

Introduction to Bangime tones

This “tour” is designed to help end-users of our Bangime documents (grammar, lexical spreadsheet, texts) understand how the tonal system works. Transcriptions are in IPA. Audio clips are included. Be warned that there is some range in pronunciation, and individual audio clips are not always middle-of-the-road representatives of the speaker’s range of pronunciations. The sound-file icons are visible in “print-layout” view in Word, but not in “draft” layout.

Bangime has three tone levels, H[igh], M[id], and L[ow]. Using *a* as a prop, they are transcribed *á*, *ā*, and *à*, respectively. All three play important and distinctive roles in a) the lexicon, b) tone sandhi (more or less low-level phonological processes involving word or morpheme sequences), and c) tonal ablaut (morphologically significant tone mutations on stems).

Noun stems can belong to any of six major tonal melodic classes: /L/, /LH/, /M/, /ML/, /H/, and /HL/. The /.../ notation indicates the underlying or lexical tone pattern of the stem. The actual pronunciation also depends on the prosodic weight of the stem: light, mid-heavy, and heavy.

Monosyllabic noun stems may have /L/, /M/, or /H/ melody. A distinctive feature of /M/ melody is that the pitch declines during the course of the syllabic nucleus, in isolation or more generally before a pause. This happens even with prosodically light stems (Cvv, Cvw, Cvj, CvCv). The pitch decline is indicated by using L-tone notation for the syllabic coda in prepausal position (and in citation forms). No such decline occurs (noticeably) in /L/ or /H/ monosyllabics, whose pitch is roughly flat even in prepausal position.

(1)

a. /L/ *tùùⁿ* ‘thorn’



b. /M/ *būùⁿ* ‘powder’ (<*būùⁿ*>)



c. /H/ *kúúⁿ* ‘egg’



The pitch drop at the end of /M/ monosyllabic stems like ‘powder’ does not occur in nonprepausal position. For example, the /M/ tone stretches to the end of the stem before plural suffix *-nde* (2b). In fact, it extends into the suffix by M-Terracing (see below), though this is obscured in (2b) by prepausal tone-dropping.

(2)

- a. /L/
- tùùⁿ-ndé*
- ‘thorns’



- b. /M/
- būūⁿ-ndè*
- ‘powders’ (< /būū
- ⁿ
- ndē/ after M-Terracing)



- c. /H/
- kúúⁿ-ndè*
- ‘eggs’



Light bisyllabic CvCv noun stems may have monotonous /L/, /M/, or /H/ melody, or bitonal /ML/, /HL/, or /LH/ melody. /HL/ and especially /ML/ are uncommon and are strongly associated with diminutives, including frozen diminutives (final è vowel). /LH/ is also uncommon and is associated with borrowed nouns. In isolation or otherwise prepausally, there is no audible distinction between /M/ and /ML/, because of the pitch decline in the second syllable of /M/ stems.

(3)

- a. /L/
- bùrⁿà*
- ‘stick’



- b. /M/
- dijà*
- ‘village’ (< /dijā/)



- c. /H/
- pári*
- ‘arrow’



- d. /ML/
- kūlè*
- ‘member of a caste specializing in sewing calabashes’



- e. /HL/
- kímè*
- ‘agama lizard’



- f. /LH/
- pòsó*
- ‘poison’



The distinction between /M/ and /ML/ light bisyllabic noun stems is clear even prepausally in the plural. Plural suffix *-ndé* polarizes tonally to the final L-tone of the stem in (4b), but is M-terraced and then subject to prepausal tone-dropping in (4a).

(4)

- a. /M/
- dijā-ndè*
- ‘villages’ (< /dijā-ndē/ after M-Terracing)



- b. /ML/
- kūlè-ndé*
- ‘members of a caste ...’



