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# Bar-tailed Godwits *Limosa lapponica* on south Swedish shores in spring – emergency stopovers or a regular occurrence?

MARTIN GREEN

**Abstract**

The occurrence of spring staging Bar-tailed Godwits *Limosa lapponica* in two bays in Öresund, southwestern Sweden, was monitored in 1996–1998. Godwits were present in the area from early April to early June with a peak in the first half of May, when several hundred birds where present at one time. The timing of the occurrence indicates that the birds belong to the "European population". Total number of birds involved per season could maximally be a few thousand, constituting 1–3% of the total population in northern Europe. Numbers of birds present was not significantly correlated to weather variables as wind, cloud cover or precipitation. The birds foraged intensively but no large scale accumulation of fuel stores was observed (i.e. by the use of abdominal profile scores), indicating a relatively rapid turnover of individuals in the area. More females than males were observed which indicate differences in migration strategies between the sexes. It is concluded that the two bays are a regular, but small-scale, stopover area for Bar-tailed Godwits during spring migration.

*Martin Green, Department of Animal Ecology, Lund University, Ecology Building, S-223 62 Lund, Sweden. E-mail: martin.green@zooekol.lu.se*

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## Introduction

Bar-tailed Godwits *Limosa lapponica* flying along the East Atlantic flyway gather in large numbers in the Wadden Sea (the Netherlands, Germany and Denmark) during spring to build up nutrient stores for their final migration towards Arctic breeding areas (Glutz et al. 1977, Cramp & Simmons 1983). Two populations with separate wintering and breeding areas use this flyway. The "European population", about 115,000 birds, winter around the British Isles and in the Wadden Sea. These birds spring stage in the Wadden Sea during March to mid-May before an assumed non-stop flight to breeding areas mainly around the White Sea basin, north-west Russia (Prokosch 1988, Drent & Piersma 1990). The "Afro-Siberian population", about 700,000 birds in the early 1980s but now probably considerably fewer than that (T. Piersma pers. comm.), winter in west Africa and spring stage in the Wadden Sea during May before an assumed direct flight to western or central Arctic Siberia in late May or early June (Drent & Piersma 1990, Piersma & Jukema 1990).

Both populations probably pass over Sweden during the flight from the Wadden Sea towards the Arctic, but observed numbers are normally relatively low and no large scale staging occurs (SOF 1990). The low numbers observed are probably due to the fact that wader migration mainly takes place at high altitude and during night time (Alerstam 1990, Gudmundsson 1994), making migrating flocks almost impossible to observe with conventional methods. The scarcity of suitable areas for foraging, i.e. mudflats and shallow sea shores rich in invertebrate prey, probably prevents any large scale spring staging. In some years, however, large numbers are observed during bad weather conditions (rain or strong headwinds) (Breife 1976, Hedgren 1988, Waldenström 1987, SOF 1990). During such occasions several thousands of Bar-tailed Godwits can be temporarily grounded on Swedish shores, but as soon as weather conditions allow they continue their flight (Breife 1976, Waldenström 1987). A regular spring stopover, with birds staying for some period, is known to occur at a few places along the west coast but numbers are low, usually below 75 birds at one time (Cederlund 1985).

During spring 1996, I became aware of the fact that, by Swedish standards, relatively large numbers of Bar-tailed Godwits were regularly present in two shallow bays of Öresund on the western coast of Skåne, southernmost Sweden. This finding made me follow these birds more closely, collecting a data set on the occurrence and behaviour of the species in the bays. Several interesting questions immediately arose regarding these birds. Was the occurrence a weather dependent phenomenon, the area functioning as an emergency stopover site, or were these bays used by Godwits on a more regular basis? Were individual birds staying for a long or a short time? How many Bar-tailed Godwits were using the area in spring? Which populations were involved? Did the Godwits forage and top up their nutrient stores? In this paper I present the data collected in 1996–1998 and analyse and evaluate the above mentioned questions.

## Methods

Bar-tailed Godwits were counted in Lundåkrabukten (55° 47'N, 12° 55'E) and Salviken (55° 42'N, 12° 55'E), two shallow bays of Öresund on the western coast of Skåne, south Sweden (Figure 1). Both bays have a long sand bar at the outer part with a mixture of mudflats and shallow water (water depth ranging from a couple of centimeters to a couple of decimeters) between the sand bar and the shoreline. The area of mudflat and shallow water is approximately 0.5–1 km$^2$ at Salviken and 1–5 km$^2$ at Lundåkrabukten. Tidal amplitude in the area is only about two to three decimeters. Outside the sandbars water depth increase rapidly to 1–3 m. Cattle-grazed dry meadows border both bays along the shorelines.


