

Rutul is a Lezgian language of East Caucasian language family spoken in several Daghestanian villages and in some villages in Azerbaijan. There are five dialects: Mukhad, Shinaz, Mukhrek, Ikhrek and Borch-Khnov. In the grammars, the dialect of the village of Kina, where part of the data was recorded, is described as being of a mixed type: it has many commonalities with Mukhad and Shinaz groups, but also shares some features, mainly phonetic, with the Ikhrek group (Ibragimov 2004). Although there is a detailed descriptive account of the vowel system in Rutul dialects (Ibragimov 1972, 1978, 2004 and others), I am unaware of any instrumental research on this topic. In my study, I compare vowel spaces in two dialects of Rutul language: Kina and Ikhrek. According to the literature, Ikhrek dialect differs from Mukhad by the phonemic status of the vowel /o/, having lower position of the vowel /i/ as well as by the umlauted /ä/¹ being slightly backed. The hypothesis is that the described differences between two dialectal varieties will be supported by instrumental measurements of the vowels and vowel space.

Vowel spaces of the two dialects were compared based on measurements of F1 and F2 frequencies of vowels /a, i, u, i/ (/e/ was measured only in Ikhrek dialect since the data for this sound is present only for this village). For each village, I annotated recordings of four male speakers which contain from 20 to 66 stimuli pronounced in three isolated repetitions. The initial purpose of these recordings and stimuli set was analysis of acoustic characteristics of obstruents, thus I could not control for the number of tokens of each vowel (some are under-represented) and for the consonantal context (thus, contexts with labial consonants, known to strongly influence the formant structure, have been included). In order to minimize the contextual influence, I consider only inner part of a vowel. Formant measurements were extracted automatically with the *Praat*-script as median value out of the 10ms sequence period starting after the first third point. Before that, I manually chose the best formant settings (namely, *Maximum formant*) for each speaker by inspecting the tracks drawn by the program. Then I proceeded with the outlier detection procedure accompanied with their manual examination. The data was normalized by speaker using Lobanov's method in order to factor out the variation caused by physiological differences while keeping the dialectal differences in vowel quality. Vowel space was visualized on the F1~F2 plane and compared in terms of vowel centroids, dispersion and triangular /i, a, u/ area size.

The results indicate that there are differences in the formant frequency values of particular vowels across dialects (see Figure 1). Vowels in Ikhrek variety seem to be more centralized than in Kina: high vowels /i/, /i/ and /u/ are lower and back vowels /i/ and /u/ are slightly more fronted than in the other dialect variety; there is also backing of the front vowel /i/. As a result, vowel space dispersion and triangular area size are affected. Vowel space dispersion was measured as Euclidean distances from vowel mean to the centroid of the speaker's vowel space. It is greater among Kina speakers than among Ikhrek speakers (see Figure 2). Accordingly, triangular vowel space area (calculated as the area of the triangle defined by the mean values of the three selected vowels) of Kina speakers appears to be larger (see Figure 3). Taking into account the stress position, I also observed slightly more centralized values for the unstressed vowels, especially for [a].

¹ In the Rutul vowel system, there are four primary phonemes /a, u, i, e/ and one secondary phoneme /i/. The latter is considered secondary because it appears after certain phonetic changes as reflex of underlying primary phonemes /a, u, i/; there are only a couple of minimal pairs contrasting it with /i/. The use of the sound [o] is strongly lexically restricted.

There are also umlauted (also called glottalized (Rus. "глоттизованные") vowels [ä] and [ü] which are claimed to appear due to the intralinguistic processes as well as result from the influence of the Azeri language, and pharyngealized vowels [a^h] and [u^h] in both dialects (Ibragimov 2004: 27, Babaeva 2016: 48ff). However, there is not enough data on the umlauted and pharyngealized vowels in the available stimuli, so that it remains unclear how they are produced and how they differ.

