first steps in a linguistic analysis are the gathering of a wordlist and an inventory of phonemes. It does not minimize the importance and difficulty of this task to admit that it is only a beginning. The analyses of most Chadic languages in the Guéra region have not gone far past this beginning. Any advancement in this area of research will require a significant commitment to continued field research in the Guéra region. Until this research is done, our knowledge of East Chadic languages will remain incomplete, and Chadic linguistics will continue to be marked by oversimplifications and speculation based on limited data.

Appendix 1: Consonant and vowel charts

Baraïn (Barein) [bva] (B3)

Source: Lovestrand 2011

	Labial	Alveolar	Palatal	Velar
Voiceless plosive	p	t		k
Voiced plosive	b	d	ɟ	g
Implosive		(ɗ)		
Voiceless fricative		s		
Nasal	m	n	ɲ	ŋ
Approximants	w		j	
Lateral		l		
Rhotic		r		

Notes: The alveolar implosive was found in one of four dialects. The glottal fricative /h/ may have a phonemic role in one dialect, but it was only found in two pronouns and speakers were unable to think of another word containing the sound.

Vowels

i / ii		u / uu
e / ee		o / oo
	a / aa	

Specific Language Resources :

(Dakouli et al. 1996)

(Lovestrand 2011)

(Lovestrand forthcoming)

(Lukas 1937)

(Maass et al. 1996)

(Rendinger, de 1949)

Bidiya [bid] (B1)

Source: Alio and Jungraithmayr 1989

	Labial	Alveolar	Palatal	Velar	Glottal
Voiceless plosive	p	t	c	k	(ʔ)
Voiced plosive	b	d	ɟ	g	
Implosive	ɓ	ɗ	ʄ		
Voiceless fricative		s			h
Voiced fricative		z			
Nasal	m	n	ɲ	ŋ	
Approximants	w		j		
Lateral		l			
Rhotic		r			

Notes: Alio (2004b) records a glottal fricative [h] in one Bidiya word and in Arabic loan words. There are a few marginal words, mostly ideophonic, that have these sounds, as well (Emma Kuipers, personal communication). The status of this phone in the phonology is still debatable. It appears to follow the pattern of Migaama where the /h/ only appears in a limited number of words and is restricted to the word-initial position.

Some dialects have a glottal stop in words where other dialects use a palatal implosive. However, these dialects retain the palatal implosive in other words (Emma Kuipers, personal communication). Alio (2004b) gives examples in Bidiya of word-medial and word-final glottal stops. The phone receives its own grapheme in the Bidiya orthography.

Vowels

i / ii		u / uu
e / ee		o / oo
	a / aa	

Specific Language Resources :

(Alio 1986)
(Alio 1987a)
(Alio 1987b)
(Alio. 1988a)
(Alio 1988b)
(Alio 1988c)
(Alio 2004b)
(Alio 2009)
(Alio and Jungraithmayr 1989)

(Bagwell, Bagwell, and Faris 1992)
(Baldi 2004)
(Fédry 1977)
(Hutchinson and Johnson. 2006)
(Jungraithmayr 1991)
(Jungraithmayr 2005c)
(Takács 2009a)
(Voigt 1988)

Birgit [btf] (B1)

Source: Jungraithmayr 2004a, Marti et al. 2007

	Labial	Alveolar	Palatal	Velar
Voiceless plosive		t	c	k
Voiced plosive	b	ɗ	ɟ	g
Implosive	ɓ	ɗ	ʄ	
Voiceless fricative	f	s		
Nasal	m	n	ɲ	ŋ
Approximants	w		j	
Lateral		l		
Rhotic		r		

Notes: Jungraithmayr includes a voiceless bilabial stop in his inventory, which I did not find in his lexicon. Although I did not see all of his data, I was able to confirm that there are no words that begin with [p]. The labial fricative [f] was not included in his inventory, but is common in his data. Since I have not seen his entire paper (written in German), I can only assume that he proposes that all surface forms of [f] are underlyingly /p/. Since I cannot verify this process, I will instead assume that Birgit follows the pattern of the closely related languages Mubi, Kajakse, Masmaje, and Toram, which all appear to have lost their phonemic bilabial stop.

Jungraitmayr includes a glottal stop in his inventory. I was not able to access all of his data, but in the data I was able to examine, it appears that the glottal was always, or almost always, in the word-initial position. The same observation was made in the other source of data.

Junraithmayr also includes velar and glottal fricatives. The velar fricative does not appear in any of the three dialects in my other data source and the glottal fricative only appears in one word.

Marti et al. occasionally transcribe a velar implosive in all three Birgit dialects. The phone only appears ten times in any of the three dialects. In none of the cases, does more than one dialect have the same sound for that particular word.

