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Liangmai phonology: An overview

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ABSTRACT

This paper provides an overview of the phonological features of Liangmai, a Tibeto-Burman language spoken in Northeast India. It highlights some important features of Liangmai phonology from earlier reports and serves as an update on the study of Liangmai sound system. The phoneme inventory, syllable structure, some phonological and morphophonological features, and the structure of Liangmai tones are presented. In the beginning, the paper presents various linguistic studies carried on Liangmai so far and a brief discussion is presented on the dialectal variation and its linguistic grouping. There are twenty consonant phonemes, six vowel phonemes, nine diphthongs with four contrastive levels of tone at the prosodic level. With or without coda, the place of a nucleus is occupied by a vowel and also by a syllabic nasal that often sits on the first syllable of a disyllable. The present study will be hopefully an insight for those who are studying on the sound systems of other Northeast Indian languages. Like many other community members in Northeast India, the Liangmais are struggling for systematic writing system to represent their language in written form, and the present study will be a supplement to the Liangmai orthography preparation.

KEYWORDS

Liangmai, phonology, tone, vowel

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*Liangmai phonology: An overview*¹

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1. Introduction

This paper provides an overview of the phonological features of Liangmai, a Tibeto-Burman language spoken in Northeast India. It also serves as an update to the various reports previously given on the phonology of Liangmai. §1 gives brief introduction of the people, language, literature review and data sources. §2 presents the segmental phonology, §3 presents the syllable structure, §4 offers the phonological processes, §5 gives some morphophonological features and §6 presents the tonal features of the language, with the conclusion in §7.

1.1. *People*

Liangmai is one of the Naga tribes living in a contiguous area in southern Nagaland and north western Manipur states (See figure 1). According to the census of India 2011, there are 49,811 Liangmai speakers. The population is concentrated in Tamei sub division under Tamenglong district of Manipur² with a significant population in the present districts of Senapati and Kangpokpi in Manipur and Peren in Nagaland. According to the Liangmai Naga Council village statistics, there are 72 villages which are located in Manipur and 9 villages located in Nagaland³. As per the Census of India 2011, there are 45,546 and 3,929 Liangmai speakers in Manipur and Nagaland respectively. Other names given to Liangmai by outsiders are Kacha-Naga, Lyangmai, Liangmei or Quoireng⁴. Before 2012, Liangmai and a related tribe called Zeme were grouped together and officially known as Kacha-Naga in Manipur, while the same two tribes are officially called as Zeliang in Nagaland. Since 1980s, there had been a strong effort from the communities to do away with the misnomer Kacha-Naga⁵. Consequently, following the Constitution (Scheduled Tribes) Order (Amendment) Act, 2011 of the Parliament of India, and the subsequent notice

1 My sincere thanks to anonymous reviewers for their critical comments and many useful suggestions, editors Linda Konnerth, Stephen Morey and Kellen Parker van Dam for their kind and tireless effort given to the making of this paper and Pramod Pandey whose works inspired me to work on Liangmai phonology. All shortcomings will be mine alone.

2 Ethnologue does not mention Liangmai speakers' location in Manipur. In this regard, the author as an Ethnologue contributor had sent a note with a proof to the Ethnologue. The Editor, Ethnologue replied on 21 August 2020 and assured to update this gap of information.

3 List of Liangmai villages, Liangmai Naga Council, Manipur, Office file dated 29.11.2002.

4 'Quoireng' is not the same as 'Koireng/Koren' which is a tribe found in Manipur. The term Quoireng' was first used by McCulloch (1859) and later by Grierson (1903).

5 This term is considered to be derogatory by some people. It is a corrupted word from an original Angami Naga word *ketsa* loosely meaning 'forest'.

by The Gazette of India dated 9th January 2012, this misnomer 'Kacha-Naga' was removed and the correct nomenclature(s) as 'Liangmai' and 'Zeme' were separately and constitutionally recognized⁶ for the two tribes in Manipur. However, in Nagaland state government document, Liangmai and Zeme are still clubbed together and they are known as Zeliang.

In social-political sphere, Liangmai is also often known with the name Zeliangrong⁷. Zeliangrong is a conglomeration of Zeme, Liangmai and Rongmei, each with separate but related languages. The name is derived from each of the first syllables of Zeme, Liangmai and Rongmei. Historically, the three tribes believed that they are descendants from one father. They traced their origin to a historical place called Makuilongdi. A related tribe called Inpui is also often classified under Zeliangrong. Kabui was also a misnomer for the two tribes Rongmei and Inpui but these misnomers were done away by the same constitutional amendment act (Constitution (Scheduled Tribes) Order (Amendment) Act, 2011) and each of the four tribes since 2011 has been recognized with their respective correct nomenclatures. The Zeliangrong label was coined in 1947 (Kamei 2005: 10). It may be viewed as a sub-Naga ethnic group. It is a civil group or a union formed by a very closely and genuinely related tribes for their political and social welfare. However, today there is a section of people from these four tribes who wish to make Zeliangrong group an official tribe. Still, a larger section of people from these four tribes who prefer to have Zeliangrong as a social welfare group but leave each of the four tribes status quo. The joint Zeliangrong populations are found in a contiguous area of Assam, Manipur and Nagaland. They are mainly found in Peren district in Nagaland, Tamenglong, Senapati, Kangpokpi, Imphal East and Noney districts in Manipur and Dima Hasao (NC Hills) district in Assam.



Figure 1 – Figure 1: Northeast India map showing approximate Liangmai spoken area (map not to a scale)⁸.

6 The gazette of India, Ministry of Law and Justice (2012) (<https://tribal.nic.in/DivisionsFiles/clm/25.pdf>)

7 For Zeliangrong History, see Kamei's 'A history of Zeliangrong Naga' (2004).

8 Map created by the author.

1.2. Language

The ISO 639-3 code for Liangmai is *njn*, and the Glottocode is *lian1251*. Bradley (1997: 29) placed Liangmai under the sub grouping within the Southern Naga group of Tibeto-Burman Languages. More recent work on the classification by Post and Burling (2017) categorized Liangmai under the Western Naga [Zeliangrong]. Languages listed under this group by Post and Burling are Zeme [Empeo, Kachcha], Mzieme, Liangmai, Nruangmei [Rongmei, Kabui], Puiron, Khoirao [Thangal] and Maram. Some other Naga languages, though they are not all placed together under any sub group by Bradley or Post and Burling, are nevertheless linguistically close to Liangmai based on the author's intuition as a native Liangmai Naga speaker. These languages are Zeme, Rongmei, Thangal, Maram, Mao, Poumai, Chakhesang, Rengma, and Angami while languages like Ao, Lotha, Tangkhul and Sumi are a little less close to Liangmai.

The dialectal difference in Liangmai is not major, and there is a high level of mutual intelligibility between Liangmai varieties. However, as per the author's observations, there is a slight difference in the dialects of each geographical regions (presented in §1.4). These differences are essentially of 'accent' and lexical words. For instance, the Southern variety lacks syllabic nasal initial consonant in word like *t^häĩnāĩ* 'today' as compared to the Northern Eastern variety *ɲt^häĩnāĩ* 'today'. The Southern variety tends to have a diphthong like *t^huan* 'praise' compared to the Northern Eastern variety simple vowel e.g., *t^hɹn* 'praise'. In accent, an interrogative word *ɲdelām* 'where' is pronounced differently by North Western variety like Ntu village as *ɲdelām* from other varieties as *ɲdelām* 'where'. Both the varieties have a low tone each for the first two syllables as *ɲdelām* 'where' but for the final syllable, Northwestern variety has a high tone and other varieties have a low tone.

According to my findings, there is no significant difference in the segmental phonology (§2) and tone (§6) between the varieties of Liangmai. There is however a particular village called Puilong (exonym: Ireng) in the Southern most part of Liangmai speaking area in Manipur. It borders with Meitei speakers. Fieldwork was briefly conducted in Puilong for this study. The variation between the variety spoken in this village and the rest of the Liangmai varieties seems to be much larger in terms of mutual intelligibility. There is so far no analysis of the language spoken in Puilong. Further discussion on the dialectal variation of Liangmai is given in §1.4.

At present, Liangmai language is being transferred from parents to children in many villages. However, the sustainability of the language is uncertain. Most of the speakers today have a great enthusiasm to preserve and promote their language but in practice it cannot match their enthusiasm. Primarily, due to the lack of economic opportunity in their language, major languages like English, Hindi and Manipuri (also known as Meitei) are given a huge importance in every domain.

However, There is a Liangmai orthography in use. Using a modified form of the Roman script, writing is being practiced and this is being done more frequently by Liangmai Christian Institutions. Liangmai is taught in a couple of schools especially in Tamei area of Manipur and also in Tening area of Nagaland but they are all in an initial stage with inadequate teaching materials or pedagogy. Many actions, which are out of the scope of this paper, must be taken to realize a smooth continuity of Liangmai.

1.3. Earlier studies on Liangmai

Previous work on the phonology of Liangmai can be found in Moita (2007), an unpublished report on the preliminary study of Liangmai phonology. This may be considered as the earliest linguistic study done on Liangmai. A PhD thesis (Mataina 2014) and also Pandey (2014) based on Mataina & Pandey (2009) included sketches of Liangmai phonology. Liangmai has been studied at a PhD level by five native-speaker researchers based at different Indian Universities and this is a good number compared to other languages studied from the Northeast. These five unpublished PhD theses are shown in Table 1. However, three of these PhD theses Three of them are available online.

It is worth mentioning here which villages the varieties discussed in these five theses. First, Moita (2007) who is a native of Thalon village does not mention the variety he used in his project, but is presumed to be Thalon (Tharon) village which falls under the South Western Liangmai area. (Please see Table 2 in which I categorized Liangmai spoken areas into five groups for the purpose of this paper). This work is not a thesis. Second, Charengna (2011), a native of Kabangning (also Chaton) village which is under the North Eastern region, gives a description of Liangmai including phonological features and this is the first report at the level of PhD thesis. He does not specifically mention the village variety used for his PhD study but mentioned that data were taken from Manipur, and also mentioned eighteen language consultants, of which fourteen consultants are from Central and North Eastern areas, two are from South Eastern area and one is from South Western area. Charengna (2017) also listed phoneme inventories of Liangmai in his material for Liangmai language learning which was prepared based on the spoken variety of Ntu village, Nagaland. Third, I.D. Raguibou (2015), a native of Namtiram village uses data for his PhD thesis mainly from Namtiram area which is under South Western area. He specifically mentions that the data were based on Namtiram variety. This thesis makes a comparative study on the phonology of Zeme, Liangmai and Rongmei. Fourth, Kailadbou Daimai (2016), a native of Thalon village gives a descriptive study on the morphosyntax of Liangmai. The variety of Liangmai he used for his study is not mentioned specifically. Fifth, Guichamlung Daimai (2016) gives a phonological and a morphological description of Liangmai. He is a native of Thalon village and based his study on the spoken variety of Tamenglong area which is under South Western area. Sixth, Mataina (2014), a native of Maguilong village use the linguistic data mainly from the Northern Eastern Liangmai spoken area. Pandey (2014) reports a sketch of Liangmai phonology and the source of the data was mainly from the North Eastern Liangmai spoken area. Of the variety that was not mentioned specifically in the above five PhD theses, I assume each one of them worked on their respective village varieties and they are listed in Table 1.

