Nouns of the CVC and CC type in Berber

Marijn van Putten
Leiden University, The Netherlands

August 17 2011
# Contents

List of Abbreviations

Transcription

0.1 Zénaga Transcription & Historical Development
0.1.1 Transcription
0.1.2 Historical developments

1 Introduction

2 Proto-Berber Phonology

2.1 Proto-Berber consonant system
2.2 Proto-Berber vowel system

3 Proto-Berber noun morphology

3.1 Formation of the singular
3.2 Formation of the plural
3.2.1 Suffix formation
3.2.2 Vowel change formation
3.3 Formation of the État d'Annexion

4 Proto-Berber *ʔ

4.1 Nouns with initial Proto-Berber *ʔ
4.2 Nouns with medial Proto-Berber *ʔ
4.3 Nouns with final Proto-Berber *ʔ

5 Proto-Berber *β

5.1 Nouns with initial Proto-Berber *β
5.2 Nouns with medial Proto-Berber *β
5.3 Nouns with final Proto-Berber *β

6 Nouns with two radicals

6.1 Biradical nouns with VCVC shape
6.2 Biradical nouns with VCC shape
6.3 Biradical roots with no Zénaga cognate
6.4 Conclusion
List of Tables

1  Vowel system of Zénaga . . . . . . . . . . . . . . . . . . . . . . . . . . viii
2.1 Proto-Berber consonant system . . . . . . . . . . . . . . . . . . . . . 4
2.2 -a Perfect verbs . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 5
2.3 Proto-Berber vowel system . . . . . . . . . . . . . . . . . . . . . . . . 6
7.1 Nouns with *i/u alternation in the root . . . . . . . . . . . . . . . . . 43
7.2 *i *a variation table . . . . . . . . . . . . . . . . . . . . . . . . . . . . 45
8.1 Lengthened final radical in plurals . . . . . . . . . . . . . . . . . . . . 47
9.1 biradical root matrix . . . . . . . . . . . . . . . . . . . . . . . . . . . . 51
9.2 Proto-Berber Biradical Root Matrix . . . . . . . . . . . . . . . . . . . . 57
List of Abbreviations

*Linguistic abbreviations & symbols*

- **C** Consonant
- **V** long vowel
- **̄V** short vowel
- **(*)** Reconstructed form
- **(** non-existent form
- **x** Uncertain reconstruction
- **ff.** folio, and the following pages
- **cf.** confer, compare
- **e.g.** exempli gratia, for example
- **id.** idem, same as the previous
- **sg.** singular
- **pl.** plural
- **m.** masculine
- **f.** feminine
- **EA** état d’annexion
- **EL** état libre
- **[..]** Phonetic form
- **/.../** Phonemic form
- **<...>** Orthographic form

*Berber Languages*

- **Auj.** Aujila Berber
- **El-foq.** El-Foqaha Berber
- **Ghd.** Ghadamès Berber, Ghadamsi
- **Kb.** Kabyle Berber, Taqbaylit
- **MA** Central Atlas Berber, Tamazight
- **Mzab** Mzab, Mozabite Berber
- **Ouar.** Ouargla Berber
- **PB** Proto-Berber
- **PT** Proto-Touareg
- **Tashl.** Tashelhiyti Berber
- **To.** Touareg
- **Zen.** Zenatic
- **Zng.** Zénaga Berber
Transcription

For this thesis, I have standardised most orthographies. I write the schwa [ə] invariably as e. The Touareg and Ghadamès long [e] vowel, which must also be reconstructed for Proto-Berber, will be written <é>. I will write the palatal fricative, sometimes written as c, as <ē>.

Labialisation which is often written as <g*> is marked with <gʷ>. Emphatic consonants are written with a dot underneath: <ḍ>. I will write the voiced uvular fricative as <γ> and never as <ḡ>. The Pharyngeal approximant [ʕ] is always written as <ε> and not as <ʿ>. For the Proto-Berber the Glottal Stop I will write <ʾ> rather than <ʔ>.

For Ghadamès I follow the transcription put forth in Kossmann (1999b). The only change is that the schwa is not written as <ë> but simply as <e>.

As the spirantisation in the languages surveyed in this thesis is generally predictable, I have not included a way to represent it in the transcription.

Phonological analysis of Zénaga is currently quite difficult. Therefore, I employ the largely phonetic transcription presented in Taine-Cheikh (2008). In the next section, I will give a short introduction to the Zénaga transcription and its phonemic analysis.

Due to the Paradisi’s highly idiosyncratic spelling, I have kept the transcription of Aujila and El-foqaha as they are presented in Paradisi (1960) and Paradisi (1963) respectively, as I do not understand the material well enough to make a more accurate phonological analysis.

As a rule, Berber words will be transcribed in italics. When I specifically go into the phonetics or phonemics of a word I will mark them with […] and /…/ respectively.

0.1 Zénaga Transcription & Historical Development

Zénaga transcription has some peculiarities that are worth discussing, the spelling is for a large part phonetic rather than phonemic. In the next section, I will discuss the nature of this transcription and in which way this should be phonemically understood as far as it is currently understood. Zénaga is a radically different language from other Berber languages with several specific sound shifts from Proto-Berber. I will discuss some of the most prominent historical developments of Zénaga in section 0.1.2.
0.1.1 Transcription

For a large part Zénaga transcription follows typical Berber transcriptions. Emphatic consonants such as \( \text{ḍ} \) are written with a dot below, and fricative consonants such as \( \text{ḏ} \) are written with a line below. Most of these consonants follow the regular phonetic pronunciation. There are two consonants whose phonetic realisation is quite different than the transcription suggests. These are \( z \) and \( z \) which are pronounced [θ] and [θ̣]. These sounds are transcribed as such for their etymological origin rather than phonetic realisation.

Taine-Cheikh employs several vowel signs to transcribe the Zénaga phonetics as accurately as possible. In Zénaga there seem to be seven phonemic vowels. The table below is an adaptation from Taine-Cheikh (2008: lxxiv) including the orthographical spellings used for different phonemes in Zénaga.

<table>
<thead>
<tr>
<th></th>
<th>Open</th>
<th>Closed</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Front</td>
<td>/a/</td>
<td>/i/</td>
<td>/u/</td>
</tr>
<tr>
<td></td>
<td>&lt;\text{a, ā, o}&gt;</td>
<td>&lt;\text{i, ē}&gt;</td>
<td>&lt;\text{u, ē}&gt;</td>
</tr>
<tr>
<td>Back</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultra-short</td>
<td>/ə/</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;\text{ə}&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long</td>
<td>/ā/</td>
<td>/ī/</td>
<td>/ū/</td>
</tr>
<tr>
<td></td>
<td>&lt;\text{ā}&gt;</td>
<td>&lt;\text{ī}&gt;</td>
<td>&lt;\text{ū}&gt;</td>
</tr>
</tbody>
</table>

It is often difficult to demonstrate the contrast between the phonemes /i/ and /u/ in Zénaga. As can be seen in Table 1, both vowels have the reflex /a/, but it is not unusual to find /u/ in a place where we would expect /i/. For example the word \( o\text{f̣ud} \) pl. \( u\text{f̣udan} \) ‘knee’ corresponds to Kabyle \( \text{afud} \) pl. \( \text{ifadden} \) ‘leg’.

A last point that needs to be discussed about the Zénaga transcription is the use of the /ʔ/. If a word ends in a vowel not followed by a glottal stop, a ‘vocalic off-glide’ [h] is appended. When the word ends phonemically in a glottal stop, this vocalic off-glide is not there, nor is the [ʔ]. The presence of a word-final glottal stop can therefore be determined by the absence of any final consonant after the final vowel. As soon as the glottal stop is followed by a consonant, the glottal stop shows up again. To illustrate this distribution I cite the schema shown by Kossmann (2001b: 62) below:

3sg.m. \( y\text{-inna}h \) \( y\text{-īnna} \)
3pl.m. \( inna\text{-n} \) \( i\text{ḥna}\text{-n} \)
‘to say’ ‘to kill’

I have made one adaptation to Taine-Cheikh’s transcription. Taine-Cheikh transcribes the uvular voiced fricative as <\text{ḡ}>, I have made the transcription uniform with the rest of the transcriptions and write this sounds as <\text{γ}>.
0.1.2 Historical developments

There are several important sound changes in Zénaga that are different from sound changes found in all other Berber languages.

As the distinction between *ă and *u, and *e and *i, *é, *u is lost completely, Zénaga loses the original vowel length distinction of Proto-Berber completely.

A new distinction of vowel length is introduced by compensatory lengthening of vowels after the loss of *β. Thus, *aβ, *iβ, *éβ, and *uβ become ḍ, ī, ī, and ū.

The Proto-Berber *ʔ which is most clearly attested in Zénaga still undergoes some changes. Zénaga only allows ŋ in coda, and will metathesise all Proto-Berber *ʔ that are not in this position. The conditions and results of this metathesis is discussed in Kossmann (2001b: 63–65).

Finally, there are several shifts of consonants that make Zénaga look quite different from other Proto-Berber languages. *l shifts to y, *g often shifts to γ and *k, *k̩ often shift to g, and finally *s very often changes to š.

This does not cover all the developments of Zénaga, and we currently do not know enough about its historical development to cover all changes, but these are the most important shifts that affect the way a word looks.
Chapter 1

Introduction

This MA thesis studies the roots of Proto-Berber that would traditionally be considered to have two radicals. Recent developments in the comparative linguistics of Berber have led to the discovery of the Proto-Berber consonant *ʔ; earlier research has also unveiled the Proto-Berber consonant *β. Both are lost in many contexts in most Berber languages, but are retained in some Berber languages. Zénaga retains *ʔ and *β remarkably well. Ghadamès retains *β very well, and in some cases retains traces of *ʔ. Touareg only retains the *β well. By studying the biradical roots of Proto-Berber, we can form an impression of how many of the roots really did have two radicals, and which of the biradical roots had a hidden third radical.

For this study I have collected a corpus of data on several Berber Languages. I have started with collecting all biradical roots with the shape CVC and C(e)C found in the Kabyle dictionary by Dallet (1982), and after that I collected all biradical roots of the same shape and triradical roots that contained a β in the Ghadamès lexicon of Lanfry (1973). This created the basis of my corpus and I then proceeded to find cognates for the words found in these two dictionaries in several other Berber Languages. Languages I added to my corpus are Zénaga (Taine-Cheikh 2008), Aujila (Paradisi 1960), El-Foqaha (Paradisi 1963), Tamazight (Taifi 1992), Ouargla (Delheure 1987), Mzab (Delheure 1985), Touareg (Ritter 2009a, Ritter 2009b, Heath 2006) and Tashelhiyt.1 Several times in this thesis I will refer to Arabic words, all of these are taken from Wehr & Cowan (ed.).

I have limited myself to CVC and C(e)C roots purely to limit the scope of this thesis. A complete study of biradical nouns in Proto-Berber would involve studying the CCV roots as well. The group of CCV roots is extremely big, and currently still difficult to understand. The study of the CCV roots alone would take up a whole study on its own.

This thesis presents the generalisations and conclusions that can be drawn from the collected data of biradical roots. Before I can discuss reconstructions of Proto-Berber, we will have to establish the way that I reconstruct Proto-Berber. This involves discussing both the reconstruction of the Proto-Berber phonology and the Proto-Berber noun morphology. In chapter 2 I will discuss the Proto-Berber phonol-

---

1 I would like to thank Professor Harry Stroomer for giving me access to his forthcoming Tashelhiyt dictionary for the collection of my data for Tashelhiyt Berber.
CHAPTER 1. INTRODUCTION

ogy and in chapter 3 the morphology. These two chapters form the first part of this thesis.

The second part of the thesis is an overview of the collected data, which is presented in chapters 4, 5 and 6. In these chapters I will discuss the nouns containing a PB *ʔ, PB *β and those that do not have a clear third radical whatsoever.

The third part consists of two chapters and discusses some features of special interest in the reconstruction of Proto-Berber. Chapter 7 will discuss remarkable vocalic variations found in some nouns of my corpus. Chapter 8 discusses the lengthening of the final radical which is found in some plural formations of the (2) *ʔfuḍ pl. *ʔfaddān type.

In the final part (chapter 9), I will look at the possible noun formations that existed in Proto-Berber for biradical roots and I will examine if generalisations can be made about the formations of plurals for biradical roots.

Throughout this thesis, I will cite Proto-Berber words and its cognates in special denoted environments, which take a small indentation from the main text and are denoted with a bracketed number. I will use this number to cross-reference these words.

A typical entry of my corpus will look as the example entry below.

(28) *Reconstruction `gloss' (K10, TC510, P257)

The letters K, TC or P followed by a number are references to important works that comment on the etymology of these nouns. K refers to the number under which this word may be found in Kossmann (1999b), TC refers to the page where this word may be found in Taine-Cheikh (2008) and finally P refers to the number under which this word can be found in Prasse (1969).

Several times, if it aids the clarity of the text, the entries of my corpus are printed again. When I do this, the entries will be marked with the number in between brackets with a prime sign.

(28') *Reconstruction `gloss' (K10, TC510, P257)
Chapter 2

Proto-Berber Phonology

The Proto-Berber phonology I reconstruct and use in this thesis largely follows the reconstruction posited in Kossmann (1999b). There is one essential addition to the consonant system which radically changes the view of Proto-Berber reconstruction. I will first discuss the consonant system and then the vowel system.

2.1 Proto-Berber consonant system

The one addition to the consonant system as it is presented in Kossmann (1999b) is the Proto-Berber *ʔ. It is reflected in various ways in Berber languages. Most notably as ʔ in Zénaga Berber and often as o in Ghadamès (See Taine-Cheikh 2004, Kossmann 2001b for an in-depth discussion). These two languages are the most important languages to confirm the presence of a *ʔ.

The other consonant that I reconstruct for Proto-Berber, which has been known and studied for a longer time than *ʔ is the *β. Its development has been discussed at great length in Kossmann (1999b) and earlier by Prasse (1969), a monograph on the etymology of the h in the Ahaggar Touareg dialect and in an early study by Rössler (1964). Rössler attempts to reconstruct this consonant as an original *b, but since *b is well preserved in contexts where *β can appear as well this cannot be correct and it must be an independent sound.

The reflex of *β in Zénaga is different from other languages, as it is the origin for the vocalic length in Zénaga. This reflex of *β in Zénaga is discussed in Kossmann (2001a).

The phonetic realisation of the Proto-Berber consonant underlying Touareg h, Ghadamès β and Zénaga vowel length must be *β. It is easy to understand a shift from a bilabial fricative to [h], but very difficult to understand a shift in the other direction. Many Berber languages show remnants of the labial quality of this sounds in specific reflexes (e.g. PB *aβern ‘flour’ Ghd. aβern ‘id.’, Kb. awren ‘flour’). This provides more evidence that *β was a bilabial rather than a glottal fricative.

The reconstructed Proto-Berber consonant system as reconstructed by Kossmann (1999b) is displayed in the Table 2.1 below, which I have reorganised to be displayed in
CHAPTER 2. PROTO-BERBER PHONOLOGY

a fashion that is more acceptable in the international tradition, with point of articulation printed horizontally, and type of articulation printed vertically. To Kossmann’s table, I have added the *ʔ.

Table 2.1: Proto-Berber consonant system

<table>
<thead>
<tr>
<th></th>
<th>Labial</th>
<th>Dental</th>
<th>Palatal</th>
<th>(Post-)Velar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop</td>
<td>b</td>
<td>t</td>
<td>d</td>
<td>ḍ</td>
<td>ḱ</td>
</tr>
<tr>
<td></td>
<td>bb</td>
<td>tt</td>
<td>dd</td>
<td>ṭṭ</td>
<td>ḱḱ</td>
</tr>
<tr>
<td>Fricative</td>
<td>f</td>
<td>β</td>
<td>s</td>
<td>z</td>
<td>ṣ</td>
</tr>
<tr>
<td></td>
<td>ff</td>
<td>ss</td>
<td>zz</td>
<td>z̝</td>
<td>z̝</td>
</tr>
<tr>
<td>Nasal</td>
<td>m</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>nn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid</td>
<td>w</td>
<td>r</td>
<td>l</td>
<td>y</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ggʷ</td>
<td>rr</td>
<td>ll</td>
<td>yy</td>
<td></td>
</tr>
</tbody>
</table>

Several comments have to be made about the reconstructed consonant system, *šš and *ž have been marked with a question mark as it is uncertain if they are to be reconstructed for Proto-Berber, the occurrence of these phonemes is discussed in chapter 5 of Kossmann (1999b). Below I will briefly illustrate some of the issues discussed in chapter 5.

The *š is not a very common phoneme, but seems to have existed in Proto-Berber. Kossmann shows that there is evidence that the long variant *šš is usually a result of the sequence *sy, but since this development is so widespread, this assimilation may have been Proto-Berber already. Because of this widespread development it cannot be conclusively shown that all instances of *šš go back to *sy.

The phoneme *ž is considerably more difficult to reconstruct for Proto-Berber. In general it seems that whenever *ž occurs, it is after a *g or *γ, this seems to suggest that *ž is a result of dissimilation of the sequence *g/γ...g to *g/γ...ž. As all languages seem to have undergone this shift, it cannot be proven to have occurred. Still, *ž is in complementary distribution *g which suggests an allophonic process rather than a Proto-Berber phoneme *ž.

All cases of *žž seem to be the result of the Proto-Berber sequence zy.

*yy is often found as *ği in languages where it alternates with *y, this is a similar hardening that we find for the geminate of *w as *ggʷ.

2.2 Proto-Berber vowel system

For the vowel system, I will deviate from Kossmann (1999b) somewhat in both the short and the long vowel system.

It is obvious that Touareg has two short vowels æ and e¹, which correspond per-

¹For a discussion on the short vowels in Touareg see Prasse (1972: 21-25) and Heath (2005: 34-35)
fectly with the Zénaga vowels a and ə and the Ghadamès counterparts ā and e. It therefore stands to reason that Proto-Berber had at least these two vowels. Prasse has attempted to split the reconstruction of *e into two short vowels *ī and *ū. An important reason for Prasse to reconstruct these two short vowels is to explain the two verb types that end in *a in the perfect (Prasse 1975, Prasse 2003). With the discovery of the Proto-Berber *ʔ it is no longer necessary to reconstruct a short high vowel distinction to explain this contrast. This is illustrated in the Table 2.2 below taking the reconstruction of these two verb types in Prasse (1975) and cross-referencing them with the modern reconstruction to show how a short high vowel distinction is no longer necessary to explain these forms.

Table 2.2: -a Perfect verbs

<table>
<thead>
<tr>
<th></th>
<th>Aorist</th>
<th>Perfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prasse</td>
<td>yālsīh</td>
<td>yālsāh</td>
</tr>
<tr>
<td></td>
<td>yāmdūh</td>
<td>yāmdāh</td>
</tr>
<tr>
<td>Mine</td>
<td>yālseʔ</td>
<td>yelsāʔ</td>
</tr>
<tr>
<td></td>
<td>yāmdu</td>
<td>yemda</td>
</tr>
</tbody>
</table>

Even if we accept that the long vowels of the verb *mdu is originally from an *h as Prasse reconstructs, it will not be necessary to differentiate these two verb types by short vowel, as the final root consonant is certainly different in these two verbs, which leads to a sufficient differentiation of the two verbs.

