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The phonology of Proto-Central Chadic : the reconstruction of the phonology and lexicon of Proto-Central Chadic, and the linguistic history of the Central Chadic languages

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Section II - TYPOLOGY OF CENTRAL CHADIC PHONOLOGIES

This section comprises five chapters looking at the different phonological systems present in the Central Chadic languages. We will examine the phonological characteristics of each language, where data is available, and reconstruct the broad phonological features of the proto-language of each of the eighteen groups within Central Chadic.

First (chapter 5) we shall look at the Vowel Prosody languages, where their primary characteristic is the presence of vowel harmony caused by prosodic features of palatalization or labialization.

The second chapter in this section (chapter 6) deals with the Consonant Prosody languages. These languages are characterised by complex systems of labialized and palatalized consonants.

The third chapter in the section (chapter 7) looks at the two groups of languages that exhibit a Mixed Prosody system, where elements of vowel prosody and consonant prosody have combined.

The fourth chapter in the section (chapter 8) covers the Kotoko languages, whose phonological system doesn't fit any of the other systems.

The final chapter (chapter 9) gives a summary of the phonological characteristics of the languages and proto-languages.

The focus of this section is to establish the vowel and prosody systems of the proto-languages at the group level. In the following section (Section III) we will be using the reconstructions of the group proto-languages to establish the phonological features of Proto-Central Chadic. In particular, we will be looking at the history of the development of the different phonological sub-types (chapter 11).

5 Vowel Prosody

5.1 Introduction

In this chapter we will be looking at the phonological features of Vowel Prosody languages. These languages all display vowel harmony caused by prosodic features of palatalization and labialization. The palatalization prosody causes front vowel harmony, and in most cases changes the point of articulation of the laminal consonants from alveolar to post-alveolar. All of these languages have the palatalization prosody.

Some languages also have a labialization prosody, which causes back-rounding vowel harmony, and may also labialize velar phonemes.

We shall first of all present a stereotypical example of a Vowel Prosody language in the form of a case study of Moloko (Mofu group). We shall then go through each of the groups within Central Chadic where the Vowel Prosody system is present and, as far as possible, reconstruct the phonological system of the proto-language of the group.

It should be noted that the presence of vowel harmony in the languages of a group does not imply that the proto-language of the group also possessed vowel harmony. We must show that for individual words a particular prosody is present across a range of languages in the group. If this is true for a significant number of words, then that prosody can be reconstructed for the proto-language of the group.

5.2 Case Study – Moloko

Moloko (Bow 1999), a language of the Mofu group, exhibits all of the phenomena typical of languages using the Vowel Prosody system. The most important of these for our discussion are:

- a vowel system consisting of two vowels /a/ and /ə/ (or one vowel /a/ and an epenthetic [ə])
- two prosodies – palatalization and labialization (see section 5.2.2)
- the existence of a set of labialized velar phonemes;
- the movement of laminal phonemes to the post-alveolar place of articulation under the influence of the palatalization prosody
- the labialization of velars under the labialization prosody
- the leftward spread of prosodies, both from suffixes to roots and from roots to prefixes

5.2.1 Consonants

The consonantal inventory of Moloko is as follows:

	Labial	**Alveolar**	**Laminal**	**Velar**	**Labialized Velar**
Plosive	p	t	ts	k	k^w
	b	d	dz	g	g^w
Implosive	ɓ	ɗ			
Nasal	m	n		(ŋ)	
Pre-nasalized	^{m}b	^{n}d	^{n}z	^{ŋ}g	$^ŋg^w$
Fricative	f	ɬ	s	h	h^w
	v	ɮ	z		
Trill		r			
Approximant		l	j	w	

Table 16 - Moloko consonants

/h/ is realised as [x] word-finally, which is typical of languages in the groups in question here.

As with other languages in the Mofu group, [ŋ] is only found word-finally, and is in complementary distribution with [n]. It is analysed by Bow as being an allophone of /n/ and therefore not phonemic.

In common with many Central Chadic languages, voiced plosives and pre-nasalized plosives do not occur in word-final position.

5.2.2 Vowels and Prosodies

The vowel system of Moloko is analysed as consisting of the single underlying phoneme /a/ along with two word-level prosodies, labialization and palatalization.

These word-level prosodies are supra-segmental features that are a property of the entire word. In the case of Moloko, and other languages of this type, they are realised primarily on the vowels. The palatalization prosody fronts the vowels of the word, while the labialization prosody backs and rounds the vowels. The prosodies are denoted by ^{w} or ^{y} placed at the end of the word, and separated from the word by a space. For example, the name of this language, Moloko, has the underlying form /malaka ^{w}/. The interaction of the prosody with the vowels gives the phonetic realisation [mɔlɔkʷɔ].

Besides the vowel /a/, there is also a [ə] which Bow considers to be absent from the underlying form but which is inserted to break up most CC clusters. Only word-medial CC clusters with /r/, /l/, /w/ or /j/ as the first consonant are permitted.

The prosodies and the vowels interact to produce the following surface forms:

	No Prosody	**Palatalization**	**Labialization**
/a/	a	ɛ	ɔ
[ə]	ə	ɪ	ʊ

Table 17 - Moloko vowels

(80)	/mdga/	[mədəga]	‘older sibling’
	/matabał/	[matabał]	‘cloud’
	/mababak ^{y}/	[mɛbɛbɛk]	‘bat’
	/gva ^{y}/	[gɪvɛ]	‘game’
	/gza ^{w}/	[gʊzɔ]	‘kidney’
	/talalan ^{w}/	[tɔlɔlɔŋ]	‘chest’

(In the underlying forms ^{y} is used for the palatalization prosody and ^{w} for the labialization prosody.)

Morphemes cannot carry both the palatalization and labialization prosodies at the same time.

The vowel system is complicated by two other factors. Firstly, the vowel of the final syllable before a pause is neutralised to /a/, as in (80). This occurs after

schwa insertion but before the application of prosodies. Secondly, a word-initial vowel (always /a/) is impervious to the effects of the prosodies. The non-pre-pausal form is given for the underlying form from now on.

(81)	/ɗf atsr/	[**ɗəf** atsar]	'the food is good'	(word boundary)
	/na zm ʷ ɗf/	[na zʊm **ɗaf**]	'I eat food'	(pre-pausal)

(82)	/ala ʸ/	[alɛ]	'eye'
	/ałałaɗ ʸ/	[ałɛɬɛɗ]	'egg'
	/amam ʷ/	[amɔm]	'bee, honey'
	/azᵑga ʷ/	[azʊᵑgʷɔ]	'donkey'

5.2.3 Local Conditioning

Vowels are conditioned by adjacent labialized consonants and the approximants /w/ and /j/ in some environments. The conditioning acts on the vowels after the effect of the prosodies has been applied. The environments and effects are as follows:

(83)
wə→wu
əw→uw
jə→ji
əj→ij
Cʷa→Cʷɔ
Cʷə→Cʊ
əCʷ→ʊCʷ
ɛCʷ→œCʷ

This last process results in the presence of non-high phonetic front rounded vowels. This is the only environment where this occurs. Front rounded vowels are always due to the combination of the palatalization prosody and a labialized consonant and never to the presence of both the palatalization prosody and the labialization prosody on the same root. The following examples show the effect of a labialized consonant on adjacent vowels.

(84)	/hʷaɗa/	[hɔɗa]	'dregs'
	/tkʷrak/→/təkʷərak/	[tʊkʊrak]	'partridge'
	/dzagʷr ʸ/→/dzagʷar ʸ/	[dʒœgʷɛr]	'limp'

/ə/ is affected by an adjacent semivowel, being realised as [i] adjacent to /j/ and [u] adjacent to /w/. /a/ is unaffected by adjacent semivowels.

(85)	/kja/→/kəja/	[kija]	'moon'
	/ɗwr^{y}/→/ɗəwar^{y}/	[ɗuwɛr]	'to sleep'
	/jaɗj/→/jaɗaj/	[jaɗaj]	'to tire'
	/mawr/→/mawar/	[mawar]	'tamarind'

5.2.4 Consonants and Prosodies

Whilst the prosodies primarily affect vowels, they also have effects on certain sets of consonants. (We will see a similar phenomenon in chapter 6 with Consonant Prosody languages.)

The palatalization prosody causes the point of articulation of all laminal consonants in the word to be moved from alveolar to post-alveolar, i.e. /s/ is realised as [ʃ], /z/ as [ʒ] etc.

(86)	/dzn/	[dzaŋ]	'to prick'
	/dzn^{y}/	[dʒɛŋ]	'chance'
	/mtsapr/	[mətsapar]	'multiple'
	/mtsapa^{y}/	[mɪtʃɛpɛ]	'to drape'

The labialization prosody causes the labialization of all the velar consonants in the word.

(87)	/gara^{w}/	[g^{w}ɔrɔ]	'kola'
	/maza^{ŋ}ga^{w}/	[mɔzɔŋg^{w}ɔ]	'chameleon'
	/magadak^{w}/	[mɔg^{w}ɔdɔk^{w}]	'large hawk'

5.2.5 Spread of Prosodies

Prosodies spread leftwards within the word, either from the root onto prefixes, or from a suffix onto the root and prefixes. Data is taken from Friesen and Mamalis (2008).

In the following example, the vowels of the stem and prefix are labialized due to the spread of the labialization prosody from the suffix.

(88) /na-ɣr/
[na-ɣar]
1s-kick
'I kicked'

/ma-ɣr-ak ^{w}/
[mɔ-ɣʊr-ɔk^{w}]
1pEx-kick-1pEx
'We (excl.) kicked'

Likewise, the palatalization prosody can spread from a suffix onto the root and prefix of a verb.

(89) /n-tsk va/
[nə-tsək va]
1s-move PERF
'I moved already'

/n-tsk-a ^{y}/
[nɪ-tʃɪk-ɛ]
1s-move-NUL
'I moved'

It may be possible to have multiple suffixes with different prosodies attached to the same verb root, but no examples of this are provided.

