PHONOLOGICAL DESCRIPTIONS OF PLANG SPOKEN IN MAN NOI, LA GANG, AND BANG DENG VILLAGES (IN CHINA)

Jerod Alan Harper

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2009

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Presented to Payap University in Partial Fulfillment
of the Requirements for the Degree of

MASTER OF ARTS IN LINGUISTICS
Faculty of Arts

Payap University
August 2009

Title	Phonological Descriptions of Plang spoken in Man Noi, La Gang, and Bang Deng Villages (in China)
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ACKNOWLEDGEMENTS

ABSTRACT

This thesis presents phonological descriptions of three Plang villages in Menghai County of Xishuangbanna Tai Autonomous Prefecture in Yunnan Province of the People's Republic of China. Plang is a Mon-Khmer language of the Palaungic branch.

The purpose of this thesis is to give phonological descriptions of Man Noi, La Gang, and Bang Deng Plang for the purpose of determining, from a phonological perspective, if these three varieties could be written with one single orthography. The phonological description will include word structure, syllable structure, phonemes, register complex, and tonal analysis.

This thesis found that these varieties of Plang do not differ enough phonologically to require three separate orthographies. The main difference between the varieties is that La Gang, unlike Man Noi and Bang Deng, has not lost voiceless nasals. There for the orthography would need to include a grapheme for these phonemes. This would lead to an overdifferentiation for readers from Man Noi and Bang Deng.

บทคัดย่อ

วิทยานิพนธ์ฉบับนี้พรรณนาระบบเสียงของภาษาปลั้ง 3 หมู่บ้าน ในเทศมณฑล เหมิงไห่ เขตปกครองตนเองชนชาติไทสิบสองปันนา มณฑลยูนนาน สาธารณรัฐประชาชนจีน ภาษาปลั้งเป็นภาษาในตระกูลมอญ-เขมร สาขาปะหล่อง

วิทยานิพนธ์ฉบับนี้มีวัตถุประสงค์เพื่ออธิบายระบบเสียงภาษาปลั้งที่พูดในหมู่บ้านมันนอย ละกัง และบังเดง เพื่อศึกษาว่าสามารถสร้างระบบการเขียน 1 ระบบ จากมุมมองทางสัทวิทยาสำหรับภาษาปลั้งทั้ง 3 ถิ่นได้หรือไม่ โดยแสดงผลการวิเคราะห์โครงสร้างคำ โครงสร้างพยางค์ หน่วยเสียง ลักษณะน้ำเสียง และวรรณยุกต์

ผลการวิจัยพบว่าภาษาปลั้งทั้ง 3 ถิ่น มีระบบเสียงที่ไม่แตกต่างกันมากถึงระดับที่ต้องแยกระบบการเขียนออกเป็น 3 ระบบ ความแตกต่างของภาษาเหล่านี้ที่เห็นชัดเจน คือ ภาษาถิ่นละกังยังคงมีเสียงนาสิกไม่ก้อง ในขณะที่เสียงนี้สูญไปแล้วในภาษาถิ่นมันนอยและบังเดง จึงต้องมีตัวอักษรสำหรับหน่วยเสียงนี้ในระบบการเขียน ซึ่งอาจทำให้ผู้อ่านเข้าใจว่าภาษาถิ่นละกังต่างจากภาษาถิ่นมันนอยและบังเดงมาก

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ABBREVIATIONS AND SYMBOLS

***	Unknown Gloss
CNE	Contrast in Non-Influencing Environment
CIE	Contrast in Identical Environment
/ /	Phonemic Transcription
[ ]	Phonetic Transcription
*	Proto form
.	Syllable Boundary
#	Word Boundary
σ	Syllable
C	Consonantal
V	Vowel
V̄	Vowel with tone
V̤	Breathy Phonation
V́	High Tone
V̀	Low Tone

Chapter 1

Introduction

The Plang inhabit the mountains of Southeast Asia, stretching from Yunnan Province in Southwest China to the mountains in Shan State, Myanmar. They settled in these mountain ranges centuries ago and time and distance have separated groupings ever since. During this time the language has shifted and changed dramatically. Speakers only need to cross a mountaintop to find other Plang who they cannot understand in their native tongue. With most of the speakers of Plang living in poverty or unable to travel outside their home area few have ever encountered researchers. Outside of the countries that they inhabit little is known about them. Where they live, what they speak, and how they communicate is at best a guess at times.[1]

In Menghai County in Xishuangbanna Tai Autonomous Prefecture, Yunnan Province preliminary surveys (Hopple 2004) have shown that there are at least three major divisions in Plang speakers. The three major distinguishable divisions can be divided up by geographic location; Bulang Mountain District, Daluo/Bada Districts, and Xiding District. However, even inside these divisions there are groups of villages that have trouble communicating in Plang with other Plang villages.

In the Bulang Mountain district there are more than twenty villages known to speak Plang. A dialect perception survey conducted in early 2007 found that there are three major varieties in the district. It is the intent of this study to describe the phonology of the largest variety of Plang in the Bulang Mountain district. The conclusions of this study will help facilitate orthography design and literature development.

After a summary of the origins of the Plang people and a background to the study, with explanation of methodology used in the study, a phonological description of the three varieties will be presented. The descriptions will begin

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[1] There is very little that has been published on the origins, culture, and customs of the Plang, the background material presented in this thesis has been collected through personal communications.

with a larger unit of the sound system and will then describe smaller units in succession starting with a discussion on the Plang word, then the syllable, including presyllables, and then the consonants and vowel phonemes. Once these units have been established the suprasegmental features will be discussed. Finally, implications and areas of further research will be addressed. Wordlist that were used in this study will be found in the appendix.

1.1   Plang Origins

The Plang, along with their more dominant relatives, the Wa, are regarded as the aboriginal inhabitants of Southwest China, Northeastern Burma, Central Thailand and parts of Northwestern Laos (Hopple 2004). As the more numerous and stronger Tai peoples, who were moving from Southeastern China down toward present day Thailand and Myanmar, came into Xishuangbanna they forced these people from the valleys to the mountains.

Around 900 years ago when the Tai (Dodd 1923) arrived in Xishuangbanna there was no distinction between the Wa and the Plang peoples. Since the arrival of the Tai the Plang have emerged as a separate ethnolinguistic group, reportedly for religious reasons having turned from animistic practices to Theravada Buddhism (Hopple 2004). This would explain the many Tai loan words, especially the religious and agricultural, in the Plang language.

Most Plang do not know the stories of their origins. When asked if they thought this account was correct they were not willing to accept it or deny it. However, there were a few older villagers who said they had heard stories of their origins that were very similar to this information.

1.2   Geographic Location and Population

Today the Plang live along the China-Myanmar border with the majority living in China's Southwestern Yunnan Province. According to the 2005 census of the People's Republic of China the Plang population within country is approximately 91,900 (2007)[2]. They are most heavily concentrated in the Bulang Shan District of Xishuangbanna Tai Autonomous Prefecture. A small population can also be found in the Lincang Prefecture. When the Plang in Lincang, who refer to themselves as Awa or Ava, come in contact with speakers of the Xishuangbanna Plang, who refer to

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[2] No author. From China Facts and Figures. www.china.org.cn

themselves as Plang or Pang, they cannot understand one another and must use Chinese to communicate.
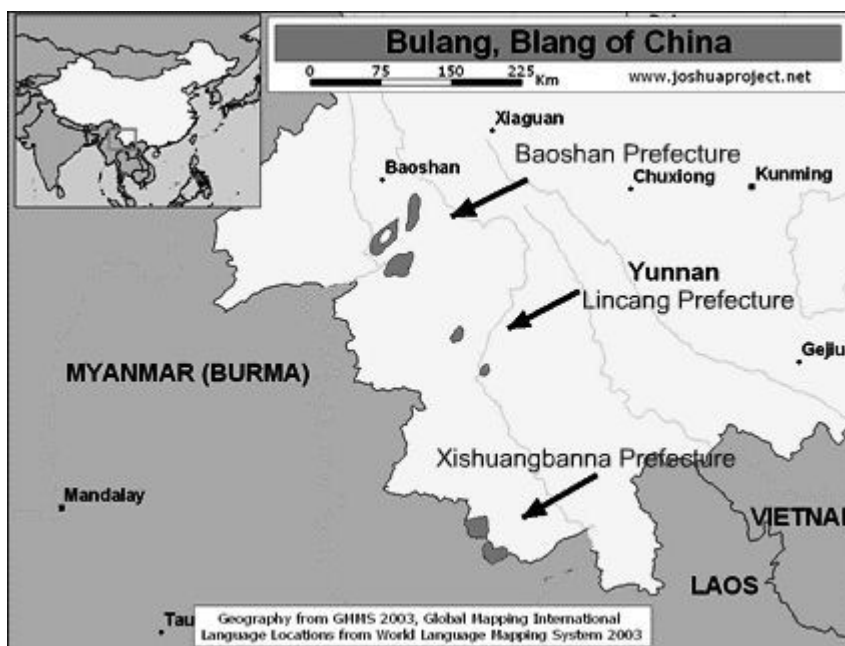
Figure 1 Plang Area in China (From Joshua Project 2009)

Plang can also be found in Myanmar and Thailand. The Plang in Thailand are concentrated in the north around Mae Sai, Chiang Rai Province, with a few living in Bangkok working in gardens and orchid farms. The population of Plang in Thailand is reported to be around 1,200. (Gordon 2005)
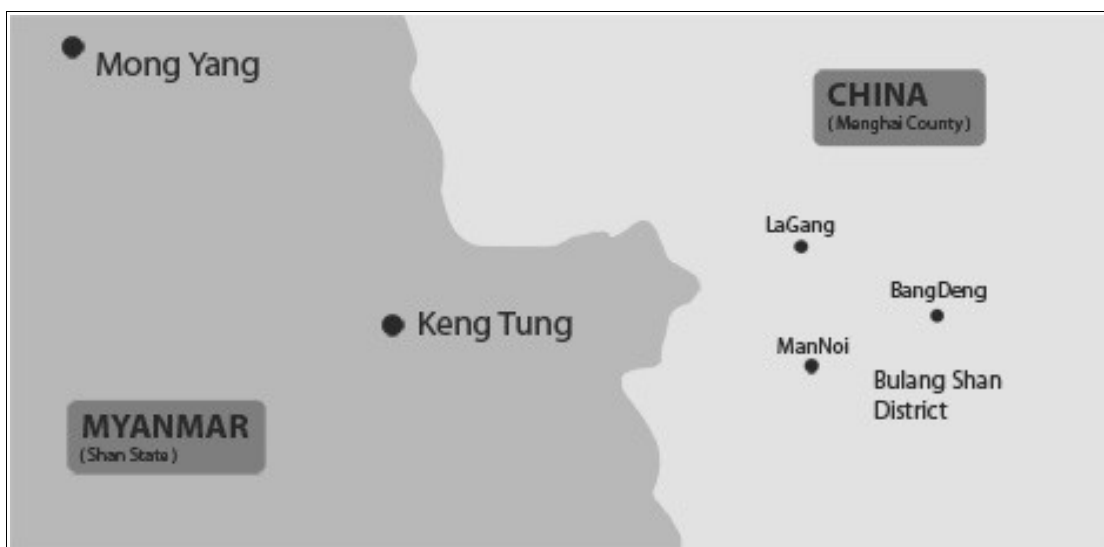
Figure 2 Plang Area (Myanmar and China)

During the time of the Cultural Revolution in China (1966-1976), the Plang people started migrating out of Yunnan. (Paulsen 1992:160) In Myanmar they settled in the Shan State in the city of Keng Tung and in the Mong Yong area, which borders China. The population in Myanmar is reported to be around 12,000. (Block 1994)

1.3 Language Classification

Plang is from the Northern Division of the Mon-Khmer branch of Austro-Asiatic family. Under that division it is then classified under the Western sub-branch of the Palaungic node. In the Western sub-branch Plang falls under the Waic languages. Plang then can be divided into three different dialects based on area, the Bulang Shan, Xiding, and Bada/Daluo dialects.
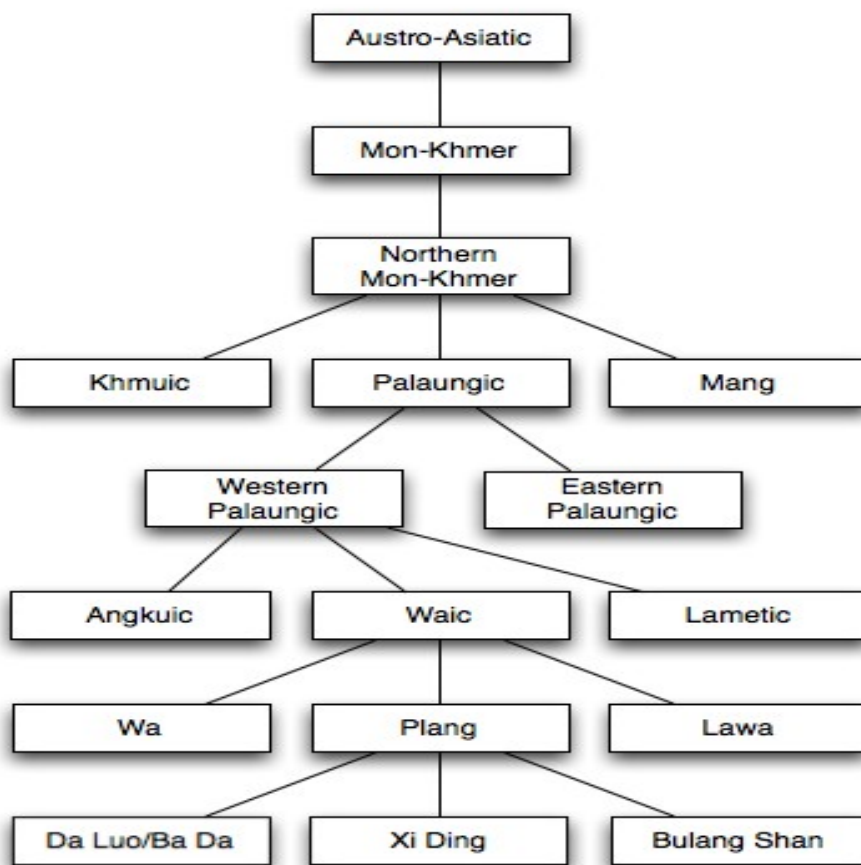
Figure 3 Plang Family Tree (Adapted from Ethnologue 2005)

1.4 Socio-Economic Status and Livelihood

The Plang, especially in the Lincang area, are very poor. The Plang are an agrarian society. Their main crops are tea, rice, corn, and sugar cane. Some, however, have

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begun to grow cotton and rubber. Families that do not have enough money to eat have to barter off items they own.

1.5   Education

Since 1949, the literacy rate among the Plang has increased dramatically. Most Plang villages have a school that children can attend through grade 3 or 4 and larger villages may have a middle school. These schools are government funded therefore the medium of instruction as well as all the curriculum is in Mandarin. Despite the increase in number of schools among Plang villages most remain illiterate or semi-literate due to the high cost of schooling. The majority of Plang children do not attend school beyond the elementary level. For children who succeed in advancing to high school they must move from their village to attend a school in the city.

1.6   Religion and General Worldview

The Plang follow a form of folk Buddhism, which is a mixture of Theravada Buddhism, ancestor worship, and the animism that they followed before they converted to Buddhism.

Since the time that they converted to Buddhism much of their ethnic identity is found in their Buddhist faith. Each village will have a temple and each young male is expected to serve as a monk for a short period of time. As a monk they learn to read the Tai scriptures aloud but not to understand what they mean. While villagers of all ages participate in festivals, it appears that only the older villagers are concerned with following the ordinances in the daily life. The most common ideas that villagers know from Buddhism are reincarnation and the giving of offerings. Outside of these two ideas most villagers and monks struggle to explain the ideological foundations of their faith.

The animistic religion they once believed in is seen through their fear of demons, ghost, and spirits. As well as the ideas of gods such as the rock god and tree god are still common in culture. Finally, this animistic religion is most clearly seen through the use of shamanism. Shamans in the Plang culture are women who either have studied how to or are gifted in interpreting the spiritual condition surrounding sickness, crop failure, or any other condition which plagues a person.

The remains of ancestor worship can be seen in their burial customs. When a person dies a chicken is killed to call back the soul of the deceased. The body is then washed, dressed in new clothes, and placed in a coffin. Along with the body, the

family usually places clothes, money and food in the coffin for the next life. The Plang only cremate those who have died unnatural deaths.

1.7   Social Structures and Customs

The Plang are a monogamous, patriarchal society. It is common to find three generations living in one Plang home. When a son marries, he goes to live with his wife's family for two to three years (or until the new bride becomes pregnant). Then, after the appropriate amount of time has passed, the son and his wife will return to his family's home to live. Young Plang are relatively free to choose marriage partners, however, it is not unusual for marriages to be arranged. Some Plang intermarry with people of other minority groups, but most do not.

The Plang traditionally lived in small clans, according to ancestral affiliations. Each clan possessed its own land and each member of the clan was responsible to work and harvest the crops. If a family moved away from the area, they forfeited their right to own land or reap the benefits of the produce. However, in 1949 all Plang forfeited their land rights to the newly founded communist government. The Plang are now allowed to lease land from the government.

Like the Xishuangbanna Tai, the Plang live in stilted homes made of wood. Until recently all homes were made of bamboo with thatched roofs. However, the newer homes are made of hardwood and have tiled roofs. The upstairs of the home is the living area with a "fire-ring" in the middle or to the side. The downstairs is used to pen animals such as pigs, chickens and sometimes water buffalo.

The Plang bury their dead in their own burial grounds, which are divided according to family name (or village). They believe that the deceased with different names (or from different villages) will not get along well and may even get into a fight if they are buried together.

Singing, dancing and playing instruments play a significant role in culture. There are a number of different dances that the Plang have, mostly pertaining to marriage and death. They also have dances for festivals when they are giving offerings of new idols to the temple. These dances are usually to the beat of a drum and cymbals. The main instrument used when singing Plang songs is the four-string guitar. Plang songs are composed of a call and response. The songs are generally about courtship and do not use the every day language. The male will begin and sing about the girl and she will respond to him.

<center>Chapter 2</center>

<center>Background and Methodology</center>

2.1   Previous Phonological Studies

The first study of the Plang variety in China was done in 1986 by a group of Chinese linguists. Data in that study was collected from Xin Man E[3], which is in the Bulang Mountain District, and from Guan Shuang, which is in the Meng Man district. Based on these two data sources the linguists produced a sketch of the Plang language. It must be noted that the two varieties differ greatly, yet there was only one phonology made combining both varieties.

Debbie Paulsen (1992, 1996a, 1996b) has done most of the phonological study on the Plang language. She has done a phonological description of the Kontoi dialect, as well as a phonological reconstruction of Proto-Plang using three dialects of Plang; Kontoi, Xin Man E, and Samtao. The Kontoi dialect is from a group of villages in the Xiding district of Xishuangbanna. The Samtao dialect used in the reconstruction, which is actually the Man Beek dialect, is from the Shan State in Burma. Previously, Samtao and Plang were listed as one language (Diffloth 1982, Grimes 1984) but it is now realized that the two are mutually unintelligible (Paulsen 1992:161) and are in fact separate languages under the Waic node.

2.2   Consonants

Paulsen (1991:129) list twenty five consonant phonemes, /p, p^h, t, t^h, c, c^h, k, k^h, ʔ, f, s, h, m, n, ɲ, ŋ, m̥, n̥, ɲ̊, l, l̥, r, w, j, j̊/. Of these phonemes only /p, t, c, k, ʔ, m, n, ɲ, ŋ, l, w, y, h/ can occur in the syllable final position. Consonants in the final position are unreleased. There are also five consonant clusters, /pl/, /kl/, /p^hr/, /k^hr/, and nasals that occur with /h/. Paulsen also states that

> /b/, /f/, and /y/ have a very low rate of occurrence.
>
> In Kontoi the /c/ and /c^h/ are grooved alveopalatal

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3   In Paulsen (1992) Xin Man E is written as Shiman.

affricates in syllable initial position, with the /c/ having an unreleased alveopalatal stop allophone in syllable final position. The alveolar fricative has an aspirated allophone /s^h/ when initial in breathy syllables. The symbol /l^h/ represents an aspirated lateral articulated with voicing initially followed by a voiceless articulation with a greater puff of air. By auditory impression it seems that the voicing is turned off halfway through the articulation of the sound. There are no vowel initial words in Kontoi. Words written with an initial vowel are actually articulated with an initial glottal (1992:163).

The Chinese sketch of Plang (Li et al. 1986) lists thirty five consonant phonemes, /p, ph, np, nph, t, th, nt, nth, tɕ, tɕh, ntɕ, ntɕh, k, kh, nk, nkh, qh, nqh, m, m̥, n, n̥, ɲ, ɲ̥, ŋ, ŋ̊, l, l̥, f, v, s, ʑ, x, h, ʔ/. There are eight syllable initial consonant clusters, /pl, phl, npl, nphl, kl, khl, nkl, nkhl/. The Chinese sketch uses /tɕ/ to write the palatal /c/, therefore /tɕ, tɕh, ntɕ, ntɕh/ will be written as /c, ch, nc, nch/. Prenasals assimilate to the point of articulation thus [np, nt, nc, nch] are realized as /mp, nt, ɲc, ŋk/. Vowels written in the word initial position are preceded by a glottal stop, as they are in Kontoi. There are ten consonants that occur in the syllable final position, /p, t, k, m, n, ŋ, h, ʔ, l, l̥/.

Paulsen (1992) list twenty six Proto-Plang consonants. As seen in Table 1 below.

	Bilabial		Labio-Dental		Alveolar		Palatal		Velar		Glottal	
Plosives	*p				*t		*c		*k		*ʔ	
	*p^h				*t^h		*c^h		*k^h			
Nasals		*m				*n	*ɲ			*ŋ		
		*mh				*nh				*ŋh		
Fricatives			*f	*v	*s						*h	
					*s^h							
Approximants					*r			*y				
								*yh				
Lateral App.						*l						
						*lh						

Table 1 Proto Consonants

2.3   Vowels

In the Kontoi variety there are eight vowel phonemes listed; /i, e, a, ɯ, ə, u, o, ɔ/. Paulsen states that the vowels, while being few, vary phonetically (1992:163). Front vowels, in breathy syllables, can become much more lax. Back vowels also have free variation. /u/ is realized as [o] in certain environments (1992:164). She states that all vowels occur in clear register, however in breathy register [ɯ] does not occur and /u̠/ and /o̠/ only have a two-way contrast (Paulsen 1991:134).

The Chinese sketch found nine simple vowels and sixteen diphthongs. The simple vowels, /i, e, ɛ, a, ɯ, ɤ, u, o, ɔ/, can occur with the ten final consonants. The complex vowels, /ie, ia, iu, ei, ɛi, ɯi, ɤi, ai, ui, oi, ɔi, ua, ɤu, au, uai, iau/, have a limited cooccurrence with the finals. (Paulsen 1992:166)

Paulsen (1992:192) also states that there are seven Proto-Plang vowels, as seen below.

	Front		Central		Back
Close	*i				*u
Close-mid	*e		*ɤ		*o
Open-mid					*ɔ
Open			*a		

Table 2 Proto Vowels

2.4   Register Complex

Matisoff states that Mon-Khmer languages have not quite developed true tone-systems in the ST [Sino-Tibetan] sense. But rather an intermediate sort of two-way articulatory opposition in which pitch-difference plays a role but is not the only distinguishing factor (Matisoff 1973:86). Linguists commonly use "register" to refer to several different aspects of language. Henderson used the term in her description of Cambodian syllables (Henderson 1952:151). However, because register actually consists of many different components that are interconnected it is better to refer to it as a "register complex." This complex can consist of consonant voicing, voice quality (phonation), aspiration, pitch level, contour, etc (Suwilai 2004:12).

Henderson's description included two separate registers. These two registers are represented in Gregerson's chart (1976). Thurgood (2007) then modified the chart, see Table 3 below, based on a composition of Henderson (1952, 1977), Matisoff (1973), Edmondson and Gregerson (1993), and Bradley (1982).

	Tense Register	Unmarked	Breathy Register
Original Initials	Proto-voiceless	Voiced/ Voiceless	Proto-voiced
Voice Quality	Creaky Tense Harsh	Modal (Clear)	Breathy
Vowel Quality	Lower (Open) More fronted vowels		Higher (Closed) More backed vowels
Diphthongization	Tendency to offglides		Tendency to onglides (Centralization)
Length	Often Shorter		Often Longer
Pitch Distinctions	Higher Pitch; Association with -ʔ and/or laryngeal tension		Lower Pitch; Association with -h and/or laryngeal laxness
State of Larynx	Larynx tense and/or raised (= reduced supraglottal cavity)		Larynx lax and/or lowered (= increased supraglottal cavity)

Table 3 Register Chart from Thurgood (2007)

Thurgood states that the raising of the larynx will result in a $F1^{4}$ which is higher, making the vowels lower. Inversely, a vowel with a lowering of the larynx results in a lower F1, making the vowel higher. Fronting and backing of the vowel correlates to the vowel's F2. A higher F2 results in a more fronted vowel while a lower F2 results in a more backed vowel (Thurgood 2000:3). Therefore, the correlation between breathy vowels and lowering of the larynx should result in a lower F1 formant.

Among Mon-Khmer languages Watkins (2002) has found there to be two phonation types in Wa. He describes the phonations using a continuum of phonation types, as seen in Figure 4 below, with creaky phonation at one end, breathy phonation at the other, and modal phonation in the middle.

Register Phonation

◄━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━►

CREAKY   MODAL   BREATHY

frequencies of the vibrations of air in the vocal tract. Areas within the spectrum with relatively high energy frequency components (i.e. areas around these peaks) are termed formants. (Aylett 1998:1)

The first is the clear register which he describes as modal tending toward slightly tense, the second is breathy which is described as modal tending toward sligthly breathy and/or lax (Watkins 2002:20). Suwilai (2004:12) states that among Khmu dialects register complex consist of tone and phonation and both equal partners. Both of these features can develop into a contrastive system. Theraphan found there to be two registers in Mon, tense and lax, but also stated that pitch and phonation-type differences are significant (Theraphan 1990:21). Theraphan also found there to be two registers in Kui, clear and breathy, but states that pitch and phonation-type are equally prominent (Theraphan 1989:14). Finally, Narumol (1982:40) states that there are two contrastive tones in Lamet that is related to tongue tension. Narumol also states that Wiang Papao Lua is a "quasi-tonal register" language with two contrastive tones, falling breathy tone and normal tone, with pitch, not voice quality being the most distinctive feature (Narumol 1982:44).

Among Plang studies specifically Paulsen and Hopple found that in Kontoi there are two types of register, clear and breathy. The clear register appears as a normal, clear voice quality. Breathy register appears as a breathy phonation type (Paulsen 1996:134; Hopple n.d.: 1). The Chinese sketch of Plang has no discussion of register for the Xin Man E dialect.

2.5   Presyllable

In Kontoi there are two presyllable types. The first type appears with the combination of /p, t, k, s/ and /a/. The second is a syllabic nasal as the presyllable. All voiced nasals can occur as presyllables (Paulsen 1992:164).

In the Chinese sketch the presyllables mainly appear as /ka/. There is also a prenasal that can occur in the presyllable position. The prenasal assimilates to the point of articulation of the stop, which they precede.

2.6   Tone

Paulsen states that there are two contrastive tones in Kontoi, high and low. These both have positional variants dependent on the type of syllable final consonants. The high tone is level before non-sonorant finals, but becomes a rising tone when before sonorant finals. The low tone is also level before non-sonorant finals, however it becomes a falling tone before sonorant finals. Finally, Paulsen states that there is the existence of a high falling tone that can only occur before sonorant finals, but this tone is rare and is usually in loan words (1996:164).

The Chinese sketch list four tones; the first tone is a high rising tone, /35/, the second tone is a high tone, /33/, the third is a high falling tone, /331/, the fourth tone is a low falling tone, /21/. The first tone, when it takes the place of the first syllable in a compound word, becomes the fourth tone. It also list that the second tone can become an extra high tone, /44/, but the occurrences are very few (Li et al. 1986:13-14).

2.7   Summary and Predictions

These studies show that the Plang in Xishuangbanna Tai Autonomous Prefecture has plosives occurring at the bilabial, alveolar, palatal, velar, glottal, and uvular points of articulation. Nasals occur at the bilabial, alveolar, palatal, and velar points of articulation. There are labio-dental, alveolar, velar, and glottal fricatives. Finally, there are approximants and lateral approximants at the alveolar and palatal points of articulation.

There are only front and back vowels. Front vowels occur at the close, close-mid, open-mid, and open positions. Back vowels occur at the close, close-mid, and open-mid position. While the Chinese sketch contains a complex system of diphthongs, the Kontoi variety has a limited set of diphthongs because of a constraining syllable structure. Vowels also can be produced in either clear or breathy register.

Tone is contrastive in Plang and has been understood as either two tones, low and high, or as four contrastive tones, high rising, high, high falling, and a low tone. When understood as two contrastive tones, high and low, there are two tonemes and two allotones.

From these studies it is expected that the varieties found in this description will have plosives at the bilabial, alveolar, palatal, velar, glottal, and uvular points of articulation. They will also have nasals occurring at the bilabial, alveolar, palatal, and velar points of articulation. Fricatives will occur at the labio-dental, alveolar, velar, and glottal points of articulation. Approximants and lateral approximants should occur at the alveolar and palatal points of articulation. There will be front vowels occurring in the close, close-mid, open-mid, and open position and back vowels occurring at the close, close-mid, and open-mid position. Vowels will either have a complex vowel system or a syllable structure that limits the diphthongs. Finally, there will be two contrastive tones, high and low, with two allotones which are predictable depending on syllable final consonants.

