

## MAIN FEATURES OF THE LIVONIAN SOUND SYSTEM AND PRONUNCIATION

**Tuuli Tuisk**

*University of Tartu*

**Abstract.** The aim of this article is to give an overview of the Livonian sound system and pronunciation. Regarding Livonian dialectal variation, the main difference is between East and West Livonian, while Central Livonian forms a transition area. The basis of the Livonian written language is the East Courland dialect. This article focuses on standard pronunciation, with some discussion of variation. Vowels and consonants are treated separately. In addition, Livonian prosodic features are discussed. Livonian stands out as being a Finnic language that has been influenced by the Baltic language, Latvian. Unlike many other Finnic languages, Livonian has voiced stops and fricatives, which can occur as long geminates. There is a large number of short and long monophthongs, diphthongs, and triphthongs in Livonian.

**Keywords:** consonants, vowels, tone, prosody, Livonian

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### 1. Introduction

The aim of the current article is to give a description of the Livonian sound system and pronunciation. The Livonian language shares similar features with the Finno-Ugric languages but also the Baltic and Scandinavian languages. Its quantity system is above all similar to Estonian (Lehiste 1960, 1997a). A significant phenomenon in Livonian word prosody is the opposition of two pitch contours (Posti 1936; Vihman 1971; Viitso 1981). Livonian is the only Finnic language that differentiates between two contrastive tones in stressed stem-initial syllables. Such tone opposition is quite unusual for Finno-Ugric languages and together with the temporal aspects leads to the special position of Livonian among the languages spoken in the contact area around the Baltic Sea. Livonian is unique among the Uralic languages in that it contrasts short and long monophthongs, diphthongs, and triphthongs, and also single and geminate consonants and word-final short and

long consonants. Additionally, differences in coda weight multiply the number of possible sound patterns. These aspects are actively used in Livonian inflectional morphology. Livonian also stands out among Finnic languages in that it contrasts final short and long vowels in stressed monosyllables. There is the gemination of voiced plosives and fricatives in the language. The structure of consonant clusters in Livonian is more complicated than in Finnish or Estonian.

Describing the Livonian sound system and the question of how to represent this system in the Livonian literary language have been much debated issues (for details see Ernštreits 2013). The Livonian language has been written for over 100 years by linguists and researchers as well as native speakers. The main interest for all of these groups has been how to represent the Livonian language in the best written form. For linguists and researchers, the primary concern has been the written representation of the language with maximum phonetic precision. For common users, the most important aspect has been how to write and read the language in the best way. Therefore, both phonetic transcription and standard written orthography have been used widely for writing Livonian, though both of these systems are relatively closely connected.

Historically, the Livonian dialectal variants of Courland (Latvian *Kurzeme*) and Livonia (Latvian *Vidzeme*) have been distinguished. The area in the central and northwestern part of present-day Latvia, along the Daugava, Gauja, and Salaca Rivers, and on the coast of the Gulf of Rīga north of the Daugava up to the Estonian settlements was originally called Livonia. Wars, diseases, and assimilation processes caused a situation where by the 19th century the Livonian language was no longer spoken in this area. There is evidence only of Salaca Livonian. Starting from the second half of the 19th century, the linguistic focus has been on Courland. Traditionally, Courland Livonian has been divided into East (spoken in the villages of Ūžkilā, Sīkrōg, Irē, Kuoštrōg, Pitrōg, Sānag, Vaid, Kūolka, and Mustānum), Central (Īra), and West Livonian (the villages of Lūž and Pizā) dialects. The main difference is between East and West Livonian, while Central Livonian forms a transition area. The Livonian written language is based on the East Courland dialect (e.g., Viitso 2008).

There are 36 letters in the modern Livonian alphabet: **a ä b c d d e f g h i j k l l m n ņ o ó õ p q r r s š t t u v w x y z ž**. The letters **c, q, w, x, y** occur only in foreign names, e.g., *Bach*, *Wiedemann*. The length of a vowel is orthographically marked with a macron above the vowel: *lēņtš* ‘southwest’, *sīedō* ‘to eat, Inf’. Words with broken tone or *stōd*

are usually marked with an apostrophe in transcriptions and learning materials (e.g., *ki'v* 'stone', *vie'ddō* 'to carry'). In the orthography, broken tone is left unmarked. There is no common agreement on how to mark broken tone in IPA<sup>1</sup>, but the symbol used for a glottal consonant (ʔ) is sometimes proposed. The length of the vowel of the second syllable after a short first syllable is also marked: *jōvā* 'good', *katāb* 'he/she covers'. Consonant length is denoted by writing the consonant either with one or two letters as, e.g., *ka'ggōl* 'neck', *vōttō* 'to take'.

The dialectal differences of Courland Livonian are clearest if one looks at vowels. In East Livonian there are 8 short and 9 long vowels in syllables with primary stress, in Central Livonian (Īra) 8 short and 8 long vowels, and in West Livonian 6 short and 6 long vowels. In the 19th century, the short and long rounded front-vowels *ü* and *ö* were in use, as well. These were replaced in all Courland Livonian dialects with unrounded *i* and *e* at the end of the 19th century. East Livonian (except Kūolka and Mustānum) differentiates long *[ō]* and *[ō̄]* (e.g., *tōvaz* 'sky' and *sōra* 'horn'). Orthographically, both vowels are marked as *ō*. In paradigmatic alternation, the mid-high rounded back-vowel *[ō]* can alternate with the diphthong *ou* and the low rounded back-vowel *[ō̄]* can alternate with short *a* (e.g., *tōvaz* 'sky, NSg' : *touvōd* 'skies, NPl' and *tōla* 'winter, NSg' : *tallō* 'winter, PSg'). In West Livonian and Īra, instead of *[ō̄]* there is *[ā]*, which is somewhat labialized (e.g., *sāra* 'horn').

## 2. Consonants

There are 23 consonants in contemporary Livonian (subchapters 2 and 3 in the current article are based on Viitso 2008, Viitso and Ernštreits 2012, Lehiste et al. 2008). Unlike many other Finnic languages, Livonian has voiced stops /b d ɖ g/ and fricatives /z ž/. Similar to Estonian, Livonian has palatalization of alveolar consonants which has occurred in front of the historical /i/ and /j/. In contemporary Livonian, /ɖ ʧ ʣ ŋ ʀ/ have acquired phonemic status. When /i/ and /j/ follow /š/, /tš/, /ž/, and /dž/, these consonants are pronounced as palatalized.