5.3 Analysis and Reconstructions

The Vowel Prosody system is the most common system amongst Central Chadic languages, and is found in around 35 languages. It predominates amongst the languages from Mafa southwards and eastwards. The languages documented as using the Vowel Prosody system are:

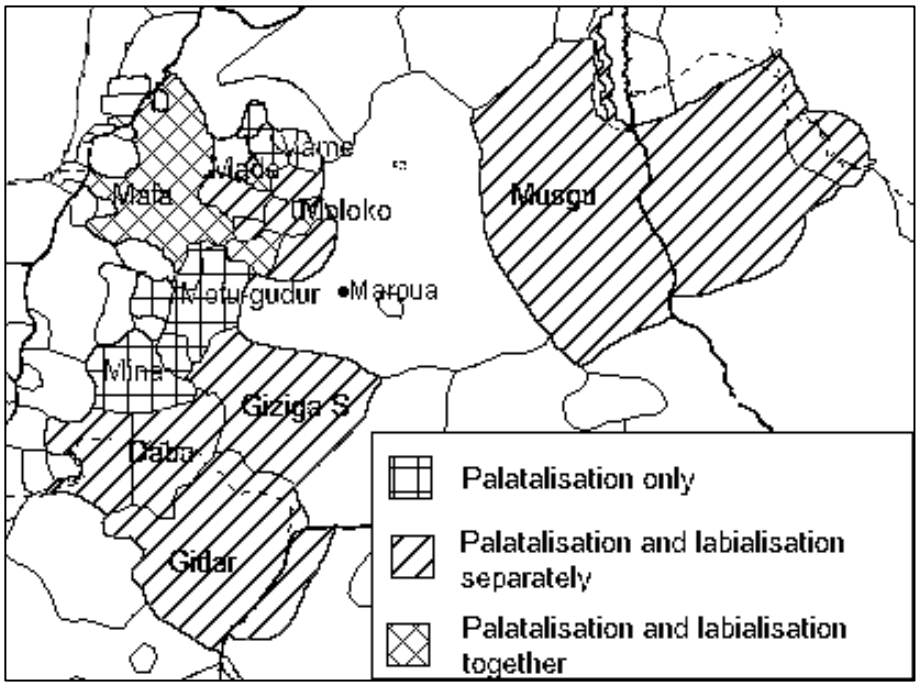
Podoko	(Swackhamer 1981)
Cuvok	(Ndokobaï 2003)
Mafa	(Barreteau and le Bléis 1990)
Mina	(Frajzyngier, Johnston, and Edwards 2005)
Daba	(Lienhard and Giger 1975)
Mbudum	(Ndokobaï in progress)
Buwal	(Viljoen 2009)
Mofu-Gudur	(Barreteau 1988)
Dugwor	(Ousmanou 1999)
Merey	(Gravina)
Gemzek	(Gravina 2003)
Zulgo	(Haller 1980)
Moloko	(Bow 1999)
Muyang	(T. Smith and Gravina 2010)
Mada	(Barreteau and Brunet 2000)
Ouldeme	(de Colombel 1997)
Mbuko	(T. Smith and Gravina 2010)
Vame	(A. Kinnaird 2010)
Mbara	(Tourneux, Seignobos, and Lafarge 1986)
Musgum	(Tourneux 1991; Tourneux 1978a)
Muskum	(Tourneux 1977)
Gidar	(Frajzyngier 2007; Noukeu 2002)

Table 18 - Works on vowel prosody languages

It should be remembered that the groups exhibiting the Vowel Prosody system do not form a genetic unit. This phonological system is an areal feature (see section 11.2.4).

In the case of Moloko we saw that words carried either the palatalization prosody or the labialization prosody, but not both. This is not the case with all of the languages that fall into this phonological type. Some languages only have the palatalization prosody, not the labialization prosody. Some have both prosodies, and these can co-occur on the same morpheme. However there are no languages which have the labialization prosody but not the palatalization prosody.

The following map shows the geographical distribution of the Vowel Prosody system and its sub-types.



Map 10 - Distribution of the Vowel Prosody system

We will see that in all the groups discussed here it is possible to reconstruct the palatalization prosody for the proto-language of the group. However, only in one case, the Musgum group, is the labialization prosody reconstructed for the proto-language of the group.

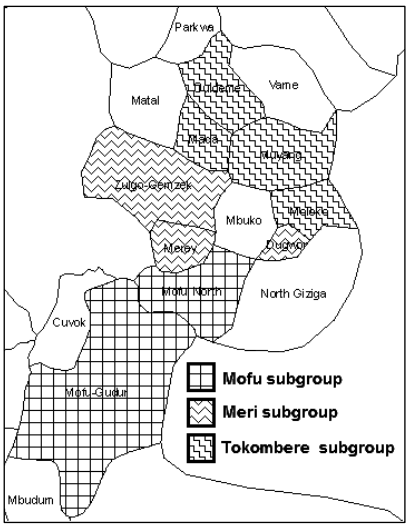
In this section we shall give brief descriptions of the phonologies of the Vowel Prosody languages group by group from a typological perspective, and then present a reconstruction of the phonological characteristics of the proto-language for each group. In the reconstructions, *ɨ is always used, whether or not the individual languages have /ə/ or /ɨ/.

5.3.1 Mofu Group

In the Mofu group all nine languages exhibit vowel harmony. All have front vowel harmony, but not all have back-rounding vowel harmony. In other

words, the palatalization prosody is present in all languages of the group, whereas the labialization prosody is not.

The following map shows the locations of the Mofu group languages and the subgroups.



Map 11 - Mofu group languages

In Ouldeme (de Colombel 1997), the most northerly of the languages, there is front vowel harmony but no back-rounding vowel harmony. Muyang (T. Smith and Gravina 2010) has both palatalization and labialization prosodies, as do Moloko (Bow 1999) and Mada (Barreteau and Brunet 2000). In the case of Mada, both prosodies can occur on a single morpheme. For Zulgo (Haller 1980), Gemzek (Gravina 2003), Merey (Gravina) and Dugwor (Ousmanou 1999) both palatalization and labialization prosodies are present. Mofu-Gudur (Barreteau 1988), the most southerly of the languages, has only front vowel harmony, though the available data (Barreteau and Hollingsworth 1990) indicates that closely related Mofu North has both front and back-rounding vowel harmony, and that the two can co-occur simultaneously on a single morpheme resulting in front-rounding vowel harmony.

In most of the Mofu group languages, /ə/ is only mildly affected by the palatalization and labialization prosodies, with realisations tending towards [ɪ]

or [ʊ]. However in Zulgo and Ouldeme /ɨ/ is fully affected, being realised as [i] or [u].

5.3.1.1 Prosodies

In this and the following section we shall examine the languages of the Mofu group to determine if it is possible to reconstruct the prosodies of palatalization and labialization, and also the vowels, for the proto-language of the group. The Mofu group offers an excellent test case for the reconstruction of vowels and prosodies. It contains nine languages which are largely well-documented, and has an internal structure which is understood. In addition, the languages of the group display each of the three attested vowel harmony options: palatalization only, palatalization and labialization separately (i.e. both cannot occur on the same morpheme), and palatalization and labialization together (i.e. both can occur on the same morpheme).

The Mofu group has been divided into three genetic subgroups (Gravina 2007a): Tokombere (Ouldeme, Muyang, Mada, Moloko); Meri (Zulgo, Gemzek, Merey, Dugwor); and Mofu subgroup (Mofu-Gudur, Mofu North).

The analysis will focus on nouns. Establishing the underlying prosody for verbs is difficult in the Mofu group. Prosodies play a role in the verbal affixation process, and it is not always a straightforward task to determine the underlying prosody. There is almost no noun morphology in the Mofu group, so nouns are far easier to work with.

Amongst the 109 Proto-Mofu roots that have been reconstructed, the vast majority carry no prosody. 22 (20%) carry the palatalization prosody. None carry the labialization prosody, or both prosodies.

Although none of the Proto-Mofu roots carry the labialization prosody, the prosody is present in many of the reflexes in present day languages. In most cases, the presence of the labialization prosody on individual words can be easily explained by the spread of the labialization component of a labialized velar onto the whole word. The data in the following table is presented at a broad phonetic level. With a few exceptions, the words from Gemzek, Merey and Mada carry the labialization prosody. However the labialization prosody does not exist in Mofu-Gudur or Ouldeme.

Gloss	Root	Mofu-Gudur	Merey	Gemzek	Mada	Ouldeme
baboon	*hɨlɨgʷɨv	/lagʷav/ lagʷav	/wələv/ wuluv	/hələv ʷ/ hulov		alkʷəv alkuv
beer	*ɣʷɨzam	/wəzam/ wuzam	/gəzam ʷ/ guzom	/gəzam ʷ/ guzom	/wzam ʷ/ wzom	wəzam wuzam
blind	*gʷɨlɨf	/wəlaf/ wulaf	/gələf ʷ/ guluf	/gəlaf ʷ/ gulof	/məwlafa ʷ/ muwlofa	/wələf/ wuləf
broom	*sɨlakʷ	/salakʷ/ salakʷ	/səlak ʷ/ sulok	/səlak ʷ/ sulok	/səlakʷ/ səlakʷ	/səlakʷ/ səlakʷ
donkey	*azɨᵑgʷa	/zəᵑgʷaw/ zəᵑgʷaw	/zəᵑgaw/ zəᵑgaw	/zəᵑga ʷ/ zuᵑgo		/azəᵑgʷa ʸ/ aziᵑgʷa

Table 19 - Labialization in the Mofu group

We can see in the data a process which leads to the development of the labialization prosody. The first step is the local conditioning of a vowel by a labialized consonant or /w/, producing a back-rounded vowel. The second step is the harmonisation of the other vowels in the word with the back-rounded vowel. Once this second step has taken place, the word can be analysed as carrying the labialization prosody.

For example, the underlying form of the root 'beer' in Mofu-Gudur is /wzam/. After schwa-insertion, local conditioning produces the surface form [wuzam]. However, in the case of Mada, the back-rounding influence of the /w/ has spread to the entire word. The underlying form is therefore /wzam ʷ/, with a labialization prosody.

There are words where two analyses are possible. The Gemzek 'donkey' [zuᵑgo] could be analysed as /zəᵑga ʷ/ or /zəᵑgʷa/. It is not possible to be certain that this word carries the labialization prosody. For the labialization prosody to be included in the phonological inventory of a language there need to be unambiguous cases where the presence of back-rounded vowels cannot be attributed to the presence of labialized consonants or /w/.

The development of the labialization prosody in this way is very widespread, but it is not predictable. We cannot say for any individual language that every word with a labialized consonant in the proto-language will develop the labialization prosody. For example, in the Merey data cited in Table 19, all words have developed the labialization prosody, except for /zəᵑgaw/ 'donkey', though in this case the exception may be due to the word being a borrowing from Mofu North.

In every case in the data we can attribute the development of the labialization prosody in a particular word of a particular language to the presence of a labialized consonant in the proto-form. The labialization prosody is not therefore a feature of Proto-Mofu. It is also unlikely to have been present in the proto-languages of the three subgroups within the Mofu group. If it were, we would expect to see consistent labialization across the languages within a subgroup for an individual root. However, when we examine its presence across the roots of the languages of each subgroup, we see a lack of consistency.

