Vernacular names for African millets and other minor cereals and their significance for agricultural history

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ACRONYMS

*	regular reconstruction
#	quasi-reconstruction based on rapid inspection of forms
AD	Anno Domini
BC	Before Christ
BP	Before present

ABSTRACT

Apart from the well-known cereals such as sorghum and millet, Africa has a number of small millets, notably fonio, iburu, *ṭef* and *Paspalum scrobiculatum* which are poorly represented in the archaeobotanical record. The fragmented distribution of fonio suggests that it was formerly more widely cultivated. The paper uses the patterns discerned in vernacular names to explore their history. Fonio is the most widely distributed and its vernacular names fall into two significant subgroups, in the Mande/Atlantic area of West Africa and in Central Nigeria. Iburu names are only recorded for Nigeria, although there is another region of cultivation in the Atakora mountains in Benin. Names for *ṭef* are extremely similar throughout the Ethiopian region, suggesting the crop has been dispersed by a dominant culture, probably the Ethiosemitic speakers, perhaps as part of the diffusion of seed/plough agriculture. The paper calls for further more detailed research on these important and neglected species.

1. Introduction

African cereal production today is dominated by maize, which is the staple of much of Eastern and Southern Africa and the more humid and subhumid zones of West-Central Africa. Pearl millet and sorghum are still the major cereals in the semi-arid regions. Finger-millet was once common in an arc between Nigeria and South Africa but is now grown only for beer in most places[1] (Blench this issue). North African staples such as wheat and barley have made little impression on Sub-Saharan Africa, although both are grown widely in Highland Ethiopia. Apart from these, Africa has a variety of small millets, which have rather local distributions. The biogeographical evidence in the relevant section below suggests that at least one of these, fonio, was more widespread and was probably brought into domestication prior to pearl millet and sorghum. The small millets of Africa are shown in Table 1;

Table 1. African small millets

Common name	Scientific name
Fonio, hungry rice	*Digitaria exilis*
iburu	*Digitaria iburua*
ṭef, t'ef	*Eragrostis tef*

Portères (1976) has also drawn attention to *Brachiaria deflexa* (Schumach) C.E. Hubbard var. *sativa* Portères, a cereal grown in small quantities in the highlands of the Fouta Djalon, in Guinea, and ditch millet, *Paspalum scrobiculatum* L. var. *frumentaceum*. African rice, *Oryza glabra*, often fills very similar niches to small millets, especially under hill cultivation, and a discussion of its likely history can be found in Blench (2006).

Our understanding of the history of the domestication, spread, and retreat of the African small millets is

[1] Pearl millet and finger-millet are dealt with separately in companion papers.

hampered by the sparse archaeological data, and very limited biomolecular work. The principal author to have focused on small millets was Roland Portères (1950, 1976 and other references below); his work was of pioneering importance and remains the only documentation for some populations. Moreover, he was one of the first authors to recognize the importance of compiling vernacular names. Nonetheless, the majority of his fieldwork was in the 1950s, and there has been considerable further research since then, although syntheses are very limited. The other key players are Auguste Chevalier (1922) who provided the first biological descriptions of some species and Jack Harlan and his collaborators, who accelerated work on identifying cultivars of many cereals (e.g. Harlan, De Wet & Stemler 1976).

A major disruptive influence when interpreting the geography of cultivation is the spread of maize; introduced into Africa by the Portuguese and the Spanish in the 16th century, it has rapidly become dominant, particularly in Eastern and Southern Africa, where it has benefited from preferential treatment by government programmes. Small millets have disappeared or planting has been much reduced, millet names have been transferred to maize and many cultivars and local names have thereby been lost.

Although Portères (1958) pioneered the use of linguistic evidence in analysing crop history further work has been limited. However, given the sparse biomolecular and archaeobotanical materials, comparative linguistics remains an important tool for the reconstruction of prehistory. By compiling the vernacular names for a plant it is possible to see whether there are common names in a particular geographical area or language family, or whether the names show considerable diversity. Where a common name is widespread, we can deduce that this represents an important nucleus for primary spread. Nonetheless, the use of linguistic evidence is not without problems, as the literature is plagued by poorly identified crop names; it is often not possible to establish which species is being referred to except by inference[2]. Blench (2006) represents a compressed presentation of the evidence, while this paper[3] is an extended view of the linguistic and distributional evidence for the history of African small millets.