Plurals of other CvCv melodic types, showing tone polarization of the suffix:

- (5)

 - a. /L/ *bùrⁿà-ndé* ‘sticks’ 
 - b. /H/ *pári-ndè* ‘arrows’ 
 - c. /HL/ *kímè-ndé* ‘agama lizards’ 
 - d. /LH/ *pòsó-ndè* ‘poisons’ 

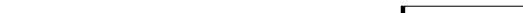
Mid-heavy stems are bisyllabic CvNCv, with homorganic nasal and voiced stop cluster medially. The difference between CvCv and CvNCv is that /H/ melody nouns usually undergo a partial pitch decline in prepausal C^áNC^ā but not in prepausal C^áC^á. The pitch drop in C^áNC^ā is only partial. The tone of the final syllable in C^áNC^ā can be analysed as a downstepped H-tone, i.e. C^áNC^á. However, since there are no lexically HM-toned words in Bangime, we can use the orthographically simpler transcription C^áNC^ā. Here are /H/, /M/, and /ML/ nouns of CvNCv shape. (There are no known /HL/-melody C^áNC^ā nouns.)

- (6)

 - a. /H/ *gúmbē* ‘baboon’ (< /gúmbé/) 
 - b. /M/ *pūndà* ‘Fulbe person (Pullo)’ (< /pūndā/) 
 - c. /ML/ *dāndì* ‘chili pepper’ 

As usual, the prepausal pitch drop for /H/ and /M/ melodies does not occur before the plural suffix. Adding this suffix brings out the distinction between /M/ and /ML/ melodies.

- (7)

 - a. /H/ *gúmbé-ndè* ‘baboons’ 
 - b. /M/ *pūndā-ndè* ‘Fulbe people’ (</pūndā-ndē/ after M-Terracing) 
 - c. /ML/ *dāndì-ndé* ‘chili peppers’ 

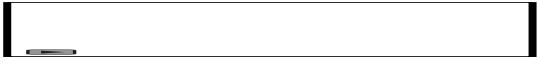
Other melodies that are possible with CvNCv stems are /L/ and /LH/, illustrated here along with their plurals.

(8)

- a. /L/ *pàŋgà* ‘granary’ 
- b. plural *pàŋgà-ndé* ‘granaries’ 
- c. /LH/ *jòŋgí* ‘rock python’ 
- d. plural *jòŋgí-ndè* ‘rock pythons’ 

Heavy stems are bisyllabic CvvCv, plus all trisyllabic and longer stems. Heavy /H/-melody stems show a full pitch decline, to the equivalent of L-tone, on the final syllable in prepausal position. Here are examples of CvvCv stems.

(9)

- a. /L/ *sààdà* ‘bunch’ 
- b. /M/ *tāārē* ‘spider’ (</tāārē/)> 
- c. /H/ *púúbè* ‘lid’ (</púúbé/)> 
- d. /ML/ *bīn᷑* ‘middle’ 
- e. /LH/ *tùùrē* ‘hyena’ 

No lexically /HL/ nouns of this shape are known. All nouns with HL-toned prepausal forms are shown to be /H/ rather than /HL/ when plural *-ndé* is added. However, there is one /ML/ CvvCv noun ‘middle’, distinguished in the plural from /M/.

(10)

- a. /H/ *púúbé-ndé* ‘lids’ 
- b. /M/ *tāārē-ndè* ‘spiders’ 
- c. /ML/ *bīn᷑-ndé* ‘middles’ 

For trisyllabic and longer stems, /LH/ can be divided into two or more subtypes depending on the position of the tone break. In our notation, the asterisk indicates repeatability. For example, /L*H/ includes L.L.H trisyllabics, while /LH*/ includes L.H.H trisyllabics.

(11)

- a. /L*H/
- ŋìjèré*
- ‘woman’



- b. /LH*/
- bùtígé*
- ‘porcupine’



Quadrisyllabic and longer examples are the following. However, such stems are mostly either borrowings or treated tonally as compounds. In the case of ‘lion’, the final syllable of a heavy H-toned sequence CVCV drops to L. This syllable reverts to its lexical H-tone before the plural suffix.

(12)

- a. /L*H*/
- sìmìnjáyá*
- ‘pig, warthog’



- b. /LH*/
- bàrádáwò*
- ‘lion’ (< /bàrádáwó/)



- c. plural
- bàrádáwó-ndè*
- ‘lions’



- d. /L*H/
- àlìmbànàjàjí*
- ‘amber’



There are quite a few tonal minimal pairs and one trio among Bangime nouns. A few of them follow:

(13) /H/ versus /M/ versus /L/

- a. /H/
- túmbē*
- ‘ant’ (< /túmbé/)



- b. /M/
- túmbè*
- ‘message’ (< /túmbē/)