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1 The International Phonetic Alphabet.

**Table 1.** Livonian consonants (corresponding IPA symbols are given in parentheses).

	Bilabial	Labiodental	Alveolar	Postalveolar	Palatalized	Palatal	Velar	Glottal
Plosive	<b>p b</b> [p b]		<b>t d</b> [t d]		ɸ ɸ̃ [t̟ d̟]		<b>k g</b> [k g]	
Nasal	<b>m</b> [m]		<b>n</b> [n]		ɲ [ɲ]			
Trill			<b>r</b> [r]		ɾ [ɾ]			
Fricative		<b>f v</b> [f v]	<b>s z</b> [s z]	<b>š ž</b> [ʃ ʒ, ʃ̟ ʒ̟]				<b>h</b> [h]
Lateral			<b>l</b> [l]		ɭ [ɭ]			
Approximant						<b>j</b> [j]		

## 2.1. Plosives

- (1) The Livonian plosives **p**, **t**, and **k** are pronounced as voiceless consonants (e.g., *padā* ‘pot’), being similar to the corresponding plosives *p*, *t*, and *k* in Estonian and Latvian.
- (2) The palatalized plosive ɸ is pronounced fully palatalized (e.g., *kaɸki* ‘broken’). It is different from Estonian palatalized *t*, which is only partly palatalized.
- (3) The short plosives **b**, **d**, and **g** are voiced word-initially and in voiced position (e.g., *gārban* ‘cranberry’, *tabār* ‘tail’). In front of *p*, *t*, ɸ, *k*, and *s* and in word-final position *b*, *d*, and *g* are weak and voiceless (or half-voiced) (e.g., *la’gtō* ‘to lay out’, *ke’g* ‘cuckoo’).
- (4) The plosive ɸ̃ in voiced position is palatalized and voiced (e.g., *sēmɸa* ‘milk’). Preceding *p*, *t*, *k*, and ɸ, ɸ̃ is weak and voiceless (e.g., *ē’ɸtō* ‘to dress’). Word-final ɸ̃ following a voiced sound is half-voiced (e.g., *lē’ɸ̃* ‘leaf’).

## 2.2. Nasals

- (5) The voiced nasal **m** is similar to Estonian and Latvian *m* (e.g., *limā* ‘mud’).

- (6) The Livonian nasal **n** represents three different sounds. It is not palatalized and usually pronounced as [n], much as *n* in Estonian and Latvian (e.g., *kanā* ‘hen’). In front of *k* and *g*, within the same morpheme, it is pronounced as [ŋ] (e.g., *kānga* ‘shoe’). Within the cluster **ngd**, it is fully palatalized and pronounced as [ɲ] (e.g., *langdi* ‘yarn, PPI’).
- (7) The nasal **ñ** is fully palatalized, being different from Estonian palatalized *n* and similar to Latvian *ņ* (e.g., *keņgi* ‘shoes, NPI’, *ka’ñki* ‘chicken’).

### 2.3. Trills

- (8) The alveolar consonant **r** is similar to Estonian and Latvian *r* (e.g., *rānda* ‘shore’).
- (9) The consonant **ř** is fully palatalized in Livonian (e.g., *křra* ‘herd’). In literary Estonian and Latvian, *r* is unmarked.

### 2.4. Fricatives

- (10) The word-initial **s** is similar to Estonian and Latvian *s* (e.g., *sovā* ‘stick’). Word-finally and in voiced position, Livonian single **s** is longer and more intense, resembling Estonian long *ss* and Latvian *s* (e.g., *tāsā* ‘here’).
- (11) The alveolar fricative **z** is fully voiced word-initially and in voiced position (e.g., *zēp* ‘soap’, *izā* ‘father’).
- (12) The word-initial fricative **š** is voiceless (e.g., *širts* ‘apron’).
- (13) The fricative **ž** is fully voiced in word-initial and voiced position (e.g., *ažā* ‘thing’). **ž** is not palatalized after *i* and *e*, but palatalized after other vowels. Word-final **ž** can become half-voiced or unvoiced. In words with broken tone, **ž** is pronounced as **iž** after a short monophthong or the diphthong *uo* (e.g., *ke’ž* ‘hand’, *tuo’ž* ‘truth’).
- (14) The fricatives **f** and **h** occur only in foreign and loan words (e.g., *foto* ‘photo’, *hārtsog* ‘duke’). The consonant *h* occurs also in interjections. The voiceless glottal fricative **h** is pronounced stronger than Estonian *h*.
- (15) The fricative **v** is voiced in word-initial or syllable-initial position as well as in word-final or syllable-final position when following a long vowel. In words longer than monosyllables, **v** can be pronounced as [u] in word-final position and in non-initial syllables

before consonants (e.g., *pappov* ‘fallow’ : *pappovd* ‘fallows, NPl’). **v** in monosyllabic words with plain tone indicates that in other word-forms **v** is between vowels and pronounced as [v] (e.g., *kouv* ‘well’ : *kouvõ* ‘well, PSg’). However, word-final **v** in monosyllabic words with broken tone indicates that **v** alternates with **vv** and is pronounced as [uvv] (e.g., *kie’v* ‘cough’ : *kie’vvõ* ‘cough, PSg’).

## 2.5. Laterals

- (16) The Livonian voiced lateral **l** is similar to Estonian *l*, but can also be pronounced like Latvian and Finnish *l*.
- (17) The voiced lateral **ļ** is fully palatalized and differs from Estonian palatalized *l* in its palatalization duration (e.g., *nõļa* ‘joke’).

## 2.6. Approximant

- (18) In word-initial and syllable-initial position, the approximant **j** is pronounced similarly to Estonian and Latvian. In word-final, syllable-final, and consonant-initial position, **j** is pronounced as [i] (e.g., *kõj* ‘spoon’, *ka’j* ‘harm’).

## 2.7. Geminate and consonant clusters

In intervocalic position, there are short and long geminates<sup>2</sup> in Livonian (e.g., *võtāb* ‘he/she takes’, *võttõ* ‘to take’). Both the short geminate and the long geminate close the preceding syllable. After a long geminate, the second syllable vowel is significantly shorter than after a short geminate. A distinctive feature of Livonian as compared to other Finno-Ugric languages is the gemination of voiced plosives and fricatives (e.g., *ka’ddõ* ‘to disappear’, *i’zzõ* ‘father, PSg’). Also, the voiced trill can occur as a long geminate (e.g., *kirrõd* ‘axes’). The distinguishing of voiceless short and long plosive geminates is preserved in words with more than two syllables, as well (Tuisk 2015a).

