VERNACULAR NAMES FOR TARO IN THE INDO-PACIFIC REGION AND THEIR POSSIBLE IMPLICATIONS FOR CENTRES OF DIVERSIFICATION AND SPREAD

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ACRONYMS

#	quasi-reconstruction	BP	Before present
*	regular reconstruction	C	consonant
AD	Anno Domini	Kya	‘000 years ago
BC	Before Christ	mtDNA	mitochondrial DNA
		V	vowel

1. Introduction

Taro (*Colocasia esculenta*) is one of oldest and most important cultigens in the Indo-Pacific region and even on the mainland remains a significant element in the staple diet in humid areas where rice has now become dominant. The date(s) and place(s) of the domestication of taro remains controversial; the wild ancestors of lowland taro occur across an extensive tract from the island of New Guinea through to the foothills of the Himalayas, so biogeography alone cannot answer this question. Matthews (1991) suggests that the origin of domesticated taros is to be found in the 'wildtype' *C. esculenta var. aquatilis*, a natural species in NE India or SE Asia. However, he notes the occurrence of apparent wildtype taros over a broader geographical range, as far east as Australia and New Guinea, and suggests that domestication could have taken place within this area. Moreover, there is a second, cold-climate type, characterised by a smaller corm and spreading stolons, found at higher altitudes, for example in the Himalayas, but spreading across north China through to Japan. Yoshino (2002) is the first to explicitly describe a possible cold-adapted wildtype taro in the Himalayas. Indeed Yunnan is an area rich in taros, but so far barely described (Eyzaguirre 2000). It is widely held that there was another, perhaps earlier, domestication in the Melanesian area (Lebot & Aradhya 1991; Lebot et al. 2004). Evidence for an ancient cultivated form has been reported at Kuk Swamp in New Guinea (Denham et al. 2003; Fullagar et al. 2006). These are dated to 10,200-9910 *cal.* BP and simultaneously there is a palaeosurface of pits, runnels, stake and post holes. In the Andaman Islands, there is a strong possibility of wild taro being native but unreported in the islands, due to the bias of botanists against reporting wild forms of this cultivated species.

The use of vernacular names to interpret patterns of diversification and spread of major staples has so far been of limited importance in SE Asia, and most attention has been given to rice (e.g. Revel 1988). For the Pacific, there has been more effort in relating linguistic data to attested archaeology and Ross et al. (2008) represents an important compilation of reconstructions for plant names relating to the Oceanic languages. Hays (2005) has compiled a substantial database of vernacular names for tubers in Irian Jaya, apparently the precursor of a more complete work. Unfortunately, his analysis does not cite actual forms, except in passing. But to date, the implications of vernacular names for taro have been little explored. This paper[1] makes a preliminary attempt to bring together the scattered evidence and to speculate on the significance of its patterns for our understanding of taro diversification. It is important to emphasise the linguistics is not biology; the existence of widespread names cannot itself provide evidence for centres of domestication. But it does provide pointers to likely regions to explore and it can certainly sustain a narrative for the spread of the cultivated taros. In addition, the analysis of vernacular names can provide evidence for semantic switching, in other words, the re-application of names for other plants to taro, or alternatively, the transfer of taro terms to other staples such as rice. This in turn provides broader evidence for regional crop history. In addition to this, it is often possible to make concrete the sometimes imprecise assignations of linguists; for example, a reconstruction of 'potato' (an Andean crop) for proto-Tibeto-Burman (Matisoff 2003) almost certainly applies to taro. It must be added that our knowledge of vernacular names for wild taros and their relatives remains extremely weak; there has surely been a long history of transfer of terms back and forth as populations colonise new ecological and biotic regions.

The English word 'taro' derives from a Polynesian language, and has become the dominant reference term in Pacific literature. More globally, *Colocasia esculenta* has a number of names used in the English literature and it is important to reconcile these to ensure that the entire range of sources is captured. Taro is usually known as 'cocoyam' in publications on Africa, a name combining *koko*, a common vernacular term, and 'yam' (Burkill 1985). In older Indian literature, taro is often known as 'Caladium' from an outmoded scientific name, *Caladium esculentum* or as *Arum colocasia*. These are the common names used to refer to them in important compilations such as Watt's (1889-93) *Dictionary of the Economic Products of India*. Both of these names are repeated in quite recent publications such as the Burrow & Emeneau (1984) *Dravidian Etymological Dictionary*. In Northeast India, where amateur linguistics is still dominant, taro is often referred to as 'Caladium' or 'the arum' even in modern publications.

[1] This version has benefited from comments and corrections by Laurie Reid, Matthew Spriggs and an anonymous referee. My thanks to them. I have tried to respond to all their comments, but occasionally have preferred my original interpretation.

There are no very comprehensive sources for taro names in the Indo-Pacific region. Honourable mention may be made of Arnaud et al. (1997), Ross et al. (2008) and Rensch & Whistler (2009) although these cover principally Austronesian[2]. Madulid (2001) represents a major source for the Philippines and other national botanical texts provide additional material on mainland SE Asia. There are now a number of important online resources for comparative lexical data for individual phyla or branches. These are shown in Table 1;

Table 1. Online lexical resources for Asia-Pacific languages

Phylum	Title	URL
Austroasiatic	Mon-Khmer etymological dictionary	http://sealang.net/monkhmer/
Austronesian	Austronesian Comparative Dictionary	http://trussel2.com/ACD/acd-hw_a1.htm
Oceanic	Proto-Oceanic Test Page	http://sealang.net/oceanic/
Polynesian	Polynesian Lexicon Project Online	http://pollex.org.nz/
Sino-Tibetan	Sino-Tibetan Etymological Database	http://stedt.berkeley.edu/~stedt-cgi/rootcanal.pl
Dravidian	Digital Dictionaries of South Asia	http://dsal.uchicago.edu/dictionaries

The Mon-Khmer etymological dictionary available on the SEALANG site allows researchers to sort through a wide variety of sources for Austroasiatic languages, although Muṇḍā is not represented, except where Muṇḍā cognates are noted in Shorto (2006).

2. Language phyla of the Indo-Pacific

The Indo-Pacific region, depending on how broadly it is defined, encompasses a number of distinct language phyla and geographically named groups (Table 2). For this discussion, NE Asia, Japonic, Koreanic and Ainu are excluded.

Table 2. Language phyla in the Indo-Pacific region

Phylum/Group	Extension	Comment
Andamanese	Andaman islands	Not a genetic group
Austroasiatic	NE India to Việt Nam, Nicobars, Malay Peninsula	
Austronesian	Taiwan to New Zealand, Việt Nam	
Daic	South China, Thailand, Laos, Việt Nam, NE India	
Hmong-Mien	South China, Thailand, Laos, Việt Nam	
Mongolic	Yunnan	Only Mongolic occurs in the region
Papuan	Melanesia, with western extension in Indonesia	Not a genetic group
Sino-Tibetan	China to Nepal, Thailand, Laos, Việt Nam	

As noted in the comments, the genetic unity of some of these is doubtful and their internal structure (especially Sino-Tibetan) is highly contested (Blench & Post in press). Claims abound in the literature for the existence of macrophyla (for example Austric, which would unite Austroasiatic and Austronesian, or Sino-Austronesian). Mongolic is excluded for lack of data and the Andamanese are, or were until recently, foragers with no cultivated plants.

3. The patterns of vernacular names

3.1 General

Vernacular names for taro appear to fall into a pattern, with four (or five) widespread regional terms which occur across many countries and jump language phylum boundaries, in contrast to nuclei of diversity where the names appear to be very distinct even within a small geographical area. The most characteristic such areas are Northeast India and the Philippines. Papuan remains rather difficult to analyse, as the languages are so numerous and many are almost undocumented. The major roots for ‘taro’ are;

[2] Astonishingly, the *Comparative Austronesian Dictionary* (Tryon et al. 1995) omits to include taro, although it compiles names for ‘potato’.