2.8   Methodology

The phonological description presented in this thesis is based on words elicited by a 598-item wordlist. The wordlist is composed of common nouns, verbs, and adjectives. The wordlist was created by combining the words of the Southeast Asia 436 wordlist and the Palaungic 242 wordlist (Hopple 2006). After combining the two wordlist, overlapping words or words for items that are not found in China, of which there were eighty, were removed reducing the wordlist to 598 words. It was then divided into semantic domains to ease elicitation. There was also a photo book that was created to ensure correct elicitation. Certain words were not able to elicited due to the language helper was not able to think of the word being asked. For that reason there were 546 words elicited from Man Noi, 531 words elicited from Bang Deng, and 525 words elicited from La Gang.

2.8.1   Data Source and Collection

A wordlist, of five hundred and ninety eight words, was elicited from 7 villages in the Bulang Mountain District; Jieliang[5], Lao Man O, Mang An, Man Noi, Bang Deng Xin Zhai, and Xin Nan Dong. Plang males between the ages of sixteen and thirty-eight were sought for elicitation. This age range best reflects the current state of Plang pronunciation and vocabulary. Chinese was the main language used for elicitation, while some Thai was also used.

The word was read in Chinese and then the language consultant would say the Plang equivalent I would transcribe the word and he would repeat the word when I looked up at him. This would allow me time to write and give adequate space between words. Pictures to help convey meaning accompanied some words. When a word was encountered that the language consultant was not able to understand it was skipped until the end when they could have more time to think about the word or consult others who had come into the home.

A wordlist was elicited from one person, but in every case there were people around the speaker who would help him to understand what we were eliciting or to help him think of the word. Many problems that we had were over the group of people arguing over what word was correct because often they used different words. I asked the language helper to recite to me the word that he used and that was the word transcribed. Another problem occurred when those in the room to help would laugh at the speakers pronunciation. In Man Noi for the word 'frog' the speaker and

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[5]   Due to technical problems only 158 words were successfully recorded from Jieliang.

another man said /ruk/, while others said /huk/. I would only transcribe the word that the main helper used.

2.8.2 Phonetic Analysis

The data from the 7 villages was entered into Speech Analyzer[6]. The spectrograms and pitch listings were used to correct transcription errors. The words were then glossed and reference numbers were added. Once the wordlist were corrected and glossed in Speech Analyzer they were then exported to Phonology Assistant[7]. Words from both high and low tones were selected to be analyzed with Praat[8] to help determine tonemes and allotones. Finally, Praat was used to determine the vowel formant frequencies to distinguish the modal and breathy distinctions.

2.9 Limitations of the Study

The study presented in this thesis is limited first by the amount of time that was allowed in each village. Due to the short amount of time that I was allowed to be in each village I could only collect a maximum of five hundred and ninety eight words from one person. It is also limited in that it only presents phonologies from three of villages in the district.

2.10 Goal of the Study

The goal of this study is first to describe the phonology of each of the three villages The phonological description will include word structure, syllable structure, phonemes, register, and tonal analysis. The second goal was to determine from these phonological descriptions if it would be possible to use one orthography for all three varieties.

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[6]   Speech Analyzer is a computer program for acoustic analysis of speech sounds. It performs fundamental frequency, spectrographic and spectral analysis, and duration measurements. It also can add phonemic, orthographic, tone, and gloss transcriptions to phonetic transcriptions in an interlinear format. (http://www.sil.org/computing/sa/index.htm)

[7]   Phonology Assistant manages transcribed Speech Analyzer files and can be used to produce phone and distribution charts as well as query the corpus to test phonological hypotheses. (http://www.sil.org/computing/speechtools/pa.htm)

[8]   Praat is a program that can be used to determine the frequency of tones. (http://www.praat.org)

2.11   Benefits of the Study

The first benefit of this study is that it will present phonological information for an area of Plang languages that have not been studied. It will serve to increase the amount of phonological information of Plang languages in general. This study will also help to start the process of literacy for the Plang in the Bulang Shan District.

Chapter 3

Phonological Description of Man Noi Plang

This chapter will give a description of the phonology found in the Man Noi village of the Bulang Mountain district. The description will begin with a discussion on what constitutes a word in this variety. Working at progressively smaller units of the sound system, a description of the syllable will follow the word and then a discussion on the phonemes. Finally the suprasegmental aspects will be covered.

3.1   Words

Words in Plang, as in most Mon-Khmer languages, tend to be monosyllabic. There is, however, a large number of words that consist of more than one syllable. These words with more than one syllable consist of a presyllable and a main syllable.

3.1.1   Monosyllabic Words

The typical monosyllabic word begins with a consonant followed by a nucleus, which is a vowel, and then a final consonant. The syllable structure for the monosyllabic words is #CV̌C#.

#CV̌C#

/kúj/	'have'	/píʔ/	'forget'
/lúŋ/	'high, tall'	/jĭn/	'warm'
/mók/	'at, sit'	/ʔɛ́w/	'to look for'

3.1.2   Polysyllabic Words

There are two forms of polysyllabic words, sesquisyllabic words and compound words. Sesquisyllabic words, widely noted in Mon-Khmer languages, have the following structure: a stressed main syllable, preceded by an unstressed and otherwise phonologically reduced minor syllable (Conver 1999). The maximal structure for a presyllable is #CV.

#CV.CVC#

| /ta.léj/ | 'basin' | /sa.cáʔ/ | 'ghost' |
| /ku.cɤ́ʔ/ | 'seed' | /ma.héŋ/ | 'strength' |

The second class of polysyllabic words comes from the combining of words to form compound words. Compounding can occur between two monosyllabic words and between a monosyllabic word and a sesquisyllabic word. Each kind is listed below with examples.

#CV̆C.CV̆C#

| /ʔúm/ | + | /ʔɛ́t/ | = | /ʔúm.ʔɛ́t/ |
| 'water' | | 'small' | | 'stream' |

| /hɤ́k/ | + | /ŋáj/ | = | /hɤ́k.ŋáj/ |
| 'hair' | | 'eye' | | 'eye brow' |

| /ʔúm/ | + | /tuɯ́ʔ/ | = | /ʔúm.tuɯ́ʔ/ |
| 'water' | | 'vegetable' | | 'vegetable soup' |

#CV̆C.CV.CV̆C#

| /kɔ́n/ | + | /ka.pɤ́n/ | = | /kɔ́n.ka.pɤ́n/ |
| 'offspring' | | 'female' | | 'daughter' |

| /pɤ̀j/ | + | /ka.mè ʔ/ | = | /pɤ̀j.ka.mè ʔ/ |
| 'person' | | 'male' | | 'man' |

| /pɔ́n/ | + | /la.màn/ | = | /pɔ́n.la.màn/ |
| 'flesh' | | 'oil' | | 'fat' |

3.2   Syllables

There are two types of syllables in the Man Noi variety, the main syllable and the minor syllable. Throughout this paper the term *syllable* will be used for the main syllable, while *minor syllable* will be used for the half weighted presyllable.

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3.2.1   Main Syllable

Man Noi syllable structure is represented in the following formula: #CᵛC#.   All twenty-one phonemic consonants can fill the syllable initial consonant position. There are, however, only twelve consonants which can fill the syllable final position, see 18 below. When in the syllable final position /p, t, c, k/ are unreleased.

	Bilabial		Alveolar		Palatal		Velar		Glottal	
Plosives	p		t		c		k		ʔ	
Nasals		m		n		ɲ		ŋ		
Fricatives									h	
Approximants	w					j				

Table 4 Man Noi Final Consonants

3.2.2   Presyllables, Prefixes, and Particles

There are three types of minor syllables in Man Noi Plang, prefixes, particles, and presyllables. Presyllables and particles can be represented as #CV, however prefixes would be represented as #Cᵛ. Svantesson (1983:35) states that presyllables are a phonological unit, while prefixes and particles are morphological (and semantic) units .

Consonants occupying the onset position in these minor syllables are restricted to /t, k, m, s, kʰ, l, pʰ/. Vowels that can occur in the minor syllables are restricted to /a, u/. However, in fast speech the /a/ can be reduced to [ə]. The vowel /u/ occurs only with /k/ in the minor syllable.

The minor syllables /ka, sa, ku/ are the most common. These minor syllables fall under the class of presyllables because they have no specified uses. Even though they have no meaning of their own they are an integral part of the word. /ka/ occurs in verbs and nouns and question words, /sa/ occurs in verbs and nouns, and /ku/ occurs in nouns and question words.

(1) /ka/

/ka.téʔ/   'earth, dirt'
/ka.màŋ/   'rich'
/ka.páj/   'medicine

(2) /sa/

       /sa.pʰóm/   'to be hungry'

       /sa.ŋàj/   'far'

       /sa.ʔɤ́ɲ/   'snake'

(3) /ku/

       /ku.píʔ/   'fruit'

       /ku.tíʔ/   'bracelet'

       /ku.júk/   'ear ring'

The minor syllable /ta/ occurs as a presyllable, a prefix and a particle. As a prefix it functions as a classifier in the semantic domain of time, i.e. morning, evening (Lewis 2008:27). As a particle it functions as a causative grammatical marker, for example when added to 'dead' it becomes 'kill'. Each will be listed below with examples.

(4) /ta/ presyllable

       /ta.léj/   'basin'

(5) /tá/ prefix 'Time Domain'

       /tá.ŋùp/   'morning'

       /tá.pùh/   'evening'

(6) /ta/ particle 'Causative Particle'

/ta/	+	/vɔ́k/	=	/ta.vɔ́k/
/Causative/		'bend, crooked'		'to bend'

/ta/	+	/jɤ̀m/	=	/ta.jɤ̀m/
/Causative/		'dead'		'to kill'

The prefix /kʰá/ is limited to a specific semantic domain. It only occurs in the semantic domain of location (position).

(7) /kʰá/   prefix 'Location'⁹

    /kʰá.nèj/   'inside'

    /kʰá.nòk/   'outside'

    /kʰá.nòʔ/   'in front'

/pʰa/ presyllable

(8) /pʰa/

    /pʰa.ját/   'weak'

    /pʰa.tàj/   'cotton'

    /pʰa.sáh/   'lightning'

/la/ presyllable

(9) /la/

    /la.pʰ ̀ɤh/   'leaf'

    /la.màn/   'oil'

/ma/ presyllable

(10) /ma/

    /ma.cʰèŋ/   'wok'

    /ma.hèŋ/   'strength'

When a presyllable, prefix, or particle contain /a/ and precede a /j/ it assimilates to the palatal and is produced as /aⁱ/. Therefore a word such as /sa.júŋ/ 'light' has an surface form of [sáⁱ.júŋ].

Prefixes and particles both contain a semantic meaning that modifies the meaning of the syllable. Aside from grammatical functioning, prefixes and particles differ in that prefixes have an inherent tone, while particles do not. The prefixes for time and location both have inherent tone and do not assimilate to the tone of the following syllable. Particles, such as the causative particle, do not have an inherent tone and therefore assimilate to syllable they precede.

⁹ Words with the presyllable /kʰá/ are loan words from Tai.

Prefixes also differ from particles and presyllables in that they can precede sesquisyllabic words which expands the word structure to #CV̆.CV̆.CV̆C#.

#CV̆.CV.CV̆C#

/tá/	+	/sa.ŋì?/	=	/tá.sà.ŋì?/
time prefix		'sun'		'daytime'

3.3 Interpretation of Ambiguities

There are ambiguous segments with final diphthongs. Vowels glide to [i] or [j] and [u] or [w]. These environments, if interpreted as diphthongs, would be the only place where there is an open syllable as the main syllable. All syllables are closed. Therefore, these semivowels are being interpreted as final consonants, /j/ and /w/.

3.4 Phonemes

In this section an inventory of the consonant and vowel phonemes will be presented. The distribution of each phoneme will also be shown.

3.4.1 Consonants

There were twenty-five consonantal sound segments found in the Man Noi variety. Twenty-one of the sound segments were found to be phonemic. The phonemic sound segments are represented in Table 5 below.

	Bilabial		Labio-Dental		Alveolar		Palatal		Velar		Glottal	
Plosives	p				t		c		k		?	
	pʰ				tʰ		cʰ		kʰ			
Nasals		m				n		ɲ		ŋ		
Fricatives			f	v	s						h	
Approximants	w				r		j					
Lateral App.					l							

Table 5 Man Noi Consonant Phonemes

3.4.1.1 Consonant Contrast

Phonemes are shown to contrast in identical environments (CIE) or contrast in non-influencing environments (CNE). Contrasts are shown below.

/p/ – /pʰ/	/pɤ́h/	'to fly'	/pʰɤ́h/	'flower'	CIE
/t/ – /tʰ/:	/tɔ̀j/	'to walk'	/tʰɔ̀j/	'to be shallow'	CIE

/c/ – /cʰ/:	/cèŋ/	'beside'	/mà.cʰèŋ/	'wok'	CNE
/k/ – /kʰ/:	/kák/	'branch'	/kʰák/	'water buffalo'	CIE
/c/ – /k/:	/cúʔ/	'to know'	/kúʔ/	'to love'	CIE
/r/ – /l/:	/kà.ràʔ/	'to steal'	/láʔ/	'to speak'	CNE
/l/ – /n/:	/lák/	'late'	/nák/	'dragon'	CIE
/m/ – /n/:	/mút/	'cloud'	/nút/	'to suck'	CIE
	/hɤ̌m/	'to bathe'	/hɤ̌n/	'much, many'	CIE
/t/ – /n/:	/ká.tɤ̌t/	'to snap in two'	/ká.nɤ̌t/	'to swallow'	CIE
/n/ – /ɲ/:	/nám/	'blood'	/ɲám/	'often'	CIE
	/ʔèn.nàʔ/	'this'	/ʔèɲ/	'to eat'	CNE
/ɲ/ – /ŋ/:	/pɤ̌ɲ/	'to shoot'	/pɤ̌ŋ/	'to blow'	CIE
/s/ – /h/:	/súʔ/	'painful'	/húʔ/	'to be deep'	CIE
/f/ – /v/:	/féh/	'trousers'	/vèk/	'to labor'	CNE
/ʔ/ – /h/:	/ʔɤ̌m/	'salty'	/hɤ̌m/	'to bathe'	CIE
	/tóʔ/	'buttocks'	/tóh/	'to open'	CIE
/j/ – /w/:	/sàj/	'sand'	/sàw/	'twenty'	CIE
	/jáw/	'cheap'	/wàn/	'to scatter seeds'	CNE
/w/ – /v/:	/wàn/	'to scatter seeds'	/vàk/	'insect, bug'	CNE

There is only one contrastive pair between /f/ and /v/. The contrast between /w/ and /v/ is not well attested because there are a few words occurring with /w/ in the initial position which can be produced as [v].

3.4.1.2 Plosives

There are nine phonemic plosives that occur at the bilabial, alveolar, palatal, velar, and glottal points of articulation. The bilabial, alveolar, palatal, and velar plosives all can occur as aspirated syllable initially. Also four plosives, /p, t, c, k/, when they occur syllable final are unreleased, [p˺, t˺, c˺, k˺]. The glottal stop occurs in both the syllable initial and final position. The plosive phonemes are listed with examples below.

(11) /p/ voiceless bilabial unaspirated plosive: /pùn/ 'to receive'

/pìʔ/ 'to forget'

/péj.làʔ/ 'bat'

(12) /pʰ/ voiceless bilabial aspirated plosive: /pʰìh/ 'to sweep'

/pʰɛ́h/ 'bee'

/pʰɔ̀n/ 'five'

When in the syllable final position /p/ is realized as a voiceless bilabial unreleased plosive [p˺] as in [cáp˺] 'to be correct'.

(13) /t/ voiceless alveolar unaspirated plosive: /tìm/ 'low, short'

/tèʔ/ 'arrow'

/tà.pàj/ 'noon'

(14) /tʰ/ voiceless alveolar aspirated plosive: /tʰéj/ 'to sweep'

/tʰɛ́m/ 'bee'

/tʰɔ̀p.tʰɔ̀p/ 'to slap'

When in the syllable final position /t/ is realized as a voiceless alveolar unreleased plosive [t˺] as in [ʔít˺] 'to sleep'.

(15) /c/ voiceless palatal unaspirated plosive: /cìŋ/ 'to sew'

/cùm/ 'soybean'

/cúk.cók/ 'to deceive, cheat'

(16) /cʰ/ voiceless palatal aspirated plosive: /cʰɤ́ŋ/ 'blanket'

/mà.cʰèŋ/ 'wok'

/ʔá.cʰéh/ 'to sneeze'

When in the syllable final position /c/ is realized as a voiceless palatal unreleased plosive [c˺] as in [kéc˺] 'to sprout'. The /cʰ/ is not well attested, it only appears three times in the data. Also as listed above one occurrence, /ʔá.cʰéh/ 'to sneeze', is an onomatopoeia. The only contrast that is found is in a non-influencing environment, /cʰɤ́ŋ/ 'blanket' and /cɤ́ʔ/ 'rice seedling.'

(17) /k/ voiceless velar unaspirated plosive: /kén/   'to twist rope'

/kɔ́n/   'son'

/ká.váj/   'tiger'

(18) /kʰ/ voiceless velar aspirated plosive: /kʰíʔ/   'firewood'

/kʰák/   'water buffalo'

/ká.kʰɤ́p/   'to meet'

When in the syllable final position /k/ is realized as a voiceless velar unreleased plosive [k˺] as in [l̩̀k˺] 'pig'.

(19) /ʔ/ voiceless glottal plosive: /tìʔ/   'one'

/léʔ/   'rain'

/cɯ́ʔ/   'to know'

According to Paulsen's (1992:170) Proto-Plang both *p and *k occur in a cluster with *l. However, Man Noi has lost this clustering. Where the reconstructed proto-language has *plaŋ 'Plang' the Man Noi pronunciation has changed to [paŋ]. There are also words that show evidence that glottal closure is disappearing. These words were said in careful speech and when asked to repeat them were produced without the final glottal closure.

/sɯ̀/ 'straight'   /jɔ́ŋ.mù/ 'where'

/kɤ̀/ 'to swell'   /ká.ná/ 'what'

/pɤ̀n.mù/ 'how many'

In summary there are nine phonemic plosives with four allophones. Unlike the proto language the Man Noi plosives do not occur in clusters in the onset. While the majority of words contain a coda there are a few words which have lost their glottal stop closure.

3.4.1.3   Nasals

There are four phonemic nasals occurring at the bilabial, alveolar, palatal, and velar points of articulation. All nasals can occur in both onset and coda positions. Below the nasal phonemes are listed with examples.

(20) /m/ voiced bilabial nasal: /mút/   'cloud'

/máj/   'to write'

| | | /sím/ | 'bird' |
| | | /jɤ̀m/ | 'to die' |

(21) /n/ voiced alveolar nasal:	/nɯ́k/	'night'
	/núj/	'pit, stone'
	/kán/	'matter'
	/pʰɔ̀n/	'five'

(22) /ɲ/ voiced palatal nasal:	/ɲén/	'to grasp, hold'
	/ɲàʔ/	'house'
	/lɤ̀ɲ/	'blunt'
	/páɲ/	'to sell'

(23) /ŋ/ voiced velar nasal:	/ŋáp/	'to yawn'
	/ŋɔ̀j/	'fire'
	/ʔéŋ/	'faeces'
	/kʰɯ́ŋ/	'drum'

Paulsen states that several Waic languages contain a nasal + /h/ cluster and these correspond to the voiceless nasals or liquids in Plang. However, both the Shinman and Samtao varieties tend to voice the nasals (1992:181). Man Noi has lost the voiceless nasals and like Shinman and Samtao have voiced nasals.

3.4.1.4   Fricatives

There are four fricatives occurring at the labiodental, alveolar, and glottal points of articulation. Fricatives produced at the labiodental and alveolar points can occupy the onset position. The fricative produced at the glottal point of articulation can occupy both onset and coda positions. The fricative phonemes are listed below with examples.

(24) /f/ voiceless labiodental fricative: /féh/   'trousers'

The /f/ is not well attested, appearing only once in the data.

(25) /v/ voiced labiodental fricative:	/vèj/	'fast, quick'
	/vàk/	'insect, bug'
	/ká.váʔ/	'door'

In fast speech /v/ can be produced as [β].

(26) /s/ voiceless alveolar fricative:	/súʔ/	'to be new'
	/sɔ́ʔ/	'dog'
	/ká.sáŋ/	'elephant'

(27) /h/ voiceless glottal fricative:	/héj/	'forehead'
	/húk/	'frog'
	/hèh/	'root'
	/mùh/	'to crawl'

The voiceless glottal fricative /h/ does appear in free variation with [r] in the onset. For example when eliciting the word 'to steal' the speaker first said /kɔ́.rúk/ but others present said that they pronounced the word as /kɔ́.húk/, the main speaker then said that he used both.

The Man Noi fricatives have not deviated from the proto-language. In the proto language /f/ is not well attested, this is also the case in the Man Noi variety. One other word was found to contain /f/, /fáj/ 'to worship', however this is a borrowed term from Tai.

3.4.1.5   Approximants

There are three approximants in the Man Noi variety and they occur at the labial-velar, palatal, and alveolar positions. There is also one lateral approximant, which occurs at the alveolar point of articulation. Both /w/ and /j/ can fill both onset and coda positions. However, in the coda position the approximants create off-glides of the vowel. The lateral approximant and the alveolar approximant, /l/ and /r/, can only occupy the onset position. These phonemes are listed below with examples.

| (28) /w/ voiced labial-velar approximant: | /wàt/ | 'temple' |
| | /wàn/ | 'to scatter seed' |

There are two reasons that /w/ is suspicious. First there are only two occurrences in all the data. One occurrence, /wàt/ 'temple', is a loan word from Tai. The second is that /w/ can be produced as [v] and [β]. For example, /wàt/ can be pronounced in free variation as [vàtˀ] or [βàtˀ].

(29) /j/ voiced palatal approximant: /jɛ́t/ 'cloth'
/jàm/ 'cry, bark'
/jɤ̀m/ 'to die'

(30) /l/ voiced alveolar lateral approximant: /lík/ 'pig'
/lòt/ 'to pull'
/làj/ 'two'

(31) /r/ voiced alveolar approximant: /kɔ́.rúk/ 'wolf'
/kà.ràʔ/ 'to steal'

Paulsen (1992:187) states that the Proto Plang *lh clustering in final position is now only present as /h/. This seems to be the case in Man Noi as well. As well the *lh cluster in word initial position has been reduced to a voiced alveolar lateral approximant.

(32) _lh → _h
*kìlh[2] 'salt' → /kìh/

*kəmɔ̀lh[1] 'banana' → /kà.mɔ̀h/

*pìlh[1] 'sweep' → /pʰih/

(33) lh_ → l_
*lhek[1] 'iron' → /lɛ́k/

*lhiʔ[1] 'rain' → /lɛ́ʔ/

Man Noi does not have consonant clusters where the Proto-Plang does. They have lost clusters altogether. Also the /r/ and /l/ no longer contrast in final position. The *r has been reduced to /h/ and the *l has been reduced to /j/.

(34) _l → _j
*ŋɔ̀l[2] 'fire' → /ŋɔ̀j/

*prel[1] 'hail' → /pʰɛ́j/

(35) _r → _h
*kàr[1] 'wind' → /kúh/

*mhar[1] 'rice field' → /máh/

Since Man Noi Plang has lost consonant clusters in the onset the approximants differ from the proto language. For instance, in Proto-Plang *r clusters with *pʰ and *kʰ and *l clusters with *p, k, h, but these clusters are all absent from Man Noi.

3.4.2 Vowels

There are ten vowel phonemes in the Man Noi variety. The phonemic sound segments are represented in Table 6 below. There are four front vowels, five back vowels, and one central vowel. Vowels are produced with clear or breathy register, however the back consonants influence the preceding vowel. Vowels that end in glottal stops can be produced with a slight creaky phonation.

	Front		Central		Back	
Close	i				ɯ	u
		ɪ				
Close-mid	e				ɤ	o
Open-mid	ɛ					ɔ
Open			a			

Table 6 Mon Noi Vowels

3.4.2.1 Monophthongs

Vowel phonemes are listed below with examples.

(36) /i/ close front unrounded:

/sím/   'bird'

/tì?/   'hand'

/ká.kí?/   'to pile up'

(37) /ɪ/ near-close near-front unrounded:

/sɪ́m/   'Tai'

/ʔɪ́t/   'to sleep'

/ká.lɪ́t/   'hate'

(38) /e/ close-mid front unrounded:

/lé?/   'rain'

/méh/   'to return'

/ká.né?/   'monkey'

28

(39) /ɛ/ open-mid front unrounded: /pʰɛ́h/ 'bee'

/lɛ̀ɲ/ 'few'

/ká.ŋɛ́t/ 'to listen'

Both /e/ and /ɛ/ are both phonemic vowels. These vowels contrast in non-influencing environments. Shown here:

/e/ – /ɛ/: /tè?/ 'arrow' /pɛ̀?/ 'goat' CNE

/kéh/ 'to pick fruit' /?ɛ́h/ 'chicken' CNE

However, as seen from Table 7 below, there seems to be a correlation between /e/ and /ɛ/. In Man Noi there are more occurrences of /ɛ/ over /e/. It may be that as the language changes that /e/ could become an allophone of /ɛ/, but so far this is uncertain.

	e_	ɛ_
m	-	+
n	-	+
ɲ	-	+
ŋ	+	-
pʼ	-	+
tʼ	-	+
cʼ	-	+
kʼ	-	+
?	+	+
h	+	+
w	-	+
j	+	-

Table 7 Correlation /e/ and /ɛ/

(40) /ɯ/ close back unrounded: /tɯ́?/ 'vegetable'

/hɯ́k/ 'feather, hair'

/ká.tɯ́?/ 'cave'

(41) /u/ close back rounded: /pú?/ 'friend'

/nút/ 'to suck'

/ká.pʰúm/ 'to breathe'

(42) /ɤ/ close-mid back unrounded: /pɤ́ŋ/ 'to blow'

/hɤ́t/ 'to smell'

/ká.cɤ́p/ 'hat'

(43) /o/ close-mid back rounded: /tóʔ/ 'buttocks'

/ɲók/ 'brain'

/sá.pʰóm/ 'hungry'

(44) /ɔ/ open-mid back rounded: /pʰɔ́k/ 'to hang out'

/sɔ́ŋ/ 'bitter'

/ká.tɔ́m/ 'egg'

(45) /a/ open central unrounded: /táh/ 'to rest'

/pàm/ 'to chew'

/péj.làʔ/ 'bat'

As seen in Table 8 below there are restrictions on the vowels according to the consonant they precede.

	i_	ɪ_	e_	ɛ_	ɯ_	u_	ɤ_	o_	ɔ_	a_
m	+	+	-	+	+	+	+	+	+	+
n	-	+	-	+	+	+	+	+	+	+
ɲ	-	-	-	+	-	-	+	-	+	+
ŋ	+	-	+	-	+	+	+	+	+	+
pˀ	+	+[10]	-	+	-	+	+	+	+	+
tˀ	-	+	-	+	+	+	+	+	+	+
cˀ	-	-	-	+	-	-	+	-	+	+
kˀ	+	-	-	+	+	+	+	+	+	+
ʔ	+	-	+	+	+	+	+	+	+	+
h	+	-	+	+	+	+	+	+	+	+
w	-	-	-	+	-	-	-	-	-	+
j	-	-	+	-	+	+	+	-	+	+

Table 8 Vowels preceding final consonants

Predictably, back vowels do not occur before /w/. The only front vowel to occur before /j/ is /e/. The back vowels /ɯ, u, o/ are restricted in that they do not occur

---

[10]The two words that appear as an /ɪ/ before a [pˀ] are loan words from Tai, /sám.síp/ 'thirty' and /sí.síp/ 'forty'.

before the palatal nasal or palatal plosive. The open central unrounded vowel, /a/, is the most unrestricted vowel occurring in every position.

3.5   Register Complex

Register in Man Noi is not one singular feature, but is made up two features that are interrelated. The two features present in this complex are phonation type and tone. These features will be discussed below.

3.5.1   Phonation

There are two phonemic phonation types in the Man Noi variety; clear and breathy. The clear register is produced with no alteration in voice quality. However, when in association with a final glottal stop the word can be produced with slight tensing and is usually shorter in duration.