A recent publication on the classifier of Liangmai by Kailadbou Daimai (2020) will be a first published book on the linguistics of Liangmai. Apart from the study on phonology, linguistic articles on aspects such as morphology and morphosyntax of Liangmai can be found in Charengna (2011, 2014), Mataina (2013, 2018), Guichamlung Daimai (2013), Kailadbou Daimai (2019, 2020), I.D. Raguibou ID (2014) and Kailadbou Daimai & I.D. Raguibou (2020).

Author	Thesis Title	University	Region of Study
Widinibou Charengna (2011)	A descriptive analysis of Liangmai	Assam University	North Eastern
WichamDinbo Mataina (2014)	A descriptive grammar of Liangmai	JNU	North Eastern
I. D. Raguibou (2015)	The comparative phonology of Zeme, Liangmai and Rongmei	Assam University	South Western
Kailadbou Daimai (2016)	The morphology of tense and aspect of Liangmai	Delhi University	South Western
Guichamlung Daimai (2016)	Phonology and morphology of Liangmai	Assam University	South Western

Table 1 – Unpublished PhD theses on the study of the language of Liangmai.

1.4. Data in this study

There are 2102 words and 206 sentences listed in my database. All the recorded data used in this work are from the author's PhD thesis work which were recorded during the period between 2009 and 2014. In addition, an analysis of my own voice as a native speaker when producing the relevant tokens is also included in this study for the purpose of comparison with other speakers. Data were collected mainly from Kuilong area, being the home region of the author whose data was also analysed, as well as Tamei Sub-Division, Tamenglong district of Manipur or the North Eastern Liangmai area (Table 2), and they made up the main data for this study. Some of the villages from Kuilong area are Nkou (Takou), Riangleong (Lenglong), Kuilong, Maguilong (Makuinong), Nallong and Rienta (Lemta).

It may be useful to mention that on a day-to-day basis I also observed and analyzed generally the sound features of all Liangmai both from Nagaland and Manipur, and incorporated them with a note concerning which variety is being referred to wherever necessary. This observation is possible through community meetings and interactions from time to time. Liangmai villages⁹ are located in a contiguous area with an uneven distribution of some Zeme, Rongmei, Inpui, Maram, Thangal, Nepali and Kuki villages within the Liangmai spoken area.

For the representational purpose in this study, I categorize Liangmai villages not politically, administratively or religiously but geographically and to some extent linguistically into five regions. It must also be noted that Liangmai is a single tribe. Linguistically, I based these five dialectal groups of Liangmai on four things i.e., geography, regional accents, lexical words especially for flora and fauna, and some minor

⁹ The names of many villages mentioned in this paper are written as per the local name and if any, exonyms, the names that are entered in government document by outsiders are given within the bracket.

mutual unintelligibility issues. This is the first linguistic grouping and it is very preliminary. Some sample indigenous villages from each region are shown in Table 2. My native village Maguilong (Makuinong) is in Manipur but I grew up in Nagaland. Delhi, where I did my doctoral study, has a collection of Liangmai speakers from nearly every village. They had come to Delhi for education or employment opportunity. I observed that in terms of the speech sound especially in the phoneme inventory, there is no significant variety among the Liangmai speakers. However, there is a lot of interesting variety among the regional accents. I have not seen any village of Liangmai that does not have a different accent from the other. As stated earlier, there is a significant dialectal variation in the domains of lexical semantics especially of flora and fauna in Liangmai and to include discussion on this variation is out of the scope of this paper. Further study of the dialectal variation of Liangmai is a separate project which is under preparation by the author.

North Eastern Liangmai	North Western Liangmai	South Eastern Liangmai	South Western Liangmai	Central Liangmai
Chakha, Bamrekluang (Ileng), Kuilong, Rienta (Lemta), Kadi, Liangchi (Makui), Bena Tabang, Nkou (Takou), etc in Manipur	Nchangram, Tening, Ntu, Nzau, etc in Nagaland and Nkongphung (Konphung) in Manipur	Nkhen (Makhen), Ariang (Khunkhu Naga) Aling, Singra (Thingra), Konsaram (Konsakhul), Tedlong (Nurathen), etc in Manipur	Namtiram, Niamning (Inem), Phellong, Taningjam Nheng, Thalon (Tharon), etc in Manipur	Piuleklong (Tamah), Chiang (Langmei), Machenglong (Lamlaba), Nzensg (Atangkhou), etc in Manipur

Table 2 – Broad linguistic grouping of Liangmai spoken area.

2. Segmental phonology

The phonology of Liangmai system can be classified into three major patterns: consonants, vowels and tones. In this section, I present the segmental phonology of Liangmai including consonant and vowel phonemes. There are twenty consonant phonemes, and six vowels with nine diphthongs. Four contrastive levels of tone are found in Liangmai and a discussion of tone is given in §6. The four tones in this paper are transcribed as high tone, mid tone, low tone and extra low tone¹⁰.

2.1. Consonant

Twenty consonant phonemes characterizing six distinctive places of articulation and six distinctive manners of articulation are found in Liangmai. All the consonants occur word initially. Three stops /p/, /t/, /k/ and three nasals /m/, /n/, and /ŋ/ are the only six

¹⁰ Transcription and tone marking in this paper follows International Phonetic Alphabet (IPA) system. Tones are marked in the following manner: /é/ for high tone, /ē/ for mid tone, /è/ for low tone and /ë/ for extra low tone.

consonants in Liangmai that occur word finally (Mataina and Pandey 2009; Mataina 2014: 33). Table 3 shows the twenty native consonant sounds.

	Bilabial	Labio-dental	Alveolar	Palatal	Velar	Glottal
Stop Aspirated stop	p b		t d t ^h		k g t ^h	
Nasal	m		n		ŋ	
Affricate			ts			
Fricative		f	s z			h
Approximant	w		ɹ	(j)		
Lateral Approx.			l			

Table 3 — Inventory of Liangmai consonant phonemes.

For an overview of Liangmai consonant phonemes reported in earlier studies by seven researchers are shown in Table 4. As far as the number of consonant phonemes is concerned, much of the difference is due to the absence or presence of a glottal stop (See §2.1.1). The case of this difference is discussed in §2.1.1. However, I. D. Raguibou (2015) has a large difference in the number of his phonemes from the rest of the reports as shown in Table 4. This is because he considered prenasalized sound as a phoneme.

Researcher	Stops	Glottal Stop	Nasals	Affricate	Fricative	Approx	Trill or Flap	Total no of consonant phonemes
Amos Moita (2007)	11	yes	3	0	3	3	1	21
Widinibou Charengna (2011)	10	No	3	0	3	3	1	20
Widinibou Charengna (2017)	10	Yes	3	1	3	3	1	21
Wichamdinbo Mataina (2014)	8	No	3	1	4	4	0	20
Pramod Pandey (2014)	8	No	3	1	4	4	0	20

I.D. Raguibou (2015)	19	Yes	6	2	6	5	1	39
Guichamlung Daimai (2016)	9	No	3	1	3	3	1	20
Kailadbou Daimai (2020)	10	Yes	3	1	3	3	1	21

Table 4 – An overview of Liangmai consonant phonemes reported in earlier studies.

2.1.1. Stops /p, b, t, d, k, g t^h, k^h/

The series of stops in Liangmai has three places of articulation. They are bilabial, alveolar and velar. All the three plain voiceless stops /p/, /t/, and /k/ occur in all positions of a syllable while all the three plain voiced stops /b/, /d/ and /g/ occur only word initially. The two aspirated stops /t^h/ and /k^h/ are alveolar and velar stops. They occur only word initially and medially. Phonemic contrast of stop consonants and all other consonants is given in §2.2 and §2.3. A bilabial voiceless aspirated stop is reported to be present in Liangmai by all the researchers mentioned in Table 4 except Mataina (2014) and Pandey (2014). I will discuss this in a while (§2.1.4).

Further, on the stop series, in earlier eight reports on Liangmai phonology, Moita (2007: 21), Raguibou (2015: 63), Charengna (2017: 8), Kailadbou Daimai (2020: 18) attest final glottal¹¹ stop /ʔ/ in Liangmai. However, Charengna (2011), Mataina (2014), Pandey (2014), Guichamlung Daimai (2016) do not attest the presence of glottal stop in their analysis. For the linguistic varieties used in above reports by each of them, please see again §1.3. In my further observation of Liangmai, I do not find the presence of glottal stop initially or finally as per my data which are mainly from North Eastern and Western Liangmai spoken area including speakers from Nzau village, Nagaland. I basically make this claim based on the non-closure of the glottis. Figure 2 shows there is no closure of glottis between /ná/ and /mài/. The voice samples were taken from North Eastern, North Western and Central Liangmai group. In his study, presumably of the Northern variety, Charengna (2011) does not report about the glottal stop but reports the presence of a final glottal stop in his 2017 study of Ntu village variety of Nagaland. For the study of the Southern Liangmai variety, Moita (2007), Raguibou (2015), Kailadbou Daimai (2020) reported the presence of glottal stop, while Guichamlung Daimai (2016) who is also from Thalon village (Southern) does not report the presence of the glottal stop.

As far as examples of the glottal stop is concerned, Charengna (2017: 8) listed only one example as *ndaʔ* ‘ancient’. Moita (2007) listed eight examples and some of them reproduced here as *naʔmai* ‘child’, *kədiʔi* ‘earth’ and *pəkinaʔ* ‘husband’. Raguibou (2015: 63) listed ten word examples and some of them are *naʔmai* ‘child’, *suwáʔn* ‘morning’ and *pəkinaʔ* ‘husband’. Kailadbou Daimai (2020: 18) stated that glottal stop occurs word medially and finally with four examples as *ŋeŋʔna* ‘wild cat’, *k^heʔna* ‘sickle’, *malàʔ* ‘easy’

¹¹ In the original transcription, a question mark appears in place of the glottal stop except for Daimai (2020), but based on my analysis, it is clear that /ʔ/ was the intended meaning.

and *kaʔ* ‘carry’. In any case, they found the glottal stop only in a few examples only in a final position and no other evidence for their claim were given. A further experimental phonetic study on Southern variety may be able to confirm the status of glottal stop.