Figure 1. Map showing the study sites Lundåkrabukten and Salviken.
*Karta visande studieområdena Lundåkrabukten och Salviken.*

Countings were made at least once every five days during the periods 20 April–3 June 1996, 8 April–3 June 1997, 6 April–3 May 1998, and 19 May–1 June 1998. Mean time between counting occasions was 3.3 days in 1996, 2.8 days in 1997 and 3.1 days in 1998. During these countings all suitable areas for waders in the bays were scanned from fixed places along the shores. Distance between scanning sites did not exceed 2 km. In this way I could control for double countings as birds already counted were clearly visible from the next observation post. In total, 52 countings were made, 15 in 1996, 22 in 1997, and 15 in 1998.

During all countings I also made notes on the behaviour of each bird, categorizing them as feeding or resting. At 22 occasions, nine days 28 April–26 May 1996, ten days 29 April–30 May 1997 and three days 29 April–3 May 1998, I determined the sex of all birds present. Males were distinguished by bright copper-red summer plumage or traces of red summer plumage and/or smaller size (Cramp & Simmons 1983, Prokosch 1988). In 1998 abdominal profile scores of 223 birds at nine occasions were collected, following the five-stage scale of Wiersma & Piersma (1995), to establish variation in energy stores during the season. The scale was originally developed for Knots *Calidris canutus* but should be applicable to Bar-tailed Godwits as well since Godwits build up fat and protein stores in the same way as Knots do (T. Piersma pers.comm.). Abdominal profile score is a coarse method of assessing fat stores without having to catch the birds. By estimating the shape of the birds' abdomen one can classify the birds in categories ranging from lean (no energy stores) to very fat (large energy stores). The method is probably too coarse to estimate fat content of individual birds but should be sufficient for comparisons of the status of groups of birds between areas, during a season etc. (Wiersma & Piersma 1995).

To analyse the effect of wind and some other weather variables on numbers of Bar-tailed Godwits I used weather data from the European Meteorological Bulletin (EMB, Deutches Wetterdienst) for the relevant periods. Weather data in EMB are given from 00 GMT and 12 GMT (= 02 and 14 local Swedish summer time) at different pressure levels corresponding to different altitudes. As Bar-tailed

Godwits probably mainly fly over south Sweden during night time I used the midnight data. Wind direction and speed were collected for ground level situations and for the 850 Mb level (approximately 1.5 km a.s.l.). Mean altitude of spring migrating wader flocks recorded by tracking radar in Lund (55° 42'N, 13° 12'E) in 1998 was 1.7 km a.s.l (Green unpubl.). Thus, an altitude of 1.5 km should correspond well with the altitudes actually used by waders passing south Sweden in spring. Weather data from Copenhagen, Denmark (25 km SW of study sites) was used as this was the closest weather station in the EMB to the study sites. For each night preceding an observation day, I calculated the wind effect ('tailwind vector', i.e. the expected wind assistance or resistance that the flying birds would get: positive in tailwinds and negative in headwinds,) for migrating Godwits passing the area (for calculations see Piersma & Jukema (1990) and Piersma & van de Sant (1992)) to analyse if number of staging Godwits was correlated to wind direction and speed. In the calculations it was assumed that Bar-tailed Godwits fly with an airspeed of 18 m $s^{-1}$ (65 km $h^{-1}$), similar to the airspeed measured with tracking radar in Lund on four identified Bar-tailed Godwit flocks in spring 1998 (Green unpubl.). Furthermore it was assumed that the birds fly along a fixed migratory direction (track) towards ENE (67.5°), as Knots and Brent Geese *Branta bernicla* flying along the same route do (Gudmundsson 1994, Green 1998).

## Results

*Number of birds and timing of occurrence*

Bar-tailed Godwits occurred very regularly in the bays in all three springs since they were observed at 51 of the 52 countings. Already in early April a couple of tens were present. Numbers then increased slowly during April, reaching 100–200 birds at the end of the month. A peak of 300–450 birds was reached in the first half of May in both years with observations during this period. Numbers then decreased during the rest of the month but over 100 birds were regularly present until around 25 May. During the last days of May and in early June usually only a few birds were still present (Figure 2). At only one occasion a larger flock was observed after 25