Vowels produced with a breathy phonation tend to have an association with final /h/. Also breathy vowels tend to be longer than the modal vowels. While the back vowels have a lower F1 when produced with a breathy phonation, the only front vowel to have a lowered F1 is /i/. As seen in Table 9 below

Modal Vowel	Mean Standard Deviation		Breathy Vowel	Mean Standard Deviation	
	F1	F2		F1	F2
i	347.8 50.2	2168.7 70.6	i̤	397.8 70.2	1821.9 76.4
ɪ	434.3 17.9	1701.4 52.1	ɪ̤	420.9 24.3	1546.6 39.1
e	477.2 30.6	1885.8 32.2	e̤	465.9 58	1733.3 24
ɛ	588.37 59.9	1901 50.3	ɛ̤	573.2 48	1744.1 24.5
a	805.6 54.9	1411.2 38.3	a̤	758.4 39.5	1241.9 31.4
ɯ	374.3 21.3	1414.6 34.5	ɯ̤	402.4 12.3	1264.9 46.9
u	393.7 30.4	903.6 50.7	ṳ	419.5 40.2	1077.9 39.2
ɤ	458.5 22.9	1461.7 27.5	ɤ̤	479.6 58.8	1295.3 81.2
o	471.4 45.1	1067 33.4	o̤	464.5 53.2	875.4 61.5
ɔ	602.9 38.8	935.4 37.6	ɔ̤	618 41.4	1073.1 44.4

Table 9 Man Noi Vowels mean F1 and F2

Using the mean value of the formants the following figure graphically displays the modal vowels.
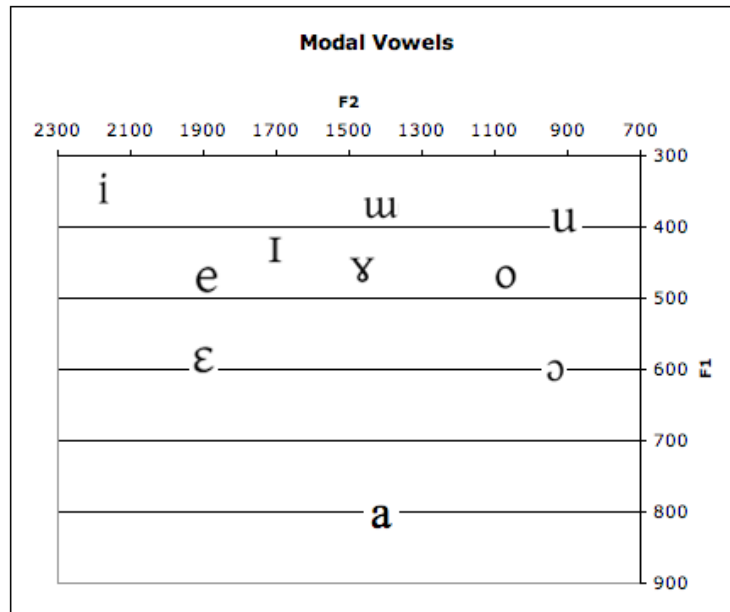
Figure 5 Man Noi Modal Vowels

Using the mean value of the formants the following figure graphically displays the breathy vowels.
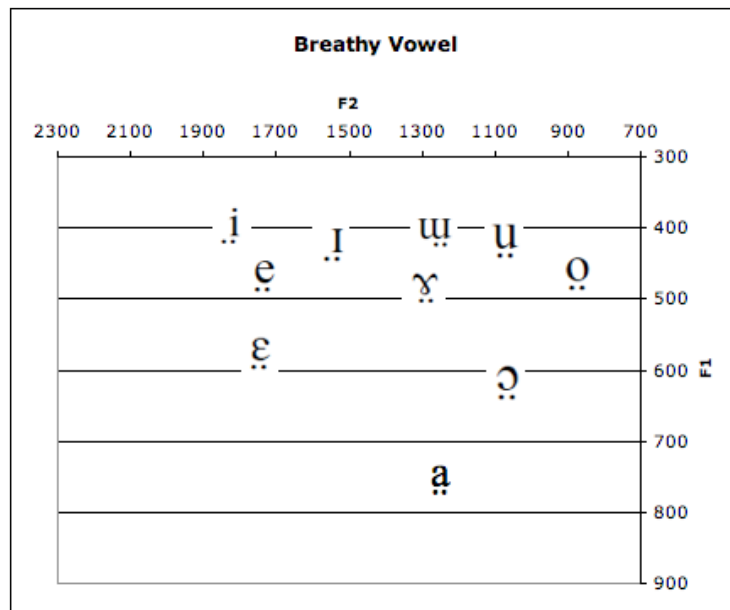
Figure 6 Man Noi Breathy Vowels

In summary there are two phonation types in Man Noi Plang, breathy and modal. Using Watkins phonation continuum, see Section 2.4, Man Noi phonation types can be described as such: breathy phonation is modal tending towards breathy, modal phonation is modal tending toward creaky as seen in Figure 7 below.

Man Noi
Modal

Man Noi
Breathy

CREAKY   MODAL   BREATHY
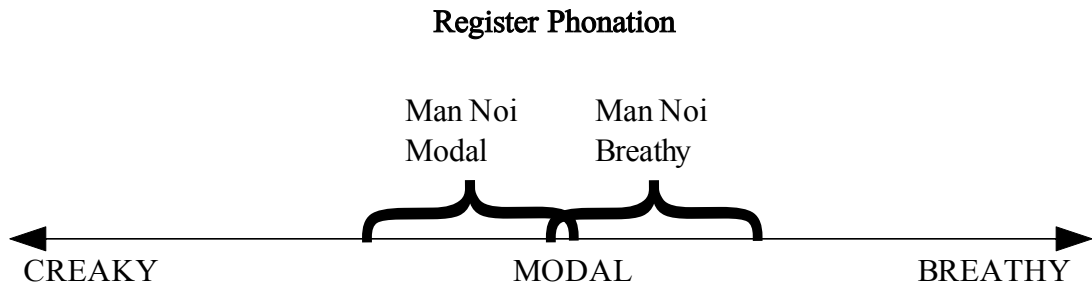
Figure 7 Man Noi Phonation

3.5.1.1   Phonation Contrast

Phonation is shown to contrast in identical environments (CIE) or contrast in non-influencing environments (CNE). Contrasts are shown below.

/i/ – /i̤/:	/kʰíh/	'bear'	/k̤ìh/	'salt'	CNE
/ɪ/ – /ɪ̤/:	/sɪ́n/	'cooked'	/pɪ̤̀n/	'to lay aside'	CNE
/e/ – /e̤/:	/kéh/	'to pick fruit'	/lè̤h/	'six'	CNE
/ɛ/ – /ɛ̤/:	/lɛ́k/	'iron'	/vɛ̤̀k/	'to work'	CNE
/a/ – /a̤/:	/páɲ/	'to sell'	/pà̤ɲ/	'white'	CIE
/ɯ/ – /ɯ̤/:	/húɯk/	'feather, hair'	/tɯ̤̀j/	'to buy'	CNE
/u/ – /ṳ/:	/pún/	'four'	/pṳ̀n/	'to receive'	CIE
/ɤ/ – /ɤ̤/:	/pɤ́ɲ/	'to shoot'	/lɤ̤̀ɲ/	'blunt'	CNE
/o/ – /o̤/:	/lóʔ/	'peel, husk'	/pʰò̤ʔ/	'clothing'	CNE
/ɔ/ – /ɔ̤/:	/tɔ̀j/	'to walk'	/sɔ̤̀j/	'to cut with knife'	CNE

3.5.1.2   Close Back and Close-Central Vowels

From the visual representation of the vowels it must be answered whether [ɯ] and [ɤ] are better interpreted as [ɨ] and [ə]. Ladefoged and Bladon (1982) observed this problem in cardinal vowels. Ladefoged observed this in distinguishing the difference between close central and front vowels, while Bladon observed it between close central and back vowels. They observed that lip rounding changes the F2 and F3. In close front vowels, the articulatory action of rounding the lips lowers F3 greatly and the F2 only slightly, while in close back vowels the same action lowers F2 greatly and alters F3 only slightly (Watkins 2002:57).

	F2	F3
u	931.5	1548.6
ɯ	1083.5	1586.9
o	870.4	1672.3
ɤ	1353.2	1664.5

Table 10 Man Noi Back Vowel F2 and F3 Average

From Table 10 above it can be seen that the F3 of [ɯ] and [ɤ] differ only slightly from the back rounded vowels, but differ greatly in F2. Therefore, it is better to describe /ɯ/ and /ɤ/ as back vowels rather than central vowels.

3.5.2   Tone

The second feature present in the Man Noi register complex is tone. There are two tonemes in the Man Noi variety and each tone has one allotone. The allotones are based on a positional variation. The two level tones are classified as a high and low tone. Each tone will be discussed further below.
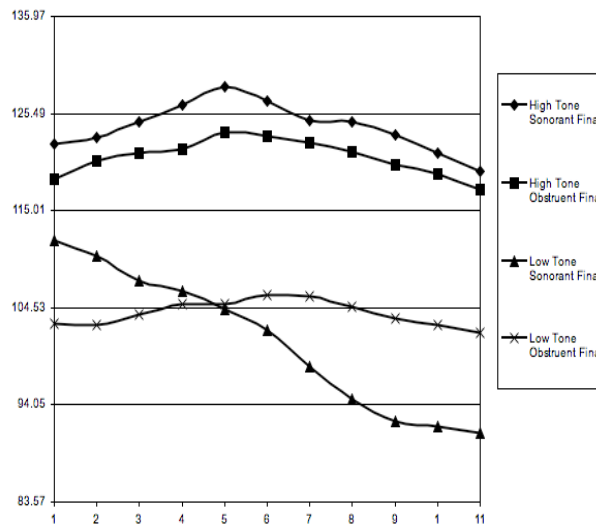
Figure 8: Man Noi Tone

3.5.2.1   Tone Contrast

Tonemes are shown to contrast in identical environments (CIE) or contrast in non-influencing environments (CNE). Contrasts are shown below.

/í/ – /ì/:	/píʔ/	'year'	/pìʔ/	'forget'	CIE
/ɪ́/ – /ɪ̀/:	/sɪ́n/	'cooked'	/sɪ̀n/	'to count'	CIE
/é/ – /è/:	/céŋ/	'light, bright'	/cèŋ/	'beside'	CIE
/ɛ́/ – /ɛ̀/:	/pɛ́n/	'all'	/ɲɛ̀n/	'to grasp'	CNE
/á/ – /à/:	/káŋ/	'eagle'	/kàŋ/	'mouse, rat'	CIE
/ʉ́/ – /ʉ̀/:	/ká.tʉ́m/	'dark'	/cʉ̀m/	'soybean'	CNE
/ú/ – /ù/:	/ʔúm/	'water'	/cùm/	'small bowl'	CNE
/ɤ́/ – /ɤ̀/:	/mɤ́j/	'snow'	/mɤ̀j/	'ugly'	CIE
/ó/ – /ò/:	/lók/	'to pull up'	/nòk/	'full'	CNE
/ɔ́/ – /ɔ̀/:	/pɔ́j/	'to pasture'	/pɔ̀j/	'to loosen'	CIE

3.5.2.2   High Tone

The high tone occurs normally when the high tone ends with an obstruent final. The high tone is a /44/ tone. It begins at 118 Hz rises to 123 Hz and ends at 117 Hz. as seen in Figure 8 above. This can be seen in Figure 9 and Figure 10 below. There is one high allotone which is based on syllable final consonants.

36
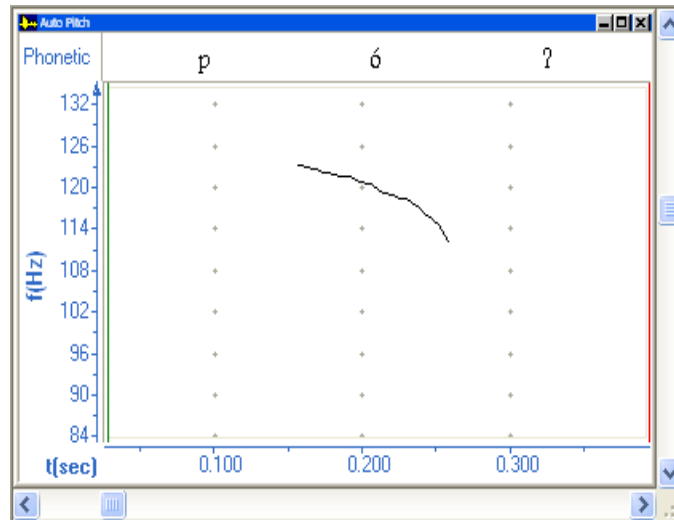
Figure 9: 'to carry on back'
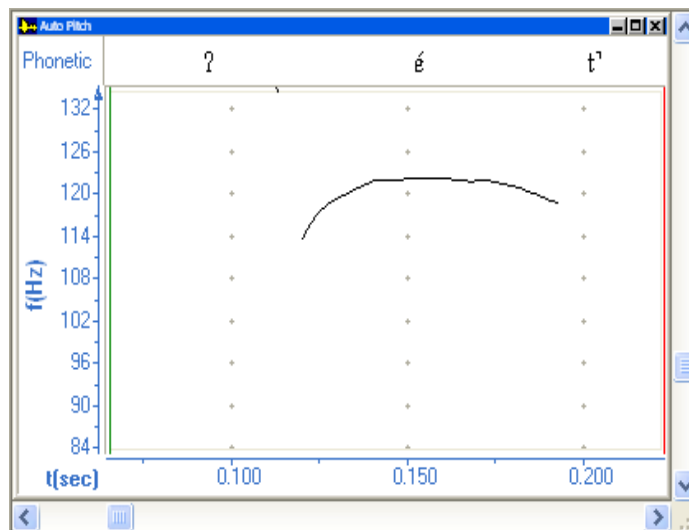
Figure 10: 'small'

The high allotone occurs when the high tone ends in a sonorant final causing the tone to be raised resulting in an allotone of [454]. It generally begins at 122 Hz rises to 128 Hz and then ends at 120 Hz . As seen in Figure 11 and Figure 12 below.
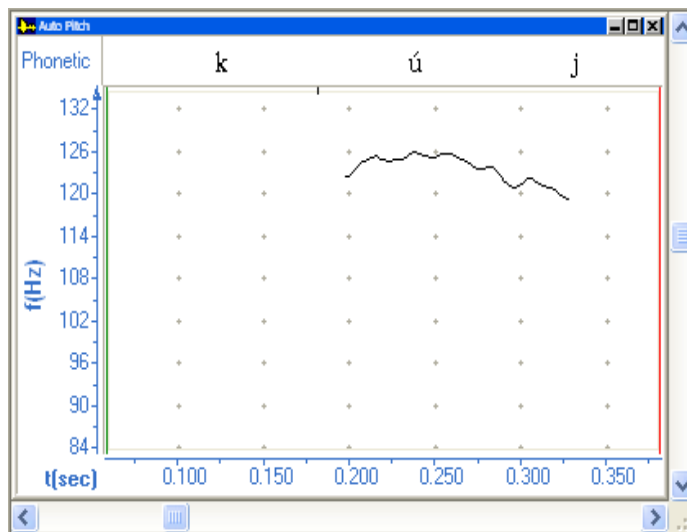
Figure 11: 'have'
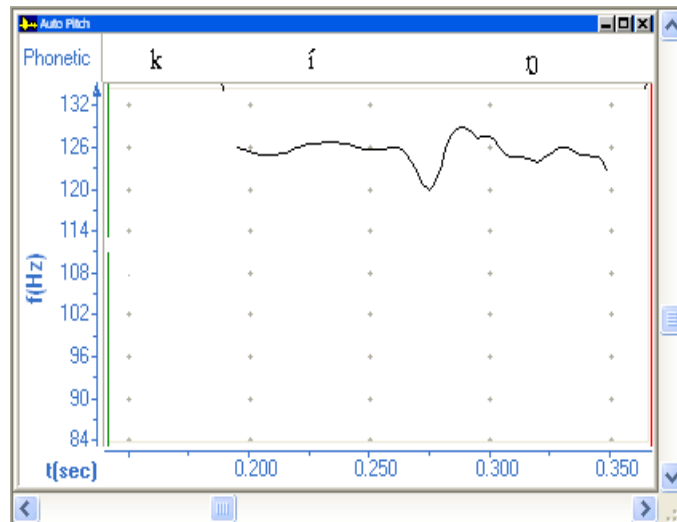
Figure 12: 'price'

3.5.2.3   Low Tone

The normal tone occurs when the low tone ends with an obstruent final. It is level tone of /22/. It begins at 102 Hz rises to 105 Hz and ends at 101 Hz as seen in Figure 8 above. This can be seen in Figure 13 and Figure 14 below. As with the high tone there is one allotone which are based on the syllable final consonant.
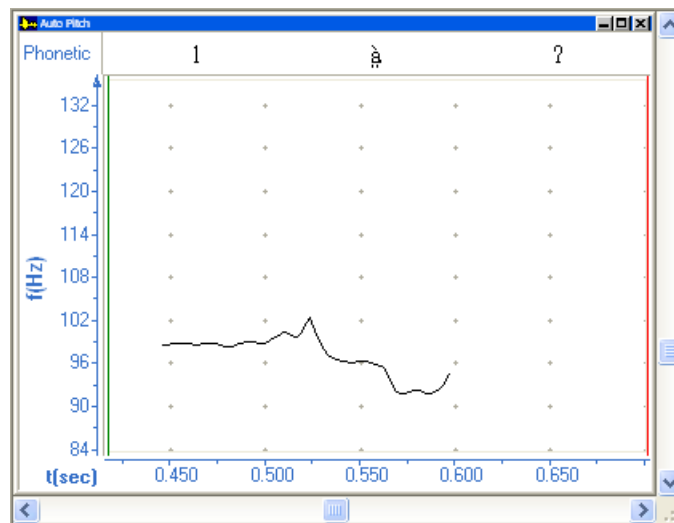
Figure 13:'tea'
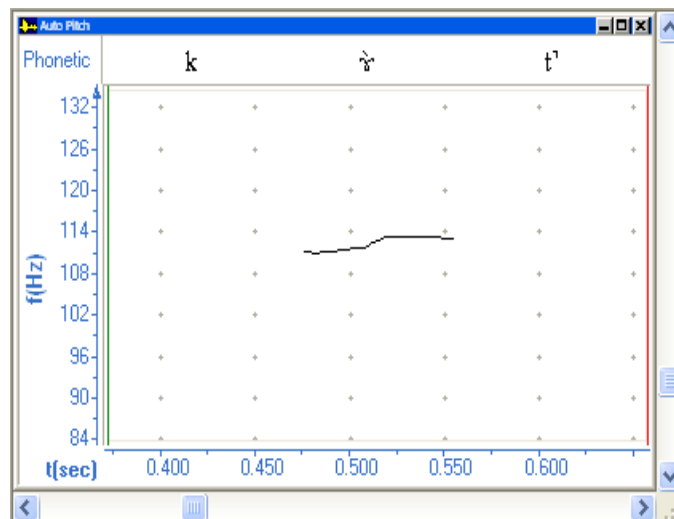
Figure 14: 'chop'

The low allotone occurs when the low tone ends in a sonorant final causing the tone to fall more significantly resulting in an allotone of [31]. It generally begins at 111 Hz falls to 91 Hz. Low tones with obstruent finals average to a tone of /22/. As seen in Figure 15 and Figure 16 below.
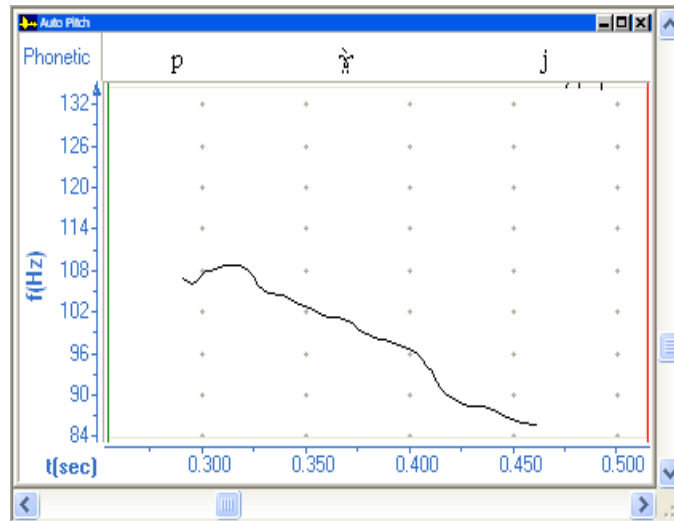
Figure 15: 'person'
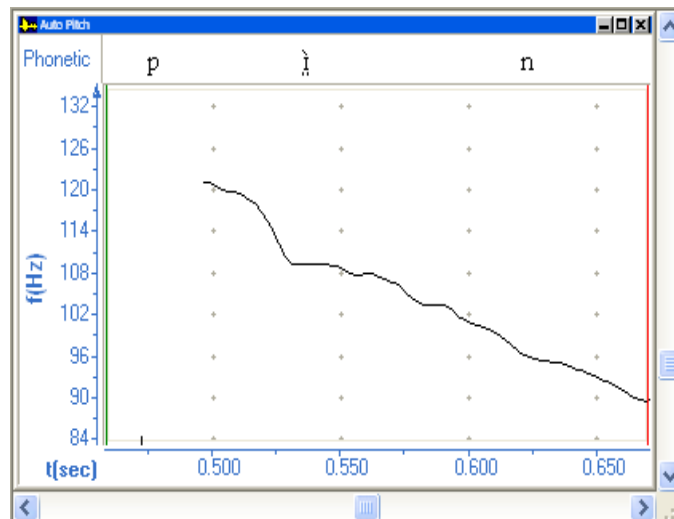
Figure 16: 'to lay aside'

In summary in Man Noi there are two contrastive tones, high and low. Each tone has one allotone that is the result of the final consonant.

3.5.3 Phonation and Tone

Speakers are aware that both tone and phonation are present. In trying to describe phonation they would say that the throat was either *jin* 'tight' or *song* 'loose'. However, they stated that this feature of the language was more present in older people, i.e. people older than forty-five. The more dominant feature with the younger people, who have studied in Chinese schools, seems to be tone. When asked

to distinguish between two similar sounding words the participant would always refer to the tone being different. How these feature function together is still unclear, but by the low occurrence of words with a breathy phonation it seems that tone is the more dominant feature in general.

3.6 Phonological Processes

This section will describe the phonetic explanation of the allophonic occurrences in the language.

3.6.1 Word

3.6.1.1 Voice Assimilation

When the voiceless plosives /p, t, k/ follow a voiced nasal after a syllable break the voiceless plosive is produced as voiced. This can be written as:

$$[\text{-cont}] \rightarrow [+\text{voiced}] / [+\text{nasal}]\_$$

(46)   Underlying Form: /ʔúm.púʔ/   'milk'

       Surface Form: [ʔúm.búʔ]   'milk'

(47)   Underlying Form: /hɔ́m.t̂ɪm/   'garlic'

       Surface Form: [hɔ́m.ɗɪm]   'garlic'

(48)   Underlying Form: /lɤ̀n.kúʔ/   'yesterday'

       Surface Form: [lɤ̀n.gúʔ]   'yesterday'

3.6.1.2 Final Plosives

The plosives /p, t, c, k/ when in final position are realized as unreleased. This is written by the rule

$$[\text{-cont}] \rightarrow \text{unreleased} / \_\#$$

(49)   Underlying Form: /káp/   'chin'

       Surface Form: [káp˺]   'chin'

(50)   Underlying Form: /lʉ́t/   'deaf'

       Surface Form: [lʉ́t˺]   'deaf'

(51)   Underlying Form: /hɛ̀c/   'word, speech'

       Surface Form: [hɛ̀c˺]   'word, speech'

(52)   Underlying Form: /jùk/   'to lift'

         Surface Form: [jṳ̀k˺]   'to lift'

3.6.1.3   Tonal Assimilation

Presyllables have no inherent tone. Therefore presyllables assimilate to the tone of
the syllable that they precede.

(53)   Underlying Form: /ta.léj/   'basin'

         Surface Form: [tá.léj]   'basin'

54)   Underlying Form: /sa.táʔ/   'tail'
         Surface Form: [sá.táʔ]   'tail'

3.6.1.4   Glottal Deletion

When the first word in a compound word ends in a glottal stop the glottal stop is
deleted when combined with the second word. The deletion rule can be written as:

$$/ʔ/ \rightarrow \varnothing / \_.\sigma$$

(55)   /lóʔ/   +   /kʰúʔ/   =   /lóʔ.kʰúʔ/

         'peel, husk'   'tree'   'tree bark'

         Underlying Form: /lóʔ.kʰúʔ/   'tree bark'

         Surface Form: [ló.kʰúʔ]   'tree bark'

3.6.1.5   Allotone

As stated above there are two tonemes, high and low, as well as two allotones.
These can be understood by the rules stated below.

         High Tone $\rightarrow$ Augmented High / _[+ son]

         Low Tone $\rightarrow$ Falling Tone / _[+ son]

3.6.2   Consonant

3.6.2.1   Off-Glides

Vowels that occur before the palatal plosive and palatal nasal have a high front off-glide. From Table 11 it can be seen that this off-glide is limited to /ɛ, a, ɤ, ɔ/. Examples are listed below. This rule can be written as:

$$/V/ \ \rightarrow \ [V^i] \ / \ \_[+cor,-ant]$$

	i_*	ɪ_*	e_*	ɛ_*	a_*	ɯ_*	u_*	ɤ_*	o_*	ɔ_*
cʼ	-	-	-	+	+	-	-	+	-	+
ɲ	-	-	-	+	+	-	-	+	-	+

Table 11 Vowels before the Palatal Plosive and Palatal Nasal

(56) ɛ → ɛⁱ/_c, ɲ   /ʔɛ̀ɲ/   →   [ʔɛ̀ⁱɲ]   'to eat'

/kɛ́c/   →   [kɛ́ⁱcʼ]   'to sprout'

(57) a → aⁱ/_c, ɲ   /páɲ/   →   [páⁱɲ]   'to sell'

/ŋàc/   →   [ŋàⁱcʼ]   'to chop'

(58) ɤ → ɤⁱ/_c, ɲ   /kà.tɤc/   →   [kà.tɤ̀ⁱcʼ]   'pestle'

/lɤ̀ɲ/   →   [lɤ̀ⁱɲ]   'blunt'

(59) ɔ → ɔⁱ/_c, ɲ   /vɔc/   →   [vɔ̀ⁱcʼ]   'to cut, reap'

/mɔ̀ɲ/   →   [mɔ̀ⁱɲ]   'mouth'

3.7   Summary

The phonological summary of the Man Noi variety is that words are either monosyllabic or sesquisyllabic. Monosyllabic words can be written with the structure #CVC#. Sesquisyllabic words can be written with the maximum structure #CV.CVC#. Words can also result from compounding between these types of words. There are twenty-one phonemic consonants, ten phonemic vowels, and two phonemic tones. Register, while phonemic, however it does not seem to be the dominant in the register complex.

Chapter 4

Phonological Description of Bang Deng Plang

This chapter will give a description of the phonology found in the Bang Deng village of the Bulang Mountain district. As with the Man Noi description this description will begin with a discussion on what constitutes a word in this variety. Working at progressively smaller units of the sound system, a description of the syllable will follow the word and then a discussion on the phonemes. Finally the suprasegmental aspects will be covered.

4.1   Words

As in the Man Noi variety there are two main types of words, the monosyllabic word and the polysyllabic word. Each will be discussed below with examples.

4.1.1   Monosyllabic Words

Bang Deng monosyllabic words are identical to the Man Noi variety. The typical monosyllabic word begins with a consonant followed by a nucleus, which is a vowel, and then a final consonant. The largest syllable structure for the monosyllabic words is #CV̆C#.

> #CV̆C#
>
> | /pɛ́h/ | 'fat' | | /ŋàj/ | 'eye' |
> |---|---|---|---|---|
> | /kɤ́ɲ/ | 'father' | | /mɯ́h/ | 'nose' |
> | /hák/ | 'skin' | | /káŋ/ | 'eagle' |

4.1.2   Polysyllabic Words

As discussed before there are two main types of polysyllabic words in Plang, sesquisyllabic words and compound words. The maximum structure for a presyllable is #CV. When combined with the syllable the resulting word structure is #CV.CV̆C#.

#CV.CⱯC#

/ka.kɤ́n/	'dragon'		/ra.páj/	'medicine'
/rə.waj/	'tiger'		/kʰu.tíʔ/	'ring'

The second type of polysyllabic words are those made from combining two monosyllabic words, two sesquisyllabic words, a monosyllabic word with a sesquisyllabic word, or three monosyllabic words to form a compound word. The resulting word structures are #CⱯC.CⱯC#, #CⱯC.CV.CⱯC#, #CV.CⱯC.CⱯC#, and #CⱯC.CⱯC.CⱯC#.

#CⱯC.CⱯC#

/ʔúm/	+	/náʔ/[11]	=	/ʔúm.náʔ/
'water'		'field'		'wet field'

/hɤ́k/	+	/ŋáj/	=	/hɤ́k.ŋáj/
'hair'		'eye'		'eye brow'

#CⱯC.CV.CⱯC#

/túj/	+	/ra.pʰóm/	=	[túj.rá.pʰóm]
'***'		'lung'		'to breathe'

#CV.CⱯC.CⱯC#

/tə/	+	/kɤ́n/	+	/tíʔ/	=	[tə́.kɤ́n.tíʔ]
/presyllable/		'***'		'hand'		'palm'

#CⱯC.CⱯC.CⱯC#

/tín/	+	/kʰáj/	+	/páʔ/	=	/tín.kʰáj.páʔ/
'electricity'		'on'[12]		'***'		'candle'

4.2 Syllables

The two syllable types in the Bang Deng variety are the main syllable and the presyllable.

---

[11] /náʔ/ 'field' is a loan word from Tai.

[12] /kʰáj/ is a loan word from Chinese.

4.2.1   Main Syllables

Bang Deng syllable structure is represented in the following formula: #CVC#. All twenty-one phonemic consonants can fill the syllable initial consonant position. There are however only thirteen consonants which can fill the syllable final position, see Table 12 below. Plosives in the coda position are unreleased.

	Bilabial		Alveolar		Palatal		Velar		Glottal	
Plosives	p		t		c		k		ʔ	
Nasals		m		n		ɲ		ŋ		
Fricatives									h	
Approximants	w					j				
Laterals				l						

Table 12 Bang Deng Final Consonants

4.2.2   Presyllables, Prefixes, and Particles

There are three types of minor syllables, presyllables, prefixes, and particles. Presyllables and particles can be represented by the structure #CV, however prefixes can be represented as #CV̆. Presyllables are a phonological unit, while prefixes and particles are morphological (and semantic) units (Svantesson 1983:35).

There are are nine consonants that can occupy the onset position, /t, pʰ, m, r, s, l, k, kʰ,ʔ/. Vowels that can occur in the presyllable are restricted to /a, u, o/. However, /o/ in the presyllable is very suspicious due to the fact that it only occurs once in entire elicited wordlist. In fast speech and relaxed speech /a/ can be reduced to /ə/. While /a/ can occur with all presyllable consonants, /u/ has a more restricted occurrence in that it only occurs with /pʰ, l, kʰ/.

