

## Behaviour

### Bioacoustical sexing and individual identification provide alternatives to capture both in zoos and in the wild

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In the last decade, bioacoustical methods proved their great value both in captive animals and wildlife management. Alongside with other applications, acoustic-based identification of sex and individuality may be considered as important for many monomorphic bird and mammal species.

Acoustic-based distant sexing is suitable for many bird taxa lacking sexual dimorphism, such as geese, cranes, rallies, raptors, owls, parrots, auks, etc. Other methods that are already in use (DNA-analysis, laparoscopy, cloak inspection) all demand capture, taking blood or feather samples or other stressing manipulations, and are very limited in their application in free-living populations. Vocal-based sexing can be considered as very reliable. Our results show that in the white-faced whistling duck (*Dendrocygna viduata*), male loud whistles are significantly lower in frequency, than those of the females. These differences provide 100 % reliability of sexing by a single call. In addition, preliminary data show, that loud whistle patterns of three other *Dendrocygna* species (*D. bicolor*, *D. autumnalis* and *D. arborea*) demonstrate high intersexual differences. Bioacoustical sexing is also relevant for cranes in relation with programmes of captive breeding and reintroduction into nature. Current practice of crane chick sexing, based on gene analyses, is not possible earlier than at 3 months of age. According to our data, tonal calls of the red-crowned crane chicks (*Grus japonensis*) provide up to 90 % reliability of sexing already in the first two weeks of their life. Calls of Siberian crane chicks (*G. leucogeranus*), emitted in response to handling, provide reliable sexing (over 97 % correct assignment to sex during the first two months of life).

The development of individual identification by voice for monitoring free-living populations and reintroduced animals has two stages: 1) the search of individual call differences, 2) the estimation of their stability over years. We gathered data on individual differences between individuals of *D. viduata* (94 % correctly assigned calls for 14 birds); of captive red-breasted geese (*Branta ruficollis*) (85,6 % correctly assigned calls for 22 birds), of free-living spotted ground squirrels (*Spermophilus suslicus*) (96 % correctly assigned calls for 13 animals) and of captive dholes (*Cuon alpinus*) (96 % correctly assigned calls for 6 animals). However, preliminary cross-validation data, sampled for the red-breasted goose and for the spotted ground squirrel suggest a substantial decrease of individual discrimination from year to year. At present, we continue to gather and to analyse representative data concerning stability of individual and sexual differences over years.

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