



Juvenile calls as indicators of sex and individuality in the Red-crowned crane (*Grus japonensis*)



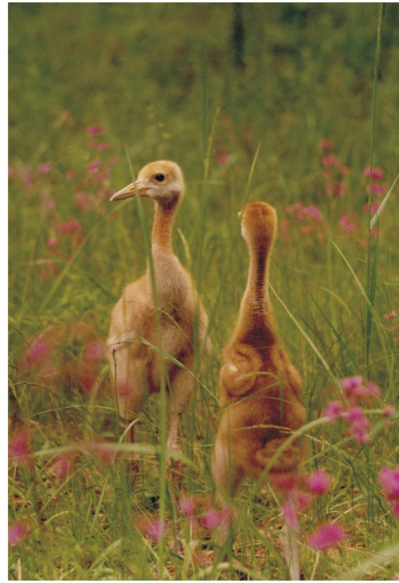
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Introduction

The Red-crowned crane is an endangered species, its population size in nature is as little as about 2000 birds. Bioacoustical data on adult cranes are scarce and almost lacking for juveniles. However, such data would be important both for understanding the early vocal ontogenesis in Gruid species and for conservation purposes.

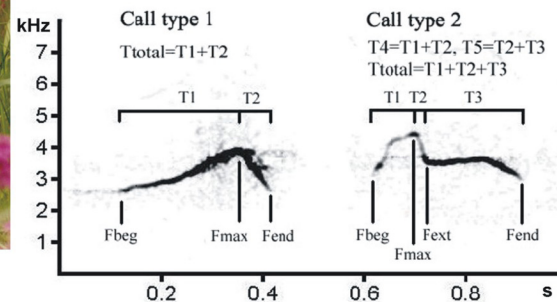
The focus of our research are the individual and sexual differences between calls of Red-crowned crane chicks throughout the first 40 days of their lives. In brooders sexing of chicks based on DNA analysis often is not possible earlier than at three-months of age. Among the imperfections of this method are stress owing to capture and blood sampling, delays of getting results, expensiveness, inapplicability in the wild. The acoustical methods, developed in the course of our studies, may be considered as a good alternative or supplementation of the current practice.



Methods

We tape-recorded sounds from 6 chicks (3 males and 3 females), that were parent raised in summer 2003 in Oka Crane Breeding Center (Russia). Sexes of these chicks were independently confirmed by 2 laboratories. We analysed 2 tonal call types (fig.1). We measured 3 frequency and 3 temporal parameters type 1-calls (n=611), and 4frequency and 6 temporal parameters for type 2-calls (n=581).

Figure 1. The measured parameters for 2 call types.



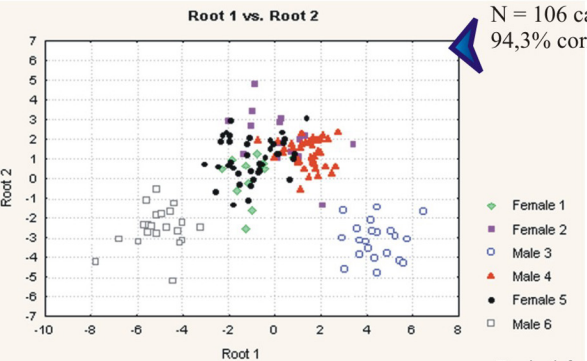
Results

Despite a high interindividual variability, for limited time periods of 4 to 15 days (9 to 20 calls per individual), discrimination function analysis showed up to 97% of correct assignment to individual (random value is 17% for 6

individuals) and up to 93% of correct assignment to sex (random value is 50% for two sexes). Over the complete 40-days period, discrimination was lower (68% for assignment to individuality and 71% to sex), probably, because of voice alterations during growth.

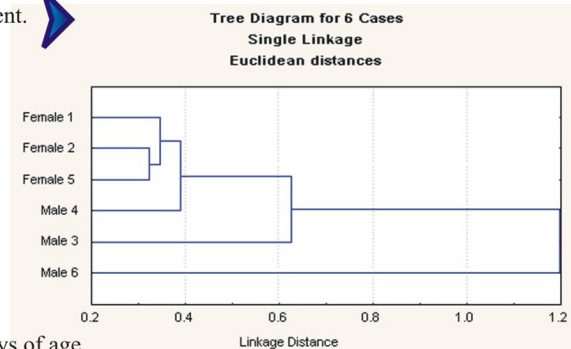
Individual differences

Period from 4 to 15 days of age
N = 106 calls.
94,3% correct assignment.

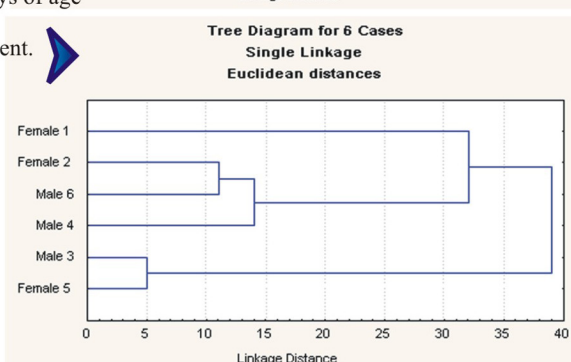
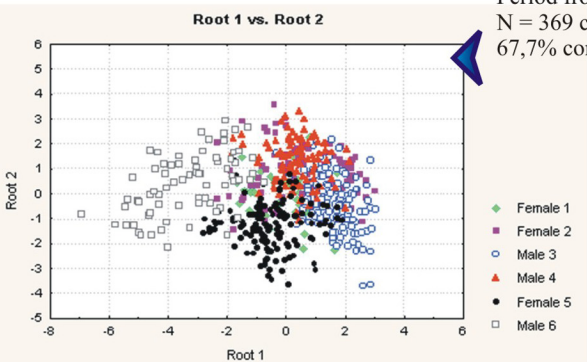


Sexual differences

5 days-old chick.
Weight 200g.



Period from 0 to 40 days of age
N = 369 calls.
67,7% correct assignment.



40 days-old chick.
Weight 2500g.



Discussion

These cues to individuality and to sex in juvenile bird voices may be not important in summer, when crane families, consisting of a pair of adult cranes and one or rarely two chicks, wander from their breeding territories. But cranes have one interesting feature: the chick's high frequency peep-like voice changes to a low, loud, guttural call of the adult only at ten to eleven months (for the Red-crowned crane) and adults continue to defend and to partially feed their chicks until the onset of the next breeding cycle. The vocal change coincides with the chick's expulsion by its parents from the family unit. That's why we suggested

that individual and sex differences in calls of juvenile birds may prepare the ground for the future development of individual and sex-related features in voices of adolescents. These features might become important in autumn and winter, when the chicks of different parents mix up with each others, or during pairing of young cranes. These data have a practical application for the development of noninvasive bioacoustical sexing in the Red-crowned crane chicks or, taking into account long preservation of juvenile calls in crane repertoires, for monitoring young cranes released into nature.