A flaw in Prasse's reconstruction of these two verb types, is that it cannot explain why his *yālsāh and *yāmdāh have different reflexes in several Berber languages despite having the exact same phonetic environment in his reconstruction. Kossmann (2001b: 67) conclusively shows that the perfect of Figuig roots of these two types (ccu and cc* respectively) has different reflexes, this could not be explained if they both ended in *-āh.

Another source that provides better evidence for a short high vowel distinction, is the labialisation of velars found in several northern Berber dialects. Kossmann (1999b: 42ff.) discusses this phenomenon at length. Kossmann attempts to show that *ā can be the cause of labialisation of velars. I am unsure whether this evidence is sufficient to reconstruct a Proto-Berber short high vowel distinction, and I will keep it largely out of consideration in this thesis. I will discuss words in my reconstructions have labialisation that cannot be explained by other means. As the vast majority of the words do not have labialisation, the high short vowels cannot be distinguished, even if there was a distinction, and I will therefore note them as *e.

It is clear that we can reconstruct at least three long vowels in Proto-Berber. Namely *a *i and *u which are reflected in Berber languages as a, i and u respectively. Touareg and Ghadamès seem to have two additional phonemic long vowels *é and *o. Whether these can be reconstructed for Proto-Berber requires a closer look.

Prasse (1975) and Prasse (1990) have proven indispensable for the reconstruction of the Proto-Berber long vowel system. While Prasse's first article claims that that *é and *o both cannot be reconstructed for Proto-Berber, his second article elaborates
further on these vowels in Touareg and concludes that *é must be of Proto-Berber origin. Although the é found in Touareg is often the result of internal changes due to vowel harmony, in several cases, é remains unaccounted for, such as in the feminine plural ending -én, the initial vowel é- and the negative root vowel marker -é-. This leads Prasse to the conclusion that é must be reconstructed for Proto-Berber. Therefore, in the long vowel system, besides the obvious *a, *i and *u, Touareg and Ghadamès give clear indications that there must have been a fourth long vowel *é.

Prasse also shows that Touareg and Ghadamès o can usually be explained as a result of vowel harmony of Proto-Berber *u. He recognises that the Ghadamès o seems to occur word finally in words of the type Aor. yâlsîh Perf. yîlsūh but sadly fails to draw the conclusion that this has to do with a lost consonant different from his reconstructed *h. Kossmann (2001b) conclusively shows that the final o in Ghadamès verbs of this type go back to roots with final *ʔ.

We can now reconstruct the Proto-Berber vowel system as is shown in Table 2.3.

<table>
<thead>
<tr>
<th></th>
<th>Short</th>
<th>Long</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>High</td>
<td>Mid</td>
</tr>
<tr>
<td>e (ī, ŭ?)</td>
<td>á</td>
<td>ă</td>
</tr>
<tr>
<td>i</td>
<td>é</td>
<td></td>
</tr>
<tr>
<td>u</td>
<td></td>
<td>a</td>
</tr>
</tbody>
</table>
Chapter 3

Proto-Berber noun morphology

The Berber noun distinguishes between two numbers, singular and plural. It also distinguishes two 'states' or 'cases' known as *état libre* (Free State) and *état d'annexion* (annexed state) which I shall refer to as *el* and *ea* respectively.

In the following sections, I will discuss different parts of the formation of the nouns. The description is not exhaustive, but includes everything that is relevant to the specific type of nouns of my corpus, that is to say, nouns with the structure CVC and CC.

3.1 Formation of the singular

Masculine nouns in Proto-Berber invariably have an initial vowel before the root, this is usually *a*, and more rarely *é*, *u* and *i*. Feminine nouns have the same initial vowel, but the initial vowel is preceded by a *-t* and the root is usually followed by a *-*.

(13) *adeʔfi* `marrow'
(28) *ulβi* `heart'
(43) *elám* `skin'
(17) *iγasseʔi* `bone'
(1) *taḍuβti* `wool'
(45) *té/iḍv̆kti* `mastic tree'

3.2 Formation of the plural

The plural is formed in a number of ways; I will discuss all the formations present in my corpus. The noun can receive its plural through the suffix formation and the vowel change formation.

In both types of plural formation the initial vowels *a* and *é* of the singular are changed to *i* in the plural. Words with initial *u* invariably keep *u*. Words with initial *i* remain unchanged. Some nouns have an initial *a* in the plural.
3.2.1 Suffix formation

This formation is made by adding a suffix *-ăn to the root of masculine nouns. Feminine nouns lose their final *-t and add *-én.

There are several other less common plural suffixes besides the two mentioned above. Two other plural suffixes are found in this corpus, namely, *-awăn and *-an, which are both suffixes exclusively found for masculine nouns in my corpus.

(15) *ifaʔssăn `hands`
(31) *tifé/arén `rewards`
(17) *iyasseʔan `bones`
(28) *ulβawăn `hearts`
(23) *aβăḍan `nights`

3.2.2 Vowel change formation

There are two types of plural formation that are created by a vowel change. The types are: the a-infix type, the a-suffix type.

a-infix type

In this common type, a vowel *a is inserted before the root’s last consonant. This replaces any vowel in that position in the singular. Outside the realm of biradical roots, these nouns generally do not take a plural suffix. It seems that the absence of a plural suffix is avoided in biradical roots, as not a single word in my corpus lacks a plural suffix, which is usually *-ăn, and *-an once. There seems to be a tendency to lengthen the final consonant, this tendency will be discussed in more detail in chapter 8.

(2) *ʔfud pl. *ʔfaddăn `knee`
(3) *ʔβyur pl. *ʔβyarăn `moon`
(33) *ʔβyil pl. *ʔyllăn `arm`

a-suffix type

This formation is exclusive to feminine nouns. It involves placing an *-a behind the last consonant and changing the before last consonant to a high vowel. This high vowel is usually *i, but *u is found once in my corpus. If the vowel is already high it remains unchanged.

(5) *taʔmart pl. *tiʔmiraʔ `beard`
(59) *tamurt pl. *timuraʔ `earth`
(6) *taʔrikît pl. *tiʔrikaʔ `saddle`

1The plural of `beard’ in Zénaga taʔmuna implies a glottal stop after the suffix *-a. See also (62) *tanast for a further discussion and more proof.
3.3 Formation of the État d'Annexion

Most Berber languages have an Annexed state. Zénaga, Ghadamès and Siwi lack a EA, and Touareg has a slightly different formation. Considering the largely uniform use and formation in the languages that do have it, it must be Proto-Berber.

The EA is formed by shortening the prefix vowel. *a and *é become *ă and *i becomes *e. The evidence of *é having *ă as its EA counterpart is slim, but important. Touareg is the only language that distinguishes *i and *é that retains the EA. All other languages have an initial *i that becomes *e in the EA, these are the regular reflexes expected in these languages and do not speak against the Touareg evidence. Despite Touareg being the only language that shows this specific reflex unambiguously, there is no reason to think that Touareg innovated, so it is probably old.

An element *w- is placed in front of the shortened initial vowel of masculine nouns. Touareg lacks this element *w-, Prasse (2002) presents a convincing explanation that the *w is old, and the absence in Touareg is an innovation. In many languages in front of initial *i and *e that is a result of a reduced *i, *y- is added instead. It is not clear whether this is an old or a late common assimilation of *w-.

Some nouns have a stable vowel in the EA, which means the initial vowel remains unchanged. Kossmann (2001b: 86ff.) convincingly shows that nouns that had a initial *aʔ in Proto-Berber usually have a stable initial vowel a in the singular while it has an unstable initial i in the plural. The origin of other stable vowels is not always clear. *u is always stable, and often *i is stable as well. A theoretical explanation that does not help much in terms of historical phonetic analysis is presented by Penchoen (1973: 19ff.) who considers the nouns with a stable vowel to have this initial vowel as part of the stem, while those who have an unstable vowel gain their initial vowel as a prefix. But as Kossmann (2001b: id.) shows that stability can be caused due to phonetic factors, so in this case saying the *a is part of the root or is a prefix does not give any more insight in the reconstruction.

---

2Siwi undergoes an accent shift in genitive constructions, but has no shortening of the vowel nor an initial w. (Vycichl 2005: 207ff.). Zénaga lacks any indication of EA (Nicolas 1953: 38ff.). Ghadamès lacks an EA as well (Lanfry 1973).

3For a discussion on the EA of Touareg see Prasse (1974: 11-33)
Chapter 4

Proto-Berber *

I will now present all the nouns that have a *ʔ in the root. Sadly, we can only be sure of a PB *ʔ when it is attested in Zénaga. Therefore this chapter can only present words that have a Zénaga cognate.

4.1 Nouns with initial Proto-Berber *

The nouns that have an initial glottal stop is quite a large group and has received considerable attention in Kossmann (2001b). Several claims have been made about the initial glottal stop in Kossmann’s article which I will re-examine with the corpus that I have collected.

First, the Ghadamès initial vowel o- often corresponds to Zénaga aʔ-, in the data collected by Kossmann this correspondence seems to be regular.

This correspondence is obscured in Ghadamès because Proto-Berber roots of the structure aCuC are usually reflected as oCeC in Ghadamès as is suggested by Kossmann (2001b: 84): cf. PB *afuʔs > Ghd. ūes, and PB aʔfad > Ghd. ūed.

Kossmann also shows in his article that the initial sequence *aʔ- seems to yield stable vowels in the EA of the Berber languages that have one. But strangely, the initial sequence *iʔ- for the plurals yields the standard unstable vowel in EA. Kossmann explains this by means of an accent shift. It is not certain if this was the case, and I will not discuss the accent any further, because too little is known about this at the moment.

Both the correspondence of Ghadamès o- to Proto-Berber aʔ and the stability of the prefix vowel in the EA will be examined for each word with an initial Proto-Berber *ʔ below.

(1) *taʔduft 'wool' (TC11)
   Kb. tāduṭ, tāduṭ (ta-) pl. tāduṭin (ta-) 'id.'; Mā tāduṭ (ta-) pl. tāduṭin 'id.'; Tashl. tāduṭ (ta-) 'id.'; Ouar. tēduft 'id.'; Mzab ēdduuf pl. tīdufa, ēdduufa 'id.'; Ghd. tōeft 'id.'; Auj. tāft 'id.'; El-foq. tāeft 'id.'; Zng. tāʔduḍ, tāʔduḍ pl. tāʔduḍin 'id.'; To. tāduft pl. tādufn 'id.'
4.1. NOUNS WITH INITIAL PROTO-BERBER *ʔ

Kossmann (1996: 102-104) discusses the reconstruction of this word, and convincingly shows that the final consonant of the root was *β which is devoiced to f in several languages; in other languages *β is assimilated to the final consonant to creating a lengthened -tt. As Kossmann shows, the Mzab form edduft must be understood as a typical Mzab loss of the initial vowel *a- in front of CV, resulting in a cluster td which is subsequently assimilated to dd, this yields the form found in Mzab today.

Supplementing Kossmann’s reconstruction, we can now be sure that this root had a *ʔ as its initial root consonant, evidenced by the Zénaga glottal stop and the stable prefix vowel ta-. The initial o in Ghadamès gives us no further confirmation due to the aCuC root shape in Proto-Berber.

\[\text{(2)} \quad \ast aʔfud \text{ pl. } \ast ifaddăn \text{ 'knee' (TC14)}\]

Kb. afud (u-) pl. ifadden (i-) 'leg'; MA afud (u-/wa-) pl. ifadden 'knee'; Tashl. afud (wa-) pl. ifadden (i-) 'leg'; Ouar. fud pl. ifadan 'knee'; Mzab fud (u-) pl. ifadden 'id.; Ghd. ñfed pl. faddăn 'id.; Auj. afud, afiddf pl. ifadden 'id.; El-fq. afud pl. ifadden 'id.; Zng. oʔfud, aʔfud pl. uʔfudan 'id.; To. ñfud pl. ifaddăn 'id.'

Due to Zénaga cognate, this word can be clearly shown to have had an initial radical *ʔ in Proto-Berber. We find a stable initial vowel in several languages and in Tashelhiyt we find the perfect correspondence of a stable vowel in the singular and an unstable vowel in the plural. The correspondence of the Ghd. o to the sequence *aʔ is not helpful here because this word has the structure aCuC.

\[\text{(3)} \quad \ast aʔ/βyur \text{ 'moon' (K712, TC69)}\]

Kb. aggur, agur (wa-) pl. aguren, aguren (wa-) 'id.; MA agʷur, ayur (u-/wa-) pl. agʷurn, ayurn 'id.; Ouar. yur (u-, wi-) pl. iyaren 'id.; Mzab yur (u-) pl. iyaren 'new moon'; Ghd. ūyår pl. oyarwān, end-øyår 'moon, lunar month'; Auj. ayār 'new moon'; El-fq. ayār 'id.; Zng. ūʔyr pl. ūʔyrān 'moon'; To. ñyār pl. orān 'id.'

This word is well attested in Berber languages, but is difficult to reconstruct. First of all, Zénaga seems to clearly point to an initial radical *ʔ in the singular, but the plural has a long vowel, which rather points to an initial radical *β. Kabyle, and Tashelhiyt retain the stable vowel well which may point to an initial *ʔ. Ghadamès can give us no further information due to the aCuC root structure.

Ouargla has an unusual EA in the singular namely wiyur, this seems to be a reflex of an initial *β which also appears in the Zénaga plural. Ouargla then, points to *wâbyur for the EA rather than the expected *wâyur as per the regular reflex of *eβ > i in Zénatic languages (Kossmann 1999b: 86). Compare the similar reflex wi- in Mzab for a word with a definite initial *β: (25) *aβv̆rn 'flour'.

Ouargla is not the only language with unusual reflexes; there are two languages with unexpected plurals, one is Tashelhiyt imr and the other is Touareg orān. Both these reflexes are extremely difficult to understand.

The Tashelhiyt reflex seems to point to a form *iyerăn with an unexplained shortening of the root vowel *u and no indication of *ʔ.

The Touareg form may have undergone a shift *iyorăn > *yyorăn > *yorăn > *orăn.\(^1\)

\(^1\)This development was suggested by Kossmann in personal correspondence
The loss of the initial *y is difficult. In Mali Touareg the initial *y is often lost in the 3sg.m. of the verb, but in other dialects also show this plural, this is not a common sound shift, and it is therefore difficult to explain why it is lost.

The Touareg singular has no reflex of the initial *β which may either mean it had *ʔ in the singular, similar to Zénaga, or that *β is lost in front of *y similar to how *β is lost in front of *w in (21) *aβal.

As of yet it is unclear how to reconstruct this word, even the question of what the initial root consonant was cannot be answered.

(4) *aʔkal 'earth' (K489, TC26)
Kb. akal (wa-) 'id.; Mā akal, ašal (wa-), išš pl. ikallen, išallen 'id.'; Tashl. akal (wa-) pl. ikallen, ikaln, akallen 'id.'; Ghd. ākl, ākal 'earth'; Auj. ašal 'country, village'; Zng. a'gīy 'earth'; To. ākal pl. ikallān 'earth'

This word can be reliably reconstructed with an initial radical *ʔ for several reasons. First, Zénaga shows a ʔ. Secondly, Ghadamès has an initial o. Finally, The ʔa has a stable vowel in Tashelhīyi, Tamazīght and Kabyle.

(5) *taʔmart pl. *tiʔmira 'beard' (TC34)
Kb. tamart (ta-) pl. timira (te-) id.; Mā tamart pl. timira 'id.'; Tashl. tamart (ta-) pl. tamarin (ta-) , timarinin, timira 'id.'; Ouar. tāmart pl. timira (te-) 'id.'; Mzab tāmart pl. timira (te-) 'id.'; Ghd. tōmārt pl. tomārēn 'id.'; Auj. tamīrt pl. tmīra 'id.'; Zng. taʔmmārt pl. tuʔṃṃuṛa, tuʔṃṃuṛayn, tuʔṃṃuṛaʔn 'id.'; To. tāmart pl. timarrēn 'id.'

This word has a ʔ in Zénaga and an o in Ghadamès, we also find a stable vowel in the plural. Therefore this very common word can be accurately reconstructed in Proto-Berber.

(6) *taʔrike pl. *tiʔrika 'saddle' (TC49)
Kb. tarikt (ta-) pl. tirika (ti-) 'id.; Mā tarikt, tarišt pl. tirika (t-) 'id.'; Tashl. tarikt (ta-) pl. tirikēn 'camel saddle'; Zng. tīrokt pl. tīrgēn 'camel saddle'; To. tārikk pl. tirikēn 'camel saddle'

The word for 'saddle' is well-attested in Berber languages and clearly has an initial *ʔ as evidenced by the ʔ in Zénaga and the o in Ghadamès. The stability of the vowel is less evident. Kabyle has a stable vowel in the singular, but also in the plural which is unexpected. Tamazīght has a weak vowel in the plural, but I have found no information regarding the stability of the vowel in the singular.

Zénaga has an unusual plural suffix -ən. It is difficult to determine the exact development of this plural in Zénaga. The singular of Zénaga has an initial vowel i rather than the *a that we find in all other Berber languages.

(7) *taʔfukt 'sun(light?)' (K576, TC16)
Kb. taʃukt 'sunlight'; Mā taʃukt, taʃušt, taʃuʃyt (te-) 'sun'; Tashl. taʃukt (ta-) 'id.'; Ouar. tʃuʃyt, tʃʊʃit pl. tʃuʃa (te-) 'id.'; Mzab tʃuʃyt pl. tʃuʃa 'id.'; Ghd. tʃefet, tʃeffet 'sun, sunlight'; Auj. tʃefet 'sun'; El-foq. tʃuʃkt 'id.'; Zng. tʃʊʃʃuʃkt, tʃʊʃʃuʃgt, tʃʊʃkt 'id.'; To. tʃuʃuk pl. tʃuʃuʃken (rare) 'id.'
This word has an imperfect correspondence in Ghadamès and Aujila. Both these languages lack the final *k. This is not a regular development, nevertheless these words look very similar to the other words for sun. Ghadamès has initial o- that points to *aʔ, which strengthens the correspondence despite the lack of *k.

In Naït-Zerrad (2002: FW1) we find several words pertaining to `light' that have a *w rather than a *k as its final root consonant. It would seem that these roots are nevertheless related. Possibly the Ghadamès and Aujila variants are derived from these variants with *w rather than with *k.

Some examples include Figuig tfawt `light', Beni Iznasen tfawt `light' and Jebel Ne-fusi tfawt `fire'.

This word has a stable vowel in Tashelhiyt, but it is unstable in Tamazight.

(8) *ʔalud `mud' (TC60)
Kb. alud (wa-) `id.; MA alud (wa-) pl. aludn, ilattan `id.; Mzab luḍ (u-) `mud'; Ghd. alud `id.; Zng. toʔ luḍ `id.;

This word shows an initial glottal stop in Zénaga, but Ghadamès has no initial o. Zénaga has the feminine form of this noun but otherwise corresponds perfectly. We find both Kabyle and Tamazight with a stable initial vowel. Although it is difficult to explain why Ghadamès has no o as the initial vowel, it seems likely that the *ʔ in Zénaga is original. A plausible but ad hoc scenario is that Ghadamès avoided the sequence of two o's in subsequent syllables.