Vowels

i / ii		u / uu
e / ee		o / oo
	a / aa	

Specific Language Resources :

(Jungraithmayr 2004a)

(Jungraithmayr 2005a)

(Marti, Mbernodji, and Wolf. 2007)

Dangla (Dangaléat) [baa] (B1)

Source: Burke 1995

	Labial	Alveolar	Palatal	Velar
Voiceless plosive	p	t	c	k
Voiced plosive	b	ɗ	ɟ	g
Implosive	ɓ	ɗ	ʄ	
Voiceless fricative		s		
Voiced fricative		z		
Nasal	m	n	ɲ	ŋ
Approximants	w		j	
Lateral		l		
Rhotic		r (ɾ)		

Notes: In one of the three dialects, Eastern Dangla, the trill and flap rhotic are contrastive (Burke 1995:6 citing Montgolfier, de 1973:10 and Fédry 1974:5). Alio calls the second rhotic a retroflex, but uses the phonetic symbol for a flap (Alio 2009).

Vowels

i / ii		u / uu
e / ee		o / oo
ɛ / ɛɛ		ɔ / ɔɔ
	a / aa	

Specific Language Resources:

(Baldi 2007)

(Boyeldieu 1977)

(Burke 1995)

(Ebobissé 1978)

(Ebobissé 1979)

(Ebobissé 1980)

(Ebobissé 1985)

(Ebobissé 1987)

(Fédry 1969)

(Fédry 1971a)

(Fédry 1971b)

(Fédry 1971c)

(Fédry 1974)

(Fédry 1977)

(Fédry 1981)

(Fedry 1990)

(Frajzyngier, Krech, and Mirzayan 2002)

(Frajzyngier 2005)

(Montgolfier, de 1973)

(Shay 1994)

(Shay 1999)

(Shay 2008)

Jonkor Bourmataguil [jeu] (B1)

Specific Language Resources:

(Roberts 1993)

Kajakse [ckq] (B1)

Sources: Alio 2004a, Marti et al. 2007

	Labial	Alveolar	Palatal	Velar
Voiceless plosive		t	c	k
Voiced plosive	b	ɗ	ɟ	g
Implosive	ɓ	ɗ	ʄ	
Voiceless fricative	f	s		
Voiced fricative		z		
Nasal	m	n	ɲ	ŋ
Approximants	w		j	
Lateral		l		
Rhotic		r		

Notes: Alio's inventory includes a voiceless bilabial plosive /p/. This is surprising, since the sound only occurs once in his data in the word "three," which he transcribes [sóòp]. My other source transcribes it [sób˺] with an unreleased voiced stop (Marti et al. 2007). This word in other languages often has a pronunciation similar to [subu]. Kajaske (like Birgit, Masmaje, Mubi and Toram) appears to have replaced /p/ with /f/.

Alio labels the palatal obstruents affricates. Following the pattern of other languages, I have reanalyzed them as plosives.

Alio includes a glottal stop in his inventory, which I have removed. In his data, the sound is limited to the word-initial position, except in six words. Alio worked with Herrmann Jungraithmayr, who has an affinity for glottal stops.

Marti et al. (2007) also include a velar implosive in five words.

Vowels

i / ii		u / uu
e / ee		o / oo
	a / aa	

Specific Language Resources:

(Alio 2004a)
(Doornbos and Bender 1983)
(Marti, Mbernodji, and Wolf. 2007)

Kujarge [vkj], unclassified

Specific Language Resources:

(Blažek 2010)
(Doornbos and Bender 1983)

Mabire [muj] (B1)

Source: Johnson and Hamm 2002

	Labial	Alveolar	Palatal	Velar
Voiceless plosive	p	t	c	k
Voiced plosive	b	d	ɟ	g
Implosive		ɗ		
Voiceless fricative		s		
Voiced fricative		z		
Nasal	m	n	ɲ	ŋ
Approximants	w		j	
Lateral		l		
Rhotic		r		

Notes: The alveopalatal affricates in the wordlist have been reinterpreted as palatal stops, according to the general pattern seen in these languages. The alveolar implosive appears in five of the 220 wordlist items. One word is transcribed with a word-medial uvular fricative [χ], which I have omitted from the inventory.

Vowels

i		u
e		o
ɛ	ə	
	a	

Notes: Data for this language is minimal and no phonological studies have been done with the speakers. The inventory above shows the vowels transcribed in the wordlist. If this is the vowel inventory, it would be uniquely asymmetrical among Chadic languages. No long vowels are transcribed in the data.

