

Relating linguistic reconstructions of plant names in Berber to the archaeobotany of North Africa

Presented at the conference

International Workshop African Archaeobotany IX

University of Las Palmas de Gran Canaria

26-29th June 2018

[CIRCULATION DRAFT]

Roger Blench
McDonald Institute for Archaeological Research
University of Cambridge
Department of History, University of Jos
Kay Williamson Educational Foundation
8, Guest Road
Cambridge CB1 2AL
United Kingdom
Voice/ Ans (00-44)-(0)7847-495590
Mobile worldwide (00-44)-(0)7967-696804
E-mail rogerblench@yahoo.co.uk
<http://www.rogerblench.info/RBOP.htm>

This printout: Cambridge, April 12, 2018

TABLE OF CONTENTS

ACRONYMS AND CONVENTIONS	ii
1. Introduction	1
2. The transition to agriculture in North Africa	1
3. The linguistic situation past and present	2
3.1 The present-day situation.....	2
3.1.1 Arabic	2
3.1.2 Berber	2
3.1.3 Songhay	4
3.2 Reconstructing the past.....	5
3.2.1 Inscriptional languages	5
3.2.2 Punic	5
4. Evidence from crop names.....	6
4.1 Cereals	6
4.2 Pulses.....	8
4.3 Vegetables	9
4.4 Fruits/tree crops	11
5. Synthesis and the agenda for further research.....	15
References	16

MAPS

Map 1. North Africa: current linguistic situation.....	2
Map 2. Present distribution of Berber	3

TABLES

Table 1. Arabic dialects of North Africa.....	2
Table 2. Berber names for barley.....	6
Table 3. Berber names for durum wheat.....	6
Table 4. Berber names for bulrush millet.....	7
Table 5. Berber names for sorghum.....	7
Table 6. Berber names for rye.....	8
Table 7. Berber names for lentil.....	8
Table 8. Berber names for pea.....	8
Table 9. Berber names for broad bean.....	9
Table 10. Berber names for onion.....	10
Table 11. Berber names for carrot.....	10
Table 12. Berber names for cucurbits.....	10
Table 13. A Berber root for melon.....	11
Table 14. Berber names for pomegranate.....	11
Table 15. Berber names for apple.....	12
Table 16. Berber names for fig.....	12
Table 17. A Berber/Guanche name for dried fig.....	12
Table 18. Berber names for green fig.....	13
Table 19. Berber names for almond.....	13
Table 20. Berber names for date(-palm).....	13
Table 21. Berber names for pear.....	14
Table 22. Berber names for carob.....	14
Table 23. Berber names for olive.....	14
Table 24. Berber names for quince.....	15
Table 25. Chronological stratification of Berber cultigens.....	16

ACRONYMS AND CONVENTIONS

*	regular reconstruction
BCE	Before Common Era
BP	Before present
ONA	Old North African

1. Introduction

The North African coast has represented something of a lacuna in the archaeobotanical record until recently, and research in large areas still remains problematic for security reasons. For several key questions, the timing of the transition from foraging to agriculture and the spread of individual cultigens remains in the realm of speculation. The object of this paper¹ is to explore the relationship between the vernacular terms for cultivated plants in the Berber languages and the evolution of agriculture in North Africa. This can shed light on the relationship between people and plants and in particular species for which no archaeobotanical data exists.

In terms of the languages spoken in North Africa today, the layering of different cultures who have invaded and settled over the last three thousand years have overwritten the period of early agriculture. During the Capsian era, languages which have no living descendants were presumably spoken, here called Old North African. Subsequently the Berber languages expanded to cover most of the region, colonising the Canaries by around 300 AD. Evidence for the influence of Ancient Egyptian on peoples to the west is surprisingly limited. Phoenician settlement from 800 BC imported new crops, as did the Roman conquest. Finally, the wave of Arab conquests from 650 AD onwards brought a wide range of plants and innovative agricultural practices (Watson 1983). All of these events are written into the palimpsest of Berber languages, and the paper presents evidence for this chronological stratification. §4. presents tables showing the Berber names for major crops together with hypotheses concerning their origin and therefore the potential link with archaeobotanical data.

2. The transition to agriculture in North Africa

The timing of the transition to agriculture in North Africa remains controversial. The paucity of stratified sites with unambiguous macro-remains of cultivated plants suggested to an earlier generation of researchers that the production systems were largely foraging and pastoral (e.g. Barker 2006). Despite the richness of agriculture in the Nile Valley, its practices were not obviously propagated westward.

Evidence from Moroccan sites now suggests significant patches of early agriculture, but these show strong relationships with the Iberian peninsula. Kaf Taht El-Ghar in Northern Morocco has yielded remains of several types of wheat, naked barley and broad bean (*Vicia faba*) dated to 7286 ± 85 cal BP (Ballouche & Marival 2003). The site of Ifri Oudadane, also in Morocco, has barley, three wheat subtypes, pea and lentil, dated broadly to the Early Neolithic B, 7000-7500 BP (Morales *et al.* 2013; Zapata *et al.* 2013). So far, these data suggest that the Ifri Oudadane materials are the oldest cultivated plant remains not only from North Africa but from the entire African continent. As Morales *et al.* (2013) point out, these dates are virtually contemporaneous the dates obtained for agriculture in Spain and for a very similar crop 'package', resembling the Near East with no trace of Sub-Saharan species. Plausibly, existing evidence is that agriculture between the Nile Valley and Morocco is significantly later than at the extremes. Zinhecra in Libya has an assemblage dated to around 2700-2400 cal BP which includes emmer and bread wheat, barley and date (Van der Veen 1992). In Jerma, the Fezzan, southern Libya, wheat, barley, date and grape are found at 2300-2000 BP, and durum wheat, barley, sorghum, olive, grape, fig, date, almond and pomegranate at 2200-1600 cal BP (Pelling 2008). The lack of a trail along the North African coast argues strongly for a maritime dispersal of farming (Zilhão 2001). Agriculture only reaches the Canaries relatively late, by around 300 AD (Morales 2010; Morales *et al.* 2017).

Several questions arise, the most important of which is whether these cultigen remains definitely indicate farming. The small quantities and the absence of clear evidence for agriculture indicate at least the possibility that foragers were trading wild produce for foodstuffs, something apparently happening in Northern Europe at around the same time in the Ertebølle culture (De Roever 2009). In addition, it is puzzling to know the ethnolinguistic identity of such peoples. These dates fall within the Capsian, but they are far earlier than the projected dates for the development of the languages spoken in the region today and it may be these early adopters do not have direct descendants.

¹ This paper represents the fruition of years of discussion with scholars from a variety of different disciplines. Particular thanks to Vaclav Blažek, Maarten Kossmann, Jacob Morales and Lameen Souag for unpublished data and critiques.

3. The linguistic situation past and present

3.1 The present-day situation

North Africa today is fairly uniform linguistically; Hassānīya and other Arabic dialects, Berber and an isolated Songhay population cover most of the terrain from west to east. However, this state of affairs is relatively recent and reflects political and religious movements over recent millennia which have induced uniformity. But it would be a mistake to read this back into the past; the expansion of languages such as Hassānīya and Tuareg are demonstrably recent. Map 1 summarises the current situation across North Africa.