(9) *ʔRG `stone' (TC47)
Ghd. ēreḡ pl. ēreḡān `id.; Zng. tiʔ rītī pl. tiʔ rīyn `id.'

The word for stone with the root ʔRG is badly attested, we find it in Ghadamès and Zénaga but the correspondence is imperfect, as Zénaga has a final vowel that is absent in Ghadamès. Not much more can be said about this word. Because the formations are so difficult, only the root can be reconstructed.

Obviously, nothing can be said about the stability of the prefix vowel as none of the languages that retain this root have a difference between el and ea.

(10) *ʔəβun `flour?' (K209, TC19)
Ghd. aβun pl. βunawān `flour of roasted barley mixed with water'; Zng. ãʔf̣(f̣)ūn `flour that has not been completely ground'

This word is badly attested in the corpus. In Beni Iznasen Berber we find awwun `a sort of porridge made of barley flour', this is probably a cognate. The reflex of *aʔ is not o in Ghadamès. It is surprising that we find the vocalism aCuC in Ghadamès, which usually becomes oCeC.

(11) *ʔəsm pl. *ʔəsmawān `name' (TC55)
Kb. isem (yi-) pl. ismawen (yi-) `id.; MA ism (yi-) pl. ismawn (yi-) `id.; Tashl. ism (yi) pl. ismawn `id.; Ouar. isem pl. ismawen `id.; Mzab isem pl. ismawen `id.; Ghd. ism `id.; Zng. ʔəsm pl. ãssāmmūn `id.; To. isem pl. ismawān `id.'
CHAPTER 4. PROTO-BERBER *ʔ

This word is extremely well-attested in the Berber languages and reconstructs easily. The biggest problem in the reconstruction of this word is the Zénaga form, which clearly shows a ? in the singular, which disappears in the plural form. The Zénaga plural in itself is exotic, where all other Berber languages point to *ʔismawān, Zénaga seems to point to *assammawān. The Zénaga plural formation has a combination of several plural formations, the change of *ʔ to *a and the suffix *-ūn in the plural are reminiscent of (44) *é/lf pl. *alfīwān, while the *a insertion and thinning of the final radical look like the nouns discussed in section 8, and then there is the highly unusual doubling of the initial consonant.

This highly unusual formation found in Zénaga is other word too such as (33) *ʔiyīl ‘arm’, (36) *udem ‘face’, (28) *uʔb and (43) *ʔlām. It would seem that this was a productive innovation in Zénaga.

As the initial vowel of this word is i-, of course o- would not be expected in Ghadamès and therefore Ghadamès can give us no further information about the initial glottal stop.

The fact that this word can be reconstructed so well for Proto-Berber should concern us. This word looks extremely similar to the Arabic word ism ‘name’. On conversion to Islam, it is customary to change your name to an Islamic name, therefore it is not unlikely that this word is a very early loan in Berber rather than a Proto-Berber word.

The fact that Zénaga has a ? does not necessarily point to an archaism. The word ʔāʔdāyi ‘tea’ is certainly a loan and also has an initial ?. Tea was introduced in North Africa much later than the Proto-Berber period, and is found in almost every Berber language, and deceptively seems to reconstruct well as a Proto-Berber word. For a further discussion on this word I refer to Stroomer (2007).

In conclusion, we can say a few thing about the reflex of the initial *ʔ in the Berber languages. In my sample, we find four words that can reliably be reconstructed with *ʔ that correspond to Ghadamès o. The other words either lack this correspondence or have the shape aCUC which shifted to oCUC in Ghadamès which obscures the correspondence. We have one word in Ghadamès that has the aCUC shape that does not shift to oCUC, and does not reflect the initial *ʔ as o either.

As for the stability of the prefix vowel, it is clear that, in a lot of languages the regular pattern with an unstable vowel has a strong effect on words that are expected to have a stable vowel, but in my corpus, every entry has at least one cognate that reflects the expected stable a vowel in the singular.

4.2 Nouns with medial Proto-Berber *ʔ

The group of nouns that has a medial glottal stop will be discussed next. It is expected that also the medial sequence *ʔ will yield o in Ghadamès. We do not expect stable vowels to appear initially, as this is no longer triggered by an initial sequence *ʔ.

*ʔadʔar pl. *ʔadʔar(r)ān ‘foot’ (TC128)
   Kb. ʔadar pl. ʔḍañn ‘id.; G ʔaḏar (u-) pl. ʔḍarn ‘id.; Tashl. ʔadar (u-) pl. ʔḍañn
4.2. NOUNS WITH MEDIAL PROTO-BERBER *ʔ

`id.'; Ouar. دراج pl. یدارن 'id.'; Mzab دراج (u-) pl. یدار، یدارن 'id.'; Ghd. اذار pl. یذارن 'id.'; Auj. اتهار، اتهار pl. یاتهارن 'id.'; Zng. اذارْرح pl. یاذارْرحن 'id.'; To. اذار pl. یاذارن 'id.'

The Zénaga word has the اّ sequence, but Ghadamès does not have o in the second syllable. Kossmann (2001b: 89-90) suggests that the original Proto-Berber sequence was *ʔa and that the sequence was changed to اّ in Zénaga by regular metathesis which can be shown to exist for ئ derived from PB *γ. As Kossmann points out himself, this explanation is not unreasonable, but rather ad hoc.

(13) *ادی/عَّفَ `marrow' (TC92)

Kb. اذیف (wa-) 'id.'; MA اذیف (wa-) pl. اذیفْن 'id.'; Tashl. اذیف (wa-) 'id.'; Ouar. اذیف (u-) pl. اذیفْن 'id.'; Zng. اذیفْن pl. اذیفْنْن 'id.'; To. اذیف pl. اذیفْنْن 'ئمّر

This word has variation between an i or u in several languages. We find a similar variation in (80) *ائي/وَّمَ 'hay' and (79) *اسي/وَّمَ 'river'. This variation will be discussed in more depth in section 7.1. Despite the unusual root vowel, this word clearly re-constructible and there is no counter-evidence against the Zénaga ʔ, so it is probably original. Despite having a medial *ʔ rather than an initial one, this word seems to have a stable vowel.

(14) *عِباّر pl. *عِباّران 'lion' (K§5.14, TC528, P362)

Ouar. ىَر 'lion (old word used in stories)'; Mzab ىَر (u-) pl. ىَرْن 'lion'; Ghd. ىَرْن pl. ىَرْنْن 'id.'; Zng. ىَرْنْن pl. ىَرْنْن 'ئمّر

عِباّر 'lion' is found in several Berber languages, but is very difficult to re-construct. It seems that the root was بَر, but it is difficult to state anything else definite about its reconstruction. Ouargla and Mzab both retain this word, but surprisingly with different reflexes. Ouargla has ىَر while Mzab has ىَر. Like Mzab, Zénaga has an initial w too. To explain the w in Mzab Kossmann (1999b: 106f.) proposes an initial *u which was later lost, the sequence *عِبا would then yield the reflex with *w. Kossmann says this same development also took place in Ouargla, but in Ouargla the form war was reanalysed as a EA of a word ** war which then led to the analogous formation ىَر that is now found in Ouargla. Ghadamès must have innovated and replaced the initial vowel *u with *w to get the resulting reflexes that we find in Ghadamès.

Kossmann (2001b: 89) revises the reconstruction posed in Kossmann (1999b) with the new Zénaga evidence by including the glottal stop in medial position. This glottal stop also explains the o vocalism in the root of Ghadamès.

In Zénaga the reflex ىَر is found. There is no evidence that PB *عِبا would yield ىَر in Zénaga, therefore the reconstruction of this word remains difficult.

(15) *افُس pl. *افِسْن 'hand' (TC143)

Kb. افزس (u-) pl. افِسْن (i-) 'id.'; MA افزس (u-) pl. افِسْن 'id.'; Tashl. افزس (u-) pl. افِسْن (i-) 'id.'; Ouar. افزس (u-) pl. افِسْن 'id.'; Mzab افزس (u-) pl. افِسْن 'id.'; Ghd. ظَفس pl. ظَفسْن 'hand'; Auj. افزس pl. افِسْن 'id.'; El-foq. افزس pl. افِسْن 'id.'; Zng. ظَفسْن pl. ظَفسْن ن 'id.'; To. ظَفس pl. ظَفسْن 'id.'
CHAPTER 4. PROTO-BERBER *ʔ

The well-attested word for `hand' is found as Ghd. ofəs with the typical vocalism from a Proto-Berber aCuC root. Zénaga points to a glottal stop lost in every other Berber language.

A striking point about two nouns in this group, namely (15) *afuʔs `hand' and (12) *aḍʔar `leg', is the fact that both these words lose their glottal stop in the plural in Zénaga. There are other nouns with this root structure that do not lose their glottal stop in the plural such as (14) Zng. waʔrän `lions' and (13) Zng. aḍifàn `marrows'.

As of yet there is no directly obvious explanation why these words would lose their glottal stop in the plural. The Ghadamès plural vássan has a *ă as the plural infix while *a is more common. Both the sequences *aʔ and *aʔ are expected to yield o in Ghadamès. So, the Ghadamès plural may point to a lost *ʔ in the plural as well.

To conclude, we find that this group is small in my corpus, but all of these nouns show clear cases of medial glottal stops, every single one of these words are well-attested in the Berber languages, but nevertheless pose several difficulties for reconstruction of the Proto-Berber form. There is one good example where *aʔ yields o in Ghadamès, which is exactly the form found by Kossmann (2001a) for this position as well.

4.3 Nouns with final Proto-Berber *ʔ

Due to the nature of my corpus, the group of nouns with a final glottal stop is small. Usually, a final glottal stop in a noun would surface with the root shape CCV since final *aʔ yields a or o and *uʔ seems to yield u. As my corpus only focused on CVC and CC roots, roots of the shape CCV are not present in my corpus.

Although we do not expect to find any nouns with a final glottal stop, some have surfaced in the data collected in the corpus, because this is unexpected, it is especially interesting to take a look at their development. Only four words belong to this group.

(16) *é/ilseʔ pl. *als(e)ʔawăn `tongue' (TC523)
   Kb. iles (yi-) pl. ilsawen, ilsan (yi-) `id.'; MA ils (yi-) pl. alsiwön `id.'; Tashl. ils (yi-) pl. ilsawn, alsiwön `id.'; Ouar. iles pl. ilsawen `id.'; Mzab iles pl. ilsawen `id.'; Ghd. ēles pl. elswăn `id.'; Auj. īles pl. īlsen, īlsān `id.'; El-foq. īlēs pl. īlēssān `id.'; Zng. aʔši pl. aʔswān `id.'; To. iles pl. ilsawän `id.'

This word, and the word that I will discuss next both lack a glottal stop in the plural in Zénaga. In the case of this word, this is not extremely striking. -ān is a very common plural suffix, which could easily be analogically appended. We do not find a regular reflex of the sequence *ʔ + awän in the masculine system of Zénaga, the feminine does have a suffix -aʔwan (Taine-Cheikh 2006).

The Touareg evidence indicates that the initial vowel is *i and not *ē, but Ghadamès shows the opposite. Ghadamès has initial *ē in both the singular and the plural. We must therefore conclude that the value of the initial vowel is unknown.

Tamazight, Tashelhiyt and Zénaga all have a initial vowel a in the plural, this is an uncommon plural formation, but it is found in linguistically divergent languages, so this is probably the old formation.
4.3. NOUNS WITH FINAL PROTO-BERBER *ʔ

(17) *iyăsse? pl. *iyăsséʔ-an 'bone' (K721, TC52)

Kb. iyes(s) (yi-) pl. iysan (ye-) 'id.'; Ma iyes pl. iyesswan 'id.'; Tashl. iys(s), ixs(s) pl. iysan, ixsan 'id.'; Ouar. iyes pl. iyesan, ixsan 'id.'; Mzab iyes, ixs pl. ixsan 'id.';
Ghd. yass, yass pl. yassan, yasân 'id.'; Auj. aysst pl. yastān 'id.'; El-foq. iyāss, iyass pl. iyassān 'id.'; Zng. iʔssı pl. aʔssañ 'id.'; To. éyăs(s) pl. iγasān 'id.'

Like the word for tongue, this word lacks a glottal stop in the Zénaga plural. In this case it cannot be explained as easily as a lack of the suffix with *ʔ. The regular reflex of *ʔ+an simply exists in Zénaga masculine nouns as -aʔn, and is very common. The reason for the lack of the *ʔ in the Zénaga plural is therefore unclear.

The value of the initial vowel in Touareg is unclear as the *γ causes lowering of the *i to é in Touareg. Ghadamès lacks an initial vowel altogether. This lack of a prefix may be an indication that the original prefix was *i which has been proposed to be regularly lost in word-initial position (Kossmann 1999a: 133-138). It is difficult to understand why Ghadamès does not have the lowering of *i to é either, as this is also the regular reflex.

There is a final problem with the length of the final radical. Several languages accept both a long and short final radical, some have a long radical in the singular and a short in the plural, and some have both forms. As of yet, it is impossible to determine which form is original.

Zénaga has an initial a in the plural, but this is nowhere to be found in other Berber languages, so this is may be a Zénaga innovation.

(18) *aḍawḍeʔ `finger' (TC132)

Kb. adad (u-) pl. idudan 'id.'; Ma adad (u-) pl. idudan 'id.'; Tashl. adad (u-) pl. idudan 'id.'; Ouar. ad pl. idudan 'id.'; Mzab daḍ pl. idudan 'id.'; Ghd. akekkeḍ pl. duḍan 'id.'; Auj. tāqt pl. taqqiḍ, taqqiḍën? 'id.'; El-foq. adad pl. idudān 'id.'; Zng. aḍayḍi, aḍayḍi pl. iḍudān 'id.'; To. ad pl. iḍedwan, iḍıdwan 'id.'

*aḍawḍeʔ `finger' is a very difficult word to reconstruct in Proto-Berber, despite being extremely well-attested. The reconstructed form presented here, is hardly a reconstruction, but rather a placeholder to refer to the word. In the vast majority of the Berber languages a reconstruction *adad pl. *idudan is the most accurate reconstruction.

For several languages this reconstruction clearly does not suffice to explain the form. First of all Zénaga and Ghadamès have some velar element before the last radical. Zénaga has γ that comes from PB *γ and the kk in Ghadamès is a velar element whose origin is unknown. Riffian is not mentioned in my sample, but it has daḍ pl. iḍedwan with an intrusive element *w in the plural this is absent in the singular. It would seem that some kind of element *w or *ww was in the original root structure. Why this form would be lost in so many languages is unclear.

A scenario that could be posited to explain the forms found is as follows: The Proto-Berber form was *aḍawḍ pl. *adedwan. The plural yielded idudan regularly in Kabyle, Tamazight, Ouargla and Mzab, which gave rise to an irregularity in the paradigm where there is a w in the singular but not in the plural, this w was then removed by analogy to give the form we find today. Some languages then retained the *w or *ww without the analogy. A problem that remains is that we do not understand
why Riffian has ḏaḍ in the singular since there still is an element *w in the plural, there is no reason for Riffian to analogically change the singular.

Another problem is the position of the *w in Touareg, which is only found in the plural, and is placed after the final *ḍ. The final glottal stop found in the Zénaga singular which is absent in the Zénaga plural brings even more problems for which no obvious answer can be found. So the scenario sketched above does not remotely cover all the problems. This leads to the unsatisfactory conclusion that we do not know what the Proto-Berber form of this word was.

Finally, there is the word for lung, which is difficult to reconstruct. The glottal stop is probably secondary therefore I have decided to discuss this word in section 6.2 at entry (39).

Having examined the words presented above, it can be concluded that all words with a final glottal stop in my sample all present problems that make it difficult to reconstruct the Proto-Berber form. It is striking that the three words discussed at length here all have a glottal stop that seems to be lost in the plural of Zénaga.
Chapter 5

Proto-Berber *β

The Proto-Berber phoneme *β is often completely lost in Berber languages. In Ghadamès this consonant is retained most consistently, and therefore the Ghadamès cognate is important to confirm the presence of the Proto-Berber *β. Zénaga retains the *β well in the form of vowel length. As the phoneme is lost often in Kabyle, many of the words with 'two radicals' in my corpus, can be shown to have three radicals where the third radical is the *β. In this chapter I will examine the roots that contain this *β and discuss the reflexes of the phoneme.

5.1 Nouns with initial Proto-Berber *β

The group of words that has a root initial *β in the corpus is large and we find several very well-attested Proto-Berber words in this group. Since in Touareg at least, *β is a glottal consonant h just likeʔ is a glottal consonant, it is worth looking if an initial *β causes stable vowels in the singular similar to nouns with initial ʔ.

(19) *tiβăyné 'dates' (K603, TC589, P544)
  ma tiyni, tini 'id'; Tashl. tiyyni 'id'; Ouar. tiyini (te-) 'id'; Mzab tiyñ (te-) 'id';
  Ghd. aβēna pl. βēnawăn 'id'; El-foq. tênî 'dates'; Zng. tāyih 'id'; To. tēhăyné
  pl. tēhăyiwên 'id'

This word is a loan from Egyptian, as is shown in Kossmann (2002: 248-250). Because of historical reasons, and because in Egyptian this noun is morphologically transparent as a derivation of the Egyptian root BNJ 'to be soft', Kossmann convincingly argues that this word is not of Berber but of Egyptian origin.

Kossmann (1999b: 106) suggests that the sequence *βey yields yy in several dialects. This seems to go well for a lot of the languages in this group but two languages remain highly problematic in the development: Zénaga and Ghadamès. The reflex of this word in Zénaga does not reflect the lengthening that is expected to be cause by the initial *β, moreover it has an initial vowel a rather than the expected i which every other Berber language, except for Ghadamès, seems to have. More-
over we would probably expect the y to be vocalised as ż(ž) after the β, similar to (20) *aβāyaw ‘nephew, grandchild’ discussed below.

As of yet, I see no way to reconcile the Zénaga word with the other languages as a historical sound development. The word actually looks too much like the other Berber words. This gives the impression that the word in Zénaga is rather a later loan from another Berber language rather than an inherited word from Proto-Berber as I would expect the regular form to be **tīž(ž)nīh.

As Zénaga is a language spoken by a nomadic people, it is not surprising that the word for ‘dates’ would be loaned. The growing of date palms requires people to be practicing agriculture, the Zénaga people probably received their dates through trading, which makes a loan probable.

Ghadamès has a masculine rather than a feminine form with a final semi-vowel w. It may be that this sequence aw was somehow introduced from the suffix -awăn in the plural βēnāwăn. But the motivation for this is unclear to me.

To conclude, this word should be reconstructed as *tiβăyné, probably without a plural as most languages lack the plural and rather seem to use the singular with a pluralic meaning. But it should be noted that especially Zénaga and Ghadamès are not yet well understood.

This word poses only a few problems in the reconstruction as *aβāyaw. But two points should be mentioned. Not all dialects of Touareg have the final *w found in the other Berber languages; I am unsure why this final *w is be lost.