There are two classes of presyllables in Bang Deng. There is a non-specified class as well as a class of presyllables that have either a grammatical function or a semantic domain. These will be listed below with examples.

/ta/ as a presyllables has a non-specified use.

(60) /ta/ non-specified use

/ta.ʔáw/   'sky'
/ta.póŋ/   'window'
/ta.púh/   'mushroom'

/tá/ as a prefix functions as a classifier for time.

(61) /tá/ prefix 'Time Domain'

/tá.sà.ŋì?/   'daytime'

/tá.ŋúp/   'morning'

/tá.páj/   'noon'

/ta/ also occurs as a particle. As a particle it serves as a causative grammatical marker.

(62) /ta/ particle 'Causative Particle'

| /ta/ | + | /jɤ̀m/ | = | /ta.jɤ̀m/ |
| /Causative/ | | 'dead' | | 'to kill' |

| /ta/ | + | /tʰɔ́p/ | = | /ta.tʰɔ́p/ |
| /Causative/ | | 'a slap' | | 'to slap' |

(63) /pʰu/ non-specified use

/pʰu.mɤ́l/   'angry'

/pʰu.mɔ̀?/   'lung'

(64) /pʰa/ non-specified use

/pʰa.sáh/   'lightening'

/pʰa.lúɨŋ/   'dust'

/pʰa.jóŋ/   'pepper'

(65) /pʰo/ non-specified use

/pʰo.mèn/   'cotton'

As stated above this is the only occurrence of /pʰo/ as a presyllable, thus this presyllable is not well attested.

(66) /ma/ non-specified use

    /ma.cʰéŋ/   'wok'

    /ma.kʰɤ́ʔ/   'eggplant'

There are only two occurrences of /ma/ as a presyllable. One occurrence is a loan word from Tai, /ma.kʰɤ́ʔ/ 'egg plant.' It is suspected from these two examples that these words are both loan words from Tai.

(67) /ra/ non-specified use

    /ra.làh/   'market'

    /ra.páj/   'medicine'

    /ra.hàʔ/   'to play'

(68) /sa/ non-specified use

    /sa.táp/   'snow'

    /sa.kóʔ/   'wet'

    /sa.táʔ/   'tail'

(69) /lu/ non-specified use

    /lu.lǐl/   'to be round'

    /lu.láj/   'deer'

The presyllable /lu/ is not well attested, only occurs twice in the wordlist.

(70) /la/ non-specified use

    /la.pʰɤ́ʔ/   'leaf'

    /la.tɤ́t/   'pestle'

    /la.ʔíh/   'to fight'

/la/ as a particle functions as a possessive marker.

(71) /la/ possessive grammatical particle

/la/	+	/ʔɤ́ʔ/	=	/la.ʔɤ́ʔ/
/Possessive/		'1ˢᵗ singular'		'mine'
/la/	+	/míʔ/	=	/la.míʔ/
[Possessive]		'2ⁿᵈ singular'		'yours'
/la/	+	/ʔɤ́n/	=	/la.ʔɤ́n/
[Possessive]		'3ʳᵈ singular'		'his, hers'

(72) /ka/ non-specified use

/ka.ɲúʔ/	'ashes'
/ka.ɲàh/	'to smile'
/ka.sáŋ/	'elephant'

(73) /kʰu/ non-specified use

/kʰu.píʔ/	'fruit'
/kʰu.túʔ/	'animal'
/kʰu.jók/	'ear ring'

/kʰá/ is a prefix that functions as a locative marker.

(74) /kʰá/ prefix 'Locative'[13]

/kʰá.kʰɯ̀ʔ/	'behind'
/kʰá.nèj/	'inside'
/kʰá.níʔ/	'beside'

(75) /ʔa/ non-specified use

/ʔa.cʰíh/	'to sneeze'
/ʔa.rùk/	'wolf'
/ʔa.ɲɔ́ŋ/	'waist'

Prefixes and particles both contain a semantic meaning that modify the meaning of the syllable. They differ in that prefixes have an inherent tone, while particles do not. The prefixes for time and location both have inherent tone and do not assimilate

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[13] Words beginning with /kʰá/ are loan words from Tai.

to the tone of the following syllable. Particles, such as the causative particle, do not have an inherent tone and therefore assimilate to syllable they precede.

As with Man Noi Plang prefixes in Bang Deng also differ from particles and presyllables in that they can precede sesquisyllabic words which expands the word structure to #CV̆.CV.CV̆C#.

#CV̆.CV̆.CV̆C#

| /tá/ | + | /sa.ŋì?/ | = | [tá.sà.ŋì?] |

| /time prefix/ | | 'sun' | | 'daytime' |

4.3   Interpretation of Ambiguities

There are ambiguous segments with what could be interpreted as final diphthongs. There are seventy words in which a vowel glides either to [i] or [u] as diphthongs or to [j] or [w] as final semivowel consonants. These environment, if interpreted as diphthongs, would be the only place where there is an open syllable as the main syllable. Therefore, these semivowels are being interpreted as final consonants, /j/ and /w/.

4.4   Phonemes

In this section an inventory of the consonant and vowel phonemes will be presented. The distribution of each phoneme will also be shown.

4.4.1   Consonants

There were twenty-five consonantal sound segments found in the Bang Deng variety. Twenty-one of the sound segments were found to be phonemic. The phonemic sound segments are represented in Table 13 below.

		Bilabial		Labio-Dental		Alveolar		Palatal		Velar		Glottal	
Plosives		p				t		c		k		?	
		p^h				t^h		c^h		k^h			
Nasals			m				n		ɲ		ŋ		
Fricatives				f	v	s						h	
Approximants		w				r			j				
Lateral App.							l						

Table 13 Bang Deng Consonant Phoneme

4.4.1.1 Consonant Contrast

Phonemes are shown to contrast in identical environments (CIE) or contrast in non-influencing environments (CNE). Contrast are shown below.

/p/ – /pʰ/:	/pɔ́k/	'to ride'	/pʰɔ́k/	'to hang out'	CIE
/t/ – /tʰ/:	/túʔ/	'smoke'	/tʰùʔ/	'chopsticks'	CNE
/c/ – /cʰ/:	/cɤ́ʔ/	'to believe'	/cʰɤ́ŋ/	'blanket'	CNE
/k/ – /kʰ/:	/kúʔ/	'to wake up'	/kʰúʔ/	'tree'	CIE
/c/ – /k/:	/cɤ́ʔ/	'to believe'	/kɤ́ʔ/	'to swell'	CIE
/r/ – /l/:	/rɛ́t/	'word, speech'	/lɛ́t/	'to lick'	CIE
/l/ – /n/:	/lɔ́j/	'three'	/nɔ́j/	'pit, stone'	CIE
/m/ – /n/:	/mút/	'cloud'	/nút/	'to suck'	CIE
	/hɤ́m/	'to bathe'	/hɤ́n/	'much, many'	CIE
/t/ – /n/:	/ká.tɛ́ʔ/	'earth, soil'	/kà.nèʔ/	'monkey'	CNE
/n/ – /ɲ/:	/nɔ̀k/	'to look'	/ɲɔ́k/	'brain'	CNE
	/pɤ́n/	'year'	/pɤ́ɲ/	'to shoot'	CIE
/ɲ/ – /ŋ/:	/pɤ́ɲ/	'to shoot'	/pɤ́ŋ/	'to blow'	CIE
/s/ – /h/:	/sɤ́t/	'to receive'	/hɤ́t/	'flesh'	CIE
/f/ – /v/:	/fáj/	'deity, spirit'	/vák/	'bug, insect'	CNE
/ʔ/ – /h/:	/ʔúl/	'to shout'	/húl/	'to vomit'	CIE
	/tóʔ/	'buttocks'	/tóh/	'to open'	CIE
/j/ – /w/:	/máj/	'to write'	/màw/	'to be drunk'	CNE
	/jám/	'to cry'	/wát/	'temple'	CNE
/w/ – /v/:	/wát/	'temple'	/vák/	'bug, insect'	CNE

There are only two contrast in non influencing environment pairs between /f/ and /v/, therefore this contrast is not well attested. The contrast between /w/ and /v/ is not well attested in the data, there are few words with /w/ in the initial position. Also /w/ in the initial position can be produced in free variation as [v].

4.4.1.2   Plosives

There are nine plosives occurring at five points of articulation, bilabial, alveolar,
palatal, velar and glottal. As stated above there are four plosive allophones
[p˺, t˺, c˺,k˺]. These are predictable in that they only occur in word final position.
The glottal stop occurs phonemically in both the syllable initial and final position.
The plosive phonemes are listed with examples below.

(76) /p/ voiceless bilabial unaspirated plosive:		/pí̜l/	'to forget'
		/pɤ̌ŋ/	'to blow'
		/júŋ.póŋ/	'stairs'

(77) /pʰ/ voiceless bilabial aspirated plosive:		/pʰíh/	'to sweep'
		/pʰáw/	'to scatter seeds'
		/lé.pʰíl/	'hail'

When in the syllable final position /p/ is realized as a voiceless bilabial unreleased
plosive [p˺] as in [kíp˺] 'to cut with scissors'.

(78) /t/ voiceless alveolar unaspirated plosive:		/tɯ́ʔ/	'vegetable'
		/tɨ̀m/	'low'
		/tà.tòm/	'to pile up'

(79) /tʰ/ voiceless alveolar aspirated plosive:		/tʰɔ́l/	'to be shallow'
		/tʰù̜ʔ/	'chopsticks'
		/tá.tʰɔ́p/	'to slap'

When in the syllable final position /t/ is realized as a voiceless alveolar unreleased
plosive [t˺] as in [lét˺] 'to lick'.

(80) /c/ voiceless palatal unaspirated plosive:		/cɯ́ʔ/	'to know'
		/cɛ́ŋ/	'light, bright'
		/sɔ́.cáʔ/	'ghost'

(81) /cʰ/ voiceless palatal aspirated plosive: /cʰɤ́ŋ/ 'blanket'

/má.cʰéŋ/ 'wok'

/tá.cʰúʔ/ 'to lie'

When in the syllable final position /c/ is realized as a voiceless palatal unreleased plosive [c̚] as in [pʰɛ́ⁱc̚] 'to spit'.

(82) /k/ voiceless velar unaspirated plosive: /kɤ̀ʔ/ 'to love'

/kóŋ/ 'to dig'

/sá.kɛ́n/ 'heavy'

(83) /kʰ/ voiceless velar aspirated plosive: /kʰúʔ/ 'tree'

/kʰɛ́w/ 'blue'

/ɲá.kʰuʔ/ 'family'

When in the syllable final position /k/ is realized as a voiceless velar unreleased plosive [k̚] as in [vúk̚] 'bent'.

(84) /ʔ/ voiceless glottal plosive: /pɛ̀ʔ/ 'sheep'

/tóʔ/ 'buttocks'

/káʔ/ 'fish'

This variety of Plang, like Man Noi, has lost the clustering between /p/ and /k/ with /l/. Therefore, words like /plaŋ/ 'Plang' are produced as /pàŋ/ in Bang Deng.

4.4.1.3   Nasals

There are four phonemic nasals occurring at the bilabial, alveolar, palatal, and velar points of articulation. All nasals can occur in both onset and coda positions. Below the nasal phonemes are listed with examples

(85) /m/ voiced bilabial nasal: /mùl/ 'to curse'

/máj/ 'to write'

/ʔɤ́m/ 'raw'

/nɤ̀m/ 'thunder'

(86) /n/ voiced alveolar nasal: /nɔ̀k/ 'to look'

/nàʔ/ 'sour'

	/nɔ́n/	'just now'
	/ŋén/	'short'

(87) /ɲ/ voiced palatal nasal:

	/ɲɔ́k/	'brain'
	/ɲáʔ/	'house'
	/páɲ/	'to sell'
	/sá.mɔ́ɲ/	'star'

(88) /ŋ/ voiced velar nasal:

	/ŋúɪt/	'to smell'
	/ŋáp/	'to yawn'
	/sá.júŋ/	'light'
	/rɤ́ŋ/	'horn'

Paulsen (1992) states that Proto Plang contains a clustering of the nasal + [h], which is produced as a voiceless nasal in other dialects. In the Bang Deng variety, as in the Samtao and Man Noi varieties, this cluster is now produced as a voiced nasal.

(89) *Nh_ → N

*nham[1] 'blood' → /nám/

*mhVl[1] 'heart' → /múl/

4.4.1.4   Fricatives

There are four fricatives occurring at the labiodental, alveolar, and glottal points of articulation. Fricatives produced at the labiodental and alveolar points can only occupy the onset position. However, the fricative produced that the glottal point of articulation can occupy both onset and coda positions. The fricative phonemes are listed below with examples.

(90) /f/ voiceless labiodental fricative:

	/fíl/	'trousers'
	/fáj/	'deity, spirit'

Like the proto reconstruction of Plang, the /f/ is not well attested appearing only twice in the entire wordlist. However, there is no free variation between /f/ and /v/. There is also contrast in non-influencing environments (CNE) between /fáj/ 'to worship' and /vák/ 'bug, insect'.

(91) /v/ voiced labiodental fricative: /vák/ 'insect, bug'

/vɔ́c/ 'to cut, reap'

/vúk/ 'bent, crooked'

(92) /s/ voiceless alveolar fricative: /sóʔ/ 'dog'

/súʔ/ 'new'

/sáj/ 'milk'

(93) /h/ voiceless glottal nasal: /húl/ 'to vomit'

/hɤ́k/ 'hair'

/rá.hàʔ/ 'to play'

/kà.ɲàh/ 'to smile'

Bang Deng fricatives do not differ from the proto language. As with the proto-language and Man Noi the /f/ is not well attested.

4.4.1.5   Approximants

There are three approximants in the Bang Deng variety and they occur at the bilabial, palatal, and alveolar positions. There is also a lateral approximant occurring at the alveolar point of articulation. Both /w/ and /j/ can fill both onset and coda positions. However, in the coda position they create off-glides of the vowel. This will be discussed further under the vowel section. The lateral approximant, /l/, like the Man Noi variety can fill the onset position, however unlike the Man Noi variety it can also fill the coda. These phonemes are listed below with examples.

(94) /w/ voiced labial-velar approximant: /wát/ 'temple'

/rá.wáj/ 'tiger'

/jàw/ 'to be cheap'

/ʔɛ́w/ 'to look for'

There is free variation between /w/ and [v]. For example, /wàt/ can be pronounced as [vàt].

(95) /j/ voiced palatal approximant: /jɛ́n/ 'to grasp, hold'

/jók/ 'ear'

| | | /pɔ́j/ | 'to pasture' |
| | | /rá.púj/ | 'shadow' |

(96) /r/ voiced alveolar approximant: /rúk/ 'frog'

| | | /ráŋ/ | 'tooth' |
| | | /rá.rɤ́t/ | 'to snore' |

The alveolar tap /r/ in the onset can occur in free variation with the lateral approximant [l]. For instance /ra.píl/ 'sieve' can be produced as [la.píl].

(97) /l/ voiced alveolar lateral approximant: /lík/ 'pig'

		/lèɲ/	'blunt'
		/ʔúl/	'to shout'
		/lú.lǐl/	'to be round'

Proto-plang has a clustering of *lh in both the initial and final position. However, in Bang Deng this cluster in the initial position has been reduced to /l/. In the final position it has been reduced to /h/.

_lh → _h

*prɤlh[1]	'to carry on back'	→	/pɤ̀h/
*rilh[2]	'root'	→	/rèh/
*kìlh[2]	'salt'	→	/kìh/

lh_ → l_

| *lhek[1] | 'iron' | → | /lɛ́k/ |
| *lhVŋ[1] | 'tall' | → | /lúŋ/ |

Also in proto-plang *r and *l are contrastive in final position. This contrast has been lost in Bang Deng because *r becomes /l/ in final position.

_r → _l

*phɤr[1]	'to fly'	→	/pɤ́l/
*mùr[2]	'to crawl'	→	/mùl/
*Cir[1]	'bee'	→	/pʰɛ́l/

Proto-plang has clusters of *p, *k with *l and *pʰ, *kʰ with *r. These clusters have been lost in Bang Deng.

4.4.2   Vowels

There are ten vowel phonemes in the Bang Deng variety. The phonemic sound segments are represented in Table 14 below. There are four front vowels, five back vowels, and one central vowel. All vowels are produced with clear or breathy phonation.

	Front		Central		Back	
Close	i				ɯ	u
		ɪ				
Close-mid	e				ɤ	o
Open-mid	ɛ					ɔ
Open			a			

Table 14 Bang Deng Vowel Phonemes

4.4.2.1   Monophthongs

Vowel phonemes are listed below with examples.

(98) /i/ close front unround: /ra.tìʔ/   'to ask'

/líŋ/   'old'

/kíh/   'salt'

(99) /ɪ/ near-close near-front unrounded: /sín/   'to count'

/híl/   'thin, flimsy'

/ʔɤ́t/   'to sleep'

(100) /e/ close-mid front unrounded: /réh/   'root'

/téʔ/   'near'

/léj/   'to flow'

(101) /ɛ/ open-mid front unrounded: /pʰɛ́l/   'bee'

/lɛ̀ɲ/   'few'

/ʔɛ́l/   'chicken'

As with Man Noi vowels both /e/ and /ɛ/ are both phonemic vowels contrasting in non-influencing environments. Shown here:

/e/ – /ɛ/:   /téʔ/   'near'   /tɛ̀ʔ/   'arrow'   CNE

                    /lèh/   'six'   /pɛ́h/   'fat'   CNE

However, as seen from Table 15 below, the same correlation between /e/ and /ɛ/ that exist in Man Noi also appears in Bang Deng. It may be that as the language changes in Bang Deng that /e/ could become an allophone of /ɛ/, but so far this is uncertain.

	e_*	ɛ_*
m	-	-
n	-	+
ɲ	-	+
ŋ	+	-
pˀ	-	+
tˀ	-	+
cˀ	+	-
kˀ	-	+
ʔ	+	+
h	+	+
w	-	+
j	+	-

Table 15 Correlation between /e/ and /ɛ/

(102) /ɯ/ close back unrounded: /ŋɯ́t/   'to smell'
                                      /cɯ́ʔ/   'to know'
                                      /mɯ́h/   'nose'

(103) /u/ close back rounded: /múl/   'heart'
                                      /júk/   'to lift'
                                      /lúŋ/   'high, tall'

(104) /ɤ/ close-mid back unrounded:/lɤ́t/   'deaf'
                                      /pɤ́j/   'person'
                                      /sɤ̀ʔ/   'straight'

(105) /o/ close-mid back rounded: /mók/   'to sit'
                                      /ʔót/   'to wipe'
                                      /sóʔ/   'dog'

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(106) /ɔ/ open-mid back rounded: /mɔ́ɲ/   'mouth'

                                   /cɔ́p/   'to guess'

                                   /lɔ́j/   'three'

(107) /a/ open central unrounded: /ɲám/   'often'

                                   /káŋ/   'eagle'

                                   /páj/   'alcohol'

As seen in Table 16 below there are restriction on the vowels according to the consonant they precede.

	i̱	ɪ̱	e̱	ɛ̱	ɯ̱	u̱	ɤ̱	o̱	ɔ̱	a̱
m	-	+	-	-	-	+	+	+	+	+
n	+	+	-	+	+	+	+	-	+	+
ɲ	-	-	-	+	-	-	+	-	+	+
ŋ	+	-	+	-	+	+	+	+	+	+
pˈ	+	+	-	+	-	+	+	+	+	+
tˈ	-	+	-	+	+	+	+	+	+	+
cˈ	-	-	+	-	-	-	+	-	+	+
kˈ	+	-	-	+	-	+	+	+	+	+
ʔ	+	-	+	+	+	+	+	+	+	+
h	+	-	+	+	+	+	+	+	+	+
w	-	-	-	+	-	-	-	-	-	+
j	-	-	+	-	-	+	+	-	+	+

Table 16 Vowels preceding final consonants

Predictably, back vowels do not occur before /w/. The only front vowel to occur before /j/ is /e/. The back vowels /ɯ, u, o/ are restricted in that they do not occur before the palatal nasal or palatal plosive. /a/ is the most unrestricted vowel occurring in every position.

4.5   Register Complex

As with Man Noi "register" in Bang Deng is better described as a register complex because there are two interrelated features. The first of these features is phonation type, i.e. breathy and modal voicing. The second feature is tone. Each will be discussed below.

4.5.1 Phonation

Bang Deng vowels are produced in a modal or breathy phonation. The modal phonation is produced with no laxing to slight tensing of the glottis. The breathy phonation is produced by a laxing of the glottis. As with the Man Noi variety phonation is not a contrastive feature of the language. See Section 3.4.2.3 above.

These phonations can be seen more clearly from the F1 and F2 formants that they produced, as seen in Table 17 below. From Thurgood (2000), it is expected that vowels produced in a breathy phonation should have a lowered F1. However, only /i, ɪ, e, u, ɔ/ have a lower F1. These vowels do tend to be longer and have an association with final /h/.

Modal Vowel	Mean Standard Deviation		Breathy Vowel	Mean Standard Deviation	
	F1	F2		F1	F2
i	329.7 27	1921.8 65.9	i̤	334.9 18.1	1717.4 56.9
ɪ	422.8 15.8	1784.3 45.9	ɪ̤	423.2 18	1682.9 64.4
e	493.9 45.9	1797.1 73.3	e̤	506.8 34.2	1665.2 23.2
ɛ	566.4 43.6	1700.7 63.5	ɛ̤	546.6 33.7	1583.2 88.9
a	812.9 54.2	1389.9 54.4	a̤	789.7 39.9	1224.8 35.2
ɯ	350.4 38.8	1490.2 38.8	ɯ̤	348.2 43.5	1359.8 59.6
u	384.9 40	883.4 42	ṳ	409 48.7	1062.8 75.4
ɤ	502.1 52.1	1437.6 18.1	ɤ̤	501.7 61.8	1358.1 54.2
o	497.1 39.4	883.1 46.9	o̤	493.6 37.3	1055.9 16.9
ɔ	604.8 70.1	1053.1 33.7	ɔ̤	628.4 37.5	922.8 47.9

Table 17 Bang Deng Vowels mean F1 and F2

Using the mean value of the formants the following figure graphically displays the modal vowels.
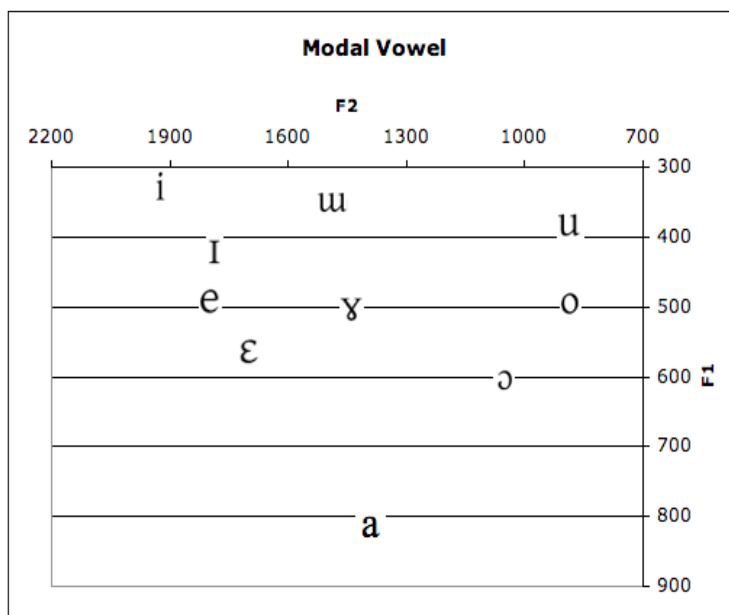
Figure 17 Bang Deng Modal Vowels

Using the mean value of the formants the following figure graphically displays the breathy vowels.
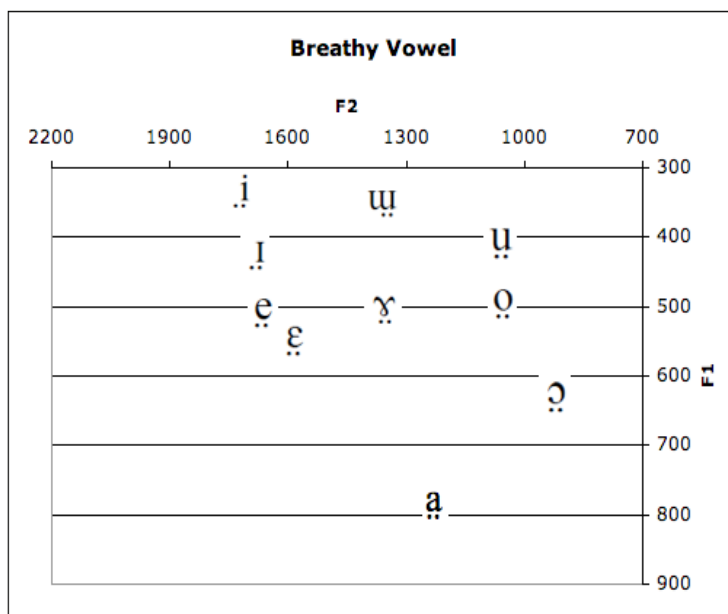
Figure 18 Bang Deng Breathy Vowels

In summary there are two phonation types in Bang Deng Plang, breathy and modal. Using Watkins phonation continuum, see Section 2.4, Bang Deng phonation types

can be described as such: breathy phonation is modal tending towards breathy, modal phonation is modal tending toward creaky as seen in below.

Register Phonation
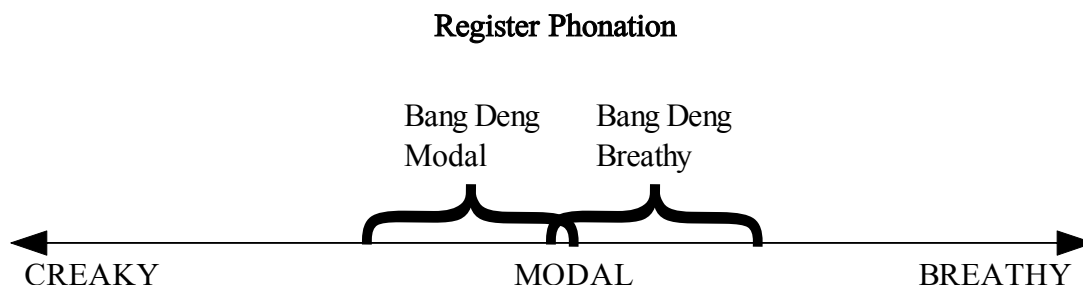
Figure 19 Bang Deng Phonation

4.5.1.1   Phonation Contrast

Phonation is shown to contrast in identical environments (CIE) or contrast in non-influencing environments (CNE). Contrasts are shown below.

/i/ – /i̤/:	/kʰíh/	'bear'	/l̤íh/	'to go down'	CNE
/ɪ/ – /ɪ̤/:	/fɪl/	'trousers'	/t̤ɪ̤m/	'low'	CNE
/e/ – /e̤/:	/léj/	'to flow'	/rè̤h/	'root'	CNE
/ɛ/ – /ɛ̤/:	/ʔɛ́t/	'small'	/lɛ̤̀ɲ/	'few'	CNE
/a/ – /a̤/:	/láʔ/	'to tell'	/là̤ʔ/	'tea'	CIE
/ɯ/ – /ɯ̤/:	/cɯ́ʔ/	'to know'	/kʰà.kʰɯ̤̀ʔ/	'behind'	CNE
/u/ – /ṳ/:	/múl/	'heart'	/mṳ̀l/	'to crawl'	CIE
/ɤ/ – /ɤ̤/:	/kɤ́h/	'to boil'	/pɤ̤̀h/	'to carry on back'	CNE
/o/ – /o̤/:	/kók/	'mortar'	/tó̤h/	'to open'	CNE
/ɔ/ – /ɔ̤/:	/sɔ́ŋ/	'bitter'	/mɔ̤̀ŋ/	'net'	CNE

4.5.1.2   Close Back and Close-Central Vowels

As with the Man Noi [ɯ] and [ɤ] vowels there is a question of whether these vowels are close back or close-central vowels, as seen in Figure 17 above. The determining factor of whether they are close back or close-central is the F3 formant, as explained in Section 3.4.2.4 above.

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	F2	F3
u	859.4	1544.8
ɯ	1087.7	1586.6
o	896.4	1630.9
ɤ	1371.3	1639.5

Table 18 Bang Deng Back Vowel F2 and F3 Average

From Table 18 above it can be seen that the F3 of [ɯ] and [ɤ] differ only slightly from the back rounded vowels, but differ greatly in F2. Therefore, it is better therefore to describe these vowels as back vowels rather than central vowels.

4.5.2   Tone

The second feature of the register complex is tone. There are two tonemes in the Bang Deng variety and two allotones. The allotones are based on a positional variation. The two level tones are classified as a high and low tone. See Figure 20 below. Each tone will be discussed further below.
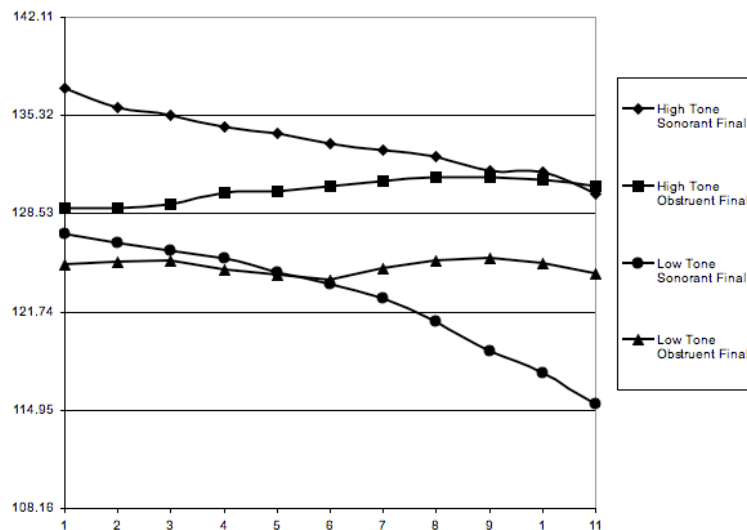
Figure 20 Bang Deng Tone

4.5.2.1   Tone Contrast

Tonemes are shown to contrast in identical environments (CIE) or contrast in non-influencing environments (CNE). Contrasts are shown below.

