

Figure 6. Hypothetical track of optimal flight heights of Bar-tailed Godwits which left the Banc d'Arguin on 25 April 1985 for a direct flight to the Dutch Wadden Sea (based on Figure 5).

Figure 4 shows that making a series of short flights is always energetically cheaper than covering the same distance in one long flight, due to the costs of transporting the extra fuel (fat). "Hopping" also entails smaller risks of fattening and timing delays. The reason that many waders nevertheless make very long flights, is thought to be due to a limited availability of high quality feeding (stopover) habitats along the flyways. In addition to the (species-specific) availability of good habitats, seasonal (high altitude) wind patterns may have a modifying influence on the timing and patterning of wader migration.

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THE IMPORTANCE OF SOUTH-EAST SUMATRA AS A SUMMERING AREA FOR NON-BREEDING WADERS, ESPECIALLY THE BAR-TAILED GODWIT *LIMOSA LAPPONICA*

Finn Danielsen & Henrik Skov

INTRODUCTION

Before 1983 almost nothing was known about the avifauna of the coastal wetlands of eastern Sumatra. Since then three surveys of waterbirds have been carried out; in October-November 1984, in July-August 1985 and in March-April 1986 (Silvius et al. 1986, Danielsen & Skov 1986, Silvius 1986).

These surveys have found that eastern Sumatra is a vital link in the East Asia/Australasia flyway for waders. This flyway population is considered to be the smallest and most threatened in the world with a total population of 4-6 million birds of over 70 species (Parish 1987). The three surveys demonstrated that several coastal wetlands in eastern Sumatra are of international importance for waterbirds according to the criteria of the Ramsar Convention.

This paper presents the results of the survey in 1985, when wader counts were carried out in the provinces of Jambi and Sumatra Selatan during the northern summer (for other details see Danielsen & Skov 1986). The aims of this survey were to find out the number and species of summering waders and the key sites of waders and their status.

STUDY AREA AND METHODS

The coastline of the provinces of Jambi and Sumatra Selatan in south-east Sumatra (103°5'E, 1°N - 2°5'S) consists mainly of accreting shores with 50-1000 m wide mudflats bordered by mangrove forest (Figure 1).

Fieldwork was conducted in late July in the province of Jambi and in early August in the province of Sumatra Selatan. In Jambi, a total of approximately 150 km of the coastline were

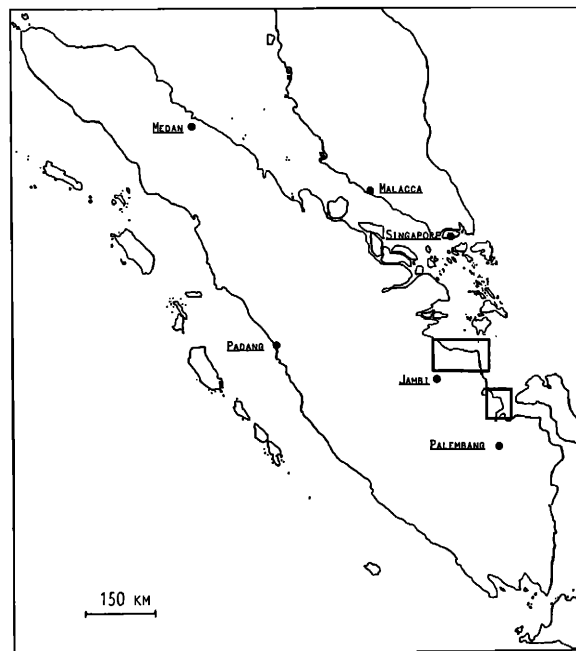


Figure 1. Map of South East Sumatra, showing the study areas at Jambi and Sumatra Selatan.

surveyed between Kuala Tungkal and Tanjung Djabung. In Sumatra Selatan, about 80 km along the peninsula between Sungai Sembilang and Banuyasin II estuary were surveyed.

We travelled eastwards and northwards along the coastline in patrol boats, together with guides from PPA (Direktorat General for Forest Protection and Nature Conservation in Indonesia) to observe shorebirds migrating

Table 1. Counts of waders in Jambi and Sumatra Selatan in July and August 1985.