Especially surprising about this word is the completely different reflex of the onset in Zénaga compared to the word for ‘dates’. As this word does reflect the *β as vowel length, this is probably the regular reflex. The reflex ż(ž) for *y seem to occur after ʔ (< pb *γ, *ʔ), as can be seen in Zng. ʔəž(ž)iɣ ‘donkey’, Kb. aγyul ‘id.’

This rule could be extended to include all glottal consonants instead of just *ʔ. This would imply that the vowel length found in Zénaga is a result of a loss of a consonant h < pb *β. Due to a lack of material, there is little extra proof for the extension of this sound law, but a possible candidate is the problematic word (3) *aβyur ‘moon’ which has been discussed earlier in section 4.1.

This word has a stable vowel in Kabyle, and Tashelhiyt which suggests that it is original.

(20) *aβāyaw ‘nephew, grandchild’ (K185, TC286, P461)

Kb. ayaw, aγaw (wa-) pl. ayawen (wa-) ‘nephew, cousin of a woman’; Mzaw ayyaw ‘grand-child, nephew’; Tashl. ayyaw (wa-) pl. ayyawn (wa-) ‘grand child, nephew’;

Zng. ʔəž(ž)iɣ pl. ʔəž(ž)ūn ‘cousin’; To. ahāya, ayyaw pl. ihāyawăn, ayyawăn, ihāya-ātăn ‘grand-child’

(21) *aβwal pl. aβwalăn ‘speech’ (TC282, P434)

Kb. awal (wa-) pl. awalen (wa-) ‘id.’; MA awal (wa-) pl. iwaļiw ‘id.’; Ouar. awal (wa-) pl. iwaļen ‘id.’; Mzaw awal (wa-) pl. iwaļen ‘id.’; Ghd. awal ‘id.’; Auj. awil ‘id.’; El-foq. awil; Zng. āwāy pl. āwāyăn, āwāyūn ‘id.’; To. awal (a-) pl. awalăn (a-) ‘id.’

This word is very well-attested in the Berber languages, but it is not instantly obvious that this root originally had an initial radical *β. Ghadamès usually preserves
5.1. NOUNS WITH INITIAL PROTO-BERBER *β

*β perfectly, but this word is reflected in Ghadamès simply as awal. The languages that tip off the lost *β in the initial position are Zénaga, Touareg and Mzab.

Zénaga has āwäy where the initial long a points to an initial radical *β, Touareg does not present the proof as straightforward as Zénaga as the reflex of this word is simply awal, but there is another noun derived from this same root, namely ahāwwal 'sound, noise'. Due to the different syllable structure, the *β now does clearly show up in Touareg as h in this word.

Mzab has a EAW Wal which perfectly reflects PB *wāβwal with the sound law *eβ > i, proposed by Kossmann (1999b: 86). A similar reflex of is found in the EA of the Mzab reflex of (25) *āβivn 'flour'.

With the evidence presented above, we can conclude that the original word must have been *aβwal. a is found as the usual reflex of the sequence *aβ, which explains why the β is not found in the majority of the languages. Ghadamès does not partake in this shift; to explain the Ghadamès form the phonetic context may provide an explanation. It is not difficult to imagine a β that was adjacent to w was lost. This is an ad hoc solution, but not unlikely.

We find this word with a stable vowel in most languages, but to explain the reflex of the Mzab EA we have assume that the word was originally had an unstable vowel.

(22) *taβurt `door' (K210, P357)

Kb. tabburt (te-) pl. tibura (te-) 'id.'; MA taggaurt, tawwurt (te-) pl. tiwira (te-) 'id.'; Tashl. tawwurt (t), taguart pl. tiwura 'id.'; Ouar. tavurt (te-) pl. tiwira 'id.'; Mzab tawurt (te-) pl. tiwira (te-) 'id.'; Ghd. taβfrt pl. teβuro 'id.'; Auj. teβurt, tavβurt pl. dvurr, dfurr 'id.' To. tahort, tabburt, tawurt pl. tihor 'id.'

The word for door shows the reflexes of the sequence *aβu clearly as present by Kossmann (1999b: 100). Tashelhiyt, Tamazight and Kabyle all show reflexes from an original *awwu which becomes awwu/aggu in Tashelhiyt and Tamazight, and abbu in Kabyle. The Zénatic languages have awu instead.

The reflexes of these words in Ghadamès and Aujila are striking. Ghadamès has taβurt and Aujila teβurt. Both languages show a lengthening of the *β, as this is one of the rare cases where there is an indication of *ββ existing at all, we should probably consider this a secondary development in these two closely related languages. It could be that this is the regular reflex of *β in an intervocalic position before an u but more examples are needed to confirm this hypothesis.

(23) *éβăḍ pl. *aβăḍan 'night' (K189, TC263, P145)
Kb. id (yi-) pl. icaid, adan (wa-) 'id.'; Id. id (yi-) pl. icaid (yi-) 'id.'; Tashl. id (yi-) pl. adan (wa-) 'id.'; Ouar. id pl. iydan 'id.'; Mzab id pl. iydan 'id.'; Ghd. ćēdu pl. ćēdavān 'id.'; Auj. avoṭ 'id.'; Zng. id pl. aḍan 'id.'; To. éhāḍ pl. ihāḍan 'id.'

This word is very well-attested in Berber languages and seems to have only two radicals. Ghadamès has an initial vowel é- which would indicate that the initial vowel is *é-, in the plural we also find è-. The Toarefg é can give us no further proof for an initial *é as it could be the result of an *ī that was lowered to è by vowel harmony
CHAPTER 5. PROTO-BERBER *B

with the *a in the root. The fact that we find an initial vowel a in the plural of Kabyle, Tashelhiyt and Zénaga suggests that the initial vowel of the plural was originally *a.

It is interesting to note that the Zénatic languages show a semi-vowel y in the plural. One cannot help but wonder if this is a reflex of pb *β. In Zénatic the sequence *βe usually yields i (see Kossmann 1999b: 96-98), so we do not expect a y to surface in these languages, likewise if the y arose when the initial vowel was still *a in the plural we do not have a sound law to explain that either. The sequence *aβe is expected to yield a (see Kossmann 1999b: 95).

This word only seems to have two radical consonants, and there is no indication that there might be a third except maybe the Zénatic reflexes with the y in the plural.

(24) *aβv̆rn `flour' (K171)
   Kb. awren (we-) pl. iwernan (i-) `id'; Ma awren (wa-) pl. awern `id'; Tashl. agɣern, awr(e)n (u-) `id'; Ouar. aren (u-) `id'; Mzab aren (wi-) `id'; Ghd. aβārn pl. bârnawan `id'; Auj. vrūn, āvrûn; El-foq. arēn `id`.

This word is well-attested, and a prime example of the development of the sequence *aβVR as aR in Zénatic while it yields aw(w)VR in the other dialects (Kossmann 1999b: 107-109). It is impossible to be sure about the value of the short vowel in the root, as the following r colors the *e to á in Ghadamès regardless. All other languages that retain this word, have not retained the short vowel distinction.

The ea found in Mzab is wīren, this is an odd form from from a regular perspective as an initial vowel a in Mzab regularly yields w(e)- and sometimes wa- in the ea. From an historical point of view this form can be explained as a very archaic retention. Originally we expect the paradigm to be El *aβern EA *weβern. As a e in open syllables is disallowed in Mzab, the sequence of the EA was metathesised to form *weβren. The
5.2. Nouns with medial Proto-Berber *β

The group of nouns that we find with a medial Proto-Berber *β in the root is extremely limited in my corpus. So limited in fact, that the group is only represented by one instance in my corpus.

(27) *i/infār pl. *anβarăn `eyebrow/eyelash' (P560)
    Ghd. anβăr pl. anβarăn `eyelash'; To. énhăr pl. anhărăn `eyebrow'

The initial vowels of Ghadamès and Touareg do not correspond, other than that the correspondence is perfect. It is likely that the strange vocalism of the plural as found in Touareg was spread to the singular by analogy in Ghadamès. The initial ĕ found in Touareg could be both from *i and *ē due to vowel harmony the contrast has been lost.

In my corpus nouns with medial *β is very badly attested, this is probably because of the limited scope of my corpus. If we look at a broader study of *β in Kossmann (1999b) the amount of nouns with a medial *β is considerably higher.

5.3 Nouns with final Proto-Berber *β

The group with a final Proto-Berber *β in the root is very small, and this is unsurprising considering the corpus. Sequences of *Vβ generally lead to vocalic reflexes,
therefore these roots would often show up in CCV type roots, which I do not discuss in this thesis. Nevertheless, I have found three roots that belong to this group.

The first word is the word for wool (1) *taʔḍuβt which was discussed earlier. Kossmann (1996: 102-104) discusses this word, the f found in most languages seems to be the regular reflex of PB *β before *t.

(28) *ulβ pl. *ulβawän 'heart' (K133, TC559, P482)
    Kb. ul (wu-) 'id.'; MA ul (wu-) pl. ulawên (wu-) 'id.'; Tashl. ul (wu-) pl. ulawên (wu-) 'id.'; Ouar. ul pl. ulawên 'id.'; Mzab ul pl. ulawên 'id.'; El-foq. āl pl. ulâwen 'id.';
    Zng. āy pl. āllän 'id.'; To. ulh, ul, ewel pl. ilhawän, ulawän, āwâllän.

In most languages the *β of *ulβ is lost. Only in Touareg and perhaps in Zénaga this consonant was retained. In Touareg we find the word as ulh with the h clearly pointing to the lost *β. In Iwellemmeden and Ayr Touareg we find the variant ewel for this word, I am unsure how to analyse this form, but it seems to suggest that an original *u underlies *u.

Zénaga has the word as āy. Vowel length in Zénaga generally points to a Proto-Berber sequence of *Vβ. If this sequence underlies the Zénaga form, the *β must have undergone metathesis from *ulβ to *uβl to eventually yield the form we find today. This metathesis is irregular, but not phonotactically unlikely. As argued earlier, final *β probably was h before yielding vowel length in Zénaga. The cluster [lh] in word final position is quite difficult to pronounce, while [hl] before a vowel is considerably easier, this may be the motivation for the metathesis. Zénaga has a strange plural which is somewhat similar to that of (43) ālâm and (36) *udem, except that we do not see the *β lengthened as it is lost in the plural.

(29) *é/i/ayir(β?) pl. *iyir(β?)(-aw)-än 'shoulder' (K638, TC44)
    Kb. iyir, iyîr (yi-) pl. iyîren 'id.'; MA iyir pl. iyîrîn, iyîrîwên 'shoulder, upper arm';
    Tashl. iyîr (yi-) pl. iyîrîwên 'shoulder'; Zng. āfr pl. āfrân 'id.'; To. āzîrîh, āzîr pl. āzîrîhan, āzîrîn 'id.'

It seems that this word belongs here. The final h that we find in Mali Touareg may come from a *β that was lost in this context in all other Berber languages.

The palatalisation of *γ to ẓ in Touareg is irregular but not uncommon, other word is found in my corpus with the same development namely (63) *iγḍ `ashes'\(^1\).

It is impossible to determine what the original initial vowel of the singular was. None of the languages that reflect *i distinguish between *i and *e and the Touareg reflex rather points to an initial *a. Zénaga has a plural with an initial *a, but no other languages show this plural, so it cannot be determined if it was original.

\(^1\)The palatalisation of *γ in Touareg is discussed in Vycichl (1990).
Chapter 6

Nouns with two radicals

A great amount of nouns that have two radicals, can now be shown to have originally had three consonants of which one was either *ʔ or β. This does not mean all nouns with two radicals must have had these lost consonants. In this chapter I will present the words that lack a third radical. This does not mean there never was a third radical but it does mean that there is no direct comparative proof for it. Prasse tries to reconstruct a Proto-Berber *h to explain long vowels, which for the sake of internal reconstruction may be preferable, but I will focus purely on the reconstructible Proto-Berber by means of the comparative method.

Sadly, if a Zénaga cognate is absent, it is difficult to find out whether a *ʔ was ever there. Therefore for the first part of this chapter I will discuss the nouns that can be shown to not have had a *ʔ and therefore probably were truly biradical. I will divide this group in two sections, the words of the shape VCVC and the words of the shape VCC.

After these two sections of roots with a definite biradical shape, I will discuss all the roots in my corpus for which I have not found a Zénaga cognate.

6.1 Biradical nouns with VCVC shape

(30) *idammăn ‘blood’ (TC109)
   Kb. idim (yi-) pl. idammen (i-) ‘id.’; Ma idammen ‘id.’; Tashl. idammn (yi-/i) ‘id.’;
   Ouar. idammen ‘id.’; Mzab idammen ‘id.’; Ghd. dămmăn, dammăn ‘blood’ ‘id.’;
   Auj. dîmmen ‘id.’; El-foq. idammen ‘id.’; Zng. əḏämmän ‘id.’

The word *idammăn was most likely a plurale tantum as only Kabyle has a singular idim. Other words for liquids are found exclusively in the plural as well such as *aman ‘water’, this does not mean all words for liquids are plural, but it shows that liquids as plurale tantum have precedent; therefore, it seems likely that Kabyle innovated here. The initial vowel is unstable except in Tashelhiyt, but even there it has an unstable variant.

The absence of an initial vowel in Ghadamès confirms that the original initial vowel was *i as is discussed in Kossmann (1999a: 133-138).
(31) *téf(ʃ)é/ărt pl. *tifé/arén `reward’ (TC151)
Mzab tifirt (te-) tifirin (te-) `reward, wage, payment’; Ghd. téfért pl. tefarèn `benefit, reward’; Zng. toffàrt pl. tòffàrìn `cash payment’; To. tefért pl. tiférèn `reward’

This word is difficult to reconstruct as some languages show a long initial radical. Another point of difficulty is the root vowel. Touareg has a vowel é in the root while Ghadamès has â in the singular and a in the plural. Zénaga likewise has an a in the root.

All the other languages do not distinguish between *é and *i so give no further indication about the root vowel, this may be an example of a noun with a root vowel *é which will be discussed in section 7.3.

Despite these difficulties these words are all clearly related. It may be that the short â in Ghadamès is some form of regular shortening, but with the current material we cannot be sure. Even then, we would be left with a change of *é to *a in the root that cannot be explained.

The initial vowel in Ghadamès clearly points to a Proto-Berber *é, Touareg points to *é too. It is striking that the initial *é in Ghadamès is stable in the plural while it changes to *i in Touareg.

(32) *ta/émedt pl. *timédèn `umbilical cord’ (TC346)
Kb. timit (ti-) pl. timidin (ti-) `id.; MÀ timít pl. timidin (ti-) `id.; Ouar. timàt pl. timidin (te-) `id.; Mzab timàt pl. timidin (te-) `id.; Ghd. tamet pl. tmédèn `id.; Zng. tamàD pl. tmùddäyn, tmùddäyn `id.; To. témet `umbilical cord’ pl. tmédèn `placenta’

This words has some variants in some of the languages that are difficult to understand; Zénaga has tmàd with an unexplained vowel *a in the root. For Touareg Kabyle and Tamazight the initial vowel of this root is *é. Yet, Ghadamès, Mzab and Ouargla rather have an initial *a. This is clearly visible in Ghadamès, while in Ouargla and Mzab the presence of this vowel can be seen by the absence of an initial vowel. This is the result of an irregular sound shift a > Ø before a long vowel in the next syllable. Due to this reduction it is impossible to tell whether the variant with prefix vowel *a was stable or not.

Ghadamès and Touareg both indicate that the root vowel of this noun was *é.

(33) *a/i/éγil pl. *iγallăn `arm’ (TC59)
Kb. iγil (yi-) pl. iγalln (i-) `id.; MÀ iyil, ayil (wa-) pl. iyiln `id.; Tashl. iyil (yi-) pl. iyalln (i-) `id.; Ouar. ayil (u-) pl. iyilen, iyilen `arm, forearm’; Mzab ayil (u-) pl. iyAlln `id.; Ghd. ÿl pl. ÿllàn `arm’; El-foq. ayil, ayil `id.; Zng. iʔy pl. aʔllàn, aʔllūn `forearm’; To. ayil pl. iyallàn `arm’

This word is very common in Berber, but the evidence for the initial vowel is conflicting. Some languages show *a as the initial vowel while others have *i or *é. The plural seems to be *iγallàn, but Zénaga has an initial a and a suffix -ūn here.

Despite having a Zénaga cognate, this word may still have three radicals, as a sequence of two ? is disallowed, and the *γ shifts to ? in Zénaga, it is not out of the ques-
tion that this word was originally *a/iγʔil. The glottal stop is less likely to have been other side of the *γ because in that case an initial o in Ghadamès would be expected.

(34) *taγart 'drought' (TC58)
Kb. taγart 'id.'; MA taγart, taγara 'id.'; Tashl. taγart 'id.'; Zng. taʔrt 'drying, being dry'

This word is not broadly attested in my sample and the languages in which we find it do not give a clear form. Kabyle lacks a full vowel a in the root, and one of the two variants in Tamazight has an unexplained final a. The Zénaga cognate is not a perfect semantic match, but the formation of the Zénaga word seems to be identical to the other words.

This word is a derivation of the verb γr `to dry'. The strange variation in form found in Tamazight may be because the second form is simply another deverbal formation.

Because *γ shifts to ň in Zénaga and a sequence of two ň is disallowed, Zénaga in this case cannot give us much information about the original formation, as it cannot be seen if this word was perhaps *taʔγart or taγʔart.

(35) *taγuyyét pl. *tiγuyya 'shout' (K649, TC65, P586)
Kb. taγʷešt pl. tuγaš `voice'; MA taγuyyít pl. tiγuyya 'shout'; Zng. tâʔžih 'id.';
To. teγuyyét, tâγuyett pl. tiγuyyétén, tiγuyya 'id.'

All languages point to *taγuyyét except for Kabyle where both the final *é an the full vowel *u seem lost. Zénaga shows the typical reflex of *y as ň after a ň. It seems that the Kabyle cognate is a slightly different formation that does not have the root final vowel.

6.2. BIRADICAL NOUNS WITH VCC SHAPE

(36) *udem pl. *udemawăn 'face' (TC108)
Kb. *udem (wu-) pl. udemawen (wu-) 'id.'; MA udem pl. udmawn 'id.'; Tashl. udm (wu-) pl. udmawan 'id.'; Ouar. udem pl. udmawan 'id.'; Mzab udem pl. udmawan 'id.'; El-fq. idém pl. idemāwen 'id.'; Zng. əḏəm pl. ŏddäṃmūn 'id'; To. udem, idem pl. udemawăn, idmawăn 'id'

This word is very well-attested in the Berber languages. Oddly enough, Mali Touareg and El-Foqaha have a different initial vowel than all other languages. They both have *i instead of *u. The reason for this is unclear. Another striking form is the plural found in Zénaga, which not only has an unexpected a as the initial vowel but also lengthening of both root radicals.

(37) *éḍs `sleep' (TC139)
Kb. iḍs 'id.'; MA iḍs, its (yi-) 'id.'; Tashl. iḍs (yi-) 'id.'; Ouar. iḍes 'id.'; Mzab iḍes 'id.'; Zng. uṭaš `sleeping, dream'; To. éḍes pl. éṭsawăn `sleep'
Despite having a plural in Touareg, it seems likely that this word had no plural, as none of the other languages have a plural. Semantically it is difficult to imagine a plural for this word. For some dialects of Touareg, notably Ahaggar Touareg, *i is lowered to *é in Touareg in front of an emphatic consonant, with just a cognate in Ahaggar it would be impossible to determine the initial vowel. This word is also found in Ayer Touareg which lacks this lowering, therefore we can be sure that the initial vowel was *é.

