

**Studies on Genetic Diversity and Its Maintenance in the Japanese Population of
Japanese Crested Ibis (*Nipponia nippon*)**

Yuichi Wajiki

Summary

Japanese crested ibis (*Nipponia nippon*) completely disappeared from the wild in 1981, and the last individual indigenous to Japan died in captivity in 2003. Then, as a national project, the Japanese captive population has been established by using five individuals derived from the Chinese captive population as founders. Its size has increased rapidly, and the maintenance phase is about to start. In 2008, the reintroduction programs were initiated on Sado Island. In order for the Japanese reintroduced population to survive in the wild where environmental changes are frequent, the retention of genetic diversity in the population is needed. Because the reintroduced population is founded by the captive population, it is also very important to maintain the genetic diversity in the Japanese captive population. We first predict the number of founders to be introduced newly and the carrying capacity needed to maintain the genetic diversity in the captive population. It was suggested that under the condition that the carrying capacity was 200 individuals which was calculated as the current one, the gene diversity after 100 years was estimated to be about 60% with no supplements from China. Moreover, it was estimated that it would be required to continue introductions of four supplements every five years for 100 years, in order to

retain 90% of the gene diversity after 100 years at the carrying capacity of 200 individuals. The target of retention of 90% after 100 years could never be achieved with no supplements. Because these results were based on the assumption that the five founders were unrelated and non-inbred, the genetic analyses when they were assumed to be related were performed using pedigree information. The adoption of mean kinship strategy as the breeding strategy suited to the maintenance phase was also investigated. When different assumptions were used ranging from zero to 0.25 of kinship coefficients between the five founders, the results showed that the gene diversity and the mean inbreeding coefficient would fluctuate largely from 65% to 82 % and from 0.07 to 0.29, respectively. We also found that the introduction of mean kinship strategy into the Japanese captive population should require adequate consideration because the genetic importance of individuals based on mean kinship shifted largely. It would become more effective to analyze the genetic status and to introduce mean kinship strategy into this population with more credible molecular evaluation of the relationships among founders. One of the most important factors to ensure the genetic diversity in the reintroduced population is the number of individuals to be released. Our simulation indicated that 10-15 individuals, which were currently released in the annual reintroduction, would be needed to be released each year over 50 years in order that the reintroduced population after 50 years retains a rare allele with a frequency in the captive population of 0.05 with a probability of more than 90%. Therefore, the current reintroduction program appears to be reasonable and should be continued.