HU – A LANGUAGE WITH UNORTHODOX TONOGENESIS

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In this article I will describe and analyse a small vocabulary I collected in September 1984 from a native speaker of Hu /xúʔ/, a Mon-Khmer language spoken by about 1000 persons in a few villages in the Xiǎo Měngyǎng area in Jǐnghóng county, Sipsong Panna (Xīshuāng Bǎnnà), Yúnnán province, China. The Hu are known among the local Chinese as Kōnggé.

Hu belongs to the little-known Angkuic group of the Palaungic branch of the Mon-Khmer languages. Small Angkuic populations are scattered over south-western Yúnnán province, and in another article (Svantesson 1988) I describe the language of another of these, U, spoken in the village Paã Xɛp (Bāngxié) in Shuāngjiāng county.

The place of Angkuic within the Palaungic branch is shown in the following table according to Diffloth (1982a):

Palaungic
  East Palaungic
    Waic
    Angkuic
    Lamet
  West Palaungic
    Danaw
    Riang
    Rumai

Although my material is too small to allow a complete synchronic phonemic analysis, the most important historical developments in Hu can be inferred from it. From a general phonological point of view, the most interesting phenomenon is the development of a two-tone system where the tones are not the reflexes of voiced/voiceless proto-initials, as is most often the case in Mon-Khmer two-tone (or two-register) languages. Instead, the tones are the reflexes of the long/short vowel opposition which existed in Proto-Palaungic (inherited from Proto-Mon-Khmer). As far as I know, no language with this kind of tonogenesis has been described before.

Initial consonants

The Angkuic languages are characterised by a 'Germanic' development of the initial stops—that is to say, voiceless stops have become aspirated, and voiced stops have become voiceless unaspirated. This is illustrated by the following examples:

Hu	U	Lamet	N. Kammu	S. Kammu	
*voiceless					
phíɲ	phèt	píɲ	píɲ	piɲ	'to shoot'
thàɲ	thán	táaɲ	táaɲ	taaɲ	'to weave'
khàp	khap	káap	káap	kaap	'jaw'
*voiced					
pàɲ	pán	pàaɲ	–	–	'white'
pʁí?	qí	prìi?	prì?	bri?	'forest'
phltàk	?atăˤ	pltàak	ktáak	kdaak	'palm (of hand)'
kàŋ	káã	–	kàaŋ	gaaŋ	'house'
kák	káˤ	kàk			'to bite'

In Southern Kammu (as recognised from Lindell *et al.* 1981), the original Proto-Mon-Khmer voicing contrast is retained. The unaspirated stops in the Angkuic languages Hu and (Paã Xɛp) U correspond to voiced stops in Southern Kammu, and the aspirated stops correspond to voiceless unaspirated. Original voiced and voiceless stops have merged in Lamet (Rmèet; from Lindell *et al.* 1978) and Northern (Yùan) Kammu, giving rise to lax and tense register in Lamet, and low and high tone in Northern Kammu, as is the case in Mon-Khmer and other languages with 'orthodox' register or tone development*. The examples also show that the Hu tones are not the result of orthodox tonogenesis.

Hu has a contrast between initial *s*- (with the allophone [ɕ] before *i*, and in the word *sʁéŋ* 'red') and *θ*-, an opposition which is not present in U or other Angkuic languages, but which is found in Danaw (Luce 1965), as a contrast between *ts*- and *θ*-. In Lamet, and in the rest of Palaungic (and in Kammuic), Hu *s*- and *θ*- correspond to *s*- and *h*-, respectively. Diffloth (1977) and Ferlus (1978) reconstruct these as Proto-Mon-Khmer *c- and *s-, respectively. According to Diffloth (1977), *c- became *ts- in Proto-Palaungic. Examples are:

	Hu	U	Lamet	Danaw		
*c-	sɔ́?	sò	sɔ́?	tso[1]	'dog'
	salé?	salè	slɛ̀ɛ?	kălé[1]	'rain'
	nsí?	nchí	sí?	tsi[1]	'louse'

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*In the Northern Kammu form *ktáak*, the tone is determined by the voiceless *k*. (Ed.)

