

Mate Guarding by Curlew Sandpipers (*Calidris ferruginea*) during Spring Migration in North Siberia

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ABSTRACT. It is poorly known whether arctic-breeding shorebirds form pairs before or after arrival at the breeding site. We describe the display and mate-guarding behavior of curlew sandpipers *Calidris ferruginea* at a stopover site in high arctic Siberia, suggesting that in this species pairs may be formed before the birds reach their final nesting localities.

Key words: shorebirds, mate guarding, migration, curlew sandpiper, *Calidris ferruginea*, Siberia

RÉSUMÉ. On ne sait pas très bien si les oiseaux de rivage qui nichent dans l'Arctique forment des couples avant ou après leur arrivée sur l'aire de reproduction. On décrit le comportement de cour et de garde du partenaire chez le bécasseau cocorli (*Calidris ferruginea*) à un site de passage en Sibérie boréale, en suggérant que chez cette espèce, les couples se constituent avant que les oiseaux n'atteignent leur aire de ponte finale.

Mots clés : oiseaux de rivage, garde du partenaire, migration, bécasseau cocorli, *Calidris ferruginea*, Sibérie

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INTRODUCTION

In several wader species that breed in the High Arctic, birds appear in pairs immediately after arrival at their breeding grounds (see references in Meltofte, 1985). It is generally unknown, however, whether pairs were formed shortly after arrival at the breeding site or if the birds paired somewhere in the winter quarters or during spring migration. The latter is the case with many ducks and geese (Cramp and Simmons, 1977).

Several authors have suggested that curlew sandpipers *Calidris ferruginea* may arrive paired at their breeding sites (Dement'ev and Gladkov, 1951; Portenko, 1959; Holmes and Pitelka, 1964; and references in these), but we have not found any studies confirming this, either for curlew sandpipers or for any other wader species. The objective of this paper is to describe the mate-guarding and display behavior of curlew sandpipers at a late spring stopover site in North Siberia. The social behavior of the curlew sandpiper on or near its breeding grounds has received relatively little attention (nothing is reported in Cramp and Simmons, 1983; but see Haveland, 1915; Portenko, 1959; Holmes and Pitelka, 1964).

STUDY AREA AND METHODS

We studied the migration of birds at the southern coast of Sibiryakov Island, Russia (72°40'N, 79°00'E; Fig. 1) between 6 June and 3 July 1992. The island is approximately 600 km² and is situated off the mouth of the Yenisey River, just west of the Taymyr Peninsula in Siberia. This very flat and sandy island (maximum elevation 33 m a.s.l.) is covered with a thin layer of tundra vegetation, mainly lichens and mosses. During our stay the sea was totally ice covered.

Three observers (PF, FH and ÅL) spent about 2-14 hours every day throughout the stay in the study area, counting migrating birds and watching the behavior of birds resting

in the area. Most observations were carried out between 0600 and 2400 local time (GMT + 7 h). Small "walk-in" traps made of chicken wire were used daily to trap birds for banding.

Curlew sandpipers breed on high arctic coastal tundra, mainly in central Siberia, and spend the non-breeding season on coastlines of Eurasia, south of 20°N (Dement'ev and Gladkov, 1951; Portenko, 1959; Cramp and Simmons, 1983; Hayman *et al.*, 1986). The sexes can be distinguished relatively easily during the breeding season, because males have a darker and more colorful plumage (Cramp and Simmons, 1983; Hayman *et al.*, 1986).

RESULTS

Snowmelt in 1992 was extremely late (O. Chernikov, pers. comm. 1992), with snow cover virtually 100% from 6 to 14 June. Mean temperatures were approximately 0°C in early June and never exceeded +8°C. After 14 June small patches of bare tundra became available, especially near the shoreline.

The first wader, a dunlin *Calidris alpina*, was seen on 8 June. A flock of five curlew sandpipers was seen on 14 June. Between 15 and 23 June, 10-50 curlew sandpipers were present in our study area. After 23 June, we only saw 1-3 pairs and single males on the island.

On 16 June, most of the curlew sandpipers were paired. A few single males were seen, and on one occasion we observed an unaccompanied female. The birds remained close to the shoreline where snow-free patches first became available, feeding preferentially in the narrow zone where the snow had just melted.