Table 3. Common Indo-Pacific roots for 'taro'

No.	Quasi-reconstruction	Main phyla
1a.	*#traw?*	Austroasiatic
1b.	*#tales*	Austronesian
2.	*#ma*	Papuan, Austronesian
3.	*#biRaq*	Austronesian, Tai-Kadai
4.	*#poŋ*	Austroasiatic, Sino-Tibetan

Forms 1a and 1b are listed in this way to show that I consider them part of the same set, for reasons given in §3.2. These reconstructed forms are marked with the hache (#) to indicate that they should *not* be considered definitive. Such quasi-reconstructions should be considered rather as hypothetical reference forms, awaiting more comprehensive historical linguistics. The sections below discuss each of these reconstructions in turn. Apart from these, there are a large number of 'stray' names, which form no evident pattern. These are collected in Table 9, since they may well have implications for early adoption of wild taros.

Kikusawa (2000) focuses on an additional root, **suli(q)*, which is attested across the Austronesian world, most often as 'sucker, runner, shoot', which is the meaning Blust (2010) attributes to proto-Austronesian. However, it has the meaning 'generic taro' in a wide range of Austronesian languages from Yami to Fijian, and clearly has been long co-associated with the Austronesian taro lexicon. She notes that these forms are all recorded within the zone where swamp-taro, *Cyrtosperma chamissonis*, occurs in wild and cultivated forms. The proposal is thus that this was original referent of the **suli(q)* root regularly came to encompass the generic range of taros.

3.2 #traw? /#tales

The most important lexical cluster in SE Asia focuses on the widespread term, *#traw?* which has reflexes throughout Austroasiatic and which Shorto (2006:475) reconstructed to proto-Mon-Khmer. It is here claimed that this is related to the Proto-Malayo-Polynesian *#tales* which is widespread in Austronesian. Table 4 shows a sample of typical reflexes of *#traw?* for mainland SE Asia; further forms in individual languages can be found in Ferlus (1996). Austronesian forms are very numerous so only a sample is included. The gloss is given separately where 'taro' is not the definition in the source .

Table 4. Reflexes of *#traw?* 'taro' in SE Asian languages

Phylum	Branch	Language	Attestation	Gloss	Source
Sino-Tibetan	Naga	Garo	tariŋ	arum	Burling (2003)
Austroasiatic		PMK	*$t_2$raw?		Shorto (2006:475)
Austroasiatic	Monic	Mon	krao		Shorto (2006)
Austroasiatic	Monic	Nyah Kur	traw		Thongkum (1984)
Austroasiatic	Vietic	Thavung	t^hoo^3		Ferlus (1996)
Austroasiatic	Vietic	Vietnamese	sọ		Ferlus (1996)
Austroasiatic	Vietic	Proto-Vietic	*sro$^?$		Ferlus (1996)
Austroasiatic	Khmeric	Old Khmer	trav		Ferlus (1996)
Austroasiatic	Khmeric	Khmer	tra:v		Ferlus (1996)
Austroasiatic	Khmuic	Khmu	sro?		Ferlus (1996)
Austroasiatic	Pearic	Chong	k^hre:^{A}		Ploykaew (2001)
Austroasiatic	Bahnaric	PSB	*təraw		Sidwell (2000)
Austroasiatic	Bahnaric	East Bahnar	trɔɔu	amaranth	Sidwell (2000)
Austroasiatic	Katuic	PK	*craw		Ferlus (1996)
Austroasiatic	Katuic	Bru	ʔaraw		Sidwell (2005)
Austroasiatic	Katuic	Kuy	ʔaaràaw		Sidwell (2005)
Austroasiatic	Katuic	Sre	traw		Sidwell (2005)
Austroasiatic	Katuic	Mlabri	kwaaj		Risschel (1995)
Austroasiatic	Katuic	Ong	raw		Ferlus (1996)
Austroasiatic	Palaungic	Riang	sro?		Ferlus (1996)
Austroasiatic	Palaungic	Palaung	tɔh		Ferlus (1996)
Austroasiatic	Palaungic	Danaw	kăro^1		Ferlus (1996)

Phylum	Branch	Language	Attestation	Gloss	Source
Austroasiatic	Palaungic	Proto-Wa	kroʔ		Diffloth (1980)
Austroasiatic	Palaungic	Lamet	ruəʔ		Ferlus (1996)
Austroasiatic	Palaungic	Khang	hɔ		Ferlus (1996)
Austroasiatic	Khasian	Khasi	shriew	arum	Singh (1906)
Austroasiatic	Muṇḍā	Sora	‘saro	*Caladium esculentum*	Zide & Zide (1976)
Austroasiatic	Muṇḍā	Mundari	saɽu	edible root	Zide & Zide (1976)
Austroasiatic	Muṇḍā	Santal	saru		Zide & Zide (1976)
Austronesian		PMP	*talət	taro	Dempwolff (1938)
Austronesian	Philippines	Palawan	talas	taro	Arnaud et al. (1997)
Austronesian	Philippines	Taot Bato	talus-talus	taro	Madulid (2001)
Austronesian	Barito	Dusun	tadis	kaladi	Hudson (1967)
Austronesian	Malayic	Indonesian	talas	taro	Arnaud et al. (1997)
Austronesian	Oceanic	P-Oceanic	*talo(s)	taro	Ross et al. (2008)

Some of the changes in initial consonant make cognacy uncertain. For example, Mon *krao* looks as if it is cognate with Nyah Kur *traw*, but k→t is not a regular sound-shift; the root has been conserved but the initial minor syllable has been replaced. By contrast, the t→s changes observable in many Austroasiatic languages are attested across the lexicon. It may well be that many of the **tales* forms found in ISEA are early borrowings from Malay. Reid (1973) points out that the typology of Philippines languages vowel systems can help detect loanwords. For example, the normal reflex of PMP /ə/ should be /ə/ in Palawan, not /a/ and it thus likely to be a loan. Similarly with the back vowel /u/ in Taot Bato. Tagalog *taro* is so improbably like the Oceanic forms that it is probably a late borrowing from English.

The near-universal distribution of this root in Austroasiatic suggests that taro played an important role in its early expansion. Diffloth (2005) has pointed out the strong geographical correlation between subgroups of Austroasiatic and river valleys. Although wild taros do generally occupy wet places, including river valleys and lowlands, this is not proof of the locus of domestication, but beyond this proposal reasonable linguistic conjecture cannot go. This conjunction of linguistics and ecology suggests that Austroasiatic speakers were either the original domesticators of taro, or ‘early adopters’ at least as far as mainland SE Asia is concerned.

The terms in Austroasiatic and Austronesian are too similar for there not to be a relationship between them, whether borrowing or reflecting an ancient genetic connection. Dempwolff (1938:128-9) reconstructed **talət* for proto-Austronesian, but his evidence includes neither Formosan nor indeed any languages near Taiwan. Wolff (2010: 7, 993) gives evidence that **tali* is widespread in Austronesian languages of Taiwan (Table 5). However, he regards these forms as a secondary loan due to their irregular relationship.

Table 5. 'Taro' in Formosan languages

Language	Attestation	Gloss
Thao	*ɬari*	taro, *Colocasia exculenta*
Atayal	*caiʔ*	taro
Sediq	*sariʔ*	taro
Rukai	*tái*	taro
Maga	*a-tée*	taro
Bunun	*taiʔ*	taro
Amis	*tali*	taro, tuberous food

Source: adapted from Wolff (2010)

Wolff regards the reconstructed Proto-Malayo-Polynesian with the final affricate (*talec* in his transcription) as a regular reconstruction. Yet he cannot cite evidence from any language north of Palawan, in other words this is virtually absent from the Philippines. Indeed, if the argument presented here is correct, it is misleading to consider this term reconstructible in the earlier stages of Austronesian dispersal; it is most likely a widespread borrowing. The absence of this term in Philippines languages also argues against inheritance from a supposed ‘Austric’ phylum. If Austric did exist, the forms attested in Taiwan should not look like secondary loans. Moreover, given current views on the rapid dispersal of Austronesian speakers following

their departure from Taiwan, reflexes of **tales* should surely be attested in the Philippines.