Map 1. North Africa: current linguistic situation



3.1.1 Arabic

The Arabic spoken across North Africa is divided into a number of dialect groups (Table 1);

Table 1. Arabic dialects of North Africa

Lect	Location
Hassānīya	Mauritania and adjacent areas
Moroccan	Morocco
Algerian	Algeria
Uled Suliman	Libya, Niger, Nigeria
Shuwa	Nigeria, Cameroun, Chad
Chadian	Chad, Sudan
Bedawi	Egypt, Cairene

Hassānīya Arabic (حسانية), the language of the Moors, is a conservative Arabic dialect originally spoken by the Beni Hassān, who are thought to have expanded from North Africa in the 15th century onwards (Taine-Cheikh 1979). It is likely that they assimilated a largely Berber population, of which Zenaga is the last remaining island. Although the Hassānīya must have interacted with other *in situ* populations, there is little evidence in unidentified loanwords for the linguistic affiliation of these populations.

3.1.2 Berber

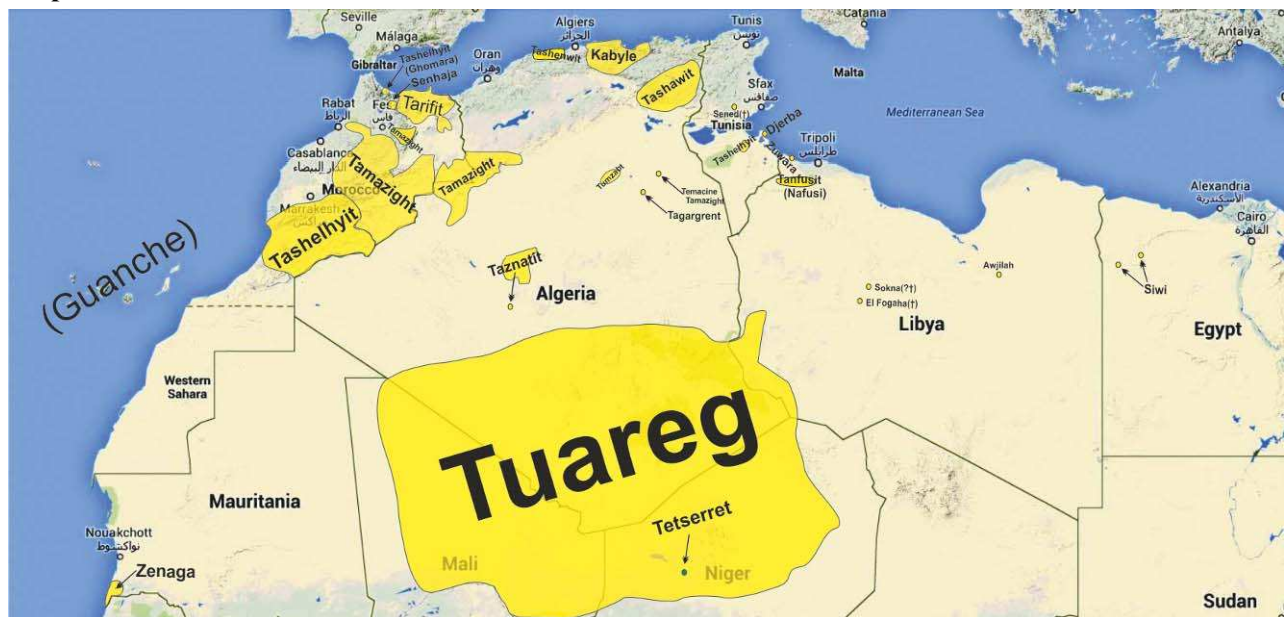
3.1.2.1 Mainland languages

The Berber languages constitute a major branch of the Afroasiatic language phylum and are spoken both by settled and nomadic populations along the North African coast and far down into the Sahara, presently reaching the borders of Nigeria. Today, Berber languages are confined to a series of islands surrounded largely by Arabic (Map 2). This is a considerable geographical range, but it has been regularly argued that Berber culture and by implication, people, reached as far as the Nile Confluence (e.g. Behrens 1989). Nonetheless, Berber must once have been the dominant population throughout much of North Africa and the Sahara in the past (Brett & Fentress 1996; Blench 2001). Although the Tuareg are presently the most

Roger Blench Archaeobotany and Berber names for cultivated plants

widespread group, found across much of Algeria, Niger and southern Libya, their expansion is probably relatively recent as they may have entered the south-central Sahara as late as the 6th century AD (Camps 1974).

Map 2. Present distribution of Berber



The Berber remain a highly mobile group, the Tuareg in particular forming new communities in the coastal cities of West Africa and are adept at maintaining a strong media presence. The Zenaga in SW Mauritania were a significant group when first described, but are now down to some 300 speakers (Taine-Cheikh 2008, 2010). North of Agades in Niger live the Tetserret, whose language shows correspondences with Zenaga but who are now encapsulated among the Tuareg (Lux 2013). Other islands of Berber speakers occur within the Arabic-speaking zone further east, most notably at Awjila (أوجلة) (Putten 2013), formerly at El-Fogaha (الفقهة) (Paradisi 1963) and Siwa (Laoust 1932). Furthermore, Berbers must have reached the Canaries at an unspecified date in the past, leading to the formation of the Guanche, the now-vanished aboriginal population (Wölfel 1965).

Despite an abundance of information, there are a series of major unanswered questions about the affiliations, origins and date of diversification of the Berber languages (Galand 1970-1). Berber is Afroasiatic, and its nearest relative is likely to be Semitic. Yet when deep-level Arabic borrowings are weeded out, the corpus of established Afroasiatic roots is very small, pointing to a 'long tail', a split from the main branch at quite some time-depth. When and where this took place is highly uncertain. Similarly, the dates of the primary expansion of Berber are problematic; its extremely low internal diversity points either to a recent epoch or to an episode of language levelling. Neo-Punic and Latin borrowings suggests a late date for proto-Berber of 100-200 AD. Under no circumstances can Berber be identified with the Capsian (ca. 12,000-8000 BP) or even the first stages of the Neolithic in North Africa (? 7000 BP onwards), both of which are far too early to be reconciled with Berber internal diversity. If this is indeed so, what process is in consilience with the archaeological record? The only way to account for the distinctiveness of Berber is to suppose that the speakers of the proto-language must have been resident somewhere for a long period, diverging from Afroasiatic but not diversifying internally².

At a point in the more recent past, a social or economic change must have transformed their society, stimulating a major expansion. Blench (2001) argued that this was pastoralism, corresponding to the expansion of pastoralism across the Central Sahara, which is around 5-4000 BP (Brooks *et al.* 2009). Di

² Alternatively they could have diversified but the branches that developed at that period were then assimilated by other languages.

Roger Blench Archaeobotany and Berber names for cultivated plants

Lernia (2006) radiocarbon dated a large number of cattle burials in the Messak in southern Libya, and they give a fairly consistent suite of dates pointing to the introduction of livestock ca. 7000 BP. These dates are difficult to reconcile with the lack of diversity within Berber and there are three possible explanations;

- a) either the early wave of pastoral expansion was a quite different group of people who have vanished without trace
- b) or Berber has diversified extremely slowly compared with other world language families
- c) or Berber underwent a major episode of language levelling around 100-200 AD, eliminating prior diversity

Postulating mystery populations is bad science, and the most likely explanation is that the expansion of pastoralism across the Sahara was indeed a primary migration of Berbers into the desert. The closeness of Berber lects is only explicable if we postulate a significant later episode of language levelling, perhaps as late as 200 AD (Kossmann 2013). The similarities between even the far-flung branches of Berber, Zenaga and Siwa, date from this period. This co-occurs with the establishment of the Roman *limes* in North Africa, suggesting that the concentration of population this induced stimulated the spread of a prestige dialect. Kossmann (2013) points out that there are well-assimilated Latin loans associated with agricultural terminology which are part of proto-Berber, as well as numerous Arabic borrowings from that are found virtually across its range. This points to a series of levelling episodes within Berber, facilitated by the mobile culture of the nomads and a strong pressure to keep communication systems open, which may in turn be associated with the importance of the camel from the first century AD onwards (Brogan 1954). It seems likely that residual populations remained after this event, but a third wave of expansion and assimilation occurred with the Tuareg dispersal, from the 6th century onwards, which in turn eliminated other more archaic and diverse Berber lects such as the relatives of Tetseret. Finally, the Hassānīya expansion from the 15th century further pushed back the south-western Berber lects and precipitated the long decline of Zenaga.