Specific Language Resources:

(Hutchinson and Johnson 2006)
(Johnson and Hamm 2002)

Masmaje [mes] (B1)

Source: Alio 2004a, Marti et al. 2007

	Labial	Alveolar	Palatal	Velar	Glottal
Voiceless plosive		t	c	k	
Voiced plosive	b	ɗ	ɟ	g	
Implosive	ɓ	ɗ	ʄ		
Voiceless fricative	f	s			h
Voiced fricative		z			
Nasal	m	n	ɲ	ŋ	
Approximants	w		j		
Lateral		l			
Rhotic		r			

Notes: Alio includes a voiceless bilabial stop in his inventory. I was not able to access all of his data to examine which words he transcribed with this phone, but my other source only uses a [p] one time in a list of 230 words. That particular word is the verb "to be afraid". Alio's transcription of the word for "fear" begins with a bilabial implosive. Until the data shows otherwise, I will assume that Alio's inventory for Masmaje makes the same unfounded claim that he does for Kajakse.

Alio also includes a glottal stop in his inventory. Though I was not able to access his complete lexicon, the items I did see were not sufficient proof that the glottal occurs in any position other than word-initial. Alio worked with Herrmann Jungraithmayr who has an affinity for glottal stops.

Alio labels the palatal obstruents affricates. Following the pattern of other languages I have reanalyzed them as plosives.

Marti et al. (2007) transcribe three Masmaje words with a velar implosive. They also include a few instances of an alveopalatal fricative and a velar fricative. I am assuming those rare phones to be most likely the result of a lenition process.

Vowels

i / ii		u / uu
e / ee		o / oo
	a / aa	

Specific Language Resources:

(Alio 2004a)
(Marti, Mbernodji, and Wolf 2007)

Mawa [mcw] (B1/B3)

Source: Roberts 2009

	Labial	Alveolar	Palatal	Velar
Voiceless plosive	p	t	c	k
Voiced plosive	b	d	ɟ	g
Implosive	ɓ	ɗ		
Voiceless fricative		s		
Nasal	m	n	ɲ	ŋ
Approximants	w		j	
Lateral		l		
Rhotic		r		

Notes: "Absent from the table are the glottal stop, the glottalized ['w] noted by Jungraithmayr, and h, f, and z. Suffice it to say that this point that the glottal stop only occurs phonetically at the beginning of vowel-initial words, and for that reason need not be recognized as a phoneme. We will discuss the question of the glottalized w in more detail later in the paper, but we affirm that there is no need to recognize it as phonemic either. The consonants f, h, and z also occur, but only in loan words from Arabic, and it is for that reason that they have been excluded from the chart of (1). The case of z is a bit more delicate, though. In addition to Arabic loans, [z] also occurs as a fusion of /s/ with a nasal: /bus na kul/ [buzakul] "that fish". And speakers claim to have found two other cases of word-initial z which may be native words, and not loans. If this is confirmed, there may be some justification for including /z/ among the phonemes…" (Roberts 2009)

Vowels

i / ii		u / uu
e / ee	ə / əə	o / oo
	a / aa	

Notes: "Jungraithmayr (1981) shows nine vowels in the Mawa inventory; in particular, he distinguishes /e/ and /ɛ/, /o/ and /ɔ/, and /ə/ and /ʌ/, giving in some cases evidence of contrast. Upon further checking, however, we find that the situation that he presents is not completely accurate. There is in fact no difference between ə and ʌ. Jungraithmayr often transcribes ʌ in the final syllable of the nominal form of verbs, but this is not a distinctive vowel (Jungraithmayr himself calls it a "Verbindungsvokal") and it is subject to phonetic variation. My early transcriptions also showed quite a bit of variability in these vowels. As to the difference between /e/ and /ɛ/, and between /o/ and /ɔ/, it turns out that this issue is intertwined with the questions of palatalization and labialization to be discussed later in this paper. We will find, though, that /ɛ/ and /ɔ/ should not be recognized as distinct phonemes. Thus the inventory of basic Mawa vowels comprises only the six found [above]." (Roberts 2009)

Specific Language Resources:

(Hutchinson and Johnson 2006)
(Jungraithmayr 1981b)
(Roberts 2009)

Migaama [mmy] (B1)

Sources: Jungraithmayr andAdams 1992, Chesley 2003

	Labial	Alveolar	Palatal	Velar	Glottal
Voiceless plosive	p	t	c	k	
Voiced plosive	b	d	ɟ	g	
Implosive	ɓ	ɗ	ʄ		
Voiceless fricative		s			h
Voiced fricative		z			
Nasal	m	n	ɲ	ŋ	
Approximants	w		j		
Lateral		l			
Rhotic		r	(ɽ)		

Notes: Jungraithmayr and Adams (1992) include a glottal stop in their inventory which I have removed since it appears to be limited to the word-initial position. The glottal fricative is also limited. There are very few words with a word-medial [h] and even in the word-initial position most of the examples given are loan words from Chadian Arabic.

