Diversity of alarm calls across species of Ruminantia

Volodina Elena[1], Volodin Ilya[1,2], Chelysheva Elena[3], Frey Roland[4], Gogoleva Svetlana[5], Palko Igor[5]

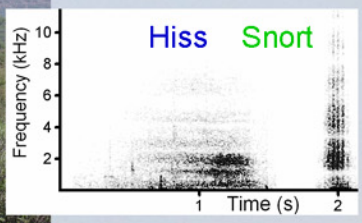
1 Moscow Zoo, Russia
2 Lomonosov Moscow State University, Russia
3 Mara-Meru Cheetah Project, Kenya
4 Leibniz Institute for Zoo and Wildlife Research, Germany
5 Severtsov Institute of Ecology and Evolution, Russia

http://www.bioacoustica.org

volodinsvoc@mail.ru

BACKGROUND In mammals, acoustics of vocalizations toward potential threat are mostly studied for rodents, primates and carnivores. For ruminants, these data are scarce.
AIMS of this study were 1) to investigate the acoustic variables of alarm calls variation in three species of ruminants (giraffe, sambar, Indian muntjac) toward potential predators (humans or carnivores) and 2) to examine the acoustic diversity of alarm calls across species of Ruminantia.

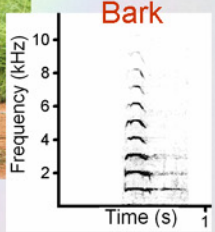
Giraffe



Hiss (n=22)
duration 0.72±0.22 s
fpeak 0.69±0.61 kHz

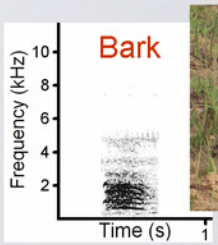
Snort (n=20)
duration 0.28±0.10 s
fpeak 0.20±0.29 kHz
pulse rate 23.7±4.2 Hz

Sambar deer



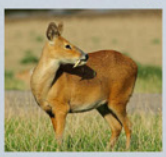
Bark (n=45)
duration 0.15±0.03 s
fpeak 1.61±0.57 kHz
f0max 0.98±0.26 kHz

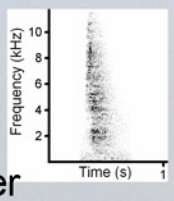
Indian muntjac



Bark (n=155)
duration 0.24±0.04 s
fpeak 0.89±0.28 kHz
f0max 0.66±0.08 kHz

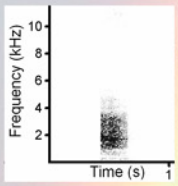
Hissing alarms

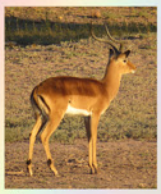




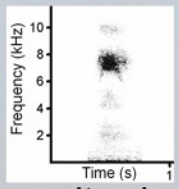
musk deer

Snorting alarms

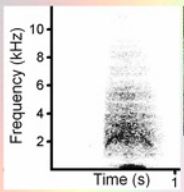




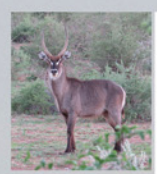
impala

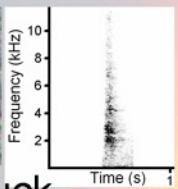


goitred gazelle

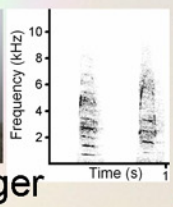


Western tur

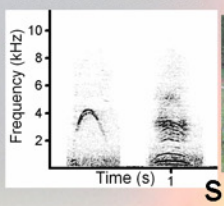




waterbuck

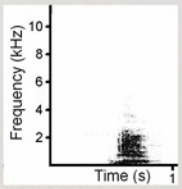


klipspringer

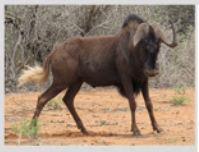


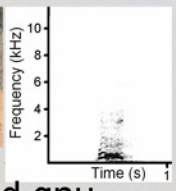
springbok

Barking alarms

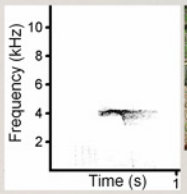


greater kudu

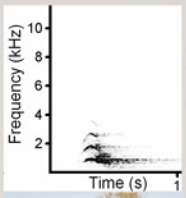


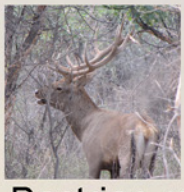


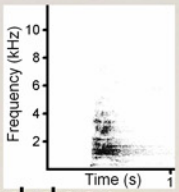
white-tailed gnu



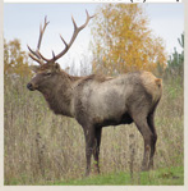
sika deer







Bactrian red deer



Siberian red deer

Classifying alarm calls

Classifying alarm calls to hisses, snorts and barks was based on visual analysis of call spectrograms. Barks are distinctive by presence of the fundamental frequency. Hisses and snorts (both lacking the fundamental frequency) are separated by the explosive air expulsion in snorts versus the non-explosive expulsion in hisses.

Conclusion

The acoustic diversity of alarm calls among different species of Ruminantia suggests it as a potential new mammalian model taxon for investigating the role of acoustic diversity in alarm communication, in addition to the traditional model taxa.

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GENERAL BIOLOGY

Acoustic Structure of Alarm Calls in Indian Sambar (*Rusa unicolor*) and Indian Muntjac (*Muntiacus vaginalis*) in South Vietnam

I. A. Volodin[a,*], E. V. Volodina[b], R. Frey[c], S. S. Gogoleva[d,e,f], I. V. Palko[d,e], and Academician V. V. Rozhnov[d]

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