- c. /L/
- tùmbè*
- ‘bunch’



(14) /M/ versus /L/

- a. /M/
- tììⁿ*
- ‘borassus palm’ (< /tìì
- ⁿ
- /)



- b. /L/
- tììⁿ*
- ‘tail’



(15) /H/ versus /L/

- a. /H/
- míndí*
- ‘grub’ (< /míndí/)



- b. /L/
- mìndí*
- ‘billygoat’



- (16) /H/ versus /M/

- a. /H/ *díjá* ‘food’



- b. /M/ *dījà* ‘village’ (</dījā/)



- (17) /LH/ versus /H/

- a. /LH/ *nìimbé* ‘charcoal’



- b. /H/ *píimbè* ‘sand’ (</píimbé/)



This concludes our presentation of lexical tones for nouns and the effects on them of prepausal position. In addition, nouns are subject to tonal modifications of two types, tone sandhi and tonal ablaut.

Tone sandhi occurs when juxtaposing two words or morphemes induces tonal changes in one of them. Tone sandhi processes are generally assimilatory or dissimilatory. We have already illustrated Tone Polarization as it shows up in nominal plural suffixation. The other principal tone sandhi processes in Bangime are:

- | | | |
|------|----------------------------|--|
| (18) | LL#L-to-LM#L
M#H-to-L#H | dissimilatory and rhythmic
dissimilatory (polarizing) |
| | LL#M-to-LM#M | assimilatory (anticipatory) |
| | HH#L-to-HL#L | assimilatory (anticipatory) |
| | Rightward Tone-Spreading | assimilatory |
| | M-Terracing | assimilatory |

Although LL#L-to-LM#L and LL#M-to-LM#M could easily be combined notationally into a single process, since both change LL to LM, they differ in that one is dissimilatory and the other assimilatory (anticipatory).

LL#L-to-LM#L takes a tonally flat LLL input sequence and outputs an undulating, rhythmic LML. Since there are no lexically /LM/-melody words and few /ML/-melody words, this tone sandhi process provides a useful audible cue that a word boundary after the M-tone is present.

- (19) *bùrⁿà* ‘stick’ plus *mèrⁿè* ‘heavy’ → *bùrⁿā mèrⁿè* ‘(a) heavy stick’



The other dissimilatory tone-sandhi process is M#H-to-L#H. It neutralizes the distinction between M and L tones in the position before a word beginning with H-tone. This process

applies, for example, before preverbal perfective particle *kóó*. This is shown by putting /M/-melody *tì̄n* ‘borassus palm’ (</tì̄n/>) and /L/-melody *tì̄n* ‘tail’ before *kóó*.

(20)

- a. *tì̄n kóó [í tì̄-wò]* ‘a borassus palm (*tì̄n*) fell’ 
- b. “ “ ‘a tail (*tì̄n*) fell’ 

With LL#M-to-LM#M, the final L-toned syllable of the first word is raised to M by anticipation of the following M-tone.

- (21) *bùr̄nà* ‘stick’ plus *gāà* ‘lasted’ → *bùr̄nā gāà* ‘a stick lasted’ 

In HH#L-to-HL#L, the final H-tone of the first word drops to L in anticipation of the following L-tone.

- (22) *pári* ‘arrow’ plus *mèr̄nè* ‘heavy’ → *pári mèr̄nè* ‘(a) heavy arrow’ 

Rightward Tone-Spreading requires a little grammatical background. A very common configurational pattern in Bangime is a syntactic mini-phrase expressed as [x Y], where x is one of a small number of pronominal or definite elements and Y is a full-fledged stem. The x element is of the segmental form *a*, *ŋ* (nasal of variable realization), or \emptyset (zero). Although the x element is syntactically bracketed with Y, it may be phrased phonologically with the final syllable of a preceding word. This is moot when x is \emptyset , but often clear when x is nonzero (*a* or *ŋ*). The *a* usually contracts with a preceding vowel, while the *ŋ* is realized as the syllabic coda of the preceding syllable. Rightward Tone-Spreading is illustrated in (24-26) using definite *ā*. Its basic M-tone is audible in isolation (‘the dog’). Medially in a clause, if it is phrased closely with the preceding word, it appears as *á*, *ā*, or *à* by tone-spreading. If it happens to become *ā* by this spreading process, this M-toned proclitic does not form a tight M-terrace with a following M-toned noun (26). Rightward Tone-Spreading also applies to the 1Sg and 3Sg *ŋ* proclitics before the verb ‘hit’ in (24-25). In the case of definite *ā*, alternative pronunciations preserving the underlying M-tone are also possible when the prosodic phrasing with the preceding word is not seamless (24-bis).

