

Consonantal Phonemes in Lotha: A Study of Inventory, Realization, and Distribution

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Abstract

The phonemic inventory of Lotha consonants, a Tibeto-Burman language spoken by the Lotha people in Nagaland, India offers a remarkable inventory of consonants in Lotha. The study focuses on the inventory of consonants in the language, their phonetic realization, and their distribution in different phonological contexts. Lotha has thirty-seven consonantal phonemes that can be further classified based on their manner of articulation and place of articulation. Lotha consonants are divided into two classes: obstruents and sonorants. The obstruents consist of plosives, fricatives, and affricates, and are predominantly voiceless, whereas the sonorants comprises of nasals, liquids, and approximants, and are generally voiced. The study reveals that Lotha exhibits a sizeable inventory of obstruent sounds, with twenty-three consonantal phonemes, and fourteen sonorant phonemes. The work examines the voicing properties of these consonantal phonemes, with seventeen voiceless obstruents, six voiced obstruents, eight voiced sonorants, and six voiceless sonorants. The paper provides an in-depth analysis of Lotha consonants and their distribution of sounds in the language.

Keywords: Lotha, Naga, Tibeto-Burman, Phonology, Consonants, Voicing, Articulation

1. Introduction

1.1. Brief background of the Language

Genetically Lotha belongs to the central Naga group of the Tibeto-Burman sub-branch of the Sino-Tibetan language family, which is spoken by an estimated population of 179,000 individuals, as per the Census of India, 2011. Lotha is spoken all over Nagaland, with the majority of speakers residing in the Wokha district. Lotha does not possess its own script, and instead utilizes the Roman script introduced by the British and American Missionaries during the late 19th century.

Despite having various dialectal variations, linguistic variation in Lotha is primarily observed at the lexical variation, specifically in the accent of the speakers, which may vary from village to village due to regional differences. Literary works in Lotha are predominantly composed in the variety spoken in central villages, specifically in and around Wokha town.

The study focuses on the standard variety of the Lotha language spoken in and around Wokha Town. By examining this variety, the study aims to provide a comprehensive analysis of the language's sound system, with a particular focus on the consonantal phonemes. Through this analysis, we hope to contribute to a deeper understanding of the Lotha consonantal phonemes.

Earlier works on the sound system of Lotha is limited and one of the earlier works was that of Acharya's (1973) 'Lotha Grammar' and Acharya's (1975) 'Lotha phonetic reader' where he provides a description on the phonetics of Lotha. His work includes a description on the segmental sounds and tones. He listed thirty-three consonantal phonemes and on the basis of the point of articulation Lotha has seven ways opposition which are bilabial /p, p^h, pf, f, m, m^h, w/, labiodentals /f, v/, alveolar/t, t^h, ts, ts^h, s, z, n, n^h, l, l^h, r, r^h/, palatal /c, c^h, š, ž, ñ, ñ^h, ŋ, ŋ^h, y/, velar/k, k^h/ and glottal /h/.

On the basis of the manner of articulation, Lotha has seven ways opposition which are stops /p, p^h, t, t^h, c, c^h, k, k^h/, affricates /p, pf, ts, ts^h/, Nasals /m, m^h, n, n^h, ñ, ñ^h, ŋ, ŋ^h/, laterals /l, l^h/, trills/r, r^h/ and glide /w, y/.

Bruhn (2014) on the other hand, in his work 'A Phonological reconstruction of Proto-Central Naga' listed 30 consonantal sounds in Lotha /m, m̃, n, ñ, ŋ, ŋ̃, p, p^h, t, t^h, k, k^h, ʔ, ts, ts^h, tʃ, tʃ^h, f, v, s, z, ʃ, h, l, l̃, r, r̃, j, j̃/.

