PHONOLOGICAL SKETCH OF THE SIDA LANGUAGE OF
LUANG NAMTHA, LAOS

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Abstract
This paper describes the phonology of the Sida language, a Tibeto-Burman language spoken by
approximately 3,900 people in Laos and Vietnam. The data presented here are the variety
spoken in Luang Namtha province of northwestern Laos, and focuses on a synchronic
description of the fundamentals of the Sida phonological systems. Several issues of diachronic
interest are also discussed in the context of the diversity of the Southern Loloish group of
languages, many of which are spoken in Laos and have not yet been described in detail.

Keywords: Sida, Loloish, phonology, Laos

ISO 639-3 codes: slt

1 Introduction
This paper provides a first overview of the phonology of the Sida language [ISO: slt], a Tibeto-Burman
language spoken in Northern Laos and Northern Vietnam. The data presented here are representative of one
dialect spoken in Luang Namtha province of Laos.

1.1 The Sida language and its speakers

According to the 2015 census of Laos, there are
3,151 ethnic Sida people in Laos, and it is
believed that all speak the Sida language. There
are Sida speakers in Vietnam as well, and the
total of speakers in both countries has been
estimated at around 3,900 (Lewis 2014). Sida is
an officially recognized ethnic group in both
countries.

In Laos, the group known by the exonym
Sida or Sila, uses the autonym /wa31ɲɤ35 a31/
31/ or /wa31ɲɤ35 a31m31a̰31/. In traditional narrative, they
refer to themselves as /ko55ɣɯ55 a31ja31/ ‘the
children of Go Gue’, /ko55ɣɯ55/ being the
maternal ancestor of all Sida people2. The Sida
language is known as /wa31ɲɤ35 a31kʰjo31/ ‘Sida-
mouth’ or /wa31ɲɤ35 su31to31/ ‘Sida-language’.

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1 This paper is a revised version of a presentation given at SEALS 24 in Yangon in May 2014.
2 The Akeu people in Kyaingtong (Myanmar), speaking a closely related language, also refer to themselves as
/g55kʰu55 ne35dzɯ35/ providing supplementary evidence that may be useful when making a broader study of the
historical relationships between languages of this group.

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The Sida in Namtha prefer to use ‘Sida’ as their ethnonym when speaking Lao. Figure 1 shows the general patterns of migration of the Sida since the 19th century, based on oral history collected in Luang Namtha and Phongsaly. The move from Phongsaly west to Luang Namtha was part of a large-scale movement of people fleeing unrest in the mountainous areas of the Lao-Vietnam border area (Badenoch and Tomita 2013). Edmondson (2002) confirms this, reporting that the Sila in Vietnam tell of leaving the Muang U and Muang La area of Phongsaly province in Laos about 175 years ago because of ‘harsh conditions and exploitation’.

The Sida of Luang Namtha now live in two adjacent villages. Ban Sida is the larger of the two, located at approximately two hours walk into the mountains from the main road. Their agricultural livelihoods are supported by rice and maize cultivation, and supplemented with sale of non-timber forest products. More recently, they have begun planting rubber.

The Sida in this area have had close relations with the Kim Mun and Mien, in addition to Yunnanese traders that frequented the area. In previous generations, it was common for Sida men to be fluent in Southwestern Mandarin and Mien, and have some competence in Lue or Nyuan, the Tai languages spoken in the Namtha valley. They have also been in contact with speakers of Pana, another small Tibeto-Burman language spoken near the Sino-Lao border in Luang Namtha. Currently, most Sida speak Lao or Lue, although fluency in Mandarin is limited to a few elderly men. Mien is no longer commonly spoken. Children born in Ban Nam Dii grow up trilingual, speaking Kim Mun and Lao in addition to Sida. Lao literacy is limited among the Sida. Recently there has been an influx of Sida migrants from Phongsaly province, where the majority of Lao Sida speakers live. All Sida children learn Sida as their first language, and it is used as the language of the household.

Interviews conducted during our fieldwork suggest that there are three main dialects spoken in Laos. In addition to the Sida spoken in Luang Namtha, there seem to be two varieties spoken in Phongsaly province, which could be thought of as Lower Phongsaly (Muang Samphans and Muang Bun Nuea) and Upper Phongsaly (Muang Nyot Ou). The wordlists given in Kingsada and Shintani (1999), Shintani et al (2001) and Kato (2008) seem to support this, but more detailed fieldwork is required. In Luang Namtha, the Samphans variety is considered to be a prestige dialect.

The data presented in this paper were collected in Ban Nam Dii, from four speakers in three age-groups: a 69-year old male, a 46-year old male, and his children, a 28-year old male and 23-year old female. The contact languages used in the fieldwork were Lao, Sida and Southwestern Mandarin Chinese.

1.2 Position within Tibeto-Burman

Although this is the first systematic look at the phonology of Sida, the existence of the language has been known for some time from short wordlists collected in Laos and Vietnam. Sida is a Tibeto-Burman language belonging to the Loloish branch of Lolo-Burmese. According to Bradley’s classification of Southern Ngwi (Loloish) languages, Sida falls into the Bi-Ka sub-group (Table 1).

