

Таблица. Географическая изменчивость предупреждающего об опасности сигнала красного сурка

Регион	n	Порядковые номера и длительность звуков (мс, $\bar{x} \pm s.e.$, $P=95\%$)			
		1	2	3	4
1. Тянь-Шань, Гиссаро-Дарваз, Алай (10 локальных популяций)	105	141 \pm 2,7	106 \pm 2,7	119 \pm 2,7	128 \pm 2,8
2. Восточный Памир (5 локальных популяций)	51	131 \pm 2,4	61,8 \pm 3,5	39,0 \pm 3,8	34,5 \pm 2,8
3. Каракорум	22	135 \pm 4,7	64,9 \pm 5,2	53,4 \pm 6,0	40,3 \pm 7,3

Из таблицы следует, что длительность звуков и тенденции её изменения внутри серий, начиная со второго в серии звука, объединяют сурков, населяющих Северный Пакистан, с Восточнопамирской популяцией, но отдалают от популяций, обитающих к северу - в Гиссаро-Дарвазе, Алае и Тянь-Шане. В группе популяций 1 звуки не только более длительны, но длительность их возрастает к концу серии, в то время как в популяциях, населяющих Восточный Памир и Каракорум, напротив, сокращается.

Результаты изменчивости сигнала позволяют предположить, что группы популяций с Тянь-Шаня, Гиссаро-Дарваза и Алая, с одной стороны, и с Восточного Памира и Каракорума, - с другой, заслуживают подвидового статуса. Ориентировочно граница между подвидом проходит по рекам Бартанг, Мургаб и Аксу.

GEOGRAPHIC VARIATION IN MARMOTA CAUDATA ALARM CALLS: BIOACOUSTICAL ANALYSIS SUPPORTS THE SUBSPECIFIC STATUS OF EAST PAMIR AND KARAKORAM POPULATIONS

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Limited knowledge of geographical variation in *Marmota caudata* makes it difficult to properly define subspecific ranges (Gromov et al., 1965). Some authors (Gromov et al., 1965; Yakovlev, Derlyatko, 1967; Davidov et al., 1978) mentioned that marmots inhabiting Eastern Pamir

might be a unique population based, in part, on unique alarm call characteristics. Nikol'skii and Orlenev (1980) confirmed that Eastern Pamir marmot produced unique calls but the distribution of this subspecies is unknown.

Marmota caudata alarm calls consist of a series of short, quickly repeated notes. The second and subsequent notes in populations inhabiting the Eastern Pamir are much shorter than marmots inhabiting the Tyan-Shan and Alay. It was assumed that signal variation was caused by glacial isolation and the Eastern Pamir is assumed to be an intraglacial area (Zabirov, 1955; Trofimov, 1962; Chediya, 1962). The goal of this report is to enlarge our knowledge of the geographical variability of *Marmota caudata*. We compare the structure of marmot alarm calls inhabiting Northern Pakistan with those described by Nikol'skii and Orlenev (1980), having added some new material from Pamir, Alay and Gissaro - Darvas. Marmots were recorded in natural conditions. Once in Khunjerab National Park in the Karakoram mountains of north-eastern Pakistan.

The average length of the second and subsequent notes varies between populations (Table 1). In populations 1, notes remain long, while in populations 2 and 3, notes get shorter throughout the multi-note alarm calls.

Thus, the length of the second and subsequent calls unites marmots inhabiting Northern Pakistan with the population of East Pamir, while differentiating it from the populations inhabiting the Tyan - Shan, the Gissaro - Darvas and the Alay. These acoustic characteristics are consistent with other traits that reinforce our assigning these populations subspecific status. The border between subspecies likely to be in located along revers the Bartang, the Murgab and the Aksu.

Table 1. Geographical variability of *Marmota caudata* alarm calls

Regions	n	The serial number and the duration of sounds (ms, $\bar{x} \pm s.e.$, $P=95\%$)			
		1	2	3	4
1. Tyan-Shan, Gissaro-Darvas, Alay (10 local populations)	105	141 \pm 2,7	106 \pm 2,7	119 \pm 2,7	128 \pm 2,8
2. East Pamir (5 local populations)	51	131 \pm 2,4	61,8 \pm 3,5	39,0 \pm 3,8	34,5 \pm 2,8
3. Karacoram	22	135 \pm 4,7	64,9 \pm 5,2	53,4 \pm 6,0	40,3 \pm 7,3