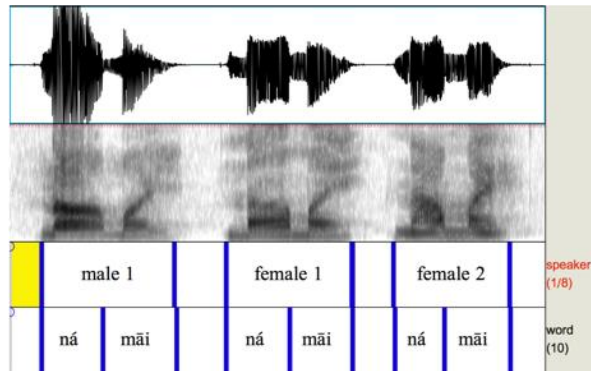


Figure 2 – Wave form of nonglottalized *námāi* ‘child’ produced by Pingsilak Newmai, 55 (male 1) of Nzau village, Diana Ngonamai (female 1), 35 of Bena village and Ajiukamliu Pamai, (female 2), 33 of Chiang village.

2.1.2. Nasals /m, n, ŋ/

There are three voiced nasal consonants occurring in three places of articulation, viz., bilabial, alveolar and velar. All the nasal consonants occur in all positions, e.g., *múu* ‘grow’, *mānám* ‘smell’ and *ŋām* ‘possible’. The velar nasal /ŋ/ occurs less frequently word-initially. In my database, only seven words have a velar nasal initially.

2.1.3. Affricate /ts/

The unaspirated alveolar affricate is the only affricate sound found in Liangmai. It occurs frequently both in word initial and medial positions and does not occur word finally. Examples of affricate are *tsū* ‘dig’, *tsōp* ‘blister’ and *kàtsàk* ‘hail’.

2.1.4. Fricatives /f, s, z, h/

The fricative series occurs in three distinctive places of articulation, namely, labiodental, alveolar and glottal. Voiceless labiodental fricative occurs word initially and medially, for example, *fúŋ* ‘to carry’ (as load), *fū* ‘search’, and *tsəfū* ‘clan’, *tsəfú* ‘seashore’, and *kəfū* ‘spade’. A bilabial voiceless fricative [ɸ] is in free variation with a labiodental fricative /f/ particularly in a monosyllable but not in a disyllable, e.g., *tsəfāi* ‘shawl’. Also, in a fast speech or when someone is emotionally charged, an aspirated stop [p^h] can be used in place of [f] but limited only to monosyllable, e.g., *fàk* ‘disburse’ pronounced as [p^hàk]. I will discuss more on this with other reports very shortly.

The laminal alveolar fricatives /s/ and /z/ occur only syllable initially and medially. Examples of voiceless alveolar fricatives are *sáj* ‘thousand’, *sìŋbāŋ* ‘tree’, *təsū* ‘paddy’, *zú* ‘pull’, and *təzà* ‘rat’. Both may sound palatalized as /ʃ/ and /ʒ/ especially in the sociolect of younger people working, often outside the Northeast, in the corporate world, or of younger Liangmai popular singers where they may pronounce [ʃāŋmāi] for *sāŋmāi* ‘outsider’ and [ʒón] for *zón* ‘sell’. This particular phenomenon cannot be yet considered even as a free

variation but it has become so common among some speakers. It may be due to the influence of Western language like English from popular songs, TV, movie and work/office environment especially in telemarketing that involves multi-national companies.

The voiceless glottal fricative /h/ occurs syllable initially, e.g., *hā* ‘absent’, *hām* ‘lay’, *hīŋ* interjection and *tsəhóm* ‘bear’. The frequency of voiceless glottal fricative appears to be less in comparison with other consonant phonemes.

In the fricative series, if we look at the earlier reports, all the researchers mentioned in Table 4 except for Mataina (2014) and Pandey (2014), do not include the labiodental fricative as a phoneme. Moita (2007: 16) however states that /f/ and aspirated stop /p^h/ are in free variation. By observing the same examples (Table 5) used by these seven researchers, I can observe that they analyzed what I consider to be a labiodental fricative /f/ as an aspirated plosive sound /p^h/. I based my analysis on the introspection and perception of my own voice and also acoustic analysis of the voices of the five native speakers¹² from different regions. One of the indigenous Liangmai villages called ‘Konphung¹³’ is pronounced as *kōnfūŋ* with an air passage through the oral cavity with a constriction and the lower lip lightly tapping the upper teeth throughout the utterance of the onset of the second syllable. For this controversial phoneme /f/, the Liangmai Christian Literature Society (LCLS) in its romanized orthography uses both the letters ‘f’ and the grapheme ‘ph’ alternatively.

Moita, 2007	Mataina, 2014	Pandey, 2014	Raguibou, 2015	Daimai, G, 2016	Charengna, 2017	Daimai, K, 2020	Gloss
p ^h iu	fiu	-	-	p ^h iù	-	-	to search
p ^h uŋ	fuŋ	-	-		p ^h uŋ		to carry
-	tsəfi	-	-		p ^h i		leg
kəp ^h iu	kəfiu	-	-		-		spade
c ^h əp ^h ai	tsefai	-	c ^h əp ^h ài	tsəp ^h ài	-	tse.p ^h ai	shawl

Table 5 – Sample words containing IPA sounds /f/ and /p^h/ in the different seven analyses.

Figure 3 shows a Praat picture of a labiodental fricative sound /f/ in Liangmai. Voices of two persons in monosyllable and disyllable words from each of the five regions were examined. There is no signal of plosive sound (bursting image) on the onset of the waveform and wide band spectrogram for the word *fū* ‘search’ from ten samples.

12 Chambuibou Chalunmai, M-40, Renta (Lemta) village; NK Taraibou, M-45, Niamning village; ML Kaisungbou, 40, Makhen village; Paramjin Moita, M-35, Thalon village; Thonbamliu Pamai, F-27, Rianglong village; Florence Newmai, F-30, Tamei.

13 Also known as Nkonphung /nkōnfūŋ/.

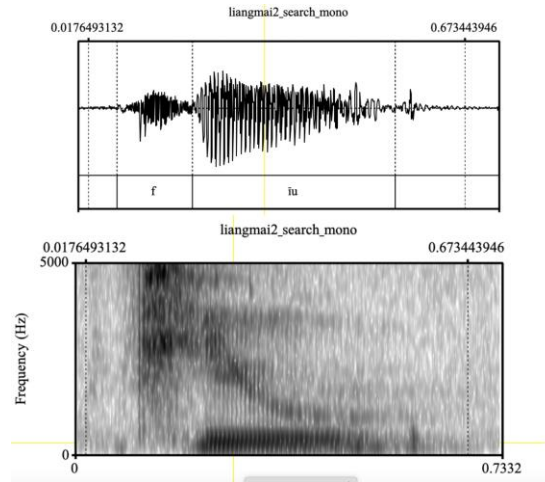


Figure 3 – Waveform and spectrogram of *fiu* ‘search’. Voice of NK Taraibou, M-45, of Niamning village.

Observing Liangmai phonology in particular and Naga languages in general in the literature, it is common to find bilabial aspirated stop /p^h/. But wherever there is an aspirated stop in such language, there is a tendency for a labiodental fricative to be absent. This phenomenon is seen in Liangmai (Moita: 2007), Mongsen Ao (Coupe 2007), Rongmei (Haokip 2014) and Poula (Lemaina and Khyriem 2015) among others. Teo (2014: 20) however reported both aspirated bilabial stop and labiodental fricative in Sumi although he considered the later as a rare phoneme. Bruhn (2014) also reported both /p^h/ and /f/ in Lotha. In her comparative study of Naga sound patterns in relation to its orthographies, Kevichusa-Ezung (2021) also reported the presence of labiodental fricative /f/ in Zeme, Angami, Rengma, Chokhri and Kheza. If we look a little further away from Naga languages but in the Northeast India, aspirated stop is reported in Meitei (Chelliah 1997: 20) but she states that it varies freely with the labiodental fricative /f/. Konnerth (2014: 55) also reports in Karbi that aspirated stop /p^h/ and bilabial voiceless fricative /ɸ/ are in free variation.

The question arises whether it is a bilabial aspirated or a labiodental fricative that may be common to Naga languages or both of them in free variation. Konnerth (2014: 55) states ‘Scott DeLancey (p.c) notes that this allophonic alternation between /p^h~ɸ/ also occurs in Boro (Boro-Garo, Tibeto-Burman; Assam, Northeast India), and may be an areal feature. Indeed, the alternation between /p^h~ɸ/ geographically extends into North Eastern Bhutan, where it is found in at least Kurtöp (but presumably other languages as well) (Hyslop 2011: 106).’ Historically, it might have been a full aspirated stop in Liangmai as well because I have aspirated /t^h/ and /k^h/ in my stop series. But for the modern Liangmai, this supposed labiodental fricative is realized by constant flutter between the lower lip and the upper teeth. It may also be the case in Liangmai that we should analyze even the aspirated velar stop /k^h/ as part of the fricative series although this has to be considered only after thorough investigation including a diachronic study of Liangmai. This is because, an aspirated fricative velar /x/ seems to be a free variation with an aspirated velar stop /k^h/. But a voiceless alveolar fricative /θ/ does not seem to appear as a variation for alveolar aspirated stop /t^h/.

2.1.5. Approximants /w, ɹ, j, l/

The four approximants are voiced bilabial approximant /w/ as in *wà* ‘something’, voiced alveolar approximant /ɹ/ as in *ɹá* ‘untie’, palatal approximant /j/ as in *jō* ‘yes’ and lateral approximant as in *láŋ* ‘cook’. They do not occur in final position but occurs in all other positions.

It is notable that the approximant /ɹ/ sometimes varies with the trill alveolar /r/, although the conditioning is not known precisely. It observes that this rhotic consonant in Liangmai appears to be a trill when it occurs in a closed syllable, for example, *rán* ‘to plan’, *ràt* ‘to tie’, while it appears to be an approximant alveolar /ɹ/ when it occurs in an open syllable, for example, *ɹá* ‘to thread’, *ɹi* ‘late’ and *ɹà* ‘poisonous’.

The palatal approximant /j/ in Liangmai is a minor phoneme in terms of its distribution and therefore, it is placed within a parenthesis in the consonant chart (See Table 3). In my database that has above 2000 words, it occurs only in four functional words and one lexical word, e.g., *jí* ‘good’. Moreover, the word *jí* ‘good’ is a variant form common only to some of the village varieties such as Kuilong, Niamning, Namtiram, Taningzam, etc. It occurs mostly in an initial position. It has one instance of the palatal approximant /j/ occurring in a word medial position, e.g., *áijā* ‘EXCLAMATION’. Examples of palatal approximant /j/ are *-jei* ‘DECLARATIVE’, *-je* ‘yes’, and *jo* ‘DISCOURSE MARKER’. The discourse marker *jo* is very common in its usage. It suffixes a noun or pronoun to express love, respect, or even an anger in humility e.g., *tīŋwāŋ-jō* ‘Oh God’.