If the **tales* reflexes in Austronesian are borrowings from Austroasiatic, when and where would such a transfer have taken place? Speakers must have borrowed it during an early phase of contact, with Borneo the most likely zone, as this is where there is evidence for contact with the Vietnamese mainland and where the reflexes of **tales* appear, assuming the Austronesian expansion is modelled as spreading south and east from the Philippines. Phonological irregularities suggest that apparently cognate forms from languages of the southern Philippines are borrowings.

Cereals were almost certainly the basis of Austronesian subsistence on Taiwan (e.g. Bellwood 2004), but during their expansion they switched to vegeculture. Since this is unlikely to have been a consequence of contact with Negrito foragers, one possibility is that Austroasiatic speakers were previously resident in insular SE Asia (Blench 2011). In this model, taro and other elements of vegeculture had spread east from the mainland, and the expanding Austronesians adopted it from the Austroasiatic speakers whom they subsequently assimilated, but not before borrowing their term for the plant. Cultivated taro would have been carried back to Taiwan apparently via a language where the form did not include a final fricative. Indeed initial fricatives (*s-*) and lateral fricatives (*ɬ-*) in some Formosan languages point strongly to an Austroasiatic source. The mixed vocabulary in Philippines languages (e.g. Table 10) presumably indicate taro was introduced multiple times from different regions, and that names were also transferred from indigenous wild Colocasias.

Evidence for the diffusion of this term to the north and west is limited, but nonetheless, Matisoff (2003:173) proffers **sr(y)a* as proto-Tibeto-Burman for 'yam/potato' and **grwa* for taro. Table 9 compiles vernacular names for 'taro' in Tibeto-Burman languages; it is very hard to see how these support such a reconstructed form. Such occurrences as there are undoubtedly reflect borrowing from Austroasiatic.

3.3 *#ma*

Many Oceanic languages attest a root for taro which has been reconstructed as **m^{w}apo(q)* (Ross et al. 2008). However, the reflexes in many actual Austronesian languages are much shorter forms. Table 6 shows some examples of these given in Ross et al.;

Table 6. Oceanic names for 'taro'

Language	Attestation
Lou	m^{w}a
Titan	ma
Mangseng	m^{w}a
Dawawa	mavu
Arosi	m^{w}a

These terms closely resemble those in Papuan languages. Pawley (2005:101) quotes a Trans-New Guinea phylum (TNG) reconstructed form **mV* for taro. Hays (2005: Map 3) shows the distribution of this root in Irian Jaya. The Trans-New Guinea phylum, a previously somewhat controversial grouping, is now accepted by many linguists. The TNG includes a large number of Papuan languages along the central spine of the island of New Guinea and has outliers on Timor and other offshore islands. Unaffiliated Papuan languages are found all around its fringes, especially in the lowlands, and this geographical patterning leads us to think it expanded from the highlands. The lexical diversity of the TNG suggests that it is significantly older than Austronesian, so it may have originated as much as 10,000 years ago (Pawley 2005: 97). The stimulus for the expansion of the TNG is unknown but the proposal is that it was some sort of vegeculture. Taro is naturally a lowland plant, but Denham et al. (2003) have argued that it would have spread early to the highlands, hence its identification at Kuk swamp. It is thus credible that this reconstruction is linked to a Melanesian centre of domestication and that TNG speakers the spread earliest cultivated taro in this region. However, there is no evidence for the *mV-* root for taro west of Timor. Ross et al. (2008:266) point out that reflexes of this root are rather scattered in Western Oceanic and that they are possibly borrowings from Eastern Oceanic, where the term is widespread. The Papuan and Austronesian terms are surely related, and Pawley (2005:101) states unambiguously that Austronesian borrowed the TNG term.

3.4 *#biRaq*

The source of the third widespread root for 'taro' is a semantic shift. Table 7 shows a root originally applied to *Alocasia macrorrhizos,* an edible wild aroid in Taiwan (Photo 1). Originally wild, this plant later became a cultigen in the Austronesian world and the name persisted. Based on numerous attestations in Oceanic, this plant is reconstructible to proto-Oceanic (Ross et al. 2008:272). However, forms for 'taro' in the Daic (= Tai-Kadai) languages are strikingly similar to the Austronesian reconstruction. It has long been accepted that there is some sort of link between Daic (=Tai-Kadai) and Austronesian (Benedict 1942). In recent times, the notion that Daic is simply a branch of Austronesian, possibly at the Malayo-Polynesian stage, is becoming more widely accepted (Ostapirat 2005; Sagart 2005; Norquest 2007; Blench in press, a). The assumption is that one branch of the Austronesians who left Taiwan returned to the mainland, migrated inland and became Daic speakers. The Austronesian name for *Alocasia macrorrhizos* was applied by proto-Daic speakers to *Colocasia esculenta*. Table 9 shows the reflexes of this root, consistently applied to *Alocasia macrorrhizos* in Austronesian, but restricted to taro in Daic.

Photo 1. ***Alocasia macrorrhizos***

Source: Forest & Kim Starr images

Table 7. The ***biRaq*** **root for 'aroid' in SE Asian language phyla**

Phylum	Branch	Language	Attestation	Gloss	Source
Austronesian		PAN	*biRaq	*Alocasia* sp.	Zorc (1995)
Austronesian	Formosan	Rukai	biʔa	*Alocasia* sp.	Li (1994)
Austronesian	Philippines	Ilokano	bíga, bíra	*Alocasia macrorrhizos*	Madulid (2001)
Austronesian	Philippines	Kankanay	bíla-bíla	*Alocasia* sp.	Madulid (2001)
Austronesian	Philippines	Bontok	bilbíla	*Alocasia* sp.	Madulid (2001)
Austronesian	Malayic	Malay	bira	*Alocasia* sp.	Madulid (2001)
Austronesian	Oceanic	P-Oceanic	*piRaq	*A. macrorrhizos*	Ross et al. (2008)
Austronesian	Timor	Tetun	fia	taro	Arnaud (1997)
Austroasiatic	Aslian	Semai	gaag	? < Daic	Dentan (2003)
Daic	Kra	Paha	pɣaak D2	taro	Ostapirat (2000)
Daic	Kra	Laha	haak	taro	Ostapirat (2000)
Daic	Hlai	Proto-Hlai	*ra:k	taro	Norquest (2007)
Daic	Kam-Tai	Sui	qam^{4} ɣaak^{7}	taro	Burusphat et al. (2003)
Daic	Kam-Tai	Mulao	ʔɣa:k^{7}	taro	Ferlus (1996)
Daic	Kam-Tai	Lakkia	ya:k^{7}	taro	Ferlus (1996)
Daic	Tai	P-Tai	*pʰrɨak	taro	Ferlus (1996)
Daic	Tai	N. Zhuang	pi:k^{44}	taro	Burusphat & Xiaohang (2006)
Daic	Tai	Thai	pʰɯ̀ak เผือก	taro	SEALANG
Daic	Tai	Shan	pʰɤk^{2} ဢိူင်ၶ	taro	Moeng (1995)
Daic	Tai	Aiton	ph(r)ɯk^{1}	taro	Morey (2005)

The Daic reflexes with a final velar (-k/-g) show that the Austronesian final uvular was present when the term was adapted. Daic versions of Austronesian words typically delete the first syllable (Ostapirat 2005) but forms like Paha *pyaak* still retain this. Interestingly, the full CVCVC structure must still have been present during the evolution of Tai proper, since Tai languages delete the middle segment (Austronesian –R-, still realised as such in proto-Hlai) probably through a process of metathesis, if the proto-Tai reconstruction is accurate. The historical interpretation of this would seem to be that Daic speakers were unfamiliar with cultivated taro in Taiwan, and only encountered the cultivated plant on the mainland. Rather than borrowing a name from a resident group, they adapted the name from a plant they already knew.