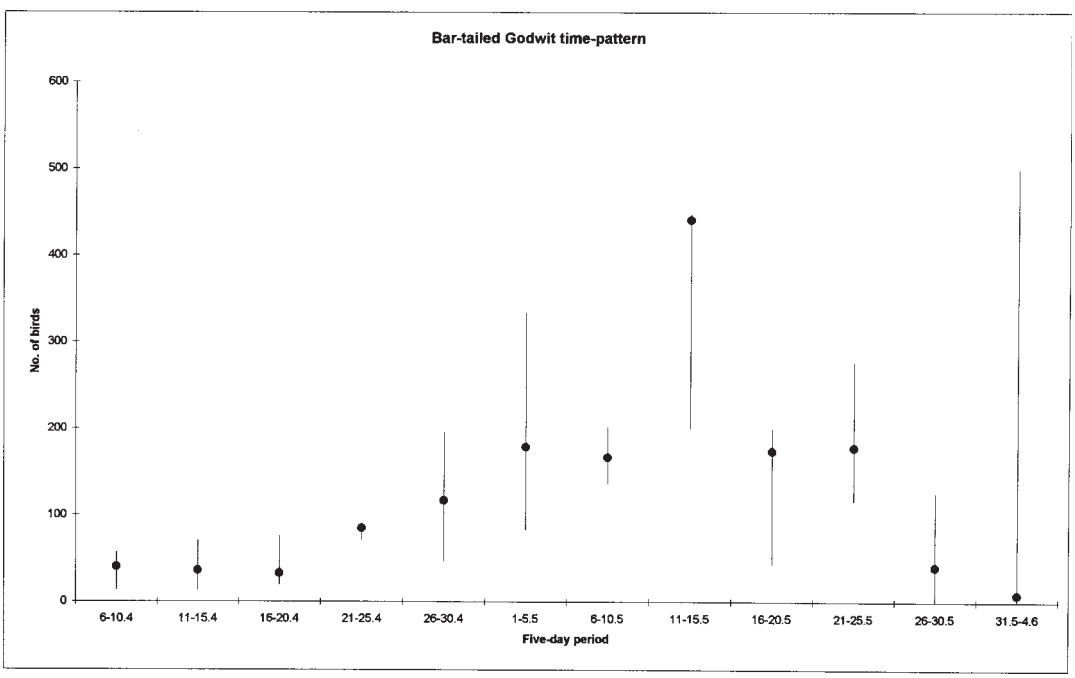



Figure 2. Time pattern of staging Bar-tailed Godwits in Lundåkrabukten and Salviken during spring 1996–1998. Dots show median number of birds present per five-day period, vertical bars show the range of numbers present per five-day period.
*Tidsmönster i antalet rastande myrspovar i Lundåkrabukten och Salviken vårarna 1996–1998. Punkter visar medianantalet fåglar per femdagarsperiod, vertikala staplar visar spannet från högsta till lägsta noterade antal rastare per femdagarsperiod.*

May. In the early morning of 1 June 1997 a flock of 500 birds was resting in Lundåkrabukten. These birds apparently only made a short stop as they had left the area only a few hours later. Overall median date, all years combined, was 13 May.

As no birds were captured and marked, length of stay for individual birds and thus total number of Bar-tailed Godwits using the area per season is hard to evaluate accurately. Arrivals and departures could not be used either as these events were hardly observed at all. During all visits only one departing flock and no arriving ones were observed. In the early evening of 7 May 1997, a small flock of eleven birds suddenly left the rest of the feeding flock (167 birds) and climbed steeply towards ENE, apparently leaving the area. A "guesstimate" of the range of total number of birds can be achieved by calculating the minimum and maximum numbers of observed birds per season. In the first estimate a long length of stay is assumed and minimum number of birds is calculated as the sum of birds disappearing from the area, i.e. decreases in numbers between counting occasions. In the second estimate a short length of stay is assumed and all birds are considered to be new ones at each counting occasion. The maximum sum will then simply be the sum of all countings in a season. Using the first method, four counting occasions with 157, 203, 73 and 0 birds present would give the estimate of 203 birds having used the area. With the maximum method the estimate would be 433 birds. Using this approach numbers of birds observed in the area was 457–1768 in 1996, 1145–3565 in 1997 and 326–1062 in 1998. Note the differences in observation coverage between the seasons, with a late start in 1996 and no observations at all made between 4 May and 18 May in 1998.

*Sex ratios*

The distribution of numbers of males and females at different counting occasions during 1996 and 1997 are shown in Figure 3. Sex ratios (males/females) varied considerably between different days, ranging from 0.29 to 2.23. Generally, females were the more numerous sex. In total, also including data from three days in 1998, the number of females exceeded the number of males at 16 of 22 study days. Average sex ratio for all occasions was 0.84 (± s.d. 0.42), significantly lower than an equal ratio of 1.0 (one-tailed t-test, $t = -1.79$, $df = 21$, $p = 0.04$). No obvious time patterns in sex ratios over the season could be discovered.

*Number of birds and weather*

No significant correlations were found between tail-wind vectors during the night and the number of staging Godwits the next day, nor did cloud cover have any significant effect on numbers of Godwits (Table 1). I also tested if precipitation or fog affected numbers present in the bays but no significant difference was found between the number of Godwits on days after nights with rain and/or fog and days after nights with no rain and/or fog (Mann-Whitney U-test, $n_1 = 19$ , $n_2 = 32$ , $z = -0.34$, $p = 0.73$).

