

## Chapter 3

### Muak Sa-aak consonants and vowels

This chapter describes the Muak Sa-aak inventory of 22 consonants, 18 vowels. Tone will be addressed in Chapter 5. Consonants will be described first, including initial consonants, consonant clusters, and final consonants. The second part of the chapter will address vowels, including monophthongs and diphthongs, and vowel length.

#### 3.1 Consonants

Muak Sa-aak has 22 distinctive consonants. They include oral and nasal stops at the bilabial, alveolar, palatal, and velar points of articulation, plus a glottal stop. Aspiration and voicing are distinctive for the stops, although the voiced stops are not common, and there are no voiced stops at the palatal or velar points of articulation. The four aspirated consonants /p<sup>h</sup>, t<sup>h</sup>, c<sup>h</sup>, k<sup>h</sup>/ have been analyzed as single segments since they form clusters with sonorants, and there are no clusters consisting of three consonants in Muak Sa-aak. There are three voiceless fricatives: labiodental /f/; alveolar sibilant /s/; and glottal /h/. There are also four approximants, the lateral approximant /l/, and the central approximants /r/, /w/ and /j/. The following sections will discuss major-syllable initials, consonant clusters, final consonants, and presyllable onsets.

##### 3.1.1 Initials

All 22 consonants may occur syllable-initially. The full inventory is shown in Table 24, below. Any context-dependent alterations or other phonetic detail of interest will be given in the following subsections to identify the phonetic value of Muak Sa-aak consonants, followed by an example. Contrasts are included in Appendix 3.

**Table 24. Consonant phonemes in Muak Sa-aak**

	Labial		Alveolar		Palatal		Velar		Glottal
	p	b	t	d	c		k		
Stop	p <sup>h</sup>		t <sup>h</sup>		c <sup>h</sup>		k <sup>h</sup>		ʔ
Nasal	m		n		ɲ		ŋ		
Fricative	f		s						h
Central approximant	w		r		j				
Lateral approximant			l						

### 3.1.1.1 Stops

As shown in Table 24, Muak Sa-aak has 11 stops at five places of articulation.

- /p/: voiceless bilabial stop.

(4) 1557 /pian<sup>3</sup>/ “red”

- /p<sup>h</sup>/: voiceless aspirated bilabial stop.

(5) 1431 /p<sup>h</sup>ɣɲ<sup>3</sup>/ “shoot (v)”

- /b/: voiced bilabial stop.

(6) 1315 /bɔt<sup>2</sup> c<sup>h</sup>a:j<sup>1</sup>/ “cloud”

- /t/: voiceless alveolar stop.

Phonetically this phoneme is realized as a fronted voiceless alveolar stop [t̪].

(7) 327 /ti<sup>2</sup>/ “self”

- /t<sup>h</sup>/: voiceless aspirated alveolar stop.

(8) 150 /t<sup>h</sup>e:t<sup>1</sup>/ “sit”

- /d/: voiced alveolar stop.

(9) 133 /duam<sup>3</sup>/ “look at (far)”

- /c/: voiceless palatal stop.

Phonetically this phoneme is realized as a slightly affricated voiceless alveolo-palatal stop [t̪].<sup>25</sup>

The degree of friction is speaker-dependent (more friction for Speaker B than for Speaker A).

(10) 63 /cu:ŋ<sup>3</sup>/ “leg”

- /c<sup>h</sup>/: voiceless palatal aspirated stop.

Phonetically this phoneme is realized as a voiceless alveolo-palatal aspirated stop [t̪<sup>h</sup>~ç].

This stop occurs in free inter- and intra-speaker variation with a homorganic fricative. Speaker A used both allophones, sometimes in the same word on different occasions. Speaker B used the fricative more frequently than Speaker A; Speaker D always used a fricative.

(11) 1202 [çak<sup>2</sup>] /c<sup>h</sup>ak<sup>2</sup>/ “seed” Speaker B

(12) 1202 [t̪<sup>h</sup>ak<sup>2</sup>] /c<sup>h</sup>ak<sup>2</sup>/ “seed” Speaker A

- /k/: voiceless velar stop.

