XXVI International Bioacoustics Congress

(October 8-13, 2017)

ABSTRACT
VOLUME

Organized by

Poster 35

Vocal identity and nonlinear phenomena in the alarm calls of a lagomorph species, the Alpine pika (*Ochotona alpine*)

Julia D. Kozhevnikova[1*], Ilya A. Volodin[1,2], Vera A. Matrosova[3], Inna L. Isaeva[4] and Elena V. Volodina[2]

[1]Department of Vertebrate Zoology, Faculty of Biology, Lomonosov Moscow State University, Moscow 119234, Russia
[2]Scientific Research Department, Moscow Zoo, Moscow 123242, Russia
[3]Engelhardt Institute of Molecular Biology, Russian Academy of Sciences, Moscow 119991, Russia
[4]Khakasskiy State Nature Reserve, Abakan 655017, Russia
julia_k98@mail.ru

In Alpine pikas *Ochotona alpina*, acoustic variation has been investigated for male and female summer songs, whereas cross-seasonal alarm calls were not studied so far. This study investigated individuality of alarm calls, recorded between 13 and 29 September 2012 in the buffer zone of the Khakasskiy State Nature Reserve (Russia). Callers from different colonies separated by distance of 20-50 m (estimated animal density comprised 100 individuals/hectare) vocalized toward a researcher, slowly moving from colony to colony. As pikas were unmarked, we considered long series of alarm calls as belonging to different focal individuals based on human voice comments and uniform intensity and echo pattern on call spectrograms. From the total of 2734 recorded alarm calls, we analysed for individuality 36 focal series (8-27 calls per series, 458 calls in total). For acoustic diversity, we analysed series containing at least 2 alarm calls (second calls within series, 279 calls in total). Alarm calls were short (0.104 ± 0.013 s) high-frequency (f0max=12.3 ± 1.2 kHz), deeply frequency-modulated (df0=10.3 ± 1.1 kHz; f0beg=2.2 ± 0.5 kHz; f0end=2.5 ± 0.3 kHz). Distance to f0max comprised $30.0\pm6.5\%$ of total call duration, f peak had 3-peak distribution probably indicating formants. Discriminant function analyses based on first 8 calls of 36 series, last 8 calls of series and 8 randomly selected calls of series, classified calls to individuals with accuracy 93.1%, 91.7%, 91.3%, higher than levels by chance ($16.9\pm1.7\%$, $16.8\pm1.8\%$, $17.2\pm1.8\%$, permutation text, 1000 permutations). Parameters mainly introduced in discrimination were call duration, distance to f0max, f0beg and f0end. Of 36 individuals, 17 lacked nonlinear phenomena, 7 had them covering less than half of call duration, 6 more than half of call duration and 5 not in all calls. We conclude that alarm calls of Alpine pikas are strongly individualistic and nonlinear phenomena might play a role in their individualization.