Finally, it is worth noting that the Zénaga cognate has a vowel *a in the root which points to *a or *â which is not reflected in any of the other languages which either point to a *e in the root or no vowel at all. Moreover, Zénaga has an initial *u which is unexpected.

(38) x a/i/éfer pl. *iferawan `wing' (TC....)
Kb. iferr (yi-) pl. iferrawen (i-) `id.'; MA afer (u-, wa-), ifer pl. afriwn (wa-) `id.';
Tashl. ifr (yi-) pl. ifrawn 'leaf, wing'; Ouar. afer (u-) pl. afriwen 'wing'; Mzab afer (u-), afrw (we-) pl. afriwen (we-) `id.'; El-foq. tefrî pl. tefrâi 'leave of a branch';
Zng. âfrâin `wings, feathers'; To. afer, afaw pl. ifrâvân `wing'

*afer is difficult to reconstruct. Several languages show the *w of the plural suffix in the singular as well. As it is hard to understand how the *w from the plural would get included into the singular, it may have been part of the root instead, and was later reinterpreted as part of the plural suffix in several languages, such as Kb. iferr pl. iferrawen, MA afer/ifer pl. afriwn. Touareg aferaw pl. ifrawăn would then be original.

Another problem is the vocalisation of the second element many languages show *aw but some show *iw, this alternation is understandable if it is the plural suffix, which often has variation between *-iwăn and *-awăn, but Mzab even shows this *iw in the singular, it is difficult to explain this form.

The initial vowel is difficult to reconstruct properly, some languages have *a while others have *i or *é. With the current knowledge it is impossible to determine how exactly this word should be reconstructed for Proto-Berber.

(39) x turewt `lung' (TC423)
Kb. turet pl. turin `id.'; MA turt pl. turin `id.'; Tashl. turin `id.'; Ouar. tura pl. turawin `id.'; Mzab tarut (te-) pl. tirutîn (te-) `id.'; El-foq. tûrî pl. tûrâu `id.'; Zng. torid pl. torâin `id.'; To. torr, tarut pl. torrawân, tarutên `id.'.

This word poses a lot of problems in reconstruction. The Zénaga torid pl. turâin `lung' has a glottal stop. As I have discussed in my paper on Zénaga Berber plural formations, this cluster ?d found in Zénaga may be the result of Proto-Berber word final *-t-t. Feminine nouns that end in vowels always take an additional *-t for the feminine suffix in Tamazight. A similar development may have taken place in Zénaga and then ?d is probably the regular result of *-tt. The glottal stop that arose in the singular due to this rule, then gave rise to the analogical plural formation that tries to retain this glottal stop.

The above scenario would imply that the root ends in a vowel with an additional feminine suffix. Zénaga is the only language with this form. Other languages end in

1 See Penchoen 1973: 16
6.2. BIRADICAL NOUNS WITH VCC SHAPE

a vowel *a* such as Ouargla and El-Foqaha, which others end in -ut such as Mzab and for example Ahaggar Touareg. Some languages don't have a final vowel at all, such as Kabyle and Tamazight. In fact it is extremely difficult to establish a reconstruction for either the singular or the plural. It may be so that the original form in Proto-Berber was a plurale tantum which was variously reinterpreted as a singular or a plural, after which different plural or singular formations were formed.

(40) *urγ* `gold' (TC423)

<table>
<thead>
<tr>
<th>Language</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mzab</td>
<td><em>urγ</em></td>
</tr>
<tr>
<td>Ghd.</td>
<td><em>urγ</em></td>
</tr>
<tr>
<td>El-foq.</td>
<td><em>urγ</em></td>
</tr>
<tr>
<td>Zng.</td>
<td><em>urγ</em></td>
</tr>
<tr>
<td>To.</td>
<td><em>urγ</em></td>
</tr>
</tbody>
</table>

A well-attested Berber word that gives little trouble in reconstruction. We cannot be sure of the vowel of the root because *γ* would color *e* to *ă*. The Ghadamès variant with a long *a* in the root is striking. It may be that this is a mistake in identification of the vowel during Lanfray’s fieldwork.

This noun is a derivation of the Proto-Berber root *wrγ* `to be yellow', which means the initial *u* was probably originally a vocalisation of the *w*.

(41) *é/iγăf* pl. *aγăfawăn* `head' (K719, TC13)

<table>
<thead>
<tr>
<th>Language</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kb.</td>
<td><em>ass</em></td>
</tr>
<tr>
<td>Tashl.</td>
<td><em>asf</em></td>
</tr>
<tr>
<td>Mzab</td>
<td><em>asf</em></td>
</tr>
<tr>
<td>Ghd.</td>
<td><em>asf</em></td>
</tr>
<tr>
<td>Zng.</td>
<td><em>asf</em></td>
</tr>
<tr>
<td>To.</td>
<td><em>asf</em></td>
</tr>
</tbody>
</table>

This word is extremely well-attested in the Berber languages, some languages have *x* where we would expect *γ*, this is simply a voicing assimilation with the following *f*. The Kabyle and Zénaga plural with initial *a* challenge the regular picture found in all the other languages which have an *i* in the plural. This initial *a* should probably be considered an archaism of these languages.

The value of the initial vowel cannot be determined as *i* would shift to *é* in front of *γ* in both Touareg and Ghadamès.

(42) *asăf* pl. *usfan* `day' (TC506)

<table>
<thead>
<tr>
<th>Language</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kb.</td>
<td><em>ass</em></td>
</tr>
<tr>
<td>Tashl.</td>
<td><em>asf</em></td>
</tr>
<tr>
<td>Ghd.</td>
<td><em>asf</em></td>
</tr>
<tr>
<td>Zng.</td>
<td><em>asf</em></td>
</tr>
<tr>
<td>To.</td>
<td><em>asf</em></td>
</tr>
</tbody>
</table>

This word is notable for several things, in most languages it seems like there is only one root consonant *s*, but Tashelhiyt and Ghadamès betray the origin of the final ss to be *sf*. Apparently final *sf* causes an assimilation to ss in most languages. In Tashelhiyt we find both the assimilated version and unassimilated version in the singular. In the plural we only find the assimilated version. In the Tashelhiyt expression *asfan* `today' we see the *f* return as well.

The second point of interest is the remarkable plural formation with a prefix *u* rather than *i* this is well-attested and only Aujila and Ghadamès seem to have a different plural formation. Finally it should be noted that Zénaga unexpectedly has an emphatic *ṣ* as its root consonant instead of a plain *s*, the reason for this is unclear.
CHAPTER 6. NOUNS WITH TWO RADICALS

(43) *élăm pl. *ilmawăn `skin' (TC583)
    Kb. tallum (ta-) pl. tallumin (ta-) `screens made of thin strips of skin'; Tashl.
    ʾlm (yi-, i-) pl. ʾlmawn `leather, skin'; Ghd. ʾlám pl. ʾlámawän `animal skin'; El-
    foq.ʾlém `skin'; Zng. ʾywm pl. ʾlammūn, ʾlammūn `id.' To. ʾlām pl. ʾlāmawän
    `skin, leather'.

The fact that Ghadamès has an initial vowel *é shows that this is the original vowel.
Kabyle is a different derivation of the same root, which shows that the root is still
found in Kabyle, but not this specific formation.

Aujila has a word glîm pl. glîmen `skin', despite looking similar, this word is unre-
related. We find a cognate for this word in Mali Touareg aljem pl. jalémän `prayer skin'.
Ultimately these words may be related but a prefix *g is not a common prefix to derive
nouns.

The Zénaga cognate has a plural formation with initial a. As there is no other evi-
dence for this initial a it is difficult to determine if this is an archaism. But considering
the very strange plural formation with both root consonants doubled and a suffix -ūn,
it is unlikely that it was original. This is the same strange plural formation that we
find in nouns like (11) *ʔís and (36) *ʔ/dem.

The words (23) *ʔásad 'night' and (28) *ʔalβ are both biradical nouns that have a Zénaga
cognate, but because they contain a *β they have been discussed earlier in chapter 5.

6.3 Biradical roots with no Zénaga cognate

A large amount of the nouns in my sample have no Zénaga cognate and therefore it
is difficult to confirm whether there ever was a third radical. But as discussed both
at (28) and (40) there is some reason to believe that words that start with an initial
*a have a third radical *w. Other than that proof for a third radical in the following
words is hard to find because a Zénaga cognate is lacking. As it has been shown that
*aʔ can cause stable *a in the E, it is interesting to see whether any of these words
have a stable vowel. Sadly, there is no indication that *aʔ is the only origin of a stable
*a, therefore we still cannot be sure whether such words originally had three radicals.

(44) *é/ilf pl. *alβawän `swine'
    Kb. ʾlef (yi- pl. ʾlfan (yi-) `id.'; MA ilf (yi-), irf (yi-) pl. ilfan (yi-) `id.'; Tashl. ʾlf (yi-)
    pl. ʾlfan (wa-), ʾlfan (wa-) `id.'

This noun is only found in Northern Berber dialects, but is well-attested there.
Tamazight has an odd variant of the singular: ʾr which rather looks like Tarifiyt where
PB *r regularly becomes r. I do not understand how this form ended up in Tamazight,
but for the purpose of reconstruction of Proto-Berber this is not very relevant.

Due to the lack of a Touareg or Ghadamès cognate it is impossible to determine
whether the initial vowel of this word is *é or *i.

Tashelhiyt has an initial *a in the plural which could be an archaism.

(45) *tē/idvt `mastic tree'
    Kb. tidekt (ti-) `id.'; MA tidekt `id.'; Tashl. tidkt, tidkt, tidkt (ti-) `id.'
This word is only attested in three languages of my sample, Tashelhiyt has several different variants which seem to be various approaches to assimilation of *d + *k. The lack of a cognate in Touareg or Ghadamès makes it impossible to determine if the initial vowel is *i or *é.

(46) *adal `alga'  
   Kb. adal (wa-) `duckweed'; Tashl. adal (wa-) pl. adaln, idaliwn `alga'; To. adal, ādala pl. adalān, idalatān `id.'

This word is not widely attested but the wide geographical distribution gives the impression that it is in fact Proto-Berber. Mali Touareg has an unusual variant with a final -a appended. I do not understand the origin of this extension.

This noun has a stable initial *a.

(47) *adan(s) `bowels'  
   Mā adan (u-) pl. adann `id.'; Tashl. ada pl. adan (wa-) `id.'; Mzab adan (wa-) pl. adanen (wa-) abdomen, bowels; Ghd. ādan pl. adānān `bowels'; To. pl. adanān `id.'

This word is well-attested but somewhat difficult to reconstruct. The word `bowels' has a pluralic meaning, and the `singular' that we find in Tamazight, Mzab Ghadamès and Touareg rather looks like a plural by itself due to the -an which may be a suffix. Tashelhiyt is different than the rest and has a singular and the form that is considered the singular in other languages is in fact the plural. The Tashelhiyt form may very well be archaic while all other languages innovated. But it could also be that the singular in *adan was reinterpreted as a plural in Tashelhiyt and then Tashelhiyt innovated by making a singular by analogy.

Both Tashelhiyt and Mzab point to a stable vowel *a for this noun both in the singular and the plural.

(48) *adē/il `grape'  
   Kb. adil `id.'; Mā adil (wa-) `id.'; Tashl. adil `id.'; Ouar. adil (u-) pl. idilēn `id.'; Mzab adil (u-) pl. idilēn `id.'

This word is only found in Northern Berber languages, some of the languages only have a singular while others have a plural too, determining the original situation on this subject is difficult with the limited data in my corpus.

The root vowel can not be distinguished as *é or *i since a Ghadamès or Touareg cognate is lacking.

Tamazight has a stable vowel in the ea. My lexical data did not provide insight on the stability of Kabyle and Tashelhit. Ouargla and Mzab have unstable vowels.

(49) *ugēl pl. *ugēlan `tooth (canine)' (K401)  
   Kb. ugel (wu-) pl. uglan (wu-) `tooth'; Mā ugl (wu-) pl. uglan (wu-) `id.'; Tashl. ugel(wu-) `molar tooth' pl. uglan (wu-) `canines'; Ouar. ugel pl. uglan `tooth (canine)'; Mzab uǥål pl. uǥlân `id.'; Ghd. tawǥlēt pl. tewǥlēt `canine'; Auj. tuwegil pl. tuwegilãn `molar', awegil pl. wègešen `canine'
This word is very well-attested, and it seems clear that initial *u comes from a radical *w because of the words that we find in Ghadamès and Aujila. These languages do not have the same formation for this word, but in their divergent formations the radical *w surfaces.

(50) *agum ‘trunk’?

\[\text{Ma agum} \text{ ‘pivot of a hand mill’; Tashl. aguma, agumat pl. igumadn ‘trunk of a date palm’; Ghd. ōjem pl. gānmān ‘heart, core of a fruit, axle of a mill’}\]

The languages in which this word is attested all have quite divergent meanings but the words seem to be related. The axle of a mill has a cylindrical shape, similar to the trunk of a date palm. The meaning heart on Ghadamès can also refer to the heart of a date palm. This word must have either referred to a ‘core’ or a ‘trunk’ of a date palm.

(51) *agur ‘castrated goat’

\[\text{Ghd. aqur pl. ĝurān ‘male goat’; To. āgorr pl. ĝorgān ‘castrated goat’}\]

This word is not well-attested, moreover, Ghadamès does not have the expected shift of aCuC to oCeC, this could mean that the Ghadamès word is a loan from Touareg.

(52) *taβgust pl. *taβegusin ‘saddle strap’ (K397)

\[\text{Kb. taqʷest (t-)}, \text{pl. tagʷsin, tagusin ‘id.’; Ma tagʷust, tawust pl. tīgʷusin, tīwusin (t-), ‘id.’; Tashl. taggʷst (ta-) pl. tuggas, tīgʷas ‘id.’}\]

This word is only attested in Northern Berber languages. Tashelhiyt has an interesting a-infinit plural not found in any of the other languages. Although this root looks biradical root actually has three radicals, the root is βgs which is discussed in Kossmann (1999b: 122). The Kabyle root bges ‘to gird’ belongs to this noun tagʷest, to reconcile this alternation, we have the root βgs, where *β underlies b in preconsonantal position, while it is lost in the context *aβe yielding the reflex a.

The initial vowel is stable in both Kabyle and Tashelhiyt.

(53) *agʷaẓẓ pl. *igʷăẓẓăn ‘cheek’

\[\text{Ma aqʷus(wa-) pl. agʷusn (wa-) ‘jawbone’; Tashl. aguz, aguz pl. iquzzan ‘cheek’; Ghd. aqʷaz pl. ĝuzzān ‘cheekbone’; To. ăqaz pl. ĝuzzān ‘cheek’}\]

The Tamazight word may not belong here as both the meaning and the final consonant do not correspond perfectly with the other cognates. If the Tamazight word is related, this word seems to speak in favor of the idea that labialised velars were not caused by a neighboring *u as it is clear from Ghadamès and Touareg that no such sound could be adjacent, while Tashelhiyt’s reflex does point to a labliased *g*. Alternatively it could be that the Ghadamès and Touareg vocalisation is not original and that the *u found in Tamazight and Tashelhiyt is simply original and that this vowel caused the labialisation.

The lengthened final consonant found in Tashelhiyt and Ghadamès seems to be original, which implies that this word is not a true CVC root.
6.3. BIRADICAL ROOTS WITH NO ZÉNAGA COGNATE

(54) *takurt\ pl. *tikurén \`ball'
    Kb. takurt (t-) pl. tikurin (t-) \`bal of yarn'; Tashl. takura\ pl. takurin \`ball'; To. takurit pl. tikurryén \`ball, lump'

    Touareg has a very unexpected reflex of this word. It is a different formation of the same root. It may be that this word is an early loan from Arabic kura(t) \`ball', it may also be a derivation from the Proto-Berber verb kur \`to be round'.
    Tashelhiyt shows a stable initial vowel but Kabyle shows a weak unstable initial vowel.

(55) *akuz\ pl. *ikuzăn \`mealworm'
    Tashl. akuz (wa-) pl. ikuzn \`id.'; Ghd. ökez\ pl. end-ökez \`id';

    This word is well-attested in the Berber language, but it is exceptionally badly attested in my corpus. Tamazight has a stable initial vowel. The Ghadamès o here is no indication of a lost *ʔ because it has the aCuC root shape that shifted to oCeC.

(56) *tamemt \`honey'
    Kb. tament (ta-) pl. tamnin (ta-) \`honey bee'; MA tament \`honey'; Tashl. tament (ta-) \`honey'; Ghd. tament \`honey'; Auj. timent \`honey'; To. tament, tammunt, tammomt pl. tammen, tammomen

    This word has the root mm in several languages such as Ghadamès and some Touareg dialects. Several other languages show a root mn. Assuming that the second variant is the result of an assimilation is tempting, but probably incorrect. In the verbal system of Tamazight in the 2pl.f. ending we find r- ...-mt with an unassimilated m. A likelier explanation of this variant must then be dissimilation of the root, or alternatively, assimilation from mn to mm.
    Tamazight and Tashelhiyt have an unexpected doubling of the initial radical, which is also found in a variant found in Eastern Iwellemmeden Touareg. Since the doubling is so widespread this may be an old formation. What exactly was the motivation to choose the CC over the CC version is yet unclear.
    Additionally, Touareg seems to have two different forms depending on the dialect. Most dialect have tament which points to *tamemt but Iwellemmeden has tamumt, tammomt that points to *tam(m)umt instead.

(57) *am(m)ud \`prayer'
    Ghd. amud, ammūd\ pl. mūdawăn, end-ammūd \`prayer'; Auj. amūd; To. emud, amod pl. imaddăn \`islamic prayer'

    This word is not very widely attested, it is not obvious why a Berber word for \`prayer' would be loaned from Touareg into Ghadamès or vice-versa, so it may be old. Ghadamès has an unusual variant with a double initial radical, the origin of this is unclear.

(58) *am(m)ud \`door post'
    Mzab ammud (wa-) pl. immuden \`pillar, post'; Ghd. amūd\ pl. mūdawăn \`door-post'
The Ghadamès reflex is homophonous to the reflex found in (57), Mzab has this word too but with a double initial radical. Mzab has a stable initial vowel. This word may be an early loan from the Arabic word *amūd ‘flagpole, pole, post’. In which case this word should not be reconstructed for Proto-Berber.

(59) *tamurt pl. *timuraʔ ‘earth’
Kb. tamurt (t-) pl. timura (t-) ‘id.’; MA tamurt (t-) pl. timura (t-) ‘earth’; Tashl. tamurt (t-) ‘id. (neolog.?)’; Ouarg. tamurt pl. timura (te-) ‘id.’; Mzab tamurt (te-) pl. timura (te-) ‘id.’; Auj. tamurt (t-) ‘id.’; El-foq. tamurt pl. tmūra ‘id.’

This word is well-attested, the distribution of a stable vowel in the singular and an unstable vowel in the plural as found in Kabyle is often indicative of an initial *ʔ, but without further evidence, we cannot be certain of its presence.