Table 1: Bradley’s Southern Ngwi classification (2002)

<table>
<thead>
<tr>
<th>Southern Ngwi</th>
<th>Akoid</th>
<th>Bi-Ka</th>
<th>Bisoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akha</td>
<td>Kaduo/Katu</td>
<td></td>
<td>Bisu</td>
</tr>
<tr>
<td>Hani</td>
<td>Biyue/Piyo</td>
<td></td>
<td>Laomian</td>
</tr>
<tr>
<td>Haoni/Baihong</td>
<td>Muda</td>
<td></td>
<td>Sangkong</td>
</tr>
<tr>
<td>Akeu</td>
<td>Sila/Sida</td>
<td></td>
<td>Phunoi</td>
</tr>
<tr>
<td>Chepya</td>
<td>Phana</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The diversity of Tibeto-Burman languages in northern Laos is high (Shintani and Kato 2009), but we have only just begun to understand the breadth or depth of this linguistic complexity. In addition to Sida, related languages Paza (Phousang), Pana, Khir, and Muji spoken in Phongsaly, Oudomxay and Luang Namtha provinces will further expand Bradley’s Bi-Ka sub-group. A plethora of Akoid and Bisoid languages and dialects are also found, and these are spoken in relative geographic proximity.
2 Syllable structure
The canonical syllable structure in Sida is:
$$C_1(C_2)V(C_3)/T$$

$C_2$ is an optional medial (with limited phonemic distribution) and $C_3$ is an optional coda, and $T$ is a tone. The cognate words in principle have open syllables. The details of the phonological system this structure governs are given below.

3 Consonants
Sida has 20 distinct consonant phonemes, differentiating four points of articulation and four manners of articulation. Table 3 gives the consonant inventory of Sida.

**Table 3: Sida consonant inventory**

<table>
<thead>
<tr>
<th></th>
<th>labial</th>
<th>alveolar-dental</th>
<th>palatal</th>
<th>velar</th>
</tr>
</thead>
<tbody>
<tr>
<td>plosive</td>
<td>p</td>
<td>t</td>
<td>te</td>
<td>k</td>
</tr>
<tr>
<td>fricative</td>
<td>pʰ</td>
<td>tʰ</td>
<td>teʰ</td>
<td>kʰ</td>
</tr>
<tr>
<td>nasal</td>
<td>m</td>
<td>n</td>
<td>ɲ</td>
<td>ɲ̊</td>
</tr>
<tr>
<td>approximate</td>
<td>w</td>
<td>l̥</td>
<td>l</td>
<td>j</td>
</tr>
</tbody>
</table>

Contrastive pairs for consonant phonemes are given below:

/p/ vs. /pʰ/: /pa³³la³³/ ‘moon’ vs. /u⁴³pʰa³³/ ‘leaf’
/t/ vs. /tʰ/: /ta³³/ ‘to look at’ vs. /tʰa³³/ ‘PROHIBITIVE’
/tɕ/ vs. /tɕʰ/: /tɕu³³/ ‘to have, to exist’ vs. /tɕʰu³³/ ‘to speak’
/k/ vs. /kʰ/: /ki⁵⁵lɯ⁵⁵/ ‘green’ vs. /a³³kʰi⁵⁵/ ‘foot’
/f/ vs. /s/: /ʃs³¹/ ‘to protect vs. /ʃʃa³³/ ‘to study’
/x/ vs. /ɣ/: / xu⁵⁵/ ‘gold’ vs. /ɣu⁵⁵/ ‘good’

/m/ vs. /n/: /mA³³/ ‘person’ vs. /nᵃ³³/ ‘deep’
/p/ vs. /ŋ/: /ŋʃ³³/ ‘frost’ vs. /ŋa³³/ ‘salty’

/w/ vs. /ŋ/: /wa³³/ ‘careless’ vs. /ja³³/ ‘child’
/l/ vs. /l̥/: /l̥a³³/ ‘palm of hand’ vs. /lᵃ³³/ ‘to fall down’

Unaspirated plosives /p/, /t/, /tɕ/ and /k/ contrast with aspirated /pʰ/, /tʰ/, /tɕʰ/ and /kʰ/. In principle, unaspirated plosives are phonetically realized as voiced stops, although there is significant phonetic variability in the degree of voicing. Thus /p/ represents a phoneme that varies freely between [p] ~ [b]; the same holds true for the others as well. In his brief description of Sila spoken in Vietnam, Edmondson (2002) reported voicing contrasts /p/-/b/ and /k/-/ɡ/, but remarked that there was no /d/ in the data to contrast with /t/.

In addition to the observed voicing variability among speakers, we have found no minimal pairs to justify voicing as a contrastive feature in Sida plosives. Our own preliminary investigations of the closely related languages Paza, Pana and Muji further suggest that voicing is not phonemic for the Bi-Ka languages spoken in Laos.

There are two exceptions to this non-contrastive voicing generalization, as there is a voicing contrast in the velar fricative /ʃ/-/ɣ/ and the alveolar lateral /ʃ̊/-/l̥/. Phonetically, /l̥/ is realized as [ʃ̊]. The historical sources of these phonemic pairs explain the contrast within the otherwise non-contrastive system, discussed further below (section 6.2).

The palatal nasal is noted as /ɲ/ although the phonetic realization is closer to [ɲ̊], with the blade of the tongue remaining at a short distance from the palate.

Examples of Sida consonant phonemes are provided in Appendix 1.
3.1 Onset/initial
All consonants can occur in initial position. Allophones of consonants are shown in Table 4. The labial nasal /m/ also occurs syllabically as [m̩], for example, /m̩55/ ‘to do’, /m̩31/ ‘to say’.

Table 4: Consonant allophones

<table>
<thead>
<tr>
<th>phoneme</th>
<th>allophones</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tɕ/</td>
<td>[tɕ], [ts]</td>
</tr>
<tr>
<td>/tɕʰ/</td>
<td>[tɕʰ], [tsʰ]</td>
</tr>
<tr>
<td>/s/</td>
<td>[s], [ɕ], [ʃ]</td>
</tr>
<tr>
<td>/x/</td>
<td>[x], [h]</td>
</tr>
<tr>
<td>/w/</td>
<td>[w], [v]</td>
</tr>
</tbody>
</table>

3.2 Medial
Two approximates, /l/ and /j/, can occur in medial position in Sida words. Table 5 provides the medial combinations found in Sida.