Not including identified loan words, only a dozen words in Jungraithmayr and Adams lexicon contain the glottal fricative. Chesley comments that this phoneme is likely restricted to the word-initial position—even in those words that are not evidently loan words (2003).

Jungraithmayr and Adams (1992) label the palatal obstruents affricates. I have reinterpreted them as plosive to match the pattern of these languages.

Chesley (2003) also proposes the retroflex rhotic as a phoneme though he had questions about its precise phonetic articulation. The sound is not found in all dialects of Migaama (Emma Kuipers, personal communication.)

Migaama also employs a labiodental flap in some "ideophonic" expression. "*En outre, une consonne fricative labio-dentale v se trouve dans quelques idéophones ; par ex.kàvàc*" (Jungraithmayr and Adams 1992:17).

Vowels

i / ii		u / uu
e / ee		o / oo
	a / aa	

Notes: The mid-open vowels [ɛ] and [ɔ] can occur as allophones of their mid counterparts.

Specific Language Resources:

(Abdoullaye and Kelly 1985)

(Boyeldieu 1977)

(Chesley 2003)

(Frajzyngier and Ross 1996)

(Jungraithmayr and Adams 1992)

(Jungraithmayr 1975)

(Jungraithmayr 2003)

(Jungraithmayr 2005a)

(Wolff 1977)

Mogum [mou] (B1)

Source: Kuipers 2010b

	Labial	Alveolar	Palatal	Velar
Voiceless plosive	p	t	c	k
Voiced plosive	b	ɗ	ɟ	g
Implosive	ɓ	ɗ	ʄ	
Voiceless fricative		s		
Voiced fricative		z		
Nasal	m	n	ɲ	ŋ
Approximants	w		j	
Lateral		l		
Rhotic		r		

Vowels

i / ii		u / uu
e / ee		o / oo
	a / aa	

Notes: The vowels [ɛ] and [ɔ] also occur phonetically. The environment they occur in has not yet been established, thus there is a possibility that future phonological studies could show that they are phonemic.

Specific Language Resources:

(Dakouli, Maass, and Toomey 1996)
(Jungraithmayr 1961)
(Jungraithmayr 1964)
(Kuipers 2010b)
(Rendinger, de 1949)

Mubi [mub] (B1)

Source: Kuipers 2010a

	Labial	Alveolar	Palatal	Velar	Glottal
Voiceless plosive		t	c	k	
Voiced plosive	b	d	ɟ	g	
Implosive	ɓ	ɗ	ʄ		
Voiceless fricative	f	s			h
Voiced fricative		z			
Nasal	m	n	ɲ	ŋ	
Approximants	w		j		
Lateral		l			
Rhotic		r			

Vowels

i / ii		u / uu
e / ee		o / oo
	a / aa	

Notes: Mubi clearly uses long vowels phonetically, but their phonemic status is yet to be confirmed by linguistic evidence. Since every Chadic language in the Guéra has long vowels, their phonemic status is assumed until proven otherwise.

Specific Language Resources:

(Doornbos and Bender 1983)
(Johnson and Mbernodji 2006)
(Jungraithmayr 1968)
(Jungraithmayr 1978a)
(Jungraithmayr 1987a)
(Jungraithmayr 1991)
(Jungraithmayr 2003)
(Jungraithmayr 2005c)
(Kuipers 2010a)
(Newman 1977b)
(Tacáks 2009b)
(Wolff 1988)

Mukulu (Gergiko) [moz] (B2)

Source: Jungraithmayr 1990

	Labial	Alveolar	Palatal	Velar	Glottal
Voiceless plosive	p	t	c	k	ʔ
Voiced plosive	b	ɗ	ɟ	g	
Implosive	ɓ	ɗ	ʄ		
Voiceless fricative		s			
Voiced fricative		z			
Nasal	m	n	ɲ	ŋ	
Approximants	w		j		
Lateral		l			
Rhotic		r			

Notes: Jungraithmayr gives examples of the glottal stop in a word-medial position and even presents evidence of the glottal stop being geminated.

A velar implosive is also included in Jungraithmayr's inventory. This phone has been analyzed as an epenthetic phone occurring at a morpheme boundary after a velar nasal (James Roberts, personal communication).