Kabyle has a stable initial vowel, all other languages show an unstable vowel.

(60) *timẓén ‘barley’
Kb. timẓin (te-) ‘id.’; MA timẓin (t-) ‘id.’; Tashl. timẓin (t-) ‘id.’; Ouarg. timẓin (te-) ‘id.’; Ghd. temẓet pl. temẓên ‘id.’; Auj. timẓin (t-) ‘id.’; El-foq. timẓin ‘id.’

A well-attested word, generally found only as a plural.

(61) x/a/i/énv̆γ ‘palate’
Kb. anγ (wa-), ineγ (yi-) pl. inγan (yi-) ‘id.’; MA anγ (wa-), anγu (wa-) pl. anγen (wa-), anγi wn ‘id.’; Tashl. anγa pl. anγatn, anγi wn ‘id.’

This word is not well-attested in my corpus and poses some problems. The Kabyle word has both the form with initial a- as initial i-, while Tamazight alternates between a root vowel e and u. Finally, Tashelhiyt has an unexpected vocalic ending in the singular. The plural is difficult to determine. Without further evidence in other Berber languages, it will be difficult to provide an accurate reconstruction.

(62) x/t(ʔ)nast pl. *ti(ʔ)nisaʔ ‘key’
Ouarg. tnast pl. tinisa (te-) ‘id.’; Mzab tnast pl. tinisa (te-) ‘id.’; Ghd. tonest, tonēss pl. teniso ‘id.’

This word is found in only three languages in my corpus. Ghadamès has an initial o which might point to an initial radical *ʔ in Proto-Berber. The reflex of the plural is extremely interesting; in (5) *taʔmart ‘beard’ I discuss that the plural formation in -a may be *-aʔ because of the Zénaga cognate. The reflex with o in Ghadamès in this same type of plural formation, supports such a hypothesis because o is found as the regular reflex of -aʔ in word final position in the verbal system as can be seen in Kossmann (2001b: 74-80).

The e found in the Ghadamès root is difficult to reconcile with the a that we find in the root of Ouargla and Mzab.

As the initial vowel is lost in Ouargla and Mzab, it of course is unstable by default.

(63) *i/iyd ‘ash’ (K634)
Kb. iyd (yi-) pl. iyden (i-) ‘id.’; MA iyd (yi-) pl. iydn ‘id.’; Tashl. iyd (yi-) ‘id.’; Ouarg. iyd ‘extinguished, cold cinders’; Mzab iyd ‘ash’; Ghd. ĕšed pl. end-ēšed ‘id.’; To. ĕpo, ĕṭṭed pl. ĕḍawān ‘id.’
As mentioned earlier, this word undergoes the same palatalisations of *γ to *ẓ in Touareg as (29 *é/iγir(β) `shoulder'. This word seems to have the palatalisation in Ghadamès as well. The palatalisation in Ghadamès is different from the one found in Touareg as it is a shift from *γ to š rather than to ż. This word and several other words that show palatalisation of this type like Ghd. tašardempt `scorpion' are discussed in Vycichl (1990).

It is difficult to determine if the Ghadamès é points to an original é. γ would cause the *ι to be lowered to é in Ghadamès, but this *γ that causes this lowering is no longer there. The relative chronology of these two shifts has not been determined, so it cannot be said with certainty that the *é is original.

(64)  *té/ireyt `heap of grain'
Kb. tirešt (t-) pl. tiraš (ti-, t-) id.; Tashl. tirit, tiršt `id.'

This word is only very sparsely attested. Both Kabyle and Tashelhiyt at first seem to point to a root rš but closer examination shows that Tashelhiyt has a variant tirit, to reconcile these two divergent forms we have to assume a final radical *y which shifts to š in front of *t (Kossmann 1999b: 220). By analogy this š was spread to the plural as well in Kabyle.

(65)  *é/ired `grain of wheat' pl. *iredān `wheat'
Kb. ired (yi-) pl. irden (yi-) id.; MA ird pl. irden `id.'; Tashl. ird (yi-) pl. irden `id.'; Ouar. irden `eggs of grasshoppers, yellow frains in the bellies of edible grasshoppers'; Mzab irden `wheat'; Auj. irden pl. yérden `id.'; El-fq. yérdən `id.'; To. éred pl. érdän, érdawän `id.'

There are no languages that can give us an insight whether the initial vowel was *é or *i in this word as I have only found a Touareg cognate in Mali Touareg, where the *i automatically shifts to é before an r. El-Foqaha and Aujila both have unusual reflexes with an initial y in the plural.

(66)  *uraw 'hand together palms upwards'
Kb. uraw (wu-) pl. urawen (wu-) id.; MA uru (wu-) pl. urawn `id.'; Tashl. uraw pl. urawn `capacity of two hands joined together'

This word is not well-attested in my corpus. It is the only noun with an initial *u in my corpus that has a CVC root structure instead of CC. Little more can be said about this word.

(67)  *aruy pl. *aruyān `porcupine'
Kb. aruy (wa-) pl. aruyen (wa-) `id.'; MA aruy (wa-) pl. aruyın (wa-) `id.'; Tashl. aruš, aruy pl. uraš, urušan, iruša `id.'

Only Northern Berber languages seem to have this word, Tashelhiyt has a different plural formation from Kabyle and Tamazight that may be original. The correspondence between y and š in Tashelhiyt is unusual. There are cases of y changing to š in Tashelhiyt, but only before t (see Kossmann 1999b: 220). The best way to explain this irregular sound correspondence is that originally the masculine was aruy while
te feminine was *tarašt and that then the š of the feminine was spread to the masculine by analogy.

Both Kabyle and Tamazight have a stable initial vowel a in the singular and the plural.

(68) *tasąf pl. *tisufaʔ ‘(acorns of the) holly oak’

Kb. tasaft (ta-) pl. tisufa (t-) ‘id.’; Tashl. tasaft (ta-) pl. tasafin ‘id.’

This word is only found in Northern Berber, considering the natural environment in which oaks grow, it is unsurprising that it is not found outside of Northern Berber. The Kabyle distribution of stable vowel a in the plural and unstable vowel i in the plural points to an initial *ʔ, Tashelhiyt also has a stable initial a but no information is available on the stability of the plural, but we do know that the plural does not get an initial vowel *i.

(69) *a/észɛn pl. *isën ‘tooth’

Ghd. asɛn pl. sɛnɛn ‘id.’; Auj. asɛn pl. sɛnɛn ‘id.’; El-Foq. isɛn pl. isɛnɛn, isɛnɛɛn ‘id.’; To. ésɛn pl. isɛnɛn ‘id.’

Geographically this word is limited to eastern Berber languages in my corpus. It is such a basic word of a language’s lexicon, that it is surprising that this word is not more widely attested. The reconstruction of the initial vowel is difficult, Ghadamès and Aujila point to a while El-Foqaha and Touareg point to *é. There is no compelling reason to be found to prefer one over the other.

Both Ghadamès and Touareg show that the root had an initial vowel é.

Ghomara has a word that is probably cognate to this word asan (u-) pl. isanen ‘tooth’.

This would then be proof that this word also exists in Northern Berber, although it seems to have been lost in most other Northern Berber languages. The vocalism is strange, you would expect to find **isin in a Northern Berber language.

(70) *tészɛmt ‘salt’

MA tisɛnt ‘id.’; Ouar. tisɛnt (te-) ‘id.’; tisɛnt ‘id.’; Ghd. tɛsɛnt ‘id’; To. tɛsɛmt pl. tɛsɛmɛn ‘id’

Most languages show an *n before *t, but Touareg shows an *m. It is tempting to think that there is assimilation at work here, but this is made considerably less convincing because Tamazight allows the sequence mt as found in the 2pl.f. verbal ending t-...mt. The reason why Touareg has m as opposed to the n in other languages remains unclear.

(71) *észɛm, *tasɛmt ‘animal fat’

Kb. tasɛmt, tasɛmt ‘id.’; Ghd. tasɛmt pl. tasɛmɛn ‘id.’; To. ésɛm pl. isɛmɛn

Touareg has a masculine formation while Kabyle and Ghadamès have a feminine formation. The taC̄eCt formation seems to occur more often as a feminine counterpart to éCăC roots (cf. (43) *élâm).

---

2Ghomara lexical data is taken from el Hannouche (2008)
6.3. BIRADICAL ROOTS WITH NO ZÉNAGA COGNATE

(72) \(^{72}\) *taβyv̆tt pl. *tuβyat `shoulder?' (K149)
Kb. *tayett (ta-) pl. tuyat (tu-) `id.'; Ma *taytt pl. tuyat `id.'; Tashl. *taytt pl. tiwatin `armpit'; To. *tayät, *tyat pl. *tihiw `front foot'

Formally the Touareg word corresponds perfectly, but semantically the word is difficult to connect. Additionally, the plural of the Touareg word seems to imply that the y found is originally from *β.

The Tashelhiyt cognate more convincingly belongs to this word, and we find a reflex w in the plural, this seems to point to either a Proto-Berber *w or *β that somehow changed to y in some contexts while it is w in others. The description of the reflexes of the *β by Kossmann (1999b) fails to explain this word. But assuming a *w or *y as the original consonant does not lead to fruitful results either.

A possible but ad hoc explanation is to consider some kind of cluster of a *β with a semivowel. In (21) we saw how the cluster *βw yields w in Touareg and Ghadamès, possibly something similar is going on but with a cluster βy instead. This still would not adequately explain the reflex w in the Tashelhiyt and Touareg plural. The order of the semi-vowel and the *β may also be in reverse order, which is considered by Kossmann (1999b). He also points out that this reconstruction is uncertain.

More research will have to be done to say anything more about this word's development.

(73) \(^{73}\) *a/ézyéḍ pl. *izyéḍan `donkey' (K p. 231-232, P643)
Kb. izžeḍ `id.'; Ghd. azēḍ `id.'; Auj. azit, azit, azitōt pl. zitān, zitān `id.'; To. éyhéḍ, ayšéḍ, éšéḍ, éžéḍ, ižžiḍ, ažaḍ pl. ihéḍan, išéḍan, ižžaḍem `id.'

This word is discussed by Kossmann (1999b: 231-232). It is one of the typical nouns that looks like it has the žž cluster in Proto-Berber, which probably developed from an original cluster *zy, the only problem that remains then, are the Touareg reflexes that point to a metathesis of *zy to yz.

Ghadamès and Touareg show that the root vowel was *é. Ghadamès has initial a while Touareg has initial *é. This root is a triradical root that has the same *a / *é distribution as found in several other nouns as discussed in section 7.3.

Kabyle has an unexpected reduction of the root vowel of *é to e.

(74) \(^{74}\) *azal `daylight' (P219)
Kb. *azal (a-) pl. ižilan (i-) `daylight, heat'; Tashl. azal (a-) `day'; El-foq. azál pl. azalīwen `day'; To. ažel, ašel, ažel, ažel pl. ižilan, išilan, ižilan `id.'

This word is only found in a few languages, and the Touareg reflexes prove to be problematic. Kabyle and Tashelhiyt have a full vowel a in the root, this vowel is never found in Touareg where most dialects have e and some have i. The initial vowel is not a in every dialect of Touareg like it is in Kabyle and Tashelhiyt, sometimes i is found too.

It is clear that the same root lies at the origin of this word, but it may be that Touareg originally has a different formation than the Northern Berber languages do.

(75) \(^{75}\) *taẓ(ẓ)ult `kohl'
Kb. taẓult (ta-) `id.'; Ma taẓẓult (t-) `id.'; Tashl. taẓult (ta-) `id.'; Ouar. taẓult (t-) `id.'; Mzab taẓẓult (t-) `id.'; Ghd. taẓult `id.'; To. taẓolt pl. taẓolén `kohl'
This word is in some cases found with a long ẓẓ rather than a single ẓ; the reason for this is unclear. The original stability of the initial vowel is unclear. Kabyle and Tashelhiyt have a stable initial vowel, while Tamazight, Ouargla and Mzab rather have an unstable initial vowel.

(76) *é/izv̆m pl. *izmawn `lion'
Kb. izem (yi-) pl. izmawen (yi-) `id.'; Ma izem (yi-) pl. izmawn `id.'; Tashl. izm (yi-) pl. izmawn (yi-) `id.'

This word is only attested in northern Berber languages, making it impossible to determine whether the initial vowel was an *é or an *

(77) *aw/ur pl. *awer `root'
Kb. azur (u-) pl. izuran `id.'; Ma azur (u-) pl. izuran `id.'; Tashl. azur (u-) pl. izuran `id.'; Mzab azur (u-) pl. izuran `id.'; Ghd. azur pl. izuran `id.'; To. azar `id.'

Most languages have a root vowel u in the singular as well as the plural, but Touareg and Kabyle have an *a this may be old.

In personal correspondence Maarten Kossmann pointed out that Riffian has aẓwer for this root. This reflex is reminiscent of (18) *adawḍeʔ `finger', which also had a w where all other dialects pointed to *w. This may be original, but further evidence is lacking. It is remarkable that the plural formation found in Kabyle is the exact same as the one found in (18).

All languages point to an unstable initial *a.

(78) *azaw `hair'
Mzab azw (u-) `id.'; Ghd. azaw pl. end-azaw `id.'; Auj. aževū, ažévū `id.'; El-foq. azuv n iyaf `hair of the head'; To. tehăwhăwt, tezăwzăwt pl. tihăwhăwén, tizăwzăwén `white hair'

This word is found in several languages, but presents some difficulty; Aujila has a v in this word which usually points to *β which is absent in Ghadamès and Touareg. Touareg does not have the original word, but only a reduplicated derivation.

No language can tell us anything about the stability of the initial vowel, as Mzab would have been the only language to show this, and it lost its initial *a.

(79) *asi/uf pl. *isaffăn `river'
Kb. asif (wa-) pl. isaffen (i-) `id.'; Ma asif (wa-) pl. isafen `id.'; Tashl. asif (wa-) pl. isaffn `id.'; Mzab suf (u-) pl. isufen `id.'

This word is exclusively found in Northern Berber dialects, but in these dialects it is a very well-attested word. The word has *i/*u variation which I will discuss in section 7.1.

Most languages point to a stable initial vowel in the singular. Kabyle has a weak initial vowel in the plural which is the distribution expected for nouns with initial *ʔ. It cannot be confirmed that this was the case.
6.3. BIRADICAL ROOTS WITH NO ZÉNAGA COGNATE

(80) *`ali/um` straw'
   MA: alim (wa-) `id.'; Tashl. alim (wa-) `id.'; Ouar. lum (u-) `id.'; Mzab lum (u-) `id.'; Ghd. õlem `id.'; Auj. alúm `grass';

Just like (79) above, this word has *i*/*u variation. This word is more widely attested. Like the above word, the initial vowel seems to be stable.

Tamazight has a remarkable Zénatic-like variant that lacks an initial *a, this is the second word in my corpus that seems to show Riffian influence in Tamazight (see also (44)).

(81) *`u/ifv̆f pl. `u/ifv̆ffan `nipple of an udder'
   Kb. iff (yi-) `id.'; MA iff (yi-) pl. iffan `id.'; Tashl. uff (wu-) pl. uffan (wu-) `id.'; Ouar. iff pl. iffan `id.'; Mzab iff, ifef pl. ifeffan, iffan `id.'

This word is only attested in Northern Berber dialects, and at first sight it seems that this word only has one root consonant. But Mzab shows that there is a short vowel in between the two f's, and the root must therefore be ff. Tashelhiyt has an initial *u in this word unlike all other languages, this will briefly be discussed in section 7.2.

(82) *te/irv̆mt pl. *tiram `meal'
   Kb. tiremt (te-) pl. tiram (t-) `id.'; MA tiremt pl. tiram `id.'; Tashl. tirmt (ti-) pl. tiram (ti-) `id.'

This word is only found in three Northern Berber languages of my corpus, and very little can be said about the original form or whether it has lost any consonants as none of the languages in which this word is attested give any further clues.

(83) *a/i/édés pl. *idésăn `side'
   Kb.idis (yi-) pl. idisan (i-) `side (of the body)'; MAidis pl. idisn `side, flank'; Tashl. idis pl. idisan `id.'; Ouar.idis pl. idisan `id.'; Mzabidis pl. idisan `id.'; Ghd. adës `id.'

This word is well-attested, but surprisingly has an initial a in place of the *i in Ghadamès. Due to a lack of a Touareg cognate the value of the initial *i may also be *é. Ghadamès shows that the root vowel was *é.

(84) *a/elés pl. *ilésăn `fleece'
   Kb. ilis (yi-) pl. ilisen (yi-) `id.'; Tashl. ilis (yi-) pl. ilasîwn `id.'; Ouar. ilis pl. ilisen `id.'; Mzab ilis pl. ilisen `id.'; To. élés `cotton (Mali), wool (other dialects)'

Every single noun in this word points to an initial i and Touareg has the original initial *é, the only out-lier is Ghadamès which has an initial a instead. Zénaga does not know this noun, but the root is known from the verb A āyyəš P īyäš `to shear (a sheep)'. The long initial vowel generally points to a *β but in this case no proof for this can be found in Ghadamès or Touareg, making the Zénaga verb an irregular out-lier.

Both Touareg and Ghadamès have a vowel é in the root which is probably original.
(85) *ta/i/ési/éra* `mill'
Kb. tissirt, tassirt (te-), tisirt (te-) pl. tissyar (te), tisyar (te-) `grain mill, molar tooth'; MA tisirt pl. tisar `(water) mill'; Ouar. tasirt (te-) pl. tisira (te-) `grind stone'; Mzab tasirt pl. tisira `hand mill'

This word is well-attested in the Northern Berber languages, but nevertheless is difficult to reconstruct. First of all, there seems to be free variation between initial *i* (or *é*) and *a* even within one language, as seen in Kabyle. Secondly, most of these languages point to a root sr, but Kabyle’s plural formation suggests that the root is syr instead. Due to a lack of Ghadamès and Touareg cognates, the value of the root vowel cannot be determined.

(86) *éẓéḍ* `milling'
Kb. iẓiḍ `id.'; Tashl. iẓiḍ `id.'; To. éẓéḍ `grinding'

A verbal noun of the verb *eẓăḍ* `to grind'. This word is not very broadly attested in my sample, but seems to belong to the group of words that have an *é* in the root and an *é* as the initial vowel. If there was a Ghadamès cognate you would expect it to have an initial *a* just like the rest of this group has. This pattern is discussed further in section 7.3.

(87) *tadist* pl. *tidisén* `belly'
Kb. tadist (ta-), tidusin (te-), tidusa (te-) `pregnancy, fetus'; MA tadist (te-) pl. tidusín (te-) `small belly', adis (u-) pl. idusán `belly, pregnancy'; Tashl. adis (u-) pl. idasén (i-) `belly'; Ouar. aeddís (u-) pl. ieddas `belly, stomach'; Mzab aeddís (u-) pl. ieddas `id.'; Ghd. tadist, tadiss pl. tedisén `belly', Auj. tedăšt `id.'; El-foq. tadist `id.'

This word is well-attested in Berber but has several remarkable features. Ouargla and Mzab have an ‘emphatic’ construction with an inserted e and Aujila inexplicable has a vowelsystem *u* in the root rather than *i*.