(13) 1650a /kaj<sup>3</sup>/ “they (3 Dual)”

- /k<sup>h</sup>/: voiceless aspirated velar stop.

(14) 18 /k<sup>h</sup>ɛŋ<sup>3</sup>/ “tooth”

- /ʔ/: glottal stop.

This occurs phonemically only syllable-initially.

(15) 326 /ʔic<sup>2</sup>/ “person”

### 3.1.1.2 Nasals

Muak Sa-aak has four distinctive nasals, /m, n, ŋ, ɲ/. These nasal finals vary in length according to the length of the preceding vowel, having a long allophone whose distribution is predictable. A longer vowel tends to produce a shorter final, and a shorter vowel a longer final (see discussion in Section 3.2.3.1).

<sup>25</sup> Since alveolo-palatal consonants appear to be a Mainland-Southeast Asian areal feature, Clark represents them with single letters that Chinese researchers use in their description of Hmong-Mien languages (2008: 24). These symbols are chosen for the phonetic transcriptions of the alveolo-palatal consonants in this study as they accurately describe the phonetic quality of these sounds; however, the usual palatal symbols will be used for the phonemes since they are widely used in the literature.

- /m/: voiced bilabial nasal.

(16) 1281 /mul<sup>3</sup>/ “silver”

The voiced bilabial nasal also occurs as a syllabic nasal, but there was only one example of this in the data set ([m̩k<sup>h</sup>ot<sup>2</sup>] “rice, dehusked”). The speakers, when asked, could not think of other words with syllabic nasals.

- /n/: voiced alveolar nasal.

(17) 435 /nɯn<sup>3</sup>/ “speak”

- /ɲ/: voiced alveolo-palatal nasal.

Phonetically this phoneme is realized as a voiced alveolo-palatal nasal [ɲ].

(18) 467 /ɲel<sup>3</sup>/ “grumble, complain”

- /ŋ/: voiced velar nasal.

(19) 134 /ŋaŋ<sup>3</sup>/ “hear”

### 3.1.1.3 Fricatives

Muak Sa-aak has three voiceless fricatives, /f, s, h/.

- /f/: voiceless labiodental fricative.

(20) 491 /faj<sup>3</sup>/ “whip” (n)<sup>26</sup>

There are only a few occurrences of this fricative (23 items in the wordlist, of which nine are borrowed), and some speakers seem to realize it as the frequently occurring aspirated stop [p<sup>h</sup>] instead (the phoneme /p<sup>h</sup>/ is found in 116 items). For example, when referring to the name of their own village, sometimes a speaker would say /fa:j<sup>1</sup>/ and other times a speaker would say /p<sup>h</sup>a:j<sup>1</sup>/. It is possible that this is variation resulting from their contact with Tai Lue, which is described as having [f]. Further research with more speakers is needed to determine whether the labiodental is a phoneme undergoing a sound change, or the result of influence from a neighboring language.

- /s/: voiceless alveolar sibilant.

<sup>26</sup> Not the same word as the name of the village in the next paragraph.

(21) 900 /sɛp<sup>2</sup>/ “play”

- /h/: voiceless glottal fricative.

This phoneme occurs in only 31 words in the data (all but four of these are Tai Lue loanwords), and only in monosyllables. It does appear in contrast with the sibilant /s/, which is more common because it serves both as a presyllable initial consonant and as a main syllable initial.

(22) 423 /hɛl<sup>3</sup>/ “avoid”

### 3.1.1.4 Approximants

Muak Sa-aak has three central approximants /w, r, j/, and the lateral approximant, /l/.

As noted for the final nasals (see also discussion in Section 3.2.3.1), these approximant finals have lengthened final allophones. Their distribution is predictable based upon the length of the preceding vowel, such that a longer vowel tends to produce a shorter final, and a shorter vowel a longer final.

A phonetic description of all Muak Sa-aak approximants is given below.

- /w/: voiced labio-velar approximant [w~β].

