

cannon-netted on the Eiderstedt peninsula. Most (1020) birds were Dunlins. 340 waders were colour-marked, and the catches included no less than 36 birds carrying foreign rings. On 5 June, the very large total of 100 000 Knots were recorded from around Scharhorn alone.

Norway

1730 Knots, of which 870 were dye-marked and/or leg-flagged, were caught in Balsfjord (Troms) on 3 occasions between 12 and 26 May. 35 birds carried rings from elsewhere, the majority being from moulting and wintering areas on the east coast of Britain. Counts and observations of dye-marked birds showed little turnover during the 2-3 weeks when the birds were present. No dye-marked Knots from elsewhere were seen during regular checks of the 15 000 birds present; nor were any dye-marked birds of other target species seen. Knots arrived at Porsangerfjord (Finnmark) about a week later than in Balsfjord. No dye-marks were seen in checks of 800 of the 20-30 000 Knots present in the third week of May.

Iceland

One cannon-net catch of 32 Knots was made on 14 May in S.W. Iceland. Amongst these were a bird ringed in Britain and another in the Netherlands. Mist-netting earlier in the season proved unsuccessful. However no less than 17 colour-marked waders from outside Iceland were seen during the spring fieldwork. Most had been marked in Britain.

The Future

Would all readers please note that any outstanding reports of colour-marked waders should be sent as soon as possible to the WSG Colour-marking Register, Dr. D.J. Townshend, Department of Zoology, University of Durham, South Road, Durham DH1 3LE, U.K. Similarly, any other outstanding information of relevance to this project, requests and comments should be sent to the WSG Co-ordinator, Theunis Piersma (address below).

Would all 'contact-persons' from the main participating groups please note that a short meeting to discuss the details of the work carried out this spring, and plans for the project in future springs, will be held at approximately 2000h on Friday 4 October 1985 at La Rochelle, during the WSG Autumn Meeting. Anyone unable to attend this meeting should make any necessary comments in advance to the Co-ordinator.

Finally, our thanks to all those who have participated in the project for their help in further increasing our understanding of the spring migration systems of waders.

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THE WINTERING GROUNDS OF THE BLACK-TAILED GODWIT IN WEST AFRICA

by Wibe Altenburg, Jan van der Kamp and Albert Beintema

INTRODUCTION

From 2 October to 15 December 1983 the first two authors studied the winter distribution of the Black-tailed Godwit *Limosa limosa* in West Africa. This study was part of a project on migratory birds of WWF/IUCN (project 3096) and ICBP (project 9238), focused upon migration and wintering of two 'Dutch' bird species, the Black-tailed Godwit and the Spoonbill *Platalea leucorodia*. The aims of the godwit study were: 1) to map the wintering areas of the Black-tailed Godwit in Southern Mauritania, Senegal, The Gambia and Guinea-Bissau, 2) to count aquatic birds in these areas, 3) to describe the winter habitats and their possible threats, and, 4) to study feeding ecology (on a small scale), in view of possible godwit damage to rice fields. In this short note we only present data on numbers of godwits in the study area. Information on other subjects can be found in our expedition reports (Altenburg & van der Kamp 1985a, 1985b).

THE BLACK-TAILED GODWIT

Three subspecies of Black-tailed Godwit are recognized (Figure 1):

a) The eastern subspecies, *Limosa l. melanuroides*, from East Siberia and Mongolia; winter counts on the Australian coast (Jessop & Lane 1983), probably the most important wintering area for this subspecies, indicate a breeding population of at least 15 000 pairs.

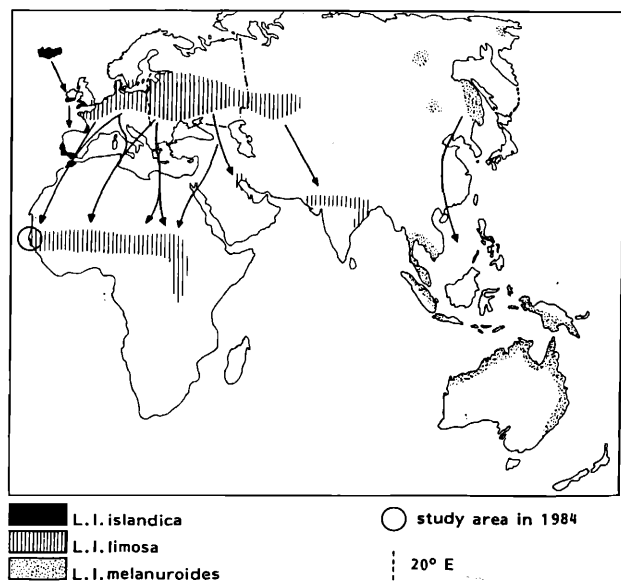


Figure 1. The most important breeding areas of the Black-tailed Godwit, the probable wintering areas and a number of possible migration routes (arrows). After Cramp & Simmons (1983), Glutz von Blotzheim *et al.* (1977) and Voous (1962).