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2 The criteria for gemination here is that the geminate sequence at the syllable boundary is divided between two syllables.

The short geminates of voiceless stops are written, as in Estonian, with a single letter, e.g., *võtiāb* ‘he/she takes’. Single voiceless fricatives in intervocalic position are also short geminates as, for example, in the word *tāsā* ‘here’.

The plosives **p, t, t̥, k**, fricatives **s, š, f, h**, nasals **m, n, ŋ**, laterals **l, ɭ** and trills **r, ʀ** are always pronounced long in word-final position in monosyllabic words with the plain tone and written with a single letter (e.g., *kik* ‘rooster’, *kaš* ‘cat’, *rōk* ‘talk, speech’, *tas* ‘cup’). This is similar to Estonian where these are written with two letters (e.g., *kukk* ‘rooster’, *kass* ‘cat’).

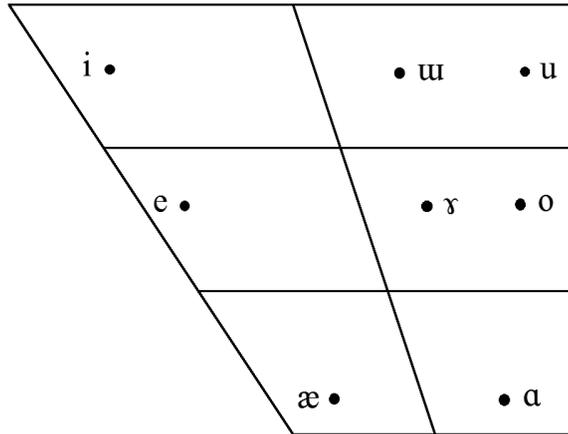
The structure of consonant clusters in Livonian is more complicated than, for example, in Finnish or Estonian. The consonants **p, t, t̥, k, s, š, f** and **m, n, ŋ, l, ɭ, r, ʀ** are pronounced longer as the first component of a consonant cluster than in corresponding Estonian consonant clusters and even stretched in such words with plain tone as, e.g., *maksõ* ‘to pay’, *andõ* ‘to give’, *kuolm* ‘three’, *mõtlõ* ‘to think’. The consonants **p, t, t̥, k, s, š, f** are pronounced half-long as the first component of a consonant cluster in words with plain tone where there is a long vowel in the second syllable, e.g., *pitkā* ‘long’, *liestā* ‘flounder’, *kaļlā* ‘cauldron’. As for the duration of some consonant clusters in Livonian, there is a similar correlation between the duration of the consonant cluster and the following syllable as in Estonian. For example, in the word *mustā* ‘black’ there is a short consonant cluster followed by a half-long (or long) vowel, while in the word *mustõ* ‘black, PSg’ there is a long consonant cluster followed by a short vowel.

### 3. Vowels

Livonian has eight vowel phonemes, represented by the letters *i õ u e ö o ä a*, which are pronounced as [i u u e ɤ o æ a]. There are nine long vowels *ā ā ē ī ō ō ð ū ō*. Vowels are divided according to tongue height as: high /i, õ, u/, mid-high /e, ö, o/, and low /ä, a/ vowels (see Table 2 and Figure 1). All vowels in primary stressed syllables occur as short and long. Note that East Livonian differentiates long [ō] and [ō] (see Table 3).

**Table 2.** Livonian short and long monophthongs.

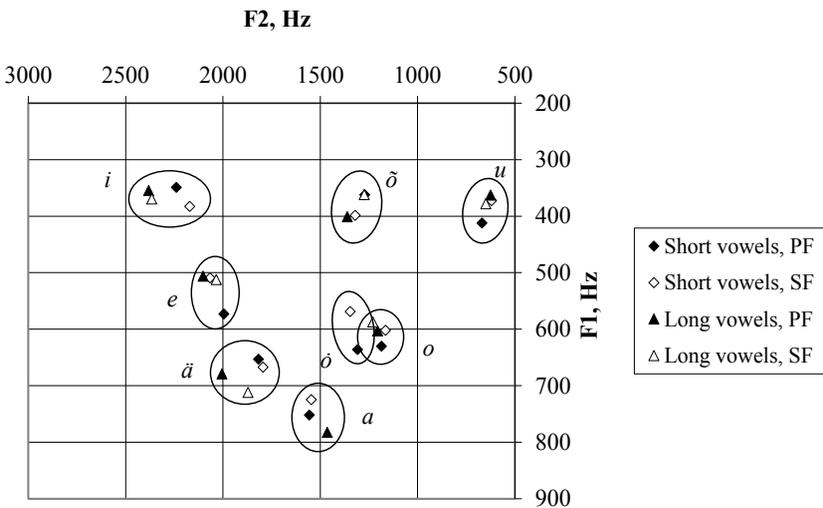
	Front vowel	Back vowel	
High	<b>i ī</b>	<b>õ ȭ</b>	<b>u ū</b>
Mid-high	<b>e ē</b>	<b>o ȯ</b>	<b>o ȯ</b>
Low	<b>ä ǟ</b>	<b>a ā</b>	<b>ɑ</b>

**Figure 1.** Livonian vowels on the vowel chart.

- (1) Livonian **i**, **a**, **u**, **o**, and their long counterparts are pronounced like the corresponding short and long vowels in Estonian and Latvian (e.g., *kilā* ‘village’, *kalā* ‘fish’, *lūdõ* ‘broom’, *kõgiņ* ‘for a long time’). Livonian **o** and **ȯ** are never pronounced as diphthongs.
- (2) Mid-high **e** and **ē** are pronounced as the corresponding sounds in Estonian and as the so-called narrow short and long *e* in Latvian (e.g., *dek* ‘blanket’, *lēba* ‘bread’).
- (3) Low **ä** and **ǟ** are pronounced as a short and long *ä* in Estonian and as a short and long so-called wide [ɛ] in Latvian (e.g., *käbā* ‘cone’, *sālga* ‘back, NSg’).
- (4) Livonian **õ** and **ȭ** are higher than Estonian short and long *õ* and more back than Russian *ы* (e.g., *sõbrā* ‘friend’, *võrõz* ‘stranger’). Word-final **ȭ** may not be pronounced in the sentence when the following word starts with a vowel. Sometimes **ȭ** is also not pronounced at the end of the inessive and elative and in verb forms of plural 2nd and 3rd person.