Table 5: Medials

<table>
<thead>
<tr>
<th>medial</th>
<th>combinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>-j-/</td>
<td>/pj-/, /pj-/, /kj-/, /kʰj-/, /mj-/</td>
</tr>
<tr>
<td>-l-/</td>
<td>/pl-/, /pʰl-/, /ml-/</td>
</tr>
</tbody>
</table>

Medial /-j-/ follows only bilabial and velar stops, and the bilabial nasal. Medial /-l-/ is phonemically more limited, occurring only with the bilabials stops and the bilabial nasal. However, in the speech of young people, medial /-l-/ has merged with medial /-j-/ and in the next generation will disappear completely. For example, ‘silver, white’ is pronounced /pʰlu55/ by people over 50 years of age, and /pʰju55/ by the rest of the community. The same is true for /mla31/ ~ /mja31/ ‘arrow’, another etymon with a well-attested original medial /-l-/.

The presence of /-l-/ in Akoid languages was noted with surprise and interest by Hansson (1988) in the Akeu language of northern Thailand. The occurrence of /-l-/ in the Loloish languages of northern Laos is relatively widespread (Badenoch 2009) and interesting historically. Medials are discussed further in comparative and diachronic perspectives in section 6.

3.3 Coda
Coda in Sida words include /-p, -t, -k, -m, -n, -ŋ/, but are found only in words borrowed recently from Lao.

*sum55lep55* ‘for [person]’
*pʰu31sə53my31kɪt55* ‘the English language’
*nək55coŋ31* ‘teacher’
*ŋw55空前* ‘singer’
*təŋ55təŋ55* ‘only’

In speech of the older generations, coda are often neutralized to a creak on the preceding vowel.

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3 All phonemes /tɕ/, /tɕʰ/, /x/ and /w/ are in free variation, but realization of /s/ follows the phonetic rule: /s/ → [ɕ~ʃ]/ _i._
4 Vowels

4.1 Monophthongs
Twelve simple vowels comprise the Sida vocalic space, making it more complex than many other Lolo-Burmese languages. The Sida vowel phoneme inventory is presented in Table 6, and examples are given in Appendix 2.

Table 6: Sida vowel inventory

<table>
<thead>
<tr>
<th>vowel phoneme</th>
<th>pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>y</td>
</tr>
<tr>
<td>u</td>
<td>u</td>
</tr>
<tr>
<td>e</td>
<td>ø</td>
</tr>
<tr>
<td>r</td>
<td>o</td>
</tr>
<tr>
<td>e</td>
<td>ɔ</td>
</tr>
<tr>
<td>a</td>
<td>ɐ</td>
</tr>
</tbody>
</table>

Front and back vowels have both unrounded and rounded opposition at close /i, y, u, u/ and mid-close height /e, ø, ɤ, o/. There are no true central vowels. High vowels are often fricated, enhancing contrast with mid vowels. Allophones of the Sida vowels are summarized in Table 7.

Table 7: Sida vowel allophones

<table>
<thead>
<tr>
<th>vowel phoneme</th>
<th>variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ɤ/</td>
<td>[ɤ]~[ə]</td>
</tr>
<tr>
<td>/ɐ/</td>
<td>[ɐ]~[ɑ]</td>
</tr>
<tr>
<td>/a/</td>
<td>[a]~[æ]</td>
</tr>
</tbody>
</table>

The presence of two [a]-colored vowels is notable. In Akoid languages we do not find this contrast in the vowel inventory. In the Lolo-Burmese context, however, this contrast is found in Lianghe Achang (Burmish, spoken in Dehong, Yunnan; Shi 2009⁴), and Lolopho (Loloish, spoken in Muang Sing of Luang Namtha, Laos; Hayashi 2015). This is discussed in more detail below (section 6.4).

There is a two-way contrast, plain versus creaky, on all Sida vowels. The plain-creaky contrast is shown in /wa31/ ‘bamboo’ and /wa̰31/ ‘pig’. Other examples of well-known Lolo-Burmese etyma with a creaky vowel in Sida are /mjɐ̰33/ ‘eye’, /pʰɤ̰31/ ‘to become’ and /nɐ̰33/ ‘black. In principle, creaky vowels are from Proto-Loloish final-stop coda. This phonation contrast is common in Southern Loloish languages. In intergenerational comparison, this vowel feature appears to be somewhat unstable, although younger speakers do distinguish plain-creaky in normal speech.

Vowel phonemes are contrasted as follows:

/i/ vs. /e/ vs. /ɛ/: /pi33/ ‘to win’ vs. /pe33/ ‘to divide up’ vs. /pɛ33jɔ31/ ‘dragon’
/y/ vs. /a/: /tʰy31/ ‘to spit out’ vs. /tʰo31/ ‘to wrap up’
/u/ vs. /u/ vs. /ɑ/: /tu31/ ‘to hit’ vs. /tx31/ ‘to soak’
/a/ vs. /o/ vs. /ɔ/: /tʰu55/ ‘thick’ vs. /tʰo55/ ‘to open a hole’ vs. /tʰɔ55/ ‘number of times’
/a/ vs. /u/ vs. /a/: /tɛa31/ ‘to eat’ vs. /tɛa31/ ‘to have, to exist’

Nasalized vowels exist as well, although their distribution is limited to Chinese borrowings and a very small number of Sida words of solid TB etymology, such as /a31 mɯ̃33/ ‘hair’.

⁴ This type of contrast in Lianghe Achang was also examined in Hayashi’s fieldwork carried out in 2005-2006.
4.2 Diphthongs
There are four diphthongs in Sida, but all have their sources in Tai or Chinese borrowings (Table 8).