Vowels

i / ii		u / uu
e / ee		o / oo
	a / aa	

Specific Language Resources:

(Adwiraah 1991)

(Blažek 1994)

(Jungraithmayr 1977a)

(Jungraithmayr 1977b)

(Jungraithmayr 1977c)

(Jungraithmayr 1977d)

(Jungraithmayr 1982)

(Jungraithmayr 1983)

(Jungraithmayr 1987a)

(Jungraithmayr 1987b)

(Jungraithmayr 2003)

(Jungraithmayr 2004b)

(Jungraithmayr 2005a)

(Lukas 1974)

(Lukas 1977)

(Roberts 1999)

(Sharp 1997)

Saba [saa] (B3)

Source: Sauer 2007

	Labial	Alveolar	Palatal	Velar	Glottal
Voiceless plosive	p	t		k	ʔ
Voiced plosive	b	d	ɟ	g	
Implosive	ɓ	ɗ			
Voiceless fricative		s			
Nasal	m	n	ɲ	ŋ	
Approximants	w		j		
Lateral		l			
Rhotic		r			

Notes: Data shows the glottal stop in an intervocalic position.

Vowels

i / ii		u / uu
e / ee	ə / əə	o / oo
	a / aa	

Specific Language Resources:

(Dakouli, Maass, and Toomey 1996)
(Rendinger, de 1949)
(Sauer 2007)

Sokoro [sok] (B3)

Source: Martin 1999

	Labial	Alveolar	Palatal	Velar
Voiceless plosive	p	t	c	k
Voiced plosive	b	d	ɟ	g
Implosive	ɓ	ɗ	ʄ	
Voiceless fricative		s		
Nasal	m	n	ɲ	ŋ
Approximants	w		j	
Lateral		l		
Rhotic		r		

Notes: Martin proposes that the glottal stop is a phoneme in Sokoro but gives little evidence to demonstrate its phonemic status and admits that its status is "un peu précaire" (1999).

Vowels

i / ii		u / uu
e / ee	ə / əə	o / oo
	a / aa	

Notes: The status of the mid central vowel is somewhat dubious. It is relatively rare in the language and does not occur in any verb roots. There is a phonological process that lengthens vowels so more research is needed to confirm that each of the vowels can also occur long phonemically.

In heavy syllables, the near-close vowels [ɛ] and [ɔ] occurs as allophones of [e] and [o] respectively.

Specific Language Resources:

(Benton 1912)
(Chesley and Faris 1994)
(Fédry 1971d)
(Jungraithmayr 2005b)
(Martin 1999)
(Rendinger, de 1949)

Tamki [tax] (B3)

Source: SIL Chad wordlists

	Labial	Alveolar	Palatal	Velar
Voiceless plosive	p	t	c	k
Voiced plosive	b	d		g
Implosive	ɓ	ɗ		
Voiceless fricative		s		
Nasal	m	n	ɲ	ŋ
Approximants	w		j	
Lateral		l		
Rhotic		r		

Notes: The wordlists do not give clear evidence of a voiced palatal obstruent. The transcription [dj] shows up in one word, but the same word was transcribed [tʃ] by another linguist working on the same list five years later. This may be an accidental gap, since the Saba list also shows few voiced palatal obstruents. There is one pair of cognates in the list containing a voiced palatal obstruent in Saba. The sound is transcribed as a voiced velar stop in Tamki.

Specific Language Resources:

(Dakouli, Maass, and Toomey 1996)

Toram [trj] (B1)

Source: Alio 2004a

	Labial	Alveolar	Palatal	Velar	Glottal
Voiceless plosive		t	c	k	
Voiced plosive	b	d	ɟ	g	
Implosive	ɓ	ɗ	ʄ		
Voiceless fricative	f	s	ʃ		h
Voiced fricative		z			
Nasal	m	n	ɲ	ŋ	
Approximants	w		j		
Lateral		l			
Rhotic		r			

Notes: Alio includes a voiceless bilabial stop /p/ in his inventory, even though it does not appear in his data. He also includes a flap [ɾ], which is only seen in three words in his data. Phonemic distinction between a trill and flap has only been attested in one language (Eastern Dangla). Alio does not present any minimal pairs. Therefore, I have judged it prudent to leave the flap out of the inventory until more data establishes its role in the language as a phoneme.

Alio labels the palatal obstruents as affricates. Following the pattern of other languages I have reanalyzed them as plosives.

Alio includes a glottal stop in his inventory, which I have removed. In his data, the sound is limited to the word-initial position, except for in a handful of words. Alio worked with Herrmann Jungraithmayr, who has an affinity for glottal stops.

The palatal and glottal fricatives are rare sounds in these languages, but common in the language of wider communication: Chadian Arabic. For this reason, the appearance of these sounds in the Toram wordlist are suspected of being the result of contact with Arabic. However, Alio, presumably a speaker of Chadian Arabic, marks any word in his lexicon that he assumes to be of Arabic origin. Therefore, we can be reasonably sure that there are examples of these sounds in the language, which are not a result of borrowing. Though he does not present minimal pairs, he does present enough (non-Arabic) examples of each sound to refute any simplistic allophonic relationship between these and another phone. I have, therefore, assumed both sounds to be phonemic—just as he presents them, although clearly the question is worth revisiting.