68

*s-	θúm	sùp	húum	θɔn^4	'to bathe'
	paθéɲ	sèt	phíɲ	păθén^4	'snake'
	θaʔɔ̀ɲ		sʔɔ́ɔɲ		'dry'
	θamáʔ	samà	ʔmáaʔ		'wind'

U has the regular reflex *ch-* of *c- after minor syllables, as in the example 'louse'. Proto-Palaungic also had *h-, which is retained as such in all languages but, unfortunately, I failed to elicit any word with *h- in Hu.

There are some words in which Palaungic *s-* corresponds to *c-* in Kammu—they include Hu *sáŋ* 'bitter', Kammu *cáŋ*. Here, Ferlus reconstructs *tš- in Palaungic, Kammuic and Viet-Muong (corresponding to two Proto-Mon-Khmer initials, *ts- and *tš-).

Minor syllables
As in other Northern Mon-Khmer languages, most non-compound words are monosyllabic or sesquisyllabic, i.e. consisting of a major syllable preceded by an unstressed minor syllable (cf. Shorto 1960). Minor syllables have a syllabic sonorant (such as *m* in *θmphúp* 'lung') or a (probably) non-contrasting vowel which I have written as *a* (*kaʔà* 'two').

There is also a contrast between *θ-* and *s-* minor syllable initial in Hu (and in one word, *ts-* is attested). This opposition is not maintained in this position in U, Lamet or Proto-Waic (=PW; Diffloth 1980), where the most common corresponding initial is *s-*:

Hu	U	Lamet	PW		
θanàt	nát	snàat	*snat	'gun'
θaʔàw	saʔà	sʔàar		'sour'
θaʔɔ̀ɲ		sʔɔ́ɔɲ		'dry'
θavàŋ	savã̀			'to ask'
θathán	sathàt			'old'
θatháʔ	sathà	ntáaʔ	*sntaʔ	'tail'
θamáʔ	samà	ʔmáaʔ	*ʔmaʔ	'wind'
θmphúp	saphŏp			'lung'
samóʔ	samò		*smoʔ	'stone'
saléʔ	salè	slɛ̀ɛʔ	*hlɛʔ	'rain'
saplàŋ	saχã́	smplàaŋ		'shoulder'
saŋày	ŋ̂ay	ŋàay	*ʔŋay	'eye'
sŋkhóʔ	khù		*ŋkoʔ	'yesterday'
tsaŋàl	saŋên	sŋàal	*sŋal	'blue'

Presumably, *θ-* and *s-* are the reflexes of Proto-Palaungic *s- and *ts- (< *c-), respectively, which have merged into *s-* in U, as usual. It may be noted that *s- has (at least in some cases) been retained in this position in

69

Lamet and Waic. As mentioned above, word initial *s- has usually become *h-* in these languages. There are irregularities, which may be due to more complex initial consonant clusters.

The occurrence of minor syllable initial *ts-* in *tsaŋàl* 'blue' suggests a different Proto-Palaungic consonant, presumably the reflex of Ferlus' (1978) *tš-, since the Kammu cognate is *cŋáar* with initial *c-*.

Hu has also retained the contrast between *s-* (< *ts- < *c-) and *θ-* (< *s-) in major syllable initial position after a nasal minor syllable:

Hu	U	Lamet	PW	
nsí?	nchí	sí?	*si?	'louse'
nasòk	sŭˤ	yóok	*hyok	'ear'
nθàc	ntshăt	máac	*hmac	'sand'
nθím	nchìp	lmhíim	*mhem	'claw'

Here, U has *s* in 'ear', where the minor syllable has disappeared, otherwise *ch* or *tsh* (which are probably allophones of a single phoneme). After a nasal minor syllable, *s* never occurs in U, but has developed into *tsh/ch*, which accounts for the unexpected occurrence of these consonants in the words for 'sand' and 'claw'.