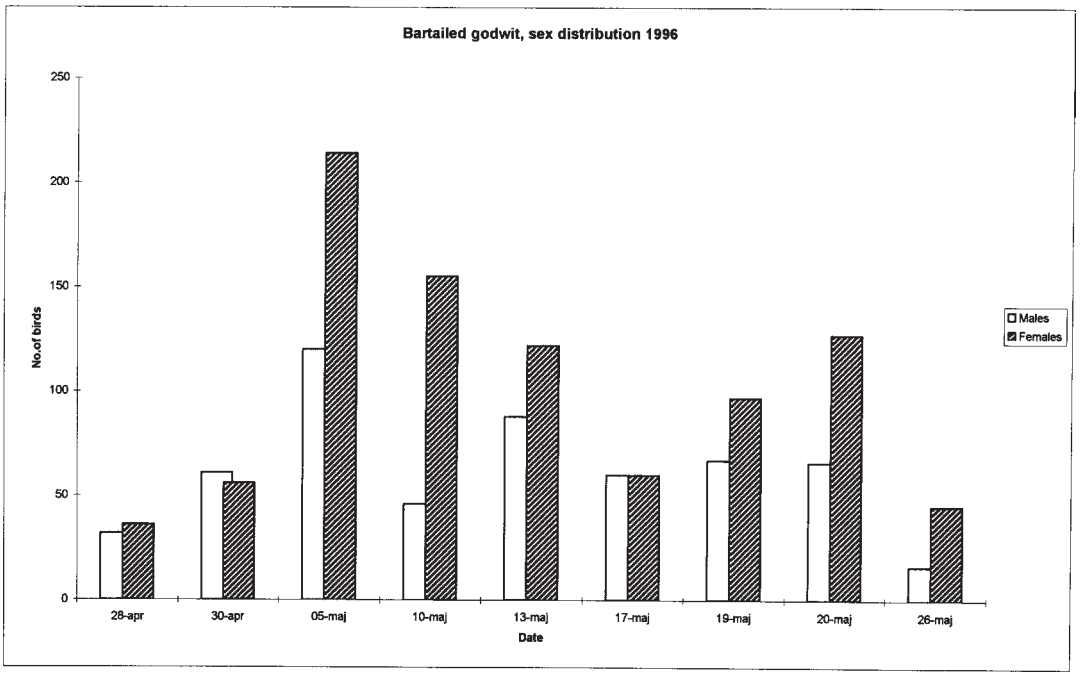
*Behaviour*

The majority of all observed birds were foraging (75% of 6589 bird observations). In two cases the behaviour of the same flock was noted at two different times during the same day. Typically, the Godwits were feeding in the shallow water between the outer sandbars and the shores, wading around in a few cm deep water probing their bills into the mud. No detailed studies on feeding habits, capture rates and preys taken were made but all feeding birds were foraging intensively and among observed prey items, polychaetes dominated. In addition, a few bivalves were also observed to be captured.

There was a typical time pattern in the activities of the Godwits. Birds observed in the early parts of the day (i.e. 05.00–12.00) were foraging to a smaller extent than birds observed after noon (12.00–21.00). In several cases flocks observed in the mornings were sleeping or just resting. The birds then started to feed during late morning-early midday and in the afternoon all birds were feeding.

*Abdominal profile scores*

The abdominal profile scores showed very little variation during spring 1998 (Figure 4). Almost all classified birds were fat or very fat, in total 136 (61%) in category 5, 84 (38%) in category 4 and 3 (1%) in category 3, on the five graded scale where 1 corresponds to a lean bird and 5 to a very fat bird. Dividing the material in ten day periods showed no large differences in profile scores over the season, only a weak tendency for increasing profile scores as the season progressed (Figure 4).