- (5) **õ** and **ȭ** are mid-high back vowels, being somewhat lower than Estonian *õ*. The mid-high unrounded back-vowel /*õ*/ occurs only in stressed syllables following the word-initial consonants /p, m, v/ (e.g., *põis* ‘boy’, *mõizõ* ‘manor’, *võigõ* ‘to swim’).
- (6) **ȭ** is a long low back vowel (e.g., *sõdõ* ‘to get’, *rȭ* ‘money’).

In addition, the results of the phonetic measurements of Livonian vowels are presented in Figure 1 (according to the measurements by Lehiste et al. 2008)<sup>3</sup>. The vowels were pronounced by one native male speaker of Livonian.



**Figure 2.** Average formant values of short and long vowels in stressed syllables of the male speaker VB (Lehiste et al. 2008: 85). (PF – words in phrase-final position, SF – sentence-final position)

In the pronunciation of the speaker, both short and long vowels in the stressed syllables can be grouped as follows: on the basis of F1 /i õ u/ are high vowels, /e ȭ o/ mid-high vowels, and /ä a/ low vowels. According to F2 /i e ä/ are front vowels and /ȭ u õ o a/ back vowels. Compared to short vowels, long vowels /i ä/ are moved front and /a/ more back. Short /o/ and /ȭ/ are located quite close to each other.

The dialectal differences of Courland Livonian are clearest if one looks at vowels. Table 3 shows short and long vowels in primary-stressed

3 These materials did not contain long /*ȭ*/ in stressed syllables.

syllables in East, Īra (Central), and West Livonian. There is some variation in East Livonian. Namely, the long low back-vowel  $\bar{o}$  is absent in the villages of Kūolka and Mustānum. In Mustānum, the mid-high back-vowels  $\acute{o}$  and  $\bar{o}$  are absent, as well. In East Livonian and Īra, the diphthongs  $uo$  and  $\bar{u}o$  have been replaced with  $\acute{o}$  and  $\bar{o}$  after  $p$ ,  $m$ , and  $v$ . In the 19th century, the short and long rounded front-vowels  $\ddot{u}$  and  $\bar{o}$  were in use. These were replaced in the whole area with unrounded  $i$  and  $e$  at the end of the 19th century.

**Table 3.** Vowels in the primary stressed syllable in Livonian dialects.

East Livonian					Īra (Central Livonian)					West Livonian					
<i>i</i>	$\bar{o}$	<i>u</i>	$\bar{i}$	$\bar{\acute{o}}$	$\bar{u}$	<i>i</i>	$\bar{o}$	<i>u</i>	$\bar{i}$	$\bar{\acute{o}}$	$\bar{u}$	<i>i</i>	<i>u</i>	$\bar{i}$	$\bar{u}$
<i>e</i>	( $\acute{o}$ )	<i>o</i>	$\bar{e}$	( $\bar{\acute{o}}$ )	$\bar{o}$	<i>e</i>	$\acute{o}$	<i>o</i>	$\bar{e}$	$\bar{\acute{o}}$	$\bar{o}$	<i>e</i>	<i>o</i>	$\bar{e}$	$\bar{o}$
$\ddot{a}$	<i>a</i>		$\bar{\ddot{a}}$	$\bar{a}$	( $\bar{\acute{o}}$ )	$\ddot{a}$	<i>a</i>		$\bar{\ddot{a}}$	$\bar{a}$		$\ddot{a}$	<i>a</i>	$\bar{\ddot{a}}$	$\bar{a}$

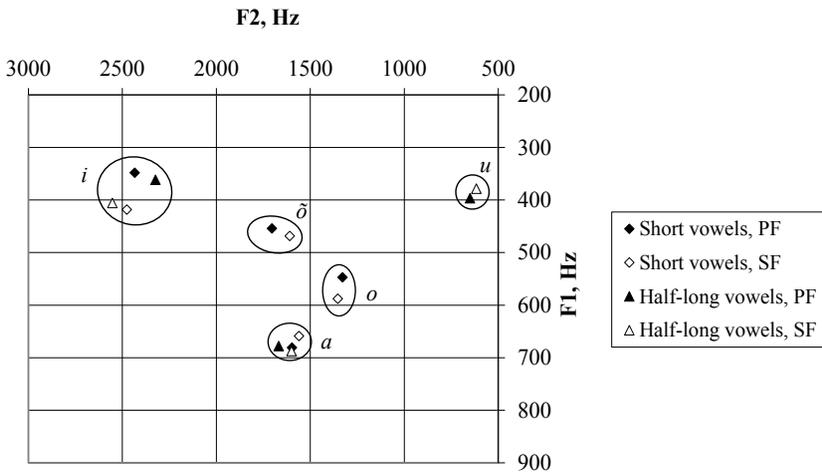
In East Livonian, there are 4 short and 4 long vowels in the unstressed syllables following the primary stressed syllable (Table 4), but there are several restrictions and the occurrence of a particular vowel depends on the structure of the primary-stressed syllable.

**Table 4.** Livonian unstressed syllable vowels following the primary-stressed syllable.

East Livonian				West Livonian				
<i>i</i>	$\bar{o}$	$\bar{i}$	$\bar{u}$	<i>i</i>	$\bar{o}$	<i>u</i>	$\bar{i}$	$\bar{u}$
<i>e</i>		$\bar{e}$		<i>e</i>			$\bar{e}$	
	<i>a</i>		$\bar{a}$	<i>a</i>			$\bar{a}$	

In Figure 3, the results of the phonetic measurements of Livonian short and half-long vowels in unstressed syllables are presented (according to the measurements by Lehiste et al. 2008)<sup>4</sup>. Again, the vowels were pronounced by the same native male speaker of Livonian.

4 The materials did not contain /e/ in unstressed syllables.



**Figure 3.** Average formant values of short and half-long vowels in unstressed syllables of the male speaker VB (Lehiste et al. 2008: 87). (PF – words in phrase-final position, SF – sentence-final position)

In the speech of the male speaker, the quality of the short high vowels /i/ and half-long /i u/ of unstressed syllables do not vary much in quality. Their quality is rather close to that of the same vowels in stressed syllables. However, compared to the high vowel /ø/ in stressed syllables, /ø/ in unstressed syllables has moved more to the center of the vowel space.