1.2. Methodology

The methodology employed in this research study is a qualitative approach that draws on primary data collected from language consultants, who are native speakers of Lotha, through field work. The sample of language consultants comprised of eight individuals, both male and female, from various age groups, including both educated and illiterate individuals to provide a diverse range of perspectives. Data elicitation was conducted through interviews with language consultants, utilizing techniques such as word-lists and oral traditions. The collected data was subjected to thorough analysis using linguistic methods to examine the features of consonants in Lotha. This qualitative approach allowed for a deeper understanding of the consonantal sounds in the language and provided insight into the sound system of Lotha, consonants in particular.

The tools used for elicitation of data include methods of interviews, questionnaires and audio recorders like Zoom H4n, were used for recording and analyzing the data.

2. Consonantal Phonemes in Lotha

The consonant table is presented in the conventional form, where the place of articulation is on the horizontal axis and the manner of articulation on the vertical axis. When there is a voicing contrast, the left sound shown in the table is voiceless and the right sound is voiced. Based on the above definitions, Lotha has thirty-seven consonantal phonemes: /p, p^h, t, t^h, c, c^h, k, k^h, m, m̥, n, n̥, ɲ, ɲ̥, ɳ, ɳ̥, ʃ, ʃ̥, v, s, z, ʒ, h, ʔ, pʃ, bʋ, ts, dz, ts^h, tʃ, dʒ, l, l̥, r, r̥, w, j/. Based on the manner of articulation, Lotha has a total of nine stops, eight nasals, seven fricatives, seven affricates, two laterals, two trills and two approximants. Each of these series can be further classified into bilabial, labio-dental, alveolar, alveo-palatal, palatal, velar and glottal on the basis of their place of articulation. The consonant phonemes in Lotha have been identified to have allophonic variants. The allophonic variants of the consonant phonemes in Lotha are illustrated below:

The bilabial /p/ has three allophonic variants [p], [p̥] and [b].

The alveolar /t/ has two allophonic variants [t] and [d].

The palatal /c/ has two allophonic variants [c] and [j].

The velar /k/ has three allophonic variants [k], [k̥] and [g].

Table 1 illustrated below represents the inventory of consonantal phonemes in Lotha:

	Bilabial	labio-dental	Alveolar	Post-alveolar	Palatal	Velar	Glottal
Stop	p p ^h		t t ^h		c c ^h	k k ^h	ʔ
Nasal	m m̥		n n̥		ɲ ɲ̥		
Fricatives		f v	s z	ʃ ʒ			h
Affricates		pʃ bʋ	ts dz ts ^h		tʃ dʒ		
Lateral			l l̥				
Flap			r r̥				
Approximant	w				j		

Table 1: Consonantal phonemes of Lotha

Lotha has a large inventory of obstruent sounds consisting of twenty-three consonantal phonemes belonging to the obstruent class comprising of plosives (oral stops), fricatives and

affricates. The rest fourteen consonantal phonemes belong to the sonorant class comprising of nasals, liquids and approximants. Prototypically obstruent sounds are mostly voiceless; however voiced sounds are also common. Lotha has seventeen voiceless obstruent sounds: /p, p^h, t, t^h, c, c^h, k, k^h, ʔ, f, s, ʃ, h, pf, ts, ts^h, tʃ/ and six voiced obstruent sounds: /v, z, ʒ, bv, dz, dʒ/. On the contrary, sonorant sounds are prototypically voiced and rarely voiceless. Lotha has eight voiced sonorant sounds: /m, n, ɲ, ŋ, l, r, w, j/ and six voiceless sonorant sounds: /m̥, n̥, ɲ̥, ŋ̥, l̥, r̥/ which made up a unique characteristics of Lotha consonants.

2.1. Contrastive Pairs Between Phonemic Consonants

The importance of understanding the phonetic and phonemic aspects of a language is to accurately describe and analyze its sound system. The data presented exhibits the contrastive pairs of phonemic consonants in Lotha, which have been identified to have allophonic variants. The phonemic contrasts are exemplified by a set of minimal pairs and near-minimal pairs of words.