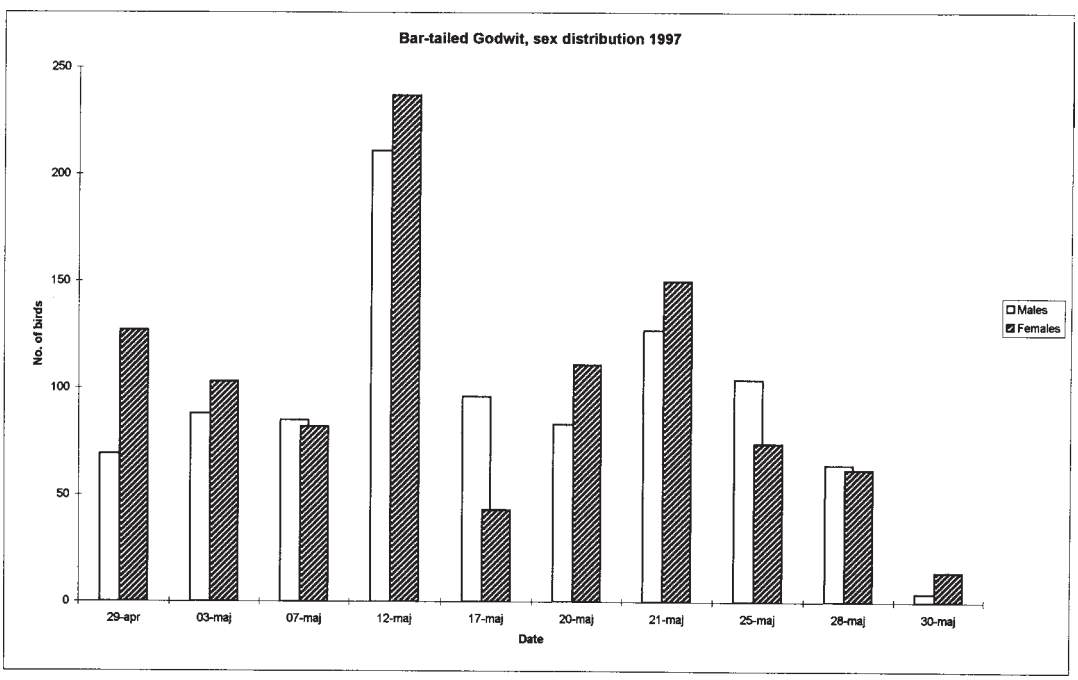




Figure 3. Distribution of males (open bars) and females (hatched bars) of staging Bar-tailed Godwits in Lundåkrabukten and Salviken at different counting occasions during spring 1996 (a) and 1997 (b).
*Fördelningen av hanar (ofyllda staplar) och honor (streckade staplar) bland rastande myrspovar i Lundåkrabukten och Salviken vid olika räkningstillfällen vårarna 1996 (a) och 1997 (b).*

Table 1. Correlations (Spearman´s rank correlation) between number of Bar-tailed Godwits present in Lundåkrabukten and Salviken, south Sweden during spring 1996–1998 and some meteorological factors.

*Korrelationer (Spearmans rang korrelation) mellan antalet rastande myrspovar i Lundåkrabukten och Salviken, Skåne vårarna 1996–1998 och några väderfaktorer.*

| | Correlation coefficient | Level of significance | N |
|---|---|---|---|
| Tail-/Headwindvector (ground level)<br>*Med-/Motvindsvektor (marknivå)* | -0.20 | p = 0.16 | 51 |
| Tail-/Headwindvector (1500 m a.s.l)<br>*Med-/Motvindsvektor (1500 m.ö.h.)* | -0.13 | p = 0.38 | 50 |
| Cloud cover<br>*Molnighet* | 0.19 | p = 0.17 | 51 |

## Discussion

*Numbers of birds*

Peak numbers and the regularity of occurrence of Bar-tailed Godwits in Lundåkrabukten and Salviken were unusually high for Swedish standards, although published reference material is scarce. Compared to Getterön, about 250 km further north along the west coast, peak numbers were six to seven times higher (cf. Cederlund 1985). Apart from observations in association with bad weather, the numbers found in Lundåkrabukten-Salviken seems to be the highest found in Sweden during spring time (cf. SOF 1990). That large numbers of Godwits can occur at some occasions every spring in the Lundåkrabukten-Salviken area have been known for some decades (Ekberg & Nilsson 1994), but the early appearance in April and the regularity of the occurrence during the spring season have not been emphasized previously. Published bird reports show that during the years 1975 to 1995 flocks exceeding 100 birds have been reported to the regional report committee of the Swedish Ornithological Society from the bays in all springs except two (Regional bird reports, ”Fåglar i Skåne 1975–1995”). Yearly maximums were 500–650 birds in the 1970s, 200–600 birds in the 1980s and 100–500 birds in the early 1990s (Regional bird reports, ”Fåglar i Skåne 1975–1995”).

*Emergency stopover or a regular occurrence ?*

The occurrence of Bar-tailed Godwits in Lundåkrabukten and Salviken during spring 1996–1998 could not be regarded as a weather induced phenomenon. Numbers in the bays followed a regular time pattern in each year with no significant correlations between numbers present and weather variables. However, as shown by the correlation coefficients in Table 1, there was a tendency for more birds being present with increasing headwinds and cloud cover. The interpretation of this must be that weather might influence the numbers present to some degree, but at least in this material not significantly so. The behaviour of the birds in this study was different from the behaviour of birds observed during emergency stopovers in bad weather at the east coast of Sweden. At those occasions, no or very little foraging was observed and the birds appeared restless with flocks arriving and departing all the time (B. Breife pers. comm., Waldenström 1987), quite unlike the birds in Öresund.