A possible exception to this is the Meri subgroup, where there is more uniformity in the labialization of roots. For example, in the data presented, the two languages Merey and Gemzek have labialized all the roots, with the sole exception of the Merey entry for 'donkey' mentioned above. It is therefore possible that the labialization prosody was present in Proto-Meri.

Although the labialization prosody was not a part of the phonemic inventory of Proto-Mofu, the palatalization prosody was very much present, and we can reconstruct the palatalization prosody for a number of roots. For many roots there are languages where the palatalization prosody has been lost. Where a good majority of the reflexes carry the prosody, this is taken as evidence of its presence in the proto-language.

Gloss	Root	Mofu-Gudur	Dugwor	Zulgo	Moloko
ashes	*vɨta ʸ		/bəta/ bəta	/bəta ʸ/ bite	/vəta ʸ/ vəte
hole	*vɨɗ ʸ	/vəgaɗ ʸ/ vəgeɗ	/abaɗ ʸ/ abeɗ	/bəja ʸ/ bije	/pəɗa ʸ/ pəɗe
nose	*hʷɨtɨr ʸ	/hatar ʸ/ heter	/mətar ʸ/ məter	/hətər ʸ/ hitir	
porcupine	*tsɨhaɗ ʸ		/ⁿdzahaɗ ʸ/ ⁿdzeheɗ	/tsaha ʸ/ tsehe	/aⁿdzahaɗ ʸ/ eⁿdzeheɗ
tongue	*ɗɨrɨnah ʸ	/ɗərna ʸ/, /nanah ʸ/ ɗərne, neneh	/hərnaɬ ʸ/ hərneɬ	/arah/ arah	/hərnak ʸ/ hərnek
tooth	*ɬɨr ʸ	/ɬar ʸ/ ɬer	/ɮar ʸ/ ɮer	/ɮər ʸ/ ɮir	/ałar/ ałar
wind	*hɨmɨɗ ʸ	/mamaɗ ʸ/ memeɗ	/həmaɗ ʸ/ həmeɗ	/həᵐbəɗ ʸ/ hiᵐbiɗ	/həmaɗ/ həmaɗ

Table 20 - Palatalization in the Mofu group

In the data presented in Table 20 above, only two entries are consistently palatalized across the data, 'hole' and 'porcupine'. In some cases, the absence of palatalization can be put down to borrowing from a different group. For example, the reflex of 'tongue' found in Zulgo has probably come from Mandara *nara<ara* (the Mandara initial *n-* is prefixed to words to avoid forms beginning with a vowel (see section 3.4.5)).

The entries for 'tooth' and 'wind' show consistent palatalization for the languages of the Mofu and Meri subgroups, but consistent absence of palatalization for the languages of the Tokombere subgroup.

In some cases the palatalization prosody has developed in individual words due to the presence of /j/. In these cases, the palatalization prosody is not reconstructed for Proto-Mofu. In the following data, the prosody has developed in both examples in Merey and Muyang. In Dugwor and Moloko it has developed in 'bird' but not 'squirrel'.

Gloss	Root	Mofu-Gudur	Dugwor	Merey	Moloko	Muyang	Ouldeme
bird	*ɗɨjɨŋ^{w}	ɗijaŋ	ɗijeŋ	ɗijeŋ	eɗəjen	eɗiŋ	aɗeŋ^{w}
squirrel	*hajaŋ	ajaŋ	hijaŋ	hijeŋ	ajah	ejeŋ	ajeŋ

Table 21 - Palatalization due to /j/

In summary, the palatalization prosody can be reconstructed for a number of roots for Proto-Mofu. Palatalization has also developed in other roots in individual languages of the Mofu group where it was not present in Proto-Mofu. Similarly, palatalization that was present in Proto-Mofu has been lost in individual words in the various languages. The labialization prosody is an innovation within the languages of the group and was not a feature of Proto-Mofu.

5.3.1.2 Underlying Vowels

As with Moloko (see section 5.2.2), the languages of the Mofu group can be analysed as consisting of at most two vowels /a/ and /ə/, which interact with the prosodies, labialized velars and approximants to produce a more extensive system of surface vowels.

In many of the languages a rule operates that lowers underlying /ə/ to /a/ in the final syllable before a pause. Since this is the form most commonly used as

the citation form in the data under examination, it is not possible to determine from these languages whether the final vowel in a word is underlying /ə/ or /a/. However there are several languages – Merey, Gemzek, Zulgo and Ouldeme – which do not have this rule, and so these languages can be used for reconstructing final vowels.

Gloss	Root	Mofu-Gudur	Dugwor	Moloko	Muyang	Ouldeme
baboon	*hɨlɨgʷɨv	/lagʷav/ lagʷav		/hərgʷav/ hərgov	/aləgəvʷ/ aluguv	/alkʷəv/ alkuv
beer	*ɣʷɨzam	*hʷɨzam→ /wəzam/ wuzam	*gʷɨzam→ /gəzamʷ/ guzom		*hʷɨzam→ /zəmʷ/ zum	*hʷɨzam→ /wəzam/ wuzam
blind	*ɣʷɨlɨf	*hʷɨlɨf→ /wəlaf/ wulaf	*gʷɨlɨf→ /gəlafʷ/ gulof	*hʷɨlɨf→ /həlafʷ/ həlof		*hʷɨlɨf→ /wələf/ wuləf
body	*vaw		/ba/ ba	/va/ va	/vaw/ vu	/vaw/ vo
breast, milk	*ɗɨwah	/ɗəwa/ ɗəwa	/awah/ awah		/ɗəwa/ ɗuwa	/aɗəwa/ aɗuwa
cow	*ɬa	/ɬa/ ɬa	/ɬa/ ɬa	/ɬa/ ɬa		/ɬa/ ɬa
ear	*ɬɨmaj	/ɬəmaj/ ɬəmaj	/ʞam/ ʞam		/ɬəmaʸ/ ɬimi	/ɬəmaj/ ɬəmaj
fly (insect)	*dzɨwaj	/dzadzəwaj/ dzadzəwaj	/dzəwaj/ dzuwaj	/dzəwaj/ dzəwaj	/azəwaʸ/ ezywi	/zəwaj/ zuwaj
head	*ɣɨr	/raj/ raj	/gar/ gar		/ahar/ ahar	/ɣar/ ɣar
horn	*dɨram	/tələm/ tələm	/dəramʷ/ dərom[1]		/adramʸ/ edrem	
locust	*dzaraj	/dzaraj/ dzaraj		/dzaraj/ dzaraj	/dzaraj/ dzaraj	/dzaraj/ dzaraj
three	*mahkɨr	/maakar/ maakar	/makar/ makar	/makar/ makar	/mahkər/ mahkər	/makar/ makar
water	*jam	/jam/ jam	/jam/ jam	/jam/ jam	/jam/ jam	/jam/ jam
youth	*gawɨla	/gəwla/ gula	/gəwla/ gula			

Table 22 – Vowel reconstructions in the Mofu group

[1] The /ə/ is not necessarily affected by the labialization prosody, but is affected by adjacent labialized consonants, as in 'blind' and 'fly'.

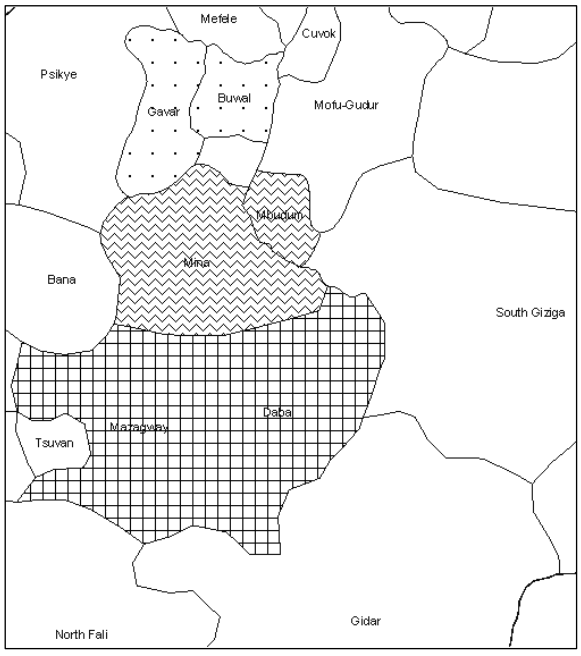
Individual languages also have specific rules which apply. For example, Mofu-Gudur raises vowels in a closed mid-phrase syllable, Dugwor neutralises vowels in the antepenultimate syllable to /ə/, and Muyang raises word-final vowels.

Once these factors are taken into consideration, there is a great deal of consistency in the underlying vowels across the group, and it is possible to provide good reconstructions for many roots, a selection of which are given in Table 22 above. From this we can conclude that Proto-Mofu had a system of two underlying vowels.

5.3.2 Daba Group

The Daba group is made up of six languages. In all except one (Mazagway Hidi), there is either a published phonology, or else work is in progress.

The six languages can be divided into three subgroups: Daba and Mazagway Hidi; Mina and Mbudum; Buwal and Gavar. The locations of the Daba group languages and their subgroups are shown in the following map.



Map 12 - Daba group languages

Within the Daba group, only Daba (Lienhard and Giger 1975) has been analysed as having both front and back-rounding vowel harmony. Buwal (Viljoen 2009) and Mbudum (Ndokobaï in progress) both have the palatalization prosody, and also show signs of an emergent labialization prosody. In Mina (Frajzyngier, Johnston, and Edwards 2005) there is no labialization prosody and the palatalization prosody only affects underlying /a/. Gavar (Noukeu 2004) is the only language in the group whose phonology does not follow the Vowel Prosody system. Vowel harmony has been lost, though its trace can be seen on certain vowels and consonants.

5.3.2.1 Prosodies

In this section we shall look at whether the two prosodies of palatalization and labialization can be reconstructed for Proto-Daba. We will show that for this group it is possible to reconstruct the palatalization prosody for the proto-language, but not the labialization prosody.

In all languages except for Buwal and Gavar, the prosodies affect both /a/ and /ə/. In Buwal, only /a/ is affected, and in Gavar there are no prosodies.

The labialization prosody exists fully only in Daba. Amongst the 136 items reconstructed for the group, only a handful carry the labialization prosody in Daba, and in most cases the presence of labialization can be seen to originate from a labialized velar or /w/. The table below gives examples of roots where the reflex in Daba carries the labialization prosody. In two of these words labialization has also developed in Mbudum. In all cases there is either a labialized velar or /w/ in the root to provide the source of the labialization.