Vowels

i / ii		u / uu
e / ee		o / oo
	a / aa	

Specific Language Resources:

(Alio 2004a)

Ubi [ubi] (B1/B3)

Source: Alio 2004a

	Labial	Alveolar	Palatal	Velar
Voiceless plosive	p	t	c	k
Voiced plosive	b	d	ɟ	g
Implosive	ɓ	ɗ	ʄ	
Voiceless fricative		s		
Voiced fricative		z		
Nasal	m	n	ɲ	ŋ
Approximants	w		j	
Lateral		l		
Rhotic		r		

Notes: Alio includes a glottal stop in his inventory, which I have removed. In his data, the sound is limited to the word-initial position except in a few examples. Alio worked with Herrmann Jungraithmayr, who has an affinity for glottal stops.

Alio labels the palatal obstruents as affricates. Following the pattern of other languages, I have reanalyzed them as plosives.

Vowels

i / ii		u / uu
e / ee		o / oo
	a / aa	

Specific Language Resources:

(Alio 2004a)
(Hutchinson and Johnson 2006)

Zerenkel [zrn] (B1)

Source: Ramat 2007, 2011

	Labial	Alveolar	Palatal	Velar	Glottal
Voiceless plosive	p	t	c	k	
Voiced plosive	b	d	ɟ	g	
Prenasalized plosive	mb	nd	ɲɟ	ŋg	
Implosive	ɓ	ɗ	ʄ		
Voiceless fricative		s			h
Voiced fricative		z			
Nasal	m	n	ɲ	ŋ	
Approximants	w		j		
Lateral		l			
Rhotic		r / ɽ			

Notes: Zerenkel is the only Chadic language of the Guéra to have prenasalized consonants. These phonemes have been cited in word-initial position in multiple words. The sound also exists in the neighboring Nilo-Saharan language Dadjo Dar Dadjo.

Vowels

i / ii		u / uu
e / ee		o / oo
	a / aa	

Notes: Open-mid vowels /ɛ/ and /ɔ/ also occur in Zerenkel, but there is no evidence that they have phonemic status.

Specific Language Resources:

(Johnson 2005)
(Ramat 2007)
(Ramat 2011)

Appendix 2: Possible Kujarge-East Chadic B cognates

The Kujarge wordlist from the field notes of Paul Doornbos (circulated by Paul Whitehouse in 2005) was compared with eighteen languages from the East Chadic B subbranch. References for those data sources can be found in the text above and in Appendix 1. Below are the likely cognates found between Kujarge and the East Chadic languages. Of the ninety-five Kujarge words examined, thirty-four appear to have a cognate with some East Chadic language.

animal/viande: kwé
Kajakse: kʰímé ; Masmaje: kʰóméí ; Mubi: komɛ? ; Zerenkel: kume

corde: bɔŋe / bɔɲa
Mukulu: bônné

corne: gapfe / gaffa
Baraïn: gáp:íníŋ ; Bidiya: gɛpunu ; Birgit: géfò ; Dangla: gepi ; Kajakse: gáfò ; Mabire: gepo ; Masmaje: gérìn ; Mawa: gab ; Migaama: gaapa ; Mogum: gɛpo ; Mubi: gebi ; Saba: gə̀pán?ɛ̀ ; Sokoro: gə̀pán ; Tamki: gə́p ; Toram: gɛ́:fò ; Ubi: gaba ; Zerenkel: gapi

courir: ŋgúrú
Baraïn: gòró ; Bidiya: gadu ; Dangla: ŋagaɗe ; Kajakse: ɠèréʄ͡ʄá ; Mabire: gaɗu ; Migaama: gaɗɗo ; Mubi: giɾu ; Saba: gá?gà? ; Sokoro: nà gád gádì ; Tamki: kəɗɛ ; Ubi: gega ; Zerenkel: aɾŋgaɾuwa

dix: kʌrup
Baraïn: kúr ; Kajakse: kúɾwì ; Masmaje: kúɾúk˺ ; Mubi: kuɾuk' ; Zerenkel: kuɾuki ; also: Bidiya: ɔɾɔ ; Birgit: ?ò'rók˺ ; Dangla: orok ; Mabire: oɾa ; Mawa: kwajɛ ; Migaama: orra ; Mukulu: kòomát ; Saba: órkà ; Sokoro: órkà ; Tamki: ɔrka ; Toram: ó:rò ; Ubi: oɾoki

donner: buruno / bure / birini
Baraïn: bèdí ; Bidiya: bɛɾɛ ; Birgit: bírú ; Dangla: ŋabere ; Kajakse: fáɾ?ì ; Mabire: biɾka ; Masmaje: fáɾkʰú ; Migaama: biraw ; Mogum: nobira ; Mubi: baɾ ; Tamki: ɓeke ; Ubi: bije ; Zerenkel: aɾbaɾa

