long screeches rather than warbling trills. The swifts were observed in the evening, and then at dawn of the following day, both times in calm overcast weather.

Recently Leader (2011) presented evidence to support the splitting of Fork-tailed Swift into four species. Of these, only *A.* (*p.*) *cooki* is known to breed in Indochina, although the breeding range of *A.* (*p.*) *kurodae* is not far from north-eastern Vietnam (it includes Guangdong and probably eastern Guangxi, China). Leader stated that *A.* (*p.*) *cooki* habitually breeds in limestone caves. However, cave-breeding cannot be used for differentiating between the taxa, because *A.* (*p.*) *kurodae* and *A.* (*p.*) *pacificus* also sometimes breed in caves, including caves in sea-cliffs (Leader 2011; also pers. obs. in Vityaz Cove, Ussuriland). The plumage of the Ha Long Bay birds seemed almost black with no brown tinge. This feature and the narrow rump-bands suggest that the birds were *A.* (*p.*) *cooki*. Green iridescence characteristic of *A.* (*p.*) *cooki* was not seen, probably due to lack of direct sunlight.

Ha Long Bay is a World Heritage Site, and parts of it (although not the colony site) are protected in national parks. It is not a particularly popular birding destination. The area receives heavy tourist traffic, but this is focused in popular areas. The bay contains many limestone islands and so more remote parts may harbour additional nesting sites of Fork-tailed Swift. Assuming the Ha Long Bay birds are *A.* (*p.*) *cooki*, the known range of this taxon is extended by 300–400 km to the east, and down to sea-level. It is possible that further studies will find *A.* (*p.*) *cooki* to be sympatric with *A.* (*p.*) *kurodae* in extreme north-eastern Vietnam or Guangxi.

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References

Leader, P. J. (2011) Taxonomy of the Pacific swift *Apus pacificus* Latham, 1802 complex. *Bull. Brit. Orn. Club* 131: 81–93.

Pilgrim, J. D., Bijlmakers, P., De Bruyn, T., Doppagne, S., Mahood, S. P. & Tordoff, A. W. (2009) Updates to the distribution and status of birds in Vietnam. *Forktail* 25: 130–136.

Robson, C. (2011) *A field guide to the birds of South-East Asia*. London: New Holland.

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Notes on the 2009 autumn crane migration in Muraviovka *zakaznik*, Amur oblast, Russian Federation

ADAM C. STEIN & GALINA NOSACHENKO

Introduction

Direct visual observations and counts have been a useful tool in understanding population size and dynamics of many conspicuous migratory species (Dingle 1996). In particular, observations or counts that take advantage of geographical features which funnel a large number of migrants into a relatively small area can prove highly valuable. For example, Smith (1980) was able to count over 500,000 migratory raptors as they funnelled through Panama during their migration from North to South America. Throughout the world, these geographical features have been identified by researchers and counts are now conducted annually in many of these locations providing long-term trends with certain migratory species (Dingle 1996).

In the Russian Far East, the large wetland complex of Muraviovka *zakaznik* (Russian game reserve) serves as one of these geographical features where large numbers of White-naped Cranes *Grus vipio* and Hooded Cranes *G. monacha* become concentrated during autumn migration. This 34,000 ha *zakaznik* is surrounded by agricultural fields in the southern portion of Amur oblast in the Russian Federation. Given that the *zakaznik* is located on the Russian/Chinese border, data collected here not only have the potential to provide unique insights into the health, demographics and numbers of cranes during their migration but may also aid in detecting changes in any of these which could result from their transition to new political and cultural hosts. Given that both White-naped and Hooded Cranes are listed as globally Vulnerable with a declining population (BirdLife International 2008), information regarding their population, environmental use and where efforts should be concentrated (both in a political and life-cycle context) will be valuable for the proper management of their populations.

During the northern autumn of 2009, we monitored cranes that utilised Muraviovka *zakaznik* as a stopover site during their migration from their breeding grounds in Russia to their wintering sites further south in China, the Korean peninsula and southern Japan. More specifically, we performed a morning census throughout the stopover period when the birds departed from their roosts and travelled to their feeding sites. This census allowed us to derive (1) an approximate number of individuals of each of the species migrating through the reserve, (2) the size of flocks departing from their roosts, (3) the time at which they departed from their roosts, and (4) the approximate ratio of juveniles to adults birds. In addition, we were able to view and evaluate injured birds as well as hybrid pairs. Our key observations are presented here.