Table 8: Sida Diphthongs

<table>
<thead>
<tr>
<th>diphthong</th>
<th>variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ɤi/</td>
<td>mja³¹ɤi⁵⁵ ‘eggplant’ &lt; Lao</td>
</tr>
<tr>
<td>/ai/</td>
<td>teʰai³¹watts⁵³ ‘porcelain bowl’ &lt; Chinese</td>
</tr>
<tr>
<td>/ao/</td>
<td>pjao³³ ‘twelfth year of the calendar’ &lt; Chinese</td>
</tr>
<tr>
<td>/oa/</td>
<td>soa³¹ ‘classifier for pairs’ &lt; Chinese</td>
</tr>
</tbody>
</table>

5 Tones
The tone bearing unit in Sida is the syllable, not the word. Sida has three lexical tonemes: /55/ high, /33/ mid and /31/ low falling. Examples of tone contrast include:

/ɪ³¹tʰo³¹/ ‘hat; mountain’
/ɪ⁵⁵tʰo³¹/ ‘water’

/i³¹ɲi³³/ ‘yesterday’
/i³⁵ɲi⁵⁵/ ‘this’

/ŋɔ⁵⁵/ ‘1SG’
/ŋɔ³¹/ ‘five’

/a⁵⁵ pʰi³¹/ ‘grandmother’
/a³¹ pʰi⁵⁵/ ‘chili-hot’

Additionally, there are two grammatical tones: /35/ mid-rising and /53/ high-falling. Grammatical tones can be considered tonal alternations caused by certain grammatical constructions. At this point we have identified three alternation patterns, although we believe more will emerge.

a)  possessive tonal alternation: 31 → 35

The first example of possessive tonal alternation is when a noun modifies another noun. For example, /wa³¹ɲɤ³¹/ ‘Sida’ undergoes a tone shift from 31 to 35 on the second element when combined with other words such as /a³¹kʰjo³¹/ ‘mouth’, /sɯ³¹to³¹/ ‘language; logic’ or /a³¹m a̰³¹/ ‘person’.

wa³¹ɲɤ³⁵ sɯ³¹to³¹ ‘Sida language’
wa³¹ɲo³³ a³¹kʰjo³¹ ‘Sida language’
wa³¹ɲi³³ a³¹m a̰³¹ ‘Sida person’

b)  possessive tonal alternation: 31 → 33

The second example of possessive tonal alternation is triggered using the possessive particle /kɔ³³/, which causes the previous 31 tone to assimilate to 33. For example, /a³¹ɲo³¹/ ‘3SG.NOM’ is realized as /a³¹ɲo³³/ in /a³¹ɲo³³ kɔ³³ a³¹pjo³³ pur³¹/ ‘his book’.

c) particle-induced tonal alternation: 55 → 53, 31 → 53
Post-verbal particles can also trigger tone alternations. For example, the stative verb /₃₁pʰi55/ ‘to be spicy’ undergoes a tone alternation when the interrogative particle is changed from /₃₁/ to /₃₁wa/. 

\[
\begin{align*}
\text{₃₁pʰi55} & \quad \text{₃₁pʰi55} \\
\text{spicy} & \quad \text{Q}
\end{align*}
\]

‘Is it spicy?’

\[
\begin{align*}
\text{₃₁pʰi55} & \quad \text{₃₁pʰi55} \\
\text{spicy} & \quad \text{Q}
\end{align*}
\]

‘Is it spicy?’

\[
\begin{align*}
\text{₃₁pʰi55} & \quad \text{₃₁pʰi55} \\
\text{spicy} & \quad \text{₃₃wa} \text{Q}
\end{align*}
\]

‘It’s not spicy?’

The same interrogative particle /₃₁wa/ produces a 5₃ tone on a preceding 3₁ tone as well, for example a question about degree.

\[
\begin{align*}
\text{₃₅lo₃₁} & \quad \text{₃₁ma₃₁} \\
\text{how much} & \quad \text{NEG hurt} \quad \text{Q}
\end{align*}
\]

‘It doesn’t hurt very much?’

\[
\begin{align*}
\text{₃₅lo₃₁} & \quad \text{₃₁ma₃₁} \\
\text{how much} & \quad \text{₃₃wa} \text{Q}
\end{align*}
\]

‘It doesn’t hurt very much?’

At this moment, it seems safe to say that the two tones /₃₅/ and /₃₃/ are not lexical, but rather grammatically induced tones. Hence, the functional load of these tones is relatively low in Sida phonology. It is interesting to note that Colloquial Burmese (CB) is also well known as a language with grammatically induced tone (creaky tone), though it is different in that CB creaky tone also functions as lexical tone (Okell 1969).

6 Discussion in diachrony

The discussion section addresses three areas of interest in the phoneme inventory, focusing on internal typological inconsistencies of the Sida system.

6.1 Medials

The history of medials in the Sino-Tibetan languages has been an issue of interest for some time. In Lolo-Burmese, the preservation of /-r-/ and /-l-/ in Old Burmese as /-j-/ has provided a useful point of comparison with the greatly reduced picture of medials in other well-known languages such as Akha and Hani. Hayashi’s (2010) description of medials in Youle Jino opened the door for a relook at the history of this part of the phonology of Loloish languages. Like Jino, Sida has a richer inventory of medials than Akha, with the Namtha variety preserving /-j-/ and /-l-/ as introduced above. Table 9 provides examples of medials in Namtha, with two other dialects provided for a comparative perspective.