- (23) *ā kūrēè* ‘the dog’ (M-terraced) 

- (24) *[Ø ná] [á kūrēè] [í dègè]*
 [1Sg Ipfv] [Def dog] [1Sg hit.Ipfv] 
 ‘I am hitting the dog.’

(24)-bis (alternative pronunciation)

- | | | | |
|--------------------------------------|--|--|--|
| $[\emptyset \quad ná]$
[1Sg Ipfv] | $[\bar{a} \quad kūrē\bar{e}]$
[Def dog] | $[\bar{y} \quad dègè]$
[1Sg hit.Ipfv] | |
|--------------------------------------|--|--|--|
- 'I am hitting the dog.'
-
- | | | | |
|--------------------------------------|--|--|--|
| $[\emptyset \quad dà]$
[3Sg Ipfv] | $[\bar{a} \quad kūrē\bar{e}]$
[Def dog] | $[\bar{y} \quad dègè]$
[3Sg hit.Ipfv] | |
|--------------------------------------|--|--|--|
- 'He/She is hitting the dog.'
-
- | | | |
|---|--|--|
| $[\emptyset \quad jāā]$
[3Sg see.Pfv2] | $[\bar{a} \quad kūrē\bar{e}]$
[Def dog] | |
|---|--|--|
- 'He/She saw the dog.'

M-Terracing is the most important process by which sequences of two or more words, including some [x Y] phrases, fuse into tonally level sequences. Within NPs, this is mainly due to definite \bar{a} , which spreads its M-tone to the end of a following noun if the noun's lexical tone melody does not begin with M-tone. When it applies, M-Terracing erases the noun's lexical melody.

(27)

- a. \bar{a} plus *būrⁿā* 'stick' → *ā būrⁿā* 'the stick' (< /ā būrⁿā/ after M-Terracing)
- b. \bar{a} plus *tūrē* 'hyena' → *ā tūrē* 'the hyena' (< /ā tūrē/ after M-Terracing)
- c. \bar{a} plus *pári* 'arrow' → *ā pári* 'the arrow' (< /ā pári/ after M-Terracing)
- d. \bar{a} plus *jáambè* 'child' → *ā jáambè* 'the child' (< /ā jáambē/ after M-Terracing)

After definite \bar{a} forms an M-terrace with the following noun, \bar{a} itself may change its surface tone due to Rightward Tone-Spreading triggered by a word to its left, not shown in (27a-d), see (24-26) above. This spreading stops at the \bar{a} and has no effect on the following noun, which remains M-toned.

The final L-tone in the definite singulars, e.g. *rⁿā* in *ā būrⁿā* 'the stick' (27a), is due to prepausal tone-dropping of M-toned words, as described above. Stem-wide M-toned noun *būrⁿā* occurs in nonprepausal position. Likewise, its plural (28) is a single M-terrace, but the final syllable (i.e. the plural suffix) is subject to prepausal tone-dropping.

- (28) *ā būrⁿā-ndè* 'the sticks' (< /ā būrⁿā-ndē/ after M-Terracing)

M-Terracing also occurs in indefinite (undetermined) noun-adjective combinations.

- (29) *kūwò* (< /kūwō/) ‘house’ plus *mèrⁿè* ‘heavy’ → *kūwō mērⁿè* ‘a heavy house’ (< /kūwō mērⁿē/)



Here lexical /kūwō/ by itself and (after M-Terracing) /kūwō mērⁿē/ are both subject to prepausal tone-dropping of the final syllable.

L-Terracing is less conspicuous than M-Terracing but it does occur, in two versions. First, an entire M-terrace can be dropped to L-toned before an H-tone, by the M#H-to-L#H tone sandhi process described above. This confirms that the elements of the terrace are “locked” into a flat tonal sequence (a “terrace”), even though the entire sequence can surface with either M or L tones. /kūwō mērⁿē/ ‘a heavy house’ (see above) undergoes M#H-to-L#H before perfective *kóó*, for example.