b) The western subspecies, *Limosa l. islandica*, from (predominantly) Iceland; recent counts in Iceland (estimation by A. Gardarsson, in Piersma in prep.) suggest a breeding population of at least 10 000 pairs. The subspecies winters along the coasts of Britain, France and the Iberian peninsula, possibly as far as Morocco (Prater 1975).

c) The 'central' subspecies, *Limosa l. limosa*, from Western, Central and Eastern Europe and West Siberia. The size of the Eastern European and West Siberian population is unknown but thought to be much smaller than the Western and Central European populations of 101 000 - 116 000 breeding pairs (Cramp & Simmons 1983, van Dijk 1983, Glutz et al. 1977). Due to a recent decline in the Netherlands, where c. 80-90% of this population is breeding, this figure may be currently below 100 000 pairs. Godwits breeding east of 20°E (Eastern Europe, West Siberia) migrate south and south-east, and probably winter mainly in East and Central Africa. Godwits breeding west of 20°E (Western and Central Europe) migrate south-west, via the East-Atlantic flyway, and mainly winter in West Africa. Our 1983 Godwit expedition was focused upon the Western and central European population of the subspecies *limosa*.

THE WINTER POPULATION

Godwits do not breed generally until they are two years old; most of them spend their second summer in Africa (e.g. Haverschmidt 1963). Assuming a first-year survival of 0.7 and a survival of 0.8 in later years (Beintema & Drost in press), a population of birds, starting to reproduce at an age of 2 years, will be stable when 0.7 fledglings per pair per annum are produced. Starting with 100 000 adult pairs, the midsummer population will then consist of 200 000 adults, 70 000 new fledglings and $0.7 \times 70\ 000 = 50\ 000$ 2nd-year birds. Thus, in the following year there will be $0.8 \times (200\ 000 + 50\ 000) = 200\ 000$ adults again. Assuming a mortality that is more or less equal before and after midwinter, this will result in a midwinter population of 180 000 adult, 45 000 2nd-year birds and 60 000 first-year birds: a total of 285 000 birds.

STUDY AREA

The study area was situated on the Atlantic coast of West Africa, roughly between 17° and 11° N (Figure 2). It includes the southern edge of Mauritania and the western parts of Senegal, The Gambia and Guinea-Bissau. Of all Dutch Black-tailed Godwit rings recovered south of the Sahara, c. 90% have been found in this area. Within the study area, there are five geographically-distinct regions with wetlands in which counts and other observations were made. These five regions are characterized by valleys and deltas of big rivers, with large estuaries and a relatively small altitudinal drop. As a consequence, the saltwater influence is sometimes apparent more than 100 km inland. The regions differ in their combinations of flood plains, mangroves, coastal lagoons, mud flats, saltwater marshes and rice fields. The delta and valley of the river Senegal are characterized by vast expanses of bare, fresh or brackish flood plains, irrigated rice fields and, along the coast, brackish to salt lagoons. The delta of the river Saloum is almost completely salt and is dominated by mangroves, bordered by a practically bare brackish- to saltwater marsh and, along the coast, small areas of sandy mud flats. The parts of the study area which are situated further south