/w/~ [w] \_openV<sub>2</sub>; C<sub>2</sub>\_V<sub>2</sub>; \_#

~ [β] \_elsewhere

~ [β~w] C<sub>1</sub>V<sub>1</sub> . \_V

(C<sub>1</sub> = presyllable initial consonant; V<sub>1</sub> = presyllable vowel;

C<sub>2</sub> = main syllable initial consonant; V<sub>2</sub> = main syllable vowel)

Syllable-initially, there is an overall pattern of free variation between these two allophones. However, in monosyllabic words, the allophone [w] commonly occurs before open vowels, particularly the vowel /a/. Before other vowels, however, particularly high unrounded front vowels, it is usually delabialized to a bilabial approximant [β]. This variation is shown in Examples (23) to (26). As the initial of the main syllable in a sesquisyllabic word, however, it occurs in free variation, as seen in Examples (27) and (28), “flea”. As the second consonant of a cluster, or as a final consonant, this phoneme is realized as [w].

(23) 809 [wa:<sup>1</sup>] /wa:<sup>1</sup>/ “give”

(24)	871	[wa <sup>i</sup> c <sup>2</sup> m.kɛp <sup>2</sup> ]	/wac <sup>2</sup> m.kɛp <sup>2</sup> /	“sword”	
(25)	1430	[βɾl: <sup>3</sup> ]	/wɾl <sup>3</sup> /	“throw”	
(26)	165	[βu <sup>1</sup> βi: <sup>3</sup> ]	/wu <sup>1</sup> wi: <sup>3</sup> /	“wave” (hand)	
(27)	1118	Speaker A	[s.wɛŋ: <sup>3</sup> ]	/s.wɛŋ <sup>3</sup> /	“flea”
(28)	1118	Speaker B	[s.βɛŋ: <sup>3</sup> ]	/s.wɛŋ <sup>3</sup> /	“flea”

- /r/: voiced alveolar approximant [ɹ~r]

Word initially, the alveolar approximant is in free variation with an alveolar trill. When it is the second consonant of a cluster, it is usually pronounced as an approximant. It does not occur word-finally. If the speaker is paying attention to his speech, he will produce a trill. If not, he will use an approximant. For this reason, it seems that the trill is considered the more proper or the clearer pronunciation.

(29)	533		/rim <sup>3</sup> /	“village”
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- /j/: voiced palatal approximant [j~j̥~ç]

(30)	249		/jam <sup>3</sup> /	“die”
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Word initially, /j/ is sometimes realized with devoicing and increased friction, as seen in this example of one word pronounced twice by the same speaker:

(31)	571	[p <sup>h</sup> jaŋ <sup>3</sup> ]	[p.ɕaŋ <sup>3</sup> ]	/p <sup>h</sup> .jaŋ <sup>3</sup> /	“fat”
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This is in agreement with Svantesson’s finding of friction in the realization of the palatal approximant in U as discussed in Section 2.1.3 (1988: 69).

- /l/: voiced lateral approximant

(32)	1408		/li: <sup>1</sup> /	“come/ go out”
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### 3.1.2 Consonant clusters

A limited number of consonant clusters are permitted. There are no syllable-final consonant clusters; all are syllable-initial. Only the voiceless bilabial and velar stops take the position of the first consonant in a cluster; only the consonants /w/ and /r/

can take the position of the second consonant in a cluster. The clusters found in the data are given in Table 25, below.

**Table 25. Syllable-initial consonant clusters**

	w	r
p	pw	pr
p <sup>h</sup>	p <sup>h</sup> w	p <sup>h</sup> r
k	kw	kr
k <sup>h</sup>	k <sup>h</sup> w	k <sup>h</sup> r
(t)	---	(tr)

One cluster has been included in parentheses in Table 25, /tr/.

There is only one example of the cluster /tr/, shown in Example (33) below:

(33) 324 /ʔun<sup>3</sup> tra:j<sup>3</sup>/ “danger”

This particular word is a borrowed word from Tai Lue. In addition, only Speaker A pronounced it this way; Speaker B did not pronounce it as a cluster, but with a presyllable, as in Example (34):

(34) 324 /ʔun<sup>3</sup> t.ra:j<sup>3</sup>/ “danger”

Example (33) could be the result of careless pronunciation or slurring of the presyllable by Speaker A. Therefore, /tr/ was not considered a true cluster in the language.

