

Wildlife conservation

Stability of calls in the red-breasted geese (*Branta ruficollis*): pilot tests in captivity for future vocal monitoring in the field

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Distant monitoring of animals using individual identification on the basis of call features, is relevant for endangered species, because capture-recapture procedures are limited in application. Individuality in call structures has been demonstrated for many species and provides a potential for reliable identification of a caller by voice. However, most studies has been demonstrated existence of high individual differences within short periods, whereas stability of calls would be crucial for population monitoring over years.

In Moscow Zoo we analysed stability in loud two-syllable calls of red-breasted geese throughout five breeding seasons, from 1985 to 1989. In total for five seasons discriminant analysis on 55 temporal, frequency and power parameters showed 86 % of correct assignment to individual (n = 430 calls from 22 birds; 16 - 20 calls per bird) and 87 % of correct assignment to sex (n = 125 calls; 22 males, 3 calls per male; 12 females, 4 - 5 calls per female).

Within each season the discriminant analysis showed high values of correct assignment to individual (from 100 % (3 birds) to 88 % (25 birds) for different seasons). For analysis of stability in calls, we applied two approaches of preparing samples for cross-validation procedures: (1) we used discriminate functions, counted for a previous season for discrimination of calls recorded in following seasons, and (2) we used discriminate functions, counted for the first n seasons, for discrimination of calls recorded in n + 1 season. We found, that in both cases average values of correct assignment to individual for birds, recorded in the following seasons, did decrease substantially in comparison with values of discrimination within a previous season. In addition, discrimination values were individual-dependent - some birds had very reliable discrimination over seasons, whereas for others birds the discrimination was poor.

In nature, red-breasted geese nest in small colonies from 3 to 10 pairs, separated by a few kilometers. The two-syllable call is the most often emitted call in the red-breasted goose both in captivity and in nature. Guarding males usually use this call for mobbing humans, domestic dogs and polar foxes. Therefore, these calls may be easily recorded in nature, and small sizes of natural nesting colonies may provide more accuracy of vocal identification in this species in comparison with our data. In summary, distant acoustical monitoring of populations is promising in the red-breasted goose. However, aspects of call stability over years should be studied more thoroughly.