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5 The history of medials in Burmese provides some clues for investigation of this phenomenon in Lolo-Burmese languages, though the medials of each language will have developed independently. Regarding Burmese medials, see Nishi (1976).
Table 9: Sida medials

|--------|--------------------------|----------------------|----------------------------------------|
| eye    | mĝ̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆̆️
velar + */r-/ rhotacization in Jino, not attested in WB, and suggesting that this happened after the split of Burmese and Loloish (Hayashi 2010). This ultimately resulted in a voiceless lateral in contemporary Sida.

6.2 Voiceless lateral

The presence of a voiceless lateral in the consonant inventory of Sida, contrasting with the voiced /l/, creates an asymmetry in what is otherwise a relatively straightforward system. The distribution of the Sida voiced lateral is interesting for the consideration of medials at the Proto-Loloish stage. In addition to the correspondences discussed above, PLB */kl-/ and */gl-/ > Sida /l̥-/ for many, but not all instances. For instance, in Sida /teʔq̲31/ ‘cold’ we see the development */gl-/ > /t̥ɕʰ-/ in a process of palatalization. The full set of tokens from our data set is presented with Proto-Loloish reconstructions from Bradley (1979) where available, in Table 12.

<table>
<thead>
<tr>
<th>Sida</th>
<th>Bradley (1979)</th>
<th>Gloss</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>/l̥o̰ 31</td>
<td>teg̲ 31</td>
<td>bridge</td>
<td>Jino khj̲o 55~</td>
</tr>
<tr>
<td>ḭ 35</td>
<td>lo̰ 35</td>
<td>clan leader</td>
<td>Jino ~khru 55 ‘hole’</td>
</tr>
<tr>
<td>j̲ṵ 33</td>
<td>j̲o̰ 31</td>
<td>classifier for long</td>
<td>Jino khju 55</td>
</tr>
<tr>
<td>j̲o̰ 31</td>
<td>pjo̰ 31</td>
<td>*klo ‘inside’</td>
<td>Jino <del>khj̲u 55</del></td>
</tr>
<tr>
<td>j̲a̰ 33</td>
<td>j̲a̰ 31</td>
<td>*ko ‘steal’</td>
<td>Jino k̲r̲a̰ 44</td>
</tr>
<tr>
<td>j̲a̰ 31</td>
<td>pjo̰ 31</td>
<td>*ʔ-kroŋ ‘throat’</td>
<td>Jino khj̲u 55~</td>
</tr>
<tr>
<td>a̰ 31</td>
<td>j̲a̰ 31</td>
<td>*gla ‘fall’</td>
<td>Jino ~khri 55</td>
</tr>
<tr>
<td>a̰ 31</td>
<td>j̲a̰ 31</td>
<td>*ʔ-kroŋ ‘excrement’</td>
<td>Jino k̲h̲i 55</td>
</tr>
<tr>
<td>a̰ 31</td>
<td>j̲a̰ 31</td>
<td>clay</td>
<td>Jino ~khri 55</td>
</tr>
<tr>
<td>a̰ 31</td>
<td>j̲a̰ 31</td>
<td>cell of beehive</td>
<td></td>
</tr>
</tbody>
</table>

The full history of Sida medials remains to be elaborated. There seem to be several trajectories of medial development, but at this point we suggest that the four paths of medial change presented by Hayashi (2010) for Jino – rhotacization/yodization, emerging, dropping/affrication and palatalization – seem to be at work in Sida as well.

6.3 Vanishing *r

Another phonemic differentiation in the voicing of consonants is between /x/ and /ɣ/, the other asymmetry in the Sida consonant inventory. The occurrence of /ɣ/ is limited, coming only before /ɯ/, and traced to Proto-Loloish */r-/ for example, Sida /ɣɯ 55/ ‘to laugh’ < *ray, /ɣɯ 31/ ‘big’ < *ari, and /ɣɯ 31/ ‘bone’ < *ʃə-ro. In all of these examples, the younger generation has /Ø/ as an allophone of /ɣ/. This means that this last trace of *r is following the normal development of this historical phoneme, which is *r > Ø; for example /ɔ 55/ ‘fontanelle’ < *ra, /i 35/ ‘water’ < *re, /t̥s 53/ ‘to obtain’ < *ra, /ŋ 33/ ‘chicken’ < *k-rak, and /kʰɯ 55/ ‘to arrive’ < *k-rok. In a few other instances, we see the development *r > j, such as /j 55/ ‘strength’ < *ra and /j 55/ ‘hundred’ < *C-ra, as can be seen in the development of Colloquial Burmese. Sida /j/ is normally derived from Proto-Loloish *y.

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6 Some exceptions can be found, such as: ‘to hear’ PLB. gla/kla > Sida kja31.
7 Bradley (1979)’s reconstructed PL forms are used here because there are more cognate forms available.
8 This will be explored in more detail in a forthcoming paper by the authors.
6.4 /a/ and /ɐ/
As mentioned in Section 4.1 the presence of contrasting /a/ and /ɐ/ vowels can be considered atypical of an Akoid language, although the phenomenon is not without evidence in Lolo-Burmese. At this point, there is no obvious internal conditioning factor at work, although our data suggest that /ɐ/ occurs more frequently with glottalization, while /a/ occurs more frequently with clear voice. However, this is just a general trend in the data, with a significant degree of variation. In searching for an answer, we looked at the possibility of an historical explanation, for example the potential for influence from a final *-k, which could be related to the creakiness. The data did not hold up convincingly. We also looked to data on Sida dialects in Phongsaly, and found that in those there are three vowels, /a/, /ɐ/, and /ə/, which loosely correspond to Namtha /a/ and /ɐ/. For example, Namtha /a/ corresponds with Phongsaly /ə/ (or /ɐ/), Namtha /ɐ/ corresponds to Phongsaly /a/, Namtha /a/ corresponds to Phongsaly /ɐ/. A more thorough comparative analysis is required to clarify the vowel correspondences, but in the context of this synchronic description of Namtha Sida, it seems reasonable to say that there is a merger under way, where /ɐ/ is merging with /a/. It is interesting that the merger is on the more fronted /a/, which is arguably less common typologically. While /a/ is merging with /a/ in native Sida words, /a/ is retained in the phonemic space of Sida through Chinese and Lao loanwords, which are not subject to this putative vowel merger. The language contact situation in Luang Namtha is much more complex than in Phongsaly, and this needs to be taken into future consideration of the changes under way in the Sida dialect spoken in our research site. There is no obvious source of an influence that would favor /a/ over /ɐ/ in the surrounding languages, which suggests that more subtle forces are at work.