3.1.2.2 The peopling of the Canaries

The Canaries were visited by numerous maritime peoples, including the Phoenicians, Romans, Arabs and medieval European nations, including the Mallorcans and Genoese. However, the core population were the Guanche people, with four dialects spread across seven main islands. External settlement seems to have begun in the early fourteenth century on Tenerife. When the Spanish first reached the Canary Islands they were they found the local dances so entrancing that these were carried back to Europe and entered the repertoire of classical music, hence the *canaries* in the harpsichord suites of J.S. Bach. Unfortunately, the fate of the language was less iconic, as by the end of the eighteenth century it had disappeared, with the speakers killed, dying from disease or being assimilated.

There is little doubt that Guanche were affiliated to the Berbers. What remains of their language shows clear Berber cognates, inscriptions on the islands are related to Numidian and DNA evidence links modern Canarians to Berbers (Maca-Meyer *et al.* 2003). However, there are many perplexing aspects of the culture of the Canaries. The most notable is the presence of mummified bodies, which use the specific techniques associated with Ancient Egypt. Whether this implies the ancestors of the Guanche were carried to the Canaries by Egyptian ships remains a point for speculation.

The records of Guanche are only those recorded by travellers and amateur enthusiasts and use wayward orthographic conventions. The classic synthesis, Wölfel (1965) collects together all the records sorted by semantic field, and notes many similarities with Berber. Most researchers who have looked at the records of Guanche have agreed (e.g. Galand 1987/88). Moreover, the very short inscriptions on rock in the Canaries which are in the old North African Numidian script further confirm the Berber link. As it turns out, several recorded Guanche names for food plants, including barley and wheat, are neatly linked to mainland Berber terms, suggesting agreement between the linguistic and archaeobotanical record.

3.1.3 Songhay

The Songhay languages are spoken along the Niger between Timbuktu and Gao, stretching into the Sahara of Niger and South and East into Benin Republic and Nigeria. Songhay is one branch of the Nilo-Saharan phylum which spreads across Middle Africa from Ethiopia to Mali. An isolated population, the

Roger Blench Archaeobotany and Berber names for cultivated plants

Kwarandzyey [=Korandje] of Tabelbala (تبلالة), live in a small community on the Moroccan-Algerian borderland (Souag 2015). These people are apparently a group which migrated around the eighth century for unknown reasons, but possibly as plantation workers.

3.2 Epigraphic clues to the past

3.2.1 Inscriptural languages

Written records, iconography and archaeology can all provide general indications of the more diverse past of the region. The ‘Tehenu’ appear in Vth Dynasty sources (3200 BC) as livestock keepers of the Western Desert (Vernet and Onrubia-Pintado 1994:56). Egyptian records speak of the incursions of the I-S-B-T-U, usually identified with the Asbytes of Herodotos, nomads from the deserts west of the Nile who raided settlements in the Eighteenth Dynasty (1543–1292 BC). Herodotos (ca. 500 BC), Book IV in particular, gives a long account of the geography and characteristics of the Maghrebin tribes, which grow more exotic as they move westward from the known terrain of Egypt and the Nile. Nonetheless, the oases of Siwa, Awjila and the capital of the Garamantes in the Fezzan can easily be recognised in his account. Beyond that, Herodotos claims that ten days march west of the Garamantes live the Atarantes ‘who have no names of their own’. It has been speculated that the name Atarantes derives from Berber *adrar* (pl. *idaren*) ‘mountain’. The challenge is to sift out the colourful and fantastical elements and develop an interpretation which is congruent with both synchronic linguistics and archaeology.

The epigraphic indications of a former linguistic geography are all fragmentary; inscriptions in Libyco-Berber and Punic/Latin scripts, terms without etymologies in present-day languages and the characteristics of residual populations which may reflect former distinct ethnolinguistic groups whose languages have been assimilated. Apart from Latin in North Africa and recent Arabic, the principal script is Berber (O’Connor 1996). Its modern form, Tifinagh (ⵜⴰⴳⴷⵓⴷⴰ in Neo-Tifinagh), is the written form of Tuareg and is still in use. Older forms of the script, known as Libyco-Berber, occur spread across from the Central Sahara to Western Morocco, with fragmentary texts also recorded in the Canaries. The first inscriptions occur in the 3rd century BC and continue through to the 3rd century AD, but almost all texts are disappointingly short, hence the limited contribution of epigraphy to Berber history (Le Quellec 2011).

The eastern variant was used in what is now Constantine, the Aurès region and Tunisia. Since twenty-two letters out of 24 can be transliterated and there are several Numidian bilingual inscriptions in Libyan and Punic, it is the best-deciphered variant (Zyhlarz 1932). The western variant was used along the Mediterranean coast from Kabylie to the Canary Islands has 13 extra letters, which has made decipherment more uncertain (Février 1964–1965). It is entirely possible that the underlying language is different from the Eastern inscriptions.

3.2.2 Punic

Punic is an extinct Semitic language spoken in the overseas Phoenician empire in North Africa, which included Carthage and some Mediterranean islands. The Phoenicians originated in what is now Lebanon and created a sea-borne empire. Carthage was founded ca. 800 BC and destroyed in 146 BC, but the language continued to be spoken until around the 6th century AD. It is known from inscriptions (most of them religious formulae) and personal name evidence (Tomback 1978; Kerr 2010). A series of late trilingual funerary texts found in the Christian catacombs of Sirte, Libya are in Classical Greek, Latin and Punic. Al-Bakri (c. 1014–1094), an Andalusian Muslim geographer, describes an unknown language spoken in Sirte in the tenth century, so it is conceivable Punic survived as a spoken language into the medieval era.

Part of the interest of Punic are the borrowings in proto-Berber, which implies that the culture of Carthage preceded the break-up of Berber (Vycichl 1952; Malášková & Blažek 2012). In addition, the nature of the loans provides useful information on the interaction of the two cultures. Due to the destruction of the libraries following the Third Punic War (149-146 BC), records of the language are mainly in later neo-Punic (Kerr 2010). Kossmann (2013:59) notes the absence of Punic loans in Zenaga, which may reflect the nomadic lifestyle of the desert nomads (most Punic loans are nouns associated with settled life) but possibly showing the migration of the Zenaga prior to the period of significant interaction.

4. Evidence from crop names

4.1 Cereals

The cereals which can be clearly reconstructed for proto-Berber are barley, wheat and (more surprisingly) bulrush millet. Barley (*Hordeum vulgare* subsp. *vulgare*) is one of the oldest domestic cereals and may have been domesticated as early as 8500 BP in the Near East. Jones *et al.* (2013) argue for a Western Asian origin and multiple introductions in Europe. Remains of domestic barley are found in Egypt dated to earlier than 8000 BP (Germer 1985: 208). Six-row hulled barley is common all across North Africa, reaching Gran Canaria by the third century AD and is the most frequent cultigen recorded at all sites (Morales *et al.* 2017). The Berber names for barley are extremely uniform and may have been transferred from wild barley (Table 2) although Middle Egyptian *šma*, barley, is conceivably related to the Berber term.