2.2. Consonant onsets

As noted, all the twenty consonant phonemes as listed in Table 3 appears word initially. Here, I present the phonemic contrast of consonant onsets and consonant codas in the subsequent section. Examples in each pair or set are given in the same tone.

2.2.1. Stop onset minimal pairs

Table 6 gives minimal pairs for bilabial, alveolar and velar stops in both open and closed syllables.

/p/ VS /b/	/pá/ ‘read’	/bá/ ‘swim’
	/pēn/ ‘satisfy’	/bēn/ ‘wear (shawl)’
/t/ -VS /d/	/tón/ ‘ride’	/dón/ ‘cut (elongated object)’
	/tūn/ ‘push’	/dūn/ ‘short’
/t/ VS /t ^h /	/tā/ ‘stop’	/t ^h ā/ ‘scrub (utensil)’
	/tí/ ‘comb’	/t ^h í/ ‘drink’
/k/ VS /k ^h /	/kā/ ‘white’	k ^h ā/ ‘collect’

	/k'éŋ/ 'plenty'	/k ^h éŋ/ 'ask'
/k/ VS /g/	/kā/ 'white'	/gā/ 'PP'
	/kèn/ 'cross' (v)	/gèn/ 'nail' (v)

Table 6 – Minimal pairs for bilabial, alveolar and velar stops.

2.2.2. Nasal onset minimal pairs

Table 7 shows the minimal pairs of the onset nasal sounds.

/m/ vs. /n/	/múi/ 'grow'	/núi/ 'laugh'
	/māk/ 'neg'	/nāk/ 'a while'
/n/ vs. /ŋ/	/mēnám/ 'smell'	/mēŋám/ 'shame'
	/nām/ 'click (photo)'	/ŋām/ 'possible'

Table 7 – Phonemic contrast of the onset nasal sounds.

2.2.3. Affricate minimal onset

There is only one affricate sound /ts/ in Liangmai. Table 8 gives the onset minimal set for affricate /ts/, alveolar fricative /s/ and alveolar stop /t/.

ts__	/tsū/ 'dig'	/tsóŋ/ 'gather'
s__	/sū/ 'begin'	/sóŋ/ 'boil (water)'
t__	/-tū/ 'ACC'	/tóŋ/ 'ride'

Table 8 – Onset minimal set for affricate /ts/, alveolar fricative /s/ and alveolar stop /t/.

2.2.4. Fricative onset minimal set

Table 9 presents the minimal set of onset fricatives.

f__	/fú/ 'dry (on the sun)'	/fāŋ/ 'cut (fruit)'
s__	/sú/ 'dry (something above a fire)'	/sāŋ/ 'dry (adj.)'

z__	/zú/ 'pull'	/zāŋ/ 'inquire (around)
h__	/hú/ 'brave'	/hāŋ/ 'cut (branch on the tree)

Table 9 – Onset minimal set in onset fricatives.

2.2.5 Approximant onset minimal set

Table 10 shows the minimal set of onsets in four approximants.

w__	/wà/ 'something'	/wāŋ/ 'come'
j__	/jā/ 'yes'	—
r__	/rà/ 'witchy', /rā/ 'untie'	/rāŋ/ 'clear (jungle with machete)'
l__	/là/ 'fill (of mud into a hole)'	/lāŋ/ 'send'

Table 10 – Onset minimal set in four approximants.

2.3. Consonant codas

Only three stops and three nasals occur in coda position in Liangmai. They are /p/, /t/, /k/, /m/, /n/, and /ŋ/. Occurrence of these phonemes in final position is common to the Tibeto-Burman languages spoken in Northeast India (Burling, 2003:173).

2.3.1. Stop codas

Table 11 presents a minimal set in stop codas in a low tone.

_p	/t̚àp/ 'break (of rope)	/s̚àp/ 'cut (something by sliding the knife)
_t	/t̚àt/ 'go'	/s̚àt/ 'storey'
_k	/t̚àk/ 'grind (on a mill)	/s̚àk/ 'drink'

Table 11 – Minimal set in stop codas in a low tone.

2.3.2. Nasal codas

Table 12 offers minimal set of onset nasal codas in a mid tone. Of the three nasals /m/, /n/, and /ŋ/, the velar nasal seems to have the highest frequency of occurrence.

__m	/sām/ ‘brief’	/lām/ ‘PP’
__n	/sān/ ‘extra’	/lān/ ‘give a wages’
__ŋ	/sāŋ/ ‘dry’	/lāŋ/ ‘send’

Table 12 – Minimal set in nasal codas in a mid tone.

2.5. Vowel

There are six vowels and nine diphthongs in Liangmai. There is no phonemic length distinction although a vowel in an open syllable may naturally be lengthened. Table 13 shows the vowel phoneme inventory of Liangmai. The minimal pairs or near-minimal pairs of the vowels are shown in Table (14).

	Front	Central	Back
Close	i		u
Close-mid	e		ɔ
Open-mid		ə	
Open		a	

Table 13 – Inventory of Liangmai vowel phonemes.

/i/ VS /e/	/pī/ ‘give’	/pē/ ‘pluck’
	/rī/ ‘late’	/rē/ ‘demand’
/a/ VS /ɔ/	/lāŋ/ ‘cook’	/lɔŋ/ ‘flow’
	/kām/ ‘white’	/kɔm/ ‘hurl (stone)’
/ɔ/ VS /u/	/dɔŋ/ ‘cut’	/dúŋ/ ‘keep’
	/sɔŋ/ ‘boil’	/sūŋ/ ‘block’

/ə/ VS /a/	/pā-rā/ 'his bone'	/pà-rà/ 'he (exclusively)'
	/kāpóŋ/ 'bloom'	/kāpóŋ/ 'white(-?)'

Table 14 – Phonemic contrast of vowel phonemes.

The high front vowel /i/ occurs word medially and finally, e.g., *ī* 'I' (1sg), *gín* 'to bear', *gì* 'argue'. Occurrence of the phoneme /i/ in an initial position is nil except for *ī* 'I' (1sg). The vowel /i/ can be realized as a central high vowel [i]. This allophonic variation occurs only when it occurs in a closed syllable particularly before a nasal coda, e.g., /tín/ ~ [tín] 'wet', [pín] 'to be allergic' and [dùipín] 'spring (of water)'. The front close-mid vowel /e/ occurs frequently in word medial and final position, e.g., *pēŋ* 'depart', *pè* 'to pluck' and *ɛ* 'to harass'. There is only one known example of this vowel occurring in an initial position, e.g., *è* 'okay'. The variant form of *è* 'okay' is *èi*.

The open central low vowel /a/ occurs word medially and finally, e.g., *tàt* 'go', *rāŋkáj* 'money', *pà* 's/he'. The open central low vowel /a/ can be realized as a schwa in one context as an allophonic variation: /a/ ~ [ə]. It appears as a schwa in a closed syllable with a nasal coda and a stop coda, e.g., /bām/ ~ [bām] 'exist' and /tət/ ~ [tət] 'go'. This condition is frequent in fast speech.

The phoneme /ɔ/ is a back rounded vowel. It appears to occur generously in a word medial position but very rarely in initial and final positions. It can be realized either as open mid [ɔ] or as close mid [o]. They are in free variation although it is difficult to clearly state the condition. An open mid /ɔ/ seems to be common in closed syllable with nasal coda, e.g., *tóŋ* 'to ride', and *tō* 'to be slandering'. As per my database, occurrence of open-mid vowel in an initial position is nil except for an interjection word, e.g., *o* 'oh'. The occurrence of mid back vowel in a final position is infrequent. Examples for a final position are *kó* 'step (on something)', *lò* 'to get' and *tsəlò* 'field'. These two words *lò* 'to get' and *tsəlò* 'field' are variant forms common to Rienta (Lemta) and Bena Tababang villages in North Eastern Liangmai area. The common forms will be *lù* 'to get' and *tsəlù* 'field' respectively.

The high back vowel /u/ occurs frequently in medial and final positions, e.g., *lúŋ* 'to live', *ənù* 'soft' and *pù* 'busy'. Out of 2102 words in my database, there are only two examples of the back vowel occurring in a word initial position, e.g., *u* or *um* 'yes' and *ui-si* 'that-DEF'. The central high vowel /i/ seems to occur as an allophonic variation of /u/ in a closed syllable, e.g., /tūn/ ~ [tín] 'push', /tún/ ~ [tín] 'wet' and /kābún/ ~ [kābín] 'ice'.

The schwa vowel /ə/ occurs only word initially and medially, e.g., *əpí* 'head', *kātíŋ* 'pillar'. It seems to sit only in a prefix position in a disyllable word. While articulating this schwa in a careful manner, the mouth may become wider but it does not sound like low central vowel /a/. In fast speech, the schwa can be dropped in a prefix position of a disyllable. The schwa vowel occurs in an initial position generally as a possessive marker of a first person pronoun or in an inalienable word especially to refer kinship terms and body parts, e.g., *ə-pàu* 'my grandpa', *ə-lù* 'my field', *ə-mik* 'my eye', and *pə-sā* 'fats'. Earlier, I had listed only five vowels in my unpublished PhD study (2014: 54), also listed five by the author and Pandey (2014: 411). This is due to the reason we had taken schwa vowel /ə/ as an allophone of the open central low vowel /a/. Moita (2007), Charengna (2011), I.D.

Raguibou (2015), Guichamlung Daimai (2016) reported six vowels. Moita (2007) however has eight vowels in all. Kailadbou Daimai (2021) noted six vowels but describes that it may be a reduced form of the central low vowel /a/ and says it requires further analysis.

Primarily, the distribution of schwa is found only in the first syllable of disyllable or multi-syllable words. It occurs generously in a generic or formative prefix of disyllable words, e.g., *tsè-kì* ‘house’, *mālóŋ* and *tsəlīaŋ* ‘proud’, and also in the first syllable of root morphemes, e.g., *kəlīo* ‘smart’, *məkūm* ‘think’, *təlūŋ* ‘wealth’, *māsēn* ‘like’ and *kəlāŋ* ‘fast’. Phonemic contrast between schwa vowel and low central vowel vowel is shown in Praat picture in Figure 4 to support the claim that /ə/ and /a/ are a separate phoneme. The length difference for each of the first syllable in *məkūm* ‘think’ and *mákūm* ‘next year’ are different in both the speech waveform and the spectrogram.