Kabyle shows a stable vowel in the singular and a weak vowel in the plural, a distribution expected with a word that has an initial glottal stop, but the Ghadamès cognate shows that there is no initial glottal stop. All other nouns have a weak vowel in both the singular and the plural.

(88) *a/i/éγăyd* pl. *iγiydăn* `kid'
Kb. iyid (yi-) pl. iyíden (i-) `id.'; MA iyid (yi-) pl. iyíd (yi-) `id.'; Ouar. iyid, iýeyd pl. iyeyden `id.'; Ghd. aíd pl. eidán `id.'; El-foq. aýid, aýed pl. ayídän `billygoat'; To. éváyd pl. iyidyádn `kid'

From Touareg evidence it is clear that this root is in fact triradical γyd rather than biradical. El-Foqaha has an initial a just like Ghadamès, while all other dialects have *i/é.

(89) *é/i/é/ýi/`seiving'
Kb. ifif (yi-) `id.'; Tashl. ifif (yi-) `id.'
A verbal noun that is not widely attested in my corpus. It is likely that the original root structure was éCéC as this formation is found more often for verbal nouns (cf. (86) *ézéC). 

(90) *afa(ʔ)r `cynodont'
    Tashl. afar (wa-) `id.'; Ghd. afør `id.'

Another sparsely attested word, but found in two geographically remote languages. Ghadamès has a medial o which probably points to an original medial sequence *aʔ.
    Tashelhiyt has a stable initial vowel.

(91) *a/é/ífi/ís pl. *ífi/isán `hyena'
    Kb. ífs (yi-) `id.'; MA ífs, afís (u-) pl. ífsn `id.'; Tashl. ífs pl. ífíswn, ífís, ífísan `id.'; Mzab ífs pl. ífsn

A word only found in Northern Berber languages of my corpus. Surprisingly, Tamazight has a variant with an initial *a.

(92) *é/ígvr pl. *é/ígvrän `field'
    Kb. iger (yi-) pl.igran (yi-) `id.'; Tashl. igr (yi-) pl.igran (yi-) `id.'

An extremely sparsely attested noun in my corpus. Little more can be said about this word due to the small amount of cognates.

(93) *taluf pl. *tilufaʔ `sorrow'
    Kb. taluf (ta-) `great misfortune' pl. tilufa (t-) `sorrows'; MA taluf pl. tilufa (t-) `pain, grief'

A sparsely attested word in my corpus. Kabyle has a stable initial vowel in the singular and an unstable vowel in the plural, the distribution found for initial *ʔ nouns.

(94) *amur pl. *imurän `part, portion'
    Kb. amur (u-) pl. imuren (i-) `id.'; MA amur (u-) pl. imurn `id.'; Tashl. amur `id.'

This word seems to have has an unstable initial vowel. A lack of any further cognates makes accurate reconstruction difficult.

6.4 Conclusion

The amount of true biradical roots that have a Zénaga cognate are quite small in number. Many of the nouns in my corpus turn out to have three radicals despite looking like biradical roots in most Berber languages.

Some words in the group of biradical nouns have an initial *u, there is reason to believe that originally these nouns had an initial *w and therefore were triradical. There are several words that show the *é / *a variation in the initial vowel. These words will be further discussed in section 7.3. Then there are a few nouns that have initial *é.
Most striking is the small amount of initial *a nouns. The only two words that do have this initial vowel are (42) *asāf `day' and (34) *taγart `drought'. (34) is ambiguous in its original number of consonants as there could be a lost *ʔ as discussed in its respective entry. This leaves us with just *asāf as proof of an initial *a in biradical nouns. It may be worth noting that *asāf has a stable initial vowel. We have seen that a stable initial *a can be the result of an initial lost radical. While this radical certainly is not *ʔ in this word, as we have a Zénaga cognate, there may be another consonant that was lost.

This brings up an interesting contrast with the triradical nouns that I have identified. The triradical nouns in my sample seem to almost completely lack initial *é. The only triradical noun found with an initial *é is (73) *a/ézyéd which actually has variation between *a and *é.

Within my sample then, *a and *é seem to be in complementary distribution. Whether this points to an actual allophony is difficult to determine, as the sample that I have used is so limited. It may be the case that *é always shifts to *a in front of *ʔ and maybe also in front of *β. More research will have to be done on this subject to confirm this hypothesis.

Of the 94 nouns I have discussed, 12 roots are clearly biradical. [total Zénaga cognate] have a Zénaga cognate. Biradicals are therefore a small subset of the nouns found in my corpus and were probably a rare class in Proto-Berber.

Having looked at the nouns that have no Zénaga cognate, we find some words with stable initial *a which may point to a lost consonant, possibly *ʔ, but without further evidence the data is too unclear to confirm this hypothesis.
Chapter 7

Vocalic variation

Several nouns in my sample show variation of vowels in either the root or the initial vowel. I will now examine these roots and their distribution. There are three types of this variation which I have collected in the following three sections. First there are the roots that have *i/*u variation in the root vowel (Section 7.1). Second there are the roots that have this same variation in the prefix vowel (Section 7.2). Finally, there is the roots that alternate between initial *é (or *é) and *a (Section 7.3).

7.1 Roots with medial *i/*u variation

Table 7.1: Nouns with *i/u alternation in the root

<table>
<thead>
<tr>
<th>Number</th>
<th>Noun</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>(13)</td>
<td>*adi/uʔf</td>
<td>`marrow'</td>
</tr>
<tr>
<td>(80)</td>
<td>*ali/um</td>
<td>`straw'</td>
</tr>
<tr>
<td>(79)</td>
<td>*asi/uf</td>
<td>`river'</td>
</tr>
</tbody>
</table>

Below I have repeated these three entries for convenience.

(13') *adi/uʔf `marrow'

(80') *ali/um `straw'
MA *alim (wa-) `id.'; Tashl. *alim (wa-) `id.'; Ouar. *lum (u-) `id.'; Mzab *lum (u-) `id.'; Ghd. *elem `id.'; Auj. *alum `grass'

(79') *asi/uf pl. *isaffăn `river'
Kb. *asif (wa-) pl. *isafen (i-) `id.'; MA *asif (wa-) pl. *isafen `id.'; Tashl. *asif (wa-) pl. *isaffn `id.'; Mzab *suf (u-) pl. *isufen `id.';
The amount of words that show this alternation, is very limited as you can see in the table above. But despite the small size of this sample the distribution of the *i/*u variation is strikingly clear.

The Zénatic and Touareg languages seem to always take the u variant. While the other languages take the i variant.

This distribution is the inverse of the reflexes of word final *eβ as discussed in (Kossmann 1999b: 86ff.). *eβ becomes i in Zenatic and Touareg, and u in the remaining Berber languages.

This obviously incites a certain suspicion, that here too, we are dealing with a lost consonant. A similar development must have then taken place: *eX > ê, when a long schwa was no longer allowed, the vowel was split towards either of the high non-central long vowels. Since the reflex of *eβ is different from *eX this development must have taken place at different stages but in a similar manner.

This hypothetical third radical may actually be visible in *adi/uʔf already, as it has three radicals. The other two words may have also had a medial *ʔ but since both languages lack a Zénaga cognate one cannot be sure.

It would seem that a development PB *eʔ > ë has taken place, but this cannot be the whole story, as we readily find counterexamples in the verbal system with verbs that have an initial *ʔ such as in Mali Touareg A okår (not **ékår P aker ‘to steal’ < PB A *eʔkår P *aʔker.

Something that *adi/uʔf *ali/um and *asi/uf have in common is that they all have a final labial consonant. So maybe it is the specific sequence *eʔB where B stand for any labial that resulted in the above reflexes. If this hypothesis is true, we must reconstruct *adi/uʔf, *ali/um and *asi/uf as *adeʔf, *aleʔm and *aseʔf respectively.

It is worth pointing out that the original sequence cannot be uʔf that resulted in this variation, as we find the word avuʔs ‘hand’ in Zénaga from PB *afuʔs ‘id.’ which does not have *i/*u variation.

With the lack of a good Zénaga cognate it remains uncertain if this hypothesis is correct. Possibly, further research will turn up more examples. It is possible that there are verbs with a final sequence of *ʔB in Zénaga that will aid in testing this hypothesis.

7.2 Roots with initial *i/*u variation

There are only two words that seem to have variation between *i and *u in the prefix vowel. Namely the word (81) *u/ifv̆f `nipple of an udder’ and the word (36) *u/udem `face’.

(81) *u/ifv̆f pl. *u/iffan `nipple of an udder’
   Kb. iff (yi-) `id.; MÁ iff (yi-) pl. iffan `id.; Tashl. uff (wu-) pl. uffan (wu-) `id.;
   Ouar. iff pl. iffan `id.; Mzab iff, ifef pl. ifeffan, iffan `id.’
(36) *udem pl. *udemawân `face’
   Kb. *udem (wu-) pl. udemawen (wu-) `id.; MÁ udem pl. udmawen `id.; Tashl. udm (wu-) pl. udmawen (wu-) `id.;
   Ouar. udem pl. udmawen `id.; Mzab udem pl. udmawen `id.; El-foq. idem pl. idemawen `id.; Zng. ažəm pl. ažədəm `id.; To.
   udm, idem pl. udmawân, idmawân `id’
The distribution of these words is very different and not as uniform as the group discussed above. The *idem* variant of `face` is found in Adghagh Touareg and El-Foqaha, while the *iff* variant is found in all languages except for Tashelhiyt where *uff* is found. As no pattern presents itself at all, it remains difficult to determine any explanation for this variation.

## 7.3 Roots with initial *i/*a variation

This group is bigger than the group with *i/*u variation. The process of words with *i* as the initial vowel where others have *a* has been discussed in Vycichl (2005:43-62), which he explains as umlaut. Sadly he fails to present any convincing distribution that show that this is a regular development.

The name *i/*a variation may be a bit of a misnomer. A large part of this group the variation is rather between *a* and *é* and for some it is impossible to see if the word has an initial *é* or *i*. But since these words have the same variation with *a* it seems likely that these nouns also had an initial *é*.

Below, I present a table with all the roots in my corpus that have initial variation between *i* and *a*. This table presents what initial vowel is found per language in my corpus for these roots.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(83)</td>
<td>*a/i/édés</td>
<td>i</td>
<td>i</td>
<td>i</td>
<td>i</td>
<td>a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(84)</td>
<td>*a/élés</td>
<td>i</td>
<td>i</td>
<td>i</td>
<td>i</td>
<td>a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(85)</td>
<td>*ta/i/ési/ért</td>
<td>i</td>
<td>i</td>
<td>a</td>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(69)</td>
<td>*a/ésén</td>
<td>a</td>
<td>a</td>
<td>i</td>
<td>é</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(32)</td>
<td>*ta/émédt</td>
<td>i</td>
<td>i</td>
<td>ø</td>
<td>ø</td>
<td>a</td>
<td>ø</td>
<td>é</td>
<td></td>
</tr>
<tr>
<td>(73)</td>
<td>*a/ézyéd</td>
<td>i</td>
<td>a</td>
<td>a</td>
<td>é</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(38)</td>
<td>*a/i/éfer</td>
<td>i</td>
<td>a/i</td>
<td>i</td>
<td>a</td>
<td>a</td>
<td>é?</td>
<td>a</td>
<td></td>
</tr>
<tr>
<td>(33)</td>
<td>*a/i/éyil</td>
<td>i</td>
<td>a/i</td>
<td>i</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td></td>
</tr>
<tr>
<td>(29)</td>
<td>*a/i/éyir(β)</td>
<td>i</td>
<td>i</td>
<td>i</td>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(61)</td>
<td>*a/i/énηγ</td>
<td>a/i</td>
<td>a</td>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(91)</td>
<td>*a/i/éψ/és</td>
<td>i</td>
<td>a/i</td>
<td>i</td>
<td>i</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This group can be divided in two groups. One group that has *é* as the root vowel as shown by Touareg and Ghadamès and the other group that does not.

The group that has *é* as the root vowel are the six nouns. (73) *a/ézyéd also belongs here and is triradical, this shows that this variation type also occurs in triradical roots. All of these have the pattern éCéC in Touareg and aCéC in Ghadamès (and Aujila if a cognate is present). Most other languages have the vowel pattern iCiC. Mzab and Ouargla sometimes have the same variant as Ghadamès, that is to say, the word with an initial *a*, and once we find them with no initial vowel, which also points to an orig-
inal initial a. The word (85) could belong to the above group, but has no Ghadamès or Touareg cognate to confirm the vocalism, but we find that exactly in Mzab and Ouargla the initial *a appears, the same languages where this occurred for the word (32) *ta/émédt.

This group has a few nouns that may be considered verbal nouns. The obvious one is (84) *a/élés, but also (85) *ta/i/ésé/irt may be a verbal noun. The word (86) *ézd may belong to this group as well, but we have no Ghadamès cognate to confirm that it would have had an initial *a, this noun is also a verbal noun. But besides these verbal nouns we have several clear cases of nouns that are obviously not. (69) *a/ésén and (32) ta/émédt are clear examples of nouns in this class that probably are not verbal nouns.

Having identified this group of words with *é *a variation in the initial vowel, we are left with the question what the origin is exactly of this *a found in Ghadamès and sometimes in Mzab and Ouargla, while all other languages point to an initial *é.

The best way to explain the attested forms is by analogy. Words with initial *a far outnumber words with initial *é, it could be that Ghadamès innovated this complete category of éCéC nouns to become aCéC. The basis of this analogy can be easily established: The plural of both the *é-initial and *a-initial nouns take the same initial vowel *i (Usually in Ghadamès ø). If initial *é nouns look the same in the plural as the initial *a nouns, a speaker can be inclined to regularise the paradigm. A similar development may have been at work in Mzab and Ouargla, but in these cases, this analogy was not regularised across the board.

The remaining words do not all have the same root shape. (38) is difficult to reconstruct in many ways, as discussed earlier in its entry. Likewise, (61) is problematic in its reconstruction. (33) is clearly reconstructible except for its initial vowel. The root vowel can be clearly shown to have an *i and not an *é; Ghadamès and Touareg have an initial *a while most of the northern Berber languages have an initial i which may go back to *i or *é The word (29) *é/i/áyir(β) may have had a third final radical and has a reflex in Touareg with an initial *a and not *é as expected, Like with (33) *a/i/éyil, Touareg evidence shows that the root vowel was a true *i.

Due to the shape of the word for donkey, it ended up in my corpus by chance, despite being triradical. This has proven fortunate as it shows that the éCéC formation exists for triradical nouns.
Chapter 8

Final radical lengthening in CVC root plurals

A large group of nouns undergo lengthening of the final root consonant in the plural, for example *afuʔs pl. ifaʔssăn 'river'. All these nouns are of the a-infix type plural except for (51) *agur. This does not mean that the process of consonantal lengthening in this plural type is automatic, as we do find words of this type that lack lengthening such as (3) *aʔβyur pl. *iʔβyarăn 'moon'. In table 8.1 I have collected all the words that have lengthening in the plural from my sample. Below it I will reiterate the entries of the words mentioned for clarity.

Table 8.1: Lengthened final radical in plurals

<table>
<thead>
<tr>
<th>Number</th>
<th>Singular</th>
<th>Plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>(30)</td>
<td>*afud</td>
<td>*ifaddăn</td>
</tr>
<tr>
<td>(2)</td>
<td>*afud</td>
<td>*ifaddăn</td>
</tr>
<tr>
<td>(15)</td>
<td>*afuʔs</td>
<td>*ifaddăn</td>
</tr>
<tr>
<td>(4)</td>
<td>*aʔkal</td>
<td>*iʔkallăn</td>
</tr>
<tr>
<td>(51)</td>
<td>*agur</td>
<td>*igarrăn</td>
</tr>
<tr>
<td>(57)</td>
<td>*amud</td>
<td>*imaddăn</td>
</tr>
<tr>
<td>(33)</td>
<td>*a/iγil</td>
<td>*iγallăn</td>
</tr>
<tr>
<td>(79)</td>
<td>*asi/uf</td>
<td>*isaffăn</td>
</tr>
</tbody>
</table>

(30') *idammăn 'blood'  
Kb. idım (yi-) pl. idammen (i-) 'id.'; MÁ idammen 'id.'; Tashl. idâmın (yi-/i) 'id.'; Ouar. idammen 'id.'; Mzab idammen 'id.'; Ghd. dămmăn, dammăn 'blood' 'id.'; Auj. dîmmen 'id.'; El-foq. idâmın 'id.'; Zng. əḏämmän 'id.'

(2') *aʔfud pl. *iʔfaddăn 'knee'  
Kb. afud (u-) pl. ifadden (i-) 'leg'; MÁ afud (u-/wa-) pl. ifadden 'knee'; Tashl. afud
(wa-) pl. ifadden (i-) ‘leg’; Ouar. fiud pl. ifudan ‘knee’; Mzab fiud (u-) pl. ifadden ‘id.’; Ghd. öfed pl. fadden ‘id.’; Auj. afüd, afüdd pl. fadden ‘id.’; El-fq. afüd pl. ifadden ‘id.’; Zng. oʔifud, àʔifud pl. uʔifudan ‘id.’; To. àʔif pl. ifadden ‘id.’

(15’) *afuʔs pl. ifaʔssăn ‘hand’
Kb. afus (u-) pl. ifassen (i-) ‘id.’; Mzab afus (u-) pl. ifassen ‘id.’; Ghd. öfess pl. fassan ‘hand’; Auj. afus pl. fassen ‘id.’; El-fq. afus pl. ifassen, fassan ‘id.’; Zng. àʔfus pl. uvassan, uvassan ‘id.’; To. afus pl. ifassan, fassan ‘id.’

(4’) *aʔkal ‘earth’ (K489)
Kb. akal (wa-) ‘id.;’ Mzab akal, ašal (wa-), ĕš pl. ikallen, ĕšallen ‘id.’; Ghd. ĕkăl, ĕkal ‘earth’; Auj. ašal ‘country, village’; Zng. aşgăy ‘earth’; To. ĕkal pl. ikallăn ‘earth’

(51) *agur pl. *agur(r)ăn ‘castrated goat’
Ghd. ĕgur pl. ĕgurăn ‘male goat’; To. ĕgorr pl. îgorrăn ‘castrated goat’

(57’) *am(m)ud ‘prayer’
Ghd. ĕmad, ammăd pl. mădawăn, end-ammăd ‘prayer’; Auj. amăd; To. emud, aμod pl. imaddăn ‘islamic prayer’

(33) *aγil pl. *iγallăn ‘arm’
Kb. iγil (yi-) pl. iγallen (u-?) ‘id.’; Mzab iγil (wa-) pl. iγaln ‘id.’; Tashl. iyil (yi-) pl. iγalln (i-) ‘id.’; Ouar. iyil (u-) pl. iγallen, iyilen ‘arm, forearm’; Mzab iyil (u-) pl. iγallen ‘id.’; Ghd. iyil pl. iγaln ‘arm’; El-fq. iyil, iyęłl ‘id.;’ Zng. iγy pl. aγiln, aγiln ‘forearm’; To. iyil pl. iγallăn ‘arm’

(79’) *as¡uf pl. *isaffăn ‘river’
Kb. asif (wa-) pl. isaffen (i-) ‘id.;’ Mzab asif (wa-) pl. isafen ‘id.;’ Tashl. asif pl. isaffn ‘id.;’ Mzab suf (u-) pl. isufen ‘id.;’

Several things should be pointed out when considering these words. First of all it is striking that Ghadamès has a for the infix vowel in (30), (2) and (15). Some Touareg dialects such as Ayer Touareg have a as well for (15). I am unsure why this is the case.