/í/ – /ì/:   /ʔíŋ/   'to come'   /cìŋ/   'to sew'   CNE

/ɨ́/ – /ɨ̀/:	/tɨ́m/	'to chop'	/tɨ̤̀m/	'low'	CIE
/é/ – /è/:	/léj/	'to flow'	/vèj/	'quick, fast'	CNE
/ɛ́/ – /ɛ̀/:	/cɛ́ʔ/	'money'	/tɛ̀ʔ/	'arrow'	CNE
/á/ – /à/:	/páŋ/	'table'	/pàŋ/	'Plang'	CIE
/ɯ́/ – /ɯ̀/:	/cɯ́ʔ/	'to know'	/kʰà.kʰɯ̤̀ʔ/	'behind'	CNE
/ú/ – /ù/:	/múl/	'heart'	/mṳ̀l/	'to crawl'	CIE
/ɤ́/ – /ɤ̀/:	/nɤ́m/	'urine'	/nɤ̀m/	'thunder'	CIE
/ó/ – /ò/:	/kóŋ/	'to dig'	/lòŋ/	'black'	CNE
/ɔ́/ – /ɔ̀/:	/kʰɔ́ʔ/	'hoe'	/kʰɔ̀ʔ/	'to wait'	CIE

4.5.2.2   High Tone

The high tone is a level tone of /44/ beginning at 128 Hz and ending at 130 Hz as seen in Figure 20 above. There is one high allotone which is influenced by the final consonants. The high tone occurring with an obstruent final is a normal tone. This tone begins around 128.8 Hz and rises to 130.3 as seen in Figure 21 and Figure 22 below.
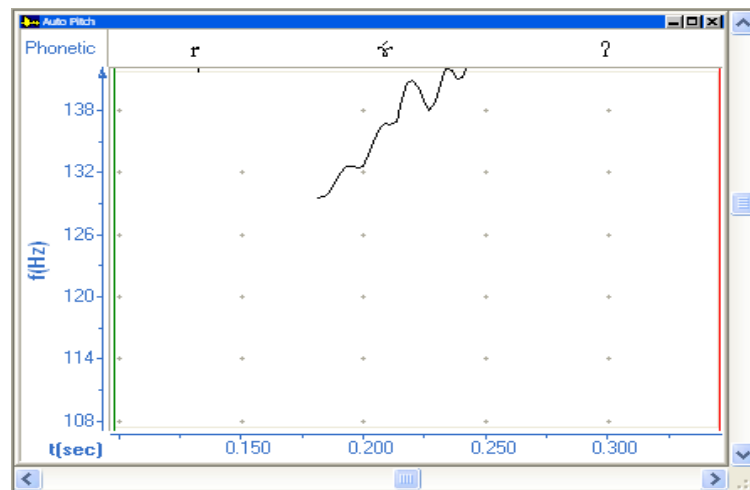
Figure 21 'to be deep'
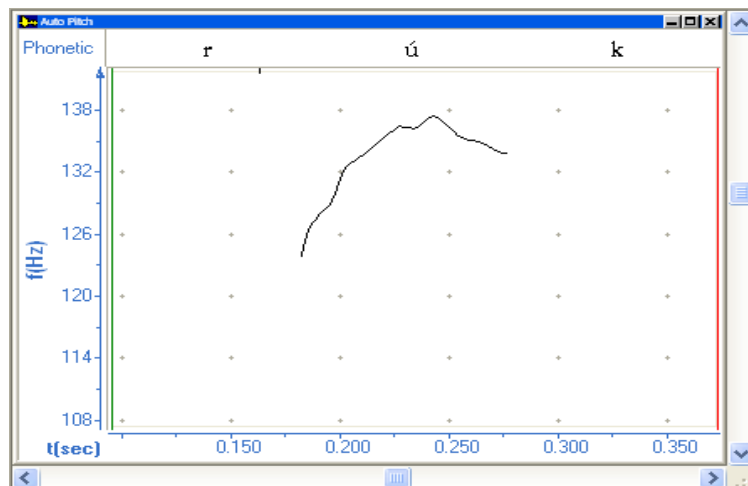
Figure 22 'frog'

When the high tone occurs before a sonorant final the resulting allotone is a falling tone of [43]. The tone begins around 137.7 Hz and falls to 129.9 Hz. As seen in Figure 23 and Figure 24 below.
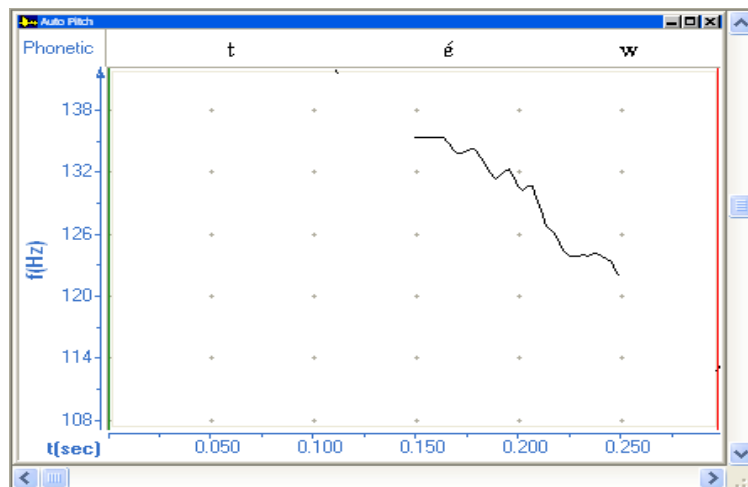
Figure 23 'to walk'
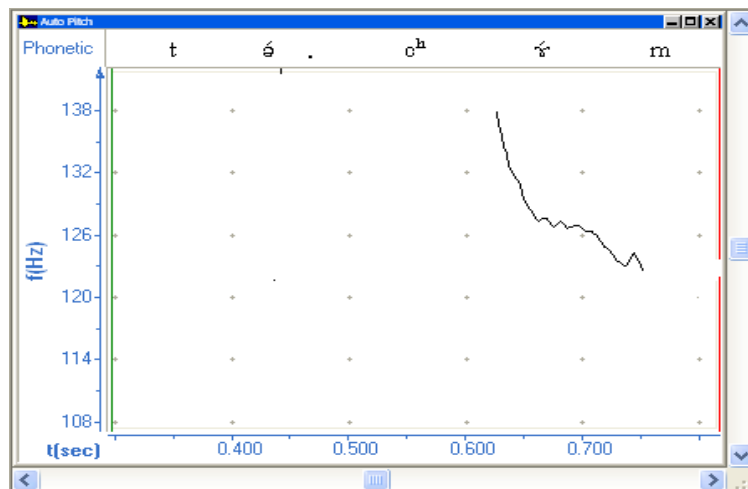
Figure 24 'religion'

4.5.2.3 Low Tone

The low tone is tone of /33/ the tone begins at 124.9 Hz and ends at 124.3 Hz as seen in Figure 20 above. As with the high tone there is one allotone which is the result of influencing from the syllable final consonant. The normal tone occurs when the low tone ends with an obstruent final it is a level tone. This can be seen in Figure 25 and Figure 26 below.
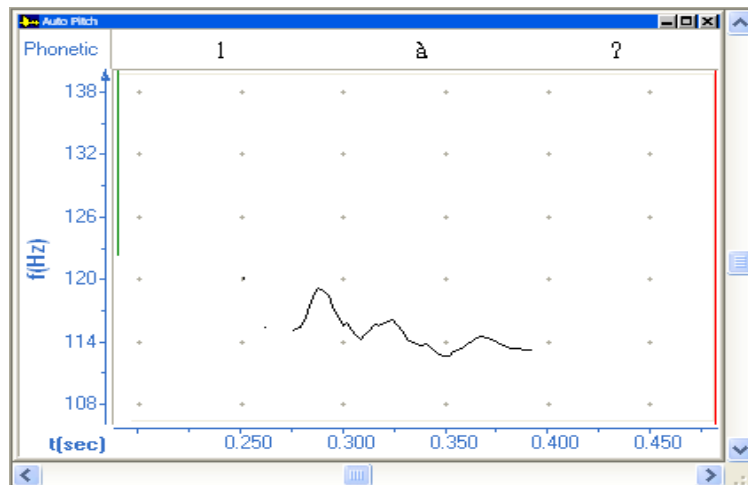
Figure 25 'tea'
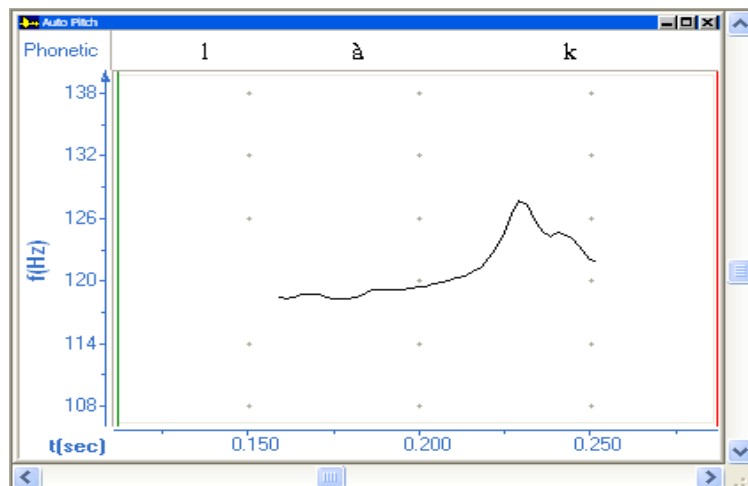
Figure 26 'late'

The allotone occurs when the low tone ends in a sonorant final causing the tone to fall resulting in an allotone of [32]. It generally begins at 127 Hz falls to 115 Hz. As seen in Figure 27 and Figure 28 below.
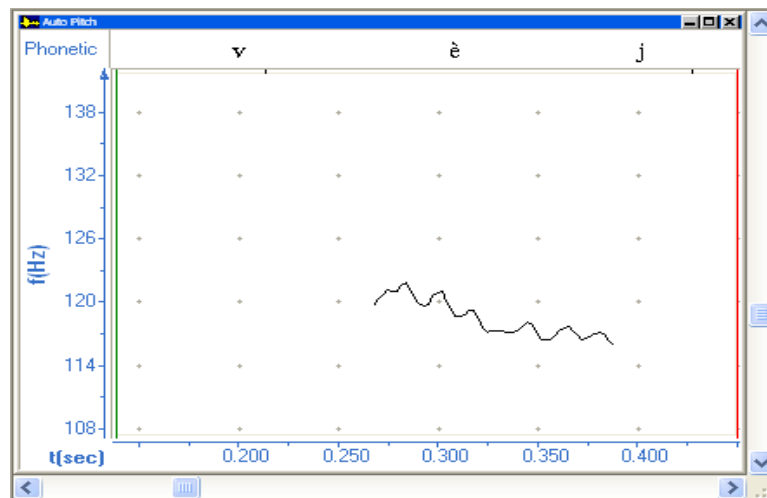
Figure 27 'to be fast'
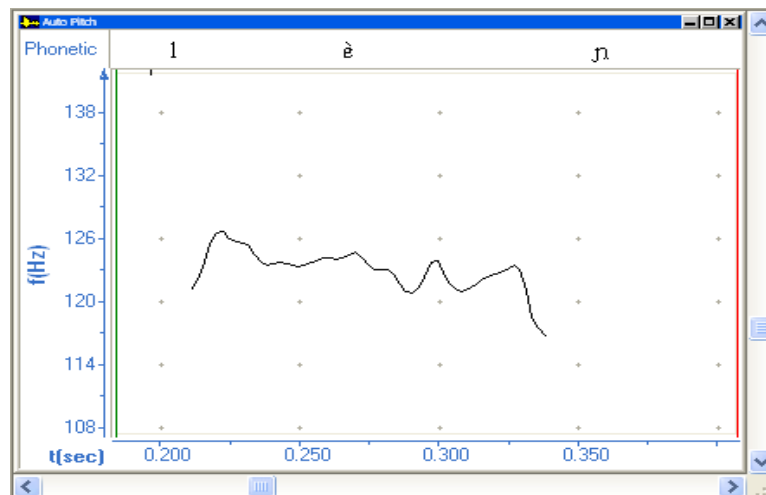
Figure 28 'to be blunt'

In summary in Bang Deng there are two contrastive tones, high and low. Each tone has one allotone which is the result of influencing from the final consonant.

4.5.3   Phonation and Tone

From the limited number of words that occur with breathy phonation it is hard to determine which of these features is more dominant. However, during elicitation when asked to explain the difference between words containing breathy phonation the language consultant would always state that the words differed in tone, not in phonation.

4.6   Phonological Processes

This section provides a description of the phonetic features of the Bang Deng variety.

4.6.1   Word

4.6.1.1   Voice Assimilation

As with the Man Noi voicing assimilation the Bang Dang variety also follows the same rule. Voiceless plosives when following a voiced nasal after a syllable break the voiceless plosive is produced as voiced:

$$[\text{-cont}] \quad \rightarrow \quad [+\text{voiced}] / [+\text{nasal}]\_$$

(108)   Underlying Form: /ʔúm.páh/   'weak'

Surface Form: [ʔúm.báh]   'weak'

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(109)   Underlying Form: /kɤ̀ɲ.tàʔ/   'ancestor'

        Surface Form: [kɤ̀ɲ.dàʔ]   'ancestor'

(110)   Underlying Form: /táŋ.kàw/   'butterfly'

        Surface Form: [táŋ.gàw]   'butterfly'

4.6.1.2   Final Plosives

The plosives /p, t, c, k/ when in final position are realized as unreleased. This is written by the rule:

$$[\text{-cont}] \quad \rightarrow \quad \text{unreleased} \: / \: \_\#$$

(111)   Underlying Form: /rɪ̀p/   'grass'

        Surface Form: [rɪ̀p˺]   'grass'

(112)   Underlying Form: /mút/   'could'

        Surface Form: [mút˺]   'cloud'

(113)   Underlying Form: /tɤ́c/   'to stab'

        Surface Form: [tɤ́c˺]   'to stab'

(114)   Underlying Form: /húk/   'to go up'

        Surface Form: [húk˺]   'to go up'

4.6.1.3   Tone Assimilation

Bang Deng presyllables have no inherent tone. Therefore presyllables assimilate to the tone of the syllable that they precede.

(115)   Underlying Form: /ka.mɤ̀c/   'ant'

        Surface Form: /kà.mɤ̀c/   'ant'

4.6.1.4   Glottal Deletion

If the first word in a compound word ends in a glottal stop it is deleted when combined with the second word. The deletion rule can be written as:

$$/ʔ/ \quad \rightarrow \quad \varnothing \: / \: \_.\sigma$$

(116)   /lò ʔ/   +   /kʰúʔ/   =   /lóʔ.kʰúʔ/

        'peel, husk'   'tree'   'tree bark'

Underlying Form: /lòʔ.kʰúʔ/   'tree bark'

Surface Form: [ló.kʰúʔ]   'tree bark'

4.6.1.5   Allotone

As stated above there are two tonemes, high and low, as well as two allotones.
These can be understood by the rules stated below.

High Tone   → Falling Onset / _[+son]

Low Tone   → Falling Coda / _[+son]

4.6.2   Consonants

4.6.2.1   Off-glides

Vowels that occur before the palatal plosive and the palatal nasal have a high front
off-glide. However, as seen in Table 19 below, this off-glide is limited to the
vowels /ɛ, a, ɤ, ɔ/. This can be written by the rule:

$$/V/ \quad \rightarrow \quad [V^i] \; / \; \_[+cor,-ant]$$

	i_*	ɪ_*	e_*	ɛ_*	a_*	ɯ_*	u_*	ɤ_*	o_*	ɔ_*
cˀ	-	-	-	+	+	-	-	+	-	+
ɲ	-	-	-	+	+	-	-	+	-	+

Table 19 Bang Deng Vowels before the Palatal Plosive and Palatal Nasal

(117) ɛ → ɛⁱ/_c, ɲ   /lɛ̀ɲ/   →   [lɛ̀ⁱɲ]   'blunt'

/pʰɛ́c/   →   [pʰɛ́ⁱcˀ]   'to spit'

(118) a → aⁱ/_c, ɲ   /pàɲ/   →   [pàⁱɲ]   'white'

/pác/   →   [páⁱcˀ]   'to scratch'

(119) ɤ → ɤⁱ/_c, ɲ   /tɤ́c/   →   [tɤ́ⁱcˀ]   'to stab'

/kɤ́ɲ/   →   [kɤ́ⁱɲ]   'father'

(120) ɔ → ɔⁱ/_c, ɲ   /hɔ́c/   →   [hɔ́ⁱc˺]   'to finish'

/mɔ́ɲ/   →   [mɔ́ⁱɲ]   'mouth'

4.7   Summary

The phonological summary of the Bang Deng variety is that words are either monosyllabic or sesquisyllabic. Monosyllabic words can be written with the structure #CVC#. Sesquisyllabic words can be written with the maximum structure #CV.CVC#. Compound words can also be formed from combining these two types of words. There are twenty-one phonemic consonants, ten phonemic vowels, and two phonemic tones. Register, while phonemic, is not as dominant in the register complex as tone.

Chapter 5

Phonological Description of La Gang Plang

This chapter will present a description of the phonology Plang found in the La Gang village which is located in the Bulang Mountain district. The description will be ordered from largest sound segment, i.e. the word, and then describe progressively smaller units of the sound system. Finally, the suprasegmental aspects of the variety will be described.

5.1 Words

As with the Man Noi and Bang Deng varieties the majority of the words in La Gang are monosyllabic. However, there is also a group of polysyllabic words. Each type of word will be described with examples below.

5.1.1 Monosyllabic Words

The monosyllabic words in Man Noi and Bang Deng can be represented by the structure, #CⱯC#. The monosyllabic word structure for La Gang is however different and can be represented by the structure #C(C)ⱯC#. Therefore the monosyllabic word can begin either with a single consonant or a consonant cluster. The initial consonant or consonant cluster is followed by a vowel and then a final consonant. Examples of both are listed below.

#CⱯC#		#C(C)ⱯC#	
/lìk/	'pig'	/kláŋ/	'eagle'
/nám/	'blood'	/pʰrók/	'rib'
/pʰɔ́k/	'to ride'	/plɔ́j/	'to pasture'

5.1.2 Polysyllabic Words

As with the Man Noi and Bang Deng variety there are two types of polysyllabic words in the La Gang variety. The first is a sesquisyllabic word, which is composed of a phonologically reduced presyllable and the syllable. Examples are listed below.

#CV.CV̆C#		#CV.CCV̆C#	
/ʔa.rɔ́ŋ/	'horse'	/sa.kʰròŋ/	'knee'
/ka.ɲàh/	'to smile'	/ʔa.pʰrɤ̀k/	'to step on'
/sa.ʔɔ́j/	'smelly'	/ta.plàj/	'noon'

The second type of polysyllabic word are compound words. Compound words can occur between two monosyllabic words, a monosyllabic and a polysyllabic word, or between two polysyllabic words. Example are given below.

#CV̆C.CV̆C#

/tʰéj/	+	/nàʔ/	=	/tʰéj.nàʔ/
'plow'		'field'		'to plow a field'

#CV̆C.CV.CV̆C#

/kɔ́n/	+	/ka.pɤ́n/	=	/kɔ́n.ka.pɤ́n/
'child'		'female'		'daughter'

#CV.CV̆C.CV.CV̆C#

/ʔa.pɤ́k/	+	/ka.ʔóʔ/	=	/ʔa.pɤ́k.ka.ʔóʔ/
'boat, raft'		'bamboo'		'bamboo raft'

5.2   Syllables

The La Gang syllables, like the Man Noi and Bang Deng syllables, are separated into to types, the presyllable and the main syllable. The main syllable will be referred to as the syllable. Each will be discussed below with examples.

5.2.1   Main Syllables

The syllable structure in the La Gang variety can be expressed by the formula $C_1(C_2)V̆C$. All twenty one of the phonemic consonants can fill the C_1 position. The coda position is limited to thirteen consonants. See Table 20 below. The optional C_2 consonant is the most limited of any consonant. When this consonant is present it forms an initial cluster with C_1.

	Bilabial		Alveolar		Palatal		Velar		Glottal	
Plosives	p		t		c		k		ʔ	
Nasals		m		n		ɲ		ŋ		
Fricatives									h	
Approximants	w					j				
Laterals				l						

Table 20 La Gang Final Consonants

There are only five consonants that fill the C_1 position, /p, k, pʰ, kʰ, h/ when the in the cluster. See Table 21 below. The /l/ occurs with /p, k, h/ in the consonant cluster, while /r/ occurs with /pʰ, kʰ, h/. The palatal approximant also occurs with /h/ in the cluster. The /hj/ cluster is not well attested in the data, only occurring once in [ʔa á .hjúk˥] 'ear'. Paulsen's proto-reconstruction includes a voiceless semivowel *yùk[1] 'ear'.

	p_	pʰ_	k_	kʰ_	h_
r	-	+	-	+	+
l	+	-	+	-	+
j	-	-	-	-	+

Table 21 La Gang Consonant Clusters

5.2.2   Presyllables, Prefixes, and Particles

As in the Man Noi and Bang Deng varieties the presyllable consist of a single consonant and a vowel. There are eleven consonants that can fill the presyllable onset position, /k, kʰ, p, pʰ, s, m, t, ʔ, h, l, j/. The only vowels that occur in the presyllable are /a, u, ɤ/. In fast or relaxed speech /a/ and /ɤ/ can be produced as [ə].

Prefixes and particles both contain a semantic meaning that modify the meaning of the syllable. They differ in that prefixes have an inherent tone, while particles do not. The prefixes for time and location both have inherent tone and do not assimilate to the tone of the following syllable. Particles, such as the causative particle, do not have an inherent tone and therefore assimilate to syllable they precede. Therefore, presyllables and particles can be represented but the formula #CV, but prefixes would be represented by #CV̵.

La Gang prefixes also differ from particles and presyllables in that they can precede sesquisyllabic words which expands the word structure to #CV̆.CV.CV̆C#.

#CV̆.CV.CV̆C#

/tá/   +   /sa.ŋìʔ/   =   [tá.sà.ŋìʔ]

/time prefix/   'sun'   'daytime'

5.3   Interpretation of Ambiguities

The ambiguities in this variety, as in Man Noi and Bang Deng, are with the final sound segment in the syllable. The presyllable is open but the syllable is closed. With this interpretation of the syllable the final sound segments are considered final consonants and not final vowel. Therefore, where it could be interpreted as a final /i/ or /u/ it has been interpreted as /j/ or /w/.

5.4   Phonemes

This section will give an inventory of the phonemic sound segments found in La Gang. Distribution will be given as well as examples and evidence.

5.4.1   Consonants

Twenty seven sound segments were found in the La Gang variety. Of those twenty seven only twenty three were found to be phonemic. The phonemic sounds are represented in Table 22 below.

	Bilabial		Labio-Dental		Alveolar		Palatal		Velar		Glottal	
Plosives	p				t		c		k		ʔ	
	pʰ				tʰ		cʰ		kʰ			
Nasals		m				n		ɲ		ŋ		
Voiceless Nasals						n̥				ŋ̥		
Fricatives			f	v	s						h	
Approximants	w				r			j				
Lateral App.						l						

Table 22 La Gang Consonant Phonemes

5.4.1.1   Consonant Contrast

Phonemes are shown to contrast in identical environments (CIE) or contrast in non-influencing environments (CNE). Contrast are shown below.

/p/ – /pʰ/:	/pɔ́n/	'meat'	/pʰɔ́n/	'five'	CIE
/t/ – /tʰ/:	/táh/	'rest'	/tʰám/	'sacred writing'	CNE
/c/ – /cʰ/:	/cɤ́t/	'to dye '	/cʰɤ́p/	'to blink'	CNE
/k/ – /kʰ/:	/kút/	'to shave the head'	/kʰúʔ/	'tree'	CNE
/c/ – /k/:	/cìŋ/	'to sew'	/kíŋ/	'expensive'	CNE
/r/ – /l/:	/rèc/	'word, speech'	/lɛ́c/	'to go in'	CNE
/l/ – /n/:	/nàʔ/	'sour'	/làʔ/	'tea'	CIE
/m/ – /n/:	/mɤ̀h/	'name'	/nɤ̀h/	'to push'	CIE
	/hɤ́m/	'to bathe'	/hɤ́n/	'much, many'	CIE
/t/ – /n/:	/tɤ́h/	'to pound'	/nɤ̀h/	'to push'	CIE
/n/ – /ɲ/:	/nɔ́k/	'to look'	/ɲɔ́k/	'brain'	CIE
	/lɔ̀n/	'to flow'	/mɔ́ɲ/	'mouth'	CNE
/ɲ/ – /ŋ/:	/pɤ́ɲ/	'to shoot'	/pɤ́ŋ/	'to blow'	CIE
/n/ – /n̥/:	/nɤ́ʔ/	'to drink'	/n̥ɤ̀t/	'to smell'	CNE
/ŋ/ – /ŋ̊/:	/ŋàj/	'eye'	/ŋ̊áp/	'to yawn'	CNE
/s/ – /h/:	/séŋ/	'diligent'	/héŋ/	'fat (animal)'	CIE
/ʔ/ – /h/:	/ʔéŋ/	'feces'	/héŋ/	'fat (animal)'	CIE
	/tó?/	'buttocks'	/tóh/	'to open'	CIE
/j/ – /w/:	/máj/	'to write'	/màw/	'to be drunk'	CNE
	/ját/	'to cry'	/wàt/	'temple'	CNE
/w/ – /v/:	/wàh/	'to be wide'	/vák/	'bug, insect'	CNE

There are only two pair of words which contrast in non influencing environment between /f/ and /v/. The contrast between /w/ and /v/ is not well attested, there are only a few words with /w/ in the initial position. Also some words with /w/ in the initial position can be produced as /v/.

5.4.1.2   Plosives

There are nine phonemic plosives occurring at the bilabial, alveolar, palatal, velar, and glottal points of articulation. There are four plosive allophones, /p˺, t˺, c˺, k˺/, occurring predictably in the word final position. The glottal stop can occur in the

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onset of both syllable and word initial and in the coda position. The plosives are listed below with examples.

(121) /p/ voiceless bilabial unaspirated plosive:

	/pún/	'four'
	/pɤ́l/	'to fly'
	/plàŋ/	'Plang'

(122) /pʰ/ voiceless bilabial aspirated plosive:

	/pʰɔ́n/	'five'
	/phíl/	'bee'
	/pʰrúɨl/	'mud'

When in the syllable final position /p/ is realized as a voiceless bilabial unreleased plosive [p˺] as in [rìp˺] 'grass'.

(123) /t/ voiceless alveolar unaspirated plosive:

	/tíʔ/	'hand'
	/tòk/	'poor'
	/táh/	'to rest'

(124) /tʰ/ voiceless alveolar aspirated plosive:

	/tʰéj/	'plough'
	/ʔa.tʰíh/	'to be strong'
	/tʰàw/	'old'

When in the syllable final position /t/ is realized as a voiceless alveolar unreleased plosive [t˺] as in [tɤ́t˺] 'to stab'.

(125) /c/ voiceless palatal unaspirated plosive:

	/cìŋ/	'to sew'
	/cɔ̀h/	'to help'
	/cɤ́t/	'to dye'

(126) /cʰ/ voiceless palatal aspirated plosive:

	/cʰɤ́p/	'to blink'
	/cʰɔ́n/	'bed'
	/cʰóp.mɨ́h/	'ring'

When in the syllable final position /c/ is realized as a voiceless palatal unreleased plosive [c˺] as in [klɨ̀ⁱc˺] 'bad'.

(127) /k/ voiceless velar unaspirated plosive: /kláŋ/ 'eagle'

                  /kìh/   'salt'

                  /kɛ́n/   'to twist'

(128) /kʰ/ voiceless velar aspirated plosive: /kʰríh/ 'bear'

                  /kʰɛ́j/   'to wear a hat'

                  /kʰúʔ/   'tree'

When in the syllable final position /k/ is realized as a voiceless velar unreleased plosive [k̚] as in [vúk̚] 'to bend'.

(129) /ʔ/ voiceless glottal plosive: /hláʔ/ 'leaf'

             /ʕ́ɪm/   'raw'

             /kúʔ/   'to like'

5.4.1.3 Nasals

There are four phonemic nasals occurring at the bilabial, alveolar, palatal, and velar points of articulation. There are two phonemic voiceless nasals occurring at the alveolar and velar points of articulation. All voiced nasals can occur in both C_1 and coda positions. Voiceless nasals only occur in the onset. The nasals are listed with examples below.