In addition, none of the consonant clusters with /w/ as the second consonant have more than one or two distinct lexical items that are not clearly borrowed words. Examples of these clusters are given in Examples (35) to (38).

(35) 1303 /pwi:<sup>1</sup> ʔo:m<sup>3</sup>/ “foam”

(36) 639 /p<sup>h</sup>wi:<sup>1</sup>/ “open”

- (37) 846 /kwaŋ<sup>3</sup> s.ruaŋ<sup>3</sup>/ “(be) lost”  
 (38) 418 /k<sup>h</sup>waŋ<sup>1</sup> k.tit<sup>2</sup>/ “invite”

Consonant clusters with /r/, however, are common in the data. Examples of these consonant clusters are given in (39) to (42).

- (39) 578 /prut<sup>2</sup>/ “salt”  
 (40) 688 /p<sup>h</sup>raŋ<sup>3</sup>/ “thatch”  
 (41) 597a /krew<sup>3</sup>/ “stir (in circles)”  
 (42) 437 /k<sup>h</sup>ra:k<sup>1</sup>/ “shout, cry out”

### 3.1.3 Final consonants

The following consonants occur in the syllable-final position: /p/, /t/, /c/, /k/, /m/, /n/, /ŋ/, /l/, /j/, and /w/. They are shown in Table 26 below.

Table 26. Final consonants

	Bilabial	Alveolar	Palatal	Velar
Stop	p	t	c	k
Nasal	m	n	ɲ	ŋ
Central approximant	w		j	
Lateral approximant		l		

These finals are the voiceless unaspirated stops, the nasals, the lateral approximant, and the central approximants. The approximant /r/ does not occur in the syllable-final position. The final stops are unreleased: [p̚, t̚, c̚, k̚]. Examples of the final consonants are given in (43) to (53).

- (43) 22 /k<sup>h</sup>a:p<sup>1</sup>/ “chin”  
 (44) 1517 /k.sɿt<sup>2</sup>/ “be thick”

(45)	89	/sɾc <sup>2</sup> /	“muscle”
(46)	987	/le:k <sup>1</sup> /	“pig”
(47)	714	/su <sup>2</sup> lɛm <sup>2</sup> /	“log”
(48)	470	/k <sup>h</sup> i:n <sup>3</sup> /	“deny”
(49)	1322	/s.mɾŋ <sup>3</sup> /	“star”
(50)	1567	/c <sup>h</sup> aŋ <sup>3</sup> /	“(be) bitter”
(51)	597a	/krew <sup>3</sup> /	“stir (in circles)”
(52)	140	/k <sup>h</sup> a:j <sup>3</sup> /	“to eat”
(53)	974	/ʔɛl <sup>3</sup> /	“chicken”

The lack of syllable-final /r/ is interesting because /r/ does occur in consonant clusters; /l/, in contrast, occurs syllable-finally but not in clusters. They must be considered two separate phonemes, however, because both occur word-initially, with many examples, and there is clear evidence of contrast, with minimal pairs.

The glottal stop, although phonetically it occurs frequently in the syllable-final position, is not a final consonant phoneme. It occurs predictably in the syllable-final position of Tone 2 syllables which do not have a stop final consonant of /p/, /t/, /c/, or /k/. It does not occur with Tone 1 or Tone 3. With Tone 2, however, it can follow vowels, or syllable-final nasals or approximants, although no other syllable-final consonant clusters occur. The glottal stop in syllable-final position is therefore considered a feature of tone, rather than a separate final consonant phoneme.

The final palatal consonants /c/ and /ŋ/ normally cause a high vowel [i] onglide. When these consonants follow any vowel other than /i/, this tends to generate what at first appear to be vowel glides, but these glides do not occur in other environments. They are predictable, and occur only with final palatal consonants. Therefore the [i] onglide may be considered part of the phonemes /c/ and /ŋ/ when they occur in the final position, rather than part of the vowel. This is common in Mon-Khmer languages. Examples (54) and (55) show final /c/ when following a front high vowel versus final /c/ when following another vowel.