6.5 Historical source of Sida tones
The historical source of the three lexical Sida tones is relatively transparent, traceable back to Proto-Loloish (Bradley 1979). Sida 55 tone is the reflex of PL high tone *1, 31 is from PL low tone *2 and 33 is from PL mid tone *3. Bradley explains the PL mid tone as a secondary development from a two-tone system. The Sida 33 tone is much less common than 55 and 31 tones, indicating support for this development.

55 < *1 /tɕʰi55/ ‘barking deer’ < *kye1
31 < *2 /o31kʰa31/ ‘head’ < *u2
33 < *3 /a31mu33/ ‘feather, body hair’ < *ʔ-mwe3

Creaky vowels seem to contrast on high/mid and low tones only, and for the most part can be traced back to a high/low (H/L) contrast on consonant-final Proto-Loloish syllables.

creaky vowel 31 /a³¹tɕɯ̰31/ ‘wrist, elbow’ < *C-dzik³
/ɕa³¹/ ‘pig’ < *wak³
creaky vowel 33 /ɐ³³/ ‘chicken’ < *k-rakH
/ŋɐ̰33sɯ31/ ‘banana’ < *ŋak³

7 Summary
This paper has provided an introductory sketch of the foundations of Sida phonology, based on our fieldwork with speakers of the Sida as spoken in Luang Namtha. We have provided examples from synchronic, comparative and diachronic perspectives to highlight some of the interesting aspects of the language. The loss of voicing as a distinctive contrast in the plosives of Lao Sida seems to be indicative of a larger trend in the Bi-Ka languages. At the same time a voicing contrast in the velar fricative and alveolar lateral has appeared, although the voiced velar fricative is in the process of disappearing. Sida also provides insights on the historical question of medials in Tibeto-Burman. This work will provide the foundation for more in depth studies of the Sida lexicon, syntax, and comparative-historical analysis of the lesser-known Tibeto-Burman languages of the Laos-Yunnan border area.

Acknowledgments
The authors express their appreciation for funding from Kyoto University through the Hakubi Project (Badenoch) and a JSPS KAKENHI grant (Hayashi; Grant No. 26370492) to enable the fieldwork on Sida.
Last but not least, we express our deepest gratitude to our Sida language consultants and local people in Luang Namtha.

**Abbreviations**

**References**


Appendix 1: Sida consonants

**Stops**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Example</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>/p/</td>
<td>/pe/31/ [be/31]</td>
<td>stops</td>
</tr>
<tr>
<td></td>
<td>/pa33 la33/ [ba33 la33]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>/u55 pu31/ [u55 pu31]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>/e31 po55/ [e31 bo55]</td>
<td></td>
</tr>
<tr>
<td>/t/</td>
<td>/ta31/ [da31]</td>
<td>to look at</td>
</tr>
<tr>
<td></td>
<td>/t323/ [tɔ̰/33]</td>
<td>to come out</td>
</tr>
<tr>
<td></td>
<td>/to55/ [to55]</td>
<td>to drink</td>
</tr>
<tr>
<td></td>
<td>/ty33/ [dy33]</td>
<td>to put on clothes</td>
</tr>
<tr>
<td></td>
<td>/ty33/ [ty33]</td>
<td>to ascend</td>
</tr>
<tr>
<td>/k/</td>
<td>/ko31 p/31/ [go31 p/31]</td>
<td>vegetable</td>
</tr>
<tr>
<td></td>
<td>/ki55 lɯ55/ [ki55 lɯ55]</td>
<td>green</td>
</tr>
<tr>
<td></td>
<td>/ky31/ [ky31]</td>
<td>rice plant</td>
</tr>
<tr>
<td></td>
<td>/k/55/ [ko/55]</td>
<td></td>
</tr>
<tr>
<td>/pʰ/</td>
<td>/pʰu/31/ [do31 pʰu/31]</td>
<td>buttocks</td>
</tr>
<tr>
<td></td>
<td>/pʰi31/ [pʰi31]</td>
<td>leaf</td>
</tr>
<tr>
<td></td>
<td>/pʰo55/ [pʰo55]</td>
<td>to roast</td>
</tr>
<tr>
<td></td>
<td>/pʰj31/ [pʰj31]</td>
<td>grandmother</td>
</tr>
<tr>
<td></td>
<td>/pʰa31/ [pʰa31]</td>
<td>to be broken</td>
</tr>
<tr>
<td>/tʰ/</td>
<td>/tʰa31 [tʰæ31]</td>
<td>one</td>
</tr>
<tr>
<td></td>
<td>/tʰu31 [tʰu31]</td>
<td>sky, heavens</td>
</tr>
<tr>
<td></td>
<td>/tʰe31 [tʰe31]</td>
<td>to pound</td>
</tr>
<tr>
<td></td>
<td>/tʰo31 [tʰo31]</td>
<td>to wrap</td>
</tr>
<tr>
<td></td>
<td>/tʰo31 [tʰo31]</td>
<td>foot</td>
</tr>
<tr>
<td></td>
<td>/kʰ/31 kʰi55/ [kʰi55 kʰi55]</td>
<td>hard</td>
</tr>
<tr>
<td></td>
<td>/kʰi31/ [kʰi31]</td>
<td>skin</td>
</tr>
<tr>
<td></td>
<td>/kʰu31 tʰa33/ [kʰu31 da33]</td>
<td>to be all gone</td>
</tr>
</tbody>
</table>