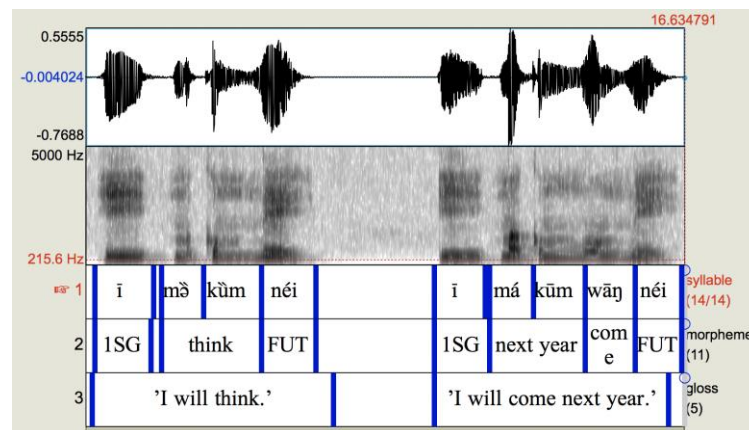


Figure 4 – Speech waveform and wide band spectrogram of the words *məkūm* ‘think’ and *mákūm*¹⁴ ‘next year’ in a sentence.

Another minimal pair to show a schwa as a phoneme in Liangmai will be *pə* ‘he/she’ and *pə̀* ‘his/her’, e.g., /pə-rā/ ‘his bone’ and /pə̀-rà/ ‘he (exclusively)’. It must be noted here that in Liangmai for a third person singular, *pə̀* ‘his/her’ would be suffixed with a possessed noun root and indicate a possession without the usual possessive marker /gu/ as /pə-rā/ ‘his bone’. With this evidence, even in phonemic transcription, I analyze schwa as a schwa for a practical purpose. On a more theoretical level, it may be in the future possible to subsume the schwa as /a/.

2.6. Diphthongs

There are nine diphthongs. They are /ai/ /au/ /ei/ /ia/ /io/ /iu/ /ɔi/ /ua/ /ai/ /au/ and /ui/. Except for the diphthong /ia/ and /ua/, the rest of the diphthongs are restricted to an open syllable. The diphthong /ei/ is marginal in its occurrence. The diphthong /ua/ is common to southern Liangmai variety. For the northern variety, an open mid vowel /ɔ/ is

¹⁴ /mákum/ is not a compound word but a root morpheme.

used instead. Nasalized diphthongs are not found to be present. Examples of the nine diphthongs are given in (1). The tone bearing unit in diphthong seems to be across the diphthong but I choose to place the tone diacritic on the first part of the diphthong in this paper partially for typing convenience or as assigning the tone on both the vowels of the diphthong makes the orthography look strewn.

(1)	/iu/	/t̃iu/	‘eat’
		/f̃iu/	‘search’
	/io/	/s̃io/	‘point’
		/m̃əd̃io/	‘smooth’
	/ei/	/j̃ei/	DECL
	/ia/	/k̃ət̃iaŋ/	‘pillar’
		/s̃ia/	‘chew’
	/ai/	/t̃ai/	‘kick’
		/p̃ai/	‘fly’
	/au/	/s̃au/	‘who’
		/l̃au/	‘write’
	/ɔi/	/m̃ɔi/	‘delete’
		/ŋ̃k̃ɔi/	‘crooked’
	/ua/	/t̃ ^h úan/	‘worship’
		/k̃úak/	‘forgive’
	/ui/	/s̃úi/	‘follow’
		/núi/	‘laugh’

The diphthong /ai/ and monothong /i/ are in free variation in two specific contexts: /ai/ → [i]. This is illustrated in (2) and (3). It occurs when an adjectival word, restricted to names of geography or settlements or community, describes an indefinite proper noun *māi* ‘someone’. This variation is common to the variety spoken in North Eastern villages like Takou, Lenglong, Kuilong etc.

- (2) /r̃iaŋl̃ɔŋ-m̃ai/ ~ [r̃iaŋl̃ɔŋ-m̃i]
 Rianglerong-person
 ‘The people of Rianglerong (village)’
- (3) [k̃ə̃k̃ā-k̃i-m̃ai] ~ [k̃ə̃k̃ā-k̃i-m̃i]
 white-house-person
 ‘The Britishers’.

Secondly, it also allows for a specific bound root morpheme *nāi* ‘day’ as shown in (4). It does not occur with time word like /m̃āpb̃ə-ñai/ ~ *[m̃āpb̃ə-ñi] ‘Sunday’.

- (4) /ŋ̃t̃^hāiñai/ ~ [ŋ̃t̃^hāiñi] ‘today’

/ṅdānāi/ ~ [ṅdānī] ‘yesterday’
 /ṅdānāi/ ~ [ṅdānī] ‘day before yesterday’

3. Syllable

This section discusses syllable structures including phonotactic distribution, consonant cluster, hiatus and syllabic consonant. The syllable in Liangmai consists of a nucleus with an optional onset and coda. A nucleus is represented by a vowel or a diphthong or a syllabic consonant. The occurrence of an onset consonant is frequent than the occurrence of a coda consonant. All syllables require a tonal realization. A simple canonical syllable structure of Liangmai may look like the Figure 5. The symbols in Figure 5 indicate: σ = Syllable; C = consonant; V = vowel (or a diphthong or a nasal syllabic consonant), and T is an obligatory suprasegmental tone.



Figure 5 – Syllable structure of Liangmai

The different shapes of syllable are illustrated with examples in Table 15. This Table only contains examples of the same types (i.e., no diphthongs and no syllabic nasal). While CV and CVC patterns are so predominant, VC pattern is absent with the exception of only one example, namely, *ām*¹⁵ ‘food’.

Syllable shape	Liangmai example	Gloss
CV	/pi/	‘give’
CVC	/pak/	‘run’
VC	/am/	‘food’
V	/i/	‘T’

Table 15 – Types of a syllable shape.

¹⁵ *ām*, for food is a very colloquial term commonly used for kids. But it is often use for a sarcastic purpose among adults.

In an open syllable type, we can have two types of syllable as V, and CV, and in a closed syllable, we have CVC and VC shapes as shown in Table 15. There are only one example for VC shape as far as I can find it from the data I listed, e.g., *ām* ‘food’. Besides the aforementioned types of syllable, in a rare case the structure of the syllable after a vowel syncope may appear as CCV (See §4.2).

Further, a syllable in Liangmai can be classified depending on whether a nucleus is a monothong or a diphthong and a syllabic consonant (See §3.4 for a discussion on the syllabic consonant).

3.1. Phonotactic distribution

Table 16 shows the possible occurrence of consonants, vowels, diphthongs and a nasal syllabic /ŋ/ in different slots. While vowel /i/, /ɔ/ and /u/ occur in all positions, occurrence of vowel /e/, /a/ and /ə/ are restricted to limited positions. Only alveolar nasal /n/ can function as a syllabic consonant (See §3.4).

C1	V	C2	T
all consonants	i, e, ə, a, ɔ, u, all diphthongs, one alveolar syllabic nasal	p, t, k, n, m, ŋ	high tone mid tone low tone extra low tone

Table 16 – Phonotactic distribution of syllable constituents.

3.2. Consonant cluster

Other Naga languages like Kohima Angami, Chokri, and Mao have consonant cluster at an onset level but Sumi appears to be different from them, consonant cluster is absent, as reported in Teo (2014: 113). A consonant cluster is absent in Liangmai. However, after a vowel syncope as part of a phonological process and/or due to idiosyncratic property, one may find a consonant cluster like /br/ /pl/ /tr/ /kl/ and /kr/ (§4.2). Some native speakers may in a casual or fast speech omit the schwa vowel, e.g., /pə̀lə̀mrá/ → [plə̀mrá] ‘because’, thus allowing consonant clusters. Otherwise, in a slow or hyper-articulation, a schwa is always present.

3.3. Hiatus

Pandey (2018) discusses four types of hiatus found in Indic languages i.e., languages which allow hiatus between syllabic nuclei, those which do not allow hiatus between syllabic nuclei, those which allow hiatus within morpheme and those which allow across morphemes. A hiatus occurs in Liangmai across morphemes due to morphological and

syntactic concatenation. In the examples (5) and (6), it is occurring in compound words, and in (7 and 8), it is occurring across two free morphemes at a sentence level.

- (5) *kà-ābá-bō rāpēn*
 PRE-pale-NOM flower
 ‘A pale (white) colour flower.’
- (6) *ā^htāu-ārī*
 collide-argue
 ‘Argue’
- (7) *tīu-ā^hmānsái*
 eat-comfort
 ‘Delicious’ (Literally- ...very good to eat).
- (8) *t^hīu-ākāk*
 sing-reply
 ‘to sing in responsive manner (by two parties).’

A vowel deletion is not allowed in these adjacent vowels. The individual tone of the vowels in the vowel sequence remains. Figure 6 and 7 show spectrograms of a non-resolution of central vowel /a/ for the words *kà-ārát* ‘lie (N)’ and *pà-āli* ‘his manner’ as articulated by the author. Figure 6 seems to be showing a slight amount of glottalization. In a careful manner, if I briefly paused right after the first morpheme, the vocal track seems to be softly obstructed. But in terms of the sound, they (Figure 6 and 7) sound similar.

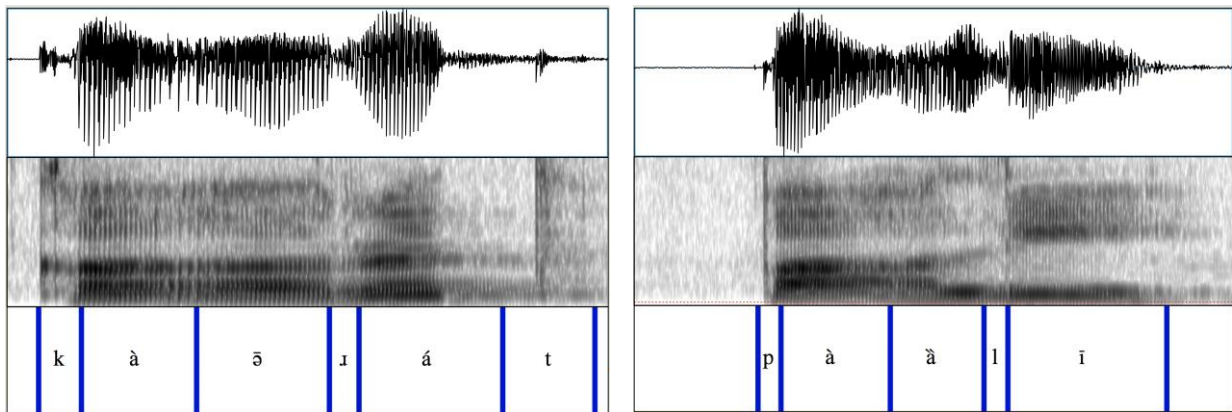


Figure 6 and 7 – Wave forms and Spectrograms showing non-deletion of vowels in hiatuses *kà-ārát* ‘lie (n)’ and *pà-āli* ‘his manner’.