Gloss	Root	Daba	Mbudum	Buwal	Gavar
beer	*mavɨw	/mavə ʷ/ movu	/mavəw/ mavu	/mavaw/ mavaw	/mavə/ mavə
fire	*kʷahʷɨ	/kəhə ʷ/ kuhu	/kahaw/ kahaw	/kʷahʷaw/ kʷahʷaw	/kʷahʷə/ kʷahu
grass	*ᵑkʷɨsaf		/ᵑgəsaf ʷ/ ᵑgusof	/ŋkʷəsaf/ ŋkusaf	/ŋkəsaf/ ŋkəsaf
cricket	*dazɨkʷ	/dazə ʷ/ dozu		/dazakʷ/ dazakʷ	/dazə/ dazə
crocodile	*hʷɨzɨm		/həzəm ʷ/ huzum	/hʷəzam/ huzam	/hʷəzəm/ huzəm

Table 23 - Origins of labialization in the Daba group

However there are two roots for which an explanation for labialization in Daba cannot be found within the Daba group.

Gloss	Root	Daba	Mbudum	Buwal	Gavar
four	*wɨfaɗ	foɗ	nfaɗ	ŋfaɗ	ŋfaɗ
bee	*ɗawam	ɓoɓom	ɓəɓam	ɓamam	amam

Table 24 - Labialization in Daba

Looking outside the group gives the Proto-Central Chadic forms *wɨpaɗ for 'four' and *ɗawɨm for 'bee'. In these examples, the /w/ has been reanalysed as the labialization prosody in Daba, but has been lost in the other languages presented here.

We can conclude that the labialization prosody is an innovation in the Daba language, and was not present in Proto-Daba, the ancestor language of the group.

Gloss	Root	Daba	Mbudum	Buwal	Gavar
bird	*vɨgam ʸ		/vəgam ʸ/ vəgem	/vəgam ʸ/ vəgem	/vigin/ vigin
bone	*kɨrɨᵑgɨɬ ʸ	/gaᵑgərəɮ ʸ/ geᵑgiriɮ	/kərᵑgəɬ ʸ/ kirᵑgiɬ	/karəᵑgaɬ ʸ/ kerəᵑgeɬ	
bow	*vɨlah ʸ		/vəlah ʸ/ vəlleh	/vəlah ʸ/ vəleh	/vəleh/ vəleh
dew	*nɨm ʸ	/mənmən ʸ/ minmin	/mənəmnəm ʸ/ minimnim	/namnam ʸ/ nemnem	
dream	*sɨnɨ ʸ	/sənə ʸ/ sini	/səsən ʸ/ səsin	/saŋsaŋ ʸ/ seŋseŋ	/ʃiŋʃiŋ/ ʃiŋʃiŋ
egg	*naɮɨɗ ʸ	/naɮəʔ ʸ/ neɮiʔ	/məɬəɗ ʸ/ miɬiɗ	naɬa ʸ/ neɬe	/anɬi/ anɬi
fish	*kɨlɨf ʸ	/kələf ʸ/ kilif	/kələf ʸ/ kəllif	/ŋkəlaf ʸ/ ŋkəlef	/ŋkilif/ ŋkilif
fly (insect)	*dzɨwɨɗ ʸ		/dzədzəwəɗ ʸ/ dʒidʒiwəɗ	/dzadzəwaɗ ʸ/ dzedzəweɗ	/dʒiwiɗ/ dʒiwiɗ
grain	*sɨsɨŋ ʸ	/sasən ʸ/ sesin	/səsəŋ ʸ/ sisiŋ	/nsaŋ ʸ/ nseŋ	/ʃiŋ/ ʃiŋ
hunger	*matɨs ʸ	/matəs ʸ/ metis	/mətəs ʸ/ mətis	/matas ʸ/ metes	/metiʃ/ metiʃ

Table 25 - Palatalization in the Daba group

The palatalization prosody can be easily reconstructed for more than thirty roots, of which a sample is presented in Table 25 above. (It should be remembered that Gavar has now lost the palatalization prosody, and front and central vowels can occur in the same morpheme. As a result Gavar has gained the vowel phonemes /i/ and /e/.)

However, there are a number of roots where it is not obvious whether the palatalization prosody was present in Proto-Daba. In these roots, palatalization is present in some reflexes, but not in others.

Gloss	Root	Daba	Mbudum	Buwal	Gavar
wind	*mɨɗ^{y}	/məɗ^{y}/ miɗ	/maɗ/ maɗ	/maɗ/ maɗ	/məɗ^{y}/ miɗ
nose	*mɨtsɨn^{y}	/mətsəʔn^{y}/ mitsiʔn	/ntsər^{w}/ ntʃur	/mtsar/ mtsar	/mtsər/ mtsər
hump	*ɗɨg^{w}ar		/ɗəᵑgər^{y}/ ɗiᵑgir	/ɗəg^{w}ar/ ɗəg^{w}ar	/ɗəᵑg^{w}ər/ ɗəᵑgur
hare	*maⁿdava n	/maⁿdavən / maⁿdavən	/məⁿdavaŋ^{y} / məⁿdeveŋ	/maⁿdəvan / maⁿdəvan	/maⁿdəvan / maⁿdəvan
ear	*ɮɨmiʔ^{y}	/ɮəməʔ^{y}/ ɮimiʔ	/ɮəm/ ɮəm	/ɮam/ ɮam	/ɮəm/ ɮəm

Table 26 - Possible palatalization in the Daba group

Given the quantity of palatalized roots that have been reconstructed, it can safely be deduced that the palatalization prosody was a feature of Proto-Daba, the proto-language of the Daba group.

5.3.2.2 Underlying Vowels

Each of the languages of the Daba group (except for Gavar) can be analysed has having two underlying vowels, /ə/ and /a/. When the palatalization prosody is present, the vowels are realised as [i]~[ə] and [ɛ] respectively. If the labialization prosody is present then the vowels are realised as [u]~[ə] and [ɔ]. /ə/ is also affected by labialized velars, /w/ and /j/ to become [u] and [i]. Reconstructing the underlying vowels of Proto-Daba is therefore a question of determining which of the two underlying vowels is present in the light of the conditioning processes that are active in the individual languages.

In the bulk of the roots that have been examined, the underlying proto-vowels can be reconstructed in a straightforward manner. In Buwal the final vowel in

the citation form is lowered, neutralising the contrast between the two underlying vowels (as is the case in geographically close Mofu-Gudur and Mafa in the Mofu group). However, the vowel of the proto-form can be deduced from the other languages.

There is one language that doesn't follow this pattern, namely Gavar. In Gavar vowel harmony has been lost, resulting in a four-vowel system of /a/, /ə/, /i/, /e/. Palatalization is now a dead process in Gavar – there are no morpho-phonemic processes where palatalization is still productive. Comparison with its lexically similar neighbour, Buwal, leads to the following general rules for establishing the vowels in Gavar for roots carrying the palatalization prosody in Proto-Daba.

- If the final vowel is underlying *a, then this vowel has the reflex /e/ in Gavar. Preceding *a have the reflex /e/, but *ɨ remains as /ə/.
- If the final vowel is underlying *ɨ, then this vowel and any preceding *ɨ have the reflex /i/. Preceding *a have the reflex /e/.
- If the root contains a laminal consonant, then these are palatalized. Note that in Gavar laminals contrast with palatalized laminals, i.e. /s/ and /ʃ/ are different phonemes. In the other languages of the group palatalized laminals are created by the influence of the palatalization prosody on the laminal phonemes, and do not contrast.

The following table gives some sample reconstructions, showing the consistency in the reflexes of the vowels. Note that in Buwal final syllable *ɨ has been lowered to *a.

Gloss	Root	Daba	Mbudum	Buwal	Gavar
ear	*ɮɨmɨʔ^{y}	/ɮəməʔ^{y}/ ɮimiʔ	/ɮəm/ ɮəm	/ɮam/ ɮam	/ɮəm/ ɮəm
guinea fowl	*zavɨn	/zavən/ zavən	/zavaŋ/ zavaŋ	/zavan/ zavan	/zavən/ zavən
fish	*kɨlɨf^{y}	/kələf^{y}/ kilif	/kələf^{y}/ kəllif	/ŋkəlaf^{y}/ ŋkəlef	/ŋkilif/ ŋkilif
cow	*ɮa	/ɮa/ ɮa	/ɮa/ ɮa	/ɮa/ ɮa	/ɮa/ ɮa
to know	*sɨn	/sən/ sən	/səŋ/ səŋ	/san/ san	/sən/ sən
to untie	*pɨl	/pəl/ pəl		/pal/ pal	/pəl/ pəl

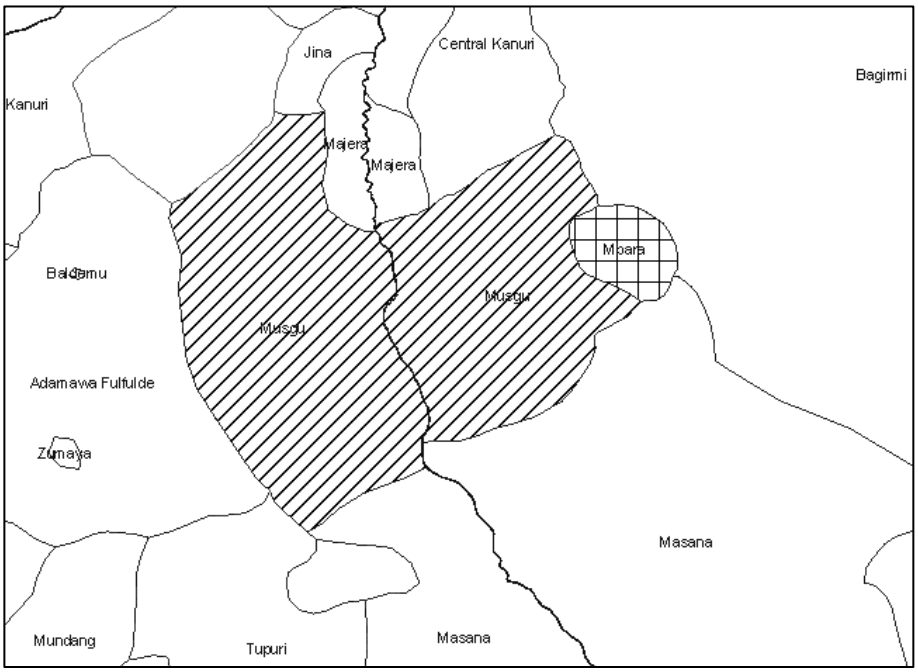
Table 27 - Vowel reconstructions in the Daba group

For Proto-Daba, therefore, we have the underlying vowel system consisting of just the two vowels /a/ and /ɨ/.

