

F-2.1.2 Study on the Migration Route Selection and Habitat Characteristics of Migratory Birds

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Abstract We satellite tracked the fall migration of Red-crowned Cranes *Grus japonensis*, White-naped Cranes *G. vipio* and Oriental White Storks *Ciconia voyciana* from the middle part of the Amur River, southern Siberia in 1998 to 2000, and the spring migration of Common Cranes *G. grus* from western India in 1999 to 2001. In one Red-crowned Crane and two Oriental White Storks, the round trip migration was successfully tracked.

Three of the four successful Red-crowned Cranes migrated down along Bohai Bay to Yancheng north of the mouth of the Yangsu River. They wintered there. The other one migrated down to the mouth of Han River of the Korean Peninsula. In spring, the Yancheng crane took more northern route than in fall, but arrived in the same breeding area as that of the previous year. Ten of the 13 successful Oriental White Storks migrated down through Bohai Bay to Poyang Lake in the middle part of the Yangsu River. The other three wintered along Bohai Bay. All the storks moved little by little, particularly within Russia where extensive natural wetlands are available. In spring, the two storks took more northern route as in the Red-crowned Crane, and one stork arrived in Qiqihar of the Heilongjan Province and the other in Noan of the Jilin Province. Three Common Cranes migrated north through Uzbekistan and Kazakhstan to the southwestern part of Russia.

In some of the staging and wintering areas, the cranes and storks are threatened by serious habitat destruction and chemical pollution.

Keywords: *Ciconia boyciana*, Conservation, *Grus grus*, *G. japonensis*, Migration, Satellite tracking,

1. Introduction

Cranes and storks are large, migratory birds that require large areas of wetland or grassland for their breeding and wintering habitats, and along all points of their migration routes. As top species in the ecosystem, they are very sensitive to the health of their habitat.

Crane and stork migration runs thousands of kilometers through several different countries, making study of migration routes logistically difficult due to political boundaries as well as distances. However, showing and protecting migration routes is crucial for the survival of many crane and stork species.

Recently, satellite transmitters (platform terminal transmitters; PTTs) became light enough to use on large species of birds, which should carry an extra load of no more than

4% of their body weight. PTTs are valuable in migration studies of large wetland birds such as cranes, geese, and storks¹⁾⁻⁵⁾.

We satellite tracked the migration of Oriental White Storks *Ciconia boyciana*, Red-crowned Cranes *Grus japonensis*, and Common Cranes *G. grus* in 1998 to 2001. The purpose of the study is to show the migration routes and habitat use of the birds, in order to conserve the species and their habitat. We report here the outline of the results obtained during the study period.

2. Methods

In Russia, we worked along the middle part of the Amur River. We used helicopters to find stork nests and molting flightless cranes. At stork nests, we moved down fully-grown young to the ground, and deployed PTTs. For cranes, we jumped down from the helicopter to capture the flightless cranes, and deployed PTTs. In India, we captured Common Cranes in Budj, Gujarat, using lines of nooses and bait (corn and wheat) coated with the oral tranquilizer of alpha-chloralose.

PTTs were deployed with Teflon-treated ribbons to the back of storks and cranes. PTTs were made by Nippon Telegraph and Telephone Corporation (NTT) in Japan and Microwave Corporation in the USA. Location classes range from zero to three (Service Argos 1994). The higher the location class, the more accurate the location. According to Service Argos (1994)⁶⁾, class one and two locations offer a one standard deviation accuracy of 1,000 and 360 m, respectively, for stationary transmitters. We assume an accuracy of 1 km for all data of location class one and above, which means that we will not use satellite locations for movements within 1 km.

Location class zero data were included to show migration routes, when the locations were considered appropriate from the nearest tracking time and locations. They were, however, excluded from the analysis when more accurate locations were required.

The period of stay at a particular site was calculated as the difference between the first day of arrival at the site and arrival at the next site.

3. Results and Discussion

(1) Migration routes

Three of the four successful Red-crowned Cranes migrated down along Bohai Bay to Yancheng north of the mouth of the Yangsu River. They wintered there. The other one migrated down to the mouth of Han River of the Korean Peninsula (Fig. 1). In spring, the Yancheng crane took more northern route than in fall, but arrived in the same breeding area as that of the previous year.

Ten of the 13 successful Oriental White Storks migrated down through Bohai Bay to Poyang Lake in the middle part of the Yangsu River. The other three wintered along Bohai Bay (Fig. 2). In spring, the two storks took more northern route as in the Red-crowned Crane, and one stork arrived in Qiqihar of the Heilongjiang Province and the other in Noan of the Jilin Province.