Livonian diphthongs are classified as falling (opening) or rising (closing) on the basis of the quality of their components (Viitso 1981, 2008). The falling diphthongs (see Table 5) are either short (*ie* and *uo*, e.g., *piezā* ‘nest, NSg’, *suodā* ‘war, NSg’) or long (*īe* and *ūo*, e.g., *sīedō* ‘eat, Inf’, *kūona* ‘frog, NSg’), with short falling diphthongs behaving similarly to short monophthongs. The total duration of short diphthongs usually equals the duration of short monophthongs. The phonetic measurements by Lehiste et al. (2008) have shown that short diphthongs can also be a little longer (e.g., V = 103 ms, <sup>v</sup>V = 146 ms) (Lehiste et al. 2008: 41).

**Table 5.** Livonian falling diphthongs.

<b>ie</b> <i>riek</i> ‘road’	<b>ie’</b> <i>vie’d</i> ‘water, GSg’	<b>īe</b> <i>tīedō</i> ‘work, PSg’	<b>ī’e</b> <i>tī’edō</i> ‘to do’
<b>uo</b> <i>kuonnō</i> ‘frog, PSg’	<b>uo’</b> <i>kuo’nnō</i> ‘at home’	<b>ūo</b> <i>jūodō</i> ‘to drink’	<b>ū’o</b> <i>kū’oq</i> ‘court of justice’

Rising diphthongs (see Table 6) are long and have either a long (e.g., *āi* as in *pāika* ‘place, NSg’) or short (e.g., *ei* as in *leibō* ‘bread, PSg’) first component. In East Livonian, all rising diphthongs with a long first component end in *i* (*āi*, *ōi*, *ēi*, *ōi*, *ūi*). Rising diphthongs with a short first component end in *i* (*ai*, *ei*, *ōi*, *oi*, *ui*) or *u* (*āu*, *iu*, *ou*, *ōu*). The great variety of the rising diphthongs is explained by the fact that *j* and *v* are vowelized (examples presented in parentheses in Table 6). For this reason, such combinations as *e’j*, *ō’j*, *ō’j*, *a’j*, *u’j*, *o’j*, *ū’j*, *ōi*, *ō’j*, *ū’oj*, *o’v*, *i’v*, *ie’v*, *ā’v*, *ō’v* should be treated as diphthongs and triphthongs.

Livonian triphthongs developed through diphthongization of the initial components of the diphthongs beginning with *e* and *o*, and partly as a result of the loss of *h* and metathesis (Viitso 1981).

**Table 6.** Livonian short and long diphthongs and triphthongs ending with *i* and *u* (presented according to the initial component).

<b>i</b>					<b>iu</b> <i>piukšō</i> ‘to tweet’	<b>i’u (i’v)</b> <i>i’ukšō</i> ‘to yell’	<b>īu</b> <i>pīukandōks</i> ‘tweet’
<b>ie</b>					<b>ieu</b> <i>kieuž</i> ‘rope’	<b>(ie’v)</b>	
<b>e</b>	<b>ei</b> <i>leibō</i> ‘bread, PSg’	<b>e’i (e’j)</b> <i>te’iž</i> ‘again’	<b>ēi</b> <i>klēibō</i> ‘to glue’		<b>eu</b> <i>reumatismōz</i> ‘rheumatism’	<b>e’u</b> <i>re’uglō</i> ‘to belch’	
<b>ā</b>					<b>āu</b> <i>tāuž</i> ‘full’	<b>(ā’v)</b>	
<b>ō</b>	<b>ōi</b> <i>sōidō</i> ‘to row’	<b>ō’i (ō’j)</b> <i>vō’ilō</i> ‘to wave’	<b>ōi</b> <i>sōira</i> ‘cheese’		<b>ōu</b> <i>jōugō</i> ‘sand’	<b>ō’u (ō’v)</b> <i>kō’uri</i> ‘twisted’	

<b>ó</b>	<b>ói</b> <i>móistli</i> 'wise'	<b>(ó'j)</b>	<b>õi</b> <i>võidatõ</i> 'to avoid'				
<b>a</b>	<b>ai</b> <i>aigõ</i> 'time, PSg'	<b>a'i (a'j)</b> <i>a'igõ</i> 'edge, PSg'	<b>āi</b> <i>āiga</i> 'time, NSg'				
<b>u</b>	<b>ui</b> <i>luini</i> 'bony'	<b>u'i (u'j)</b> <i>mu'idlõ</i> 'to smile'	<b>ūi</b> <i>tūima</i> 'numb'	<b>(ū'j)</b>			
<b>uo</b>	<b>uoi</b> <i>luoimõ</i> 'warp, PSg'	<b>uo'i</b> <i>kuo'igõ</i> 'ship, PSg'	<b>ūoi</b> <i>lūoima</i> 'warp, NSg'	<b>ū'oi (ū'oj)</b> <i>tū'oigõz</i> 'birch bark'			
<b>o</b>	<b>oi</b> <i>knoijõ</i> 'to prod'	<b>o'i (o'j)</b> <i>kno'ik</i> 'big piece'			<b>ou</b> <i>kouv</i> 'water well'	<b>o'u (o'v)</b> <i>jo'ug</i> 'river'	
<b>õ</b>			<b>õi (õj)</b> <i>bõik</i> 'light- house'	<b>õ'i (õ'j)</b> <i>lõ'igi</i> 'asunder'			

Descriptions of Livonian monophthongs, diphthongs, and triphthongs (e.g., Pajupuu and Viitso 1986) show that they take part in the quantity and quality paradigmatic alternation (see an example in Table 7). In polyphthongs with a short initial component (e.g., in *kuijõ-*, *luoimõ-*, *ke'itõ-*, *kuo'igõ-*-type of words), the first two components have more or less equal duration, whereas in polyphthongs with a long initial component (in *rūimõ-*, *lūoikõd-*, *tū'oigõz-*, *kīeta-*-type of words), the first component is about twice as long as the second component (e.g., Pajupuu and Viitso 1986).