Some wader species may use extra stopovers when they have departed with too small fuel deposits to cover the whole flight to their destinations, maybe because of tight time schedules dictating departure dates (Evans & Davidson 1990). The birds in this study, however, did not seem to have inadequate fuel reserves, as most birds had the highest abdominal profile scores. Note though that this must be a provisional statement as it is based on observed abdominal profile scores and not on body mass or any other more exact measurement. Thus, the Bar-tailed Godwits in Öresund did not seem to be forced to land in the area neither due to meteorological factors nor due to energetical shortcomings. The conclusion of all these observations must be that Öresund did not function as an emergency or extra stopover site during these years but as a regular, small to moderate scale (see above), stopover area for Bar-tailed Godwits during spring.

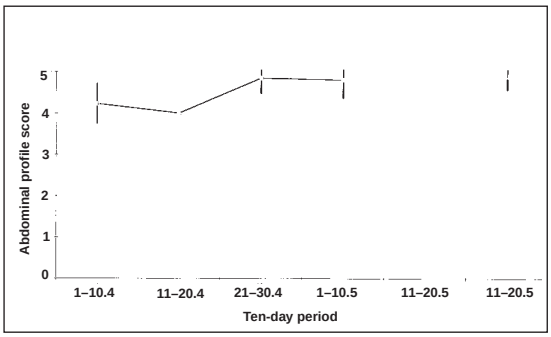



Figure 4. Average abdominal profile scores (dots) ± SD (bars) in staging Bar-tailed Godwits in Lundåkrabukten and Salviken per ten-day period during spring 1998. N-values are shown above SD bars.
*Medelvärden för "abdominal profile scores" (punkter) ± SD (vertikala staplar) hos rastande myrspovar i Lundåkrabukten och Salviken per tiodagarsperiod våren 1998. Antal studerade fåglar visas ovanför SD staplarna.*

### *Population belonging*

The timing of the visits of the Bar-tailed Godwits in Lundåkrabukten and Salviken, with an early appearance in April and a peak in the first half of May, strongly suggests that these birds belong to the "European population". The majority of these birds leave the Wadden Sea in early to mid May, but already in April a decline in numbers at some Danish and German staging sites has been observed (Meltofte 1993, Prokosch 1988), indicating a movement further towards the breeding areas. The peak in this study also coincide with a peak in migrating birds in southern Finland around 10–15 May (Hario 1980 in Meltofte 1993) and with high or relatively high numbers of observed migrating birds in some years in other areas of south Sweden (Wirdheim 1985, SOF 1990). Arrival of this population in the White Sea area is reported to be between 8–22 May, with a median arrival date of 17 May, and in the Varanger peninsula, Norway, birds arrive 13–30 May, with a median arrival date on 20 May (Glutz et al. 1977) also fitting nicely with the Öresund data.

The observed timing of the majority of birds in this study does not correspond to the passage of "Afro-Siberian" birds as these leave the Wadden Sea staging areas in the last days of May and the first days of June (Drent & Piersma 1990, Piersma & Jukema 1990). An arrival in April, as observed in this study, could hypothetically include "Afro-Siberian" birds overflying the Wadden Sea and ending up in Sweden. This seems very unlikely though, as none of the observed birds in 1998 were lean, like they would have been after a 4000 km flight from Africa (Piersma & Jukema 1990). "Afro-Siberian" birds were occasionally found in the bays however, as shown by the flock on 1 June 1997. Unlike most other observed flocks these birds were not foraging and they apparently stayed for only a very short time.

### *Which birds stopover on Swedish shores and why?*

The skewed sex ratio found in this study, with females dominating in numbers, is in contrast to what has been reported for the total populations of the species. For both populations a male biased sex ratio has been reported, both at wintering areas and during spring staging (Cramp & Simmons 1983, Piersma & Jukema 1993, Atkinson 1996). There is of course a risk that males in non-breeding plumage might have been wrongly categorized as females, but as I used both plumage and size characters the risk is probably relatively small (at least smaller than if I had used only plumage characters). There is an overlap in size between males and females (Prokosch 1988) so that large males and small females might be mistaken for each other if no plumage characters are available, but still the questionable cases in the material were rather few so I do not think that they would affect the general pattern. If we accept that the majority of birds have been rightly sexed, which I believe is the case, it seems as if proportionally more females than males use the Swedish west coast for a final top up of nutrient stores, perhaps due to a slight difference between the sexes in migration strategies.