3.4. Syllabic consonant /ŋ/

There is a considerable presence of a nasal syllabic consonant in Liangmai words. As noted, the position of nucleus therefore in Liangmai syllable will be occupied by a syllabic consonant as well. The alveolar nasal phoneme /ŋ/ is the only one consonant that is syllabic and is abundant both in noun words, verbal words and interrogative pronouns, e.g., *ŋt̪i̯aŋ* ‘shirt’, *ŋd̪e̯* ‘what’, *ŋp̪a̯* ‘hut’, *ŋs̪i̯ŋ* ‘roof storage’ and *ŋk̪o̯ŋ* ‘porcupine’. But a nasal syllabic consonant occurs only in an initial position. A bilabial nasal /m/ may appear as a nasal syllabic consonant for many speakers and this is due to an assimilation process where an alveolar nasal /n/ becomes a bilabial nasal /m/ only before the bilabial stops /p/ and /b/ (See §5.2 for an assimilation). Figure 8 below shows a waveform and a spectrogram of syllabic consonant words *ŋp̪u̯i* ‘road’ and *ŋk̪o̯ŋ* ‘porcupine’ articulated by the author.

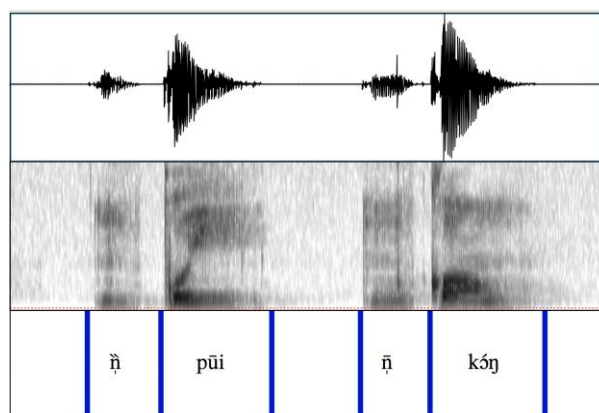


Figure 8 – Waveform and spectrogram of syllabic consonant words *ŋp̪u̯i* ‘road’ and *ŋk̪o̯ŋ* ‘porcupine’.

Charengna (2018) and Kailadbou Daimai (2021) reported the presence of prenasalized sounds in Liangmai. ID, Raguibou (2016) also listed 18 prenasalized phonemes and even included them in his consonant inventory. These co-researchers consider what I analyze here as a syllabic consonant as a prenasalized sound. The reason for these difference in our analyses is that in the above mentioned reports on prenasalization, an alveolar nasal is superscripted before a stop, an approximant and so on in their transcription, and hence a single sound unit for them and they do not elaborate how this is a single sound unit, while my data shows the alveolar nasal /n/ as syllabic consonant in the transcription. This transcription can be seen in Figure 8 above. The alveolar nasal clearly forms as a separate speech unit (phoneme) before a subsequent stop onset /p/. The syllabic nasal doesn’t change its place of articulation because of the following consonant. It has a tone of its own and is followed by both open and closed syllables. It appears as the first syllable in disyllabic words. Interestingly, it is followed by all consonant onset except for the palatal approximant /j/. Notwithstanding the aforementioned statement, in a fast but a rare case, a bilabial stops (but not a fricative or a nasal or an approximant) may be articulated as a prenasalized onset.

Another type of syllabic consonant is triggered by a vowel elision in personal pronoun word *nāŋ* ‘you’. In this specific phonological environment i.e., in *nāŋ* with any possessed noun, a low vowel /a/ and a velar nasal /ŋ/ will be allowed to delete and the remaining nasal consonant /n/ becomes a syllabic consonant as shown in (9).

- (9) /*nāŋ-kī*/ → [*ŋkī*] ‘your house’
 /*nāŋ-pī*/ → [*ŋpī*] ‘your head’.

Some vocabularies common to the Southern Liangmai villages like Thalou and Niamning (see Table 2) have no syllabic consonant by nature, e.g., *ku̯m* ‘come (down)’, *k^hám* ‘door’, and *t^háināi* ‘today’ against the common forms, e.g., *ŋ^hku̯m* ‘come (down)’, *ŋ^hk^hám* ‘door’, and *ŋ^ht^háināi* ‘today’. In general, dropping of syllabic consonant is permissible in Liangmai but potential to create confusion in certain context to the listener because it (the remaining root morpheme) becomes identical with other homophones which may have the same tone as well, example, *t^hɔ̯k* ‘to hit (with snout as of pig)’ VS /*ŋ^ht^hɔ̯k*/ → [*t^hɔ̯k*] ‘to fetch (water)’. It is also difficult to explicitly point out under what condition syllabic consonant is systematically allowed to be dropped. However, dropping of syllabic consonant is not permissible in all positions in the spoken variety of North Eastern variety for certain noun words, e.g., *ŋ^hk^hè* ‘sickle’, *ŋ^hk^hɔ̯ŋ* ‘porcupine’ but the central variety like Chiang, Machenglong villages and Southern variety like Thalou allows to be dropped in all words (p.c. Nampibou Marinmai, Kailadbu Daimai, 2021).

4. Phonological process

4.1. Consonant deletion

A consonant deletion occurs across morphemes. A velar coda /k/ in a negative morpheme /*māk*/ is allowed to be deleted in fast speech or casual speech as shown in (10). This process seems to be extended even to some lexical words, e.g., /*pɔ̯k* → *pɔ̯* ‘burst’, *mə̯nɔ̯k* → *mə̯nɔ̯* ‘paint’, *sàk* → *sà* ‘drink’.

Another type of consonant deletion occurs in a specific context i.e., when the second person singular pronoun *nāŋ* ‘you’ occurs to express a possession with its reduced form /*nə̯*/, the nasal coda in /*nāŋ*/ is deleted. In the process, even the nucleus undergoes a change from the phoneme /a/ to /ə̯/ as shown in (11). This is not strictly a consonant deletion, but rather a reduced pronominal form as is common throughout Tibeto-Burman languages of the region. All three forms of the pronoun -- the full, reduced and syllabic nasal -- coexist and there is no indication that this is an ongoing sound change but is instead stable alternation.

- (10) /*sī-māk-gēi*/ → [*sī mā-jēi*]
know-NEG-DELC
 ‘(I) don’t know.’

5. Morphophonology

5.1. Allophonic variation due to morphophonology

5.1.1. /p/ and /b/

Voiced and voiceless bilabial stops of Liangmai are in free variation in a specific morphophonemic condition: when a give-verb *pī* ‘give’ forms a compound verb with any root verbs, /p/ is realized as /b/. This voicing alternation seems to occur only with the verb *pī* ‘give’, example,

- (14) *kámpí-ləu* ~ *kámbí-ləu* ‘beat’ (IMP)
dínpi-ləu ~ *dínbí-ləu* ‘tell’ (IMP)
láŋk^háipi-ləu ~ *láŋk^háibi-ləu* ‘cook’ (IMP)

5.1.2. /t/ and /d/

Voiceless alveolar stop /t/ and voiced alveolar stop /d/ are also in free variation in a limited context i.e., word initially for a prohibitive marker as /tū/ ~ [dū].

5.1.3. /k/ and /g/

Voiced velar /k/ and /g/ are in free variation in a specific context. The locative marker /ga/ can be realized as /ka/. This occurrence happens only if the locative marker is preceded by an adverbial demonstrative or place adverbs. The usage of /k/ and /g/ as a free variant is common to South Eastern Liangmai villages such as Makhen, Ariang and Konsaram. Examples are shown in (15).

- (15) /*hai-ga*/ ~ [*hai-ka*]
 PROX-LOC
 ‘here’

 /*si-ga*/ ~ [*si-ka*]
 DIST-LOC
 ‘there’

5.1.4. /m/ and /n/

Voiced bilabial nasal /m/ and /n/ voiced alveolar nasal are also in free variation in a specific contexts i.e., coda position in a word /*kám*/ ~ [*kán*] ‘do’, /*dēlām*/ ~ [*dēlān*] ‘where’.

5.2. Assimilation

Both progressive and regressive assimilations involving consonant and vowel phonemes in Liangmai are discussed in this section. This assimilation processes are caused by a morphophonemic factor and not a regular phonological process in the language.

5.2.1. Progressive assimilation

Progressive assimilation are given in example (16-18). The assimilation process with the following phonemes does not always occur in the given phonological environment. They are restricted only to certain morphemes as shown in the examples. These phonological processes are sporadic.

(16) /d/ → /t/ ___[t]

/k^hàt-dí/ → [k^hàttí] 'and'

/tát-dù/ → [tàttù]

go-PROH
'Do not go.'

(17) /l/ → /n/ ___[n]

/lán-ləu/ → [lán-nəu]

repeat-IMP
'repeat!'

/tsəgàñ-lĩ/ → [tsəgàñni]

curry-pot
'Curry pot'

(18) /j/ → /n/ ___[n]

/t^hón-jēi/ → [t^hón-nēi]

praise-DECL
'Thanks'

/zīsú dín-jēi/ → [zīsú dín-nēi]

Jesus say-DECL
'Jesus said...'

The phonetic form of palatal approximant /j/ when it is used as a declarative marker can have several variants depending on the environment it occurs. Various allomorphs of the palatal /j/ when used as a declarative marker /jēi/ is given in morphophonology section §5.3.

5.2.2. Regressive assimilation

There are two instances of regressive assimilation. An alveolar nasal /n/ becomes a bilabial nasal /m/ when it is succeeded by a bilabial stop /p/ or /b/ (19). This may be due to the articulatory features of the subsequent onset phoneme i.e., bilabial nasal /m/.

- (19) $n \rightarrow m$ ___ [p/b]
 /ṅpɔŋ/ → [ṅpɔŋ] ‘jug’
 /ṅbìn/ → [ṅbìn] ‘to travel’

A velar nasal also becomes a bilabial nasal when it is succeeded by a bilabial stop as shown in (20). However, in my database, (20) is the only example where velar /ŋ/ becomes /m/ in the environment of /p/. The compound word *lūmpōm* ‘anger’ in (20) is formed by suffixing with a free form *pɔm* ‘to be angry’ to a bound root *-lūŋ* ‘heart’. In its usage, the word *pɔm* ‘to be angry’ is naturally prefixed by *-lūŋ* ‘heart’ although it is fine to use just *pɔm* ‘to be angry’ to use as a verb. But it is quite puzzling if we check this velar nasal regressive assimilation process in other context. Observe velar nasal in examples (21) and (22). The velar nasal in the word *-lūŋ* ‘heart’ does not become a bilabial nasal /m/ as it should have been as per the morphophonemic process in (20). In both the examples (21) and (22), like in (20), a velar nasal is followed by closed syllable, and each syllable has a bilabial stop onset and a velar nasal coda. But one of them (22) does not get assimilated to the bilabial stop /p/. Therefore, this phonological process is restricted only to a specific morpheme.