- (30) [*kūwò mērⁿè*] *kóó ñ tī-wò* ‘a heavy house fell’



There are also some cases of L-terraces that are formed directly. Examples of the type *dijà(-ndé)* ‘the village(s)’ (definite of /M/-melody noun) will be discussed later because they interact with tonal ablaut.

H-Terracing occurs when two already H-toned words combine into a phrase. There are two signs of this fusion. First, the sequence of H-toned syllables has completely level pitch. By contrast, when two H-toned words just happen to be adjacent, without being locked into a single terrace, they are usually not pronounced at exactly the same pitch. For example, the pitch of 1Sg possessor *máá* is usually lower than that of a following H-tone in the possessum (31).

- (31) *máá náá-ndè* ‘my cows’, roughly [mā:ná:ndè]



By contrast, when an /H/-melody noun is combined with an /H/-melody adjective, the two form an H-terrace with completely level pitch (except for prepausal tone-dropping of the final syllable).

- (32) *pári* ‘arrow’ plus *bórⁿú* ‘big’ → *pári bórⁿù* ‘a big arrow’
< /pári bórⁿú/ after H-Terracing)



The second sign that this is a true H-terrace, not just an accidental sequence of two already H-toned words, is that prepausal tone-dropping applies to the second syllable of the adjective *bórⁿú* ‘big’ in the preceding example. When it is not part of an H-terrace, *bórⁿú* is fully H-toned, even prepausally. This is because prosodically light H-toned words, including CVCV, are not subject to prepausal tone-dropping. This is confirmed by adding ‘big’ to an /L/-melody noun like ‘stick’. Contrast *bórⁿù* in (32) above with *bórⁿú* in (33).

- (33) *bùrⁿà* ‘stick’ plus *bó^rnú* ‘big’ → *bùrⁿà bó^rnú* ‘a big stick’



This shows that ‘a big arrow’ (32) is treated tonally as though it were a single, quadrisyllabic H-toned sequence, underlying /párbórnú/. Since a quadrisyllabic (or even trisyllabic) sequence is prosodically heavy, its final syllable is subject to prepausal tone-dropping.

This completes our introduction to Bangime lexical tone melodies, low-level tone sandhi, and morphologically sensitive tone sandhi (Rightward Tone-Spreading, terracing), as they apply mainly to nouns and NPs. However, Bangime also has tonal ablaut, a set of purely categorially (morphosyntactically) controlled tonal changes. The characteristic Bangime tonal ablaut process is tone inversion. For nouns, it means that nouns whose melody begins with H- or M-tone become entirely L-toned, while nouns whose melody begins with L-tone become entirely H-toned. We label these tone overlays with curly brackets: {H} and {L}.

For nouns, tone inversion occurs when the noun is preceded by a possessor, like 3Sg *màà* ‘his/her/its’. There are no further complications when the noun is of /M/ or /L/ melody, beyond normal tone sandhi. In (34a), /M/-melody ‘house’ drops to {L} by tonal ablaut when possessed. In ‘his/her house’, the resulting pre-surface all-L-toned /Cvñ#Cvñ/ undergoes the regular, dissimilatory (rhythm-creating) rule LL#L-to-LM#L.

- (34)

- a. *màà* plus *kūwò* ‘house’ (</kūwō/>) → *màā kùwò* ‘his/her house’
- b. *màà* plus *bùrⁿà* ‘stick’ → *màà bùrⁿá* ‘his/her stick’

Exceptionally, lexically /H/-melody nouns have a special {HL} ablaut overlay instead of inverted {L} after a possessor, but only in the singular. In the plural, the regular inversion to {L} occurs.

- (35) *màà* plus *kúwó* ‘shoulder’ →

- a. singular *màā kúwò* ‘his/her shoulder’
- b. plural *màā kùwò-nđé* ‘his/her shoulders’

Even in singular *màā kúwò* ‘his/her shoulder’, there is a sign that regular inversion to {L} has occurred at some point in the derivation. This is because the shift of 3Sg possessor *màà* to *màā* is not regular before an H-tone. The shift should occur before an M-tone, by assimilatory LL#M-to-LM#M, or before an L-tone, by dissimilatory LL#L-to-LM#L, but except in possessed forms of /H/-melody nouns there are no instances of LL#H-to-LM#H. It seems that /màā kúwó/ first undergoes tone inversion (ablaut) to /màà kùwò/,

which then triggers LL#L-to-LM#L to produce /màā kùwò/, but then a second late ablaut process, limited to nouns of /H/ melody (and therefore requiring a “memory” of the lexical starting point), shifts /kùwò/ to **kúwò**, resulting in **màā kúwò** ‘his/her shoulder’.

