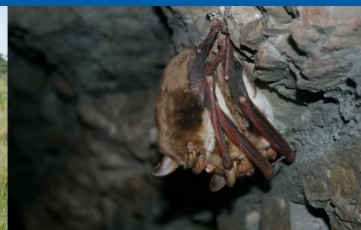


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Prügel J, Lenz S



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## Effect of age and pair-mate change on vocal duets of endangered Siberian crane (*Grus leucogeranus*)

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Vocal-based monitoring has proved its use in many animal species and is promising for the Siberian crane. It is a long-lived, slowly reproduced bird with an estimated population of 3500 cranes and is listed as Critically Endangered by the IUCN Red List. Loud duets of nesting pairs could be recorded properly from a distance 700 m in nature and are potentially appropriate for monitoring. Previous findings showed the high pair-specificity of the duets, however it is still unknown how stable they are over a bird's life and what happens with them when the bird changes its mate. Here we studied the stability of duet acoustic variables through the 10 years in 10 reproductively active pairs, whose age at the beginning of the study was 3-26 years. The duets of each pair were recorded in Oka Crane Breeding Center in two periods with the minimum interval of 10 years: in May-July 2003-2005 and 2013-2015. In May-July 2003-2017 with the interval of 3-4 years we also recorded duets of 3 birds (1 male and 2 females) with different pair mates. We measured 18 time-frequency variables in 249 duets (4-12 duets per pair, per period). We did not find general effect of age on acoustic variables of Siberian crane duets (repeated measures ANOVA,  $p > 0.05$  for all variables). Pair-specific vocal signatures remain stable over the period of study. Discriminant analysis showed 100 % percentages of correct classification to pair in each period. And cross-validation of duets from the test sets (represented by samples of 2013-2015) with discriminant functions derived from the training sets (represented by samples of 2003-2005) showed comparable high percentage of correct classification to pair (88.1 %). However, through the study period 9 birds (5 males and 4 females) from 20 studied ones slightly but significantly decreased the fundamental frequencies of their calls and 3 (3 males) from 20 – slightly but significantly changed the temporal variables of their calls (t-test,  $p < 0.003$ ). After mate change the male did not change significantly any of the acoustic variables, one of the female slightly but significantly increased the duration of the calls, another female – slightly but significantly decreased the fundamental frequency of the calls in duets (t-test,  $p < 0.003$ ). But these changes have not exceeded those of duets recorded from birds with one mate over the study period. Our data suggest that Siberian cranes can be reliably identified by their duet parts over a whole bird's life.

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