3.5 *#poŋ*

Another widespread etymon is *#poŋ*, which has been subject to multiple borrowing. The source of this is a widespread Austroasiatic term for 'yam' (*Dioscorea* spp.) which can be transferred to taro within Austroasiatic but which is also borrowed into Sino-Tibetan. In much of Sino-Tibetan the back vowel is fronted to e/i but the final velar nasal is retained in many languages including Burmese. It is quite likely spoken Burmese was a secondary source of loanwords, since many languages resemble Burmese with a loss of nasalisation. Some languages, for example Marma *prwíŋ*, insert *–r-* after C_1 which may be a result of palatalisation coming from the fronting process. Naga languages such as Meluri add an *a-* prefix to the root, giving *api*. If C_1 is deleted this yields forms such as Sema *ai* which do not at first sight look cognate. Table 8 shows all the reflexes of *#poŋ* so far identified in SE Asia.

Table 8. Reflexes of the root *#poŋ* in SE Asian language phyla

Phylum	Branch	Language	Attestation	Gloss	Source
Sino-Tibetan	Loloish	Lahu	pɛ̂		Matisoff (2003)
Sino-Tibetan	Loloish	Lisu	bi^{41}		Pelkey (2008)
Sino-Tibetan	Loloish	Laomian	poŋ^{31}	< AAS	Pelkey (2008)
Austroasiatic	Vietic	Vietnamese	môn		Ferlus (n.d.)
Austroasiatic	Vietic	Malieng	bo:n		Ferlus (n.d.)
Austroasiatic	Katuic	Souei	poŋ raw		Sidwell (2005)
Austroasiatic	Katuic	Pacoh	pu̯ŋ		Watson et al. (1979)

Languages such as the Loloish Laomain have probably borrowed this word directly, as it is phonologically unaltered. Sino-Tibetan reflexes generally probably represent an early borrowing from Austroasiatic which has diversified within Sino-Tibetan.

3.6 Other names

Table 9 sets out other terms for 'taro' in SE Asian languages, with etymological suggestions. Reconstructions can be proposed for individual Sino-Tibetan subgroups. For example, Karenic, Qiangic and Kuki-Chin all have common forms that suggest taro was known to speakers of their proto-language. However, this does not give any significant time-depth and the overall impression is of great diversity.

Table 9. Miscellaneous terms for 'taro' in SE Asian language phyla

Phylum	Branch	Language	Attestation	Gloss	Source
Sino-Tibetan	Sinitic	Chinese	yù nǎi 芋艿		Schuessler (2007)
Sino-Tibetan	Sinitic	OCM	ᵒwah		Schuessler (2007)
Sino-Tibetan	Bai	Bai (Bijiang)	xɯ^{42}		STEDT
Sino-Tibetan	Tujia	Tujia	ŋu̯i^{55}pu^{55}		STEDT
Sino-Tibetan	Tujia	Tujia (Southern)	jy^{21}du̯^{55}		STEDT
Sino-Tibetan	Tujia	Tujia (Northern)	ni^{1}bi^{1}		STEDT
Sino-Tibetan	Lolo Burmese	PLB	*blim^{2}		Bradley (1979)
Sino-Tibetan	Burmish	Lhaovo	mauy L		STEDT
Sino-Tibetan	Burmish	Zaiwa	mui^{21}		STEDT
Sino-Tibetan	Burmish	Achang (Luxi)	mui^{51}		STEDT
Sino-Tibetan	Burmish	Maru [Langsu]	mɔi^{35}		STEDT
Sino-Tibetan	Burmish	Burmese	mun		Bradley (1979)
Sino-Tibetan	Burmish	Lhaovo	mauy L		Sawada (2004)
Sino-Tibetan	Burmish	Zaiwa	mui L		Sawada (2004)
Sino-Tibetan	Loloish	Bisu	hmə̑		Bradley (1979)
Sino-Tibetan	Loloish	Mpi	m^{2}		Bradley (1979)
Sino-Tibetan	Loloish	Phola	łæ^{31}		Pelkey (2008)
Sino-Tibetan	Loloish	Naxi (Lijiang)	ʑu^{55}thv^{31}		STEDT
Sino-Tibetan	Loloish	Nusu (Bijiang)	mɯe^{55}		STEDT
Sino-Tibetan	Loloish	Pho (Delta)	χʀu^{4}		STEDT
Sino-Tibetan	Loloish	Yi (Dafang)	ŋʤ^{33}		STEDT
Sino-Tibetan	Loloish	Yi (Mile)	ʌ^{33}bu^{33}phʌ^{33}		STEDT

Phylum	Branch	Language	Attestation	Gloss	Source
Sino-Tibetan	Loloish	Yi (Mojiang)	dɛ^{33}mo^{21}		STEDT
Sino-Tibetan	Loloish	Yi (Nanhua)	dɯ^{21}		STEDT
Sino-Tibetan	Loloish	Yi (Nanjian)	tʂho^{33}		STEDT
Sino-Tibetan	Loloish	Yi (Xide)	ʑu^{21}tho^{21}		STEDT
Sino-Tibetan	Loloish	Nusu (Northern)	mɯe^{35}		STEDT
Sino-Tibetan	Loloish	Nusu (Southern)	mɯi^{55}		STEDT
Sino-Tibetan	Loloish	Mpi	kwai^{4}		STEDT
Sino-Tibetan	Luish	Cak	ane		Bernot (1966)
Sino-Tibetan	Tibetic	Tibetan (Khams)	ju^{13}tho^{31}		STEDT
Sino-Tibetan	Tibetic	Tibetan (Written)	jur tse		STEDT
Sino-Tibetan	Tibetic	Memba	solum		Badu (2002)
Sino-Tibetan	Nungish	Trung [Dulong]	gui^{55}		STEDT
Sino-Tibetan	Nungish	Trung (Nujiang)	nɑ^{31}ʑen^{55}		STEDT
Sino-Tibetan	Nungish	Anong	khu^{31}dʑu^{55}		STEDT
Sino-Tibetan	Qiangic	Horpa (Danba)	y tsɪ		STEDT
Sino-Tibetan	Qiangic	Ersu	y^{55}thəu^{55}		STEDT
Sino-Tibetan	Qiangic	Namuyi	jy^{35}thə^{33}		STEDT
Sino-Tibetan	Qiangic	Pumi (Jinghua)	y^{13}thəu^{13}		STEDT
Sino-Tibetan	Qiangic	Pumi (Taoba)	y^{35}tsə^{53}		STEDT
Sino-Tibetan	Qiangic	Queyu (Yajiang) [Zhaba]	jy^{35}tsə^{53}		STEDT
Sino-Tibetan	Qiangic	Tshona (Wenlang)	jy^{35}tse^{55}		STEDT
Sino-Tibetan	Karenic	Bwe (Western)	kʻu^{2}, ʃu^{2}		STEDT
Sino-Tibetan	Karenic	Geba	ʃu^{2}		STEDT
Sino-Tibetan	Karenic	Paku	kʻɤ^{3}		STEDT
Sino-Tibetan	Karenic	Pa-O (Northern)	sʻu^{1}		STEDT
Sino-Tibetan	Karenic	Sgaw	kʻɤ^{4}		STEDT
Sino-Tibetan	Jingpho-Konyak	Jingpho	nai^{31}		STEDT
Sino-Tibetan	Jingpho-Konyak	Konyak	tiang		STEDT
Sino-Tibetan	Konyak	Tangsa	tuŋ	arum	Bandyopadhyay (1989)
Sino-Tibetan	Tani	Apatani	i-ŋe		STEDT
Sino-Tibetan	Tani	Adi Gallong	eŋye		STEDT
Sino-Tibetan	Tani	Adi Bengni	ra-ɲin		STEDT
Sino-Tibetan	Tani	Bokar	ɲi-ruk		STEDT
Sino-Tibetan	Tani	Idu	ji^{55}tsi^{53}		STEDT
Sino-Tibetan	Kuki-Chin	PKC	*ɓaal		VanBik (2007)
Sino-Tibetan	Kuki-Chin	Angami (Kohima)	dzünuo		STEDT
Sino-Tibetan	Kuki-Chin	Ao (Chungli)	yi		STEDT
Sino-Tibetan	Kuki-Chin	Ao (Mongsen)	ami		STEDT
Sino-Tibetan	Kuki-Chin	Tiddim	baːl^{1}		STEDT
Sino-Tibetan	Kuki-Chin	Tiddim	loŋ^{1}		STEDT
Sino-Tibetan	Kuki-Chin	Lushai [Mizo]	băal		STEDT
Sino-Tibetan	Kuki-Chin	Thado	bâal		STEDT
Sino-Tibetan	Naga	Lotha	mani		STEDT
Sino-Tibetan	Naga	Maring	bal		STEDT
Sino-Tibetan	Naga	Yacham-Tengsa	niʧaŋ		STEDT
Sino-Tibetan	Mishmi	Miju	gal	arum	Boro (1978)
Sino-Tibetan	Mishmi	Idu	sona	arum	Pulu (2002)
Sino-Tibetan	Bugun	Bugun	chiyauk	arum	Dondrup (1990)
Sino-Tibetan	Puroik	Puroik	cuwa, tɕua^{53}		Tayeng (1990)
Sino-Tibetan	Kham-Magar	Bahing	kagasi		STEDT