Table 2. Berber names for barley

<u>Language</u>	<u>Attestation</u>
Central Morocco	timzin
Beni Snous	timzin
Djebel Nefusa	təmzín
El-Fogaha	túmzin
Senhadja	timzin
Kabyle	timzin
Ntifa	timzin
Mzab	timzin
Ghadames	təmzén
Awjila	təmzín
Siwa	tumzen
Ouargla	timzin
Guanche (all islands)	tamozen
Guanche, Hierro	tezzezes

Durum wheat, *Triticum turgidum* subsp. *durum*, was developed from einkorn wheat around 9000 BP in the Near East. However, it seems to have reached Egypt relatively late, being only recorded in the Ptolemaic period (Germer 1985: 212). It arrived in Gran Canaria around 300 AD, together with barley (Morales *et al.* 2017). Berber terms for wheat are also remarkably consistent (Table 3) pointing to a familiarity with the crop from the earliest period of Berber expansion.

Table 3. Berber names for durum wheat

<u>Language</u>	<u>Attestation</u>	<u>Comment</u>
Central Morocco	irdən	
Beni Snous	irdən	
Djebel Nefusa	yərdən	
El-Fogaha	yərdən	
Senhadja	irdən	
Kabyle	irdən	
Mzab	irdən	
Ntifa	irdən	
Ghadames	yərdən	
Awjila	irdən, yərdən	
Siwa	irdən	
Tarifiyt	iaḍən	
Iznasen	irdən	
Guanche, Tenerife	irichen	

Roger Blench Archaeobotany and Berber names for cultivated plants

Bulrush, or pearl millet, *Pennisetum glaucum*, is a domesticate from Sub-Saharan Africa, which was probably domesticated on the southern margins of the Sahara around 4500 BP (Manning *et al.* 2010). Remains of pearl millet are found in Saharan oases by 200 BC (Thanheiser pers. comm.) and it must have diffused into the Berber world at this time. Intriguingly, millet was not carried to the Canaries together with other cereals (Morales *et al.* 2017). Kossmann (2013) regards the linguistic evidence as proto-Berber, but it seems more plausible it was borrowed into the nascent Berber lects forming at this time, since it was not carried to many parts of the Berber world (Blench 2016). Table 4 shows the Berber names for bulrush millet; they are all evidently related, but probably constitute a chain of early borrowings.

Table 4. Berber names for bulrush millet

Language	Attestation	Comment
Tashelhiyt	anili	
Ntifa	illan	
El-Fogaha	anóli, elli	
Kabyle	ilni	
Ghadames	alele	
Awjila	ílli, élli	
Tuareg	enále	
Ouargla	inəlli	
Zenaga	?illi	

Arabic names are quite different, suggesting that millet entered the Arab world through a distinct route (e.g. Tunisian Arabic (*دُرْع* *dro'o*).

Sorghum, *Sorghum bicolor*, is another characteristic Sub-Sahara domesticate, grown in North Africa today but known to the Romans. Rainfed sorghum is recorded in New Kingdom tombs, while durra (irrigated cultivars) only appears in the 6-7th centuries AD (Germer 1985: 227). Kossmann (2013: 138) argues that some modern terms now applied to maize were originally sorghum terms. Southern Tuareg names are quite different and probably borrow from their immediate neighbours. Zenaga, however, does have a cognate term, albeit applied to millet shoots. Table 5 shows the disappointingly few terms recorded for sorghum.

Table 5. Berber names for sorghum

Language	I	II	III	Comment
Tashelhiyt	asngar			now applied to maize
Central Moroccan		tafsut		< term for 'grass'
Iznasen		afsu		< term for 'grass'
Kabyle			lbəcna	
Ouargla			lbəšna	
Ntifa	amzgur	tafsut		now applied to maize
Zenaga	uššugnaḏän			<i>petites pousses de mil</i>

Rye, *Secale cereale*, grows wild in Eastern Turkey and was probably domesticated there at an early period, but only spread much later to Europe. It is grown in a few places in the Maghreb, but the evidence is that it was introduced from Spain since existing terms seem to reflect Spanish *centeno* (Table 6).

Table 6. Berber names for rye

Language	Attestation	Comment
Tashelhiyt	išnti	
Senhadja	ṭišəntiṭ	
Tarifiyt	ṭišəntiṭ	

4.2 Pulses

The major pulses grown by the Berber include lentils, faba or broad beans, chickpeas, peas and grass-vetch (*Lathyrus*). Unfortunately, the popular and scientific names are scrambled in Kossmann (2013: 139 ff.) so the following section attempts to re-order the data.

Lentil, *Lens culinaris*, was domesticated in the Near East/Central Asian region and the oldest finds are in Syria 10,000 BP (Tanno & Willcox 2006) and Greece at 11000 BP (Yadav *et al.* 2007). A lentil seed dated to 7611 ± 37 cal BP, represents the oldest direct date of a domesticated plant seed in Morocco and, by extension, in North Africa (Morales *et al.* 2013). Lentils first appear in Egypt in a predynastic context at Matmar (Germer 1985: 87). Despite this venerable antiquity, almost all Berber names are borrowed from Arabic, with only a couple of lects retaining the original Berber form (Table 7).

This root appears to have shifted to *Lathyrus* in some languages, but ‘lentil’ was presumably the original referent. Grass-vetch, *Lathyrus sativus*, is recorded in Egypt in predynastic contexts at Badari (Germer 1985: 84) and in early Iberia (Peña-Chocarro & Peña 1999) but there is as yet no evidence for its diffusion along the North African coast. In Table 7, the forms shaded red now apply to *Lathyrus*.

Table 7. Berber names for lentil

Language	Berber	II	< Arabic	Comment
Tashelhiyt	tilintit, tilintit	tinift		
Ntifa	tiləntit		l’adəs	
Ghadames		tanifet		
Senhadja		ṭinifit	ləadəs	
Tarifiyt		ṭinifətt		
Iznasen		ṭinifətt	ləədəs	
Snous		ṭinifin	ləadəs	
Kabyle			ləəds	
Figuig			ləədəs	
Ouargla			ləəds	
Tuareg			əlyədəs	
Zenaga			ädyägi	? cognate with others

The pea, *Pisum sativum*, was domesticated in the Ancient Near East with early finds in Syria 10,500 -10,200 BP (Muehlbauer & Tullu 1997; Mikić *et al.* 2014). Peas occur together with barley and lentil at Ifri Oudadane and so are very ancient in the Maghreb. The names given in Kossmann (2013: 139) appear to refer to *Lablab purpureus*. Table 8 shows the rather meagre list of Berber names for ‘pea’.

Table 8. Berber names for pea

Language	Berber	< Arabic	Comment
Ntifa	tinifin		
Kabyle	ajilban		
Mzab	əlbəlbali		
Nefusa	bablabi	žžəlbana	

Roger Blench Archaeobotany and Berber names for cultivated plants

The broad bean, *Vicia faba*, is one of the set of ancient Near East domesticates identified by Weiss & Zohary (2011). It is found at the site of Kaf Taht El-Ghar in Morocco, thus around 7000 BP. The first records in Egypt are from a Vth Dynasty context at Abusir (Germer 1985: 81). This corresponds to the well-attested Berber root, **abaw* (Table 9).