Methods

Autumn crane activity was observed on a near-daily basis throughout the months of September and October 2009 within Muraviovka *zakaznik*. From 15 to 24 September 2009 early morning counts were conducted from 06h15 to 09h00. During this period the migratory cranes would leave their roosts within the reserve to begin feeding within the agricultural fields east of the reserve. Counting and monitoring of the cranes was conducted along a north–south farm road that bordered the reserve and the adjacent fields.

To ensure an accurate and complete count, two to four observers were spaced approximately 0.5–1 km apart along the road during the monitoring period. Utility poles were used as markers, so that each observer knew the boundaries in which he/she was to conduct his/her monitoring and to ensure that no crane was double-counted. The cranes were counted only after they passed the transect (road) travelling from west to east. At no time during the counts were cranes observed to cross the transect from east to west.

In addition to counting the cranes, observers noted any birds with apparent injuries and, when the flocks flew close enough, identified juveniles from adults. Each bird within a given flock was counted, and the time noted when each flock passed over the transect (within ten-minute intervals). Temperature data were provided for the dates of our counts by the Amur Oblast Meteorological Station located c.60 km to the west in the city of Blagoveshchensk.

Results

Numbers

Migrating cranes began to arrive in small numbers (<100 individuals) within the reserve as early as 9 September, and small flocks (<20 individuals) continued to migrate through the reserve as late as mid-October. The largest density of cranes occurred during the middle part of September.

The peak number of individuals we observed for both crane species was on 15 September. That morning we scored 1,095 Hooded and 255 White-naped Cranes, representing c.9% and 4% of the world's populations of these species respectively (BirdLife International 2008). Numbers decreased after this date and by 24 September fewer than 500 individual cranes were present within the reserve (Figure 1).

The reserve is also used by a small number of Red-crowned Cranes *Grus japonensis* as well as a few individual Eurasian Cranes *G. grus* (<5 annually). Red-crowned Cranes did not follow the daily movements out of the reserve to feed like the other species, and therefore were not included in the autumn crane census. However, there were probably no more than 15 individuals within the reserve during the autumn migration.

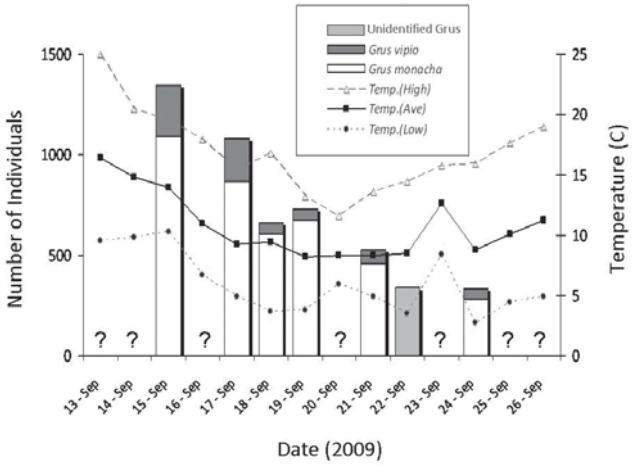

Figure 1. Total number of cranes counted on a daily basis during the observation period. White bars = Hooded Cranes, dark bars = White-naped Cranes, and grey bars = cranes too far to be identified to species. '?' indicates days when counts were not conducted. The three lines indicate the high, low and average daily temperature during the observation period.

Feeding flock size and timing

Hooded and White-naped Cranes left their roost within the reserve between 06h30 and 09h00 (Figure 2) each morning and flew east to feed in the surrounding agricultural fields. The majority of Hooded Cranes left the roost at 07h10–07h20, while most White-naped Cranes departed the roost 30 minutes later, between 07h40–07h50 (Figure 2). (Here and below, for simplicity, we include single birds when referring to 'flock' size.)

A total of 470 Hooded Crane feeding flocks were counted during the seven mornings of monitoring: 137, 104, 65, 67, 46 and 51 departing flocks for each morning respectively on which species could be discriminated (on 22 September they could not). Flock size ranged from one individual to as many as 60 individuals; however, 50% of these flocks consisted of 5 or fewer individuals, and 75% consisted of 10 or fewer individuals (Figure 3).

A total of 123 White-naped Crane feeding flocks were counted during the seven mornings of monitoring; 31, 31, 20, 13, 17 and 11 departing flocks for each morning respectively on which species could be discriminated. Flock size ranged from one individual to 43 individuals; however, 64% of these flocks consisted of five or fewer individuals and nearly 90% consisted of flocks of 10 or fewer individuals (Figure 3).

