
Notes on the breeding biology of the Bar-tailed Godwit *Limosa lapponica* in Taimyr

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The lower valley of the Bolshaïa Balkhnia river lies near the northern limit of the breeding range of Bar-tailed Godwit *Limosa lapponica* in eastern Taimyr. Bar-tailed Godwit breed on the wettest parts of the relatively dry, low hills of the region at a distance of between 0.4 to 3.5 km from the river. In 1991, six pairs bred within a survey area of c. 21 sq. km of suitable habitat (0.3 pair/sq.km). Three pairs were only 0.7 to 1 km apart, with a local density of up to c. 1 pair/sq. km. Laying occurred in the second half of June. The nests and their environment are described. Measurements are given for four breeding pairs and five clutches. Information is also given on incubating and anti-predator behaviour. Both sexes incubated, but from the second week after laying, females seemed more involved than males in incubating. Anti-predator measures were mostly directed towards mammals, while the numerous skuas, a potential predator, were not systematically mobbed.

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INTRODUCTION

Small numbers of breeding Bar-tailed Godwit *Limosa lapponica* were encountered during the international expeditions organized in recent years to various parts of the Taimyr peninsula by the Russian Academy of Sciences (Prokosch & Hötter 1990; Yésou 1991). Some pairs were observed in 1989 where the Taimyra river flows into Taimyr Lake (E. E. Syroechkovsky Jr. *pers. comm.*). A family party was observed in early August 1990 near the Taimyra mouth, on Fomin Island (75°58'N, 99°50'E), and at least two other pairs were alarming nearby (P. Yésou, E. E. Syroechkovsky Jr., E. Y. Lappo). This was the first proof of breeding in the arctic tundra subzone, but previous observations of birds alarming along the lower valley of the Taimyra (Dorogov & Kokorev 1981) suggest regular breeding. On 12 June–24 July 1991 we visited the lower Bolshaïa Balakhnia river valley, given as the northern limit of Bar-tailed Godwit breeding range in eastern Taimyr (Scalon 1938). Our observations are reported here, owing to the scarcity of information on the species' breeding biology (Glutz *et al.* 1977; Johnsgard 1981; Cramp & Simmons 1983). At present, information is only available on habitats, density and biometry for the species on the Yamal peninsula (Danilov *et al.* 1984).

STUDY AREA AND METHODS

The c. 40 sq.km study area consisted of near equal propor-

tions of wet lowland areas and rounded drier hills and was centred on our base camp (73°36'N, 106°40'E) 18 km from the river mouth. The lowlands, 1–5 m above the river's low-water level, consisted of shallow lakes and wet polygonal tundra with many ponds. Dwarf willow *Salix* grew on the river's edge, in areas regularly flooded during snow melt. Hills reached 7–20 m, and consisted mainly gentle slopes and plateaux broken by steep-sided valleys with small streams. Vegetation was intermediate between that of typical tundra and arctic tundra subzone (Chernov 1985) with almost no willows. Generally, tundra was dry, except around small lakes and in depressions where snow melt was delayed, which remained wet all year.

The main study area was intensively surveyed with a high likelihood that all breeding Bar-tailed Godwit were located. Using 'walk-in' traps on the nest, we caught and individually colour-ringed both sexes of four pairs (Table 1), two of these birds also being colour-dyed. Observations of these birds, either at the nest or elsewhere, were thereafter made randomly during our visits to various study plots. Furthermore, hilly areas a greater distance from the river than our study were walked by Igor Tcherbakov, while we rapidly surveyed by boat the immediate vicinity of the river from the mouth to c. 60 km upstream. This provided an overview of distribution within the lower valley. I. Chupin and I. Tcherbakov also surveyed by boat the lower valley of the nearby Gussikha river up to c. 73°47'N.



Table 1. Measurements of breeding adult Bar-tailed Godwit from Bolshaia Balakhnia river, Taimyr. Males 1, 2, 3, 4 were paired with females 1, 2, 3, 4 respectively. The amount of brown-barring on the axillaries corresponded to type 3 in Nieboer *et al.* (1985) in all eight individuals.

	Nest	Wing	Bill	Bill+head	Tarsus	Foot	Weight
Male							
1	A,B	205	83	123	55	?	250
2	C	213	73	109	51	90	240
3	D	216	77	117	52	90	240
4	E	?	84	123	53	96	245
Female							
1	B	?	93	124	56	98	315
2	C	?	94	135	56	92	280
3	D	229	91	132	58	96	330
4	E	229	107	148	56	96	300

RESULTS

Breeding habitat and density

Bar-tailed Godwits were not suspected to breed on wet lowlands, including the river delta. Breeding occurred only on hills, from c. 15 km from the river mouth to the upstream limit of the prospected area. In the main study area, territorial pairs or nests were located between 0.4 to 3.5 km (mean 1.3 km, $n = 6$) from the foot of the hill. No pair was found further inland, perhaps due to late snow-melt. Distribution could possibly be somewhat different in years with earlier melt. At least four pairs were most likely breeding near the Gussikha river, where Scalon (1938) considered that the species did not breed.