During foraging, males of an apparent pair always stayed within 0.5-2 m of the female. This short distance contrasted sharply with the 10 m or more that normally separated different pairs. The birds were usually quiet while on the ground, but the male would occasionally utter a nasal

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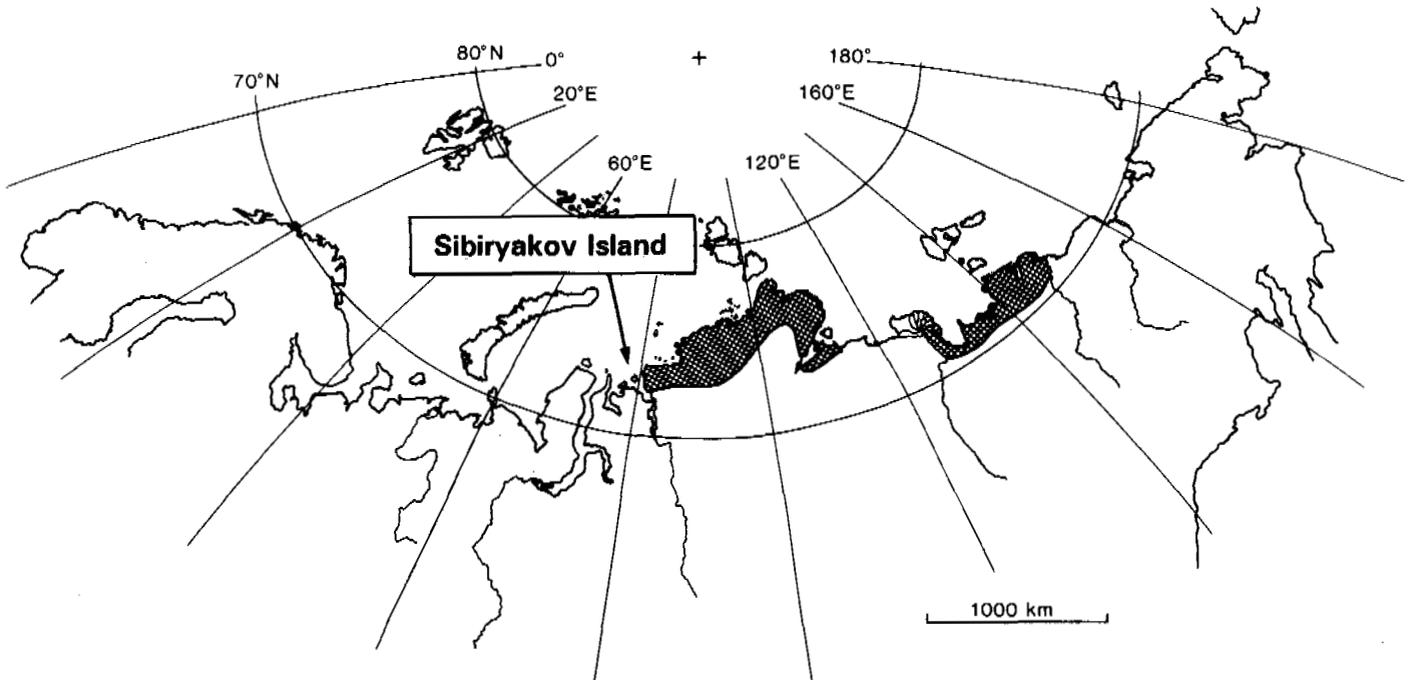


FIG. 1. Map showing the location of Sibiryakov Island in North Siberia. The hatched areas show the breeding range of curlew sandpipers (according to Cramp and Simmons, 1983).

"wed-wed-wed," similar to a call of the dunlin. If the male became separated from his mate while foraging, he would run quickly towards her. If the female flew off, the male would immediately follow her closely. The pair would fly some tens or hundreds of metres, almost invariably close to the ground. The strong link between the male and the female became especially clear on the few occasions when a female walked into one of our chicken-wire traps. The agitated male would then circle around the trap, trying to reach the female, and would stay within 1-2 m even when we came to release her. Otherwise we were never able to approach a pair closer than 10 m before the birds flew.