Phylum	Branch	Language	Attestation	Gloss	Source
Sino-Tibetan	Kham-Magar	Hayu	ram		STEDT
Sino-Tibetan	Kiranti	Dumi	khoksi		STEDT
Sino-Tibetan	Kiranti	Limbu	jak		STEDT
Sino-Tibetan	Kiranti	Thulung	liukke		STEDT
Sino-Tibetan	Kiranti	Thulung	ŋoːsi		STEDT
Hmong-Mien		PHM	*wouH		Ratliff (2004)
Hmong-Mien	Mien	Mun of Hainan	hou		Shintani (1990)
Hmong-Mien	Mien	Mun of Funing	hou^{31}		Shintani (2008)
Austroasiatic	Pearic	Samre	duun^{A}		Ploykaew (2001)
Daic	Kra	Gelao	vɔ D2*		Ostapirat (2000)
Daic	Kra	Lachi	vɦo $_{C2}$*		Ostapirat (2000)
Daic	Kra	Biao	roo C_2		Ostapirat (2000)
Daic	Kam-Tai	Kam	mo^{212} ʦi^{5}		Burusphat et al. (2000)
Daic	Be-Tai	Be	mak^{5} saŋ^{4}	foreign tuber	Hashimoto (1980)
Daic	Tai	Bouyei	ʨaŋ^{4} ŋɯ^{2}		Ratanakul et al. (2001)
Daic	Tai	Central Thai	chim^{1}		Guoyan & Burusphat (1996)

º ? < Hmong-Mien

Table 9 illustrates well the diversity of terms in the NE India/Myanmar borderland. The most likely interpretation of this is that many of these names are originally terms for wild aroids or yams and that cultivated taro spread slowly through farmer-to-farmer diffusion in this area, allowing for the mosaic of adapted names to evolve. There are definite similarities between some of the Loloish forms and Vietnamese, although these languages are not in contact. It is interesting that a term for 'taro' can be reconstructed in proto-Hmong-Mien and that it does not resemble the Austroasiatic forms. This word has no history within Sino-Tibetan, so it is a likely borrowing from Hmong-Mien *into* Chinese. Schuessler (2007:589) also points to Written Burmese *wa*^{C} 'a kind of potato', probably a late borrowing from Old Chinese. The exact date and location of proto-Hmong-Mien is still uncertain (see e.g. the speculations of Ratliff 2004). But it is quite possible that Hmong-Mien speakers were not far north of the Austroasiatic homeland during the period of taro domestication, and indeed that they were the resident cultivators encountered by expanding Daic speakers.

The other great region of diversity is in island SE Asia. Table 10 shows some of the terms that have been recorded in accessible sources. A more thorough search of the literature would undoubtedly reveal others. This diversity clearly does not point to taro forming part of the cultigen repertoire of the expanding Austronesians. Such an efflorescence of names more credibly reflects borrowing from *in situ* vegeculturalists or adaptations from the names of indigenous wild aroids.

Table 10. Taro in Austronesian languages of island SE Asia

Island	Language	Attestations
Philippines	Agta	ganet
	Ayta Mag-antsi	bígà (Storck & Storck 2005)
	Bikol	apay-ingkato, gabe, linsam, natong, tangoy
	Bisayan	abalong, dagmay, gaway, kimpoy, lagbay, butig
	Batangan	alufa, amle malagsi, amle malayong, ayuskus, bage, fakli, inamlong, sapnuan, siggalfut, simbung, sumawi, turenduy
	Bontok	amowang, pising (? < Malay banana)
	Butuanon	karlan
	Dumagat	ganet

Island	Language	Attestations
	Gaddang	tafal
	Hanunóo	badyan
	Ibanag	gavi
	Inibaloi	aba, pising (? < Malay banana)
	Ifugao	la'at. *Varieties* bal'uŋ, bangig, hīwa', ta'og, uhīlap (Newell 1993)
	Ilokano	aba, awa
	Itawis	atang
	Ivatan	bola, sudi, yasi
	Kankanay	pising (? < Malay banana)
	Kapampangan	gandos
	Maranao	dalog
	Palawan	kaladi (< Malay)
	Romblomanon	gābi (Newell 2006)
	Sambal	balingan, lapa, luko
	Tagalog	hupi, lagbay, gabi
	Taot Bato	lapung
	Tboli	kleb. Variety tlahid. Wild type huhów. (Awed et al. 2004)
Sumba	Wewewa	ulli (< **suli(q)*)
Sulawesi	Kaili	rumbi, kadue
	Pamona	suli (< **suli(q)*
	Bada?	da upe (? < **(q)ubi* 'yam')
	Napu	da upe (? < **(q)ubi* 'yam')
	Toraja	upe (? < **(q)ubi* 'yam')
	Wotu	suli (< **suli(q)*)
	Duri	kaladi (< Malay)
	Endekan	kaladi (< Malay)
	Bugis	aladi
	Makassar	kaladi (< Malay)
Timor	Makasae	muta?a, denali, leurasa
Timor	Nauete	muta?a
Timor	Ema	ute

Sources: Philippines languages, Madulid (2001); others, Arnaud et al. (1997)
N.B. Botanical sources not confirmed in available dictionaries in red

The term *gábi* occurs in many languages, possibly as a secondary loan from Tagalog. However, this is unlikely to be its origin. Reid (p.c.) observes that it looks suspiciously similar to the reflexes of widespread root **biRaq* applied to *Alocasia macrorrhizos* (Table 7) which are *bíga* in languages in which *R>g (Northern Cordilleran, Greater Central Philippines, etc.). *Gábi* could well be a metathesis of this *bíga*, applied to the incoming cultivated taro.

The name in Ibanag has given rise to the name of an important trading port in northern Luzon. The town of Vigan, first a Chinese merchant's entrepôt and later a base for the Spanish rulers of the Philippines is a metathesis of the name for 'taro' (Photo 2).