Hu also has a number of words which have a nasal minor syllable followed by a voiceless nasal major syllable initial:

Hu	U	Lamet	PW	
nn̥àm	sanàm	náam	*hnam	'blood'
nn̥ím	sanəp	nìm	*nɣm	'year'
nn̥àt	sanà			'comb'
nn̥é?	nè		*n?ne?	'meat'
mm̥úl	mùn	kmùul	*kmil	'silver'
nn̥àt	ɲăˤ	kɲàas	*kɲas	'to laugh'

The Hu forms suggest a *nasal + *h* initial cluster, while Lamet and Waic in some cases have clusters with a stop and a nasal. Taken together, this implies proto-forms with *stop + nasal + *h* clusters. Medial *h* has been lost in most of Palaungic (cf. Diffloth 1977), and in Hu, where *h* is retained, the initial stop has disappeared.

U often loses cluster initital stops (see Svantesson 1988), as is the case in the last three examples above. In the preceding list, the minor syllable *sa* in the first three words in U, taken together with evidence from outside Palaungic, suggests Proto-Mon-Khmer *ɟ- (palatal voiced stop). This tallies perfectly with Diffloth's (1980:175) reconstruction of 'blood' as Proto-Mon-Khmer *ɟnhaam. For the other two words, *ɟnh- clusters are also supported by evidence outside Palaungic: Kammu *crìas* (Southern Kammu *ɟrias*) 'comb', Mon *cnām* 'year'.

Final consonants

Hu has retained the Proto-Palaungic (and even Proto-Mon-Khmer) system of final consonants rather intact. An exception is final *-s, which has developed into -t (merging with original *-t), another innovation shared by Hu and Danaw (and several other Mon-Khmer languages as well):

Hu	Danaw	Lamet	
ʔaxèt	k'rʸet³	kríis	'bear'
phòt	pɣt³	póos	'sambar deer/barking deer'

The final palatal stop *-c sometimes appears as -t in Hu (cf. Hu *pét* 'to spit', Lamet *pèc*; Hu *ʔamút* 'mosquito', Lamet *rmùuc* 'ant'), but my data are too limited to reveal the exact circumstances under which this has taken place.

Initial *r- is realised as a uvular [ʁ] (as is also the case in some Lamet dialects, in Bùlǎngshān Blang, and in some other languages of the area). In final position, [ʁ] is pronounced as a rather vocalic uvular glide which can be written [ǎ] (incidentally a development which has also taken place in my own southern Swedish dialect! See Lindau 1985 for different kinds of r). Thus *ʔiʁ* 'fowl' is pronounced [ʔiǎ]. After the vowel a, final *-r has disappeared, or is retained as -w:

Hu	Lamet		
kaʔà	ʔláar	'two'	
mà	màar	'field'	
θaʔàw	sʔáar	'sour'	
kâw	kàar	'they (dual)'	

Tones and vowels

There are two tones in Hu, namely, high (denoted by ´ over the vowel) and low (ˋ).

The co-occurrence of tones, vowels and final consonants is restricted, as shown in this table:

		Final		
	ø	ʔ	ʁ	others
Vowel: i u ɨ	ˋ	ˊ	ˊ ˋ	ˊ
e ɛ a ə	ˋ	ˊ	ˊ ˋ	ˊ ˋ
o ɔ	ˋ	ˊ		ˋ

As mentioned above, the general rule is that originally long vowels have conditioned low tone, and short vowels have conditioned high tone, and the co-occurrence restrictions probably reflect restrictions on the co-occurrence of long and short vowels with final consonants by the time

71

that the tone system was formed. Since Lamet is a Palaungic language which retains the Proto-Palaungic (and even Proto-Mon-Khmer) length distinction, I will use Lamet examples for showing the relationship between Proto-Palaungic vowel length and Hu tones. For non-high vowels, the relationship is quite clear-cut:

	Hu	Lamet	
*short vowels:	yám	yàm	'to die'
	paθán	phán	'five'
	mép	krmìɲ	'star'
	ncén	kcèn	'heavy'
*long vowels:	yàm	yàam	'to cry'
	lèk	ɦik	'pig'
	ʔɔm	ʔóom	'water'
	nasòk	yóok	'ear'