**Table 7.** Livonian diphthongs and triphthongs.

Short first component			Long first component	
Short final component	Long final component	Broken tone	Plain tone	Broken tone
<i>aigā</i> 'edge, NSg'	<i>aigõ</i> 'time, PSg'	<i>a'igõ</i> 'edge, PSg'	<i>āiga</i> 'time, NSg'	<i>lõ'igi</i> 'asunder'
<i>kuoigīd</i> 'ships'	<i>luoimõ</i> 'warp, PSg'	<i>kuo'igõ</i> 'ship, PSg'	<i>lūoima</i> 'warp, NSg'	<i>tū'oigõz</i> 'birch bark'

#### 4. Prosodic features

Livonian has preserved the main prosodic features characteristic of Finnic languages, such as (a) word-initial stress and (b) the phonological opposition of short and long phoneme duration. Particular characteristics of Livonian are (a) the opposition of the plain tone and broken tone (i.e., *stød*), (b) the differentiation of short and long diphthongs and triphthongs, and (c) a wide difference in the structure of stressed and unstressed syllables.

One of the features characterizing the quantity opposition in Livonian is the duration ratio of syllables in a foot. Syllable durations in stressed and unstressed syllables are commonly involved in establishing three contrastive foot types in Livonian that resemble the three-way contrastive feet of Estonian (e.g., Lehiste et al. 2008). However, such a ternary opposition is not always realized in Livonian. For example, Livonian disyllabic weak-grade words with a short first syllable and a half-long second syllable (e.g., *jõvā* 'good') are similar to Estonian Q1 words, but the duration of the half-long second syllable vowel in Livonian is longer (which phonetically is rather a long vowel) than in Estonian (syllable ratios 0.5–0.7, according to Lehiste et al. 2008 and Tuisk 2012). Unlike in Estonian, Livonian can have a short diphthong in the first syllable, which can be longer than a short vowel (e.g., *piezā* 'nest'). The temporal characteristics of these Livonian words are rather similar both in read speech and spontaneous speech. The prosodic structure of Livonian weak-grade and strong-grade words with a long first syllable consisting of voiced sounds (e.g., *võrõz* 'stranger', *võrõd* 'strangers') resembles that of Estonian disyllabic Q2 and Q3 words, but there are differences in realizing these two word structures. The duration of the first stressed syllable might not differ in weak- and

strong-grade words, but this difference becomes evident in the second unstressed syllable duration (syllable ratios 1.0–1.8 and 2.4–3.2, according to Lehiste et al. 2008). Unlike in Estonian in Livonian, the long vowel and diphthong in the first syllable are closer in duration, and the difference in the second vowel duration is somewhat greater. In Estonian, there is a systematic difference in the first vowel duration and unstressed second syllable vowel. The tendency towards foot isochrony in Livonian indicated on the basis of data from controlled speech is supported by the data from spontaneous speech (e.g., Lehiste et al. 2008, Tuisk and Teras 2009).

The structures of primary-stressed and secondary-stressed feet are in principle alike (e.g., Tuisk 2015a). The syllable durations and duration ratios of secondary-stressed feet in tetrasyllabic words (e.g., *salāndōbōd* ‘they steal’) are similar to those of primary-stressed feet in Livonian, but the lengthening of the unstressed syllable is significantly larger in a primary-stressed foot than in a secondary-stressed foot. The syllable ratios in a trisyllabic secondary-stressed foot are similar to the ratios in a primary-stressed foot if the secondary-stressed foot contains the derivational affix *-nikā* (e.g., *puṛṛōnikādōks* ‘sailboat, InlPl’).

The question of tonal oppositions has been a much debated issue in the research on Livonian prosody. In primary-stressed syllables, two tones occur: the plain (or rising) tone, and the broken tone, which is rising-falling or predominantly falling and is sometimes accompanied by laryngealization. The main focus of the discussion has been on broken tone or *stød*, which has equivalents also in Salaca Livonian and in South Estonian dialects in Latvia.

The experimental research on Livonian was initiated mainly by the interest in the broken tone. The first acoustic-phonetic studies on Livonian word prosody were carried out in the phonetics laboratory of the University of Tartu in the 1920s by professor Lauri Kettunen and his student Paulopriit Voolaine. However, the special status of Livonian tones was first noticed by the Estonian linguist Ferdinand Johann Wiedemann and the Danish linguist Vilhelm Thomsen in the 19th century. Wiedemann (1861) explained the existence of different tones as specific vowel or consonant lengths similar to quantity contrasts in Estonian. Thomsen (1890) described Livonian broken tone as similar to that of Danish *stød*.

Livonian broken tone or *stød* requires a certain minimum amount of voiced material in the syllable rhyme in order to be realized. The so-called *stød-basis* is a long stressed syllable with a long vowel,

diphthong, triphthong, or a short vowel followed by a voiced geminate consonant or consonant cluster (e.g., *rq'dõ* 'money, PSg', *kuo'igõ* 'ship, PSg', *ka'ddõ* 'to disappear', *ka'lđi* 'fish, PPl'). This phenomenon must not be ignored, as *stõd* has a phonological role in differentiating meaning (e.g., *kallõ* 'island, PSg', *ka'llõ* 'fish, PSg'). Livonian broken tone or *stõd* is to a large extent predictable from syllabic and morphological structure.

Livonian *stõd* has been described as the breaking of the voice in the middle or the end of the sound (e.g., Kettunen 1925). However, some researchers have found it odd that the so-called breaking of the voice, which is such an important factor in Livonian, can often be completely absent (e.g., Posti 1936). It has also been proposed that there are three intonations in Livonian, i.e., rising, broken and falling (Posti 1936)<sup>5</sup>.

A comparison of words with the plain tone and broken tone by Seppo Suhonen (1982) showed that in disyllabic words with a closed first syllable the short vowel is longer in words with the broken tone, while in mono- and trisyllabic words the vowel is shorter. Regarding long monophthongs and diphthongs, the vowels in disyllabic words with broken tone are shorter than the vowels with plain tone.

Differences in the pronunciation across generations of Livonian speakers have been studied (e.g., Lehiste et al. 2008), concluding that the phonological opposition between the presence and absence of *stõd* has almost disappeared from the language. The acoustic features characteristic of the broken tone were evident in the pronunciation of the older generation, while the middle and youngest generation differed among themselves and sometimes the characteristic features were absent entirely.