The illustrations below showcase the contrast between voiceless aspirated and voiceless unaspirated stops that occur initially at the bilabial, alveolar, and velar locations of articulation. This contrast is illustrated by the following minimal pairs and sub-minimal pairs of words, which differ solely in the presence or absence of aspiration at these specific places of articulation:

/p/	vs	/p ^h /
/puŋa/ ‘puffy’		/p ^h uŋa/ ‘smokey’
/t/	vs	/t ^h /
/tena/ ‘to pluck’		/t ^h ena/ ‘sour’
/k/	vs	/k ^h /
/tsoki/ ‘to skip’		/tsok ^h i/ ‘mosquito’
/c/	vs	/c ^h /
/cəma/ ‘to boil’		/c ^h əma/ ‘to plant’

The phonemic contrast between voiceless aspirated and voiceless unaspirated affricates is illustrated through the following minimal pairs of words: /ts/ versus /ts^h/. These pairs exemplify the difference in aspiration between the two sounds.

/ts/	vs	/ts ^h /
/tsóá/ ‘to work’		/ts ^h òá/ ‘hot’

The phonemic contrast between the initial nasal sounds that occur at the bilabial, alveolar, palatal, and velar points of articulation is demonstrated by the following minimum pairs:

/m/ vs **/n/**
/òmà/ ‘uncle’ vs */ònà/* ‘aunt’

/n/ vs **/ŋ/**
[ēvāʔ] ‘seat’ vs */èvèŋ/* ‘neck’

The illustrations presented depict the phonemic differentiation between palatal nasals with voicing and without voicing, occurring at the beginning and middle of words, and are demonstrated using minimal pairs of words:

/ɲ/ vs **/ɲ̥/**
/ɲána/ ‘to bawl’ vs */ɲ̥ána/* ‘nearby’

The illustrations provided depict the phonemic differentiation between velar nasals with voicing and without voicing that occur at the beginning and in the middle of words, using minimal and near-minimal pairs of words:

/ŋ/ vs **/ŋ̥/**
/enəŋa/ ‘now’ vs */eŋ̥əna/* ‘to smell/sniff’

The illustrations provided depict the phonemic differentiation between fricatives with voicing and without voicing that occur at the beginning and in the middle of words, using minimal and near-minimal pairs of words:

/f/ vs **/v/**
/ofe/ ‘skin’ vs */ove/* ‘frog’

/s/ vs **/z/**
/sʂsəʔ/ ‘dragon fly’ vs */zəzəʔ/* ‘snail’

/ʃ/ vs **/ʒ/**
/èʃəʔ/ ‘raw’ vs */èzəʔ/* ‘air’

/s/ vs **/h/**
/soka/ ‘to slide’ vs */hoka/* ‘to hook’

The illustrations provided demonstrate the phonemic distinction between affricates that are articulated at different points of articulation; labio-dental, alveolar, and palatal points. This distinction is highlighted through the use of minimal pairs of words:

/pf/ vs **/bv/**
/pfə̄pfə̄/ ‘hay bud’ */bvə̄bvə̄/* ‘trumpet’

/ts/ vs **/dz/**
/tsə̄rə̄/ ‘slice it’ */dzə̄rə̄/* ‘weaving instrument’

/ts/ vs **/tʃ/**
/otsə̄ŋ/ ‘kernel’ */otʃə̄ŋ/* ‘bunch’

The phonemic contrast between lateral and trill is shown in the following minimal pairs:

/l/ vs **/r/**
/ə̄li/ ‘sheep’ */ə̄ri/* ‘enemy’

The phonemic contrast between the voiced and voiceless laterals is shown by the following minimal pairs:

/l/ vs **/l̥/**
/olə̄p̣/ ‘fish scale’ */ol̥ə̄p̣/* ‘grave’

The phonemic distinction between the voiced and voiceless trills is shown by the following minimal pairs:

/r/ vs **/r̥/**
/eroa/ ‘sharp’ */er̥oa/* ‘to growl’

The phonemic distinction between the bilabial and palatal approximants is shown by the following minimal pairs:

/w/ vs **/j/**
/woa/ ‘go’ */joa/* ‘drink’

2.2. Distribution of Phonemic Consonants and Their Allophonic Distributions

Lotha employs nine stops articulated in five different places of articulation- bilabial /p/, p^h/, alveolar /t, t^h/, palatal /c, c^h/, velar /k, k^h/, and glottal /ʔ/.