- (20) /ŋ/ → /m/ ___ [p]
 /ṅpɔm/ → [lūmpɔm] ‘anger (N)’

- (21) *ə-lūŋ* *pɔm-jēi* → [ə-lūmpɔm-mēi]
 1SG-heart angry-DECL
 ‘I am angry.’ (Lit. My heart is angry).

- (22) *ə-lūŋ* *pāŋ-mí-jēi* → [ə-lūŋ pāŋ-mí-dēi]
 1SG-heart break-PERF-DECL
 ‘I am sad.’ (Lit. My heart is broken).’

5.3. Various forms of the declarative marker /jēi/

In this section, I present a variation of the verbal suffix /jēi/ which is called a declarative marker. An allomorph of the declarative morpheme /jēi/ in Liangmai can be realized in eight forms depending on the environment it occurs, generally succeeding a nucleus or a coda of a verbal word. This verbal suffix indicates a statement. A declarative sentence is shown in example (23).

- (23) *i* *náimətsàŋ* *tsəpái-rīaŋ* *rá-jēi*
 1P everyday bamboo-rope peel -DECL
 ‘I thread a bamboo rope everyday.’

The eight allomorphs of the declarative marker /jēi/ as they appear when they suffixed a closed syllable and an open syllable are illustrated in the Table 17.

Form	Example showing (1st column) the underlying forms and (2nd column) assimilated forms	Gloss	Liangmai orthography*
Verb root having closed syllable			
/j/ → /p/ ___[p]	kāp-jēi →	kāp-pēi	'cry (-decl)' kap-e
/j/ → /l/ ___[t]	tat-jēi →	tat-lēi	'go (-decl)' tatlē
/j/ → /g/ ___[k]	dàk-jei →	dàk-ge/dàk-kēi	'weave (-decl)' dakge
/j/ → /ŋ/ ___[ŋ]	tíŋ-jēi →	tíŋ-ŋēi	'stingy (-decl)' ting-e
/j/ → /m/ ___[m]	tām-jeī →	tām-meī	'less (-decl)' tamme
/j/ → /n/ ___[n]	t ^h úan-jēi →	t ^h úan-nēi	'thank (-decl)' thuonne/thuon-e
Verb roots having open syllable			
/j/ → /oi/ ___[ɔ]	bō-jēi →	bōi	'nom-decl' bo-e
/j/ → /j/ ___[i, e, a u]	tī-jēi → pè-jēi → pá-jēi → pù-jēi →	tī-jēi pè-jēi pá-jēi pù-jēi/pù-wēi	'small (-decl)' ti-e 'pluck (-decl)' pe-e pa-e read (-decl)' pu-e busy (decl)'

*a practice followed in the Holy Bible of Liangmai

Table 17 – Various allomorphic forms of the verbal suffix /jēi/.

With regard to a verb root ending with a vowel, the morpheme /jēi/ will appear as it is with the exception for the mid back vowel /ɔ/ as shown in the second last row in Table 17. The onset of the morpheme /jei/ also can become velarized following the morpheme with a velar stop coda /k/ as [dàk-kēi]¹⁶ 'weave-DECL' instead of /dàk-gēi/ 'weave (decl). Between the two phonetic forms /[gēi] and [kēi], the former is frequently used by all spoken varieties.

16 This form is common to a spoken variety found in Liangchi (Makui) village and its surrounding areas.

6. Tone

There are four lexical tone contrasting as high, mid, low and extra low in Liangmai and this has been observed in all varieties of Liangmai that I have studied so far. Earlier studies on Liangmai tone report the existence of three levels of tone: high, mid and low (Amos 2007; Maitaina and Pandey 2009; Pandey 2014: 413; Charengna 2011, 2017; ID, Raguibou 2015; Daimai, G 2016; Daimai, K 2021), and later, a four level tone pattern was reported by the author (Maitaina 2014: 71)). This paper re-affirms the presence of four contrastive level tones in Liangmai as high, mid, low and extra low. The presence of contour tones is very few in numbers, and some of them will be discussed **very** briefly in (§6.2). Moita supplied only seven triplets without marking the tone. Charengna (2011: 56) also listed only two triplets. ID, Raguibou (2015: 81) also listed only six examples without a minimal pair or triplet. Guichamlung Daimai (2016: 52) also listed ten triplets. In all the four studies, acoustic cues were not given. Going by those few examples from both the studies, it may not be possible to explain why they have listed only three levels of tone. No example on contour tone was given by them. Maitaina and Pandey (2009) in their manuscript considered the fourth tone to be an allotone which later turned to be not the case as reported by the author (Maitaina 2014) following further investigation.

The method followed to ascertain the pitch value of the tone in the study was done by recording words in isolation and in carrier phrases. Native speakers have a difficulty to identify the number of tones unless they have minimal pairs or triplets (Coupe 2014; Konnerth 2014) and this is very much so with the native speakers of Liangmai. A field worker inquiring the number of tones from a native speaker will always fail to get the answer unless the native speaker understands what a tone in language is meant by. To identify the number of the tone in Liangmai, perception of the pitch of my voice and many speakers of Liangmai were considered. And words in isolation and carrier phrases were recorded with both male and female speakers to cross check so that they are in consonance with the already listed tone words that were taken to be in contrastive levels of tones by the perception method. Isolated words are recorded in random order i.e., it is not recorded as a sequence of minimal set words. The values of those pitches were identified in the spectrogram using the Praat¹⁷. In a waveform and a broad band spectrogram, a syllable is selected and obtained an average pitch value of each syllable. For acoustic cues, three females and three males were included, all ranging from twenty-five to forty-three years of age and they are from the North Eastern Liangmai spoken area (Please see Table 2). To expand the data coverage in the analysis of Liangmai tone, formerly, two consultants each from all the remaining four regions mentioned in Table 2 were also added in this study¹⁸ besides an observation of the voice of other speakers during **daily** normal interaction with many others as a native speaker myself. In all, 21 speakers' voice were recorded for tone analysis and among them fourteen of them were taken formerly for acoustic examination in this study.

17 Boersma, Paul & Weenink, David (2021). Praat: doing phonetics by computer [Computer program]. Version 6.1.55, retrieved 25 October 2021 from <http://www.praat.org/>

18 Pingsilak Newmai, M-52, of Nzau village Nagaland, Paramjin Moita, M-35 of Tharon village, Jisingbou NK, Niamning (Inem), Holang Ngonamai, Thonglang Akutpa and Ajiukamliu Pamai, Chiang (Langmei) village, Manipur.

A syllable in Liangmai is considered as a tone bearing unit (TBU) rather than a vowel or a rhyme. Whether a generic prefix of disyllables particularly a sesquisyllable has an inherent tone or their tone is influenced by the root is to be ascertain in a future study. As of now, they seem to have an inherent tone as we can see between *tsəká* ‘friend’ and *tsə̀lù* ‘field’. Here, the tone of both the prefixes *tsə̀* are not influenced by the tone of the root morpheme. Similarly, the tone of verbal suffixes seems to be influenced by the root verb they affix to, but some of the verbal suffixes such as an imperative marker */lāu/* and a hortative marker */k^hē/* are not necessarily influenced by the tone of a root verb. As is common, in a phrasal context, due to tone alternation process most of the tonal values of roots and affixes can be influenced by the environment they occur in and this process is not discussed in this paper. Tonal words in a quadruplet set are very few, and a triplet words and a minimal pair words are so plenty. The four level tones in Liangmai are illustrated below in Table 18. Observe each of the roots i.e., the second syllable but here, each disyllable of the four examples in Table 18 is a root themselves. I used them because they are the best quadruplet example found in my database to demonstrate four level tones.

TONE LEVEL	SYMBOL	NUMBER OF TONES	EXAMPLES
High tone	é	Tone 1	mārá ‘scream’,
Mid tone	ē	Tone 2	mə̀rā ‘sick’,
Low tone	è	Tone 3	màrà ‘scatter’
Extra low tone	ě	Tone 4	mə̀rà ‘play (as top)’

Table 18 – The four level tones of Liangmai.

Let us look at the pitch traces of a humming sound of random words representing four different tones of Liangmai and also the pitch traces of their actual pronunciation to establish four tone levels. To ascertain this specific four tones, I listed down in random order twenty-four citation words of monosyllable and disyllable that I suspect it to be words that represent all the four categories of tone. Without making them conscious about the tone, six consultants were formerly asked to produced them in recording. Figure 9 shows pitch traces of these four words in humming, and Figure 10 shows pitch traces of its actual articulation by Namsidinbou Poutamai, age 35. The mid point of the hertz value is taken as the pitch of the tone.

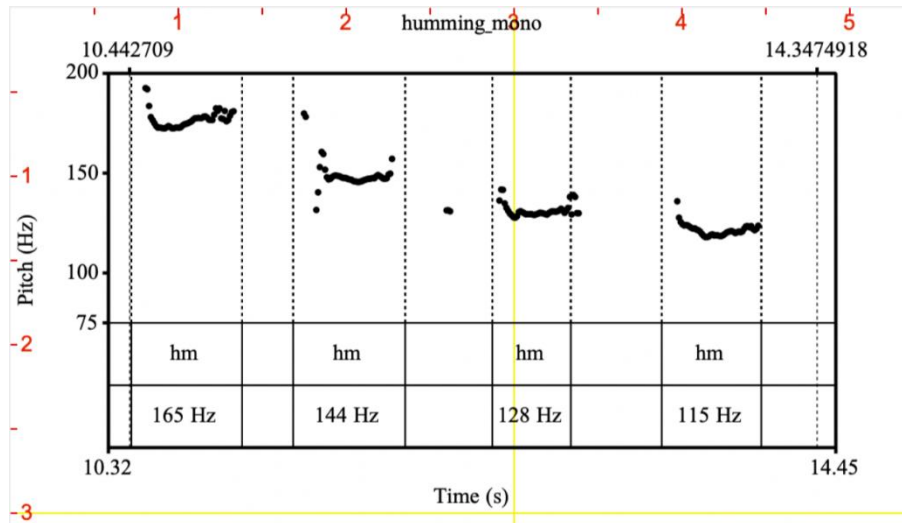


Figure 9 – Pitch traces of humming sounds *kú* ‘high’, *kā* ‘white’, *zà* ‘pierce’, and *pà* ‘he’.