4. *Un glissement semantique;* the switch from taro to rice

The idea that the original agricultural system of SE Asia was tuber-based has long history among agricultural ethnographers and Spriggs (1982:12) collected references to this idea going back to the 1940s. However, there has been no linguistic support for this idea, partly because the usual words for 'rice' and 'taro' in Austroasiatic and Sino-Tibetan appear to be unrelated. For example, 'rice' in Austroasiatic is prefix + *ko/kaw*, as opposed to 'taro' *#traw?*. However, Ferlus (1996) compared 'taro' with 'paddy rice' and makes the argument that taro names were transferred to paddy rice within Austroasiatic. The connection was presumably that both were cultivated in similar fields, whereas basic terms for rice were developed through familiarity with upland rice. Table 11 shows a sample of Ferlus' data[3] which illustrates the process he analyses.

Photo 2. Origin of the name of Vigan

Source: Author photo

Table 11. Terms for 'taro' and 'paddy' in some branches of Austroasiatic

Subgroup	Language	taro	paddy
Vietic	Proto-Vietic	*srɔʔ	*slɔʔ
Katuic	Proto-Katuic	craw	srɔ
Katuic	So	araw	trɔ
Katuic	Ong	raw	crɔ
Khmeric	spoken Khmer	tra:v	srɤv
Monic	written Mon	krau	sro'

Ferlus notes the possible cognacy of Old Written Mon *sŋu* 'rice' with the term for paddy. If this is correct, then Wa names for 'paddy' such as *ʰǹoʔ* may well also be cognate and thus in turn eroded forms such as Lamet *ŋɔ:ʔ*. Not all Austroasiatic specialists agree with his views; Diffloth (p.c.) has argued that the irregular correspondences create a problem for some of the shifts proposed. Blench (in press, b) argues that the incomplete process of borrowing and shift would inevitably create irregularities, and that the similarities are too striking to be dismissed.

Ferlus was publishing at a period when rice was thought to be considerably older in SE Asia than current archaeology suggests. The evidence that rice replaced a predominantly vegecultural system based on taro fits with the other observations quoted above. Syntheses of the prehistory of SE Asia have yet to incorporate Ferlus' observations into their narrative.

5. What about India?

It has been suggested, on the basis of some entries in the Burrow & Emeneau (1984) *Dravidian Etymological Dictionary* that Dravidian vernacular names point to a third centre of domestication in South India. These names are collated in Table 12;

[3] Ferlus' original forms are given, although for some languages alternative transcriptions are now available. However, these do not affect the underlying argument.

Table 12. Dravidian names for taro

Language	Vernacular name	Original definition
Tamil	cēmpu, cēmpai	*Colocasia antiquorum*; a garden plant, *C. indica*.
Malayalam	cēmpu, cēmpa	*Caladium esculentum.*
Kannada	kēsave, kĕsu, kesa, kesavu taro	*Colocasia antiquorum, Arum colocasia L.*
Tulu	cēvu, tēvu	a kind of yam *A. colocasia; Caladium esculentum.*
Telugu	cēma	*Colocasia antiquorum*
Parji	kībi (pl. kībul)	*Arum colocasia*
Gadba	kiyub	*Colocasia antiquorum*
Kurux	kisgō	yam
Pengo	hom kūṇi	*Arum colocasia*
Manḍa	hūpu	*Arum colocasia*
Kui	sōmbu (pl. sōpka)	species of tuberous plant somewhat like a yam or cassava
Kuvi	(Ṭ.) hōpa kuna	*A. colocasia*
Kuvi	(Ḍongria) hop'o	*A. colocasia*
Sanskrit	kemuka-, kecuka-, kevūka, kacu-, kacvī-	*A. colocasia, Colocasia antiquorum.*

Burrow & Emeneau (1984)

Some of these names resemble Austronesian terms, for example, Manḍa *hūpu* against Tagalog *hupi*, Toraja *upe*. This might be indicative of cultural contact, but equally could be chance resemblance. There is no good reason to consider these names form any kind of coherent set and cultivated taro is thus likely to have been a series of somewhat scattered introductions into the Dravidian area.

6. Irrigation techniques

An aspect of linguistic methodology to explore the diffusion of taro cultivation that has so far been little exploited is the reconstruction of agricultural technologies, in particular irrigation. If, as has been argued, there was a switch from taro to rice in various locales where the two coincide, then taro fields may well have been converted to rice production. Taro is often still cultivated along the edges of rice terraces, as for example in the Cordillera of Luzon. Photo 3 shows taro planted along the edge of a rice terrace in Mayoyao, and Ifugao-speaking area of Luzon. If it is possible to reconstruct the lexicon of irrigation techniques to a presumed proto-language, this may be evidence for the antiquity of these techniques. Attempts to do this have so far been limited, but Reid (1994) examined the terminology of wet rice production systems in the Northern Philippines. He concludes that a wide range of terms related to pondfield systems and cultivation can be reconstructed to Proto-Nuclear Cordilleran, the ancestor of the Austronesian languages of the highland areas. Although speakers of Cordilleran were clearly familiar with the rice-plant, because not only rice itself but various stages of its growth are reconstructible, irregularities in terms such as 'cooked rice' do not exclude the possibility that rice replaced prior vegetative crops. On the basis of agricultural ethnography, Bodner (1968) had already proposed that the original agricultural system of the highlands included pseudo-grains such as Job's tears and other tubers.

Photo 3. Taro at the edge of rice terraces, Mayoyao, Luzon

Source: Author photo

Reid (1994: 375) concludes from the linguistic evidence that the terraces cannot be recent as has been sometimes claimed by archaeologists. For example, it has been suggested by Acabado (this volume) that the famous rice terraces of the Cordillera of Luzon were originally constructed for taro. He also considers it likely they were also used for taro. This approach was pioneering but so far has not had successors. Spriggs (1982:9) mentions some of the scattered lexical evidence in Oceanic languages, but until vocabulary is systematically collected and compared with the known phonological regularities of any given language

family, it will be difficult to discriminate between borrowing and reconstructible forms. If we are to go beyond the plant names themselves, with all the problems they bring, such as distinguishing between wild and domestic forms or even semantic shifts to other staples, the consideration of agricultural techniques is essential.

7. What conclusions can be drawn from these patterns?

There appear to be three major reconstructions for 'taro' in SE Asia and Oceania; two of these probably represent not only centres for domestication but also engines of language phylum expansion. If the Daic-Austronesian connection is accepted, the migrating Austronesians who reached Hainan island and the mainland of Guangzhou were already familiar with *Alocasia macrorrhizos*. Encountering domestic taro, presumably in the hands of Austroasiatic speakers, they re-assigned the existing term to domesticated *Colocasia*. Figure 1 represents the hypothetical centres of lexical nuclei and their expansion in prehistory.

The map also marks regions such as northeast India and the Philippines where there is a complex of apparently unrelated terms. In NE India, these names are likely to represent original terms for wild aroids, which have been locally transferred to taro. Many populations in this region seem to have been hunter-gatherers until recently and indeed some languages remain difficult to classify.

The data tables are far from complete, and with more wide-ranging and in-depth lexicons, many of the sources of presently unidentified vernacular names might be discovered. For example, the cultivated yams on the SE Asian mainland remain extremely poorly known, both botanically and lexically, yet there is clear evidence for semantic shifting between 'taro' and 'yam'. Further material on island SE Asia and in Sino-Tibetan languages might establish more clearly the routes of diffusion of the cultivated taros. However, the evidence presented here does point to an intriguing correlation between our present understanding of taro domestication processes and widespread lexemes.

Figure 1. The pattern of lexical roots for 'taro' in the Indo-Pacific region

References

Arnaud, V. et al. eds. 1997. *Lexique thématique plurilingue de trente-six langues et dialectes d'Asie du Sud-est insulaire*. Paris : L'Harmattan.

Awed, S.A., L.B. Underwood & V.M. Van Wynen 2004. *Tboli dictionary.* Manila: SIL, Philippines.

Badu, Tapoli 2002. *Memba language guide*. Itanagar: Arunachal Pradesh State Government Directorate of Research.

Bandyopadhyay, S.K. 1989. A Tangsa wordlist. *Linguistics of the Tibeto-Burman Area*, 12(2): 79-91.