Table 9. Berber names for broad bean

Language	Berber	< Arabic	Comment
Tashelhiyt	abaw		
Ghomara	abaw		
Ghadames	abäbba		
Senhadja	abaw		
Ntifa	abaw		
Tarifiyt	baw		
Iznasen	baw		
Snous	baw		
Kabyle	abaw, ibiw		D. also gives <i>bubu</i> , <i>aləymud</i>
Mzab	abaw		
Nefusa		əlfúl	
El-Fogaha		əlfúl	
Ouargla	aw, wawa		
Awjila	biw		
Siwa	awáw		
Tuareg	ăbawbaw		
Guanche Tenerife			hachichey

The suggestion has been made that the Berber name is somehow related to the Latin name, *faba*. If so, this is more plausibly a borrowing into Latin. The Ancient Egyptian name, *pr/pal*, may well be a borrowing from a Semitic language and hence cognate with modern Arabic. The Guanche name has no certain cognates (Wölfel 1965: 503).

The chickpea, *Cicer arietinum*, is an ancient Near Eastern domesticate and is already found in the aceramic levels at Jericho. and in New Kingdom tombs in Egypt (Germer 1985: 96). Despite this, its presence along the North African coast and importance in its cuisine, appears to be due to the Arabs. There are no archaeobotanical records, and as Kossmann (2013: 140) notes, all Berber terms appear to be borrowed from Arabic.

Cowpea, *Vigna unguiculata*, is a domesticate from Sub-Saharan Africa. It is first recorded in Egypt, during the Vth Dynasty, at Abusir (Germer 1985: 87). It is not generally cultivated in the Maghreb. The hyacinth bean, *lablab*, *Lablab purpureus*, is similarly of Sub-Saharan origin and there is no evidence it was cultivated in the Maghreb until recently (though see under ‘pea’ for some confusion of names).

4.3 Vegetables

The onion, *Allium cepa*, was domesticated in southwest Turkey and the Mediterranean Basin. Bunches of onions are depicted in Egypt from the Old Kingdom onwards (Germer 1989). Table 10 compiles Berber names for onion, which suggest a borrowing from Punic, although only Awjila preserves the initial b-. The Punic term underlies the Arabic, which is attested in later borrowings. Kossmann (2013: 142) suggests the third root, F-L, found in Eastern Berber varieties may be cognate with Nobiin (Nile Nubian) *filee*.

Table 10. Berber names for onion

Language	< Punic	< Arabic	Other
Punic	b.ʃ.l		
Senhadja		ləbʃəl	
Tarifiyt		řəbʃəř	
Iznasen		ləbʃəl	
Snous		ləbʃəl	
Kabyle		lebʃəl	
Nefusa		bʃəl	
Tashelhiyt	azalim		
Ntifa	azalim		
Mzab	zalim		
Ouargla	zalim		
Awjila	bzalim		
Ghadames			aflélo
El-Fogaha			ifələlən
Sokna			afəlīlu
Siwa			afəllú
Tuareg			efāleli

The carrot, *Daucus carota*, has a single origin in Central Asia, nowadays modern Iran (Iorizzo *et al.* 2013). The Berber names pose particularly interesting problems (Table 11).

Table 11. Berber names for carrot

Language	< Latin	< Arabic	Comment
Kabyle	zřudeyya		
Nefusa			
Ntifa		ħizzu	
Mzab	tifəsnəxt		
Ouargla	tafəsnaxt		

Berber names for cucurbits are more than somewhat confused. Cucurbit terms typically shift from one species to another because of their similar growth habit. Faience models of chate cucumbers survive from the Egyptian Middle and New Kingdoms (Germer 1985: 129). The watermelon evolved from the Sub-Saharan *Citrullus lanatus*, but apparently quite recently and Berber names are almost all borrowed directly from Arabic *dəllaħ*.

Table 12. Berber names for cucurbits

Language	Pumpkin	Pumpkin	Calabash	Cucumber	Melon	Gloss
Neo-Punic				q.š.ʹ		
Proto-Berber				*ā-γ[i]ssīm		
Tashelhiyt						
Ntifa		axsay		tayəššimt	agan	
Figuig						
Mzab		tamisa	taxsayt	takərwayt	tayəssimt	
		(<i>courge</i>)				
Ouargla		tamisa	taxsayt	takərwayt	tayəssimt	
		(<i>courge</i>)				

Photo 1. Carrot, pictured in the Juliana Aricia Codex



Roger Blench Archaeobotany and Berber names for cultivated plants

Language	Pumpkin	Pumpkin	Calabash	Cucumber	Melon	Gloss
El-Fogaha						
Kabyle	afeqluj	taxsayt	taceq ^w lalt	taxyart	afeqqus	
Segr					aġan	cucumber
Sus					aġan	green melon
Ghadames					tamăksa	melon
Siwa					tamuksa	melon
Awjila		təkšáymt				
Tuareg						
Zenaga		äššiykäšši				
Guanche					bugango	calabash, melon
Ancient Egyptian				š(s)b.t, dn(r)g		

‘Cucumber’ is one case where the Punic source of the Berber term is transparent and a rare case where the name appears to have been preserved in Zenaga. The Guanche name for ‘melon’ looks unusual, almost as if it was borrowed from an African language, though Wölfel (1965) suggests some possible Berber cognates. Surprisingly, Ouargla also has a loan from Hausa, *kabiwa*, for pumpkin.

Kossmann (2013:145) notes that the M-L-L group of words found in Ntifa and nearby lects. could go back to Latin *melo* (*melonem* in the accusative) (Table 13).

Table 13. A Berber root for melon

Language	Attestation	Comment
Ntifa	lmənun	melon
Figuig	amlul	melon
Mzab	amlun	melon
Ouargla	amlul	melon

4.4 Fruits/tree crops

Pomegranate, *Punica granatum*, originates south of the Caspian, between Eastern Turkey and Albania. The earliest evidence for the domestic form is in Jordan around 5000 BP (Zohary *et al.* 2012: 135). The earliest evidence for the pomegranate in Egypt is from the New Kingdom (18th Dynasty) (Germer 1985: 42).

Table 14. Berber names for pomegranate

Language	< Semitic	< Arabic	Comment
Mzab	aṛmun		
Chaouia	armun		
Nefusa	armún		
Ouargla	aṛmun		
Ghadames	armun		
Siwa	armun		
Tashelhiyt		ṛṛmman	
Ntifa		rrman	
Kabyle		eṛremman	

The apple, *Malus domestica*, grows in a wild form all across Europe and cultivated apples are interfertile with ‘crab-apples’. However, it does not appear to have reached North Africa until quite late. An Egyptian name for ‘apple’, *dph* is recorded in a text from Ramses II (Germer 1985: 63). This is apparently cognate

Roger Blench Archaeobotany and Berber names for cultivated plants

with Punic and is borrowed into Berber (Table 15). Kossmann (2013: 146) notes that most Berber languages borrow directly from Arabic.

Table 15. Berber names for apple

Language	Attestation	Comment
Punic	d-f	
Chaouia	ad <u>f</u> u	
Djerba	ad <u>f</u> u	
Ancient Egyptian	dph	

Fig, *Ficus carica*, is one of the oldest attested tree-crops, with possible evidence for managed trees in the Near East as far back as the 12th millennium BC (Kislev *et al.* 2006). Remains of figs are found in Egypt from the First Dynasty onwards (Germer 1985: 24). Morales & Gil (2014) show that *Ficus carica* was a staple on the Canaries from the earliest period of its introduction. Its importance is shown by the use of two distinct roots for dried and green figs in Guanche and most Berber languages.