2. Individual species

2.1 Fonio, fundi, hungry rice, fundi, *Digitaria exilis* (Kippist) Stapf

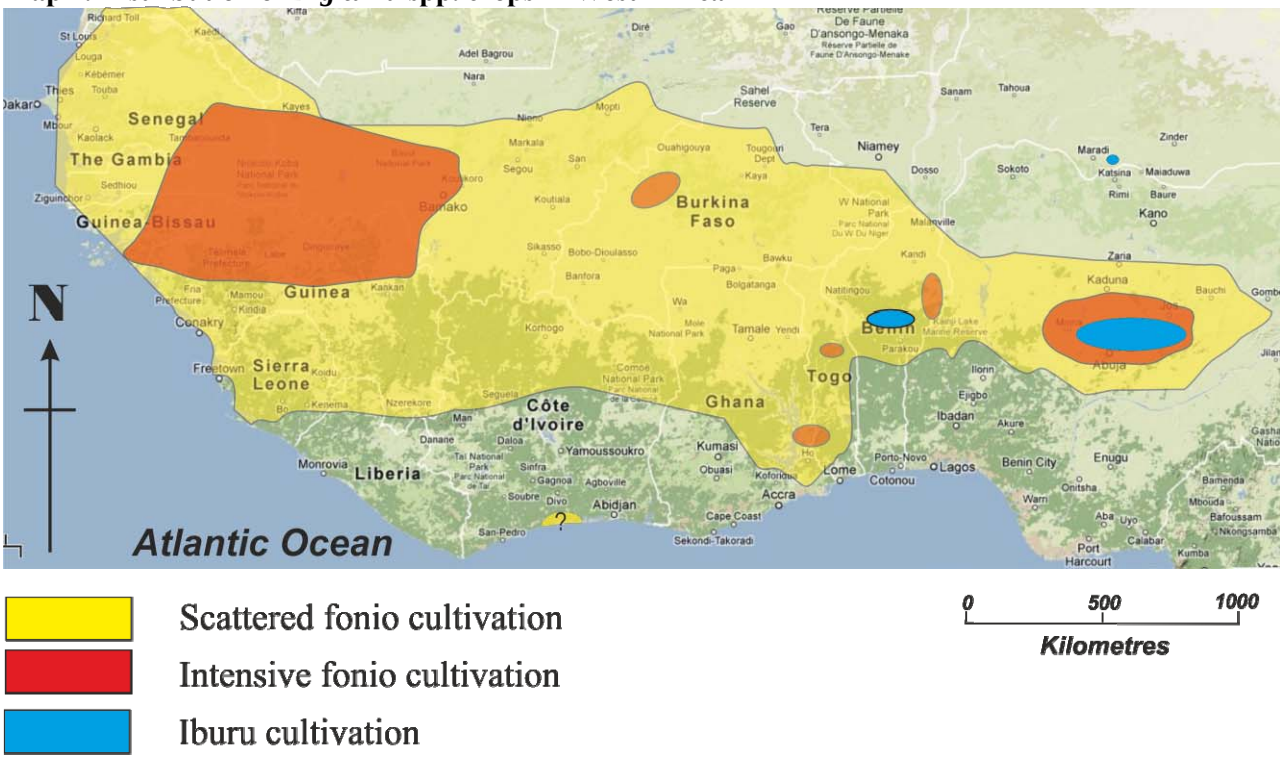
2.1.1 Background

Fonio is a short, grass-like cereal derived from a wild species, *Digitaria longiflora*. It is only slightly differentiated from its wild relative and fonio fields are often invisible to unpractised observers. Fonio is cultivated between Guinea and the Nigeria-Cameroun border (Chevalier 1922; Portères 1955; Busson 1965; Hilu *et al.* 1997). Its current rather disjunct distribution in West Africa suggests that it was formerly spread over a much wider area, but that it has been reduced to relic cultivation by high-yielding grain crops (Map 1). NAS (1996) shows a small area of cultivation in southern Cote d'Ivoire which is not mentioned elsewhere in the literature, and must be regarded as in doubt, pending confirmation. Morales-Payán et al. (2002) report that it is also cultivated in the Dominican Republic, apparently brought there from West Africa as a by-product of the slave trade.

[2] Some of the reference sources are less than helpful. For example, NAS (1996) gives vernacular names by country, leaving the reader to guess which of the seventy languages of Cote d'Ivoire a particular word represents.