A total of five nests were found, all in relatively wet places with many small shallow ponds and channels draining water to nearby streams. Nests were on almost dry hummocks covered by sedge *Carex*, moss, and occasionally heather *Ericaceae*, and were no more than 0.35 to 1.5 m from the nearest wet depression. Most depressions surrounding nests were still partly filled with melting snow at the time of laying. They remained very wet at hatching, being among the wettest places on the hill slopes, and were also attractive for feeding waders such as Little Stint *Calidris minuta* and Dunlin *C. alpina*. Previous observations on Fomin Island in 1990 suggests that these wet areas are also used for feeding by young Bar-tailed Godwits. We were, however, not able to observe this as we had to leave the area where the clutches began to hatch. Contrary to Popham (1897, in Cramp & Simmons 1983), we found no association between godwits and Long-tailed Skua *Stercorarius longicaudus*. In fact, no godwit nest was closer than 300 m from the nearest skua (two cases, including one when the skua laid after the godwit).

The only six pairs breeding on the c. 21 sq.km of hilly landscape we surveyed gave an overall density of 0.3 pair/sq.km, but the density was much higher in some areas, as shown by three pairs between 0.7 to 1 km apart (c. 1 pair/sq.km).

An unmated male stayed in the area until our departure, initially defending a territory in a habitat similar to that used by breeders, then moving to drier places between breeding territories, suggesting that the area could have supported more pairs.

No direct territorial conflicts were noted between breeding pairs. On one occasion, however, the unpaired male was attacked by a paired male, with the female joining the alarm behaviour. On a further occasion, interactions (alarming, chasing and fighting) between the unpaired male and two paired ones, successively, lasted for at least two hours.

Breeding biology

Bar-tailed Godwits were already present when we commenced field-work on 14 June, staying in small groups of 6–12 birds on the lower river bank, feeding among small stands of willow still partly snow-covered. Social activity was important within these groups, with pairs apparently already formed. Males often performed short bouts of display, and frequent agonistic behaviour.

Breeding territories were thereafter very quickly occupied. The first clutch, still incomplete with three eggs, was discovered on 19 June. Three other clutches were discovered on 20, 22 and 27 June respectively, all being full but very fresh. The first clutch was collected on 19 June; the same male was subsequently found on 29 June incubating a second, full fresh clutch 150 m from the first. Unfortunately, the female was not yet ringed when the first clutch was collected, so we cannot be certain whether it was a replacement, or whether this male rapidly attracted a second female to his territory. Different size eggs, however, suggests that the clutches were laid by different females.

Nests consisted of a shallow cup, 14–16 cm in diameter and 3–5 cm in depth, with a thin lining of lichen, moss, dry sedge and willow leaves, or heather. These nesting materials were used in variable proportions. Eggs measured, in mm:

Nest				
A*	:	56.5 x 36.6,	54.9 x 36.4,	52.2 x 37.2
B*	:	58.1 x 36.7,	57.7 x 36.8,	56.1 x 36.2, 53.9 x 37.0
C	:	55.0 x 36.0,	54.1 x 36.7,	53.9 x 36.7, 53.3 x 35.7
D	:	53.9 x 38.1,	53.6 x 37.6,	53.2 x 38.3, 52.9 x 38.2
E	:	52.4 x 36.0,	51.6, 36.2,	50.8 x 34.9, 47.9 x 37.4

* same male

Both sexes incubated, the mate keeping watch from a suitable vantage point or while feeding nearby. Males obviously played an important role in incubation during the first week or so after laying. Thereafter, males were seen guarding nearly three times more often than females. It should be noted that although this was not recorded through a strict protocol of time-budget study, it sustains the observation of Brandt (1943, cited by Johnsgard 1981), from Alaska,



and contradicts the assertion in Witherby *et al.* (1940) that males undertake the major part of incubation.

All the cases of anti-predator behaviour we observed were directed towards dogs (hence probably similar in the case of Arctic Fox *Alopex lagopus*) and man. Skuas, although numerous, were not systematically chased, godwits only occasionally joining mobbing action regularly performed by more aggressive species, in particular Pacific Golden Plover *Pluvialis fulva* and Grey Plover *P. squatarola*. When a man or a dog approached, the guarding bird went towards them, flying at low level while crying, landing 10–20 m from the intruder, continuously alarming, and jerking nervously. As the intruder got closer, the bird flew some distance from the nest, continuing to cry. This was repeated again and again until the intruder was attracted a great distance from the nest. In some cases, birds went towards an intruder when they were 300–500 m from the nest, and accompanied them a similar distance away. The incubating bird often quickly joined the guarding one and continued alarming. The unmated male displayed in a similar way when we were on its territory, and was sometimes joined by one or two females from adjacent pairs.

When flushed from the nest, incubating birds stayed within 3–20 m, crying, frequently hopping and occasionally injury-feigning, often rapidly joined by its mate. In such a situation, a pair once performed a pseudo-copulation within its distraction behaviour. Various authors cited by Cramp & Simmons (1983) suggested that alarming godwits might lure intruders towards nearby nests of other species. Despite one occasion when we discovered other nests while looking for a godwit nest, we consider that these lucky finds were due to the relatively high density of breeding birds rather than any voluntary help from godwits.

Despite this anti-predator behaviour, which probably qualifies the Bar-tailed Godwit as the noisiest species in the tundra, of the five nests located, one nest was destroyed, probably by a Pomarine Skua *Stercorarius pomarinus*, and another clutch was possibly taken by an Arctic Fox. The remaining two clutches successfully hatched.

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