- (54) 326 [ʔic<sup>2</sup>] /ʔic<sup>2</sup>/ “person”  
 (55) 1243a [lo:c<sup>1</sup>] /lo:c<sup>1</sup>/ “rattan, cane”

Examples (56) and (57) show final /ɲ/ following a non-front high vowel; there are no examples in the data of final /ɲ/ following a front high vowel as there are for final /c/.

- (56) 328 [p.k<sup>h</sup>u<sup>i</sup>ɲ<sup>3</sup>] /p.k<sup>h</sup>uɲ<sup>3</sup>/ “man”  
 (57) 1322 [s.mɤ<sup>i</sup>ɲ<sup>3</sup>] /s.mɤɲ<sup>3</sup>/ “star”

These final palatal consonants are one place where Muak Sa-aak differs in phonology from Tai Lue, which does not have final palatal consonants. It is, however, typical of other Mon-Khmer languages (see discussion, Section 2.1.3.1).

### 3.2 Vowels

This section will discuss the distinctive vowels in Muak Sa-aak, both monophthongs and diphthongs, and address the issue of vowel length. Muak Sa-aak has sixteen monophthongs with nine distinctive vowel qualities. All monophthongs are distinguished by length, apart from the open front and open back vowels. In addition, there are two diphthongs. The complete inventory of 18 vowels is shown in Table 27, below.

Table 27. Muak Sa-aak vowels

	Front	Back unrounded	Back rounded
Close	i i:	ɯ ɯ:	u u:
Close-mid	e e:	ɤ ɤ:	o o:
Open	ɛ	a a:	ɔ
Diphthongs	ia		ua

#### 3.2.1 Monophthongs

- /i, i:/ close unrounded front vowel

This vowel occurs both as long and short vowels in Muak Sa-aak. The short vowel has the near-close allophone [ɪ], occurring before final nasals or the lateral approximant. Before all other final consonants and in open syllables, it is realized as the close vowel [i], as seen in Examples (37) to (41).

/i/      —>    [ɪ]/ \_\_{N, /l/}  
              —>    [i] all other environments

(58)	823	[k <sup>h</sup> iŋ <sup>3</sup> ]	/k <sup>h</sup> iŋ <sup>3</sup> /	“(be) expensive”
(59)	1041	[çim <sup>3</sup> ]	/ç <sup>h</sup> im <sup>3</sup> /	“bird”
(60)	266	[pil: <sup>3</sup> ]	/pil <sup>3</sup> /	“forget”
(61)	1425	[ç <sup>h</sup> ip <sup>2</sup> ]	/ç <sup>h</sup> ip <sup>2</sup> /	“pick up” <sup>27</sup>
(62)	1119	[çit <sup>2</sup> ]	/ç <sup>h</sup> it <sup>2</sup> /	“head louse”

The long vowel /i:/ can occur in either of these environments, as seen in Examples (63) and (64).

(63)	470	[k <sup>h</sup> i:n <sup>3</sup> ]	/k <sup>h</sup> i:n <sup>3</sup> /	“deny”
(64)	1019	[k <sup>h</sup> i:t <sup>1</sup> ]	/k <sup>h</sup> i:t <sup>1</sup> /	“bat”

– /e, e:/ close-mid unrounded front vowels.

This vowel quality occurs both as long and short vowels.

(65)	1652	/p <sup>h</sup> e <sup>2</sup> /	“you (2PL)”
(66)	781	/te: <sup>3</sup> /	“arrow”

– /ɛ/ open-mid unrounded front vowel.

This vowel quality occurs only as a short vowel.

(67)	900	/sɛp <sup>2</sup> /	“play”
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– /u, u:/ close unrounded back vowels.

This vowel quality occurs both as long and short vowels.

(68)	421	/tun <sup>1</sup> /	“flee”
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<sup>27</sup> There is a Tai Lue word, /yip<sup>1</sup>/ “pick up, hold in the hand” (Hudak 1996: 1193).

(69) 63 /cu:ŋ<sup>3</sup>/ “leg”

- /ɤ, ɤ:/ close-mid unrounded back vowels.

This vowel quality occurs as both long and short vowels.