Single males were often chased away from the vicinity of a pair. The chasing male would utter a rapid high-pitched call that resembled the call of the little stint *Calidris minuta*. Chasing flights were vigorous. The female often participated, although it was not clear what role she played. On one occasion, a single male landed within 3-4 m of a pair. The pair-male then ran towards the intruder until they met chest to chest with lifted wings. After a short dispute, the pair-male chased him away, first on the ground and then in a flight that lasted for about 15 s. The pair-male then immediately returned to his female.

In flight, the male (sometimes also the female?) called more or less continuously, producing a repertoire involving several different calls. Apart from the "chirrup" call often heard outside the breeding season and the "stint" call described above, he would also give a bubbling twitter. The most prominent call, though, was a long whining note, "uuueeeee," given both in flight and on the ground. For further details about the breeding vocalizations of the curlew sandpiper, see Haviland (1915), Dement'ev and Gladkov (1951), Portenko (1959) and Holmes and Pitelka (1964).

On a few occasions the male changed his flight style to a "butterfly" flight, in which the wings were moved at a reduced frequency and during which he continued to call. This is thought to be the display flight (Portenko, 1959; Holmes and Pitelka, 1964). Once we saw an apparently single male conduct this "butterfly" flight, although he was quiet. When he landed close to a pair, he was immediately chased away by the male of the pair. Sometimes up to five birds were seen flying in tight flocks low over the ground, giving the "chirrup" call. The mate guarding and the display flights continued throughout our study period. On only one occasion did we see a copulation attempt, on 23 June.

In the early morning of 21 June (0325 h), two pairs were seen coming in from the sea at 30-50 m height, about 25 m apart. They continued on a NNE course over the island, both pairs giving the bubbling and whining calls continuously. On the evening of 23 June the wind was coming from the north at moderate strength, temperature was +3°C and cloud cover was low. At 2355 h, 18 curlew sandpipers took off and while calling intensively they ascended into the clouds and disappeared towards the northeast. A few minutes later, the whole sequence was repeated by a flock of 13 curlew sandpipers, which also disappeared in a northeasterly direction. This was the first time we saw curlew sandpipers ascend from our study area, and clearly these birds departed on migration. The following morning only one pair and two single birds were seen in the area.

DISCUSSION

Curlew sandpipers appear to breed only in very low numbers on Sibiryakov Island (O. Chernikov, pers. comm. 1992), the main breeding areas being farther east on the Taymyr Peninsula (Dement'ev and Gladkov, 1951; Portenko,

1959; Cramp and Simmons, 1983; Hayman *et al.*, 1986; Fig. 1). From the observations of their prominent mate-guarding behavior and subsequent departure, we conclude that the curlew sandpipers formed pairs before they reached their final breeding sites. The fact that we only saw one copulation attempt does not necessarily imply that the pairs may not have eventually bred together, since copulation frequency is normally relatively low in bird species in which mate guarding is very intense (Birkhead and Möller, 1992).

Our observations were done in a year when spring was very late. Portenko (1959) reviews more than ten studies in which the first curlew sandpipers were seen on their Siberian breeding sites between 30 May and 13 June, normally around 10 June. Thus, it is possible that many of the curlew sandpipers we saw had paired at a seasonally appropriate time, but at "waiting" sites somewhere close to the breeding grounds. However, there are indications that pairing may start far from the breeding grounds. Legge (in Portenko, 1959) reports one case of a pair of curlew sandpipers showing breeding displays in Ceylon (Sri Lanka), probably during late winter. Suschkin (in Portenko, 1959) described similar mate-guarding behavior at a stopover site in Kazakstan on 7-8 June 1894. Piersma *et al.* (1991) described the regular occurrence of display and copulation attempts in knots *Calidris canutus* during spring migration. However, no mate-guarding behavior was observed in the knots, indicating that their display behavior might have been less systematic and less directed towards a stable pair formation.

It remains to be shown when and where pair formation in curlew sandpipers normally takes place and how pairs can remain stable in a species that is highly social during migration. Pair formation well before arrival at the breeding sites could be advantageous in an environment where the time available for breeding is very short.

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