écorce: kuránu
Mubi: kuɾoɾo ; Zerenkel: koɾoɾo

entendre: aɟigala / aɟugɔna
Mubi: dʒige ; Zerenkel: aɾdʒigija

genou: guge / gife
Bidiya: gipɛ ; Birgit: 'gìfí ; Dangla: gipo ; Kajakse: kífə̀ ; Migaama: gippi ; Mogum: gip ; Mubi: gip ; Zerenkel: gibi

lune: tiré
Baraïn: túrú ; Birgit: tèɾé ; Kajakse: tì'ɾí ; Mabire: tɛɾɛ ; Masmaje: tírí ; Mogum: tɛɾɛ ; Mubi: tiri ; Mukulu: térè ; Toram: tɛ́tɛ̀

maison: kuro / kire
Baraïn: gérá (village) ; Bidiya: gɛro ; Birgit: gìɾí ; Dangla: gɛr ; Masmaje: kìrì ; Migaama: ger ; Mogum: gɛr ; Mubi: giɾ ; Toram: gɛ́r ; Zerenkel: giɾi

manger: tona / tuye / tuwona
Baraïn: tí: ; Bidiya: tia ; Birgit: tó: ; Dangla: ŋate ; Kajakse: tùwà ; Mabire: taka ; Masmaje: tígaù ; Mawa:

notə ; Migaama: tijaw ; Mogum: nota ; Mubi: tiʔ ; Saba: tátìjɔ́ ; Sokoro: nà táʔgà ; Tamki: tiəgɛ ; Toram: nù té ; Ubi: to ; Zerenkel: aɾti

mourir: maat
Baraïn: mótó ; Bidiya: maate ; Birgit: máˈtí ; Dangla: ŋamate ; Kajakse: mátì ; Mabire: mate ; Masmaje: màtì ; Mawa: nomit ; Migaama: maato ; Mogum: nomat ; Mubi: mat ; Saba: ámìtá ; Sokoro: nà mítà ; Tamki: mitɛ ; Toram: nò mát ; Ubi: midjə ; Zerenkel: aɾmata

noir: kálámàdù
Baraïn: kōlmó ; Saba: kílmì ; Sokoro: kílmì ; Tamki: kilime ; Ubi: kilimin
oreille: kumayo – kime
Kajakse: kòi̯ˈmí

partir: iɟi / ucɔmo
Kajakse: ɟ͡ɟìá

poisson: bùɟá
Baraïn: būːsí ; Bidiya: boose ; Birgit: bísò, bísì ; Dangla: boso ; Kajakse: bɔŋ́ gʰòs ; Mabire: bis ; Masmaje: bògòs ; Mawa: bus ; Migaama: buusu ; Mogum: biso ; Mubi: bogoso ; Mukulu: pùunìsó ; Saba: búsɛ́ ; Sokoro: bús ; Tamki: búsé ; Toram: bíhò ; Ubi: buza ; Zerenkel: boksi

pou de tête: bíìtà
Bidiya: itaate ; Birgit: ˈʔítáˈtì ; Dangla: ita ; Kajakse: ʔátátˋ ; Mabire: intat ; Masmaje: ʔàtátˋ ; Migaama: itaata ; Mogum: intat ; Mubi: idedi

quatre: fada
Baraïn: púdú ; Bidiya: paɗaŋ ; Birgit: fóːdì ; Dangla: poɗ ; Kajakse: fátˋ ; Mabire: pot ; Masmaje: fátˋ ; Mawa: par ; Migaama: poodì ; Mogum: pot ; Mubi: faɗa ; Mukulu: pìdé ; Saba: páʔà ; Sokoro: páʔádà ; Tamki: paɗa ; Toram: fódà ; Ubi: poɾa ; Zerenkel: paɗa

sable: alala
Ubi: juale

sang: ɪbɪrí
Baraïn: bāːrí ; Birgit: bàrá ; Dangla: bari ; Kajakse: ˈʔábàɾ ; Mabire: bar ; Masmaje: ʔábár ; Migaama: baara ; Mogum: bar ; Mubi: oboɾ ; Toram: bár ; Zerenkel: ubaɾi

savoir: kawanawe / kawananɪra
Baraïn: wōnːó

se lever: wusi / wusugɔna
Mawa: nowisi ; Sokoro: nà wúsà ; Toram: nù ús ; also Bidiya: ucu ; Birgit: gɔ́ccáˈlì ; Dangla: ŋaʔutje ; Kajakse: wɔ́cçɔ̀kʰú ; Mabire: watʃe ; Masmaje: wɔ̀dʒɔ́gɔ́ ; Mogum: noutʃa ; Mubi: wədʒik ; Mukulu: ˈòozìgá ; Ubi: wedʒe ; Zerenkel: aɾawadʒiga