[3] Elements of this paper were included in presentations at the RIHN Symposium 'Small millets in Africa and Asia' Tokyo September 19-20th, 2010, and I would like to thank the organisers for the invitation to attend.

Map 1. Distribution of *Digitaria* spp. crops in West Africa



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Some confusion has been created in the literature by the use of 'fonio' to refer to some species of gathered wild grass seeds, notably *Panicum* ssp. in Mali and *Cenchrus biflorus*, in the literature related to NE Nigeria and adjacent Cameroun and Chad. As a consequence, officially published maps, such as those on the CIRAD website, are quite inaccurate[4].

The early accounts of West African farming testify to the abundant landraces of fonio present in the early twentieth century. Gaißer (1912) describing the Lamba [=Losso] of Northern Togo lists twenty-eight varieties and Portères' (1955) account of Guinée also lists numerous cultivars. Recent years have seen something of an expansion of the biological literature on fonio, especially in relation to the collection of landraces (e.g. Adoukonou-Sagbadja et al. 2004; Adoukonou-Sagbadja et al. 2006; Clottey, V.A. et al. 2006). These are valuable in documenting the diversity of races in specific areas, but add little to the overall picture. Syntheses of the existing literature have also been published (e.g. Jideani 1990, 1999a; Haq & Ogbe 1995; NAS 1996) but there is a strong tendency for these publications to copy one another, sometimes injecting additional errors. Kandeh & Richards (1996) describe the conservation of varieties by farmers in Sierra Leone, making the point that harsh environmental conditions lead to greater agrobiodiversity. A certain amount of biochemical research has been undertaken (Jideani 1999b) but for many countries, there are no recent reports at all. All authors seem to agree that fonio and iburu are in retreat due to high labour costs in processing the grain. However, reliable figures to support this (and which not aggregate fonio and iburu) do not exist. Personal observation in Nigeria suggests that fonio is making a significant comeback, as maize yields depend on high levels of quality seed, fertiliser and pesticides and these have become so expensive following the withdrawal of subsidies that most farmers can no longer afford them. As a consequence fonio, which is both drought-resistant and does not depend on external inputs, once again becomes a practical species to plant.

Diversity within *Digitaria exilis* is broad, with landraces differing in plant habit, plant colour, glume colour, grain size and length of the crop cycle. Five varieties have been distinguished, using criteria established by Portères for Francophone countries:

[4] See the website http://fonio.cirad.fr/ for further bibliography and more detailed information

– var. *gracilis* Kankan region (Guinea).
– var. *stricta* Casamance (Senegal), Guinea, Mali and Burkina Faso.
– var. *rustica* Casamance (Senegal), Guinea, Mali and Burkina Faso.
– var. *mixta* Guinea.
– var. *densa* Togo

but clearly this is a far from complete characterisation of the landraces. Fonio tolerates a wide variety of habitats, from the sea-coast in Sierra Leone to semi-arid savanna in Burkina Faso to high-altitude grasslands such as the Jos Plateau. On the Fouta Djallon Plateau of Guinea, it grows on acidic soils with very high aluminium content. This level of adaptation points to a considerable time-depth.

Fonio seeds are small and thus hard to distinguish in the archaeobotanical record, hence there are only a few reports. Moreover, a lack of reference collections makes it difficult to discriminate between the crop and its wild relatives. The earliest archaeological date appears to be Takezawa and Cisse (2004) who present evidence for cultivated fonio from the site of Kolima Sud-Est in Mali dated to c. 1000-400 BC. Nixon et al. (2011) report the likely presence of fonio from the site of Cubalel in Senegal dated to the Late Iron Age, i.e. the last few centuries BC and at Essouk in northern Mali from their period 3b (1100-1300 AD). Compared with the overall zone of cultivation this is not only sparse but provides little in the way of certainty about dating.

The first written reference to fonio may be Al-Bakri, writing in 1068, when he mentions that in Sijilmasa the 'wheat has a small grain'. The Arab geographer Al-'Umari, writing in 1337-8 says '[*funi*].. is a downy pod, from which, when crushed, there issue seeds like those of mustard, or smaller and white in colour' (Levtzion & Hopkins 1981: 263). *Digitaria* does not have a downy pod, but the description of its seeds suggests fonio. Ibn Baṭṭuṭa, who travelled in Sahelian West Africa a decade later, in 1354, also mentions fonio cultivation in Mali.