(70) 435 /nɤn<sup>3</sup>/ “speak”

(71) 268 /so:<sup>1</sup> ɲɤ:m<sup>3</sup>/ “rejoice”

- /a, a:/ open unrounded back vowel.

This vowel quality occurs both as long and short vowels.

(72) 249 /jam<sup>3</sup>/ “die”

(73) 272 /ja:m<sup>3</sup>/ “cry, weep”

- /u, u:/ close rounded back vowel [u ~ ʊ].

This vowel quality occurs both as long and short vowels. The short vowel has two allophones in free variation, [u] and [ʊ]. However, there is a pattern to the free variation; in the data, the occurrence of the near-close allophone [ʊ] usually occurs before final nasals, with checked Tone 2, or falling Tone 3. The allophone [u] is far more common, and may occur in all environments (including those where [ʊ] occurs), as seen in Examples (74) to (78).

(74) 897 [puat<sup>1</sup> pum<sup>1</sup>] /puat<sup>1</sup> pum<sup>1</sup>/ “draw picture”

(75) 252 [kut<sup>2</sup>] /kut<sup>2</sup>/ “think”<sup>28</sup>

(76) 1469 [ʔun<sup>3</sup> ʔun<sup>3</sup>] /ʔun<sup>3</sup> ʔun<sup>3</sup>/ “put, place, set”

(77) 380 [cum<sup>3</sup>] /cum<sup>3</sup>/ “friend

(78) 1407 [lup<sup>2</sup>] /lup<sup>2</sup>/ “enter, go in”

- /o, o:/ close-mid rounded back vowel.

This vowel quality occurs both as long and short vowels.

(79) 654 /p.k<sup>h</sup>on<sup>3</sup>/ “knot”

(80) 1384 /t.po:l<sup>3</sup>/ “night”

- /ɔ/ open-mid rounded back vowel.

<sup>28</sup> There is a Tai Lue word /xɪt<sup>1</sup>/ “to think” (Hudak 1996: 1124); /x/ in Tai Lue has an allophone of [k<sup>h</sup>] and is usually /k<sup>h</sup>/ in Muak Sa-aak. These words are similar and may represent borrowing.

This vowel quality occurs phonemically only as a short vowel.

(81) 1174a /k.cɔk<sup>2</sup>/ “bamboo shoot”

This vowel quality does occur phonetically long, but [ɔ:] is considered here to be an allophone of the diphthong /ua/, as described in Section 3.2.2 below.

The hole in the chart under ([ɛ:]) may be a neutralization of [ɛ:] and [e:] in open syllables. The pronunciation of these vowels can, indeed, vary from [ɛ:] to [e:], but there is no contrast.

There is a clear contrast between the short vowels /ɛ/ and /e/ in all environments in which they occur. The long [ɔ:] and [ɛ:], however, appear to have shifted to the diphthongs described in Section 3.2.2 in all other syllable types except for the open syllable.

There are very few of the long vowel [ɔ:]; these occur only in open syllables and in a few Tai Lue borrowed words. They will be considered to be an allophone of the diphthong /ua/, occurring in open syllables, discussed further in Section 3.2.2.

### 3.2.2 Diphthongs

The diphthongs /ia/ and /ua/ are best analyzed as taking the place of the long vowel qualities [ɛ:] and [ɔ:], which are spaces left empty in the vowel chart (see Table 27). There are several reasons for this.

First, the diphthongs /ia/ and /ua/ in Wan Fai Muak Sa-aak correspond to the long vowels [ɛ:] and [ɔ:], respectively, in the variety of Muak Sa-aak spoken in Wan Saw [wan<sup>1</sup> sɔʔ<sup>2</sup>], a Muak Sa-aak variety which does not have these diphthongs. When speakers from Wan Fai try to write their own words in the Tai Lue script, which does not have /ia/ or /ua/, the vowels they choose are ones normally used to write the Tai Lue vowels /ɛ:/ and /ɔ:/. If they then unintentionally read them back as written, instead of with the normal Wan Fai pronunciation, they refer to it as “Wan Saw language.” This is evidence that not only is it a sound change between the two language varieties, but it is one with which the speakers themselves are familiar.