Studies on the "Afro-Siberian population" have shown that the males migrate towards the Arctic a few days before the females (Piersma & Jukema 1990). No such time-difference was evident in this material but the observed sex ratios may be another indication of the same phenomenon. If males are more time-stressed than females during spring, which seems likely as they are territorial and may benefit by reaching the breeding grounds early to get the best territories (Piersma & Jukema 1993), males should be less likely to take an extra stopover at the Swedish shores. Instead they should head for the Arctic as soon as climatological factors make it possible. For females on the other hand it might be more beneficial to take a more energy saving approach with, in some cases, an extra stopover in south Sweden. By doing so they both get the possibility of an extra top up of nutrient stores and higher probabilities of getting more reliable access to fa-

vourable winds as predictability of good winds over the Baltic Sea probably is higher from cues gathered at the Swedish west coast than at the Wadden Sea, some 300–500 km to the west and south-west (cf. Piersma et al. 1994). This might enable females to arrive at the breeding area in better condition and thus have better chances of a successful breeding.

*The importance of Swedish parts of Öresund as a spring staging area*

Stopover areas for waders are usually identified on the basis of maximum numbers present at one time. Normally, the criteria for being classified as an internationally important area is that more than 1% of the total population of birds should be observed in the area (Smart 1976, Prater 1981). Recently, it has been argued that a more reasonable criterion should be the total number of birds using an area in a season rather than the highest number present at one time (Desholm 1998). Trying to evaluate the importance of the Öresund area for Bar-tailed Godwits from the data in this study is hard as we do not have very accurate information on the total numbers of birds using the area. Calculated values of total number of birds using Lundåkrabukten and Salviken per season indicate that somewhere between a couple of hundred up to a few thousand individuals could be involved, but as actual length of stay is unknown this interval involves large uncertainties. There were signs that might indicate a relatively rapid turnover of birds and thus that the higher calculated values might be closer to the real total number of birds than the lower ones. The varying sex ratios between adjoining countings indicate that birds were replaced by other birds between countings. Furthermore the high abdominal profile scores during all spring in 1998 gave the impression that birds were fat already on arrival and probably had sufficient energy stores to leave the area again after a short stay. Note though that several detailed studies on staging waders of different species have failed to prove a consistent relationship between amount of energy stores and length of stay at stopovers (Holmgren et al. 1993, Skagen & Knopf 1994, Lyons & Haig 1995, Iversen et al. 1996, Warnock & Bishop 1998). The relatively stable and high abdominal profile scores, only a very weak tendency for increasing scores during the season was found, also indicate that no long-time, large scale accumulation of fuel stores took place, despite an intensive foraging by the birds, and thus that it was not the same birds that stayed in the area for a long period. Otherwise fat deposition rates must have been very low which seems unlikely as the birds were often seen to capture prey. Several non-feeding flocks observed in the mornings also gave the impression of being newly arrived, just sleeping or stretching.

The maximum calculated number of observed birds in Lundåkrabukten-Salviken constitute 1–3 % of the ”European population”, indicating that the area might be important as a stopover area to this population. The absence of increasing abdominal profile scores indicate that the area is not used for any major fuel deposition but probably more for a final top up before the flight to the Arctic, and maybe to get access to more favourable winds. A more intensive study based on capture, individual marking and subsequent resightings will hopefully make it possible to elucidate the true importance of this area to the European Bar-tailed Godwit population.

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## Sammanfattning

*Myrspovar* Limosa lapponica *på sydsvenska stränder under våren – nödstopp eller regelbunden företeelse?*

Av de stora mängder med myrspovar som rimligtvis passerar Sverige varje vår på väg mellan Vadehavet och arktiskt belägna häckningsområden ses normalt inga större antal. Någon regelbunden vårrastning i stor skala förekommer ej (SOF 1990). I samband med kraftiga motvindar och allmänt dåligt väder kan dock stora antal tvingas ner för låghöjdsflyttning och/eller nödrastning (Breife 1976, Hedgren 1988, Waldenström 1987, SOF 1990). Regelbunden vårrastning i liten skala förekommer vid vissa lokaler på västkusten (Cederlund 1985).

Under åren 1996–1998 följde jag myrspovarnas vårrastning i Lundåkrabukten och Salviken, Öresund, Skåne lite närmare då jag noterat med svenska mått mätt relativt höga och regelbundna antal vid dessa lokaler. I denna artikel redovisas materialet från dessa år och jag analyserar om förekomsten i bukterna var väderbetingad eller följde ett regelbundet mönster, vilken population fåglarna tillhörde, vilka fåglar som uppträdde i bukterna, samt områdets betydelse som rastlokal för myrspovar.