Fonio plays an important role in ritual systems across West Africa, even where it is no longer the dominant crop in an agricultural system. One of the better-known examples is the cosmogony of the Dogon in Mali. Griaule (1948: 175-183) describes the central role of the fonio seed in Dogon thinking and (remarkably) its symbolic equivalence with menstrual blood[5]. In Maurice's (1986:73) account of the Somba in northern Benin he describes the elaborate sacrifices undertaken before sowing fonio. The other region where fonio is ritually significant is in Central Nigeria. Smith (1982) notes the use of fonio (acca) seed spread on shrines among the Kagoro people, and personal observations suggests that similar practices occur both among other Plateau speakers such as the Aten [Ganawuri] and Chadic-speakers such as the Ron [Kulere]. Berthoud (1969) describes the central role of fonio in the production system of the Aten in the period before maize was introduced.

2.1.2 Language data

Vernacular names for fonio are compiled in Burkill (1994) and for western languages in Vydrine (ined.) and Segerer (ined.). Data for both fonio and iburu in Nigerian languages has been collected by the present author. The pattern shown by the names points to a major nucleus in the Mande/Atlantic speaking area in Guinea and adjacent regions and one in Central Nigeria. Table 2 shows a widespread root for fonio, something like #*fundi*, in the heartland area where the cereal is likely to have been domesticated. It is clearly freely borrowed between families and phyla, hence the variety of phonological shapes.

[5] I am aware that some of Griaule's ethnography has come to be seriously questioned (e.g. Beek 1991). Nonetheless, fonio *is* an important crop in the Dogon area and this part of the material has not been disputed.

Table 2. The *#fundi* root for *Digitaria exilis* in West Africa

Phylum	Branch	Language	Attestation	Language	Attestation
Niger-Congo		**Mande**		**Atlantic**	
	West	Mandinka	fíndi	Wolof	fini
		Bamana	fíni	Fulfulde	fonyo
		Maninka	fónĩ	Jola-Fonyi	finya
		Koranko	funa	Bedik	fɔ́ndɛ́ŋ
		Xasonka	fúndi	Basari	funyáŋ
		Kpelle	miniŋ	Manjaku	findi
		Mende	póté	Bulom	peni
		Loko	pénî	Balanta	fénhe
		Looma	pɔdɛ	Diola	ebónay
		Kono	fonde	Biafada	bofinhe
		Vai	pende	Kisi	kpendo
		Susu	fundeŋ	Limba	fundili
		Yalunka	fúndé-ná	Temne	a-pende
		Bobo	fɛ̃ *pl.* fã̃		
		Soninke	fuŋaN/fuŋaŋŋe	**Gur**	
	SE	Guro	fní	Kurumfe	peŋfe *pl.* peŋi
		Dan	pɣ̋ŋ̋	Nawdm	figm
		Mwan	fĩ́ĩ́	Somba	ipwo
		Wan	fɛ̃ŋ́		
				Kwa	
				Anufo	ǹfôni
		Dogon		**Kru**	
		Dogon	põ	Wobe	pohim
Nilo-Saharan		**Songhay**	fingi		

Sources: adapted from Vydrine (ined.), Segerer (ined.), Burkill (1994)

The presence of the most coherent form of the root seems to occur in the West Mande languages, and it is likely that this is where it originated. SE Mande languages show characteristic compressed forms and all trace of the –nd- sequence and the back vowel in V_1 position has been lost. The extreme eastern Mande languages, such as Busa and Samo, do not have cognate forms, and indeed there is no evidence speakers make use of fonio. Atlantic forms are much more morphologically diverse; those that look very like Mande, such as Bedik and Manjaku, are probably direct borrowings. The other Atlantic forms have a diverse range of incorporated morphology, which argues for loanwords. A Mande origin would make sense, in terms of ecology, since the *Eragrostis* spp. are primarily adapted to semi-arid ecologies. The terms for African rice, *Oryza glaberrima*, in West African languages form a pattern remarkably similar to fonio, originating in Mande and subsequently borrowed into Atlantic (Blench 2006).