5.3.3 Musgum Group

Data for the Musgum group comes from each of the three languages in the group: Mbara (Tourneux, Seignobos, and Lafarge 1986), Muskum (Tourneux 1977) and three dialects of Musgu, Mulwi (Tourneux 1976; Tourneux 1978a; Tourneux 1978b; Tourneux 1978c; Tourneux 1980), Munjuk (Tourneux 1991) and Vulum (Tourneux 1978a; Wolff 1985). Except for Musgu, the data is somewhat limited. For Muskum (now extinct) we only have 276 entries and for Mbara 771 entries. In addition, there is not a great amount of information available on the phonology or grammar of these languages. The effect of this is to put a limit on the amount that can be deduced about the phonological make-up of Proto-Musgum, the ancestor of these languages.

The locations of the living languages are given in the following map.



Map 13 - The Musgum group

5.3.3.1 Prosodies

The languages in the Musgum group all have both front and back-rounding vowel harmony. As with the other groups, this is analysed as being due to the presence of a prosody of palatalization or labialization. In Muskum and Mbara the prosodies affect both /a/ and /ə/, but in the Musgu dialects only /a/ is affected.

The following table shows the roots for which palatalization can be safely reconstructed for Proto-Musgum. In general the data is consistent, with few entries showing palatalization in some languages and no palatalization in others.

Gloss	Root	Muskum	Mbara	Vulum	Mulwi
grave	*jɨɬ ʸ	/jɨɬɨt ʸ/ jiɬit		/jaɬ ʸ/ jeɬ	/jaɬ ʸ/ jeɬ
to spit	*tɨnak ʸ	/taːnat ʸ/ teenet	/tɨnak ʸ/ tinek	/taːnak ʸ/ teenek	
bone	*kałka ʸ	/kɨɬɨt/ kɨɬɨt	/ᵑgɨɬ ʸ/ ᵑgɨɬ	/kałka ʸ/ keɬke	/kałka ʸ/ keɬke
horse	*pɨlɨs ʸ	/pɨlasaka ʸ/ pleseke	/pɨlɨs ʸ/ pilis	/apɨlɨs ʸ/ aplis	/apɨlɨs ʸ/ aplis
moon	*tɨla ʸ	/kɨla ʸ/ kile	/tɨla ʸ/ tile	/tɨla ʸ/ tle	
bird	*fɨːn ʸ	/fɨːtɨw ʸ/ fiituw	/fɨːna/ fiina	/fɨːnɨ ʸ/ fiini	
body	*sɨj ʸ	/sɨt ʸ/ sit	/sɨː ʸ/ sii	/sɨː ʸ/ sii	
to die	*mɨɗɨ ʸ		/mɨɗɨŋ ʸ/ miɗiŋ	/mɨrɨ ʸ/ miri	/mɨrɨ ʸ/ miri
to swim	*nʒɨ ʸ		/nɨɬ ʸ/ niɬ	/ɨŋʒɨ ʸ iŋʒi	/ɨŋʒɨ ʸ/ iŋʒi

Table 28 - Palatalization in the Musgum group

Labialization was also present as a word-level feature in the proto-language of the group. This contrasts with the situation in the Mofu and Daba groups where the labialization prosody is an innovation that took place after the split of the proto-language into its descendants.

There are a number of roots that consistently display back-rounding vowel harmony across the Musgum group data, and in these cases we can reconstruct the labialization prosody for Proto-Musgum.

Gloss	Root	Muskum	Mbara	Vulum	Mulwi
crocodile	*hɨrɨm ʷ		/hɨrɨm ʷ/ hurum	/harɨm ʷ/ horum	
chicken	*jɨgɨr ʷ			jɨgɨr ʷ/ jugur	/jɨgɨrɨj ʷ/ jugurii
to dig	*vɨrak ʷ		/vɨrak ʷ/ vurok		/vɨrgɨj ʷ/ vurgi
mouse	*kɨsɨm ʷ	/gɨzɨm ʷ/ guzum	/kɨsɨm ʷ/ kusum	/kɨsɨm ʷ/ kusum	
ashes	*bana ʷ			/bana ʷ/ bono	/(ba)na ʷ/ (bo)no
to come	*tsɨj ʷ		/tsaː ʷ/ tsoo		/sɨj ʷ/ sʉ
four	*ɸɨɗɨ ʷ	/ɸɨːɗɨj ʷ/ fuuɗi	/pɨɗɨ ʷ/ puɗu	/pɨɗɨ ʷ/ puɗu	
hump	*ɣama ʷ			/ɣama ʷ/ ɣlomo	/ɣama ʷ/ ɣomo
meat	*ɬɨwɨt	/ɬɨwɨt/ ɬuwut	/ɬɨk ʷ/ ɬuk	/ɬɨk ʷ/ ɬuk	
tree	*lɨwɨŋ		/lɨŋ ʷ/ luŋ	/alɨwɨŋ/ aluwuŋ	
woman	*mɨwɨn	/mɨwɨn/ muwun		/mɨnɨj ʷ/ munii	/mɨnɨj ʷ/ munii

Table 29 - Labialization in the Musgum group

For some, such as 'meat', 'tree' and 'woman', the back-rounded vowels in Mbara, Mulwi and Vulum can be seen by comparison with the Muskum data to be the result of the vocalisation of /w/ at a point subsequent to the languages' split from the proto-language. The resultant vowel is then reanalysed as /ɨ/ under the influence of the labialization prosody. However, other entries show consistent, reconstructable labialization coming from Proto-Musgum.

In other groups, such as the Mofu and Daba groups, back-rounding vowel harmony could be traced to the influence of labialized velar consonants or /w/. However, in the Musgum group all labialized velar consonants have been lost from the inventory. In all the data examined so far, only two words – Mbara *ngwa* 'who' and Musgum *muɗukwii* 'white'- show possible evidence for labialized velars.

This patterning argues in favour of ascribing the presence of the labialization prosody in Proto-Musgum to the reanalysis of /w/ or the labialization

component of labialized velars in its ancestor language as the word-level labialization prosody. The consistency of this loss across the languages and the consistency of the resultant vowel harmony argue for this process to have taken place in Proto-Musgum at the latest. In other words, the reanalysis of labialized velars as word-level labialization prosodies took place before the split of Proto-Musgum into individual languages.

5.3.3.2 Underlying Vowels

All the languages in the group have six basic phonetic vowels: [a], [i], [e], [u], [o] and [ɨ]. In addition, all the vowels except for [ɨ] have lengthened versions. There are also a few instances of front rounded vowels.

The short vowels can be reduced to a two vowel system /ɨ/ and /a/, with labialization producing [u] and [o] and palatalization producing [i] and [e]. Long [eː] and [oː] are due to the influence of palatalization and labialization on /aː/, or possibly the result of the combinations /aj/ and /aw/ (see Tourneux et al (1986, 148) for Mbara). However [iː] and [uː] cannot be analysed as the realisations of underlying /ɨː/ under palatalization and labialization, since there is no underlying /ɨː/. Instead these should be analysed as the sequences /ɨjɨ/ and /ɨwɨ/.

There are no roots found in the data where *aː can be reconstructed for Proto-Musgum, with or without a prosody. When /aː/ appears in the data, the cognates do not show any regular patterning. This vowel cannot therefore be reconstructed for Proto-Musgum.

Gloss	Muskum	Mbara	Vulum	Mulwi
six		ɬira	ɬaara	
lung		bubugaf	baagaf	
to dig		paa		pi
honey, bee	amtu	momoj		aamii

Table 30 - Long vowels in the Musgum group

Whilst there is more variation in the vowel reflexes in the Musgum group than in the Mofu and Daba groups, there is still a good degree of consistency, making reliable reconstructions of the underlying vowels possible in a good number of cases. It is also possible, therefore, to conclude that Proto-Musgum also had an underlying vowel system consisting of just two vowels.

5.3.4 Maroua Group

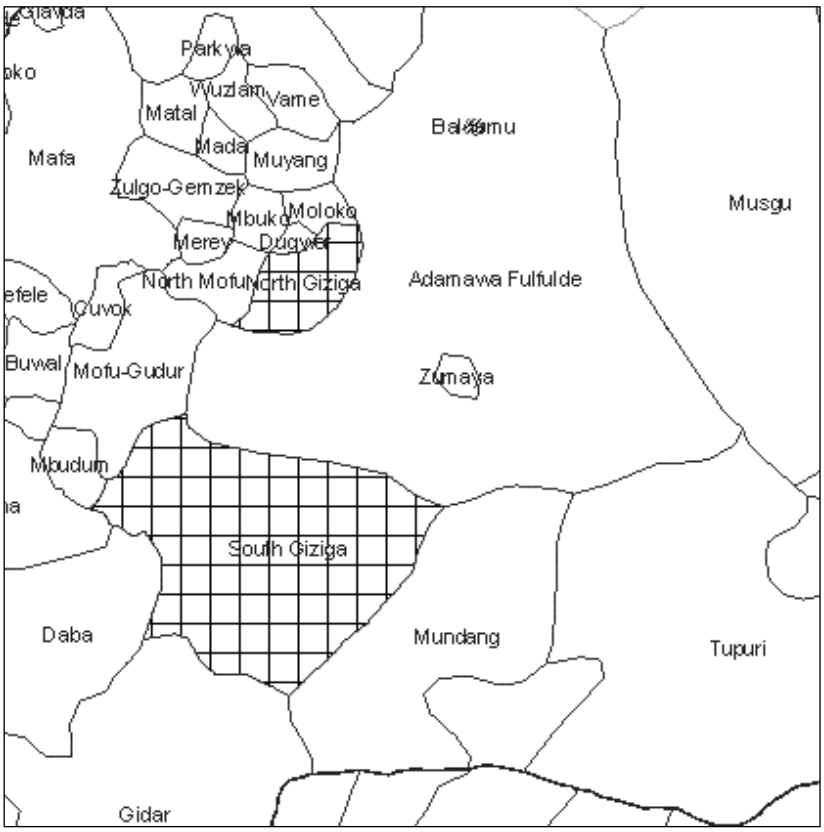
The Maroua group comprises three languages: Mbazla (Seignobos and Tourneux 1984), Giziga North (Gravina 2004) and Giziga South (Michielan and Jaouen n.d.). In the Ethnologue (Lewis 2009), Giziga North and South are considered to be dialects of a single language.

The areas where the three languages of the Maroua group are spoken are not contiguous. The geographical split between Giziga North and South occurred as a result of the Fulani conquest of Maroua in 1800 (Seignobos and Iyébi-Mandjek 2000). It is not known at what point the Mbazla area became disconnected from the Giziga area. It may have been at this same time. However the quite significant differences between Giziga and Mbazla would be more consistent with a situation where the languages had been separated for a longer period of time.