The voiceless bilabial stop /p/ in Lotha exhibits three distinct allophones: [p], [p̣], and [b]. The sound [p] is exclusively found in word-initial positions, while [p̣] appears only in word-final positions. The allophone [b] occurs between voiced segments within a word. In contrast, the

aspirated voiceless bilabial stop /p^h/ is consistently realized as [p^h] in all positions, occurring both word initially and medially.

The voiceless alveolar un-aspirated stop /t/ has two allophones: [t] and [d]. The sound [t] is used at the initial position of a word, while [d] occurs in between voiced segments. Meanwhile, the aspirated voiceless alveolar stop /t^h/ is present in both initial and medial positions of a word.

Lotha's voiceless palatal stop /c/ manifests in two allophones: [c] and [j]. [c] is employed in word-initial and word-medial positions, while [j] appears between voiced segments within a word. The aspirated palatal stop /c^h/ occurs in the initial and medial position of a word.

The voiceless un-aspirated stop /k/ displays three allophones: [k], [k̰], and [g]. [k] is found in both initial and final positions of a word, while [g] occurs in between voiced segments. On the other hand, the aspirated voiceless sound /k^h/ occurs exclusively in the initial and medial positions of a word. The glottal stop /ʔ/ exclusively occurs in the final position of a word in Lotha.

Lotha has eight nasal sounds articulated in four different places of articulation- bilabial /m, m̰/, alveolar, /n, n̰/, palatal /ɲ, ɲ̰/ and velar /ŋ, ŋ̰/.

The bilabial nasal /m/ is found in the initial, medial, and final positions of a word in Lotha. Conversely, the voiceless bilabial nasal /m̰/ is found exclusively in the initial and medial positions. The alveolar nasal /n/ occurs in the initial and medial positions of a word, while the voiceless alveolar nasal /n̰/ is also present in the initial and medial positions. Both the voiced palatal nasal /ɲ/ and the voiceless palatal nasal /ɲ̰/ occur at the beginning and in the middle of words. The voiced velar nasal /ŋ/ appears in the initial, medial, and final positions of a word, while the voiceless velar nasal /ŋ̰/ is found only at the beginning and in the middle of words.

Lotha has seven fricatives articulated in four different places of articulation- labio-dental /f, v/, alveolar, /s, z/, post- alveolar /ʃ, ʒ/ and glottal/h/.

In Lotha, the voiceless labiodental fricative /f/ can be found in both initial and medial positions of a word. Similarly, the voiced labiodental fricative /v/ is present in the initial and medial positions as well. Both the voiceless alveolar fricative /s/ and the voiced alveolar fricative /z/ occur in the initial and medial positions of a word. These sounds are produced by bringing the tongue near the alveolar ridge while expelling or vibrating air. The voiceless post-alveolar fricative /ʃ/ and the voiced post-alveolar fricative /ʒ/ are also found in the initial and medial positions of a word in Lotha. These sounds are produced by raising the back of the tongue

towards the post-alveolar region while creating a turbulent airflow. The voiceless glottal fricative /h/ occurs in both initial and medial positions within a word. This sound is produced by forcing air through a partially constricted glottis.

Lotha has seven affricates articulated in three different places of articulation- labio-dental /pf, bv/, alveolar, /ts, dz, ts^h/, and alveo-palatal /tʃ, dʒ/.

Both the voiceless labiodental affricate /pf/ and the voiced labiodental affricate /bv/ occurs in the initial and medial position of a word. The voiceless alveolar affricate /ts/, the voiced alveolar affricate /dz/ and the aspirated alveolar affricate /ts^h/ all occurs in the initial and medial position of a word. The voiceless palatal-alveolar affricate /tʃ/ and the voiced palatal-alveolar affricate /dʒ/ occurs in initial and medial position of a word.