Some of the other regions of fonio cultivation, such as the Atakora mountains in Northern Benin, are poorly documented linguistically. However, Central Nigeria has a set of roots completely unrelated to the *#fundi* complex, which indicates that this region was cut off from the main zone of cultivation at an early period (Portères 1955, 1976; Burkill 1994: 226). Table 3 shows a compilation of names for *Digitaria exilis* in the languages of Central Nigeria;

Table 3. Central Nigerian roots for fonio

Family	Language	I	II	III	Others
Afroasiatic					
Chadic	Hausa	áccàà			
	Mwaghavul		kúsúk		
	Daffo-Batura				fòʔ
	Monguna				fòʔ
	Sha		kuʃuk		
	Mundat	cwáy			
	Karfa	hâʧ			
	Mangar				ɗiya
	Richa	aac			
	Fyer				fòt
	Tambas				wusɔ
Niger-Congo					
Plateau	Berom	cùn			
	Iten	ìcen			
	Cara	can			
	Izere	ìtson			
	Hyam		ɓyo (plant)		
	Hyam	sàŋ (seed)			
	Shang		kpya		
	Ashe		ì-kpɛ̂		
	Idun	itsem			
	Tinor	icɛm			
	Nyankpa	ɛcɛm			
	Ndun	ikywan			
	Shakara	ikwan			
	Anib		ikus		
	Ayu	ìkan			
	Bu			isu	
	Ce		ì-kíí		
	Mada			běntsu	
	Ningye		kyi		
	Ninka		ikí		
	Ninzo		i-kə́		
	Numana		ikyés		
	Nunku				bínklɔ́k
	Rindre				ìrɛ̀
	Ake				àlɛ̀
	Eggon				alem
	Jijili	icwe			
	Hasha	ì-khwen			
	Sambe	ǹkwan			
	Toro	hwanɔ̀			
	Tesu		kpɔ̀kpɔ̀		yeʃì
	Tarok				ìbìʃĩ
Kainji	cLela				pɔ̀ɔʧɔ̀
Jukunoid	Wukari	ʧà			
Nupoid	Gbari			esu	
	Nupe			esò	
Yoruboid	Yoruba			sùúrù	

Compared with the #*fundi* complex, these names are much more diverse, although the most common root

(I), something like *#cʷan*, is spread throughout the region and is borrowed between Afroasiatic and Niger-Congo languages. Root III is characteristic of the Volta-Niger languages, somewhat to the south. Fonio cultivation has ceased in this region and it is possible extensive interviewing of older farmers would uncover a more complex pattern. The data therefore suggests that the initial domestication of fonio was in the Guinea/Mali region and this was the primary nucleus of diversification. It would have subsequently spread westwards and upon reaching Central Nigeria it underwent a renewed period of diversification.

2.2 Iburu, *Digitaria iburua* **Stapf.**

Iburu is a cereal closely related to fonio, but with a much more restricted distribution (Map 1). Although the plant is taller than fonio, the grain is still smaller, making the labour of collecting it very intensive. The wild species from which it was domesticated remains uncertain, although *Digitaria barbinodis* Henr., which sometimes occurs crossed with *D. iburua* in Central Nigeria, is a probable candidate (Burkill 1994). The main area of distribution of iburu is in Central Nigeria, with an isolated patch of cultivation far to the north in Zinder in Niger (Portères 1955, 1976). Portères (1946) also reports cultivation in the Atakora Mountains of Togo and Benin. This suggests that prior to the spread of major cereals such as sorghum, iburu cultivation was more widespread, although probably never as significant as fonio. Linguistically, iburu is sometimes treated as a type of fonio, sometimes as an entirely separate species. Table 4 shows a compilation of names for iburu in Central Nigerian languages, based on fieldwork by the present author[6].

Table 1. Central Nigerian names for iburu

Family	Language	I	II	Others
Afroasiatic				
Chadic	Hausa	ìbúròò		
	Mwaghavul			sùn
Niger-Congo	Berom	but		
Plateau	Iten	èbʊ̀t		
	Cara			tamu
	Shall	fut		
	Izere	àbur		
	Hyam			hat
	Shang			gbaní
	Idun			iyar
	Nyankpa			ɛŋat
	Ndun			iza
	Shakara		amáná	
	Anib		ànwɛ̀	
	Ayu		àmana	
	Bu			inci
	Ce			à-dísík
	Ningye			cim
	Ninka			àmə̌n
	Numana			ncím
	Nunku			bíncə́m
	Rindre			iki
	Jijili			ŋturu
	Tesu			yeʃì hùrùtùtù
	Sambe			yaʃì
	Toro			yaʃì
	Fyem			tyɛ̀rɛ̀p
	Horom			tɛ̀lɛ̀
	Rukul		mundel	
	Kwang			ʃàràb

[6] Eliciting correct names for iburu is difficult, since the crop is only known to older farmers, and sometimes is not regarded as distinct from fonio.