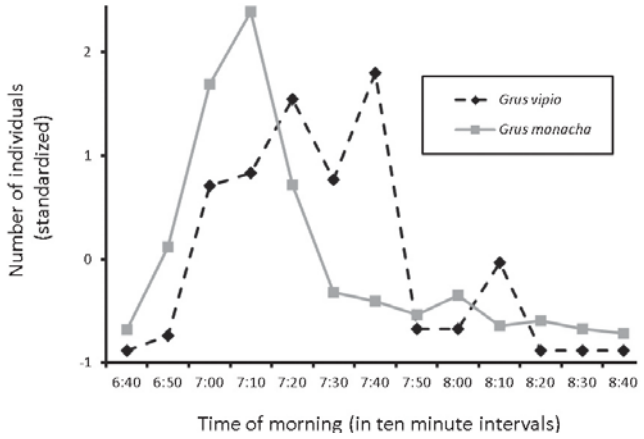

Figure 2. Graph of the average time (in ten-minute intervals) that flocks of White-naped and Hooded Cranes left the roosting site to the feeding grounds. The numbers of cranes were standardised (mean of zero and the standard deviation of one) to compare the activity between the two species.

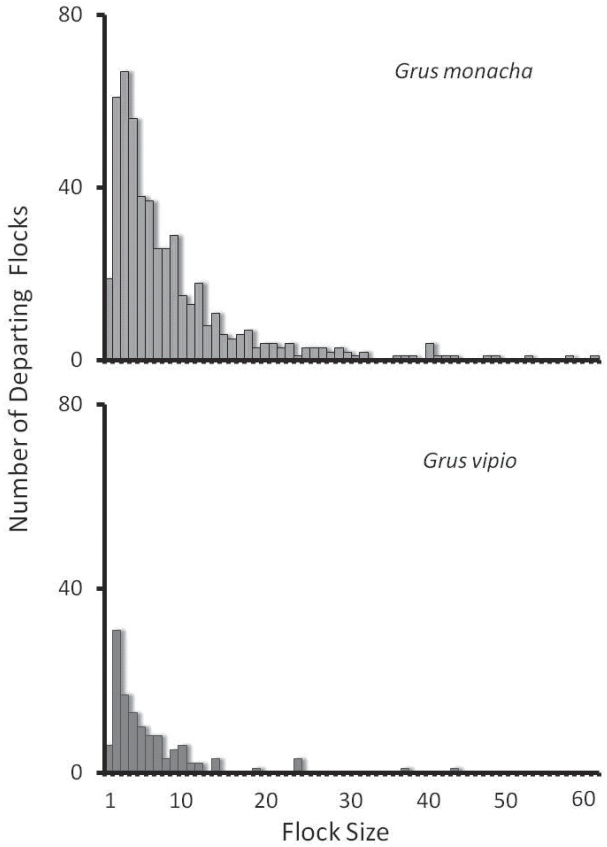

Figure 3. Graphs representing the size of flocks for both Hooded and White-naped Cranes departing the roosting areas for the feeding grounds.

Demographics

We were able to discriminate between adults and juveniles in 17 of the 470 departing flocks of Hooded Cranes we observed. Flock size of those we could age ranged from 2 to 21 (mean 7±5) individuals. On day one of observations (15 September) juveniles and adults were discriminated from each other in five flocks totalling 28 birds, seven of which were juveniles. On 17 September seven flocks consisted of 25 adults and 10 juveniles. On 18 September two flocks totalling five birds contained two juveniles. On 21 September 26 birds were aged from three flocks, in which five were juveniles. Lastly, on 24 September one flock of 21 individuals contained 19 adults and two juveniles. Overall, approximately 25% of the observed individuals were juveniles.

Similarly, we discriminated between adults and juveniles in 16 of the 123 departing flocks of White-naped Cranes observed. Flock size of those we could age ranged from 1 to 7 (mean 4±2) individuals. On 17 September five juveniles were counted in four flocks totalling 15 individuals. On 18 September 10 juveniles were counted in seven flocks totalling 23 birds. On 21 September five juveniles were counted among 15 birds in three different flocks. On 24 September two flocks consisted of six adults and five juveniles. Thus approximately 40% of all individual White-naped Cranes were juveniles.

Mixed-species pairs

Mixed pairs of Hooded and Eurasian Cranes have been noted since 1865 (reviewed in Johnsgard 1983) and are now seen annually in Japan (Brazil 2009). On 17 September we identified two mixed pairs involving these two species. Each pair had one hybrid offspring.