**Affricates**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Example</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>/tʃ/</td>
<td>/tʃe/31 [tʃe/31]</td>
<td>to have, to exist</td>
</tr>
<tr>
<td></td>
<td>/mjʃ33 tei55/ [mjʃ33 dzi55]</td>
<td>eye</td>
</tr>
<tr>
<td></td>
<td>/tʃu31/ [dzu31]</td>
<td>itchy</td>
</tr>
<tr>
<td></td>
<td>/tei55/ [dzi55]</td>
<td>beautiful, nice</td>
</tr>
<tr>
<td></td>
<td>/tʃo55/ [dzo55]</td>
<td>to live at, to be at</td>
</tr>
<tr>
<td>/tʃ/</td>
<td>/tʃn31/ [tsn31]</td>
<td>to speak</td>
</tr>
<tr>
<td></td>
<td>/teʃ31/ [pʰʃ31]</td>
<td>chili paste</td>
</tr>
<tr>
<td></td>
<td>/teʃo31 pʰʃi55/ [teʃo31 pʰʃi55]</td>
<td>to build</td>
</tr>
<tr>
<td></td>
<td>/tʃi31/ [tʃi31]</td>
<td>rice wine</td>
</tr>
<tr>
<td></td>
<td>/tʃi55 pʰi31/ [tʃi55 pʰi31]</td>
<td>to be wrong</td>
</tr>
<tr>
<td></td>
<td>/tʃo33/ [tsn33]</td>
<td></td>
</tr>
</tbody>
</table>
Fricatives

/ʃ/ /ʃa⁵⁵ ko³¹/ [ʃə⁵⁵ ko⁸¹] orange
/ʃa⁵⁵ teʰai³¹/ [ʃə⁵⁵ teʰai³¹] rich
/ʃɔ³¹/ [ʃɔ³¹] to protect
/s/ /si⁵⁵/ [ɕi⁵⁵] to die
/su³¹/ [su³¹] to know
/sj³¹/ [ɕj³¹] blood
/ʃə³¹ [ʃə³¹] breath
/ss³¹/ [ʃʂ³¹] to study
/x/ /a³⁵¹ xu¹⁵⁵ te⁵⁵ [a³¹ xu⁵⁵ te⁵⁵] yellow
/xu³⁵⁵/ [hɯ⁵⁵] to pull
/xa³¹ te⁵⁵ [ha³¹ dzy⁵⁵] meat
/xɛ⁵⁵/ [he⁵⁵] head louse
/x富力³¹ [富力³¹] to be ashamed
/y/ /a³¹ yu³¹ [a³¹ yu³¹] bone
/yu⁵⁵/ [yu⁵⁵] good, appropriate
/y富力⁵⁵/ [富力⁵⁵] to laugh

Nasals

/m/ /mi⁵⁵ te³¹ [mi⁵⁵ te³¹] land, earth
/mu³¹ [mu³¹] good
/me⁵⁵ lo⁵⁵ [me⁵⁵ lo⁵⁵] night
/me³¹ ma³³ ma³⁵ [me³¹ ma³³ ma³³] real, true
/m富力³¹ [富力³¹] fire
/n/ /n富力⁵⁵ [富力⁵⁵] to be painful
/no³¹ mu³³ [no³¹ mu³³] beard
/ne³¹ x富力³³ le³⁵ [ne³¹ ho³³ le³³] sesame
/no富力³¹ [富力³¹] to step on
/e富力³¹ [富力³¹] deep
/p/ /p富力⁵⁵ [富力⁵⁵] to cry
/p富力³³ wa³³ [富力³³ wa³³] younger sister
/pi³¹ [pi³¹] two
/pi富力³³ [富力³³] day
/p富力³³ [富力³³] tea
/g/ /g富力⁵⁵ [富力⁵⁵] salty
/ŋ富力³¹ [富力³¹] five
/ŋ富力³³ [富力³³] banana
/ŋ富力⁵⁵ [富力⁵⁵] to be so, to be correct
/ŋ富力³³ [富力³³] fish
/m/ /m富力⁵⁵ [富力⁵⁵] to say
/m富力³¹ [富力³¹] to do
/j富力³³ [富力³³] mosquito

Laterals

/l/ /a³¹ lo⁵⁵ [a³¹ lo⁵⁵] tongue
/la³³ wa³³ [la³³ wa³³] palm of hand
/lu⁵⁵ t富力³¹ [lu⁵⁵ t富力³¹] space above
/lu富力³³ [lu富力³³] to come down
/li富力³¹ [富力³¹] four
/y/ /富力³¹ [富力³¹] to steal
/富力³³ [富力³³] to fall down
/富力³¹ [富力³³] excrement (animal)
/富力³² [富力³²] to get cut
Semivowels

/w/ \( /w^{31}/ [w^{31}] \) pig
\( /wa^{31}/ [wa^{31}] \) bamboo
\( /wa^{33}/ [wr^{33}] \) to caress

/j/ \( /je^{55} ko^{55} / [je^{55} go^{55}] \) upland field
\( /ju^{55}/ [ju^{55}] \) to take, to get
\( /ja^{31}/ [ja^{31}] \) child
\( /jo^{31} te^{y^{33}} / [jo^{31} dzy^{33}] \) one hundred husband