Family	Language	I	II	Others
	Sur			tiʃi musum
Kainji	Mala	ibulu		

Compared with fonio, the names for iburu are extremely diverse. The most common root, something like #-*butu*, occurs in languages of the Jos area, and is likely to be the source of the Hausa, since no other Chadic language has a cognate form. The other roots are all relatively low frequency. Unfortunately there is no linguistic data for Atakora languages to detect a link (or lack of it) with the Nigerian names.

2.3 ṭef, t'ef *Eragrostis tef*

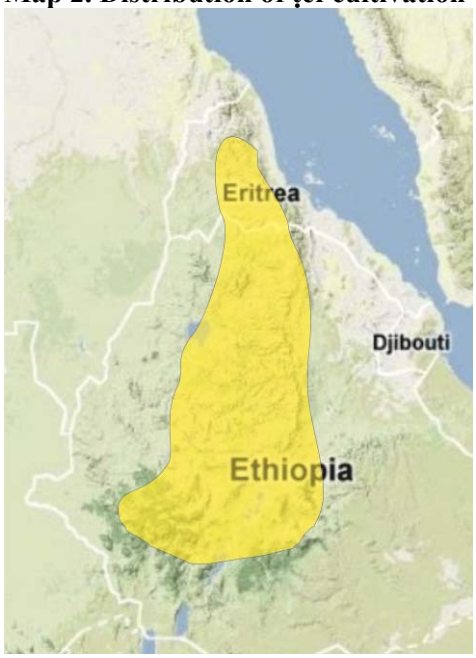
Ṭef, *Eragrostis tef*, is a cereal entirely confined to the Ethiopian highlands, and domesticated there (Photo 1). Its reported distribution in cultivation is shown in Map 2. Rather like fonio, it has very small grains, is labour-intensive to process but can yield well in infertile soils (Chiovenda 1928). Its main use is to make the national staple, *injira*, a large fermented pancake which is the accompaniment to all major meals (Westphal 1975). Trotter (1938) notes that the first clear record of *ṭef* appears to be Zuccagni (1775). Descriptions of its cultivation in Ethiopia are to be found in Burtt-Davy (1913) and Cifferri & Baldrati (1940). Ketema (1989, 1993) provides a broad overview of botany, history, cultivation systems and breeding prospects, as well as a comprehensive bibliography to date of publication. *Ṭef* is extremely varietally diversified (Bekele et al. 1995) and recent attempts have been made to improve the crop through variety selection using farmers' priorities (Belay et al. 2006).

The common name for *Eragrostis* spp. is lovegrass, and many species of lovegrass are gathered for their grains. Burkill (1994) records *E. cilianensis, E. pilosa, E. gangetica, E. ciliaris* and *E. tremula* as regularly gathered in subdesertic regions of West Africa for food. *E. pilosa* is accumulated by ants and Saharan nomads have been known to raid the nests of ants for the seeds (Gast et al. 1972). Haudricourt (1941) notes that gathering lovegrass seeds has a long tradition in the Sudan. The wild relatives of *ṭef* have been the subject of considerable discussion (e.g. Ponti 1978; Jones et al. 1978; Bekele & Lester 1981; Ingram & Doyle 2003). The review in Costanza *et al.* (1979) concludes that the nearest wild relative of *ṭef* is *E. pilosa*, a conclusion has been confirmed in other publications.

The archaeobotany of *ṭef* remains sparse with almost all finds dated by context rather than direct dating. Soderstrom (1969) claims that *ṭef* appears in pottery impressions at Hajar bin Humeid, a site in southern Yemen dating to the first century BC. However, without clear evidence that *E. ṭef* can be distinguished from its edible wild relatives and without direct dates, as well as a lack of ethnographic evidence for *ṭef* in Yemen, this claim must be treated with scepticism. Barnett (1999:59) tabulates finds of *ṭef* in Ethiopia, the earliest of which is Lalibela cave at ca. 2000 BP, while Boardman (1999) records *ṭef* from a mid-first millennium BC site near Aksum. At best we can say that *ṭef* must be several thousand years old in Ethiopia.