Nouns with contoured lexical melodies /HL/, /ML/, and /LH/ disregard the second melodic tone in inversion and behave under possession just like nouns of /H/, /M/, and /L/ melodies, respectively.

(36)

- a. **màà** plus /HL/-melody **pári** ‘(a) bet’ (French *pari*) → **màā pári** ‘his/her bet’
(homophonous with **màā pári** ‘his/her arrow’)
- b. **màà** plus /ML/-melody **dāndì** ‘chili pepper’ → **màā dāndì** ‘his/her chili’
- c. **màà** plus /LH/-melody **tùùré** ‘hyena’ → **màā túúré** ‘his/her hyena’
(< /màà túúré/ after tonal ablaut)

The interaction of tone inversion (ablaut) of noun stems with preceding definite **ā** is complex. In the singular, M-Terracing applies to nouns of most melodic classes, spreading the M-tone to the end of the noun stem. When this happens, it is difficult to determine whether tone ablaut had applied before the terracing process. However, /M/-melody nouns exceptionally fail to undergo M-Terracing after definite **ā**. Instead, the noun appears with {L} overlay, as expected under tone inversion. The definite proclitic drops with it (when not preceded by another word), forming an L-terrace.

(37)

- a. **ā** plus **dijà** ‘village’ → **à dijà** ‘the village’
- b. plural: **à dijà-ndé** ‘the villages’

The outputs of tonal ablaut are subject to lower-level tone sandhi processes that apply at their right edge. Heavy nouns of /L/ (and /LH/) melody that are inverted to {H} are then subject to prepausal tone-dropping, just as with uninverted heavy nouns of /H/ melody. This is the case in **màā túúré** ‘his/her hyena’ (36c) above. The stem-wide {H} overlay is clear in the plural.

(38) **màā túúré-ndè** ‘his/her hyenas’

Similarly, nouns of /H/ and /M/ (and /HL/ and /ML/) melodies that are inverted to {L} are then subject to assimilatory LL#M-to-LM#M and to dissimilatory LL#L-to-LM#L when followed by an M- or L-tone, respectively. (34a) above has already illustrated LL#L-to-LM#L. Another example of LL#L-to-LM#L, this time followed by Rightward Tone-Spreading onto the nasal of the locative postposition, is:

- (39) *à dìjà* ‘the village’ (< *dijà*) plus locative *ŋ-kò* → *à dìjā ŋ-kò*

We have now covered the main points of lexical, phonological, and morphophonological tone patterns relevant to nouns. Many details, including lexical irregularities, have been omitted here but are presented in the grammar.

Verbs have somewhat similar patterns, but they are more complex. This is partly because some verb tones cannot always be teased apart from verb-class-specific or lexically idiosyncratic segmental modifications (suffixes, truncation, final vowel mutations). However, some verbs have a constant segmental form, undergoing only tonal changes. Focusing on these, we can identify two major tonal classes. One class is L-toned after perfective *kóó*, and M-toned (subject to prepausal tone-dropping) in the imperative.

- (40)
- a. *kóó [jí tūgì]* ‘he/she jabbed’
 - b. *tūgì* ‘jab!’ (< /tūgī/)

Another class is M-toned after *kóó*, and L-toned in the imperative.

- (41)
- a. *kóó [Ø wōrè]* ‘he/she went’ (< /wōrē/)
 - b. *wōrè* ‘go!’

These data suggest a tone inversion process somewhat like that observed with nouns. Taking the imperative as lexically basic, and perfective *kóó* as a kind of “determiner” analogous to definite and possessive determiners for nouns, we can envisage an inversion of /M/ to {L} with ‘jab’ and of /L/ to {M} with ‘go’. Tone inversion under “determination” can therefore be seen as the core of Bangime grammar, ultimately controlled by rather abstract language-specific semantic patterns.