Appendix 2: Sida vowels

Simple Vowels

/i/ \( /i^{31}/ [ni^{33}] \) day
\( /si^{31} pi^{33}/ [si^{31} bi^{33}] \) pen
\( /e^{55} p^{h31}/ [e^{55} ph^{i31}] \) grandmother
\( /mi^{55} x^{55}/ [mi^{55} y^{55}] \) far
\( /e^{31} te^{h55}/ [e^{31} te^{h55}] \) sweet

/e/ \( /p^{h31}/ [p^{h31}] \) to vomit
\( /pe^{31}/ [pe^{33}] \) to divide up
\( /me^{31}/ [me^{31}] \) to extinguish
\( /t^{e31} u^{t55}/ [t^{e31} ut^{55}] \) salvia
\( /o^{31} p^{h31}/ [o^{31} p^{h31}] \) bamboo rat
\( /se^{31}/ [se^{31}] \) to kill

/e/ \( /me^{33} te^{o31}/ [me^{33} te^{o31}] \) other people
\( /mg^{31} n^{e31}/ [mg^{31} ne^{31}] \) tomorrow
\( /a^{31} mj^{e31} le^{31}/ [a^{31} mj^{e31} le^{31}] \) low
\( /ne^{55} lo^{55}/ [ne^{55} lo^{55}] \) earring
\( /a^{31} w^{e33}/ [a^{31} we^{33}] \) flower

/u/ \( /u^{31} ng^{31} lg^{31}/ [u^{31} ng^{31} lg^{31}] \) black
\( /u^{31} sp^{31}/ [u^{31} sp^{31}] \) breath
\( /u^{31} mg^{31}/ [u^{31} mg^{31}] \) person (of group)
\( /lu^{33} pu^{31}/ [lu^{33} bu^{31}] \) hand
\( /sp^{31}/ [sp^{31}] \) to steam

/y/ \( /y^{33} ky^{31}/ [y^{33} gy^{31}] \) pillow
\( /mi^{31} kh^{y31}/ [mi^{31} kh^{y31}] \) smoke
\( /i^{31} sy^{33} sy^{33}/ [i^{31} ey^{33} ey^{33}] \) to urinate
\( /t^{e31}/ [t^{e31}] \) to spit out
\( /jy^{33}/ [jy^{33}] \) to slice

/o/ \( /o^{33} bo^{55}/ [o^{33} bo^{55}] \) turban
\( /po^{j31} k^{u^{31}}/[po^{j31} k^{u^{31}}] \) woman’s jacket
\( /no^{55} mo^{55}/ [no^{55} mo^{55}] \) nose
\( /t^{e31} te^{o^{55}}/[t^{e31} ts^{o^{55}}] \) root
\( /po^{33} ta^{31}/ [bo^{33} da^{31}] \) cotton

/a/ \( /a^{31} mg^{33}/ [a^{31} mg^{33}] \) mother
\( /o^{31} k^{a^{31}} /[o^{31} k^{a^{31}}] \) head
\( /a^{55} sa^{31}/ [a^{55} sa^{31}] \) how
\( /ka^{31}/ [ka^{31}] \) to listen
\( /ju^{33} wa^{33}/ [ju^{33} wa^{33}] \) elephant

/æ/ \( /k^{h33} ë^{55}/ [go^{55} ë^{55}] \) winnowing basket
\( /mi^{33} te^{h55}/ [mi^{33} te^{h55}] \) sunny
\( /n^{o^{33}} tx^{55}/ [n^{o^{33}} dx^{55}] \) fish
\( /n^{o^{33}}/ [n^{o^{33}}] \) five
\( /m^{h33} n^{y^{55}}/ [m^{h33} ny^{55}] \) macaque
/o/  /to\ U1/ [do\ U1]
      /\ U1 lo\ U55 lo\ U55/ [\ U1 lo\ U55 lo\ U55]
      /po\ U1 ng\ U33/ [bo\ U1 ng\ U33]
      /pu\ U1 lo\ U33/ [bu\ U1 lo\ U33]
      /te\ U55 ja\ U1/ [ts\ U55 ja\ U1]
/u/  /t\ U1\ U55/ [t\ U1\ U55]
      /k\ U1 t\ U1/ [k\ U1 t\ U1]
      /nu\ U55/ [nu\ U55]
      /k\ U1 tu\ U1/ [k\ U1 tu\ U1]
      /\ U1\ U55 k\ U1\ U33/ [\ U1\ U55 g\ U1\ U33]
      /\ U1\ U33 px\ U33/ [h\ U1\ U33 b\ U1\ U33]
      /j\ U1\ U33/ [j\ U1\ U33]
      /k\ U1\ U33 t\ U1\ U55/ [g\ U1\ U33 t\ U1\ U55]
      /\ U1\ U55\ U5\ t\ U1\ U5\ x\ U1\ U31/ [\ U1\ U5\ t\ U1\ U5\ x\ U1\ U31]
      /\ U1\ U55\ U5\ u\ U1\ U5\ / [\ U1\ U55\ U5\ g\ U1\ U5]/
/u/  /\ U1\ U55/ [\ U1\ U55]
      /\ U1\ U31 te\ U1\ U55/ [\ U1\ U31 ts\ U1\ U55]
      /\ U1\ U55 ku\ U55/ [\ U1\ U55 gu\ U55]
      /\ U1\ U5\ U1/ [\ U1\ U5\ U1]
      /k\ U1\ U55/ [k\ U1\ U55]

- to beg, to ask for
- hot
- buffalo
- mosquito net
- person
- to do ritual treatment
- spoon
- you
- each
- door
- monkey
- to grind
- stairs
- what
- to laugh
- grease
- dry
- tuber
- to arrive