Table 16. Berber names for fig

Language	I	II	III	< Arabic	Comment
Mzab		aməšši			
Central Morocco	tazart				originally a wild berry
Shilha	taḡorait				
Ntifa	tazzart	amessegdiḍ	aqaṛro		
Nefusa					
Mzab		amušši			
Ouargla		aməšši			
Ghadames		ālmāṭk			
Siwa		iməṭšan			
Iznasen	ta <u>z</u> art			lba <u>ḷ</u> kur	
Figuig				bakur	
Kabyle	tazart			lba <u>ḷ</u> kur	tazart = dried fig
El-Fogaha		məkkīn			
Sokna		aməčč			

Table 17 proposes a cognate for an unusual Guanche term for ‘dried fig’ and an apparently related word in Kabyle. Most Berber dictionaries do not record a distinct lexeme for dried fig.

Table 17. A Berber/Guanche name for dried fig

Language	Berber	Comment
Kabyle	taεamṛiwt	
Guanche, Gran Canaria	taharenemen	

Table 18 shows that the Guanche name for ‘green fig’ has a Berber cognate on mainland languages, as well as in Moroccan Arabic.

Roger Blench Archaeobotany and Berber names for cultivated plants

Table 18. Berber names for green fig

Language	Berber	Gloss
Shilha	aḥarmuṣ	unripe fig
Kabyle	akeṛmus	<i>figue de Barbarie</i> (i.e. wild fig)
Guanche, Gran Canaria	achormaze	green figs
Arabic, Morocco	ḳarmoṣ	

The almond, *Amygdalus communis*, was collected in the wild in the Near East and Central Asia before domestication. They are found across Neolithic Europe, and are recorded in the tomb of Tutankhamun (1325 BC). Berber usually borrows from Arabic, but at least one name appears to be a borrowing from Punic, suggesting the almond came to the Maghreb via Phoenician settlement (Table 19).

Table 19. Berber names for almond

Language	Berber	< Arabic	Comment
Arabic		lluz	
Tarifiyt		ḡḡuz	
Mzab		əlluz	
Kabyle		lluz	
Ntifa		lluz	
Ghadames	ašašid		< Punic šqd(m)
Ouargla		lžužət	

The date-palm, *Phoenix dactylifera*, is one of the oldest cultigens in this region and is recorded in Egypt from the predynastic era. Kossmann (2002) identifies the Common Berber form, **tiyni*, as a (rare) borrowing from Ancient Egyptian or Coptic. Berber names for date(-palm) are shown in Table 20.

Table 20. Berber names for date(-palm)

Language	Attestation	Comment
Sus	tiyni	
Mzab	tiyni	
Siwa	tiyni	
Ghat	čini	
Ouargla	tiyni	
Ntifa	tiyni	
Kabyle		eṭṭmer
Ghadames	aβéna	
Iullemeden	tèheni	
Tuareg	téhäyné	
Zenaga	täynih	
Ancient Egyptian	bnr(.t), bnj(.t)	
Coptic Sahidic	bnne (BNNE)	
Coptic Bohairic	beni (BENI)	

Only Ghadames Berber retains a form which directly resembles Egyptian, but it is assumed the other names dropped the initial and the t- prefix denotes the tree. Wölfel (1965: 506) notes the connection between Gomera *chepude* and a Berber root for date-palm. The Guanche name is usually a place but in one source, *terra de palmas*. This is hypothetically linked to Siwa *tifuḍa* (palm sprouts) and Tuareg *tafūdek*.

The European pear (*P. communis* subsp. *communis*) descends from two subspecies of wild pears, *P. communis* subsp. *pyraster* and *P. communis* subsp. *caucasica*, which are interfertile with domesticated pears (Morgan 2015). The pear is native to Europe and the Near East and was gathered before it was cultivated.

Roger Blench Archaeobotany and Berber names for cultivated plants

However, it was only introduced into Egypt in the Graeco-Roman era, and no hieroglyph for ‘pear’ is identified (Germer 1985: 62). It was known to the Romans, and the majority of Berber names are borrowed from Latin, with a few later borrowings from Arabic (Table 21).

Table 21. Berber names for pear

Language	< Latin	< Arabic	Comment
Senhadja	ṭafirast		
Snous		langʿas, bueăwidəṭ	
Kabyle	ifirəs		
Ntifa	tifirest		
Tashelhiyt	ṭafirast		
Central Morocco	ṭafirast		
Tarifiyt	ṭafirast		
Chaouia	ṭafirast		
Figuig		nnžaž	
Mzab		langas	
Siwa		əleanžaš	

The carob, *Ceratonia siliqua*, is native to North Africa. Many recovered remains are wild, although documentary records suggest that its cultivation was known to the Romans, as it is described by Pliny. Carobs are found in Egyptian tombs from the 18th Dynasty onwards (Germer 1985:95). There appears to a rather rare Berber root for carob, while some languages borrow from Latin *siliqua* and the remainder from Arabic (Table 22).

Table 22. Berber names for carob

Language	Berber	< Latin	< Arabic	Others
Tashelhiyt	takiḍa			
Ghomara			taxerṛubt	
Senhadja			lxarrub	
Kabyle			axerṛub	
Ntifa	tikiḍa			aberniḍ
Iznasen		ṭasliwya		
Figuig		ṭasliwya		
Snous			lxerṛub	
Ancient Egyptian				nḍm

The olive, *Olea europea*, is native to a large circum-Mediterranean region. The immediate ancestry of the cultivated olive is uncertain, but *O. europaea* may have arisen from *O. chrysophylla* in northern tropical Africa. It appears to have been first domesticated about 7000 BP, although distinguishing wild from cultivated stones is problematic (Lanza 2011). Table 23 shows the main names recorded for wild and cultivated olives. The root *azəmmur* denotes the wild olive in some languages, and this was applied the cultivated species. Most languages borrow from Arabic (which is the Semitic root), but Northern Tuareg apparently derives directly from Punic *zētīm*. The oldest evidence for cultivated olives in Egypt is New Kingdom (Germer 1985: 150). The Ancient Egyptian name *d.t* also apparently resembles the Semitic root *z-t*.

Table 23. Berber names for olive

Language	Wild	Cultivated	Other
Senhadja		əzziṭun	
Tarifiyt	azəmmur	ṭazitunt	
Iznasen	azəmmur		

Roger Blench Archaeobotany and Berber names for cultivated plants

Language	Wild	Cultivated	Other
Ntifa	azəmmur	zziṭun	
Snous	azəmmur	zziṭun	
Kabyle		azəmmur	aḥeccad
Nefusa		azəmmur	
Tashelhiyt	azəmmur	zzit	
Central Morocco		zzitun	
Ghomara		zzaytun	
Mzab		əzzitun	
Ouargla		zzitun	
Ghadames		azəmmur	
El-Fogaha		zzetún	
Siwa		azəmmur	
Tuareg, Ahaggar		ǎhatim	< Punic <i>zētīm</i>
Ancient Egyptian		d.t	

The quince, *Cydonia oblonga*, was domesticated in Southwest Asia and has been grown around the Mediterranean from an early period. It was known to the Akkadians, who called it *supurgillu*, whence Arabic سفرجل *al safarjal*, ‘quinces’. The Greeks associated it with Cydonia on Crete, whence the Latin name, borrowed into Berber at the period of Roman contact. Several Berber languages retain the old Latin root, while it has been replaced in others by a borrowing from Arabic.