Secondly, this sound change also affects words borrowed from Tai Lue; if the Tai Lue word contains the Tai Lue phoneme /ɛ:/ or /ɔ:/, when borrowed into Wan Fai Muak Sa-aak, it typically becomes /ia/ or /ua/ (see Section 6.1.1).

In the Muak Sa-aak variety under study (Wan Fai variety), /ua/ occurs only in closed syllables (189 occurrences in the data), although it can occur in any of the

three tones and with any of the final consonants. The sound [ɔ:] normally occurs in open syllables (60 occurrences), although there are a few occurrences with final consonants, mainly in borrowed words (9 occurrences total, of which four are the same word, [sɔ:ŋ<sup>3</sup>], the number “two”). It is a complementary distribution.

Therefore, the sounds [ua] and [ɔ:] are actually allophones of one phoneme, /ua/.

The sound [ɛ:] occurs in free variation with the frequently occurring long mid vowel /e:/ in open syllables.

The diphthongs /ia/ and /ua/, if seen as replacements of former [ɔ:] and [ɛ:] in most environments, fill in their spaces in the vowel chart (Table 27, above).

The distribution of the two Muak Sa-aak diphthongs can be summarized as follows:

- /ua/ --> [ɔ:] / \_#
- > [ua] elsewhere

Examples:

(82)	462	[sɔ: <sup>1</sup> ]	/sua <sup>1</sup> /	“insult”
(83)	831	[p <sup>h</sup> ua <sup>l3</sup> ]	/p <sup>h</sup> ua <sup>l3</sup> /	“beg”
(84)	54	[t <sup>h</sup> i <sup>2</sup> sua <sup>k1</sup> ]	/t <sup>h</sup> i <sup>2</sup> sua <sup>k1</sup> /	“forearm”
(85)	592	[s.ruaj <sup>3</sup> ]	/s.ruaj <sup>3</sup> /	“cut”

This phoneme could have been represented as /ɔ:/ or as /ua/. In this paper, the latter has been chosen because of the limited occurrence of [ɔ:], and for greater symmetry with the diphthong /ia/.

- /ia/ \_[C]

Examples:

(86)	133b	[liam <sup>3</sup> ]	/liam <sup>3</sup> /	“watch”
(87)	273	[s.ʔuat <sup>1</sup> s.ʔiat <sup>1</sup> ]	/s.ʔuat <sup>1</sup> s.ʔiat <sup>1</sup> /	“sorrow”
(88)	1557	[piaŋ <sup>3</sup> ]	/piaŋ <sup>3</sup> /	“red”
(89)	558	[lɛn <sup>3</sup> niaw <sup>1</sup> ]	/lɛn <sup>3</sup> niaw <sup>1</sup> /	“braid” (hair)

### 3.2.3 Vowel length

As seen in the previous subsection, monophthongs have distinctive vowel length. The speakers seem to notice length, and when trying to describe the difference in some words, one speaker used the terms “heavy” and “light” to refer to syllables with short and long vowels (short being “heavy” and long being “light”).

Some examples are shown here to illustrate contrast between short and long vowels. Further contrasts are included in Appendix 3.

#### /a/ and /a:/

(90)	249	/jam <sup>3</sup> /	“die”
(91)	272	/ja:m <sup>3</sup> /	“cry, weep”
(92)	134	/ɲaŋ <sup>3</sup> /	“hear”
(93)	1565	/ɲa:ŋ <sup>3</sup> /	“sweet”
(94)	607	/raŋ <sup>3</sup> /	“smoked”
(95)	1188	/ra:ŋ <sup>3</sup> /	“flower”
(96)	798a	/k <sup>h</sup> a <sup>2</sup> /	“fish”
(97)	877a	/k <sup>h</sup> a: <sup>2</sup> /	“slave” <sup>29</sup>

#### /i/ and /i:/

(98)	1458a	/ci <sup>2</sup> /	“do/ make”
(99)	166	/ci: <sup>2</sup> /	“point” <sup>30</sup>

#### /o/ and /o:/

(100)	474	/to <sup>2</sup> /	“persuade”
(101)	37	/k.to: <sup>2</sup> /	“navel”

<sup>29</sup> Borrowed word from Tai Lue.