Lotha has two lateral sounds and its manner of articulation is alveolar /l, l̥/. The voiced alveolar lateral /l/ and the voiceless alveolar lateral /l̥/ occurs in the initial and medial position of a word. Lotha has two trills and its place of articulation is alveolar /r, r̥/. The voiced alveolar trill /r/ and the voiceless alveolar trill /r̥/ occurs in the initial and the medial position of a word.

Lotha has two approximants and two places of articulation bilabial /w/ and palatal /j/. The voiced bilabial approximant /w/ and the voiced palatal approximant /j/ occurs in the initial and medial position of a word.

The distribution of these consonantal sounds across different positions in Lotha illuminates the phonetic patterns and structures of the language, contributing to its distinctive phonological characteristics.

The distributions of the phonemic consonants and their allophonic distribution are illustrated in Table 2 below:

Consonants	Initial	Medial	Final
/p/	[penə] ‘fly’	[bvəbām] ‘flower bud’	[ntsəp] ‘bolt’
/p ^h /	[p ^h ārā] ‘garden’	[lām ^h ē] ‘mushroom’	
/t/	[tēnā] ‘topluck(a leaf)’	[òdām ^h i] ‘local fruit’	
/t ^h /	[t ^h ēnā] ‘sour’	[tsəŋ ^h i] ‘fruit’	
/c/	[cak ^h ə?] ‘toad’ [jāmā] ‘to watch quietly’	[hacəŋ] ‘sand’ [lāŋjām] ‘fermented soyabean’	
/c ^h /	[c ^h əma] ‘to plant’	[tʃonc ^h ea] ‘to open’	

/k/	[kàŋkʰɛʔ] ‘orange	[kàgɔ̃] ‘book’	[kitʃɔk] ‘brain’
/kʰ/	[kʰɛnɔ̃ʔ] ‘nose’	[kikʰɔ̃] ‘crown’	
/ʔ/			[ɛŋzeʔ] ‘sun watch’
/m/	[màkəʔ] ‘husk’	[òmi] ‘fire’	[ŋkʰám] ‘pillow’
/ŋ/	[ŋrə] ‘bread’	[hómə] ‘yawn’	[oʔŋ] ‘flour’
/n/	[nrə] ‘snake’	[fántʃ] ‘star’	
/ŋ/	[ŋəŋra] ‘short’	[ɛŋəŋa] ‘to smell’	
/ɲ/	[ɲaŋa] ‘goat’	[ɛŋa] ‘morning’	
/ɲ/	[ɲɔ̃na] ‘to knead’	[ɛɲa] ‘crumbs’	
/ŋ/	[ŋarɔ̃] ‘child’	[jɲrɔ̃] ‘finger’	[evəŋ] ‘neck’
/ŋ/	[ŋaʔ] ‘to dry up (liquid)’	[ɛŋəna] ‘to smell/sniff’	
/f/	[fəli] ‘lungs’	[ofə] ‘skin’	
/v/	[vami] ‘spring’	[ovə] ‘frog’	
/s/	[səŋrəkaʔ] ‘rainbow’	[osə] ‘cloth’	
/z/	[zəvotʰi] ‘fig’	[azəm] ‘glutton’	
/ʃ/	[farə] ‘sowbug’	[ɛfəʔ] ‘raw’	
/ʒ/	[ʒəməʔ] ‘whale’	[oʒə] ‘rope’	
/h/	[hacəŋ] ‘sand’	[ohɔ̃ʔ] ‘tooth’	
/pʃ/	[pʃəkɪ] ‘ceiling’	[tʃɔ̃npʃə] ‘earthen pot’	
/bv/	[bvəcɔ̃] ‘umbrella’	[ɛbvə] ‘shoulder’	
/ts/	[tsá] ‘walk’	[ɛtsəŋepɛʔ] ‘broom’	
/dz/	[dzə̃rō] ‘weaving instrument’	[ɛdzá] ‘to measure’	
/tsʰ/	[tsʰakidʒə] ‘honey’	[otsʰəŋ] ‘firewood’	
/tʃ/	[tʃənti] ‘ligament (joint)’	[matʃə] ‘chilly’	
/dʒ/	[dʒɔ̃kʰáp] ‘shoe’	[bvádʒɔ̃] ‘umbrella’	
/l/	[limo] ‘leaf’	[ləpli] ‘cockroach’	
/l̥/	[l̥oá] ‘pluck’	[oʔəp] ‘grave’	
/r/	[rəso] ‘half’	[pʰenrə] ‘spices’	
/r̥/	[r̥əcak] ‘bamboo shoot’	[tsə̃rə] ‘trap’	
/w/	[woa] ‘to go’	[ajiwe] ‘left side’	
/j/	[jokɔ̃] ‘necklace’	[ɛjuk] ‘cover’	