Before a final glottal stop, the tone is always high, probably due to shortening of the vowel in this position before the development of tones. For comparison, forms from (Northern) Kammu are given. This language, which has orthodox tonogenesis, is another language where the length distinction in vowels is lost before a glottal stop. Examples:

Hu	Lamet	Kammu	
sɔ́ʔ	sɔ́ʔ	sɔ́ʔ	'dog'
kathéʔ	ktáʔ	ptéʔ	'earth'
ʔɔ́ʔ	ʔɔ́ɔʔ	ʔɔ̂ʔ	'I'
phléʔ	plée ʔ	pléʔ	'fruit'

The high vowels *i* and *u* always have high tone, except before ʁ or in open syllables, where both tones occur. Compare the following examples with long proto-vowels (I have no examples with long *ɨi):

	Hu	Lamet	
	ʔasím	síim	'bird'
	phʁím	príim	'old'
	mɱúl	kmùul	'silver'
	ʔúp	ʔúup	'cooked rice'
	θum	húum	'to bathe'
But:	ʔìʁ	ʔɛ́ɛr	'fowl'

One possible explanation for the absence of a tone contrast in the high vowels is that they have higher intrinsic pitch than low vowels, as has been shown for many different languages (see, e.g., Lehiste 1970: 68-71), which might have conditioned high tone for both long and short high vowels when the Hu tone system developed. This explanation does not, however, account for the occurrence of high vowels with low tone on open syllables.

On the other hand, there are indications that the length contrast was already lost in the high vowels in Proto-Angkuic, i.e. before the development of the Hu tone system.[1] Thus, judging from the words given in Diffloth (1982a), there is no length contrast for *u* and *i* in Mok, while the contrast is retained for non-high vowels. In U, the vowel length contrast has disappeared, although it has left traces in final nasals which are retained after originally long vowels but have become stops after originally short vowels. Denasalisation has, however, taken place after both *long and *short *i* and *u*, which are thus treated as if they were short.

The following examples show this development. Lamet cognates are given because they retain Proto-Palaungic vowel length:

	Lamet	Hu	U	Mok	
*non-high long:	*yàam*	*yàm*	*yâm*	*ɲaam*	'to cry'
	ʔóom	*ʔ̃m*	*ʔôm*	*ʔoom*	'water'
	póon	*ʔaphòn*	*phón*	*phoon*	'four'
*non-high short:	*yàm*	*yâm*	*yàp*	*yɛm*	'to die'
	ntám	*nthám*	*nthàp*	*tham*	'egg'
	kcèn	*ncén*	*kὲt*	*kɔcɛn*	'heavy'
*high long:	*síim*	*ʔasím*	*pachìp*	*ʔa-sim*	'bird'
	kúuɲ	*khúɲ*	*khùt*	*khun*	'male'
	príim	*phʁím*	*χìp*	*phim*	'old'
*high short:	*kíŋ*	*(khíŋ)*	*khìˤ*	*khiŋ*	'head'

(The Hu word *khíŋ*, which occurs in *khíŋ kòŋ* 'knee' may be cognate to the words meaning 'head' in the other languages.)

The reason for the loss of vowel length in the high, but not in the other, vowels may be their shorter intrinsic length, something which has been attested for various languages (see Lehiste 1970: 18-19). Furthermore, the length contrast in the high vowels seems to have carried a rather small functional load.

As mentioned above, final -*ʁ* is more or less vocalic, which may explain why low tone can occur on high vowels before this final, as it does in open syllables.

The reason why *o* and *ɔ* occur only with low tone (except before *ʔ*) in my data is probably that there were relatively few words with short *o* and *ɔ*. This is the case in Kammu, where short and long *ɔ* do not contrast (see Svantesson 1983).

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1. Proto-Angkuic did not have tones, as is proved by the absence of tones in Mok (Diffloth 1982a). U has a tone system, which is different from that in Hu, and for the other Angkuic languages it is difficult to know whether they have tones or not, since they are known only from older and not very reliable sources, which do not give any tones.