Table 24. Berber names for quince

Language	< Latin	< Arabic	Comment
Senhadja		sfərʒl	
Ntifa		sfərʒəl	
Kabyle	taktunya		
Chaouia	taktunya		
Tashelhiyt		sfɪʒl	
Central Morocco	taktuniyt		
Mzab		əssəfərʒəlt	
Figuig		ssfərʒəl	

5. Synthesis and the agenda for further research

The archaeobotany of domestic plants in North Africa currently indicates early introductions by a maritime route into Morocco earlier than 7000 BP. It is unclear whether this was a true inception of farming culture or a failed experiment. The Canaries, however, do not have evidence for cultigens earlier than 300 AD, coinciding, apparently with a Berber migration. In Libya, the Near Eastern agricultural package appears around 2300 BP, and again probably associated with the maritime migration that brought Phoenicians. Despite the early dates for agriculture in the Nile Valley, there is no evidence for a westwards diffusion by land.

Prior to the expansion of Punic, Berber and then Arabic, unknown but distinct languages would have been spoken in Spain and along the North African coast. These languages can be referred to as ‘Old North African’ (ONA) with no presuppositions as to their genetic affiliation(s). It is possible they were related to the former languages of the Iberian peninsula, such as Tartessian. Archaeologically, these must be identified with the Capsian and its predecessors, although the languages spoken in the first period of the Neolithic in the Maghreb would also have been Old North African. But the completeness with which Berber eliminated ONA means little can be said about it. The Berber roots which are not of Afroasiatic origin may reflect these languages, or simply the long period of differentiation from the mainstream of the Afroasiatic lexicon.

Roger Blench Archaeobotany and Berber names for cultivated plants

On the basis of the linguistic evidence presented here, the gradual evolution of the Berber cultigen repertoire can be divided into a number of periods (Table 25).

Table 25. Chronological stratification of Berber cultigens

Period	Cultigens
Early Maghreb Nile Valley	barley, wheat, lentil, pea, broad bean, fig, olive date
Sub-Saharan Africa	pearl millet, sorghum, cowpea
Phoenician	apple, almond, cucumber, onion, pomegranate
Roman	quince, pear
Arab	chickpea

Although the settlement of the Canaries was relatively late, the earliest plants in the archaeobotanical record all have Guanche names which correspond rather well to Berber. At this point, the linguistic evidence is quite well-known, and although Berber continues to be documented, it is unlikely there will be major surprises. However, the archaeobotany of North Africa remains very sketchy, in part due to the security situation. More results will certainly help us in tying the linguistic analyses with concrete dates and also resolve some of the issues around the puzzle of language levelling among the Berber.

References

- Ballouche, A., Marinval, P. 2003. Données palynologiques et carpologiques sur la domestication des plantes et l'agriculture dans le Néolithique ancien du Maroc septentrional. (Site de Kaf Taht El-Ghar). *Revue d'Archéométrie* 27, 49-54.
- Barker, G. 2006. *The Agricultural Revolution in Prehistory: Why Did Foragers Become Farmers?* Oxford University Press, Oxford.
- Behrens, P. 1989. Langues et migrations des premiers pasteurs du Sahara: la formation de la branche berbère. *Libya Antiqua*, 31-53. Paris: UNESCO.
- Blench, Roger M. 2001. Types of language spread and their archaeological correlates: the example of Berber. *Origini*, XXIII: 169-190.
- Blench, Roger M. 2016. Reconstructing African agrarian prehistory by combining different sources of evidence: methodological considerations and examples for west African economic plants. In: *News from the past: progress in African archaeobotany. Proceedings of the 7th International Workshop on African Archaeobotany, Vienna, 2-5th July, 2012*. U. Thanheiser ed. 13-26. Groeningen: Barkhuis.
- Brett, M. & E. Fentress 1996. *The Berbers*. Oxford: Blackwell.
- Brogan, Olwen 1954. The Camel in Roman Tripolitania. *Papers of the British School at Rome*, 22: 126-131.
- Brooks, N., Clarke, J., Garfi, S., & Pirie, A. 2009. The archaeology of Western Sahara: results of environmental and archaeological reconnaissance. *Antiquity*, 83(322): 918-934.
- Camps, Gabriel 1974. L'âge du tombeau de Tin Hinan, ancêtre des Touareg du Hoggar. *Zephyrus*, 25 : 497-516.
- De Roever, Jutta Paulina 2009. The Pottery of Hunter-Gatherers in Transition to Agriculture, Illustrated by the Swifterbant Culture, the Netherlands. In: *Early Farmers, Late Foragers, and Ceramic Traditions: On the Beginning of Pottery in the Near East and Europe*. Dragos Gheorghiu (ed.) 150-166. Newcastle: Cambridge Scholars Publishing.
- Di Lernia, Savino 2006. Building monuments, creating identity: Cattle cult as a social response to rapid environmental changes in the Holocene Sahara. *Quaternary International*, 151:50-62.
- Fevrier, J.-G. 1964-65. La constitution municipale de Dougga à l'époque numide. *Mélanges de Carthage*, 85-91.
- Galand, Lionel 1970-1. Unité et diversité du vocabulaire berbère. In A. Giuffrè (ed.), *Atti della settimana maghribina (Cagliari 22-25 maggio 1969)*. 5-16. Milan, 17-20.
- Galand, Lionel 1987/88. Berberisch : der Schlüssel zum Altkanarischen? *Almogaren*, 18-19: 7-16.
- Germer, Renate 1985. *Flora des pharaonischen Ägypten*. Mainz: Verlag Philipp von Zabern.
- Germer, Renate 1989. *Die Pflanzenmaterialien aus dem Grab des Tutanchamun*. Hildesheim: Gerstenberg.

