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## ABSTRACT VOLUME



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## Acoustic diversity across subspecies of Red deer (*Cervus elaphus*)

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This study integrates a broad acoustic variation among subspecies and sex and age classes of Red deer, with inclusion of our own data on Iberian, Pannonian, Far-Eastern and Siberian subspecies. The species *Cervus elaphus* has originated from the Tarim Basin in Middle Asia approximately 2 million years ago and then distributed in two opposite directions, to the East and to the West. The Eastern branch went over Tian-Shan and Altai to China, Siberia and North America. The Western branch went over Caucasus and Carpathians to Western Europe. The Western stags produce low-frequency roars, ranging in their average maximum fundamental frequency from 52 Hz to 223 Hz between subspecies. The Eastern stags produce high-frequency bugles, with the average maximum fundamental frequency ranging from 660 to 2824 Hz between subspecies, which is 10 times higher than in Western stags. The presumable ancestral pattern of rutting calls containing both high and the low frequencies is found in modern Bactrian subspecies in Central Asia and is traced in Siberian and American wapiti. The evolutionary hypothesis which explains these findings suggests that the deer that migrated to the West lost their high frequency, whereas the deer that migrated to the East lost their low frequency. Within subspecies, males and females vocalize at the same fundamental frequency. In some subspecies, as in Canadian and Siberian wapiti, stags and hinds share vocal repertoires of rutting and contact calls. Ontogenetic pathways are distinctive between the Eastern and Western subspecies: in the Western, call fundamental frequency descends to adulthood, whereas in the Eastern, call fundamental frequency is high from birth onwards. Unusually for mammals, the fundamental frequency correlates positively with body mass, with the lowest calls in the smallest and the highest calls in the largest subspecies.