Vowel length or tones?

Figure 1 below shows some typical examples of the fundamental frequency (F_o) contours of the two tones on different types of syllables:
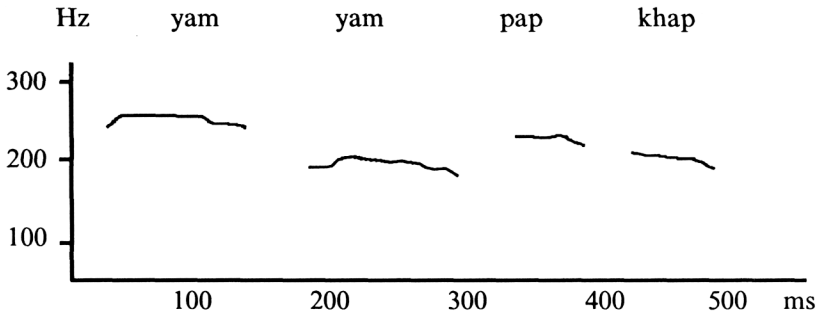

Fig. 1.

In these cases, as in many others, there is a co-variation between fundamental frequency and vowel duration, so that vowels carrying low tone have longer duration than vowels carrying high tone. One might, therefore ask whether an analysis in terms of vowel length rather than tones is possible.

To investigate this, the duration of the vowel and the mean value of the fundamental frequency over the vowel were computed (using the ILS* program package) for some words with high and low tone. The words were said in isolation by the female informant. Since the tone contours are rather flat, the average frequency value can be used to characterise the tones. The results are given in Table 1.

As seen in this table, vowels carrying low tone often have longer duration than those with high tone, as seen in the only recorded minimal pair, *yám* 'to die' and *yàm* 'to cry'. On the other hand, some vowels with high tone are longer than some with low tone, and this overlapping of duration can be taken as evidence against treating vowel length as distinctive. Each of the analysed high-tone words also has higher fundamental frequency than each of the low-tone words.

Thus, fundamental frequency is definitely a consistent phonetic correlate of the investigated opposition, while vowel length may be regarded as a concomitant factor. It seems, therefore, reasonable to analyse the opposition as one consisting of two tones.

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* ILS = Interactive Laboratory System (Ed.).

74

Table 1

		F_o (Hz)	Duration (ms)	Mean values: F_o	Duration
High tone:	yâm	269	130		
		247	135		
		263	120		
		263	120	260	126
	pâp	253	115		
		249	95		
		242	95	248	102
	kâk	253	100		
		252	130		
		258	120	254	117
Low tone:	yàm	214	200		
		215	175		
		215	225	215	200
	khàp	204	115		
		203	130		
		208	115	205	120
	ʔàk	205	180		
		201	205		
		201	180	202	188

Note: The F_o ranges are 242-269 Hz for high tone and 201-215 for low tone.

Conclusion

The Hu data raise a number of intriguing questions, two of which will be discussed here.

One concerns the classification of Palaungic. There are some striking similarities between Hu and Danaw. In particular, both have θ- where Proto-Mon-Khmer has *s-, and this is found nowhere else in Palaungic. In the sub-classification of Palaungic given in Diffloth (1977), Danaw is close to Angkuic, but in Diffloth (1982a), a classification (shown on p. 67), which puts Danaw and Angkuic rather far from each other is given. Mitani (n.d.), using lexicostatistical methods for classifying Palaungic, also finds that Danaw and Angkuic are rather distant from each other. One might ask if my data from Hu—being an Angkuic language which shares the innovation *s- > θ- with Danaw—necessitates a revision of this. Not necessarily, since it is quite possible that the development *s- > h-, which has taken place in all Palaungic languages except in Angkuic and Danaw, is the final result of two different processes: *s- > θ and θ- > h-. If that is the case, Hu and Danaw are not languages which share an

early innovation, but rather languages where a phonological rule (θ- > h-) has *not* applied, and there is no reason to assume that they have branched off together from the rest of Palaungic at some early time.