		Jambi	S Selatan	Total
Grey Plover	<i>Pluvialis squatarola</i>	0	2	2
Mongolian Plover	<i>Charadrius mongolus</i>	10	0	10
Greater Sand Plover	<i>Charadrius leschenaultii</i>	7	0	7
Mongolian/ Greater Sand Plover		294	*200	494
Eurasian Curlew	<i>Numenius arquata</i>	2 253	800	3 053
Whimbrel	<i>Numenius phaeopus</i>	366	700	1 066
Eastern Curlew	<i>Numenius madagascariensis</i>	0	2	2
Black-tailed Godwit	<i>Limosa limosa</i>	12 800	30 000	42 800
Bar-tailed Godwit	<i>Limosa lapponica</i>	20	2 000	2 020
Redshank	<i>Tringa totanus</i>	1 024	*1 000	2 024
Marsh Sandpiper	<i>Tringa stagnatilis</i>	80	*100	180
Greenshank	<i>Tringa nebularia</i>	1	8	9
Terek Sandpiper	<i>Xenus cinereus</i>	783	*500	1 283
Common Sandpiper	<i>Actitis hypoleucos</i>	3	21	24
Turnstone	<i>Arenaria interpres</i>	1	0	1
Asian Dowitcher	<i>Limnodromus semipalmatus</i>	16	0	16
Great Knot	<i>Calidris tenuirostris</i>	2	1	3
Red-necked Stint	<i>Calidris ruficollis</i>	0	*100	100
Curlew Sandpiper	<i>Calidris ferruginea</i>	144	*100	244
Eastern Collared Pratincole	<i>Glareola maldivarum</i>	25	0	25
Total		17 828	35 534	53 363

* These figures are minimum numbers estimated from identification of approximately 20% of the total waders seen.

along their flyway during their early autumn migration. Starting points were the small fishing settlement Nipah Panjang at the mouth of the river Batang Hari and Palembang.

The coast was observed from short distances of 50-800 m. During the fieldwork period, high tides were mostly during the afternoon, so counts of birds at high tide roosting sites could easily be made whilst skirting the coast.

Counts were generally made with 10x50 binoculars. However if large numbers of waders were seen, a 25x60 telescope was used. In some places shortage of time or large waves made use of telescope impossible. On such occasions an estimate of total numbers was made, and sometimes (e.g. Telok Galas) only a small percentage (20%) of waders could be identified. The time spent on census of birds varies from site to site, and ranged from several hours to several days.

A few wader species roosted at high tide on the branches of mangrove trees along the shoreline (and sometimes on scattered trees further inland and out of immediate sight), so it was sometimes necessary to flush these waders by shouting.

RESULTS

The results of the wader counts are presented in Table 1. A total of 55 000 summering and migrating waders was found. Most abundant were Black-tailed Godwits, numbering 43 000 birds. The majority of the Black-tailed Godwits gathered at three high-tide roosting sites: Sungai Simbur Naik, 6 000 birds (24 July), Tanjung Jabung, 4 500 birds (27 July) and Telok Galas 30 000 birds (4 August).

We found it difficult to determine the age of the Black-tailed Godwits. A few birds were identified as adults in worn breeding plumage or in full non-breeding plumage. The majority of birds identified were considered immatures or post-juveniles, from the combination of the presence of a pectoral band and lack of barring

of underparts. Adults in transitional plumage are almost impossible to separate from immatures/post-juveniles, but it is very unlikely that the majority of adults present at the beginning of August would have already moulted into full winter plumage.

A total of 3 000 Eurasian Curlews *Numenius arquata* was observed, with approximately 800 at Tanjung Jabung and at Telok Galas. About 2 000 Bar-tailed Godwits *Limosa lapponica* were found, nearly all in the vicinity of Telok Galas. All birds observed were in full non-breeding plumage. In addition, a total of 2 000 Redshanks *Tringa totanus* were found, with a maximum of 500 at the mouth of Sungai Simbur Naik and at Telok Galas. Small numbers of Asian Dowitchers *Limnodromus semipalmatus* were recorded at the mouth of Sungai Simbur Naik (9 birds) and at the mouth of Kuala Sado-Luar (6 birds).