Given the geographical distribution of the Giziga languages and Mbazla (or Baldemu) – illustrated in Map 14 below – we can suppose that the proto-language for the Maroua group was spoken in a large area around Maroua, eastwards to the area covered by the Musgum group.

No published phonology exists for any of these languages. The data available is of varying quality and quantity. For Giziga South there is an extensive database of some 13,000 entries compiled by Father Giuseppe Michielan. The Giziga North data consists of a word list of some 1,700 entries. For Mbazla, the data amounts to a total of 390 entries from various sources of differing quality.

Given the limitations of the data, which is skewed heavily towards the Giziga languages, and the lack of in-depth linguistic analysis, it is not possible to establish reliable reconstructions for the group. Instead we must limit ourselves to some observations about the typology of the languages based on a limited analysis of the available data.



Map 14 – Maroua Group

All three languages have both front and back-rounding vowel harmony. In the case of Mbazla, most of the instances of back-rounding vowel harmony can be ascribed to the influence of a labialized velar in the word. However, in the Giziga languages there are many instances of words with back-rounding vowel harmony that do not contain a velar. The prosodies affect both /a/ and /ə/.

Comparing the situation with that of the neighbouring Mofu and Daba groups, and also the Musgum group (with which the Maroua group appears to have had contact at an earlier time), it is not easy to determine whether the proto-language of the Maroua group had back-rounding vowel harmony (like Proto-Musgum) or not (like Proto-Daba and Proto-Mofu). It is highly probable that

back-rounding vowel harmony existed in Proto-Giziga, but the data does not permit us to claim that it also existed in Proto-Maroua.

A number of roots display consistency in palatalization.

Gloss	Root	Giziga South	Giziga North	Mbazla
bow	*halakʸ		/halakʸ/ helek	/halakʸ/ helek
dog	*kɨrɨʸ	/kərəʸ/ kiri	/kraʸ/ kre	/kəraʸ/ kire
ear	*ɬɨmɨɗʸ	/ɬəməɗʸ/ ɬimiɗ	/ɬəmaɗʸ/ ɬimeɗ	/ɬəmaj/ ɬəmaj, ʃimeʔ
fish	*kɨlɨfʸ	/kələfʸ/ kilif	/kəlafʸ/ kilef	/kələfʸ/ kilif
grass	*gɨzɨŋʸ	/gəzəŋʸ/ giziŋ	/gəzəŋʸ/ giziŋ	/gəzəŋʸ/ giʒiŋ
hearth	*lɨwɨtsʸ	/ləwəsʸ/ liwis	/ləwasʸ/ liwes	/ləwtsəʸ/ lutsi
hole	*vɨgɨɗʸ	/vəgəɗʸ/ vigiɗ	/vəgaɗʸ/ vigeɗ	/vaɗʸ/ veɗ
horse[2]	*pɨlɨsʸ	/pələsʸ/ pilis	/pəlasʸ/ piles	/pələsʸ/ pilis
path	*dzɨvɨɗʸ		/dzəvaɗʸ/ dʒiveɗ	/dəvəʸ, dzəvəʸ, ɗəvəʔʸ/ divi,dʒivi, ɗiviʔ
man	*zɨlʸ	/məɮəʸ/ miɮi	/zəlʸ/ zil	/zəlʸ/ zil
ram	*ɨzɨmʸ		/əzəmʸ/ izim	/azamʸ/ ʔeʒem, ʔaʒem
six	*markɨɗʸ	/markaɗʸ/ merkeɗ	/markəɗʸ/ merkiɗ	/markaʔʸ/ merkeʔ
tooth	*ɬɨnʸ	/ɬəŋʸ/ ɬiŋ	/ɬənʸ/ ɬin	/ɬəŋʸ/ ɬiŋ
wind	*hɨmɨɗʸ	/həməɗʸ/ himiɗ	/həmaɗʸ/ himeɗ	/səmaɗʸ/ simeɗ/tʃimeɗ

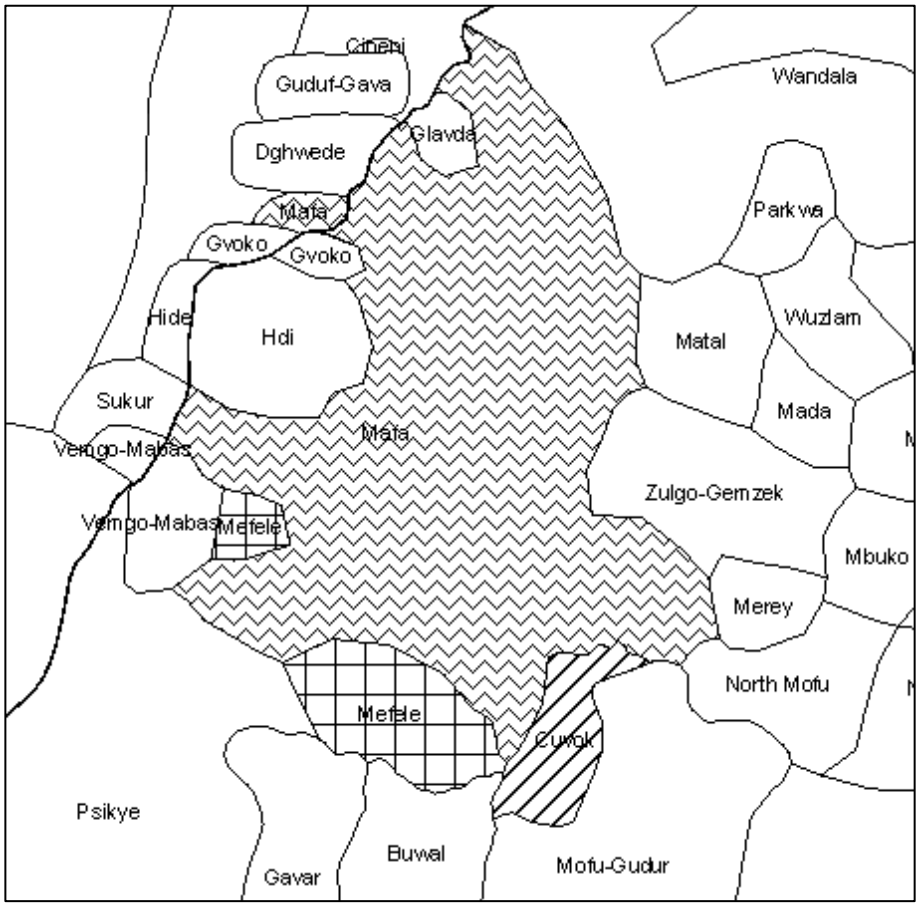
Table 31 - Palatalization in the Maroua group

As with the other groups so far examined, we can deduce that the palatalization prosody was a feature of the proto-language of the group.

[2] This is an old loan from Arabic, that was borrowed before the time of Proto-Maroua.

5.3.5 Mafa Group

The Mafa group consists of three languages, Mafa, Cuvok and Mefele. Mafa is one of the Central Chadic languages with the highest number of speakers, estimated at around 150,000 in 1982 (Lewis 2009). The following map shows the present-day locations where the languages are spoken. Note that Mefele is spoken in two discontiguous areas.



Map 15 - Mafa Group

Of the three languages in the Mafa group, there is good lexical data in two – Mafa and Cuvok – and both of these languages have published phonologies. The third language, Mefele, is as yet unstudied, and the only data available comes

from short word lists. Lexical statistics indicate that Mefele and Cuvok are more closely related to each other than either is to Mafa (Crawford 2005).

Whilst Mafa and Cuvok are closely related genetically, there are significant differences between the two languages in both the lexicon and their phonologies. Given these differences, and the problem of working with data from just two languages, it is not easy to reach firm conclusions about the phonological make-up of Proto-Mafa. Instead, we will discuss the features of the data and compare them with those of the other groups studied in this chapter.

The Mafa language (Barreteau and le Bléis 1990) possesses both front and back-rounding vowel harmony. Words may carry both the palatalization and labialization prosodies, resulting in front-rounded vowel harmony. In Cuvok (Ndokobaï 2003) there is front vowel harmony, but no back-rounding vowel harmony. Cuvok has strong contact with Mofu-Gudur, which also has front vowel harmony, but no back-rounding vowel harmony. In both Mafa and Cuvok the prosodies primarily affect /a/, but /ə/ is largely unaffected.

We must determine whether back-rounding vowel harmony was present in Proto-Mafa, and lost in Cuvok, or whether it was absent in Proto-Mafa and developed subsequently in Mafa.

5.3.5.1 Labialization

Of the 119 cognates found that are shared between Mafa and Cuvok, only twelve are labialized in Mafa. In most cases the Mafa and Cuvok forms, whilst still cognate, are quite distant and don't exhibit consistent sound changes. This indicates that the roots entered the languages from different sources and were not all inherited from Proto-Mafa (see for example 'pus' and 'tail' in the data below).

In the five words under question that are present in the Mefele word list data (Crawford 2005), four support the presence of labialization in Proto-Mafa. The fifth is not a close cognate. If labialization was indeed present in Proto-Mafa, then we must conclude that the Cuvok roots either lost the labialization prosody, or else were borrowed from Mofu-Gudur. Note that in some words ('baobab', 'horn', 'pus', 'swim'), Cuvok has palatalization or /j/ where Mafa has labialization.

Gloss	Cuvok	Mafa	Mefele
beer	/wəzam/ wuzam	/zam ʷ/ zom	
baobab	/ᵐbaːtaj/ ᵐbaataj	/ᵐbata ʷ/ ᵐboto-ᵐbota	
cheek	/baːɮam/ baaɮam	/baɮaɮam ʷ/ boɮoɮom	
horn	/dəram ʸ/ dərem	/dəram ʷ/ durom	/dərəm ʷ/ dərum
nine	/tsaɗ ʸ/ tseɗ	/tsaɗ ʸʷ/ tsœɗ	/tsəɗ ʷ/ tsuɗ
person	/ⁿda/ ⁿda	/ⁿda ʷ/ ⁿdo	/ⁿda ʷ/ ⁿdo
pus	/lalaɓ ʸ/ leleɓ	/varaɓ ʷ/ voroɓ	
to suck	/sasɓa/ sasɓa	/sasəɓ ʷ/ sosuɓ	/səsəɓa ʷ/ susuɓa
to swim	/maɮavɮav ʸ/ meɮevɮev	/nɮaɮav ʷ/ nɮoɮov	
tail	/hʷadar/ hʷadar	/fətar ʷ/ futor	/saɣdal ʸ/ ʃeɣdel
tamarind	/ᵐbəlam/ ᵐbəlam	/ᵐbəram ʷ/ ᵐburom	
thigh	/ɗats/ ɗats	/ɗas ʷ/ ɗos	

Table 32 - Labialization in the Mafa group

5.3.5.2 Palatalization

Surprisingly few (15 out of 119) of the cognates found in the Cuvok and Mafa data are palatalized in both languages. (In Cuvok, approximately 25% of roots are palatalized.)