Another question concerns tonogenesis. In almost all cases where a Mon-Khmer language has acquired tones (or registers), the development of the tone (or register) system is the result of a loss of contrasts—usually voicing contrasts—in the consonants, but in Hu, the tones have developed in connection with the loss of vowel length. The only other case known to me, in which tonogenesis of a similar kind may have taken place, is in Estonian, where a tonal distinction (different from that in Hu) has possibly developed from an earlier vowel length opposition (see Lehiste 1978). One somewhat similar case in Mon-Khmer is Pacoh which, according to Diffloth (1982b), has an unorthodox registrogenesis, where a register difference has replaced an earlier difference in vowel quality.

Both the acquisition of tones and the loss of vowel length are ongoing processes in the area where Hu is spoken, so it is perhaps not surprising to find a language that combines both. There might be a phonetic explanation as to why long vowels have acquired low tone and short vowels high tone, since there seems to be a general tendency for vowel duration and fundamental frequency to vary inversely with each other. As already mentioned, it has been shown for many languages that high vowels have intrinsically shorter duration and higher pitch than low vowels. For instance, measurements of the intrinsic pitch and duration in Standard Chinese vowels (*pǔtōnghùa*) have shown that, if other factors are constant, vowels with relatively high intrinsic pitch also have relatively short duration (Shí Bō, pers. comm.). Naturally, pitch differences of 40 Hz or more, as are found in Hu, are not the result of automatic adjustments, but an originally non-distinctive pitch difference could have taken over some of the functional load carried by vowel length, eventually acquiring phonemic status.

Vocabulary

The vocabulary is presented in reverse alphabetical order.

ka?à	'two'	*mà*	'dry field'
maʁà	'thing'	*pə̀*	'not'
ʁì	'to go'	*?amò*	'one'
?a?ɔ̀	'monkey'	*mɔ̀*	'axe'
lù	'bad'		
lâ?	'leaf'	*θamâ?*	'wind'
ŋâ?	'to itch'	*maʁâ?*	'to steal'
θathâ?	'tail'	*?ê?*	'we (pl.)'
kê?	'they (pl.)'	*salê?*	'rain'
phlê?	'fruit'	*mê?*	'you (sg.)'

kamêʔ	'dream'	*thamêʔ*	'new'
nn̥êʔ	'meat'	*phéʔ*	'you (pl.)'
θêʔ	'tree'	*thêʔ*	'to sit'
kathêʔ	'earth'	*vêʔ*	'left (side)'
katɔ́ʔ	'nose'	*ʔíʔ*	'person'
ɲíʔ	'day'	*kʁíʔ*	see *póʔ*~
ŋʁíʔ	'pestle'	*pʁíʔ*	'forest, mountain'
pasíʔ	'string'	*nsíʔ*	'louse'
paθíʔ	'blood-vessel'	*thíʔ*	'hand'
ŋkhóʔ	'rice (husked)'	*sŋkhóʔ*	'yesterday'
samóʔ	'stone'	*póʔ ~kʁíʔ*:	'spirit'
ʔɔ́ʔ	'I'	*θaklɔ́ʔ*	'bark (of tree)'
sɔ́ʔ	'dog'	*katɔ́ʔ*	'banana'
palúʔ	'salt'	*xûʔ*	'Hu'

nθàc 'sand'

líh 'to go down'

ʔàk	'bow'	*kák*	'to bite'
thʁàk	'buffalo'	*θák*	'rice (plant)'
phltàk	'palm (of hand)'	*nthàk*	'tongue'
lèk	'pig'	*phʁèk*	'ribs'
ʔaθèk	'rat'	*têk*	'small'
θək ~wíŋ:	'flea'	*nasòk*	'ear'
nthɔk	'head'	*θúk*	'hair'
thúk	'to hang'		