A puzzling form is the Zénaga reflex of (15) *ifaʔssăn, while the singular clearly, and unarguably has a glottal stop àvuʔš, the plural lacks it completely. At first it would seem tempting to posit that the *ʔ has been assimilated with the *s to form the long *ss in the plural.

Prasse (1974: 56-58) has attempted to explain the lengthening as a result of assimilation. He suggests that these plural lost a medial *h which was the cause of
the lengthening. There is no proof that all these roots had a pre-final *ʔ or any other form of a laryngeal consonant.

It is interesting to note that the word for foot (12) in Zénaga əḏəʔr also loses its *ʔ in the plural, although the final consonant is not lengthened. This then puts the final nail in the coffin for the idea that an assimilation with a laryngeal consonant may be the cause of the final lengthening.

The data in my sample provides no clear explanation why the lengthening of the final root consonant occurs in several nouns of this plural type.
Chapter 9

Noun formations

With this study, we now gain some insight of the Proto-Berber situation of the noun formation in biradical roots. As I have looked at the CC and CVC roots, it gives us the possibility to see what vowel patterns are allowed, and which are not. Another interesting thing to look at with these formations is which plural formations can be formed for which type.

Some of the nouns studied have, as expected, turned out to have three radicals rather than two. As the words found with three radicals are by no means exhaustive, I cannot say anything useful about the formation of the triradical roots. Therefore I will only look at the noun formations of biradical roots.

In general this thesis can distinguish two main groups of biradical nouns, first there are the words that have a Zénaga cognate which allows for the maximum accuracy that a word is biradical and no *ʔ* has been lost. The second group lacks this Zénaga cognate, and could therefore still be triradical.

It is possible that the study of noun formations may give indications about the nature of some of the uncertain nouns. More specifically, if we find that definite biradical nouns only have a certain amount of formations, while for the uncertain biradical nouns we find several more formations, this may be an indication that the set of formations of the uncertain biradical nouns that is not shared with the definite biradical nouns were in fact triradical.

The results of this study would be by no means conclusive, especially with the limited corpus that I am using and the limited amount of true biradical nouns. That does not mean that these are not important things to look at, as they that can provide a basis for further research on this subject. Therefore, when discussing the different formations, I will mention whether these formations occur among roots with a Zénaga cognate or not.

For biradical roots one can make a matrix of initial and root vowels, I have counted the amount of occurrences of every formation in my corpus in the Table 9.1 below.

In total I have discussed 94 words in this thesis. 27 of this total have three radicals. There are 16 biradical nouns with a Zénaga cognate. 4 of these nouns contain a *γ* and cannot be confirmed to be truly biradical. Thus 14 definite biradical nouns remain. Lastly, there are 48 biradical nouns without a Zénaga cognate. Then there are 3 nouns
whose formation is so difficult to reconstruct that no guess can be made whether they are biradical or triradical.

There are several nouns in my corpus like (35) *taγuyyét that do not have a CVC or CC shape. These were not initially intended to be discussed in my thesis, and I will keep them out of consideration in the following discussion of formations.

Table 9.1: biradical root matrix

<table>
<thead>
<tr>
<th>Initial</th>
<th>Root</th>
<th>a</th>
<th>i</th>
<th>é</th>
<th>u</th>
<th>u/i</th>
<th>a/é</th>
<th>e/ø</th>
<th>v</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td></td>
<td>9</td>
<td>2</td>
<td>-</td>
<td>14</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>é</td>
<td></td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>a/é</td>
<td></td>
<td>-</td>
<td>1</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>i</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>é/i</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>u</td>
<td></td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>u/i</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

9.1 Initial *a nouns

9.1.1 aCaC

(34) *taγart  `drought`
(46) *adal   `alga`
(47) *ada(n) `bowels`
(53) *aŋ*ațż pl. iŋ*azăţăn  `cheek`
(62) *ta(ʔ)nast pl. *ti(ʔ)nisaʔ `key`
(68) *tasaft pl. tisufaʔ `(acorns of the) holly oak`
(74) *ażal   `daylight`
(78) *azaw   `hair`
(90) *afa(ʔ)r `cynodont`

This group is quite large, but for many of the nouns there is no plural formation or the plural is difficult to determine. (47) may not belong here at all as discussed in its entry. (53) probably does not belong here either as it seems to have had a long final consonant in both the singular and the plural.

None of these nouns have a Zénaga cognate, except for (34) which is unclear on the amount of radicals, so it is difficult to determine whether this formation existed for biradical roots. The Ghadamès reflex of (62) at least may indicate that there was an initial *ʔ, but more evidence would be needed to confirm this.

1. iCaCaʔ (?)
2. tiCiCaʔ
3. tiCuCaʔ
9.1.2 aCiC

(48) *adé/il  `grape'
(87) *tadist pl. *tidisén  `belly'

This formation only appears twice in my corpus. Little can be said about the plural formation since (48) may not have had a plural at all. Both words do not have a Zénaga cognate so we cannot tell if it existed as a formation of biradical nouns in Proto-Berber.

(48) may have had a vowel *é in the root instead.

9.1.3 aCuC

(22) *taβurt  `door'
(24) *taʔ/βunt  `big stone, anvil'
(50) *agum  `trunk?'
(51) *agur pl. *agur(r)ăn  `castrated goat'
(54) *takurt pl. tikurén  `ball'
(55) *akuz pl. ikuzän  `mealworm'
(57) *am(m)ud  `prayer'
(58) *am(m)ud  `door post'
(59) *tamurt pl. *timuraʔ  `earth'
(67) *aruy pl. *aruyän  `porcupine'
(75) *taz(ţ)ult  `kohl'
(77) *aẓwe/ur pl. *izwe/uran  `root'
(93) *taluf pl. *tulufaʔ  `sorrow'
(94) *amur pl. *imurăn  `part, portion'

This is the largest group of nouns, but none of them have a Zénaga cognate, which means that we cannot be sure that this is a true biradical root group at all. aCCuC is a very common noun formation in Berber, so it may very well be that these roots are in fact triradical with a lost consonant. There seems to be little regularity in the plural formation of this root type. The forms found are displayed schematically below.

1. iCuC-ăn
2. tiCuC-én
3. iCuC-an
4. iCuC-ă?
5. tiCuC-aʔ

9.1.4 aCi/uC

(79) *asi/uf pl. isaffăn  `river'
(80) *ali/um  `straw'

Only one of these two words has a plural formation namely the common iCaCă formation. As has been discussed in section 7.1, there is reason to believe these roots actually had a medial *ʔ, which means they are triradical just like (13) *adi/uʔf despite
lacking a Zénaga cognate. This formation therefore, cannot have existed for true bi-radical nouns as the alternation itself implies that there is a third radical.

9.1.5 aCv̆C

The short vowel can be determined unambiguously for both nouns in this group.

(42) *asāf pl. usfan ‘day’
(56) *tament ‘honey’

(42) has a good Zénaga cognate, and it is the only good example of a biradical root that has an initial *a. This noun has a very unusual plural formation: uCCăn.

9.2 Initial *é nouns

9.2.1 éCéC

(31) *téfféért pl. *tiféért ‘reward’
(86) *ezéḍ ‘milling’
(89) *é/if ‘seiving’

This is are only three words that seems to belong to this group. In some languages there seems to be a variant with *a in the root for (31). All these three nouns are verbal nouns. (89) technically has an uncertain initial and root vowel, but since it is a verbal noun just like the other two in this group, it is plausible that this was the original vocalisation.

(31) has a Zénaga cognate which would imply that this noun formation exists for biradical roots. Sadly, the formation found in Zénaga is actually different, as it has a aCaC root structure. This different formation is the exact same found for (32) *temiḍt ‘umbilical cord’ which is found in Zénaga as tṃaḌ. Also that word, is the only word with a Zénaga cognate of its type. It is not unlikely that these are in fact the same root type. As explained in section 7.3, Ghadamès seems to replace initial *é with *a by analogy. (31) is the only example where this is not the case, possibly because in Ghadamès the root vowel is not é but a, and therefore is not of the éCéC formation.

9.2.2 éCv̆C

(37) *éḍs ‘sleep’
(23) *éβăḍ pl. *aβăḍan ‘night’
(43) *éłam pl. *ilmawăn ‘skirt’
(70) *tésem ‘salt’
(71) *ésem ‘animal fat’

For these nouns we can clearly distinguish the short vowels since we have the Touareg reflex for all of them.
Three of these nouns have a Zénaga cognate, two have the shape éCăC, and one has the shape éCeC. This clearly shows that both these formation exist for biradical nouns.

### 9.3 Initial *é/i Nouns

For a large group of nouns it is impossible to determine whether the initial vowel was *é or *i, usually because of the phonetic environment, sometimes because there is no Touareg or Ghadamès cognate. We only find a Zénaga cognate for the word for 'head' which is ambiguous whether it had a third radical as *ʔ would be lost on front of the *γ in Zénaga. Therefore it cannot be confirmed that this formation is truly biradical.

Every single one of these roots either has no vowel in the root, or a short vowel *e or *ă but not a single form is found with a long vowel in the root.

(41) *é/iγəf pl. *aγafawăn 'head'
(44) *é/ilf pl. *alfawăn 'swine'
(45) *té/idv̆kt 'mastic tree'
(63) *é/iɣd 'ash'
(64) *é/iɣreyt 'heap of grain'
(65) *é/ired pl. iredăn 'wheat'
(76) *é/izv̆m pl. *izmawăn 'lion'
(82) *té/irv̆mt pl. *tiram 'meal'
(92) *é/igv̆r pl. *é/igv̆ran 'field'

The plural formations in this group are very diverse, but it is interesting to note that (41) and (44) have the exact same plural formation with the strange initial vowel *a. No other patterns arise in this group.

1. aCC-awăn
2. iCC-awăn
3. iCC-ăn
4. tiCăC
5. iCVC-ăn

### 9.4 Initial *i Nouns

There is not a single biradical noun in my sample that unambiguously has an initial *i. This gap may be accidental as some of the ambiguous formations with initial *é or *i, discussed in section 9.3, may have initial *i.
9.5 Initial *u nouns

9.5.1 uCaC

(66) *uraw `hands together, palms upwards'

This is the only word of this type in my corpus, and Tamazight actually points to *urv̆w rather than *uraw. As there is no Zénaga cognate, it is impossible to determine whether this noun formation exists for biradical nouns.

9.5.2 uCv̆C

(28) *ulβ pl. *ulβawân `heart'
(40) *urv̆γ `gold'
(49) *ugv̆l pl. *ugv̆lan `tooth (canine)'

This is not a large group but it contains some very basic, well-attested words. The fact that (40) *urv̆γ is derived from a root wrγ and the Iwellemmeden reflex for (28) *ulβ seem to suggest that this group is triradical of origin where the initial *w has vocalised to *u.

(28) and (40) have Zénaga cognates, showing that these formation existed in Proto-Berber as biradical formations, or perhaps triradical formations with initial consonant *w.

Two nouns have a clear plural formation that goes back to Proto-Berber, but they are different from each other.

1. uCC-awân
2. uCv̆C-an

9.6 Initial *a/é

This group has been completely discussed in Section 7.3. Three nouns have a Zénaga cognate. (32), (33) and (38).

(32) téméḍt `umbilical cord' has a Zénaga cognate, but the formation in Zénaga is very different. Nevertheless, it seems like this formation exists for biradical noun on Proto-Berber, but as (73) *a/ézyéḍ `donkey' shows, it also exists for triradical nouns. So we can by no means be certain that the nouns of this formation are biradical except for the one with a Zénaga cognate.

(33) contains a *y so a third radical *? may have been lost in Zénaga. We therefore cannot be certain that this formation existed for biradical nouns.
9.6.1 a/éCéC

(32) *ta/éméd pl. timédén 'umbilical cord'
(69) *a/ésén pl. *isénän 'tooth'
(83) *a/i/édés pl. *idésän 'side'
(84) *a/élés pl. *ilésän 'fleece'
(85) *ta/i/ési/ért pl. *tisi/éraʔ 'mill'
(91) *a/é/ifé/is pl. *ifé/isăn 'hyena'

These nouns show several different plural formations.

1. iCéC-an
2. iCéC-ăn
3. tiCéC-én
4. tiCéC-aʔ

9.6.2 a/é/iCiC

(33) a/é/iγil pl. iγallăn 'arm'

9.6.3 a/é/iCv̆C

(61) a/i/énv̆γ 'palate'

9.7 Initial *u/i

The only two nouns that have an unclear initial *u or *i both have been discussed in Section 7.2. They both have different plural formations. (36) *udem has a Zénaga cognate, so this formation exists for truly biradical nouns.

(36) is almost exclusively found with initial *u and it probably simply belongs to nouns of the type uCv̆C as discussed in section 9.5.2. Likewise, (81) is almost exclusively found with initial *i/*é and probably belongs to the nouns of the type é/iCv̆C as discussed in section 9.3.

(36) *udem pl. *udmawăn 'face'
(81) *u/ifv̆f pl. *u/ifv̆ffăn 'nipple of an udder'

9.8 Conclusion

Now that we have examined all the formations, we can evaluate the findings. From the study of these formation it is clear that there is no correlation between the noun formation and its plural formation.

Below I have created a second version of the biradical root matrix, but this time only taking into account formations that have a Zénaga cognate. Moreover, I have decided to name the a/éCéC nouns éCéC which seems to be their original formation.
Although it is probably true that nouns with an initial *u originally had a *w as their third radical, the uniformity we find of nouns with this initial vowel in the Berber languages suggests that this radical had probably already become an initial vowel in Proto-Berber. I have therefore included it in table 9.2 below.

As I have shown in section 7.2, the nouns with *i/*u variation in the root probably were triradical, so these are not included in this matrix either.

<table>
<thead>
<tr>
<th>Initial</th>
<th>Root</th>
<th>a</th>
<th>é</th>
<th>i</th>
<th>u</th>
<th>á</th>
<th>e/ø</th>
<th>v̆</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>+?</td>
<td>-</td>
<td>-</td>
<td>+?</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>é</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>é/i</td>
<td>-</td>
<td>-</td>
<td>+?</td>
<td>-</td>
<td>+?</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>i</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>u</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The amount of true biradical nouns has turned out so small that very few generalisations can be made. This is not necessarily a bad thing, as it shows that biradical nouns were in fact very rare.
Chapter 10

Conclusion

In this thesis, I have studied the CVC and CC roots found in Kabyle and Ghadamès, and have attempted to reconstruct these words to Proto-Berber by making use of several other Berber languages.

Of the 94 words that I have reconstructed, 12 can be shown conclusively to have had two radicals. These 12 nouns have Zénaga cognates, and therefore show that there was no third radical *ʔ. Another four biradical nouns have Zénaga cognates, but contain a Proto-Berber *γ which shifts to ʔ in Zénaga, making it impossible to see whether these words had a third radical *ʔ.

27 nouns in my corpus can be conclusively shown to have three radicals. Another two nouns, namely, (79) and (80) probably had three radicals as well.

It is clear from these results, that biradical nouns are a lot less common than tri-radical nouns in Proto-Berber.

The remaining words in my corpus lack any indication whether there was a *ʔ, and we can therefore not be sure that these were truly biradical.

This poses a great problem in Proto-Berber reconstruction. We absolutely cannot be sure about reconstructions without a Zénaga cognate. Ghadamès *o can sometimes provide some information as well, but on its own can probably not be considered conclusive. Words without cognates in either of these languages are a lot less accurate reconstructions of Proto-Berber.

From the reconstruction of these nouns, several conclusions can be drawn. First of all, it is clear that Ghadamès o corresponds well to the Proto-Berber sequence *aʔ.

Secondly, it is clear that *aʔ yields a stable initial vowel, and *ʔ does not. The stability of the initial vowel does not automatically imply the presence of a *ʔ. (42) *asăf is certainly biradical and has a stable initial vowel. Sadly, this means that stability of the initial vowel cannot be used as a test for the presence of a Proto-Berber *ʔ. The stability of the initial vowel is influenced by other factors as well which are not yet determined. The study of nouns with initial *β has shown that this consonant is never the cause of a stable initial vowel, as several reflexes require an unstable initial vowel.

A final interesting conclusion that can be drawn from the study of my corpus, is that we find only one example of a triradical root with an initial *ɛ (86) *ézyɛḍ and one example of a definite biradical root with an initial *a (42) *asăf. This seems to point
to a preliminary suspicion that there is an allophonic complementary distribution. Possibly, *é is disallowed in front of *ʔ. More research will have to be done to confirm this hypothesis.

The second part of this paper examined several interesting features that were found in the corpus. It studies the vocalic variation found in several nouns and the final radical lengthening in several plurals.

It is shown that the nouns with */i/*u variation in the root vowel has a very specific distribution. *u is found in the ZénATIC and Touareg languages, while *i is found in all other languages. The variation probably goes back to nouns with the sequence *eʔ in place of this varying vowel.

The study of initial */a/*é variation also has a clear distribution. All these nouns have a vowel */é in the root and vowel */é as the initial vowel, except in Ghadamès and Aujila, where the initial vowel is always changed to *a. Mzab and Ouargla occasionally have this change as well. I have shown that this change is probably due to analogy, and was regularised for this noun type in Ghadamès.

The initial variation between *u and *i is only found in two nouns, and has very different distributions. As of now, there is no clear explanation why these different variants are found for these two nouns.

The lengthening of the final radical in nouns that have the a-infix type plural is a common process which I have examined more closely in this thesis. Despite attempts of Prasse to explain this final radical lengthening as a form of assimilation, I have found no proof for an assimilation, and even found several examples that speak against the possibility of assimilation.

For now, the reason for the irregularity of the final radical lengthening in this plural type remains completely unclear.

In the final part of my thesis I have looked at the vocalic patterns that are found in the biradical nouns of my corpus.

It is instantly obvious that initial */a is very common, and combines with the most root vocalisms. Besides that we find that initial */é seems to only combines with */é in the root, which is the only vocalism initial */a does not combine with.

Initial */i is surprisingly completely absent in my corpus. After having examined all the formations, and which formations can actually be confirmed to exist for biradical nouns, only a very small amount of possibilities remain. This is not surprising, as there are only twelve definite biradical nouns.

The study of which formations are allowed, has turned out to not be very illuminating. Several large groups can not be shown to be truly biradical, because none of the words in this group have a Zénaga cognate, for example the aCuC group. Other groups do have nouns with Zénaga cognates, but can be shown to exist as triradical nouns as well, for example the éCéC group.

The study of plural formations and in what way they relate to the formations of the singular has proven to be completely unfruitful. It is clear from my sample, that the type of plural formation found is not at all related to the type of root structure a word has in the singular.
Bibliography


Nicolas, Francis (1953) *La langue berbère de Mauritanie*. Dakar: IFAN.