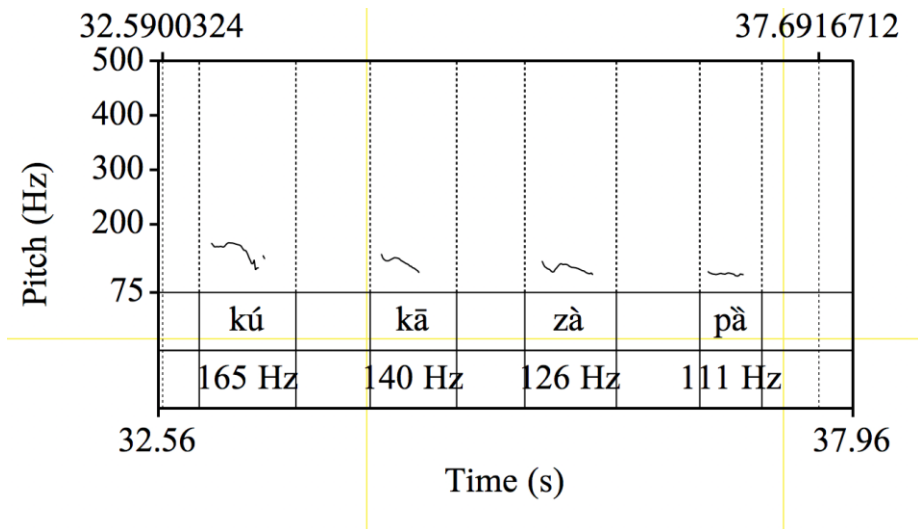


Figure 10 – Pitch traces of *kú* ‘high’, *kā* ‘white’, *zà* ‘pierce’, *pà* and ‘he’.

In addition, the Figure 11 shows a quadruplet of bisyllabic words further establishing four tone levels in Liangmai. The pitch value for each four tone are in average 160Hz for high tone, 138Hz for mid tone, 123Hz for low tone and 112Hz for extra low tone.

6.1. Minimal quadruplets and triplets tone words

More examples on minimal triplets and minimal quadruplets are supplied in this section. Table 19 shows minimal quadruplet words and Table 20 shows minimal triplet words in monosyllables.

HIGH	MID	LOW	EXTRA LOW
/zá/ ‘to socialize’	/zā/ ‘to cut away trees in large scale’	/zà/ ‘to pierce’	/zà/ to mix with hands (of salad)
/mārá/ ‘scream’	/mārā/ ‘sick’	/mārà/ ‘spread’	/mārà/ ‘play (as toy)’
/tsíu/ ‘so’	/tsīu/ ‘easy’	/tsiù/ ‘eat’	/tsiù/ ‘hear’
/lí/ ‘change’	/lī/ ‘draw (water)’	/lì/ ‘piece’	/lì/ ‘transfer (good)’

Table 19 – Quadruplet tonal words.

HIGH	MID	LOW	EXTRA LOW
/pá/ ‘read’	/pā/ ‘collapse’	—	/pà/ ‘she/he’
/són/ ‘difference’	/sōn/ ‘cheat’	—	/sòn/ ‘to receive (load)’
/níu/ ‘ache’	—	/niù/ ‘by’	/niù/ ‘taboo’
/bén/ ‘bright’	/bēn/ to wear shawl over the body	—	/bèn/ to be careful
/mázíu/ ‘loose motion’	/mèzīu/ ‘downward’	—	/mèzīu/ ‘wrap’
—	/tsəmī/ ‘marriage’	/tsəmì/ ‘meat’	/tsəmì/ ‘fire’

Table 20 – Triplet tonal words.

6.2. Contour tones

Contour tones are rare but found to be present in Liangmai. They are noticeable only when it is articulated in isolation. They may become a level tone when used it in context. The examples given here are mainly from North Eastern Liangmai spoken area although I observed the same pattern is in the variety of Nzau village which is under North Western area, and Niamning village which is under South Western area. Examples of contour tones are given in (24). I could find only a dozen contour tones in my database and the pitch

traces of them typically rise from their starting pitch level to a higher level in the end as shown in Figure 13. Due to the meagre number of contour tones present, it may not be able to state if these tones are inborn tones or came from elsewhere until we look further into it. Examples of falling contour are not found. The length of the vowels in these words seems to be usually longer than the vowels carrying a level tone. The pitch traces of Liangmai word uttered by Holang Ngonamei and Kadinponbou from North Eastern area are shown in Figure 13 and 14. Figure 13 is a monosyllable word. Figure 14 is a disyllable word where contour tone is borne by the second syllable.

- (24) *zět* 'sleep'
tǒp 'suck (milk of breast)'
təkī 'stroll'
təpǔŋ 'baby's food'
ŋsǎn 'morning'
təkī 'stroll'
kīk^hŷn 'family'
tìŋkǔm 'year'
kənǐu 'snake'
əśŋ 'soya bean'
mət^hŷu 'hire'
əlǔ 'joke'
ŋtǎu 'sit'
təpən 'to search food (as of a chicken for her chicks)'

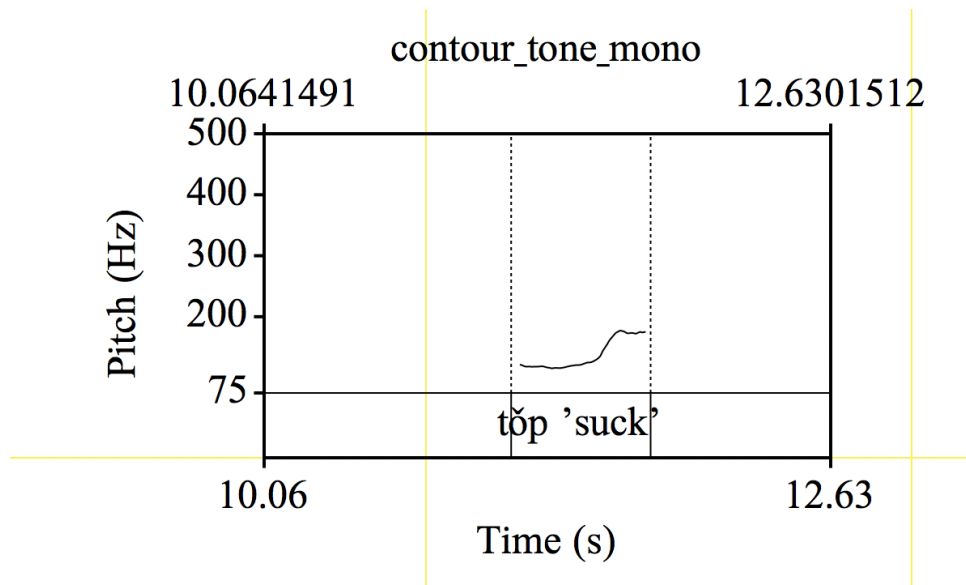


Figure 13 – Pitch traces of a mono syllable word *tǒp* 'suck' in isolation.

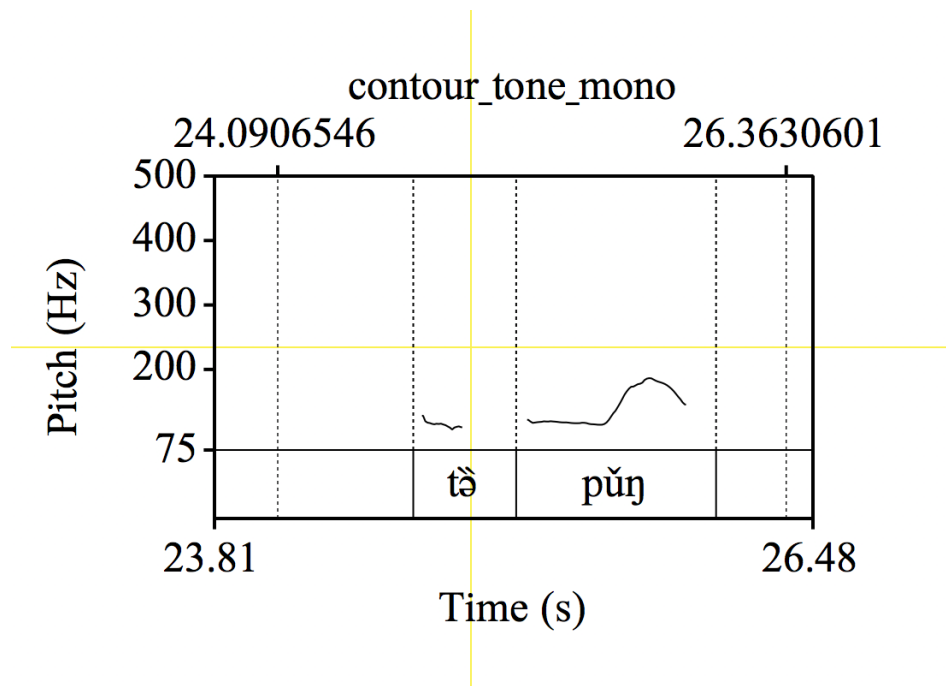


Figure14 – Pitch traces of a disyllable word *təpŋ* 'baby's food' in isolation.

7. Conclusion

This paper has outlined the phonological account of Liangmai, spoken in Northeast India. It highlighted some features of Liangmai phonology earlier reported by others and has served as an update on the study of Liangmai sound system. There are twenty consonant phonemes, six vowel phonemes, nine diphthongs with four level tones at the prosodic level in the language. With only three stops and three nasals permitted at the end of a syllable and all consonants occurring at the beginning of a syllable, the consonant phoneme inventory displays phonological features that are common to the typological features of Northeast Indian languages reported so far (Burling 2003). With or without coda, the place of a nucleus is occupied by a vowel and also a syllabic nasal often sits on the first syllable of a disyllable. Consonant cluster is not permitted in a syllable but a cluster may be formed in fast speech due to schwa deletion. Level tones are plenty and contour tones are quite rare. Tone alternation process are taking place and this will be an important feature in future study of Liangmai tone. The study of contour tone and the tone of an affix will be an interesting area to further look into. Importantly, the voicing features in relation to the tone must be further looked upon. It needs to address the question whether one or several of the tone categories also involves other features such as a breathy voice (e.g., the extra low tone) or a creaky voice (e.g., the high tone). A prosodic features such as stress, rhythm and intonation patterns will be an important feature to study in future. The present study will be an insight for those who are studying on the sound systems of other Northeast

Indian languages. Like many other community members in Northeast India, Liangmai are struggling for systematic writing system to represent their language in written form, and the present study also will be a help to the preparation of Liangmai orthography.

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