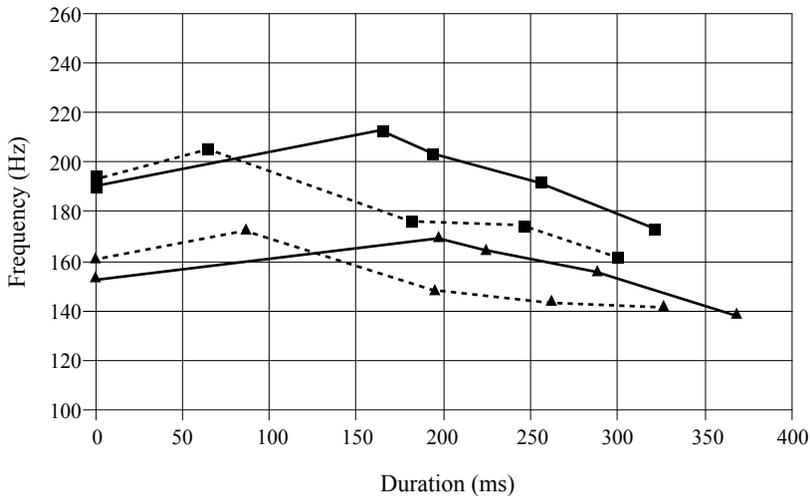
The question of acoustic features of Livonian broken tone or *stõd* is unquestionably intriguing. It has been pointed out (e.g., Vihman 1971, Pajupuu and Viitso 1986, Teras and Tuisk 2009, Tuisk 2015b) that the most characteristic acoustic features of Livonian *stõd* are (1) a relatively early fundamental frequency (F0) fall, (2) variation in intensity, and (3) irregular vibrations of the vocal folds. The absolute correlation between level intonation and the absence of *stõd* would appear to confirm the suggestion that the overall pitch contour functions as part of the perceptual cue for *stõd* in Livonian. Livonian *stõd* becomes more apparent from the intensity contour as well as the pitch contour.

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5 Posti used the terms traditionally used for Latvian tones.

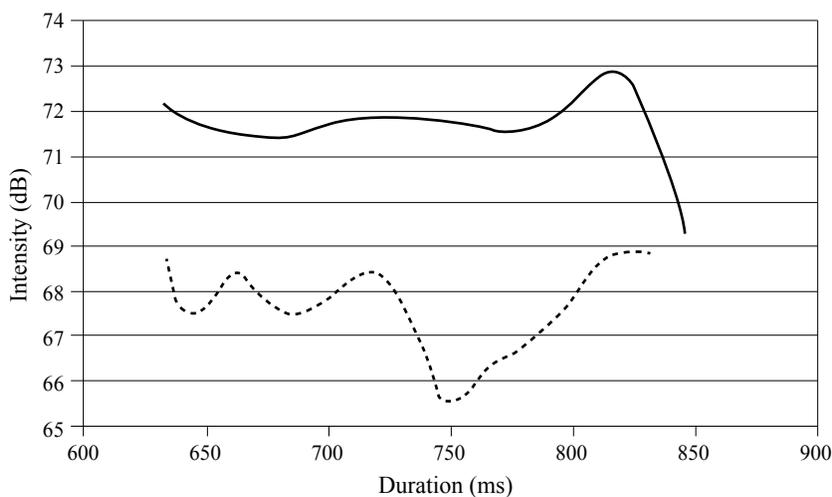
The characteristic patterns may be more evident in read speech than in spontaneous speech, but some features are still stable in spontaneous speech, as well. Studies on broken tone or *stød* suggest that not only the syllable carrying *stød* but also the following syllable might cue the difference between words with and without *stød* (e.g., Tuisk 2015b). In spontaneous speech, the first syllable durations in disyllabic words with broken tone and plain tone may get neutralized. In read speech, the durations of the second syllable are the same in words with broken tone and plain tone, but in spontaneous speech there is a significant decrease of second syllable duration in words with broken tone.

The most stable and characteristic feature of words with broken tone is an early location for the F0 turning point and intensity turning point within the stressed syllable along with the characteristic shape of the pitch and intensity contours (see Figures 4 and 5).



**Figure 4.** Fundamental frequency (in Hz) in words with *stød* (dashed line) and without *stød* (solid line) for three female speakers (black squares) and three male speakers (black triangles). The five points are at the S1 rhyme beginning, F0 peak, S1 rhyme end, S2 rhyme beginning, S2 rhyme end. (Tuisk 2015b)

Characteristic laryngealization is realized more often in read speech than in spontaneous speech. In spontaneous speech, this characteristic feature tends to weaken or disappear. However, even if the laryngealization is absent in words with broken tone, the pitch peak is earlier in the stressed syllable.



**Figure 5.** Intensity contours (in dB) in S1 in the word *mōdō* ‘land, PSg’ (solid line) and in the word *mō'zō* ‘down, Adv’ (dashed line) from one female speaker. (Tuisk 2015b)

There have been discussions on the origin of Livonian broken tone. The most general question is whether Livonian broken tone is a Latvian influence (as suggested for instance by Winkler 1999, 2000) or if it has arisen independently in Livonian and Latvian, with apocope, syncope, and syllable contraction being the main reasons for its development in Livonian (as proposed, for instance, by Posti 1942).

In Livonian disyllabic weak-grade words with a short first syllable followed by a half-long second syllable (e.g., *jemā* ‘mother’), the F0 turning point is at the beginning of the second syllable and there is a correlation between the duration of the unstressed syllable and the F0 turning point location (longer unstressed syllable duration is closely related to a late F0 turning point). There is no reason to apply characteristic tonal patterns of words characteristic to those of Estonian Q2 and Q3 words to Livonian, as these patterns are not as clear in Livonian. Words without *stød* can have a late pitch peak in weak-grade words (e.g., *lēba* ‘bread’), while in strong-grade words (e.g., *leibō* ‘bread, PSg’) the F0 peak can vary in the first stressed syllable. Thus, while pitch is a decisive factor between Q2 and Q3 in Estonian, it is not that important in Livonian. In Livonian, the tonal characteristic is more evident in the opposition of words with and without *stød*. In terms of pitch, strong-grade words with *stød* (e.g., *mie'rrō* ‘sea, IllSg’) are characterized above all by an early pitch peak. Even when the peak occurs later in the

first syllable, it is still earlier than the late peak in strong-grade words without *stød*.

Phenomena similar to the Livonian broken tone or *stød* have been described in other neighboring languages such as Latvian, Lithuanian, and Danish. Syllable intonations or tones are part of the prosodic system of Latvian (e.g., Kariņš 1996, Markus and Bond 2010). The difference between intonations<sup>6</sup> finds its realization in all long syllables. Latvian is known as a language with three syllable intonations – falling, level or drawn, and broken. However, there is great variation in Latvian dialects with a tendency to replace the broken intonation with falling intonation and to combine the falling and the drawn intonations into a single level intonation. It has been concluded that the use of Latvian syllable intonation is not important in communication (e.g., Markus and Bond 2010) and such ternary oppositions are realized only in a few word triplets.