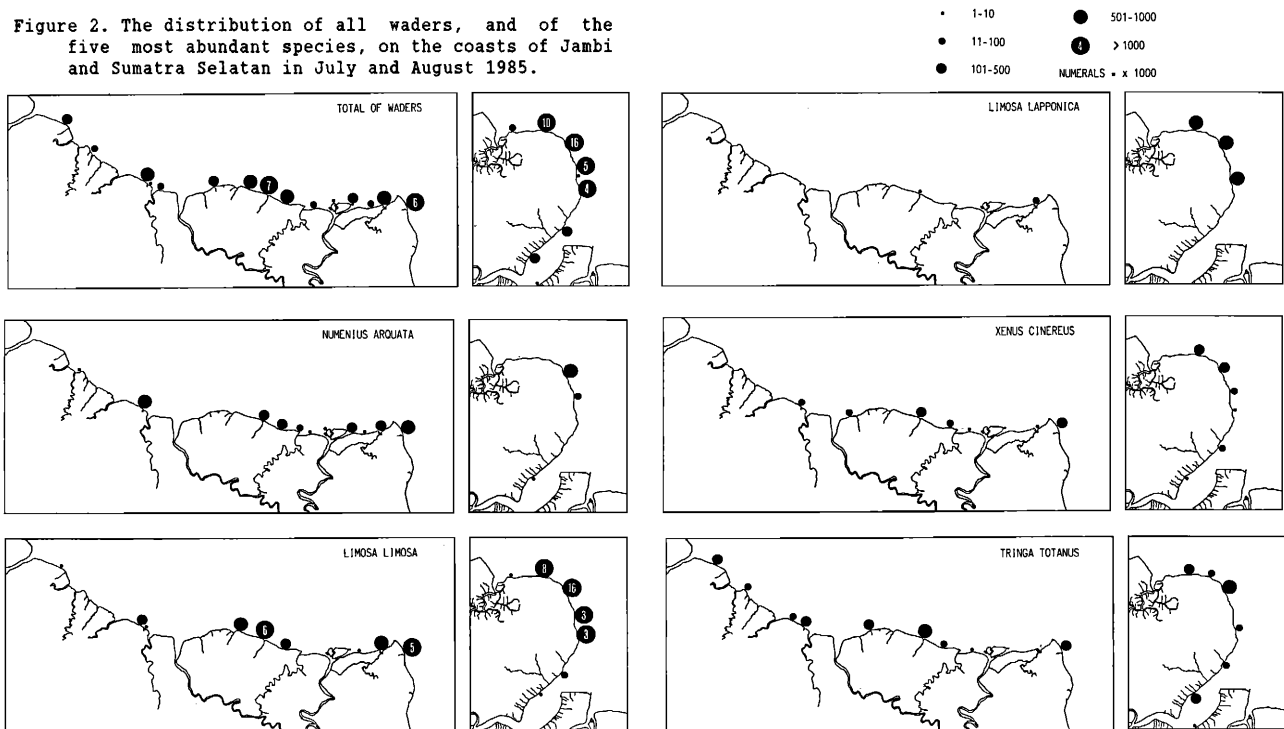
DISCUSSION

Such large numbers of migratory waders as we recorded are unprecedented at this time of the year in any area in South East Asia. Comparable Black-tailed Godwits have previously been recorded only on the River Niger in Africa and the Gulf of Carpentaria in northern Australia (Morel & Roux 1973, D. Parish in litt.).

Our observations indicate that south-east Sumatra most likely to be used as a summering area for non-breeding Black-tailed Godwits. The first arrivals of juveniles in Africa occur in the middle of August (Morel & Roux 1971). In October-November 1986 a total of 16 000 Black-tailed Godwits were seen in eastern Sumatra, indicating that the majority of the birds do not stay in the area but migrate further south. Lane (1984) recorded a total of 56 500 wintering in Australia.

From Museum collections in the Netherlands, Silvius et al. (1985) found evidence that the Asian Dowitcher was summering in Sumatra in small numbers in the 1930s. During the present

Figure 2. The distribution of all waders, and of the five most abundant species, on the coasts of Jambi and Sumatra Selatan in July and August 1985.



study some Asian Dowitchers might have been overlooked and mistaken as Bar-tailed Godwits, and it is very likely that more Asian Dowitchers actually were present.

During the survey in the same area in October-November 1984, the most abundant species was also the Black-tailed Godwit, followed in abundance by the Mongolian Plover and the Redshank. However, the dominating species during the survey in March-April 1986 were the Redshank, followed by the Asian Dowitcher and the Mongolian Plover. For a detailed comparison of these three surveys see Silvius (1988).

Our survey indicates that Sumatra is an important summering area during the northern breeding season for several species of waders, particularly Eurasian Curlew, Black-tailed Godwit, Bar-tailed Godwit and Redshank. If the numbers of Black-tailed Godwit that we observed occur in this area each year, then South-east Sumatra should be regarded as the most important summering area in the world for non-breeding birds of this species.

The shoreline of south-east Sumatra is under severe threat from agricultural exploitation and logging operations of the mangrove forest, and from rapid land-claim. More basic information is needed on the location of key sites for waterbirds, since the conservation of these birds and their habitats is of great urgency. Most of the coastal wetlands in Indonesia have so far received little or no ornithological attention.

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