Gloss	Root	Cuvok	Mafa
ashes	*marɨwats^{y}	/marəwats^{y}/ meruwets	/mərwats^{y}/, /malwats^{y}/ mərwets, melwets
dew	*maman^{y}	/mamna^{y}/ memne	/mmən-man^{y}/ mmin-men
fish	*kɨlaf^{y}	/kəlaf^{y}/ kəlef	/kəlaf^{y}/ kilef
hearth	*rɨwats^{y}	/ləwats^{y}/ luwets	/rəwats^{y}/ ruwets
horse	*pɨlas^{y}	/pəlaz^{y}/ pəlez	/pəlas^{y}/ pileʃ
nine	*tsaɗ^{y}	/tsaɗ^{y}/ tseɗ	/tsaɗ^{yw}/ tsœɗ
pap	*marawaɗ^{y}	/marawaj^{y}/ merewej	/marawaɗ^{y}/ mereweɗ
path	*tsɨvaɗ^{y}	/tsəvaj^{y}/ tsəvey	/tsəvaɗ^{y}/ tsiveɗ
porcupine	*dɨ^{m}bak$^{w\ y}$	/də^{m}bak$^{w\ y}$/ də^{m}bek^{w}	/də^{m}bak^{y}/ di^{m}bek
snake	*zazak$^{w\ y}$	/zazak$^{w\ y}$/ zezek^{w}	/sasak^{yw}/ ʃœʃœk^{w}
tongue	*lanaŋ^{y}	/nanaŋ^{y}/ neneŋ	/lana^{y}/ lene
tooth	*ɣan^{y}	/ɣaŋ^{y}/ ɣeŋ	/ɣana^{y}/ ɣene
two	*atsaw^{y}	/atsaw^{y}/ atʃew	/tsaw^{y}/ tʃew
white	*k^{w}aɗ^{y}	/k^{w}aɗk^{w}aɗ^{y}/ k^{w}eɗ k^{w}eɗ	/k^{w}ədk^{w}əɗːaʔa^{y}/ k^{w}iɗ-k^{w}iɗːeʔe
work	*maɣan^{y}	/maɣaraj^{y}/ meɣerej	/məɣan^{y}/ miɣen

Table 33 - Palatalization in the Mafa group

In other examples there is inconsistency between the languages.

Gloss	Cuvok	Mafa	Mefele
blood	/ba^{m}baz ^{y}/ be^{m}bez	/pa^{m}baz/ pa^{m}baz	/mə^{m}baz ^{y}/ mə^{m}bez
to whistle	/fafk^{w}a/ fafk^{w}a	/fək^{w} ^{y}/ fʉk^{w}	
bow (n)	/lalaŋ/ lalaŋ	/lakaɗ ^{y}/ lekeɗ	
cow	/ɻa/ ɻa	/ɻa ^{y}/ ɻe	
dream	/səwana/ suwana	/nsəwəna ^{y}/ nʃuwine	
egg	/ɬaɬaj ^{y}/ ɬeɬej	/ɬaɬaj/ ɬaɬaj	/ɬaɬəɗ ^{y}/ ɬeɬiɗ
eye	/^{n}daj ^{y}/ ^{n}dej	/daj/ daj	/da ^{y}/ de
girl	/dam ^{y}/ dem	/dam/ dam	
hair	/^{ŋ}g^{w}ats ^{y}/ ^{ŋ}g^{w}ets	/g^{w}atsə/ g^{w}atsə	/g^{w}ə^{ŋ}g^{w}əts ^{y}/ gu^{ŋ}g^{w}its
jealousy	/səlak ^{y}/ səlek	/sərak/ sərak	
to send	/ɻəra/ ɻəra	/ɻə^{ŋ}gd ^{y}/ ɻi^{ŋ}gd-	
to smell	/zaka/ zaka	/zək ^{y}/ ʒik	
to swim	/maɻavɻav ^{y}/ meɻevɻev	/nɻaɻav ^{w}/ nɻoɻov	
to vomit	/vənaha/ vənaha	/vənah ^{y}/ vineh	/vənaha ^{y}/ vənehe

Table 34 - Inconsistent palatalization in the Mafa group

Where Mefele data is available, it supports the presence of palatalization in the proto-form. However, for the verbs the presence or absence of palatalization may simply be due to the choice of the citation form used in the Mefele data.

Overall, the data, though weaker than with other groups, supports the presence of palatalization as a prosody in Proto-Mafa.

5.3.5.3 Underlying Vowels

Both the Cuvok and Mafa have been analysed as possessing just two underlying vowels, /a/ and /ə/. In pre-pausal position (used in most cases for the citation form, with verbs being the exception) both vowels are neutralised to /a/. For this reason we must compare vowel height in non-final syllables of polysyllabic roots. (Note that Cuvok /ə/ is not affected by the palatalization prosody, whereas Mafa /ə/ is fronted under palatalization.) A snapshot sample of the cognate data shows almost total consistency in vowel height in the data.

Gloss	Root	Cuvok	Mafa
pap	*marawadʃ^{y}	/marawaj^{y}/ merewej	/marawadʃ^{y}/ merewedʃ
path	*tsɨvadʃ^{y}	/tsəvaj^{y}/ tsəvej	/tsəvadʃ^{y}/ tsivedʃ
porcupine	*dɨ^{m}bak$^{w\ y}$	/də^{m}bak$^{w\ y}$/ də^{m}bek^{w}	/də^{m}bak^{y}/ di^{m}bek
pus		/lalaɓ^{y}/ leleɓ	/varaɓ^{w}/ voroɓ
quiver	*g^{w}adama	/g^{w}adama/ g^{w}adama	/g^{w}adama/ g^{w}adama
rainbow	*k^{w}araj	/k^{w}alaj/ k^{w}alaj	/k^{w}araj/ k^{w}araj
rainy season	*vɨja	/vəja/ vija	/vəja/ vija
rat	*madɨwan	/madwaŋ/ madwaŋ	/madəwa/, /mədəwa/ madəwa, məduwa
shame	*h^{w}araj	/h^{w}araj/ h^{w}araj	/h^{w}araj/ h^{w}araj
sheep	*tamak	/təmak/ təmak	/ta^{m}bak/ ta^{m}bak

Table 35 - Underlying vowels in the Mafa group

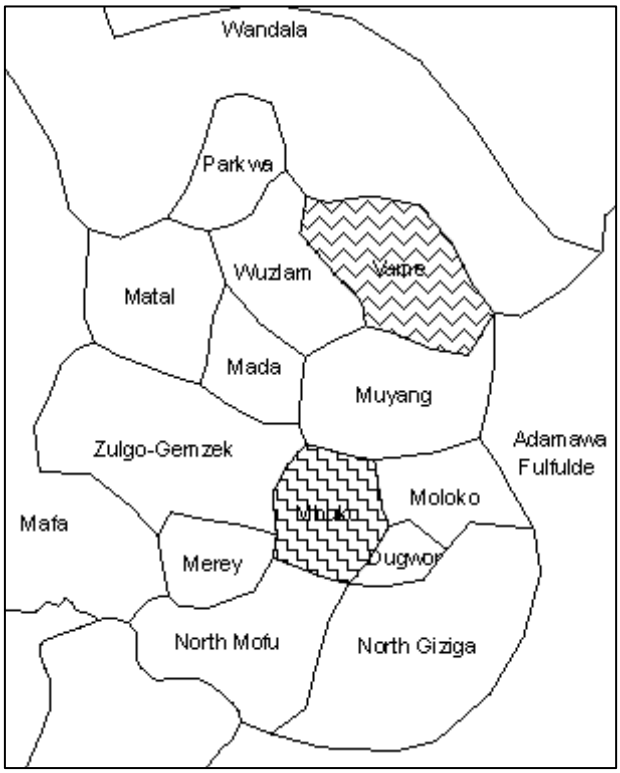
On this basis it is possible to reconstruct the underlying vowels for most of the roots examined, and also to conclude that Proto-Mafa also had an underlying two-vowel system.

5.3.5.4 Conclusion

Proto-Mafa had a phonological system largely identical to that of present-day Mafa, with two underlying vowels /a/ and /ɨ/, and word-level prosodies of palatalization and (probably) labialization.

5.3.6 Hurza Group

The Hurza group consists of two languages, Mbuko and Vame. Whilst the two languages are related, the relationship is not especially close. The two languages are separated geographically (see the map below), and have been for at least two centuries, and possibly a lot longer. Both languages have been influenced by contact with their neighbours from the Mofu group (though not the same neighbours in each case), and Vame has also been influenced by Mandara, the vehicular language of its area (which does not include the Mbuko). The result is that it is difficult to establish whether any shared cognates are inherited from the ancestor language of these two languages, or whether they are borrowed from Mofu group languages. The only clear cases are those where the root does not have cognates in the Mofu group languages. Statements about the phonological make up of Proto-Hurza must therefore be tentative.



Map 16 - Hurza group

In the Hurza group, Mbuko (T. Smith and Gravina 2010) has both the palatalization prosody and the labialization prosody, whilst Vame (A. Kinnaird 2010) has only the palatalization prosody. Clearly, the labialization prosody cannot be reconstructed for Proto-Hurza, nor can its existence be ruled out. However it is possible to establish a number of roots where the palatalization prosody is present in both languages, and can therefore be tentatively ascribed to Proto-Hurza. Note that in Mbuko and Vame, /ə/ is unaffected by palatalization, whereas /a/ is realised as [e]. In Mbuko, /a/ may be realised as [i] according to its position in the word and the phonological class of the word.

Gloss	Proto-Hurza	Mbuko	Vame
black	*zan^{y}	/zənzan^{y}/ zənzen	/mərzaŋ^{y}/ mərʒeŋ
body	*zak^{y}	/zak^{y}/ zek	/zak^{y}/ ʒek
camel	*ɮɨg^{w}ama^{y}	/ɮəg^{w}ama^{y}/ ɮug^{w}eme	/aɮəg^{w}ama^{y}/ aɮəg^{w}eme
to cut	*fɨtaɗ^{y}	/fətaɗ^{y}/ fəteɗ	/fətəɗ^{y}/ fətiɗ-ja
hole	*mɨka^{y}	/məka^{y}/ məke	/məka^{y}/ mike
horse	*pɨlas^{y}	/pəlas^{y}/ pəles	/pəlas^{y}/ pəleʃ
hut	*gɨm^{y}	/gam^{y}/ gem	/gəm^{y}/ gim
nose	*h^{w}ɨtsan^{y}	/tsəwan^{y}/ tʃœŋ	/hətsaŋ^{y}/ hətʃeŋ
rain	*avan^{y}	/avan^{y}/ iven	/avaŋ^{y}/ aveŋ
tongue	*mɨnaɬ^{y}	/məraɬ^{y}/ mireɬ	/mənaɬ^{y}/ məneɬ

Table 36 - Palatalization in the Hurza group

Both languages include labialized velar consonants in their phonemic inventories, and these can be reconstructed for Proto-Hurza. In many cases, the presence of a labialized velar in Proto-Hurza is the trigger for back-rounding vowel harmony in Mbuko. In both languages, labialized velars cause following /ə/ to be realised as [u], losing their labialization component in the process. A following /a/ is largely unaffected.