Injured birds

We observed several cranes with injuries during the autumn migration. On each observation morning a White-naped Crane was seen with an injured leg that drooped below the body as it flew. In October, after the majority of the cranes had continued south, a White-naped Crane that remained in the agricultural fields was missing a portion of its left leg (several inches above the foot). The bird was present for roughly a week but its eventual fate remains unknown. Lastly, a Red-crowned Crane was discovered near the reserve in late November; it was unable to fly, for unknown reasons, and was eventually captured and brought to a rehabilitation centre.

Discussion

At least 9% of the world's Hooded Cranes and at least 4% of the world's White-naped Cranes utilise Muraviovka *zakaznik* on an annual basis during their autumn migration. The *zakaznik* serves as an ideal location to count individuals accurately as well as to obtain a crude estimate of the demographics of the migrating cranes. Direkciya, the provincial governmental game and conservation department, has recently begun to realise the importance of this reserve for migrating cranes. Although the organisation monitors the cranes' arrival each autumn, no rigorous methodology for counting or assessing the cranes has been implemented. Our paper aims not only to provide current information about the demography and size of crane populations that use Muraviovka *zakaznik* but also to highlight a potential methodology for conducting these surveys in the future.

Our observations also suggested that 25% of Hooded Cranes and 40% of White-naped Cranes were juveniles, a higher success rate, at least for the 2009 breeding season, than has been found in Sandhill Cranes, in which the percentage of juveniles was 9.5–24% (Ballard *et al*. 1999). For future studies, it would be useful to compare the observations made at migration stops such as Muraviovka *zakaznik* to observations made once the population has settled in their wintering grounds.

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References

BirdLife International (2008) *Grus monacha*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.1. <www.iucnredlist.org>. Downloaded on 05 September 2011.

BirdLife International (2008) *Grus vipio*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.1. <www.iucnredlist.org>. Downloaded on 05 September 2011.

Ballard, B. M., Thompson, J. E., Merindo, M. D., Ray, J. D., Roberson, J. A. & Tacha, T. C. (1999) Demographics of the Gulf Coast subpopulation of mid-continent Sandhill Cranes. *Proc. Ann. Conf. Southeast Assoc. Fish & Wildl. Agencies* 53: 449–463.

Brazil, M. (2009) *Birds of East Asia: China, Taiwan, Korea, Japan, and Russia*. Princeton: Princeton University Press.

Dingle, H. (1996) *Migration, the biology of life on the move*. Oxford: Oxford University Press.

Johnsgard, P. (1983) *Cranes of the world.* Bloomington: Indiana University Press.

Smith, N. G. (1980) Hawk and vulture migrations in the Neotropics. Pp.51–65 in A. Keast & E. S. Morton, eds. *Migrant birds in the neotropics*. Washington, D.C.: Smithsonian Institution.

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Woolly-necked Stork *Ciconia episcopus* at Napahai wetland, Yunnan, China

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The Woolly-necked Stork *Ciconia episcopus* is a wading bird species of Least Concern (IUCN 2011). It ranges over tropical Africa, India, Sri Lanka and South-East Asia, and primarily feeds on fish, amphibians, reptiles and invertebrates. Although the population is stable throughout its range (IUCN 2011), the Asian population potentially merits management attention owing to land-use pressures affecting suitable marsh and wetland habitat.

Napahai wetland, covering c.660 km^2, is located on the Zhongdian Plateau within China's Three Parallel Rivers World Natural Heritage region in north-western Yunnan province (27.879°N 99.638°E) at an elevation of 3,790 m. Located next to Xianggelila (Zhongdian), Napahai is important to a variety of migratory waterbirds. Large numbers of wintering Bar-headed Geese *Anser indicus* and Black-necked Crane *Grus nigricollis* led to its designation in 1985 as a national nature reserve; some 90% of the crane's central population are estimated to use Napahai as wintering habitat (Li & Yang 2005, Liu *et al.* 2010). The wetland cycles between summer high water, driven by monsoonal rain and snow melt from surrounding mountains, and winter low water when a mosaic of wetland and agricultural areas are available for wintering waterbird use. Typically, wintering waterbirds roost in the shallow waters of Napahai and forage in surrounding wetlands or agricultural fields that surround the perimeter of the wetland (Kong *et al.* 2011).

At 13h30 on 11 June 2011 we detected a Woolly-necked Stork *Ciconia episcopus* at the north end of Napahai wetland. JWB has