Ikhrek speakers demonstrated inconsistent behavior in terms of pronunciation of some stimuli, where Kina speakers pronounced the primary vowels as expected. Most of these realizations are in the borderline area of vowels /e/, /i/, /a/ and /i/: Irregular cases for a* fall in the transitional area between vowel space of /a/ (upper part), /i/ (bottom) and /e/ (right); for i* – /i/, /i/, /e/ and /a/; for e* – /e/ and /a/; for u* – /a/ and /i/. Most of these border cases correspond to statements about phonetic correspondences in Mukhad and Ikhrek dialects: Mukhad [a] corresponds to Ikhrek [e] / [ä] (*чlap ~ чlap* ‘hair’) and Mukhad [e] / [ä] correspond to Ikhrek [a] (*pem ~ pam* ‘barn’), while Mukhad [i] corresponds to Ikhrek [a] and to [i] (*мысмар ~ масмар* ‘nail’, *далгын ~ далгин* ‘conversation’) (Ibragimov 2004: 165ff). I suppose that many of these realizations are “umlauted” vowels in Ikhrek. The following evidence supports this interpretation: vowel [ä] is claimed to be in free alternation with [e] in both dialects, there is shift [a] to [ä] in Ikhrek, correspondences mentioned above, and, finally, many cases were perceived by me as slightly fronted [a].

Literature

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- Ibragimov 1972 — G. X. Ibragimov. Vokalizm rutul'skogo yazy`ka // *Sbornik statej po voprosam dagestanskogo i vejnaxskogo yazy`koznaniya*. Maxachkala: 1972. P. 145-150.
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Figures and Tables

Figure 1. Centroids and standard deviations for separate speakers and centroids for each village (in black) on the F1~F2 plane after the Lobanov normalization.

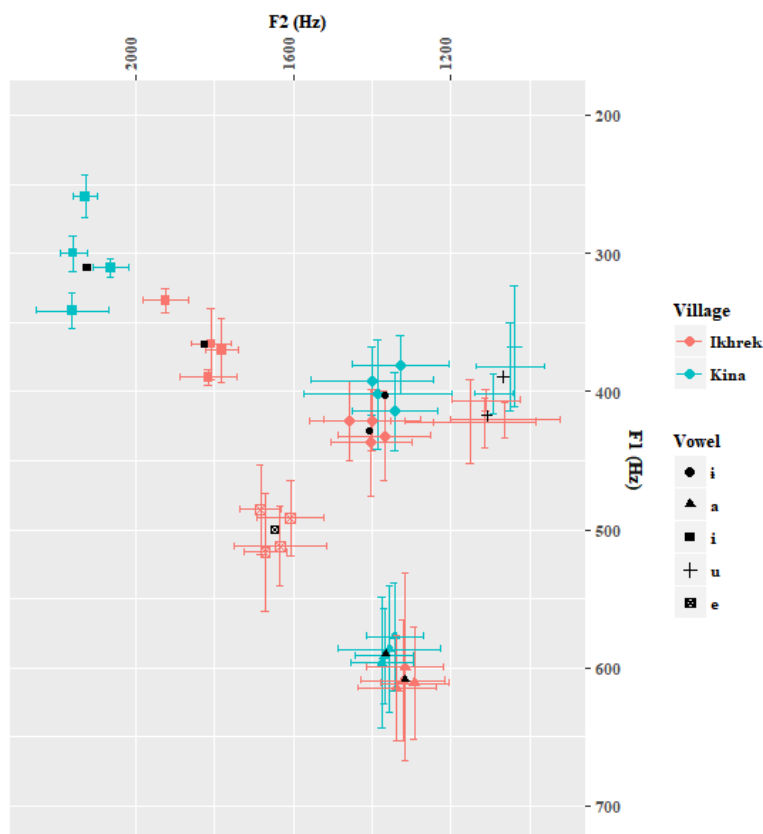


Figure 2. Barplots with the Euclidean distances from vowel mean to the centroid of speaker's vowel space (ED).



Figure 3. F1~F2 plane with the area of the polygon defined by mean values for vowels /i, a, u/ (dashed line for Ikhrek, continuous line for Kina).