Gloss	Root	Mbuko	Vame
baobab	*kʷakʷa	/kaka ʷ/ koko	/kʷakʷa/ kʷakʷa
blind	*ɣʷɨraf	/həraf ʷ/ hurof	/ɣʷəlaf/ ɣulaf
charcoal	*hʷɨvan	/avan ʷ/ uvon	/hʷəvan/ huvan
cobra	*gʷavan	/gəlgəvan ʷ/ gulguvon	/gavaŋ/ gavaŋ
field	*gʷɨvɨh	/gava ʷ/ guvo	/kʷəvak/ kuvak
fire	*akʷa	/aka ʷ/ uko	/akʷa/ akwa
house	*dahʷ	/dah ʷ/ doh	/adaw/ adaw
camel	*ɮɨgʷama ʸ	/ɮəgʷama ʸ/ ɮugʷeme	/aɮəgʷama ʸ/ aɮəgweme
grey hair	*ɗakʷar	/ɗəɗəkʷar/ ɗəɗukʷar	/akʷar/ akʷar
to boil	*kʷaɗah	/kʷaɗah/ kʷaɗah	/kʷaɗaha/ kʷaɗaha
wind	*hɨmaɗe	/maɗ/ maɗ	/hʷəmaɗe/ humaɗe

Table 37 – Development of the labialization prosody in Mbuko

Vame has a series of palatalized laminal (i.e. post-alveolar) phonemes, which contrast with the unpalatalized laminal phonemes in a few words containing only central vowels. Since this contrast is not present in Mbuko, it is not clear whether this is a feature of Proto-Hurza. The contrast is present in Mandara, so it is possible that these phonemes came into Vame through contact with Mandara.

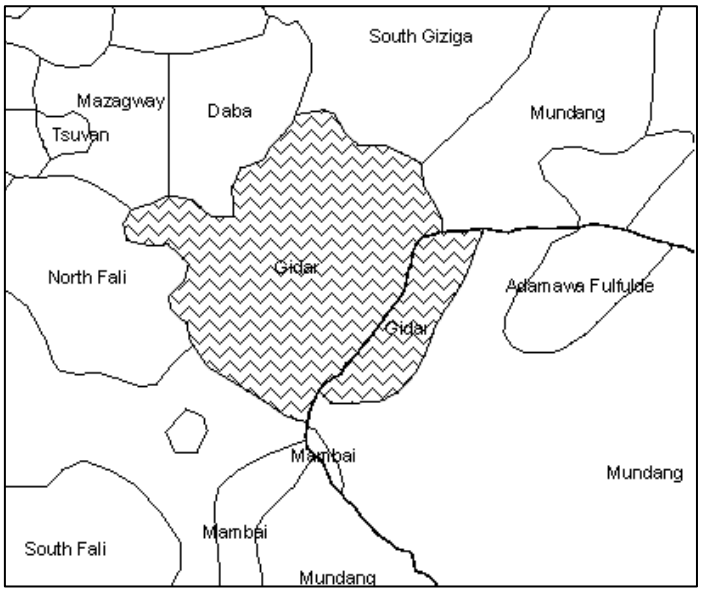
(90)	/s/	sawa	'to drink'	/ʃ/	maʃara	'spice'
	/ts/	tsawa	'to appear'	/tʃ/	tʃapa	'to strike'
	/dz/	dzawa	'to speak'	/dʒ/	dʒaka	'argument'

Both Mbuko and Vame can be analysed with just two underlying vowels /a/ and /ə/. In the cognates so far found, the two underlying vowels correspond with a high degree of consistency, making it possible to reconstruct these underlying vowels for the Proto-Hurza forms.

We can therefore conclude that Proto-Hurza had a vowel system that consisted of two underlying vowels and a palatalization prosody causing front vowel harmony. There was no labialization prosody. The consonant system included labialized velar phonemes, but no palatalized phonemes, except possibly palatalized laminal phonemes.

5.3.7 Gidar Group

The Gidar group consists of just the one language, Gidar. It is not possible to determine whether any of the features of Gidar were present in its ancestor language. The assumption will be made that Proto-Gidar had the same phonological features as Gidar. The following map shows the location, straddling the Cameroon-Chad border, where Gidar is currently spoken.



Map 17 - Gidar group

The phonological system of Gidar (Noukeu 2002; Frajzyngier 2007) includes both front and back-rounding vowel harmony. Long vowels are present, but rare, and are unlikely to be part of the core phonological system. There are two underlying vowels, /a/ and /ə/. Both vowels are affected by vowel harmony.

Gidar does not have labialized velar phonemes or palatalized laminal phonemes.

5.3.8 Mandara Group

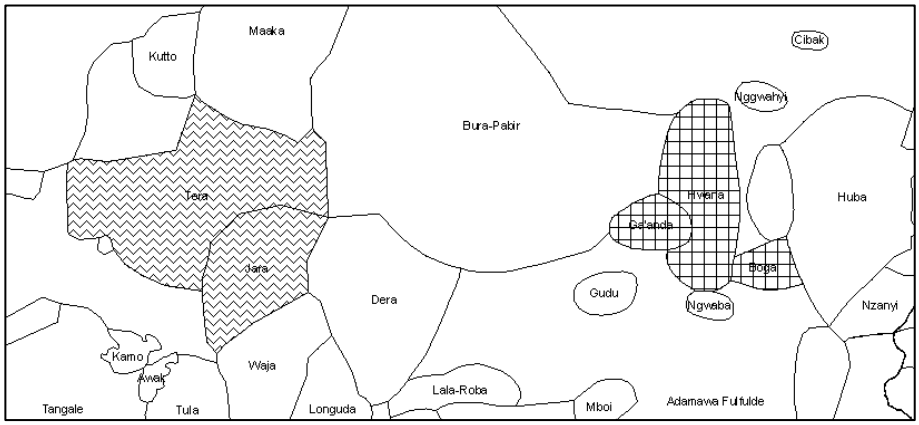
In the Mandara group, Podoko (Swackhamer 1981) is the only language of the eight in the group where vowel harmony is recorded. There is front vowel harmony, but no underlying back-rounded vowels or back-rounding vowel harmony. It is possible that vowel harmony developed in Podoko through contact with Mofu or Mafa group languages.

A full discussion of the origins of vowel harmony in Podoko will be found in chapter 7 (see section 7.2.1), along with an analysis of the phonological systems of other languages in the Mandara group.

5.3.9 Tera Group

Although the Tera group consists of five languages, only two have been the subject of linguistic studies, and in neither case is there a full phonological analysis or a good quantity of lexical data. The two languages that have been studied, Tera and Ga'anda, are from different subgroups of the Tera group, and are geographically and linguistically quite distant. Indeed, the existence of a single Tera group may be called into question. For these reasons it is not possible to establish the phonological make up of Proto-Tera with any degree of confidence. We will confine ourselves to some observations on the features of the two languages for which we have data.

The following map shows the present-day locations of the Tera group languages.



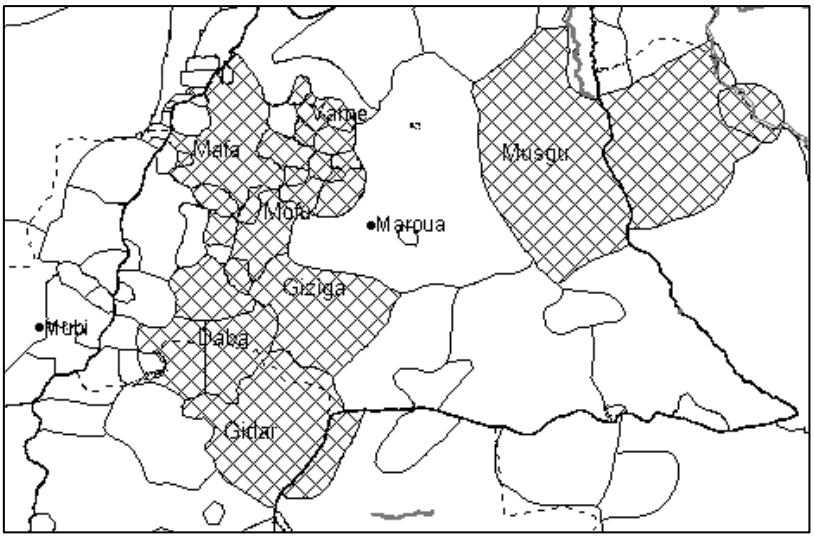
Map 18 - Tera group

Within the East Tera subgroup, Ga'anda (Ma Newman 1977) has a palatalization prosody which plays a role in the morphology of nouns and verbs. The limited data available is consistent with the existence of the labialization prosody, also giving the language back-rounding vowel harmony. For Tera itself (West Tera subgroup), very little has been written on the phonology (Newman 1970), and vowel harmony is not mentioned. However the data displays a high degree of consistency with a front and back-rounding vowel harmony system.

5.4 Summary

The reconstructions of the individual groups give a consistent picture for the phonological make-up of the proto-languages for the groups. In each case we have found that the palatalization prosody was present, along with two underlying vowels. Amongst the consonants there were labialized velars, but no other labialized or palatalized consonants. Only in the Musgum and Mafa groups was it possible to reconstruct a labialization prosody for the proto-language, and even in these cases the prosody appears closely tied to the presence of labialized velars in the root. Back-rounding vowel harmony is therefore a comparatively recent innovation in Central Chadic, whereas front vowel harmony has a longer history.

The groups presented here are not all from the same branch of the Central Chadic genetic tree, so we cannot move directly from the analysis here to a reconstruction of an earlier proto-language within Central Chadic. Rather, we see from Map 19 below that the groups (with the exception of Tera) are located in a geographical area. We shall therefore treat this phonological system as an areal phenomenon.



Map 19 - Vowel prosody languages (excluding Tera group)

In the following chapters we shall look at the other phonological systems within Central Chadic, before presenting a reconstruction of the phonology of Proto-Central Chadic.