Roger Blench Archaeobotany and Berber names for cultivated plants

- Iorizzo, Massimo; Senalik, Douglas A.; Ellison, Shelby L.; Grzebelus, Dariusz; Cavagnaro, Pablo F.; Allender, Charlotte; Brunet, Johanne; Spooner, David M.; Van Deynze, Allen; Simon, Philipp W. 2013. Genetic structure and domestication of carrot (*Daucus carota* subsp. *sativus*) (Apiaceae). *American Journal of Botany*, 100 (5): 930–938. doi:10.3732/ajb.1300055.
- Jones, G. *et al.* 2013. DNA evidence for multiple introductions of barley into Europe following dispersed domestications in Western Asia. *Antiquity* 87, 701e713. <http://dx.doi.org/10.1017/S0003598X00049401>.
- Kerr, Robert M. 2010. *Latino-Punic epigraphy. A Descriptive Study of the Inscriptions*. Tübingen: Mohr Siebeck.
- Kislev, M.E., Hartmann, A. and Bar-Yosef, O., 2006. Early domesticated fig in the Jordan Valley. *Science*, 312(5778):1372-1374.
- Kossmann, Maarten G. 1999. *Essai sur la phonologie du proto-berbère*. Köln: Rüdiger Köppe.
- Kossmann, Maarten G. 2002. Deux emprunts à l'égyptien ancien en berbère. In: *Articles de linguistique berbère : mémorial Werner Vycichl*. Kamal Nâit-Zerrad ed. 245 – 252. Paris: l'Harmattan.
- Kossmann, Maarten G. 2013. *The Arabic Influence on Northern Berber*. Leiden: Brill.
- Lanza, Fabrizia 2011. *Olive: a global history*. London: Reaktion Books.
- Laoust, E. 1932. *Siwa. I. Son parler*. Paris: Leroux.
- Le Quellec, J.L. 2011. Rock art, scripts and proto-scripts in Africa: The Libyco-Berber example. In: *Written cultures in a colonial context: Africa and the Americas, 1500–1900*. Adrien Delmas & Nigel Penn eds. 3–29. Leiden: Brill.
- Lux, Cecile 2013. *Le tetserrét, langue berbère du Niger : Description phonétique, phonologique et morphologique, dans une perspective comparative*. (Berber Studies 38). Köln: Rudiger Koppe.
- Maca-Meyer, N., Arnay, M., Rando, J.C., Flores, C., González, A.M., Cabrera, V.M. & Larruga, J.M. 2003. Ancient mtDNA analysis and the origin of the Guanches. *European Journal of Human Genetics*, 12 (2): 155–162.
- Malášková, Zuzana & Václav Blažek 2012. Phoenician/Punic loans in Berber languages and their role in the chronology of Berber. Paper presented at the conference *Rethinking Africa's transcontinental continuities in pre and protohistory*. African Studies Centre, Leiden University, Leiden, 12-13 April 2012.
- Manning K., Pelling R., Higham T., Schwenniger J-L. & Fuller D.Q. 2010. 4500-year old domesticated pearl millet (*Pennisetum glaucum*) from the Tilemsi Valley, Mali: New insights into an alternative cereal domestication pathway. *Journal of Archaeological Science* 38 (2), pp. 312-322.
- Mikić, Aleksandar, Aleksandar Medović, Živko Jovanović, and Nemanja Stanisavljević 2014. Integrating archaeobotany, paleogenetics and historical linguistics may cast more light onto crop domestication: the case of pea (*Pisum sativum*). *Genetic resources and crop evolution*, 61(5): 887-892.
- Morales, Jacob 2010. *El uso de las plantas en la prehistoria de Gran Canaria: alimentación, agricultura y ecología*, Gran Canaria: Cabildo Gran Canaria.
- Morales, Jacob, & J. Gil 2014. Gathering in a new environment: the use of wild food plants during the first colonization of the Canary Islands, Spain (3- 2nd BC to 15th AD). In: A. Chevalier, Marinova, E., Pena-Chocarro, L. (eds.), *Plants and people: choices and diversity through time. EARTH Series Vol. 1*, Oxford: Oxbow Books.
- Morales, Jacob, Pérez-Jordà, G., Peña-Chocarro, L., Zapata, L., Ruíz-Alonso, M., López-Sáez, J.A. and Linstädter, J. 2013a. The origins of agriculture in North-West Africa: macro-botanical remains from Epipalaeolithic and Early Neolithic levels of Ifri Oudadane (Morocco). *Journal of Archaeological Science*, 40(6): 2659-2669.
- Morales, Jacob, Rodríguez, Amelia & Henríquez-Valido, Pedro 2017. Agricultura y recolección vegetal en la arqueología prehistórica de las Islas Canarias (siglos 111-xv dC): la contribución de los estudios carpológicos. In: *Miscelánea en homenaje a Lydia Zapata Peña (1965-2015)*. Eraso J.F. *et al.* eds. 189-218. Universidad del País Vasco/Euskal Herriko Unibertsitatea.
- Morgan, Joan 2015. *The book of pears: the definitive history and guide to over 500 varieties*. Chelsea Green Publishing.
- Muehlbauer, F.J. and Tullu, A. 1997. *Pisum sativum L.* Purdue University.
- O'Connor, Michael 1996. The Berber scripts. In: *The World's Writing Systems*. William Bright and Peter Daniels eds. 112-116. New York: Oxford University Press.
- Paradisi, U. 1963. Il linguaggio berbero di El-Fógâha (Fezzân) (Testi e materiale lessicale). *Annali, NS*, 13:93-126.
- Pelling, R., 2008. Garamantian agriculture: the plant remains from Jarma, Fazzan. *Libyan Studies*, 39: 41-71.

Roger Blench Archaeobotany and Berber names for cultivated plants

- Peña-Chocarro, L. and Peña, L.Z. 1999. History and traditional cultivation of *Lathyrus sativus* L. and *Lathyrus citera* L. in the Iberian peninsula. *Vegetation History and Archaeobotany*, 8(1-2), pp.49-52.
- Putten, M.V. 2013. *A grammar of Awjila Berber (Libya): based on Umberto Paradisi's material*. PhD. Leiden University.
- Souag, M. Lameen 2015. Explaining Korandjé: Language contact, plantations, and the trans-Saharan trade. *Journal of Pidgin and Creole Languages*, 30(2): 189-224.
- Taine-Cheikh, C. 1979. Aperçus sur la situation sociolinguistique en Mauritanie. In : *Introduction à la Mauritanie*, 169-173. Centre de recherches et d'études sur les sociétés méditerranéennes, Centre d'études d'Afrique noire. Paris: Editions du CNRS.
- Taine-Cheikh, Catherine 2008. *Dictionnaire Zénaga-français (berbère de Maurétanie)*. Köln: Rudiger Köppe.
- Taine-Cheikh, Catherine 2010. *Dictionnaire français-zénaga (berbère de Maurétanie)*. Köln: Rudiger Köppe.
- Tanno, K.I. and Willcox, G., 2006. The origins of cultivation of *Cicer arietinum* L. and *Vicia faba* L.: early finds from Tell el-Kerkh, north-west Syria, late 10th millennium BP. *Vegetation History and Archaeobotany*, 15(3), pp.197-204.
- Tombback, Richard S. 1978. *A Comparative Semitic Lexicon of the Phoenician and Punic Languages*. Missoula, MT: Scholars Press for the Society of Biblical Literature.
- Van der Veen, M. 1992. Garamantian agriculture: the plant remains from Zinchechra, Fezzan. *Libyan Studies*, 23: 7-39.
- Vernet, R. and J. Onrubia-Pintado 1994. La place des ancêtres de berbères dans le Sahara Néolithique. In: *Milieux, hommes et techniques du Sahara préhistorique*. [No editor] 53-67. Paris: Harmattan.
- Vycichl, Werner 1952. Punischer Sprachinfluß in Berberischen. *Journal of Near Eastern Studies*, 11: 198-204.
- Watson, Andrew 1983. *Agricultural innovation in the early Islamic world: The Diffusion of Crops and Farming Techniques, 700–1100*. Studies in Islamic Civilization, Cambridge, UK: Cambridge University Press.
- Wölfel, Dominik Josef 1965. *Monumenta linguae Canariae*. Austria: Akademische Druck.
- Yadav, Shyam S. David McNeil, Philip C. Stevenson (eds.) 2007. *Lentil: An Ancient Crop for Modern Times*. Berlin: Springer Science & Business Media.
- Zapata, L., Lopez-Saez, J.A., Ruiz-Alonso, M., Linstadter, J., Perez Jorda, G., Morales, J., Kehl, M., Pena-Chocarro, L., 2013. Holocene environmental change and human impact in NE Morocco: Palaeobotanical evidence from Ifri Oudadane. *The Holocene*, 23:1286-1296.
- Zilhão, J. 2001. Radiocarbon evidence for maritime pioneer colonization at the origins of farming in west Mediterranean Europe. *Proceedings of the National Academy of Sciences* 98 (24), 14180-14185.
- Zohary, Daniel; Hopf, Maria; Weiss, Ehud 2012. *Domestication of Plants in the Old World: The Origin and Spread of Domesticated Plants in Southwest Asia, Europe, and the Mediterranean Basin*. (Fourth ed.). Oxford: University Press.
- Zyhlarz, E. 1932. Die Sprache Numidiens. *Zeitschrift für Eingeborenen-Sprachen*, 7:275-280.