Bellwood, Peter 2004. The origins and dispersals of agricultural communities in Southeast Asia. In: I. Glover & P. Bellwood eds. *Southeast Asia: from prehistory to history*. 21-40. Abingdon: RoutledgeCurzon.

Bernot, L. 1966. Eléments de vocabulaire Cak recueilli dans le Pakistan Oriental. In: Ba Shin, J. Boisselier and A. B. Griswold (eds.) *Papers on Asian history, religion, languages, literature, music folklore, and anthropology: essays offered to G. H. Luce by his colleagues and friends in honour of his seventy-fifth birthday.* I: 67–91. Ascona, Switzerland: Artibus Asiæ Publishers.

Blench, R.M. 2011. *Were there Austroasiatic speakers in insular SE Asia prior to the Austronesian expansion?* Accepted for publication in *Bulletin of the Indo-Pacific Prehistory Association*.

Blench, R.M. in press, a. *The prehistory of the Daic (Tai-Kadai) speaking peoples and the hypothesis of an Austronesian connection*. Selected Papers from the XIIth EuraSEAA meeting, Leiden September 2009.

Blench, R.M. in press, b. The role of agriculture in the evolution of Southeast Asian language phyla. In: N. Enfield & J. White eds. *Dynamics of Human Diversity in Mainland SE Asia*. Canberra: Pacific Linguistics.

Blench, R.M. & M. Post in press. Rethinking Sino-Tibetan phylogeny from the perspective of Northeast Indian languages. In: *Selected papers from the 16th Himalayan Languages Symposium, September 2010*. Nathan Hill & Tom Owen-Smith eds. New York: John Benjamins.

Blust, Robert M. *Austronesian Comparative Dictionary*. Online version. URL: http://www.trussel2.com/ACD/acd-hw_a1.htm

Bodner, Connie C. 1986. *On the evolution of agriculture in Central Bontok.* Ph.D. University of Missouri, Columbia.

Boro, A. 1978. *Miju dictionary*. Shillong: Director of Research, Arunachal Pradesh Government.

Bradley, David 1997. What did they eat? Grain crops of the Burmic peoples. *Mon-Khmer Studies*, 27:161-170.

Burkill, H.M. 1985. *The Useful Plants of West Tropical Africa, Families A-D*, Kew, Royal Botanic Gardens.

Burling, Robbins 1983. The 'Sal' languages: the Jinghpaw-Northern-Naga-Bodo sub-group of Tibeto-Burman. *Linguistics of the Tibeto-Burman Area*, 7(2):1-32.

Burrow, T. & Murray B. Emeneau 1984. [2nd ed] *A Dravidian etymological dictionary*. Oxford: Clarendon Press.

Burusphat, Somsonge, Wei Xuecun & Jerold A. Edmondson eds. 2003. *Sui Chinese English Thai dictionary.* Salaya: Mahidol University, Institute of Language and Culture for Rural Development & Kam-Tai Institute, Central University for Nationalities, PRC.

Burusphat, Somsonge & Qin Xiaohang eds. 2006. *Northern Zhuang Chinese English Thai dictionary.* Salaya: Mahidol University, Institute of Language and Culture for Rural Development & Kam-Tai Institute, Central University for Nationalities, PRC.

Dempwolff, Otto 1938. *Vergleichende Lautlehre des austronesischen Wortschatzes, vol. 3: Austronesisches Wörterverzeichnis*. Zeitschrift für Eingeborenen-Sprachen, Supplement 19. Berlin: Reimer.

Denham, T.P., S.G. Haberle, C. Lentfer, R. Fullagar, J. Field, M. Therin, N. Porch & B. Winsborough. 2003. Origins of agriculture at Kuk Swamp in the Highlands of New Guinea. *Science* 301: 189-93.

Dentan, Robert K. 2003. *Preliminary Field Notes on the Semai Language*. Thomas Doyle ed. ms.

Diffloth, Gérard 1980. The Wa Languages. *Linguistics of the Tibeto-Burman Area*. Vol. 5/2. Berkeley: University of California.

Diffloth, Gérard 2005. The contribution of linguistic palaeontology and Austroasiatic. in Laurent Sagart, Roger Blench and Alicia Sanchez-Mazas, eds. *The Peopling of East Asia: Putting Together Archaeology, Linguistics and Genetics.* 77-80. London: Routledge Curzon.

Dondrup, Rinchin 1990. *A handbook on Bugun language*. Itanagar: Director of Research, Arunachal Pradesh Government.

Eyzaguirre, P. 2000. Ethnobotanical indicators for assessing the distribution and maintenance of genetic diversity: example of taro in Yunnan. In: *D. Zhu et al. Ethnobotany and genetic resources of Asian taro: focus on China*. 46-50. IPGRI/CSHS: Rome and Beijing.

Ferlus, Michel 1996. Du taro au riz en Asie du Sud-est, petite histoire d'un glissement sémantique. *Mon-Khmer Studies*, 25:39-49.

Ferlus, Michel n.d. *Lexique de racines Proto Viet-Muong* (*Proto Vietic*). ms.

Fullagar, R., J. Field, T.P. Denham & C. Lentfer 2006. Early and mid-Holocene processing of taro (*Colocasia esculenta*) and yam (*Dioscorea* sp.) at Kuk Swamp in the Highlands of Papua New Guinea. *Journal of Archaeological Science,* 33: 595-614.

Guoyan, Zhou & Somsonge Burusphat 1996. *Languages and cultures of the Kam-Tai (Zhuang-Dong) Group: a word list.* Bangkok: Mahidol University.

Hashimoto, Mantaro J. 1980. *The Be language: a classified lexicon of its Limkow dialect.* Tokyo: Institute for the Study of the Languages and Cultures of Asia and Africa.

Hays, Terence E. 2005. Vernacular names for tubers in Irian Jaya: implications for agricultural prehistory. In: *Papuan Pasts: Cultural, linguistic and biological histories of Papuan-speaking peoples*. Andrew Pawley, Robert Attenborough, Jack Golson and Robin Hide (eds.) 625-670. PL 572. Canberra: ANU.

Hudson, Alfred B. 1967. *The Barito isolects of Borneo.* Southeast Asia Program (Dept. of Asian Studies), Data Paper no. 68, Ithaca (NY): Cornell U.P.

Kikusawa, Ritsuko 2000. Where did *suli* come from? A study of words connected to taro plants in Oceanic languages. in Bill Palmer & Paul Geraghty, eds. *SICOL, Proceedings of the Second International Conference on Oceanic Linguistics: Vol. 2, Historical and descriptive studies*. 37-47. Canberra: Pacific Linguistics.

Lebot, V. & K.M. Aradhya 1991. Isozyme variation in taro, *Colocasia esculenta* (L.) Schott, from Asia and Oceania. *Euphytica* 56:55-66.

Lebot, V., M.S. Prana, N. Kreike, H. van Heck, J. Pardales, T. Okpul, T. Gendua, M. Thongjiem, H. Hue, N. Viet and T.C. Yap. 2004. Characterisation of taro (*Colocasia esculenta* (L.) Schott) genetic resources in Southeast Asia and Oceania. *Genetic Resources and Crop Evolution* 51:381-392.

Lewis, Helen et al. 2008. Terminal Pleistocene to mid-Holocene occupation and an early cremation burial at Ille Cave, Palawan, Philippines. *Antiquity*, 82: 318–335.

Li, Paul Jen-Kuei 1994. Some plant names in Formosan languages. In: *Austronesian terminologies: continuity and change*. A.K. Pawley & M.D. Ross (eds.) 241-266. Pacific Linguistics C-127. Canberra: ANU.

Madulid, D.A. 2001. *A dictionary of Philippine plant names*. 2 vols. Makati City: The Bookmark.

Matisoff, James A. 2003. *Handbook of proto-Tibeto-Burman*. Berkeley: University of California Press.