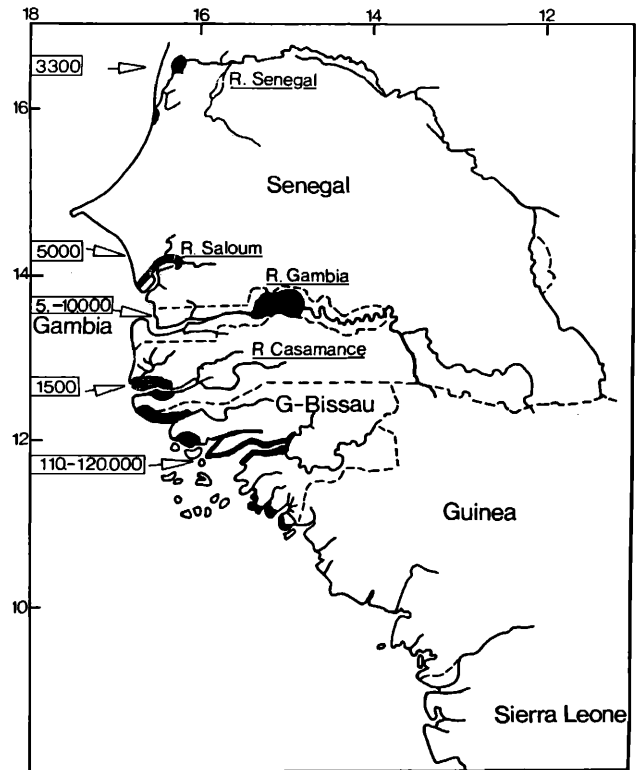


Figure 2. The study area in West Africa. The figures give counts for the Black-tailed Godwit during October-December 1983. The black spots indicate the most important wintering areas.

(river Gambia, river Casamance, different rivers in Guinea-Bissau) consist of deltas with vast marshes of mangrove, which change into a narrow belt of mangroves along the water's edge further upstream. Rice fields behind the mangroves are characteristic.

COUNTING RESULTS

Figure 2 shows the estimated numbers of Black-tailed Godwits in the different parts of the study area between the beginning of October and half December 1983. These numbers are extrapolated from both ground and aerial counts. In the Senegal delta and valley, we counted almost 100% of all potential godwit habitats. In the delta of the Saloum river we covered 85%, in the Casamance 55%, and in Guinea-Bissau about 20%. In the Gambia, which we visited only briefly, we covered no more than 10%, but we obtained relevant information of the Gambian Ornithological Society (C. White pers. comm.). Relatively small numbers were found in the deltas of the rivers Senegal, Saloum and Casamance, where the birds made use of fresh, brackish and saltwater marshes. Larger numbers were found in rice fields in The Gambia and especially Guinea-Bissau. We never noticed any immigration or emigration in the counting areas, in contrast to, for example January 1983 in Guinea-Bissau (Poorter & Zwarts 1984) and January 1984 in the Senegal delta (P. Dugan in litt.), thus we assume that the number of Black-tailed Godwits in October-December was more or less stable. The wintering population in the study area in 1983/1984 can therefore be estimated at c. 125 000 - 140 000 birds, which

is probably only a little less than 50% of the total wintering population of Western and Central European Black-tailed Godwits.

OTHER WINTERING AREAS

Within our study area, Black-tailed Godwits showed a marked preference for mangrove-swamp rice, a type of rice cultivation which occurs elsewhere in West Africa only in Guinea-Conakry and Sierra Leone (Mohr 1969, Pearson *et al.* 1981). Cultivations of dry rice and swamp rice in valleys and depressions, both common in West Africa, proved to be of no importance for the species. Since rainfall and rice cultivation methods in Guinea-Conakry and Sierra Leone are comparable with southern Guinea-Bissau, the wintering population in these countries could be some 30 000 birds. Ringing recoveries of Dutch Godwits in Guinea-Conakry (2) as well as Sierra Leone (1) confirm that some birds overwinter there. Apart from the mangrove-swamp rice, the irrigated rice in the Senegal delta and the flooded rice in the Niger Inundation Zone in Mali are important as foraging areas after the crop has been harvested, but in both deltas the majority of the birds probably overwinter outside the rice fields.

Ringing recoveries of western and central European Black-tailed Godwits in Africa suggest that outside the rice-growing regions the potential wintering grounds are very limited. No European Black-tailed Godwit has been recovered south or east of the line Sierra Leone-Mali-Algeria. Thus, the Inner Niger delta and the wetlands of Morocco are the only wintering quarters left to be considered. A recent estimation for the coastal wetlands of Morocco reveals a winter population of c. 15 000 birds (Kersten & Smit 1984), of which the ratio of *limosa* : *islandica* is unknown. In the Inner Niger Delta 10 000's of Black-tailed Godwits are known to overwinter (Roux 1973, Lamarche 1980), but these have often been thought to be of Eastern European or even West Siberian origin. Additional studies and ringing operations in Africa are needed to establish the status of Black-tailed Godwits in Morocco and, especially, Mali.

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