Portères (1958) approached the history of *ṭef* through the analysis of Ethiopian vernacular names. Almost all the names recorded in both Ethiosemitic and Cushitic languages are cognate with the Amharic *ṭef* (Ge'ez *ṭāhf* ጣሕፍ; Tigrinya *ṭaff* ጣፍ) and since the crop was clearly not brought from outside, it was probably first domesticated by Cushitic speakers (Ehret 1979). There have been some rather wild suggestions as to the etymology of this word, such as borrowing from Arabic *tahf*, a grass eaten during famines in Yemen, Amharic *teffa*, meaning 'lost', as people easily lose the seeds, and Greek τιφη, 'poor wheat' (Barnett 1999:65). Ehret (1979: 167) lists some possible cognates for Ethiosemitic *ṭef*, some of which are words for 'food' and others for different cereals. This uniformity of terminology is rather surprising, and perhaps implies that it was not a very ancient domesticate but only spread with the introduction of cereal agriculture and the ard [plough],

Map 2. Distribution of ṭef cultivation



displacing former vegecultural systems. A study of the vegeculture of highland Ethiopia, focusing on enset terminology, indicates that such a pattern can be detected from the point of view of the indigenous Omotic languages (Blench 2007).

Photo 1. Tef, *Eragrostis tef*

2.4 Kodo [birds' millet, ditch-millet] *Paspalum scrobiculatum* L. var. *polystachyum* Stapf.

Indian kodo, *Paspalum scrobiculatum* L. var. *frumentaceum*, remains a staple for subsistence farmers in many parts of South Asia (Watt 1889-93:332). It is highly varietally diversified in different regions, suggesting considerable depth of establishment (De Wet *et al.* 1978). The outer husk or pericarp can be toxic and must be removed in the milling process (see Portères, 1976:432 for references on poisoning outbreaks). Fuller et al. (2004:121) review the principal archaeobotanical records for India and conclude that it was formerly widely cultivated in the first millennium BC. Wild forms of this plant are found in low-lying places across Africa and Asia giving rise to the name 'ditch-millet'. A very similar cultivated cereal also exists in Africa, *Paspalum scrobiculatum* L. var. *polystachyum* Stapf. The only source for the use of kodo as a crop is Portères (1976: 429-433); no mention of its existence appears before 1959. Although this cereal is also gathered, like many other *Paspalum* spp. among the Kissi and Kuranko of southern Guinea, it is transplanted into rice paddies or else encouraged to invade eroded upland rice patches (NAS 1996:339). The similarities between these two plants and existence of wild forms in Africa, led Portères to observe that they are indeed the same plant and that kodo millet must originally have been carried from Africa to India. Since there are no records of even pseudo-cultivation in the East African region, this may have been as a 'promising' wild plant.

3. Conclusions

The history of small millets in Africa remains remarkably under-researched; agronomic, archaeobotanical and linguistic data are scattered and often unreliable. Fonio in particular has a wide distribution which points to the obscuring of its former importance in earlier subsistence systems, first by the spread of sorghum and millet and then later maize. The linguistic evidence points to two separate nuclei, in the region between Guinée, Mali and Burkina Faso and a separate zone in Central Nigeria. It is possible that this reflects two separate domestications, or more probably expansions of promising cultivars. If pearl millet has been displaced it, fonio it may well be the older domesticate. Currently the earliest *Pennisetum glaucum* is that recorded the Malian Neolithic sites of Karkarichinkat from 2500-2000 BC (Manning et al. 2011) in which case fonio might be as much 5000 years old. The key role played by fonio in ritual systems similarly argues for great antiquity, although no dates can be attached to such cultural embedding. Needless to say there is no archaeobotanical support for such a date, but it remains a working hypothesis. The argument made by Portères (1950) remains valid; for the earliest agriculture in West Africa, we must look to 'minor' species

with broad but scattered distributions; these almost certainly represent relics of crops which were formerly much more significant. The same applies to iburu, although this must always have has a more limited distribution.

The situation with *ṭef* is somewhat different; although certainly domesticated in Ethiopia, the uniformity of its terminology points strongly to a co-association with the spread of grain crops and plough agriculture. The production of *injira* pancakes requires a specific cooking technique more characteristic of the Arabian Peninsula. The spread of *ṭef* may thus be related to the spread of Ethiosemitic languages and with the corresponding hierarchical political and landowning systems. Only more precise elicitation of terminology, will make it possible to carry this analysis further. Further work in both disciplines should improve the 'fit' between the two datasets.

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