Matthews, P.J. 1991. A possible tropical wildtype taro: *Colocasia esculenta var. aquatilis*. *Bulletin of the Indo-Pacific Prehistory Association*, 11: 69-81

Matthews, P.J. 1995. Aroids and the Austronesians. *Tropics,* 4(2):105-126.

Moeng, Sao Tern 1995. *Shan-English Dictionary*. Maryland: Dunwoody Press.

Morey, S.D. 2005. *The Tai languages of Assam – a grammar and texts*,. Canberra: Pacific Linguistics.

Newell, Leonard E. 1993. *Batad Ifugao dictionary with ethnographic notes.* Manila: SIL, Philippines.

Newell, Leonard E. 2006. *Romblomanon dictionary.* Manila: SIL, Philippines.

Norquest, Peter K. 2007. *A Phonological Reconstruction of Proto-Hlai*. Ph.D. Department Of Anthropology, University of Arizona.

Ostapirat, Weera 2000. Proto-Kra. *Linguistics of the Tibeto-Burman Area*, 23,1.

Ostapirat, Weera 2005. Kra-Dai and Austronesian: Notes on phonological correspondences and vocabulary distribution. In: Laurent Sagart, Roger Blench and Alicia Sanchez-Mazas, eds. *The Peopling of East Asia: Putting Together Archaeology, Linguistics and Genetics.* 107-131. London: Routledge Curzon.

Pawley, A. 2005. The chequered career of the Trans New Guinea hypothesis: recent research and its implications. In: *Papuan Pasts: Cultural, linguistic and biological histories of Papuan-speaking peoples*. Andrew Pawley, Robert Attenborough, Jack Golson and Robin Hide (eds.) 67-108. PL 572. Canberra: ANU.

Pelkey, Jamin R. 2008. *The Phula languages in synchronic and diachronic perspective*. Ph.D. Linguistics. La Trobe University, Victoria.

Ploykaew, Pornsawan 2001. *Samre grammar*. Ph.D. Mahidol University.

Pulu, Shri Jimi 2002. *A handbook on Idu Mishmi language*. Itanagar: Arunachal Pradesh State Government Directorate of Research.

Ratanakul, Suriya et al. 2001. *Bouyei Chinese English Thai dictionary.* Salaya: Mahidol University, Institute of Language and Culture for Rural Development & Kam-Tai Institute, Central University for Nationalities, PRC.

Ratliff, Martha 2004. Vocabulary of environment and subsistence in the Hmong-Mien proto-language. In: Tapp, N. Michaud, J., Culas, C. & G. Yai Lee eds. *Hmong/Miao in Asia.* 147-166. Bangkok: Silkworm Books.

Reid, L.A. 1973. Diachronic typology of Philippine vowel systems. In: *Current Trends in Linguistics 11: Diachronic, areal, and typological linguistics*. Thomas A. Sebeok ed. 485-506. The Hague and Paris: Mouton and Co.

Rensch, Karl H. & Arthur W. Whistler 2009. *Dictionary of Polynesian plant names*. Canberra: Archipelago Press.

Revel, Nicole (ed.) 1988. *Le riz en Asie du sud-est*. [3 vols.] Paris: EHESS.

Rischel, Jørgen 1995. *Minor Mlabri: A Hunter-Gatherer Language of Northern Indochina*. Copenhagen: Museum Tusculanum Press.

Ross, M. Pawley, A. & M. Osmond eds. 2008. *The lexicon of proto-Oceanic: the culture and society of ancestral Oceanic society. 3: plants*. Pacific Linguistics 599. Canberra: ANU.

Sagart, Laurent 2005. Tai-Kadai as a subgroup of Austronesian. in Laurent Sagart, Roger Blench and Alicia Sanchez-Mazas, eds., *The Peopling of East Asia: Putting Together Archaeology, Linguistics and Genetics.* 177-181. London: Routledge Curzon.

Sawada, Hideo 2004. A tentative etymological wordlist of Lhaovo (Maru) language. In: *Approaches ot Eurasian Linguistic Areas.* Fujishiro, Setsu ed. 61-122. Kobe: Department of Communication Studies, Kobe City College of Nursing.

Schuessler, Axel 2007. *ABC etymological dictionary of Old Chinese*. Honolulu: Hawai'i' University Press.

Shintani, Tadahiko, L.A. 1990. *The Mun language of Hainan Island, its classified lexicon.* Tokyo: ILCAA.

Shintani, Tadahiko, L.A. 2008. *The Mun language of Funing County, its classified lexicon.* Tokyo: ILCAA.

Shorto, Harry L. 2006. *A Mon-Khmer comparative dictionary*. edited by Paul Sidwell, Doug Cooper and Christian Bauer. PL 579. Canberra: ANU.

Sidwell, Paul 2000. *Proto South Bahnaric: a reconstruction of a Mon-Khmer language of Indo-China*. Vol. 501. Canberra: Pacific Linguistics.

Sidwell, Paul 2005. *Katuic Languages: classification, reconstruction and comparative lexicon*. Munich: LINCOM.

Singh, U. Nissor 1906 [repr. 1983]. *Khasi-English Dictionary*. Shillong, Eastern Bengal and Assam.

Spriggs, M. 1982. Taro Cropping Systems in the S.E. Asian-Pacific Region: Archaeological Evidence. *Archaeology in Oceania* 17(1):7-15.

Spriggs, M. 1993. Pleistocene Agriculture in the Pacific: Why Not? *in* M. Smith, M. Spriggs and B. Fankhauser (eds), *Sahul in Review: Pleistocene Archaeology in Australia, New Guinea and Island Melanesia* pp. 137-43. Occasional Papers in Prehistory No. 24, Department of Prehistory, RSPACS, ANU.

Storck, K. & M. Storck 2005. *Ayta Mag-antsi dictionary*. Manila: SIL, Philippines.

Tahara, M., S. Suefuji, T. Ochiai & H. Yoshino 1999. Phylogenetic relationships of taro, *Colocasia esculenta* (L.) Schott and related taxa by non-coding chloroplast DNA sequence analysis. *Aroideana,* 22:79-89.

Tayeng, Aduk 1990. *Sulung language guide*. Itanagar: Government of Arunachal Pradesh.

Thongkum, Theraphan L. 1984. *Nyah Kur (Chao Bon) - Thai - English Dictionary*. Bangkok: Chulalongkorn University Printing House.

Tryon, D. et al. eds. 1995. *Comparative Austronesian dictionary.* [5 vols.]. Berlin/New York: Mouton de Gruyter.

VanBik, Kenneth. 2007. *Proto-Kuki-Chin.* Ph.D. dissertation, University of California, Berkeley.

Watson, Richard, Sandra K. Watson and Cubuat 1979. *Pacoh Dictionary: Pacoh-Vietnamese-English*. Trilingual Language Lessons, No.25, part 1. Manila, Summer Institute of Linguistics.

Watt, G. 1889-93. (ed.) *A Dictionary of the Economic Products of India*. 6 vols. Calcutta 1889-93 (Government of India).

Wolff, John 2010. *Proto-Austronesian phonology*. 2 vols. Ithaca, NY: Cornell Southeast Asia Program Publications

Yoshino, H. 2002. Morphological and Genetic Variation in Cultivated and Wild Taro. In: S. Yoshida and P. J. Matthews (eds) *Vegeculture in Eastern Asia and Oceania.* 95-116. JCAS Symposium Series 16, Japan Center for Area Studies.

Zide, Arlene R.K. & N.H. Zide 1976. Proto-Munda cultural vocabulary: evidence for early agriculture. In: *Austro-Asiatic Studies, Part II*. P.N. Jenner, L.C. Thompson & S. Starosta (eds.) 1295-1334. Honolulu: University of Hawai'i.

Zorc, R.D. 1995. A glossary of Austronesian reconstructions. In: *Comparative Austronesian dictionary. Part I. Fascicule 2*. D. Tryon et al. eds. 1105-1197. Berlin/New York: Mouton de Gruyter.