Table 2: Distribution of Consonantal Phonemes and Their Allophonic Distributions

In Lotha, the consonants found at the beginning of a word are limited to the voiceless stops /p/ and /t/ while the voiced stops [b], [d], and [g] occur in the medial position of a word. The nasals [m], [ŋ], and [ŋ] can occur at the initial, medial, and final position of a word. However, the voiced nasal alveolar [n] appears only at the initial and medial position of a word and not at the end. This is because it undergoes a phonological process where it is deleted at the end of a word if it is preceded by a vocalic phone. The remaining consonants, including the aspirated stops, fricatives, affricates, certain nasals, laterals, trills, and approximants, can occur at the initial and medial positions of a word in Lotha.

Summary and Conclusion

Lotha has a remarkable inventory of consonantal phonemes, consisting of thirty-seven consonantal phonemes: /p, p^h, t, t^h, c, c^h, k, k^h, m, m̄, n, ŋ, ɲ, ɲ̄, ɲ̄̄, f, v, s, z, ʃ, ʒ, h, ʔ, pf, bv, ts, dz, ts^h, tʃ, dʒ, l, l̄, r, ʝ, w, j/. These sounds were classified into two groups: obstruents and sonorants. The obstruent sounds in Lotha are mostly voiceless, with seventeen voiceless obstruents including oral stops, fricatives, and affricates /p, p^h, t, t^h, c, c^h, k, k^h, ʔ, f, s, ʃ, h, pf, ts, ts^h, tʃ/. The remaining six obstruents are voiced, comprising of a combination of fricatives and affricates /v, z, ʒ, bv, dz, dʒ/. In total, Lotha has twenty-two obstruent sounds that have allophonic variations, making them a unique feature of this language.

On the other hand, the sonorant sounds in Lotha are predominantly voiced, with only six voiceless sounds /m̄, ŋ, ɲ̄̄, l̄, r/ among the fourteen sonorants. The sonorant class includes nasals, liquids, and approximants. Among the sonorant sounds, Lotha has eight voiced sounds /m, n, ɲ, l, r, w, j/ which are considered prototypical for this class of sounds.

Lotha's consonantal phonemes exhibit a wide range of manner of articulation. There are nine stops, eight nasals, seven fricatives, seven affricates, two laterals, two trills, and two approximants.

The inventory of consonantal phonemes in Lotha is diversely complex. The contrast between the voiceless obstruents and the predominantly voiced sonorants, along with their allophonic variations, contributes to the abundance of consonantal sounds in Lotha and the allophonic variations of consonantal phonemes in Lotha contribute an interesting feature.

This study examining the inventory of consonantal phonemes in Lotha serves as a gateway for future research into the language's sound system. For researchers interested in Lotha or other Naga or Tibeto-Burman languages, may look into the patterns of allophonic variation which offers valuable insights into the production and perception of sounds in Lotha. By exploring these variations, a deeper understanding of the language can be attained, paving the way for further exploration and discovery.

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