sein: féfè
Bidiya: pupa ; Birgit: fìfánàŋ ; Dangla: popi ; Kajakse: fàfó ; Masmaje: fàfó ; Migaama: puupu ; Mogum: popo ; Mubi: fabo ; Toram: fúfú ; Zerenkel: papo ; also Baraïn: pējé ; Mabire: paj ; Mawa: paja ; Saba: páyò ; Sokoro: kúp ; Tamki: kúp ; Ubi: pajo

semence: uso
Baraïn: wásːì ; Bidiya: busu ; Birgit: bùsúm ; Dangla: busam ; Kajakse: búsòn ; Migaama: busina ; Mogum: busum ; Mukulu: búzú ; Toram: bóhàm ; Zerenkel: busunu

soleil: afar
Bidiya: paato ; Bigit: fòtó ; Dangla: pato ; Kajakse: fátì ; Mabire: pat ; Masmaje: fɑ́ɪ́ ; Mawa: pidi ;
Migaama: paato ; Mogum: pot ; Mukulu: pèeɗó ; Mubi: fat' ; Saba: pídò ; Sokoro: píʔò ; Tamki: pìʔí ;
Toram: fó: ; Ubi: pidio ; Zerenkel: pati

terre: kiye / kiya
Baraïn: kídá ; Bidiya: kiɗa ; Birgit: kìˈɗá ; Dangla: kiɗa ; Mabire: kit ; Masmaje: kíʔí ; Mawa: ko ;
Migaama: kiɗa ; Mogum: kit ; Mubi: kiɗì ; Toram: kít

tête: akaɟo / áke / akaɟe
Baraïn: kè: ; Bidiya: kate ; Birgit: kʰàɟ͡ɟá ; Dangla: ka ; Kajakse: kàc͡ç ; Mabire: kajat ; Masmaje: kátʃ ;
Migaama: kaja ; Mogum: kata ; Mubi: katʃ ; Toram: kát ; Zerenkel: kəj

trois: ubo
Baraïn: súb:ù ; Bidiya: subaŋ ; Birgit: súbù ; Dangla: suba ; Kajakse: sɔ́bˋ ; Mabire: sup ; Masmaje: sóbˋ ;
Mawa: sub ; Migaama: subba ; Mogum: sub ; Mubi; suɓa ; Saba: súbà ; Sokoro: súbà ; Tamki: suba ;
Toram: súbà ; Ubi: suba ; Zerenkel: sub:a

tuer: donɪra / duda / duɲure
Baraïn: dí: ; Bidiya: dec ; Birgit: gúdàigà ; Dangla: ŋade ; Kajakse: ɗúwà ; Mabire: nadɛ ; Masmaje: dégú ;
Mawa: nodaka ; Migaama: dijaw ; Mogum: noda ; Mukulu: (t)ídè ; Mubi: di ; Saba: dáigà ; Sokoro: nà
dádéŋ ; Tamki: tiɛgɛ ; Toram: nò déɛ́k ; Ubi: dage ; Zerenkel: aɾdi

un: kurwo / kirre
Bidiya: ke ; Birgit: kʰáidò ; Dangla: rəki ; Mabire: ke ; Migaama: kaɗji ; Mogum: kɛ ; Sokoro: kéttì ;
Tamki: kiiti ; Toram: kétàŋ

urine: fidiɟi
Bidiya: biʔɛ ; Birgit: ˈfíɟì ; Dangla: piɗji ; Kajakse: fɘ́ɗícç ; Masmaje: férídʒʔ ; Migaama: piɗdji ; Mogum: pi
; Mubi: fɘɾitj ; Toram: fítʃ

vache: keɟa / kúɟò
Kajakse: kʰíjà ; Masmaje: kíh ; Mubi: ki ; Zerenkel: ki

vent: usmala
Birgit: ʔòsi ; Dangla: usu ; Kajakse: kòsʊḱ ʰ ; Masmaje: kúsúk ; Mawa: otʃ ; Migaama: ussu ; Mogum: os ;
Mubi: kusuk ; Saba: ósò ; Sokoro: ós ; Tamki: ɔ́ssɔ̀ ; Ubi: aso ; Zerenkel: usuki

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The following references include all the works cited in the text, plus some twenty-two publications concerning the East Chadic B subbranch that are not cited in this paper. A few of those texts were not available to the author, but are listed here, in order to give a more complete picture to any linguist interested in this group of languages. Some of those references are lifted directly from Newman (2012). For the convenience of the researcher, Appendix 1 gives language-specific reference citings for each of the twenty Chadic languages of the Guéra.

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