Lithuanian is a language with two contrastive tones: the sharp falling or acute tone and the smooth rising or circumflex tone (e.g., Balode and Holvoet 2001). The distinction between tones is clearest in the western part of Lithuania, especially in Northern Žemaitian dialects, where the main acute tone is realized as a broken (glottalized) tone. The broken tone has been described as having an initial rise of pitch and intensity, after which a glottal stop intervenes and the remaining part of the vocalic segment is much lower in intensity and pitch.

The basic acoustic and perceptual properties of Danish *stød* are well documented (e.g., Grønnum et al. 2013). In Danish, *stød* has traditionally been characterized as a kind of creaky voice, i.e., non-modal voice with aperiodic and irregular amplitude, often accompanied by a fundamental frequency perturbation, and an abrupt and brief dip in fundamental frequency. Danish *stød* has also been explained by phonation type as a brief dynamic voice quality movement in the direction of more compressed voice and back, rather than involving a specific voice quality such as creak (Hansen 2015).

One complicated aspect of descriptions of the broken tone or *stød* in Livonian is the use of different terms. This is most likely due to the different interpretation of the phenomenon as well as the use of the language to describe it, and the tradition of the particular research group. Thus, for segmental characteristics, English *glottal stop*, German *der Bruch der Stimme*, *Stimmbruch*, *Stosslaut* or *Bruchlaut*,

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6 Latvian phonetic tradition generally uses the term *intonation*.

Danish *stød*, Finnish *katko*, French *coup de glotte*, Estonian *katkehäälik*, etc. are used. In referring to tone or intonation, English *broken tone*, *glottalized tone*, *broken intonation*, German *Stosston* (*Stoßton*), *Bruchintonation*, *gestossene Intonation*, Danish *stød*, Finnish *katko-intonaatio*, Estonian *katketoon*, etc. are used. English *glottalization*, *laryngealization*, or *creaky voice* have been used to describe irregular vibrations of the vocal folds. The question of terminology becomes more confusing when a particular term covers all acoustic features, which in order to simplify the understanding of the description should be treated separately. Despite the question of terminology, there always seems to be agreement regarding the existence of an opposition in the presence or absence of this phenomenon.

## 5. Summary

This article describes the main features of Livonian sound system and pronunciation. The Livonian written language is based on the Eastern Courland dialect. Regarding Livonian dialectal variation, the main difference is between East and West Livonian. Central Livonian forms a transition area. Livonian stands out as being a Finnic language that has been influenced by the Baltic language, Latvian. Livonian is interesting in several respects in particular. These include the presence of voiced stops and fricatives, which can occur as long geminates in Livonian, as well as a large number of short and long monophthongs, diphthongs, and triphthongs. Many possible sound patterns, syllable and foot structures, and the distinguishing of tone as well as the historical background of Livonian certainly serve to characterize it as one of the most unique languages in the contact area of the Baltic Sea.

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## Address

Tuuli Tuisk  
Institute of Estonian and General Linguistics  
University of Tartu  
Jakobi 2–409  
51014 Tartu, Estonia  
E-mail: tuuli.tuisk@ut.ee

## Abbreviations

Adv – adverb, dB – decibels, F1 – first formant, F2 – second formant, GSg – genitive singular, Hz – hertz, IllSg – illative singular, Inf – infinitive, InlPl – instrumental plural, IPA – International Phonetic Alphabet, ms – milliseconds, NSg – nominative singular, PF – phrase-final, PSg – partitive singular, SF – sentence-final, S1 – first (primary-stressed) syllable of a word, S2 – second syllable of a word, V – short monophthong, <sup>v</sup>V – short diphthong.

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**Kokkuvõte. Tuuli Tuisk: Liivi keele häälikusüsteemi ja häälduse põhi-jooned.** Käesolevas artiklis antakse ülevaade liivi keele häälikusüsteemist. Kuramaa liivi murrete seisukohalt on suurim erinevus ida- ja lääneliivi vahel, samas kui keskliivi ehk Īra kujutab endast üleminekuala. Tänapäeva liivi kirjakeel põhineb Kuramaa idaliivi murdel. Artiklis kirjeldatakse liivi standardhääldust, tuues paralleelselt välja ka mõned murdeerinevused. Vokaale ja konsonante kirjeldatakse eraldi. Lisaks antakse ülevaade liivi prosoodiasüsteemist. Liivi keel on läänemeresoome keelte seas mõneti ainulaadses olukorras, kuna keeles on mõjutusi balti keelte hulka kuuluvast läti keelest. Erinevalt teistest läänemeresoome keeltest esinevad liivi keeles helilised klusiilid ja frikatiivid, mis võivad ilmned ka pikkade geminaatidena. Samuti on liivi keel huvitav lühikeste ja pikkade monoftongide, diftongide ja triftongide rohkuse poolest.

**Märksõnad:** konsonandid, vokaalid, toon, prosoodia, liivi keel

**Kubbõvõttõks. Tuuli Tuisk: Līvõ kīel kilūd sistēm ja īeldõm pāummitõd.** Sīe kēra vōttõksõks um iļļõvaņtļimi līvõ kīel kilūd sistēmst ja īeldõmst. Kurmõ līvõ mūrddõd sūrīmi vai um idā- ja lāndlīvõd vai, sidāmi jag agā Īra um iļlādõb mūrdd. Tāmpiz līvõ kērakīel pūojõks um idālivõ mūrdd. Kēras sõb vaņtõltõd līvõ kīel standardīeltõmi, paralel ulzõ tūodsõ ka mingizt mūrdd-vaitõd. Īžkillijid ja īņõzkillijid sõbõd vaņtõltõd īžkiz. Vel sõb vaņtõltõd līvõ kīel prozodij sistēmõ. Līvõ kēļ um vāldamiersūomõ kīeld siegās eņtšvīti, ku kīelsõ um mõjtõkši leṭkīelstõ. Tuoistiz ku sūrs jags vāldamiersūomõ kēļši, līvõ kīelsõ ātõ telkõks vizād ja õrdõd īņõzkillijid, mis vōibõd jeddõ tūlda ka kui pitkād kõdkõrdizt kilūd. Līvõ kīelsõ um ka pāgiņ lītiži ja pitkīdi īdkõrdiži, kõdkõrdiži ja kuolmkõrdiži īžkiļļijidi.