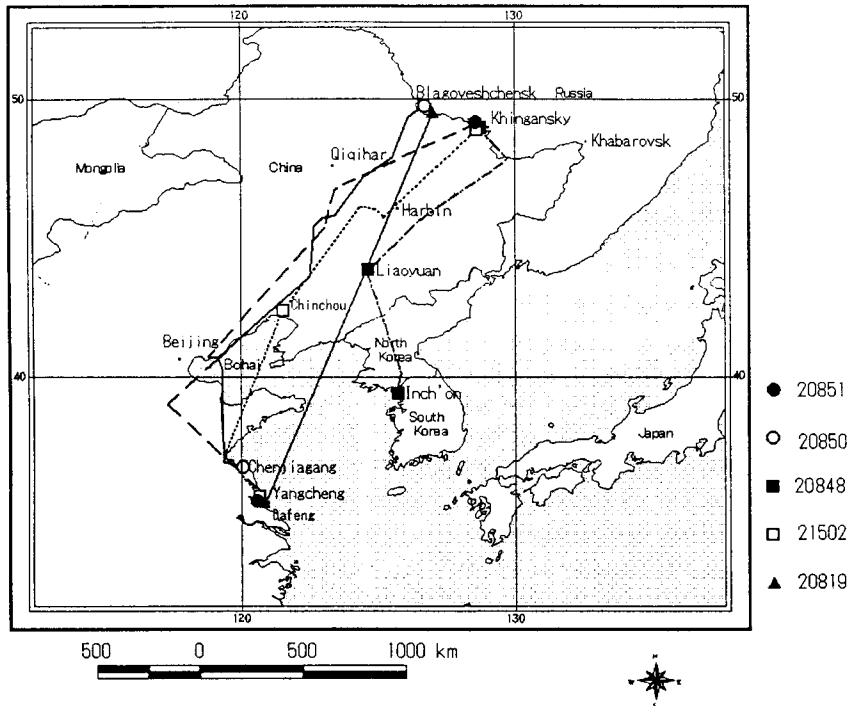


Fig. 1. Migration routes of Red-crowned Cranes satellite tracked from southern Russia in the fall of 1998 to 2000.

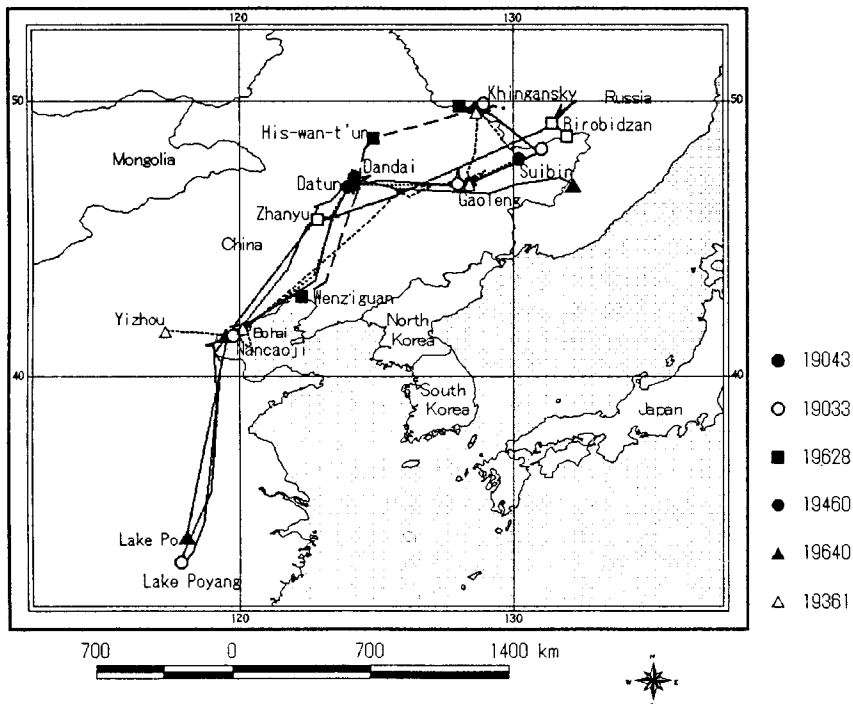


Fig. 2. Migration routes of Oriental White Storks satellite tracked from southern Russia in the fall and winter of 2000/2001.

Three Common Cranes migrated north through Uzbekistan and Kazakhstan to the southwestern part of Russia (Fig. 3). One successful crane migrated down in fall through Ningsang La of Bhutan to the Cartiawar Peninsula in India, which is 170 km away from the previous wintering area.