(130) /m/ voiced bilabial nasal: /mút/ 'cloud'

              /máj/   'to write'

              /ʕ́ɪm/   'raw'

              /lɔ́m/   'sharp'

(131) /n/ voiced alveolar nasal: /nòk/ 'full'

              /nám/   'blood'

              /nɤ́n/   'who'

              /pún/   'four'

(132) /n̥/ voiceless alveolar nasal: /n̥ɤ́t/ 'to smell'

             /m̥ìw/   'to see'

(133) /ɲ/ voiced palatal nasal: /ɲɔ̀k/   'brain'
                                    /ɲà?/   'house'
                                    /páɲ/   'to sell'
                                    /mɔ̀ɲ/   'mouth'

(134) /ŋ/ voiced velar nasal: /ŋɔ́l/   'fire'
                                    /ŋàj/   'eye'
                                    /kíŋ/   'expensive'
                                    /rɤ́ŋ/   'horn'

(135) /ŋ̥/ voiceless velar nasal: /ŋ̥áp/   'to yawn'
                                    /ʔá.ŋ̥ét/   'to listen'

Unlike Man Noi and Bang Deng this variety has not lost the voiceless nasals. It has, however, lost the cluster of nasal +/h/.

5.4.1.4   Fricatives

There are four phonemic fricatives occurring at the labiodental, alveolar, and glottal points of articulation. Only the glottal fricative can occur in both C_1 and coda positions. All other fricatives occur only in the C_1 position. The fricative phonemes are listed below with examples.

(136) /f/ voiceless labiodental fricative: /fíl/   'trousers'

The /f/ is no well attested, appearing only once in the entire wordlist. However, there is no free variation between /f/ and /v/.

(137) /v/ voiced labiodental fricative: /vèj/   'fast'
                                           /vɛ̀k/   'to work'
                                           /sá.váh/   'light, bright'

(138) /s/ voiceless alveolar fricative: /sɤ́t/   'to receive'
                                           /sím/   'bird'
                                           /só?/   'dog'

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(139) /ʰ/ voiceless glottal nasal: /hráŋ/   'tooth'

                                                     /hík/   'to cut with a knife'

                                                     /lìh/   'to lay an egg'

                                                     /mɯ̀h/   'nose'

While in Man Noi and Bang Deng the /r/ and /h/ in the onset appear in free variation this is not the case in La Gang. In La Gang, like the Man Noi variety, Bang Deng variety, and the proto-reconstruction, /f/ is not well attested.

5.4.1.5   Approximants

There are three phonemic approximants and one phonemic lateral approximant. The approximants occur at the bilabial, alveolar, and palatal points of articulation. The lateral approximant occurs at the alveolar point of articulation. Only the alveolar approximant cannot occur in the coda position. All other approximants and the lateral approximant can occur in both the onset and coda positions. Each will be listed below with examples.

(140) /w/ voiced labial-velar approximant: /wàt/   'temple'

                                                               /wàh/   'to be wide'

                                                               /pʰráw/   'to scatter'

                                                               /ʔέw/   'to look for'

There is free variation between /w/ and [v] when in the onset. For example, /wàt/ can be pronounced as [vàt].

(141) /j/ voiced palatal approximant: /júŋ/   'village'

                                                         /jέt/   'cloth'

                                                         /lèj/   'six'

                                                        /pɤ̀j/   'person'

(142) /r/ voiced alveolar approximant: /ríl/   'forehead'

                                                       /rók/   'frog'

                                                      /ʔá.róŋ/   'horse'

(143) /l/ voiced alveolar lateral approximant: /pláj/ 'alcohol'

/lɔ̀n/ 'to flow'

/hɤ́l/ 'to go'

/cál/ 'to be hungry, thirsty'

The final position clustering of /lh/ which is present in the proto-reconstruction has been reduced to /h/ in La Gang.

_lh → _h

*kìlh[2] 'salt' → /kɪ̀h/ 'salt'

*kəmɔ̀lh 'banana' → /ʔá.mɔ́h/ 'banana'

Man Noi and Bang Deng have also lost the /lh/ cluster in the onset position, however La Gang has retained this feature but it present as /hl/.

lh_ → hl_

*lhek[1] 'iron' → /hlɛ́k/ 'iron'

*lhiʔ[1] 'rain' → /hléʔ/ 'rain'

In Man Noi and Bang Deng proto final /r/ have been reduced to a final /h/. In La Gang they have become a final /l/.

_r → _l

*kàr 'wind' → /kɤ́l/ 'wind'

*phɤr[1] 'to fly' → /pɤ́l/ 'to fly'

*mùr[2] 'to crawl' → /mɤ́l/ 'to crawl'

5.4.2   Vowels

As in the Man Noi and Bang Deng varieties there are ten vowel phonemes. These phonemes are represented in Table 23 below. There are four front vowels produced at the close, near-close, close-mid, and open-mid positions. There is one central vowel produced at the open position. There are five back vowels two produced at the close, two produced at the close-mid, and one at the open-mid positions.

	Front		Central		Back	
Close	i				ɯ	u
		ɪ				
Close-mid	e				ɤ	o
Open-mid	ɛ					ɔ
Open			a			

Table 23 La Gang Vowel Phonemes

5.4.2.1   Monophthongs

Vowel phonemes are listed below with examples.

(144) /i/ close front unround: /cít/   'heart'

/tíʔ/   'hand'

/lìh/   'to go down'

(145) /ɪ/ near-close near-front unrounded: /kʰrɪ́l/   'to grind'

/pɪ̀n/   'to lay aside'

/ʔɤ̃m/   'raw'

(146) /e/ close-mid front unrounded: /hléʔ/   'rain'

/kéh/   'to pick fruit'

/ká.téʔ/   'earth, soil'

(147) /ɛ/ open-mid front unrounded: /ʔɛ́t/   'small'

/pɛ̀c/   'saliva'

/lɛ́ɲ/   'few'

As with Man Noi vowels both /e/ and /ɛ/ are both phonemic vowels contrasting in non-influencing environments. Shown here:

/e/ – /ɛ/:   /hléʔ/ 'rain'   /péʔ/   'fat (person)'   CNE

However, as seen from below, the same correlation between /e/ and /ɛ/ that exist in Man Noi and Bang Deng is also present in Lagang, but seems to be further

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developed. The contrast of /e/ and /ɛ/ before the glottal fricative is not well attested. However, there is contrast of these vowels before the glottal stop.

	e_	ɛ_
m	-	-
n	-	+
ɲ	-	+
ŋ	+	-
pʼ	-	+
tʼ	-	+
cʼ	-	+
kʼ	-	+
ʔ	+	+
h	+	-
w	-	+
j	+	-

Table 24 Correlation of /e/ and /ɛ/

(148) /ɯ/ close back unrounded: /kɯ́ʔ/   'to like'

                                    /ʔɯ́t/   'I'

                                    /mɯ̀h/   'nose'

(149) /u/ close back rounded: /júŋ/   'village'

                                    /vúk/   'ten'

                                    /kúl/   'bent, crooked'

(150) /ɤ/ close-mid back unrounded: /mɤ́l/   'to crawl'

                                        /cʰɤ́p/   'to blink'

                                        /nɤ̀h/   'to push'

(151) /o/ close-mid back rounded: /rók/   'frog'

                                        /còm/   'bowl'

                                        /nòk/   'full'

(152) /ɔ/ open-mid back rounded: /pʰɔ́k/ 'to hang out to dry'

/jɔ̀k/ 'weak'

/lɔ̀n/ 'to flow'

(153) /a/ open central unrounded: /hlát/ 'to be afraid'

/ɲàʔ/ 'house'

/nám/ 'blood'

As seen in Table 25 below there are restriction on the vowels according to the consonant they precede.

	i̠	ɪ̠	e̠	ɛ̠	ɯ̠	u̠	ɤ̠	o̠	ɔ̠	a̠
m	-	+	-	-	-	+	+	+	+	+
n	-	+	-	+	-	+	+	+	+	+
ɲ	-	-	-	+	-	+	+	-	+	+
ŋ	+	-	+	-	+	+	+	+	+	+
pˀ	+	+	-	+	-	-	+	+	+	+
tˀ	+	+	-	+	+	+	+	-	+	+
cˀ	-	-	-	+	-	-	+	-	+	+
kˀ	+	-	-	+	-	+	+	+	+	+
ʔ	+	-	+	+	+	+	+	+	+	+
h	+	-	+	-	+	+	+	+	+	+
w	-	-	-	+	-	-	-	-	-	+
j	-	-	+	-	-	+	+	+	+	+

Table 25 Vowels preceding final consonants

Predictably, back vowels do not occur before /w/. The only front vowel to occur before /j/ is /e/. The only front vowel to occur before /w/ is /ɛ/. The back vowels /ɯ, o/ are restricted in that they do not occur before the palatal nasal or palatal plosive. The open central unrounded /a/ is the most unrestricted vowel occurring in every position.

5.5 Register Complex

5.5.1 Phonation

As with the Man Noi and Bang Deng there are two phonation types in La Gang, modal and breathy. The modal phonation type is a clear phonation with no laxing of the larynx. Words that are produced in the modal phonation can have a slight tensing

when the coda is filled with a glottal stop. Modal phonation words tend to be shorter in length and tend to have a slightly higher pitch.

La Gang words that are produced with the breathy phonation are generally longer in duration. Breathy phonation words have an association with the final /h/. These words are also produced with a slightly lower pitch. Breathy words are generally words that have a low tone.

Modal Vowel	Mean Standard Deviation		Breathy Vowel	Mean Standard Deviation	
	F1	F2		F1	F2
i	349.6 35.7	1931 31.1	i̤	372.8 54	1704.6 77.9
ɪ	464.9 14.1	1698.4 45.8	ɪ̤[14]	493.3	1575.7
e	520.9 23.8	1845.4 39.6	e̤	508.9 10.1	1682.6 63.6
ɛ	579.4 32.3	1720.8 51.4	ɛ̤	593 32.8	1486.2 51.4
a	876.9 33	1449.5 33.6	a̤	893.6 39.8	1345.9 38.3
ɯ	355.8 21.8	1476.7 31.6	ɯ̤	378.3	1288.9
u	386.6 41.7	893.6 66.7	ṳ	399.9 35.8	1054.1 21.4
ɤ	496.8 57.1	1455.4 27.8	ɤ̤	509.2 59.2	1360.4 38.6
o	499.6 44.2	1004.9 53.8	o̤	535.8 45.3	1073.8 23.3
ɔ	711.9 41.9	1069.7 52.9	ɔ̤	690.3 40.5	945.1 41.3

Table 26 La Gang Vowels mean F1 and F2

Using the mean value of the formants the following figure graphically displays the modal vowels.

[14] Both /ɪ̤/ and /ɯ̤/ are not well attested in the La Gang variety. Each only appeared once in the data.
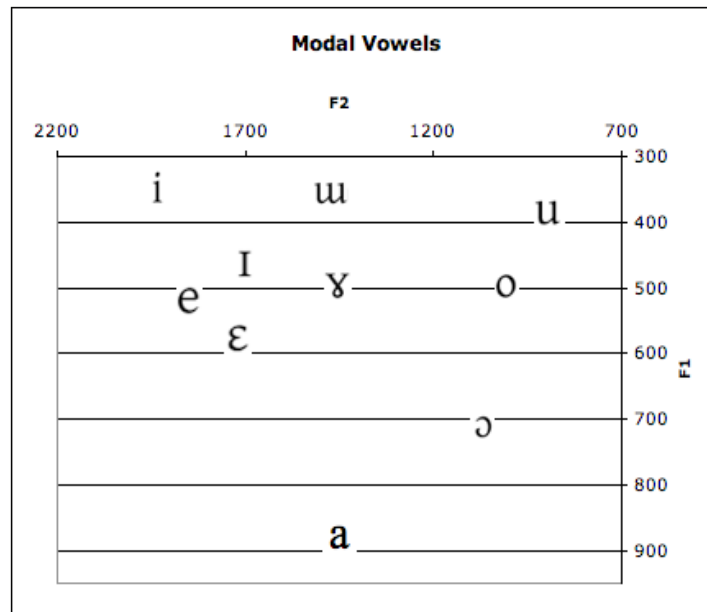
Figure 29 La Gang Modal Vowels

Using the mean value of the formants the following figure graphically displays the breathy vowels.
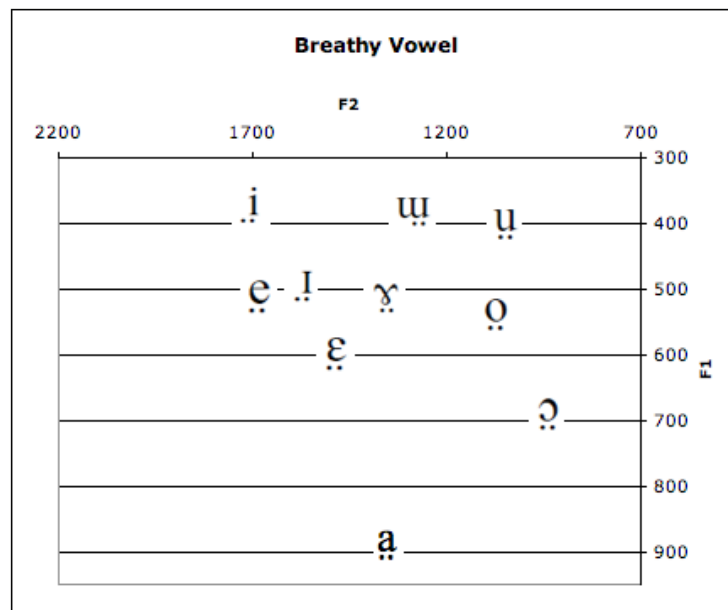
Figure 30 La Gang Breathy Vowels

In summary, In La Gang there are two phonemic phonations, breathy and modal. Using Watkins spectrum of phonation types it can be explained that breathy vowels are modal tending toward breathy and modal vowels are modal tending toward creaky as seen in Figure 31 below.

Register Phonation
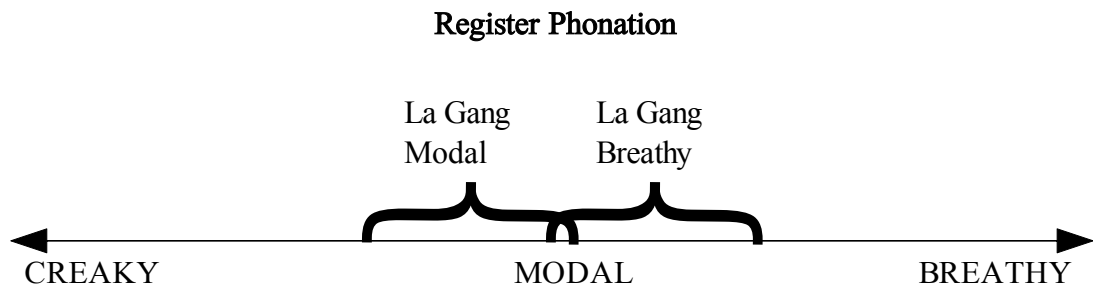
Figure 31 La Gang Phonation

5.5.1.1 Phonation Contrast

Phonation is shown to contrast in identical environments (CIE) or contrast in non-influencing environments (CNE). Contrasts are shown below.

/i/ − /i̤/:	/lìh/	'to go down'	/ḭh/	'to lay an egg'	CIE
/ɪ/ − /ɪ̤/:	/rɪ́l/	'forehead'	/r̤ɪ̀n/	'to study'	CNE
/e/ − /e̤/:	/hléʔ/	'rain'	/lè̤j/	'six'	CNE
/ɛ/ − /ɛ̤/:	/kɛ̀t/	'to bite'	/rɛ̤́t/	'word, speech'	CNE
/a/ − /a̤/:	/kàʔ/	'to give'	/hlá̤ʔ/	'leaf'	CNE
/ɯ/ − /ɯ̤/:	/kɯ́ʔ/	'to like'	/ʔá.kʰrɯ̤́ʔ/	'afterward'	CNE
/u/ − /ṳ/:	/kúŋ/	'to dig'	/hlṳ́ŋ/	'roof'	CNE
/ɤ/ − /ɤ̤/:	/sɤ́t/	'to hold'	/n̥ɤ̤́t/	'to smell'	CNE
/o/ − /o̤/:	/tóh/	'to open'	/tò̤h/	'to chop'	CIE
/ɔ/ − /ɔ̤/:	/kɔ̀ŋ/	'bottle'	/pɔ̤́ŋ/	'window'	CNE

5.5.1.2 Close Back and Close-Central Vowels

As with Man Noi and Bang Deng there is a question of whether [ɯ] and [ɤ] are better interpreted as [ɨ] and [ə]. As was stated above in Section 3.4.2.4 Ladefoged and Bladon (1982) observed that lip rounding in close back vowels lowers the F2 greatly and the F3 only slightly.

	F2	F3
u	893.6	1565
ɯ	1476.7	1556.8
o	1004.9	1607.1
ɤ	1455.4	1650.6

Table 27 La Gang Back Vowel F2 and F3 Average

From Table 27 above it can be seen that the F3 of [ɯ] and [ɤ] differ only slightly from the back rounded vowels, but differ greatly in F2. Therefore, it is better to describe these vowels as back vowels rather than central vowels.

5.5.2   Tone

There are two tonemes in the La Gang variety. The allotones that are present in the Man Noi and Bang Deng variety are not present in the La Gang variety. As seen in Figure 32 below.
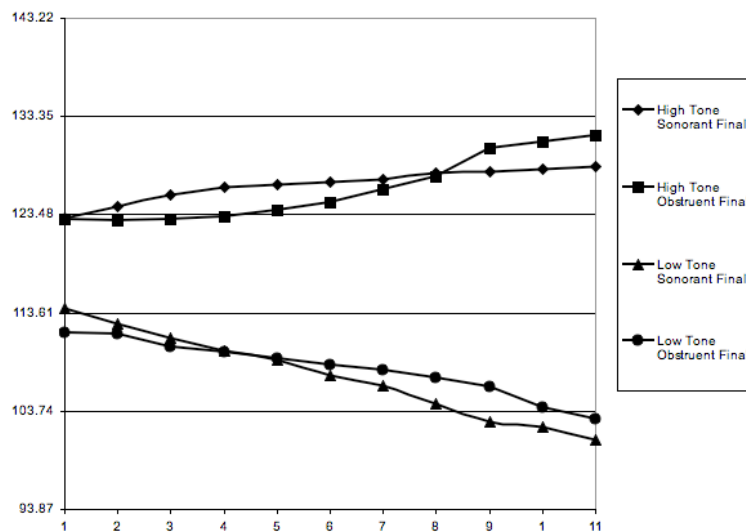
Figure 32 La Gang Tone Averages

5.5.2.1   Tone Contrast

Tonemes are shown to contrast in identical environments (CIE) or contrast in non-influencing environments (CNE). Contrasts are shown below.

/í/ – /ì/:   /kíp/   'to cut with scissors' /rìp/   'grass'   CNE

/ɨ/ – /ì/:   /sɨ́n/   'to count'   /pɨ̀n/   'to layaside'   CNE

/é/ – /è/:	/kʰéj/	'to wear a hat'	/lèj/	'six'	CNE
/ɛ́/ – /ɛ̀/:	/pɛ́ʔ/	'fat (person)'	/pɛ̀ʔ/	'goat'	CIE
/á/ – /à/:	/máw/	'cat'	/màw/	'to be drunk'	CIE
/ɯ́/ – /ɯ̀/:	/pʰrɯ́l/	'mud'	/kà.mɯ̀l/	'gold'	CNE
/ú/ – /ù/:	/ʔúl/	'to shout'	/mùl/	'ugly'	CNE
/ɤ́/ – /ɤ̀/:	/pɤ́ʔ/	'milk'	/jɤ̀ʔ/	'to do'	CNE
/ó/ – /ò/:	/tóh/	'to open'	/tò̤h/	'to chop'	CIE
/ɔ́/ – /ɔ̀/:	/lɔ́j/	'three'	/lɔ̀j/	'to swim'	CIE

5.5.2.2   High Tone

The La Gang average high tone is a level tone of /44/ that has a slight rise. The tone begins 123 Hz and rises to 129.8 Hz. See **Figure 33** and **Figure 34** below.
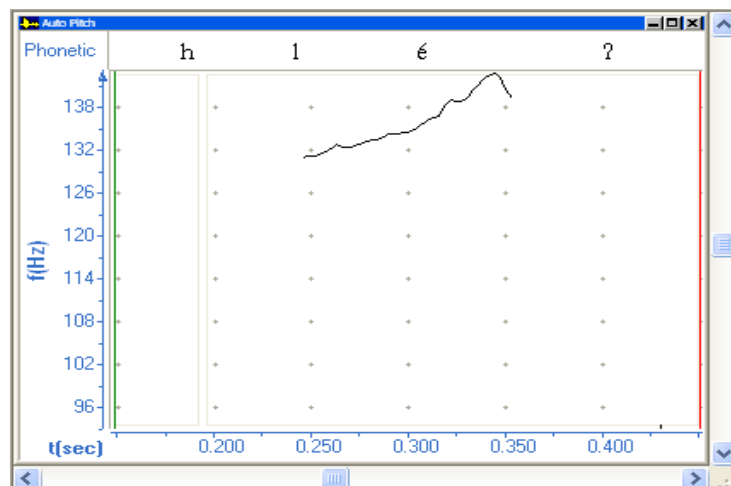
Figure 33 'rain'
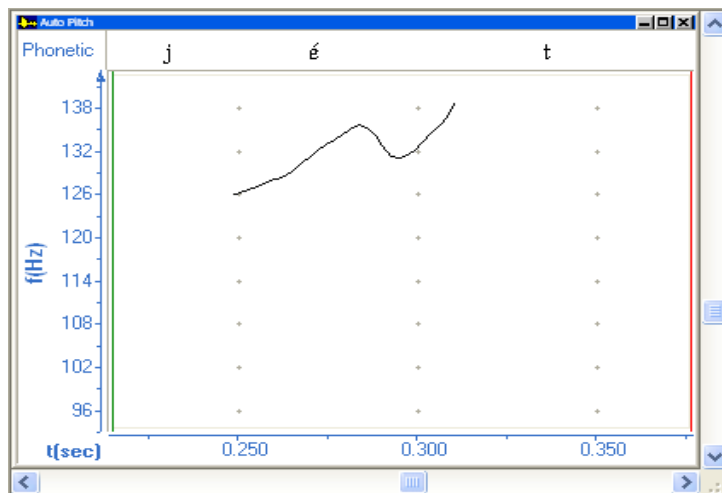
Figure 34 'cloth'

Words with a high tone and end in a sonorant tend to have a more level tone. As seen in **Figure 35** and **Figure 36** below.
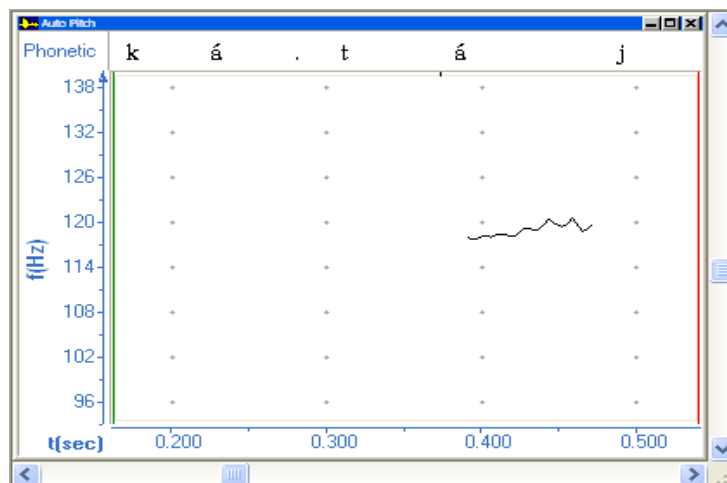
Figure 35 'rabbit'
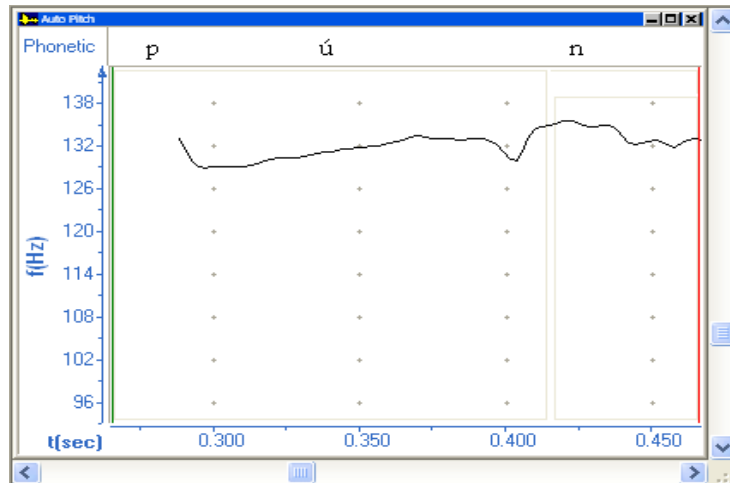
Figure 36 'four'

5.5.2.3   Low Tone

The average low tone in La Gang is a falling tone of /21/. It begins at 112.8 Hz and falls to 101.9 Hz. See **Figure 37** and **Figure 38** below.
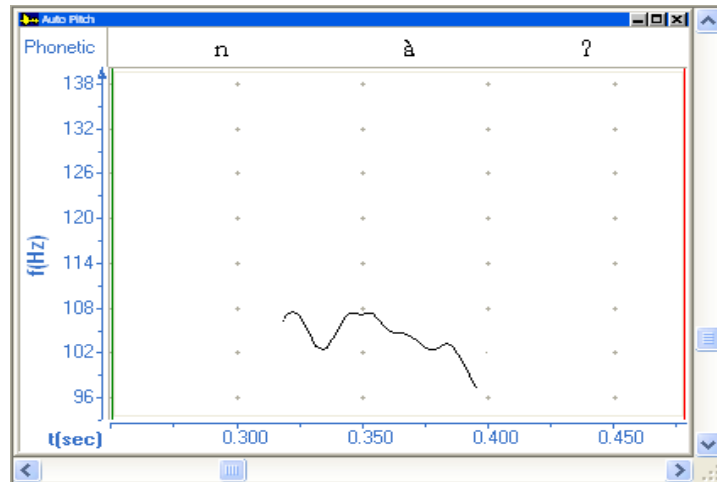
Figure 37 'sour'
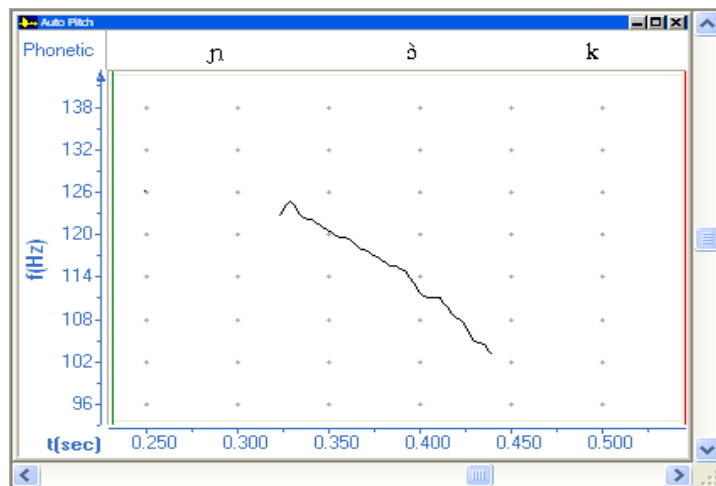
Figure 38 'brain'

Unlike low tone words which end in sonorant finals in Man Noi and Bang Deng low tone words in La Gang that end in a sonorant final do not differ from words ending in an obstruent. See **Figure 39** and **Figure 40** below.
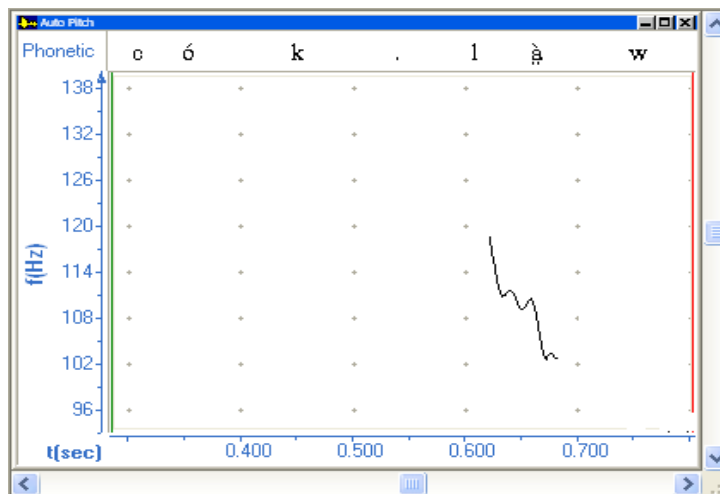
Figure 39 'butterfly'
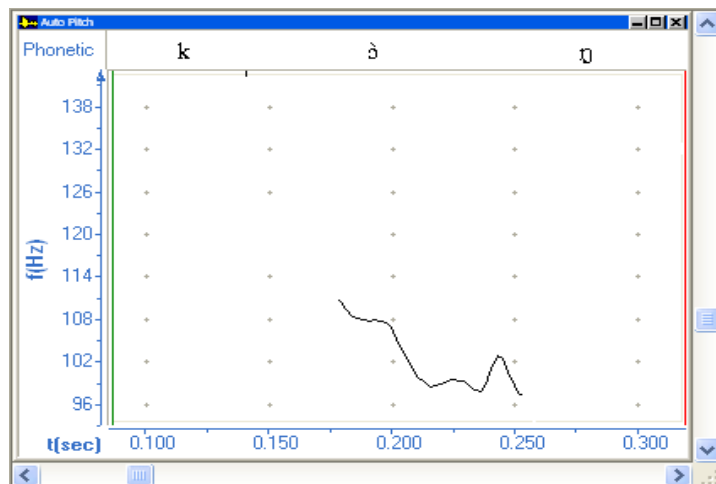
Figure 40 'bottle'

In summary the La Gang Plang variety has two tones, high and low. The high tone is a level tone of /44/ which rises slightly The low tone is a falling tone of /21/.