<sup>30</sup> Borrowed word from Tai Lue.

For Examples (96) and (97), speakers identified these words as being the same tone. However, the pitch of /k<sup>h</sup>a<sup>2</sup>/, “fish,” is higher than that of /k<sup>h</sup>a:<sup>2</sup>/, “slave,” which falls. Both are Tone 2.

Minimal pairs based on vowel length contrast frequently include borrowed words. The length contrast is clearest between long and short /a/ and /a:/.

Vowel length contrast is restricted by syllable structure (see Sections 4.2 and 5.2). Due to the restrictions on syllable structure, minimal pairs on the basis of vowel length contrast can only occur in two circumstances: between words which are open syllables occurring with Tone 2, or between syllables ending with sonorant finals (any tone, but there are far more Tone 3 syllables with sonorant finals than Tone 1 or Tone 2).

### 3.2.3.1 Lengthening of final sonorants

An interesting phenomenon was observed among sonorant final consonants. Nasals and the final lateral and central approximants /l, w, j/ (see Examples (102)-(109)) are usually audibly shorter after long vowels, and longer if preceded by short vowels, so that the overall syllable length appears equal. This final consonant lengthening did not appear to be contrastive. Although there were exceptions, and it was most easily heard in utterance-final syllables, there seemed to be a preference for a certain syllable length, with lengthened final consonants paired with short vowels.

(102)	1071	[p <sup>h</sup> ɿl: <sup>3</sup> ]	/p <sup>h</sup> ɿl <sup>3</sup> /	“fly”
(103)	1059	[p <sup>h</sup> .ju:l: <sup>3</sup> ]	/p <sup>h</sup> .ju:l <sup>3</sup> /	“wing”
(104)	249	[jam: <sup>3</sup> ]	/jam <sup>3</sup> /	“die”
(105)	272	[ja:m <sup>3</sup> ]	/ja:m <sup>3</sup> /	“cry, weep”
(106)	1041	[c <sup>h</sup> im: <sup>3</sup> ]	/c <sup>h</sup> im <sup>3</sup> /	“bird”
(107)	731a	[cup <sup>2</sup> c <sup>h</sup> u:ŋ <sup>3</sup> ]	/cup <sup>2</sup> c <sup>h</sup> u:ŋ <sup>3</sup> /	“dye cloth”
(108)	140	[k <sup>h</sup> a:e <sup>3</sup> ]	/k <sup>h</sup> a:j <sup>3</sup> /	“eat”
(109)	571a	[k <sup>h</sup> ai: <sup>3</sup> ]	/k <sup>h</sup> aj <sup>3</sup> /	“fat (cow)”

An explanation for this might be available from Thai. Brown sees vowel length in Thai as “more a function of where the final consonant begins than where the vowel ends” (1979: 12). He uses a two-fold classification of Thai tones, the one-part tones: falling, low, and high dead in closed syllables, and the two-part tones: rising, mid, and high live in open syllables. After a short vowel, the final consonant begins earlier, in the first part, or head, of the tone; if a vowel is long, the final consonant begins in the second part, the tail (1979: 12).

Rungpat Roengpitya similarly found that vowel quality and length of final nasal consonants in Thai are secondary markers used to distinguish between short and long vowels. In particular, short vowels have longer nasal finals than long vowels, and a word with a long nasal final was more likely to be identified by the listener as having a short vowel (2002: 360).

Although Roengpitya deals only with nasals, perhaps a similar phenomenon could be at work with Muak Sa-aak final sonorants, especially since it has long been in direct contact with a Tai language.

### 3.3 Summary

There are 22 consonants and 18 vowels in Muak Sa-aak as spoken in Wan Fai; 16 of the vowels are monophthongs and two are diphthongs. Although the literature available on the Angkuic languages suggests that there is no vowel length contrast in Angkuic languages, these vowels do include a length contrast, although most notable in the vowels /a/-/a:/. In syllables with final sonorants, the length contrast in the vowels seems to be reflected in a corresponding length variation (non-distinctive) in the finals, so that sonorant finals following short vowels are longer than sonorant finals following long vowels.