ŋál	'fire'	*tsaŋàl*	'blue'
mphál	'mortar'	*phêl*	'wing'
ntɔl	'wine'	*mn̥úl*	'silver'
katúl	'belly'		

nn̥àm	'blood'	*nthám*	'egg'
yám	'to die'	*yàm*	'to cry'
nêm	'younger brother'	*ʔaθêm*	'right (side)'
ʔím	'to live'	*ʁím*	'village'
phʁím	'old (of things)'	*ʔasím*	'bird'
nθím	'claw'	*nn̥ɨm*	'year'
ʔɔ́m	'water'	*kathɔm*	'liver'
núm	'piss'	*tŋʁúm*	'under'
θúm	'to bathe'		

làn	'long (in space)'	*paθán*	'five'

thán	see *nə̀y*, *ʔúɲ*	*θathán*	'old'
ncɛ́n	'heavy'	*tên*	'low'
ʔə́n	'he, she, it'	*mə́n*	'long (in time)'
phɨ́n	'woman'	*ʔaphòn*	'four'
khɔ̀n	'child'	*khɔ̀n ~ thíʔ*:	'finger'
kaʔàɲ	'wasp'	*pàɲ*	'white'
thàɲ	'to weave'	*méɲ*	'star'
paθéɲ	'snake'	*phɨ́ɲ*	'to shoot'
θaʔɔ̀ɲ	'dry'	*ʔúɲ ~ thán*:	'grandfather'
ʔaʔúɲ	'father'	*khúɲ*	'man; husband'
maʁúɲ	'ant'	*ntúɲ*	'mouth'
kaʔàŋ	'bone'	*kàŋ*	'house'
kaŋ ~xáw:	'heaven'	*saplàŋ*	'shoulder'
kaŋáŋ	'iron'	*ʁàŋ*	'flower'
maʁáŋ	'horse'	*sáŋ*	'bitter'
tháŋ	'to kill'	*paváŋ*	'tomorrow'
θavàŋ	'to ask'	*cèŋ*	'foot'
lèŋ	'high'	*sʁéŋ*	'red'
ntèŋ	'big'	*thèŋ*	'drink'
phɔ́ŋ	'many'	*θɔ́ŋ ~ ʔiʁ*:	'bedbug'
khíŋ	'tooth'	*khíŋ ~kòŋ*:	'knee'
maʁíŋ	'crab'	*wíŋ*	see *θək~*
θɨ́ŋ	'bamboo'	*kòŋ*	see *khíŋ~*
mòŋ	'to look'	*ʔaʔɔ̀ŋ*	'wasp'
xɔ̀ŋ	Mekhong	*yɔ̀ŋ*	'good'
khúŋ	'wet field'		
khàp	'jaw'	*páp*	'to speak'
θaʔèp	'rainbow'	*lèp*	'blind'
cɔ̀p	'to run'	*ʔúp*	'(cooked) rice'
θmphúp	'lung'		
ʔiʁ	'fowl'	*khìʁ*	'moon'
phaθìʁ	'bee'	*kɨʁ*	'finished'
phɨ́ʁ	'to fly'	*klùʁ*	'to sew'
phaʔát	'to swell'	*khát*	'sick'
θanàt	'gun'	*nɲàt*	'comb; to comb'
nɲàt	'to laugh'	*thasàt*	'lightning'
pét	'to spit'	*khasét*	'charcoal'
ʔaxèt	'bear'	*ʔèt*	'to sleep'
ʔòt	'to be at'	*phòt*	'sambar deer'

78

θɔ̂t	'barking deer'	*ʔamút*	'mosquito'
thút	'breast'		

θaʔàw	'sour'	*kâw*	'they (dual)'
ʔapalàw	'fish'	*phâw*	'you (dual)'
vâw	'wide'	*xâw*	see *kaŋ-*
ʔaŋêw	'cat'	*khíw*	'green'

ʔày	'we (dual)'	*khày*	'to eat'
ʔalày	'squirrel'	*ŋày ~ ŋíʔ*:	'sun'
sanày	'eye'	*ŋʔŋay*	'far'
nə̀y ~ thán:	'grandmother'	*ʔanə̀y*	'mother'
khɔ̀y	'to have'	*kaʔɔ̀y*	'three'
ʀɔ̀y	'hundred'		

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