5.5.3   Phonation and Tone

As with Man Noi and Bang Deng there is a limited number of words that occur with breathy phonation in La Gang. La Gang has not changed from the proto language as much as the other two villages and Paulsen (1992:192) describes phonation as a historical feature of the language it would be assumed that La Gang would have a more dominant feature of phonation in the register complex. However, it is currently unclear from the data which feature is more dominant. As in the case of Man Noi and Bang Deng speakers would identify tone as the feature that differed when asked to distinguish between two words.

5.6   Phonological Processes

This section will present the phonetic analysis of the La Gang variety.

5.6.1   Word

5.6.1.1   Voice Assimilation

As with Man Noi and Bang Deng there is voicing assimilation in the La Gang variety. Voiceless plosives when following a voiced nasal after a syllable break the voiceless plosive is produced as voiced. This can be written by the rule:

$$[\text{-cont}] \rightarrow [+\text{voiced}] / [+\text{nasal}]\_$$

(154)   Underlying Form: /cóŋ.póŋ/   'stairs'

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| | Surface Form: | [cóŋ.bóŋ] | 'stairs' |

(155) Underlying Form: /sɔ́n.tín/   'heel'

| | Surface Form: | [sɔ́n.dín] | 'heel' |

(156) Underlying Form: /ʔúm.kɔ́c/   'sweat'

| | Surface Form: | [ʔúm.gɔ́c] | 'sweat' |

Although there is no occurrence of a voiceless palatal plosive [c] following a voiced nasal in the wordlist, it is assumed that the voicing rule would apply in this situation as well.

5.6.1.2   Final Plosives

The plosives /p, t, c, k/ when in final position are realized as unreleased. This is written by the rule:

$$[\text{-cont}] \quad \rightarrow \quad \text{unreleased} \ / \ \_\#$$

(157) Underlying Form: /cʰɤ́p/   'to blink'

| | Surface Form: | [cʰɤ́p˺] | 'to blink' |

(158) Underlying Form: /kʰrɤ́t/   'to drop, fall'

| | Surface Form: | [kʰrɤ́t˺] | 'to drop, fall' |

(159) Underlying Form: /pèc/   'saliva'

| | Surface Form: | [pèc˺] | 'saliva' |

(160) Underlying Form: /rók/   'frog'

| | Surface Form: | [rók˺] | 'frog' |

5.6.1.3   Tone Assimilation

La Gang presyllables have no inherent tone. Therefore presyllables assimilate to the tone of the syllable that they precede.

(161) Underlying Form: /ka.cèʔ/   'river'

| | Surface Form: | [kà.cèʔ] | 'river' |

(162) Underlying Form: /ʔa.mɔ́h/   'banana'

| | Surface Form: | [ʔá.mɔ́h] | 'banana' |

5.6.1.4   Glottal Deletion

If the first word in a compound word ends in a glottal stop it is deleted when combined with the second word. The deletion rule can be written as:

$$/ʔ/ \rightarrow \varnothing / \_.\sigma$$

(163)   /hlóʔ/   +   /kʰúʔ/   =   /hlóʔ.kʰúʔ/

'peel, husk'   'tree'   'tree bark'

Underlying Form: /hlòʔ.kʰúʔ/   'tree bark'

Surface Form: [hló.kʰúʔ]   'tree bark'

5.6.2   Consonant

5.6.2.1   Off-Glides

Vowels occuring before the palatal plosive and the palatal nasal have a high front off-glide. Thus /ɛ, a, u, ɤ, ɔ/ are produced as /ɛⁱ, aⁱ, uⁱ, ɤⁱ, ɔⁱ/ when they occur before /c, ɲ/. As seen in Table 28 below this off-glide is limited to the vowels /ɛ, a, u, ɤ, ɔ/. This can be written by the rule:

$$/V/ \rightarrow [V^i] / \_[+cor,-ant]$$

	i_*	ɪ_*	e_*	ɛ_*	a_*	ɯ_*	u_*	ɤ_*	o_*	ɔ_*
cꞌ	-	-	-	+	+	-	+	+	-	+
ɲ	-	-	-	+	+	-	+	+	-	+

Table 28 La Gang Vowels before the Palatal Plosive and Palatal Nasal

(164) ɛ→ ɛⁱ/_c, ɲ   /lɛ́ɲ/   →   [lɛ́ⁱɲ]   'few'

/pèc/   →   [pɛ̀ⁱcꞋ]   'saliva'

(165) a → aⁱ/_c, ɲ   /páɲ/   →   [páⁱɲ]   'to sell'

/pác/   →   [páⁱcꞋ]   'to scratch'

(166) ɤ → ɤⁱ/_c, ɲ   /ká.mɤ́c/   →   [ká.mɤ́ⁱcꞋ]   'ant'

/pɤ́ɲ/   →   [pɤ́ⁱɲ]   'to shoot'

(167) ɔ → ɔⁱ/_c, ɲ   /vɔ́c/   →   [vɔ́ⁱcˀ]   'to cut, reap'

                      /mɔ̀ɲ/   →   [mɔ̀ⁱɲ]   'mouth'

(168) u → uⁱ/_c, ɲ   /súc/   →   [súⁱcˀ]   'to suck'

                      /ʔá.múɲ/   →   [ʔá.múⁱɲ]   'wife'

5.7   Summary

The phonological summary of the La Gang variety is that words are either
monosyllabic or sesquisyllabic. Monosyllabic words can be written with the
structure #C(C)Ⅴ̵C#. Sesquisyllabic words can be written with the maximum
structure #CⅤ̵.C(C)Ⅴ̵C#. Compound words can also be formed from combining
these two types of words. There are twenty-three phonemic consonants, ten
phonemic vowels, and two phonemic tones. Register, while phonemic, is not the
dominant feature of the register complex.

Chapter 6

Orthographic Extendibility and Summary

Having given the description of each variety consideration will now be given as whether these three varieties could use the same orthography. In this thesis the only distinction used to determine whether one orthography could be used in all three varieties is phonological. Lexical and semantic differences have not been taken into account. Any orthography would need to be able to aid the reader in learning Mandarin Chinese Pinyin if it is to be accepted by the Chinese government. This section will begin with the smaller units of the sound system and then proceed to the larger units.

6.1   Consonants

Both Man Noi and Bang Deng have the same set of phonemic consonants. La Gang has the same phonemic consonants as Man Noi and Bang Deng, however it also has two phonemic voiceless nasals. The phonemic consonants are listed below in Table 29 along with a proposed orthography.

This orthography has been designed to resemble the Mandarin Chinese Romanized script, Pinyin. This should allow those who learn to read and write in Plang to adjust to Chinese studies more efficiently. As with Pinyin when /j/ and /w/ occur in the coda they would be written as 'i' or 'u'. For example a word such as /máw/ 'to be drunk' would be written as 'mau' and /máj/ 'to write' would be written as 'mai'.

Man Noi	Bang Deng	La Gang	Proposed Grapheme
p	p	p	b
pʰ	pʰ	pʰ	p
t	t	t	d
tʰ	tʰ	tʰ	t
c	c	c	zh
cʰ	cʰ	cʰ	c
k	k	k	g
kʰ	kʰ	kʰ	k
m	m	m	m
n	n	n	n
-	-	n̥	nh
ɲ	ɲ	ɲ	ny
ŋ	ŋ	ŋ	ng
-	-	ŋ̥	ngh
f	f	f	f
v	v	v	v
s	s	s	s
h	h	h	h
ʔ	ʔ	ʔ	Unwritten
w	w	w	w word initial u word final
r	r	r	r
l	l	l	l
j	j	j	j word initial i word final

Table 29 Phonemic Chart with Proposed Graphemes

6.1.1 Overdifferentiation

If this orthography is used the result would be that writers from Man Noi and Bang Deng would then need to memorize the words that begin with voiceless nasals. Therefore the Plang literacy would contain sight words that would need to be taught

to anyone wanting to learn to read from Man Noi and Bang Deng. This would make learning to write more difficult.

6.1.2   Underdifferentiation

If on the other hand the voiceless nasals were not written and there were only one symbol for both the voiced and voiceless nasals, this would result in the reader having to guess from the context whether it is the voiced or voiceless nasal. Plang literacy would need to teach that these particular symbols have two sounds for La Gang readers. This makes learning to read more difficult.

6.2   Vowels

The three varieties have the same ten phonemic vowels. Because of the orthography is also trying to aid in the learning of Pinyin it would not be useful to the reader to use not Pinyin vowel letters. Pinyin uses a, i, e, o, u, and ü as letter for vowels. The vowels that would need new vowel letters would be /ɪ, ɯ, ɤ, ɔ, ɛ/. Not wanting to introduce a new symbol it would be possible to double letter for these vowels.

Man Noi	Bang Deng	La Gang	Proposed Grapheme
i	i	i	i
ɪ	ɪ	ɪ	ii
e	e	e	e
ɛ	ɛ	ɛ	ee
a	a	a	a
ɯ	ɯ	ɯ	uu
u	u	u	u
ɤ	ɤ	ɤ	oo
o	o	o	o
ɔ	ɔ	ɔ	aa

Table 30 Vowel Phonemes with Proposed Graphemes

6.3   Words

Among these three varieties the greatest difficulty comes in the word structure. Man Noi and Bang Deng main syllables are identically written with the rule #CVC#. La

Gang has preserved the ability to cluster and therefore the main syllable is written as #C(C)ṾC#. All three have the same maximum minor syllable structure, written as #CṾ.

6.3.1 Overdifferentiation

If the orthography writes the cluster Man Noi and Bang Deng readers would need to be taught to write the cluster but to remove the optional cluster consonant when reading. This is something that speakers already do mentally when they speak to villagers from La Gang.

6.3.2 Underdifferentiation

If the cluster is not written La Gang speakers would then have to determine from context if the word contains a cluster. This would make learning to read for La Gang speakers more difficult.

6.4 Suprasegmentals

In all three varieties tone is the same, high and low. The Pinyin method of writing tone is a tone mark above the vowel, such as á. In each variety there are only two phonemic tones. Therefore, there would be two tone marks for these three varieties, á for high tone and à for low tone. For example /pún/ 'four' would be written as 'bún' and /kɔ̀ŋ/ 'bottle' would be written as 'gàang'.

All three villages have a register complex. Assuming that tone is the more dominant feature in all three villages it would need to be written, however phonation would not be written.

6.5 Conclusion and Example Words

From a phonological perspective the three varieties do not differ greatly enough to justify separate orthographies. The main decision that must be made concerns if it would be better to overdifferentiate thus making it harder for Man Noi and Bang Deng speakers to learn to write or whether it would be better to underdifferentiate making it harder for La Gang speakers to learn to read. For the purpose of teaching literacy in these villages it would be better to underdifferentiate thus helping readers and to avoid making the script hard to comprehend.

Gloss	Man Noi	Bang Deng	La Gang	Proposed Orthography
'dog'	sóʔ	sóʔ	sóʔ	só
'to yawn'	ŋápˈ	ŋápˈ	ŋ̊ápˈ	ngháp
'to be afraid'	látˈ	látˈ	hlátˈ	hlát
'Plang'	pæ̀ŋ	pàŋ	plàŋ	blàng
'tongue'	ká.tákˈ	ká.tákˈ	ká.tákˈ	gá dág

Table 31 Example words in Proposed Orthography

6.6   Summary

The purpose of this thesis was to present a phonological comparison of Man Noi, Bang Deng, and La Gang for the purpose of deciding if these three varieties could use one orthography.

In chapter 1 the cultural background, geographic location, population, and language structure of the Plang in the Bulang Shan District of Menghai County in Xishuangbanna Tai Autonomous Prefecture of Yunnan Province was presented.

Chapter 2 presented the background and methodology for this thesis. There have only been two phonological works done on the Plang in the Bulang Shan District. The first was done by a group of Chinese linguist who used wordlist data from Xin Man E, which is in the Bulang Shan District, it also combines this data with words collected from Guang Shuang which is a village not in the district. The second phonological work was done by Paulsen who uses word list from dialects in Xiding, Bulang Shan, and Samtao areas to produce a proto-reconstruction of Plang. From these two works predictions were made as to what would be found in the varieties study for this thesis. This was followed by a description of the methodology that was used in data collection and analysis.

The next three chapters presented the phonologies of Man Noi, Bang Deng, and La Gang. These phonologies began with a description of the word and syllable structures followed by a discussion on the phonemic consonants and vowels and finally the analysis of suprasegmentals, tone and register, were presented.

In Man Noi there were found to be both monosyllabic and sesquisyllabic words. Monosyllabic words can be written by the structure #CⱯC#. Sesquisyllabic syllables are written as #CV in presyllables and particles, but as #CⱯ in prefixes. There are twenty-one phonemic consonants, ten phonemic vowels, two phonemic phonations, and two tonemes.

In Bang Deng, like Man Noi, there were found to be both monosyllabic and sesquisyllabic words. Monosyllabic words can be written by the structure #CVC#. Sesquisyllabic syllables are written as #CV in presyllables and particles, but as #CV̆ in prefixes. There are twenty-one phonemic consonants, ten phonemic vowels, two phonemic phonations, and two tonemes.

In La Gang, like Man Noi and Bang Deng, there were found to be both monosyllabic and sesquisyllabic words. Monosyllabic words can be written by the structure #C(C)V̆C#. Sesquisyllabic syllables are written as #CV in presyllables and particles, but as #CV̆ in prefixes. However, unlike the other two varieties, in La Gang there are twenty-three phonemic consonants (having not lost the voiceless nasals), ten phonemic vowels, two phonemic phonations, and two tonemes.

Finally, it is determined that the three varieties could use one common orthography. Even though they can use one orthography, to do so requires that the orthography be overdifferentiated for the Man Noi and Bang Deng varieties because voiceless nasals are still phonemic in La Gang.

6.7   Further Study

These phonological descriptions were based on five hundred ninety-eight words from one person from each village. More study needs to be done on each village's speech patterns using a larger corpus of words. It would also be profitable to analyze the phonology using sentences and stories to analyze the intonation patterns. There also needs to be an analysis of language shift between the generations, therefore there needs to be data collection done from a wide range of age groups.

It would be beneficial to retest the register analysis that has been presented in this thesis using a laryngograph. This would allow for a more accurate understanding of the register complex. As more words are collected a clearer understanding of the relationship of phonation and tone will be seen. From this it would be of great help to analyze the process of tonogenesis in Plang.

Lexicostatistics and a sociolinguistic survey will be needed discern with greater detail the difference between the various varieties. This needs to include many other villages in the area. This would lead to better decision making when choosing an orthography.

A wider study of the entire area which includes not only the other villages in the Bulang Shan District but also the Bada, Daluo, and Xiding areas. In such a study it would be beneficial to use a recorded text test to determine the dialectal boundaries.

This would lead to an understanding of the various varieties of the area and how they relate to one another and to the dialects in Myanmar. The phonological analysis that result from the wider study should then be applied to Paulsen's Proto-Plang reconstruction.

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APPENDIX I

Transcribed by: Jerod Harper		Man Noi	Bang Deng	La Gang
	Age:	20	21	16
	Gender:	Male	Male	Male
	Occupation:	Farmer	Farmer	Monk
Reference	Gloss	Transcrtiption		
1	horse	ká.hɔ́ŋ	ʔá.rɔ́ŋ	ʔá.rɔ́ŋ
2	pig	lḭ́k˺	lík˺	l̥ík˺
3	goat	pɛ̰̀ʔ	kɛ́h	pɛ̀ʔ
4	sheep		pɛ̀ʔ	
5	dog	sóʔ	sóʔ	sóʔ
6	cat	mɛ́w	mɛ́w	máw
7	hare, rabbit	kàŋ.pɔ̰̀ŋ	pàŋ.pɔ̰̀n	ká.táj
8	dragon	nák˺	rá.kɤ́n	nàk˺
9	tiger	kà.vàj	rɘ̀.wàj	
10	bear	kʰíh	kʰíh	kʰríh
11	monkey	ká.néʔ	kà.nɛ̀ʔ	kà.nɛ̀ʔ
12	wolf	kó.rṵ́k˺	ʔà.rùk˺	ʔà.ròh
13	mouse, rat	kàŋ	kàŋ	kàŋ
14	chicken	ʔɛ̰́h	ʔɛ́l	ʔɛ́l
15	bird	sím	sím	sím
16	eagle	káŋ	káŋ	kláŋ
17	swallow	káŋ.sáʔ.wáŋ.véⁱc˺	cáŋ.ká.veⁱc˺	kláŋ.sá.véⁱc˺
18	bat	péj.láʔ	mɤ́ŋ	
19	frog	hṵ́k˺	rúk˺	rók˺
20	fish	káʔ	káʔ	káh
21	snake	sá.ʔɤ́ⁱɲ	sá.ʔɤ́ⁱɲ	sá.ʔɤ́n
22	bee	pʰɛ́h	pʰɛ́l	pʰɪ́l

23	butterfly	cák.kà.làw	táŋ.kàw	cók.làỳw
24	locust	sà.tỳ̀h	sə̀.tỳ̀l	
25	ant	ká.mɤ́ⁱcˀ	kà.mɤ̀ⁱcˀ	ká.mɤ́ⁱcˀ
26	spider	hàŋ.híh	pàj.pỳ̀n	róm.ríh
27	lice	kà.hɤ̀ⁱɲ	sə̀.nàʔ	
28	fly (insect)	sà.mè̀ⁱɲ	kà.mèn	kà.mèn
29	mosquito	mèŋ.jỳ̀ŋ	kʰú.kétˀ	jòŋ
30	earthworm	vạ̀k.mój	vák.mól	
31	insect, bug	vạ̀kˀ	vạ́kˀ	vạ́kˀ
32	egg	ká.tóm	ká.tóm	ká.tóm
33	wing (bird)	pʰɤ́ⁱcˀ		pʰrɤ́tˀ
34	feather, hair	hṵ́kˀ	hɤ́kˀ	hɤ́kˀ
35	horn	hɤ́ŋ	rɤ́ŋ	rɤ́ŋ
36	tail	sá.táʔ	sá.táʔ	sá.tá
37	animal	kú.túʔ	kʰú.túʔ	kʰú.túʔ
38	milk	ʔúm.púʔ	ʔúm.pɤ́ʔ	pɤ́ʔ
39	water buffalo	kʰákˀ	kʰákˀ	ká.mǫ́j
40	elephant	ká.sáŋ	ká.sáŋ	ká.sáŋ
41	bird's nest	hán.sím	hàn.sím	hán.sím
42	duck	ʔéh.kápˀ	ʔèl.kàpˀ	ʔél.káp
43	turtle	pʰú.pʰáʔ	pʰúʔ.pʰáʔ	pʰù.pʰràʔ
44	snail	vạ̀k.ùm.pèʔ	ʔáŋ.wáʔ	vákˀ.pɤ́ⁱɲ
45	deer	púh	lù.làj	cákˀ
46	sky	ká.ʔáw	tó.ʔáw	ká.ʔáw
47	sun	ŋáj.sà.ŋìʔ	ŋáj.sà.ŋìʔ	ŋáj.sà.ŋì
48	moon	méŋ.méŋ	nɤ́n.lén	ʔóŋ.kʰ̥ị
49	star	sá.mɤ́ⁱɲ	sá.mɤ́ⁱɲ	sá.mɤ́ⁱɲ
50	cloud	mṵ́tˀ	mṵ́tˀ	mútˀ
51	wind	kṵ́h	kɤ́l	kɤ́l
52	rain	léʔ	léʔ	hléʔ
53	lightning	pʰà.sáh	pʰá.sáh	pʰá.jóŋ
54	thunder	nɤ̀m	nɤ̀m	pʰá.sáh

55	hail	pʰéj	lé.pʰíl	
56	snow	mɤ́j	sá.tə̰́pꜙ	mɤ́j.sá.tápꜙ
57	frost	ʔúm.mɤ́j	mɤ́j	
59	water	ʔúm	ʔúm	ʔúm
60	river	ʔúm.hón	ʔúm.lɔ́.héŋ	kà.cèʔ
61	lake	ʔúm.tɤ̀ŋ	tɤ̀ŋ	
62	pond	nám.mɔ́kꜙ		ʔùm.tɤ̀ŋ
63	wet field	nə̰̀ʔ	ʔúm.nàʔ	nə̰̀ʔ
64	meadow	máh	nə̰̀h	
65	earth	ká.téʔ	ká.téʔ	ká.téʔ
66	soil			ʔá.lúŋ
67	mountain	kà.kòŋ	kà.kòŋ	ʔá.kóŋ
68	cave	ká.túʔ	ká.tɤ́ʔ	ká.tɤ́
69	stone	sà.mùʔ	sá.múʔ	lókꜙ.sá.mú
70	fire	ŋɔ̀j	ŋɔ̀l	ŋɔ́l
71	mud	túⁱcꜙ		pʰrúl
72	dust	ká.pʰúŋ	pʰá.lúŋ	
73	sand	sə̰̀j	sàj	sə̰̀j
74	gold	kù.kò̰kꜙ	ká.mɤ́l	kà.mùl
75	silver	kà.mṵ̀j		kʰàm
76	iron	lékꜙ	lékꜙ	hlékꜙ
77	forest	kà.hɤ̀m	kʰúʔ	pʰríʔ
78	stream	ʔúm.ʔétꜙ		ʔúm.étꜙ
79	month	kʰíʔ	kʰíʔ	nɤ́n
80	day	sá.ŋíʔ	sá.ŋíʔ	sà.ŋìʔ
81	today	nàn.tíʔ	nán.tíʔ	nɤ́n.tíʔ
82	yesterday	lɤ̀n.kúʔ	rá.kúʔ	ʔá.kúʔ
83	tomorrow	ká.sáʔ	rá.sáʔ	ʔá.sáʔ
84	daytime	tá.sà.ŋìʔ	tá.sà.ŋìʔ	tá.sà.ŋ̰ìh
85	morning	tá.ŋùp	tá.ŋúpꜙ	ʔɤ́l.sóm
86	noon	tà.pàj	tá.páj	tà.plə̰̀j
87	night	núkꜙ	lákꜙ	tá.sóm

88	now		ɲóm.ʔén	jùm.ɛ̀n
89	just now	ɲàm.nɔ́n	nɔ́n	nɔ́n
90	afterwards	kʰàw.kà.sàʔ	ʔá̰ʔ.sá.kúʔ	ʔá.kʰrúí
91	often	ɲám	ɲám	
92	when	ɲám.mṳ̀h	ɲàm.múʔ	jà.mù
93	one	t̪ṳ́ʔ	ká.t̪ṳ́ʔ	kà.tìʔ
94	two	làj	làl	lál
95	three	lɔ́j	lɔ́j	lɔ́j
96	four	pún	pún	pún
97	five	pʰɔ̀n	pʰɔ́n	pʰɔ́n
98	six	lè̤h	lè̤h	lèh
99	seven	hà.lè̤h	ʔá.ré̤h	há.réʔ
100	eight	hóŋ.tíʔ	kʰɔ́ŋ.tíʔ	kʰróŋ.tíʔ
101	nine	sá.t̪ím	sá.t̪ím	sá.t̪ím
102	ten	kúj	kúl	kúl
103	eleven	síp.ʔét̚	síp.ʔét̚	síp̚.ét̚
104	twenty	sà̰w	sàw	sà̰w
105	twenty-one	sà̰w.ʔét̚	sàw.ʔét̚	sà̰w.ét
106	thirty	sám.síp̚	sám.síp̚	sám.síp̚
107	forty	sí.síp̚	sí.síp̚	sí.síp̚
108	one hundred	t̪ṳ̀.hɔ̀j	tí.rɔ̀j	tì.rɔ̀i
109	one thousand	t̪ṳ̀.pà̰n	tí.pán	tì.pà̰n
110	ten thousand	t̪ṳ̀.mṳ́n	tí.mṳ́n	tì.mɤ̰́n
111	half	kʰén.ŋɔ̀n	kʰɛ̀n.ŋɔ̀n	kʰɤ̰́ŋ
112	some		kúj.ŋɔ́n	
113	tree	kʰúʔ	kʰúʔ	kʰúʔ
114	bamboo	ká.ʔóʔ	kɔ́.ʔóʔ	ká.ʔóʔ
115	paddy field		hɔ̰́k̚	
116	corn, maize	sà.lìʔ	sá.líʔ	hɔ́k̚
117	cotton	pʰà.tàj	pʰò.mèn	pɤ̰́.tá̰j
118	bean	nṳ́m	cɤ̰́m	tʰó.nɔ́j
120	soybean	cùm		tʰó.ŋɔ́k̚

121	pumpkin	mákˈ.pʰákˈ	mák.pʰákˈ	mákˈ.pʰákˈ
122	cucumber	ká.kéj	tá.kíl	téŋ.sáŋ
123	vegetable	tuúʔ	tuúʔ	tuúʔ
124	chilli pepper	pʰɨ́kˈ	pʰɨkˈ	pʰrɨ̀kˈ
125	pepper	mákˈ.kʰɛ́n	pʰà.jòŋ	
126	grass	ŋ.hɨ́pˈ	rɨ̀pˈ	rɨ̀pˈ
127	mushroom	tuú.pʰúh	tɔ́.pú̥h	tɤ́.pú̥h
128	seed	kú.cɤ́ʔ	tɔ́.cʰɤ́m	kʰú.cɤ́ʔ
129	root	hɛ̀h	rɛ̀h	kákˈ
130	leaf	là.pʰɤ̀h	lá.pʰɤ́ʔ	hláʔ
131	flower	pʰɤ́h	pʰɤ́h	pʰrɤ́h
132	fruit	kú.píʔ	kʰú.píʔ	kʰú.plíh
133	pit, stone	núj	nɔ́j	
134	peel, husk	lóʔ	lòʔ	hákˈ
135	thorn	kátˈ	kátˈ	kátˈ
136	tree bark	ló.kʰúʔ	ló.kʰúʔ	hló.kʰúʔ
137	sugar cane	ʔúm.mɛ̀ʔ	ʔúm.mɛ̥́h	ʔúm.méj
138	betel nut	kù.pḁ̀m	kʰú.pám	mákˈ.tám
139	banana	kà.mɔ̀h	rá.mɔ̥́h	ʔá.mɔ́h
140	eggplant	mákˈ.kɤ́ʔ	má.kʰɤ́ʔ	mák.kʰɤ́
141	ginger	sá.kíŋ	sá.kíŋ	sá.kíŋ
142	garlic	hɔ́m.tɤ̀m	hɔ́m.tɨ́m	hɔ̀m.tɨm
143	paddy rice	hɔ́kˈ		
144	unhusked rice	ká.kúʔ	rà.kùʔ	ʔá.kúʔ
145	husk	kám	kàm	ʔá.páh
146	rice seedling	cɤ̀ʔ	hɔ̥́kˈ	rípˈ.ʔɔ́n
147	branch	kákˈ	kákˈ	
148	body	túʔ	tù.ràŋ	tʰáʔ.túʔ
149	head	ká.tɔ̥̀ŋ	rɔ́.tɔ́ŋ	ʔá.tɔ́ŋ
150	hair	huɨ́kˈ	hɤ́kˈ	hɤ́kˈ
151	face	nḁ̀ʔ	nàʔ	nàʔ
152	eye	ŋáj	ŋàj	ŋàj

153	nose	mɕ́h	múh	mὓh
154	ear	jáj.júkˈ	jókˈ	ʔá.hjúk
155	mouth	mɔ̀ⁱɲ	mɔ́ⁱɲ	mɔ̀ⁱɲ
156	tooth	háŋ	ráŋ	hráŋ
157	tongue	ká.tákˈ	ká.tákˈ	ká.tákˈ
158	beard	mɔ̰́j	mɔ́j	mɔ̀j
159	neck	ŋɔ̰̀kˈ	ŋɔ́kˈ	ŋɔ̀kˈ
160	hand	tíʔ	tíʔ	tíʔ
161	finger	ká.kɕ́n.tíʔ	tɕ́.kɕ́n.tíʔ	tíʔ.cʰúʔ
162	fingernail	ká.hím	rɕ́.hím.tíʔ	ʔá.hím
163	belly, tummy	kà.tɕ̀j	ká.tɕ́l	kà.tùl
164	navel	kà.tìŋ	ká.tíŋ	kà.tìŋ
165	waist	kà.ɲòŋ	ʔɕ́.ɲóŋ	ʔà.ɲɔ̀ŋ
166	foot	cὓ̰ŋ	cóŋ	còŋ
167	knee	ŋáj.sà.kʰὓŋ	ŋáj.sà.kʰɔ̀ŋ	sà.kʰròŋ
168	bone	sá.ʔáŋ	sá.ʔáŋ	sá.ʔáŋ
169	blood	nám	ná̰m	ná̰m
170	intestine, gut	vὲⁱcˈ	vὲⁱcˈ	vὲⁱcˈ
171	stomach		kɔ̀.tɕ̀l.hɔ́n	kɕ́.tɕ́l.hɔ́n
172	heart	cítˈ	múl	cítˈ
173	lung	pʰúʔ.pʰúʔ	pʰù.mɔ̀ʔ	tá.nókˈ
174	sweat	ʔúm.kɔ́ⁱcˈ	ʔúm.kɔ́ⁱcˈ	ʔúm.kɔ́ⁱcˈ
175	faeces	ʔéŋ	jɕ́m	ʔéŋ
176	urine	ʔúm.nuɕ́m	nɕ́m	ʔúm.nɕ́m
177	brain	ɲókˈ	ɲɔ́kˈ	ɲɔ̀kˈ
178	forehead	héj	rɕ́l	rɕ́l
179	eye brow	hɕ́kˈ.ŋáj	hɕ́k.ŋáj	kíu.tá
180	eye lid	hákˈ	ŋáj.hákˈ	kóp.ŋáj
181	cheek			sá.páʔ
182	saliva	ʔúm.ʔéh	ʔúm.pʰέⁱcˈ	pὲⁱcˈ
183	chin	kápˈ	kápˈ	kápˈ
184	back	ká.kʰɨ́ʔ	ʔa.kʰɤ́ʔ	ʔá.kʰrɨ́ʔ