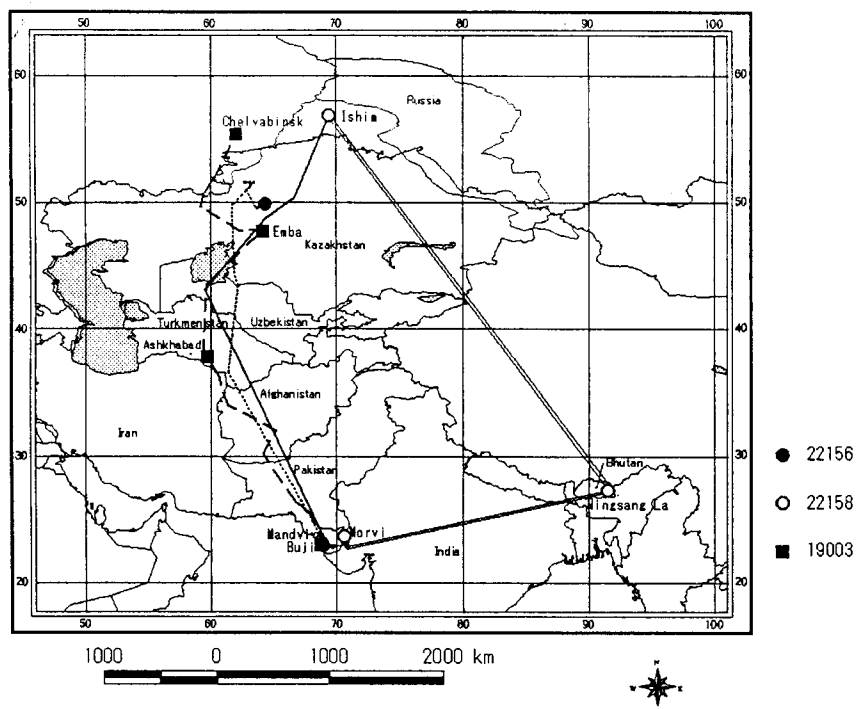


Fig. 3. Migration routes of Common Cranes satellite tracked from western India in 1999 to 2001. Round trip migration was tracked in one crane.

(2) Migration pattern through time

Oriental White Storks started migration in August, and repeated short-distance movements along rivers. They often moved little by little, particularly within Russia where extensive natural wetlands are available. They arrived in the wintering area in November, December, or January, and continued local movements even after arriving.

Red-crowned Cranes started migration in early or mid-November, and stopped over at some areas during migration. They arrived in the wintering area in late November or early December. The migration for the Korean Peninsula is quick, and took only 8 days.

Common Cranes started spring migration in early March or early May, and made some stopovers during migration. They arrived in the breeding area in late April, May or June.

(3) Conservation issues and measures

In Red-crowned and Common Cranes, it is significant to conserve important areas where many cranes visit and the length of stay is long. On the other hand, in Oriental White Storks, it is more important to conserve extensive wetland habitat along rivers, because they move little by little during migration. However, it is also important to conserve some important stork areas in China where wetland habitat is fragmented and isolated.

In some of the staging and wintering areas, the cranes and storks are threatened by serious habitat destruction and chemical pollution. The mouth of the Yellow River is getting drier and drier due to agricultural activities and economic developments along the upper and middle part of the river. The construction of Three Gorges Dam at the upper part of the Yangsu River will drastically change the water level of the river, which may result in the disappearance of Poyang Lake.

References

- 1) Higuchi, H., K. Ozaki, G. Fujita, J. Minton, M. Ueta, M. Soma, and N. Mita. 1996. Satellite-tracking of White-naped Crane *Grus vipio* migration, and the importance of the Korean DMZ. *Conservation Biology* **10**:806-812.
- 2) Higuchi, H., Y. Shibaev, J. Minton, K. Ozaki, S. Surmach, G. Fujita, K. Momose, Y. Momose, M. Ueta, V. Andronov, N. Mita, and Y. Kanai. 1998. Satellite tracking the migration of Red-crowned Cranes *Grus japonensis*. *Ecological Research* **13**:273-282.
- 3) Higuchi, H., Nagendran, M., Darman, Y., Tamura, M., Andronov, V., Parilov, M., Shimazaki, H. and Morishita, E. 2000. Migration and habitat use of Oriental White Storks from satellite tracking studies. *Global Environmental Research* **4**:169-182.
- 4) Berthold, P., Fiedler, W. and Querner, U. 2000. White Stork (*Ciconia ciconia*) migration studies: basic research devoted to conservation measures. *Global Environmental Research* **4**:133-141.
- 5) Takekawa, J., Kurechi, M., Orthmeyer, D.L., Sabano, Y., Uemura, S., Perry, W.M., and Yee, J.L. 2000. A pacific spring migration route and breeding range expansion for Greater White-fronted Geese wintering in Japan. *Global Environmental Research* **4**:155-168.
- 6) Service Argos. 1994. User Manual. CLS/Service ARGOS, Toulouse.