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Population markers of the German origin red deer (*Cervus elaphus hippelaphus*) in Southern Russia: Cytochrome *b*, microsatellites and the acoustics of rutting calls

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Wild-living representative of Cervus elaphus in Russia belong to four subspecies: three native: C.e. sibiricus, C.e. xanthopygus, C.e. maral and C.e. hippelaphus population of "Voronezh" red deer originated in XIX century from about 10 individuals introduced from Germany to the European part of Russia. Studying population status of the Voronezh red deer is important because this population serves for re-storing red deer on the European plain part of Russia, where the native red deer are extinct. This study investigates the Voronezh red deer stag cytochrome b gene, microsatellites, and the acoustics of stag 467 bouts including in total 1335 rutting roars. These data were compared with the Central European Pannonian red deer C.e. hippelaphus from the Southern Hungary (mtDNA C haplogroup) and the West European Iberian red deer C.e. hispanicus from Spain (mtDNA A haplogroup). Number of roars per bout (2.85±1.79) was intermediate in the Voronezh stags between the Pannonian (3.18±2.17) and Iberian (2.11±1.71) stags. Roar duration was the longest in the Voronezh stags (2.46±1.14 s) compared to Pannonian (1.13±0.50 s) or Iberian (1.90±0.50 s) stags, whereas the maximum fundamental frequency of the roars did not differ between Voronezh (175±60 Hz) and Pannonian stags (168±61 Hz), being significantly lower than in Iberian stags (223±35 Hz). Phylogenetic analysis of 74 mtDNA cytochrom b sequences 355 b.p. and 58 sequences 1031 b.p. from Voronezh, Pannonian and Iberian red deer revealed a high uniformity of the Voronezh red deer and their affiliation with European red deer mtDNA C haplogroup. However, the average genetic distance comprised 1.1% from either Pannonian or Iberian red deer. The preliminary fragment analysis of 48 samples from Voronezh and Iberian red deer by 4 microsatellite loci support the genetic uniformity of the Voronezh red deer and their distinctiveness from Iberian red deer. Supported by RFBR grant 19-04-00133.