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185	elbow	sók˺	sòk˺	ʔá.táj.kíh
186	arm pit	ká.lék˺	ká.lék˺	ʔá.lék˺
187	palm	ká.ták˺.tíʔ	tɔ́.ták.tíʔ	tá.kɤ́n.tíh
188	buttocks	tóʔ	tóʔ	tóʔ
189	leg	ká.váŋ	rà.wàŋ	ʔá.váŋ
191	heel			sɔ́n.tín
192	rib	sáʔ.ʔáŋ.pʰúk˺	sá.ʔáŋ.pʰúk˺	pʰrók˺
193	flesh	pón	hɤ̰́t˺	sóʔ.klɤ́n
194	fat	pón.là.mæ̀n	pɛ̰́h	ká.tál.péʔ
195	skin		hák˺	hák.nóm
196	person	pɤ̰̀j	pɤ́j	pɤ̰̀j
197	man, male	pɤ̰̀j.kà̰.mɛ̀ʔ	rà.mɛ̀ʔ	ʔá.méj
198	woman	ká.pɤ́n	rá.pɤ́n	ʔá.pɤ́n
199	old person	pá.sóŋ	pʰá.sóŋ	tá.pʰá.sóŋ
200	child	nàŋ.ʔét˺	kà.ɲòm	kà.ɲòm
201	Bulang	pæ̀ŋ	pàŋ	plàŋ
202	Tai	sím	sím	sím
203	ancestor		kɤ̰̀ⁱɲ.tàʔ	
204	father	kún.ʔéʔ	kɤ́ⁱɲ	kɤ́n
205	mother	mà.ʔéʔ	máʔ	máʔ
206	husband	kà.mɛ̀ʔ	rà.mɛ̀ʔ	ká.méj
207	wife	kà.mɔ̰̀ⁱɲ	rà.mɔ̰̀ⁱɲ	ʔá.múⁱɲ
208	son	kón	kón	kón
209	daughter	kón.ká.pɤ́n		kón.ká.pɤ́n
210	family	ɲàʔ.kʰúj	ɲá.kʰúl	ɲáʔ
211	brother	tɤ́.ʔóŋ	tɔ́.ʔóŋ	tɤ́.ʔóŋ
212	sister		ʔóŋ	tɤ́.ʔá.pɤ́n
213	friend	púʔ	rá.kɔ́h	ʔá.kɤ́h
214	cooked rice	sóm	sóm	sóm
215	oil	là.mæ̀n	rá.ʔúh	nà.màn
216	salt	kɪ̰̀h	kíh	kɪ̰̀h
217	meat		pón	pón

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218	cooked food	kú.ʔéʲɲ	tɤ́ʔ	kɤ́.tɤ́ʔ
219	soup	ʔúm.túʔ	ʔúm.tɤ́ʔ	ʔúm.tɤ́ʔ
220	alcohol (drink)	páj	páj	plǽj
221	tea (drink)	læ̀ʔ	læ̀ʔ	là̰ʔ
222	knife	kà.ŋɔ̀ŋ	tà.ràj	ʔá.ŋóŋ
223	hoe	kʰɔ́ʔ	kʰɔ́ʔ	kʰɔ́ʔ
224	plough (tool)	tʰéj	tʰéj	tʰéj
225	mill, grind	mɔ́ʔ		
226	sieve	kà.péh	rá.píl	ʔá.píl
227	broom	kà.pʰíh	rá.pʰíh	ʔá.pʰríh
229	basin	tá.léj	tá.léj	tá.léj
230	small bowl	cùm	sá.téj.ʔét˺	còm
231	chopstick	tʰúʔ	tʰùʔ	ʔá.tʰúʔ
232	bottle	kɔ̀ŋ.kɛ̀w	kɔ̰́ŋ.kéw	kɔ̀ŋ
233	wok	mà.cʰɛ̀ŋ	má.cʰéŋ	mà.tɔ̀ŋ
234	firewood	kʰḭ́ʔ	kʰíʔ	kʰíʔ
235	table		páŋ	kʰrɛ̰̀h
236	stool, low chair	páŋ		páŋ
237	bed			cʰɔ́n
238	stairs	cɤ̀m.póŋ	júŋ.póŋ	cóŋ.póŋ
239	ladder	cɤ̀m.póŋ.méw		cóŋ.póŋ.kʰúʔ
240	mirror	vɛ̰̀n	vɛ̰́n	vɛ̰̀n
241	comb	ká.sát˺	rá.sát˺	ʔá.sát˺
242	paper	ká.nát˺	ká.nát˺	ká.na̰t˺
243	pen		píʔ	pì
244	book	pàp˺	pàp˺	pàp˺
245	dance	ká.ják˺	tá.ják˺	tɔ́.ják˺
246	story	jíh.jáj	mɤ̀ŋ.jàj	màj.jàj
247	word, speech	hɛ̀ʲc˺	rét˺	rét˺
248	sound; voice	síŋ	sìn	séŋ
249	name	mɤ́h	mɤ́h	mɤ̀h
250	thing	kʰɤ̀ŋ	kʰɤ̀ŋ.kʰò	kʰrɤ̀ŋ.kʰràw

251	matter	kán	kúj.kán	kúj.kán
252	year	píʔ	pɤ́n	pí.nɤ́n
253	strength	má.hèŋ	rɛ́n	kùj.rùŋ
254	money	kà.mṳ̀j	céʔ	kà.mɤ̀l
255	price, cost	kíŋ	kíŋ	
256	medicine	ká.páj	rá.páj	ʔá.páj
257	bamboo raft		rɔ́.ká.ʔóʔ	ʔá.pɤ́k.ká.ʔóʔ
258	window	páʔ.póŋ	tɔ́.pọ́ŋ	póŋ
259	roof	pʰáŋ.ɲáʔ	pʰáŋ	hlúŋ
260	blanket	cʰɤ́ŋ	cʰɤ́ŋ	pòʔ
261	needle	ká.ɲéʔ	kɔ́.ɲéʔ	ká.ɲéʔ
262	ring	cúpˋ.mɤ́ʔ	kʰú.tíʔ	cʰóp.mɯ́h
263	mortar	kọ̀kˋ	kókˋ	klòkˋ
264	pestle	kà.tɤ̀ⁱcˋ	lá.tɤ́tˋ	ʔá.tɤ́tˋ
265	spoon	kà.còn	ʔɔ́.cón	
266	plate	pʰàn.pʰàn	sá.téh	tá.léj
267	ashes	ká.ɲúʔ	ká.ɲúʔ	pʰrúl
268	smoke	túʔ	túʔ	tú.ŋɔ́l
269	candle	t̀n.kʰáj.páʔ	tín.kʰáj.páʔ	tén.pá
270	drum	kʰɯ́ŋ	kʰɤ́ŋ	kʰrɤ́ŋ
271	gong	móŋ.móŋ	rá.páŋ	móŋ
272	arrow	tèʔ	tèʔ	tʰà.nù
273	net	mɔ̀̃ŋ	mɔ́ŋ	rɤ̀p
274	whirl in hair	jáw.jáw	cáŋ.kán	ká.lá.véj
275	evening	tá.pṳ̀h	tá.pṵ́l	tá.púl
276	grave	kà.mɤ̀ⁱcˋ	kɔ́.ɲúʔ	ʔá.mɤ́tˋ
277	house	ɲàʔ	ɲáʔ	ɲàʔ
278	village	jóŋ	jùŋ	júŋ
279	market	kà.lɤ̀h	rà.làh	
280	road	kʰáʔ	kʰáʔ	kʰráh
281	wall	kà.tɤ̀j	rà.tàl	ʔá.tál
282	door	ká.váʔ	rá.wáʔ	ʔá.wáʔ

283	(cattle) stall	kʰɔ̀k˧	hán	kʰɔ́.kʰrák˧
284	clothing	pʰɔ̰̀ʔ	jét˧	pʰró̰ʔ
285	trousers	fɛ́h	fíl	fíl
286	head dress	kà.pɤ̀h	tá.pɤ́h	tá.pɤ́h
287	cap, hat	ká.cɤ́p˧	tá.cʰɤ́p˧	tá.cʰɤ́p˧
288	ear ring	kú.júk˧	kʰú.jó̰k˧	kʰá.jók˧
289	bracelet	kú.tíʔ	kʰú.tíʔ	kʰú.tíʔ
290	shoe	kʰɛ́p˧	kʰɛ́p˧	kʰɛ́p˧
292	shadow	cáw.púj	rá.púj	cáp.pɔ́j
293	cloth	jét˧		jét˧
294	in front	kʰá.nɔ̀ʔ	kʰá.náʔ	kʰà.nàʔ
295	behind	kʰá.kʰṵ́ʔ	kʰà.kʰṵ̀ʔ	kʰà.kʰrɤ̀ʔ
296	left (side)	kʰá.tá.vḛ́ʔ	kʰá.tá.vḛ́ʔ	tá.véj
297	right (side)	kʰá.tá.tɔ́m	kʰá.tá.tɔ́m	tá.tɔ́m
298	beside	cèŋ	kʰá.níʔ	céŋ
299	inside	kʰá.nèj	kʰá.nèj	kʰà.nèj
300	outside	kʰá.nɔ̀k˧	kʰá.nɔ̀k˧	kʰà.nòk
305	deity, spirit	kú.kéh	fáj	
306	ghost	sá.cáʔ	sɔ́.cáʔ	sèt.càʔ
307	Buddha	pʰà.càw	pʰà.càw	pʰà.càw
308	soul	cáw.púj	pḭ́l	
309	temple	wà̰t˧	wát˧	wàt˧
311	religion		tɔ́.cʰɤ́m	
312	sacred writings	tʰàm	tʰám	tʰàm
313	to look	nɔ̀k˧	nɔ̀k˧	nɔ́k˧
314	to see	ɲúʔ	nɔ́k.ɲúʔ	nìu
315	to listen	ká.ŋét˧	rà.ŋèt˧	ʔá.ŋét
316	to smell (vb)	hɤ́t˧	ŋút˧	ŋ̥ɤ́t˧
317	to eat	ʔɛ̀ⁱɲ	ʔén	ʔén
318	to drink	ɲṵ́ʔ	ɲɤ́ʔ	nɤ́
319	to bite	kɛ̀t˧	két˧	kɛ̀t˧
320	to chew	pà̰m	pàm	pá̰m

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321	to suck	núˀt˺	nṵ́t˺	sút˺
322	to spit	pʰɛ́ⁱc˺	pʰɛ́ⁱc˺	pʰɛ̀ⁱc˺
323	to vomit	húj	húl	húl
324	to blow	pɤ́ŋ	pɤ́ŋ	pɤ́ŋ
325	to speak	hɛ̀ⁱc˺	rét˺	rɛ̀c˺
326	to read	láʔ	láʔ	rɛ̀n
327	to shout	hàk˺	ʔúl	ʔúl
328	to hold	sɤ́t˺	sɤ́t˺	sɤ́t
329	to grasp, hold	ɲèn	jɛ́n	
330	to pick (fruit)	kéh		kéh
331	to twist (rope)	kìn	kín	kɛ́n
332	to pick up from ground (grain)	sá.héʔ		
333	to scatter (seeds)	wàn	pʰáw	pʰráw
334	to pull	lò̤t˺	lót˺	jàt˺
335	to push	nɤ́t˺	nɤ́h	nɤ́h
336	to kick	sà.tɤ̰̀h	sá.tɤ́h	sà.tɤ̀h
337	to step on	ká.ɲáj	rá.pʰɤ́k˺	ʔà.pʰɤ̀k
338	to stand	cò̰ŋ	cɔ́ŋ	jòk˺
339	to ride	pɔ̰̀k˺	pɔ́k˺	pʰɔ́k˺
340	to walk	tòj	tɤ̤̀w	tál
341	to sit	mók˺	mók˺	mók˺
342	to carry (thing) on back	pòʔ	pɤ̰̀h	pòʔ
343	to fall down	kɤ́j	kɤ́l	ʔá.kó
344	to climb	húk˺	mùl	mùl
345	to rest	táh	táh	táh
346	to sleep	ʔít˺	ʔít˺	ʔít
347	to wake up	kʰɔ́n	kúʔ	kʰrɔ́n
348	to do (work)	jɤ̀ʔ	vék˺	jɤ̀ʔ
349	to labour	vè̤k˺		vèk˺
350	to plough (field)	tʰéj.nàʔ	tʰéj.náʔ	tʰéj.nàʔ
351	to plant (seed)	ká.sɤ́m	tá.cʰɤ́m	tɔ́.sɤ́m

352	to cut, reap	vɔ̀ⁱcˈ	vɔ́ⁱcˈ	vɔ́ⁱcˈ
353	to chop (firewood)	kɤ̀tˈ	mɔ́kˈ	tɔ́.kʰíh
354	to pull up (rice seedlings)	lókˈ	lɔ̆kˈ	
355	to put out to pasture	pɔ́j	pɔ́j	plɔ́j
356	to feed (fatten)	ká.sóm	ká.sóm	ká.sóm
357	to lead (cow)	tɤ́kˈ	tɤ́kˈ	tɤ́.kʰrák
358	to weave (cloth)	cíŋ.kʰɤ̀ŋ	cíŋ.jétˈ	tʰúj.kʰrúŋ
359	to buy	tṳ̀j	tɤ́j	tɤ̀j
360	to sell	páⁱɲ	páⁱɲ	páⁱɲ
361	to teach	ká.kʰɤ́n	rákˈ	tá.kʰɤ́n
362	to study	hɛ̀n	rɛ́n	rɛ̀n
363	to write	máj	máj	máj
364	to boil (water)	ká.lɔ́kˈ	kɤ́h	ʔà.lɔ̀k
365	to cut (w/ knife)	sɔ̰̀j	sɔ́j	híkˈ
366	to chop	ŋà ⁱcˈ	ʈʲ̆ịm	tòh
367	to cut (w/ scissors)	kípˈ	kípˈ	kípˈ
368	to grind (wheat)	mɔ́ʔ		kʰríl
369	to wear (hat)	kʰɛ́ʔ	kʰɛ́ʔ	kʰéj
370	to take off (clothes)	pɔ́ⁱcˈ	pɔ́ⁱcˈ	pɔ́ⁱcˈ
371	to hang out (clothes)	pʰɔ́kˈ	pʰɔ́kˈ	pʰrɔ́kˈ
373	to wash	sá.tɤ́ʔ	sá.tɤ́ʔ	sá.tɤ́ʔ
374	to shave (head)	kútˈ	kípˈ	kútˈ
375	to comb (hair)	sàtˈ	sátˈ	sátˈ
376	to sweep	pʰɤ̀h	pʰíh	pʰríh
377	to open (door)	tóh	tɔ́h	tóh
378	to tie, bind	pɤ̀kˈ	pɤ́kˈ	pákˈ
379	to untie (knot)	káh	káh	káh
380	to lay aside	p̰ìn	p̰ìn	p̰ìn
381	to pile up	ká.kíʔ	tà.tòm	tá.kíʔ
382	to receive	pṳ̀n	sɤ́tˈ	sɤ́tˈ
383	to look for	ʔɛ́w	ʔɛ́w	ʔɛ́w
384	to use	jóŋ		hlɔ̰́ʔ

385	to play	ká.háʔ	rà.hàʔ	ʔá.háʔ
386	to ask	ká.téʔ	rà.tèʔ	ʔá.téj
387	to answer	láʔ	tɔ́p˺	tɔ́p˺
388	to tell	ká.kʰɤ́n	láʔ	láʔ
389	to curse	sṵ̀t˺	mùl	sɔ̰̀t
390	to snore	ká.hɤ́k˺	rá.rɤ́t˺	ʔá.hrɤ́k˺
391	to help	cɔ̰̀h	cɔ̰̀h	cɔ̰̀h
392	to meet	ká.kʰɤ́p˺		ʔà.ɲòʔ
393	to steal	kà.ràʔ	ʔá.ráʔ	ʔá.ráʔ
394	to deceive, cheat	cúk˺.cók˺	tá.cʰóʔ	tɔ́.cʰóʔ
395	to come	ʔíŋ	ʔíŋ	ʔíŋ
396	to go	hɤ́j	hɤ́l	hɤ́l
397	to return	mḛ́h		mḛ̀l
398	to up (mountain)	húk˺	húk˺	hóp˺
399	to down (mtn)	l̰ḭh	l̰ḭh	lìh
400	to go out	tɔ̀j		
401	to go in	lḛ̀ⁱc˺	lḛ́ⁱc˺	lḛ́ⁱc˺
402	to drop, fall	kʰɤ̰́ⁱc˺	kʰɤ̰́ⁱc˺	kʰrɤ́t˺
403	to snap, in two	ká.tɤ́t˺	pɤ́k˺	ʔà.tàt˺
404	to break, cleave	lɔ̰̀t˺	lɔ́t˺	
405	to give birth	kɤ́t˺	kɤ́t˺	kɤ́t˺
406	to grow (of people)	hón	hón	hón
407	to be sick, ill	hɔ̀h	hól	hól
408	to swell	kɤ̀ʔ	kɤ́ʔ	kɤ́ʔ
409	to die	jɤ̀m	jɤ́m	jàm
410	to bark (of dog)	jà̰m	kál	rák˺
411	to crow (cock)	ká.tót˺		ʔà.ʔúʔ
412	to lay (egg)	ká.tóm		l̰ḭh
413	to sprout (vb)	kḛ́ⁱc˺	kɔ́h	kɔ́h
414	to fly	pɤ́h	pɤ́l	pɤ́l
415	to wink/blink	cíp.ŋàj	cʰɤ́p.ŋáj	cʰɤ́p˺
416	to swallow	ká.nɤ́t˺	rá.pɤ́t˺	ʔá.lát˺

417	to be hungry	sá.pʰóm	sá.pʰóm	cál
418	to be drunk	màw	màw	màw
419	to cough	ká.ʔúk˺	tá.ʔúk˺	tá.ʔóh
420	to sneeze	ʔá.cʰéh	ʔá.cʰíh	ʔɛ́.cʰéj
421	to yawn	ŋáp˺	ŋáp˺	ŋ̊áp˺
422	to breathe	ká.pʰúm	tʰúj.rá.pʰóm	ʔá.ŋ̊ɤ́h
423	to lick	lɛ̰̀t˺	lɛ́t˺	téw
424	to smile	kà.ɲàh	kà.ɲàh	kà.ɲàh
425	to lie		tá.cʰúʔ	
426	to sing	ká.pɤ́ʔ		tá.pɤ́ʔ
427	to choose	lɤ̀k˺	lɤ́k˺	lɤ́k˺
428	to wait	kʰɔ́ʔ	kʰɔ̀ʔ	kʰóʔ
429	to count	sìn	sín	sín
430	to be afraid	lát˺	lát˺	hlát˺
431	to dream	kà.mùʔ	rà.mùʔ	ʔà.mùʔ
432	to itch	kà.ŋàʔ	ŋàʔ	ʔá.ŋáʔ
433	to scratch	kʰáⁱc˺	páⁱc˺	páⁱc˺
434	to crawl	mṵ̀h	mṵ̀l	mɤ́l
435	to swim	lɔ̀j.ʔúm	lɔ̀j	lɔ̀j
437	to sink	cóm	cóm	sà.kɛ̀n
438	to flow	lòn	léj	lɔ̀n
439	to give	kàʔ	kàʔ	kàʔ
440	to wipe	ʔót˺	ʔót˺	tá.lɤ́ʔ
443	to bathe	hɤ́m	hɤ́m	hɤ́m
444	to split	kʰɛ́k˺	tét˺	pʰáʔ
445	to stab	tɤ́ⁱc˺	tɤ́ⁱc˺	tɤ́t˺
446	to dig	kóŋ	kóŋ	kúŋ
447	to pound	tɤ́h	tɤ́ʔ	tɤ́h
448	to cook	kɤ́.sòm	kɤ́.sóm	kɤ́.sóm
449	to shoot	pɤ́ⁱɲ	pɤ́ⁱɲ	pɤ́ⁱɲ
450	to hunt		hɤ́l.pɤ́ⁱɲ	
451	to kill	tà.jɤ̀m	tà.jɤ̀m	tɤ́.jám

452	to fight	kà.ʔìh	lá.ʔíh	ʔá.ʔíh
453	to exchange	kà.pìn	pín	plén
454	to take	sɤ̀t˺		
455	loose	pɔ̀j		káh
456	finish	cɤ́t˺	hɔ́ⁱc˺	ʔɤ́ⁱc˺
457	to separate	sà.kàh	sɤ̀.kàh	sà.kàh
458	to slap	tʰɔ̀p˺.tʰɔ̀p˺	tá.tʰɔ́p˺	tá.tʰɔ́p˺
459	to bloom	pʰáh	pʰáh	pláh
460	to split w/a knife	pʰáʔ	pʰáʔ	
461	to bend	tá.vɔ́k˺	vúk˺	vúk˺
462	to lift	jὺk˺	júk˺	sà.kèn
463	to sew	cᶦ̀ŋ	cìŋ	cìŋ
464	to dye	cᶷ̀p˺		cɤ́t˺
465	angry	sùt˺	pʰú.mɤ́l	pɔ́ŋ.sɤ́p
466	hate	ká.lít˺	sà.mɤ̀m	sá.mɤ́m
467	fear	lát˺		plát˺
468	laugh			ká.ɲáh
469	cry	jᶏ̀m	jám	jàm
470	love	kúʔ	kɤ̀ʔ	kɤ́ʔ
471	like			kúʔ
472	believe	cɤ́ʔ	cɤ́ʔ	nàp
473	know	cúʔ	cúʔ	cɯʔ
474	guess	cɔ̀p˺	cɔ́p˺	càp˺
475	remember			sá.tíʔ
476	forget	pìʔ	píl	pᶖ̀l
477	think	kà.kɤ̀t˺	rá.kɤ́t˺	ʔá.kɤ́t˺
478	want	láʔ		sɤ́t˺
479	able to	càŋ	cáŋ	càŋ
480	big	hɔ́n	hɔ́n	hɔ́n
481	small	ʔὲt˺	ʔɛ́t˺	ʔɛ́t˺
482	high, tall	lúŋ	lúŋ	hlúŋ
483	low	tᶖ̀m	tᶖ̀m	tὲm

484	long	láŋ	làŋ	láŋ
485	short	ŋέⁱɲ	ŋέⁱɲ	ŋέⁱɲ
488	thick	kà.pỳ̰j	ká.pɤ́l	
489	thin, flimsy		hɪ́l	
490	far	sà.ŋàj	sà.ŋàj	sà.ŋàj
491	near	kà.tὲʔ	ʔá.téʔ	ʔá.téʔ
492	much, many	hɤ́n	hɤ́n	hɤ́n
493	few	lὲⁱɲ	lὲⁱɲ	léⁱɲ
494	straight	sùù	sɤ̀ʔ	pl̰ín
495	crooked	vúk˥		vɔ́k˥
496	light	sá.júŋ	sá.júŋ	sá.júŋ
497	heavy	sà.kὲn	sá.kέn	sà.kɪ̀n
498	hard	kɔ́h	kɔ́l	kέn
499	soft	ʔón	ʔɔ́l	ʔòn
500	light, bright	céŋ	céŋ	sá.váh
501	dark	ká.túm	tʰán.tá.céŋ	ʔá.tɤ́m
502	red	sá.kʰák˥	sá.kʰák˥	sá.kʰrák˥
503	yellow	lɤ́ŋ	lɤ́ŋ	hlɤ́ŋ
504	blue	kʰέw	kʰέw	kʰὲw
505	white	pà̰ⁱɲ	pà̰ⁱɲ	pà̰ⁱɲ
506	black	lɔ̰̀ŋ	lɔ̰̀ŋ	lɔ̰̀ŋ
508	full	nòk˥	núk˥	nòk˥
509	beautiful	nɔ̀m	nɔ́m	nɔ̰́m
510	ugly	mɤ̀j	mɤ̀l	mùl
511	fat (person)	kɤ́n		péʔ
512	fat (pig)			héŋ
513	clean	mɔ́t˥	háj.mɔ́t˥	mɔ́t˥
514	old	pá.sɔ́ŋ	líŋ	tʰà̰w
515	good		nɔ́m	
516	bad		pɪ̀n	klɤ̰̀ⁱc˥
517	quick, fast	vὲj	vὲj	vὲj
518	slow	líŋ	líŋ	líŋ

519	dry	sá.ʔóh	sá.ʔóh	sá.ʔóʔ
520	wet	sá.kóʔ	sá.kóʔ	sá.kóʔ
521	new	súʔ	súʔ	
522	old	líŋ	pʰá.sóŋ	líŋ
523	raw	ʔím	ʔím	ʔím
524	cooked	sín	sín	sín
525	sharp (knife)	lɔ̰m	lɔ̰m	lɔ̰m
526	blunt (knife)	lɛ̰ⁱɲ	lɛ̀ⁱɲ	lɛ̰̀ɲ
528	late	lák˺	làk˺	
529	expensive	kíŋ	kíŋ	kíŋ
530	cheap	jáw	jàw	jàw
532	difficult	sɤ́p˺	sɤ́p˺	sɤ́p˺
533	hot	hɔ̀n	pát˺	rɔ̀n
534	cold	kɔ́t˺	kɔ́t˺	ʔà.kɛ̀t˺
535	warm	jín	sá.ʔɤ́l	
536	sour	nàʔ	nàʔ	nàʔ
537	sweet	téw	téw	téw
538	bitter	sɔ́ŋ	sɔ́ŋ	sɔ́ŋ
539	hot (spicy)	pʰέt˺	pʰέt˺	pʰέt˺
540	salty	ʔɤ́m	ʔɤ́m	ʔɤ́m
541	fragrant	hɔ́m	hɔ́m	hɔ́m
542	smelly	sá.ʔúj	sá.ʔój	sá.ʔój
543	thirsty	ʔút˺	sòm.ʔɪt˺	cál
544	tired	sá.tɤ́ŋ	sá.tɤ́ŋ	sà.tòl
545	painful	súʔ	sɤ́ʔ	sɤ́ʔ
546	diligent	síŋ	kíu	séŋ
547	lazy	ká.náh	ká.náh	kʰà.nàh
548	poor		tọ̀k˺	tọ̀k˺
549	rich	kà.màŋ	rà.màŋ	ʔà.màŋ
552	to be skinny	sá.kʰót˺	héŋ	hèŋ
553	to be wide	vàh		wạ̀h
554	to be narrow	ʔòp˺		ʔá.lít˺

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555	to be deep	húʔ	rɤ́ʔ	rɤ́ʔ
556	to be shallow	tʰɔ̀j	tʰɔ́l	tɔ̰̀l
557	to be round	lú.léj	lú.lĭl	lú.lĭl
558	to be dirty	háj.ká.kʰén	sá.rój	
559	same	ká.mɤ́n	rà.mɤ̀n	ʔá.mɤ́n
560	different			máŋ.ʔá.mɤ́n
561	rotten	lúh	làtˀ	
562	smooth	ká.ɲúj	ká.ɲúl	
563	strong	háj.páh	háj.páh	ʔá.tʰíʔ
564	weak	pʰá.játˀ	ʔúm.páh	jɔ̀kˀ
565	blind	ŋàj.ká.pétˀ	ŋáj.lɤ́ʔ	ŋáj.já.pétˀ
566	deaf	lú.tˀ	lɤ́tˀ	hlɤ́tˀ
567	correct	cápˀ	cápˀ	mɔ́.ráj
568	wrong	kɤ́ⁱcˀ	kɤ́tˀ	klɤ́tˀ
569	ripe	ká.túm	ká.tɤ́m	kɤ́.sín
570	cool	jín		
572	I	ʔúˀ.tìʔ	ʔɤ́tˀ	ʔúˀ
573	we	ʔétˀ.tìʔ	ʔét.tíʔ	ʔétˀ
574	you (sg)	mítˀ.tìʔ	mítˀ	mítˀ
575	you (pl)	pétˀ.tìʔ	pét.tíʔ	pétˀ
576	he, she, it	ʔɤ́n.tìʔ	ʔɤ́n	ʔɤ́n
577	they	kètˀ.tìʔ	két.tíʔ	kètˀ
578	my	lá.ʔɯ̀ʔ	lá.ʔɤ́ʔ	ʔɤ́t.tìh
579	your (sg)		lá.míʔ	mìt.tìh
580	his/her		lá.ʔɤ́n	ʔɤ́n.tìh
581	is	cèj	pén	cèj
582	there is	kúj	kɔ́j	kúj
583	at	mókˀ		mɔ́kˀ
584	this	ʔɛ̀n.nàʔ	ʔén	níʔ
585	here	júŋ.ʔɛ̀n.nàʔ	jóŋ.ʔén	jóŋ.én
586	that	ʔɔ̀n.nàʔ	ʔɔ́n	kʰà.nòʔ
587	there	júŋ.ʔɔ́n	kʰá.nóʔ	jóŋ.mùʔ

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588	who	nɤ́n		nɤ́n
589	what	ká.ná	ká.náh	ká.náw
590	where	jóŋ.mṳ̀h	jóŋ.múh	
591	how	kù.jòh	kʰú.jɔ́	
592	how many	pɤ̀n.mṳ̀h	pɤ́n.múh	pɤ̀n.mṳ̀h
593	very	kɔ̀m	háj	
594	all	pén	pɤ́t˺	
595	also	céj	kò	
596	again	tʰɛ́m	lím	
597	not	tóŋ	tɔ́ŋ	ʔú.ɲɤ̀h
598	do not	cúʔ		tóŋ

RESUME

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