*Material och metod*

Antalet rastande myrspovar i de båda bukterna (Figur 1) räknades minst en gång varje femdagarsperiod (i regel oftare än så) under april–början av juni 1996–1998. Ett uppehåll i verksamheten skedde dock 3–19 maj 1998. Totalt genomfördes 52 räkningar. I samband med dessa räkningar noterades även vad fåglarna gjorde (födosök/vila), samt vid 22 tillfällen könsbestämdes samtliga rastande fåglar. Våren 1998 insamlades data om undergumpens utseende (abdominal profile scores), ett visuellt mått på fåglarnas fettstatus (se Wiersma & Piersma 1995 för detaljer).

För att utröna om förekomsten i bukterna var väderberoende insamlades väderdata från Köpenhamn (25 km SW om studieområdet). Vindstyrka och vindriktning vid marknivå och på 1500 m höjd under natten före varje räkningsdag användes för att räkna ut medvindsvektorer dvs den vindassistans som spovarna kan ha haft, positiv i medvind och negativ i motvind (se Piersma & van de Sant 1992 för uträkningar).

*Resultat*

Förekomsten av myrspovar följde ett mycket regelbundet mönster under de tre säsongerna (Figur 2). Redan i början av april fanns några tiotal på plats. I slutet av månaden hade antalen ökat till omkring 100 fåglar. En topp nåddes under första halvan av maj med 300–450 fåglar varefter antalen sjönk även om upp mot 200 fåglar som regel fanns kvar till 25 maj. Sista dagarna i maj och i början av juni fanns i allmänhet endast ett fåtal fåglar i bukten med ett undantag: Den 1 juni 1997 sågs dock tillfälligt 500 myrspovar i Lundåkrabukten.

Det totala antalet myrspovar som rastade i bukterna uppskattades till mellan några hundra och upp till maximalt 3500 per vår, siffror som har stora osäkerheter då inga fåglar individmärkts och då det var vissa skillnader i bevakningsgrad mellan åren. Bland de rastande spovarna var det en sned könsfördelning med fler honor än hanar (Figur 3). Det fanns inga signifikanta samband mellan antalet rastande myrspovar i bukterna och väder under föregående natt, vare sig för vindar, molnighet eller nederbörd (Tabell 1). Huvuddelen (75%) av alla observerade myrspovar födosökte intensivt. Trots detta kunde ingen större fettuppläggning i form av ökande ”abdominal profile scores” noteras (Figur 4). Det föreföll som om fåglarna var feta redan vid ankomsten.

*Diskussion*

Att relativt stora antal med myrspovar förekommer på dessa lokaler vid enstaka tillfällen varje vår var känt redan tidigare (Ekberg & Nilsson 1994), men regelbundenheten i uppträdandet har tidigare ej påvisats. Antalen som noterats är ovanligt höga efter svenska förhållanden om man undantar de noteringar som gjorts i samband med dåligt väder. Förekomsten visade inga signifikanta tecken på att vara väderberoende även om en tendens till ökat antal rastare i samband med ökande motvind och molnighet noterades. Det rörde sig inte heller om fåglar i dålig kondition som tvingats avbryta sin flyttning då i princip samtliga fåglar var feta eller mycket feta. Istället måste uppträdandet klassas som regelbunden vårrastning om än i mindre skala. Av allt att döma är Öresundsområdet i allmänhet och dessa bukter i synnerhet de främsta regelbundet använda vårrastningslokalerna för myrspov i Sverige.

Huvuddelen av fåglarna bör ha tillhört den i Västeuropa övervintrande och i Nordeuropa häckande populationen då tidsmönstret i bukterna sammanföll med dessa fåglars avfärd från Vadehavet (Prokosch 1988, Meltofte 1993) och överensstämde fint med rapporterade ankomstdatum från häckningsområdet (Glutz et al. 1977). Den i Afrika övervintrande och i Sibirien häckande populationen lämnar inte Vadehavet förrän i månadsskiftet maj–juni (Piersma & Jukema 1990) och uppträdde troligen i mindre omfattning i området.

Den sneda könsfördelningen i Öresund med fler honor än hanar skiljer sig från förhållandena i de totala populationerna (Piersma & Jukema 1993) och kan tyda på skilda flyttningsstrategier mellan könen. Det är sedan tidigare känt att hanar av den sibiriska populationen lämnar Vadehavet några dagar före honorna (Piersma & Jukema 1990) och det kan tänkas att även europeiskt häckande hanar är mer tidstressade än honorna och därmed mindre benägna att ta ett extra rastningsstopp. Honorna kanske tjänar mer på ett extra stopp med möjligheter till ytterligare påfyllning av näringsförråden. Dessutom kan detta stopp ge dem bättre möjligheter till att få goda vindar för resterande delen av flyttningen då vindförhållanden över Östersjön förmodligen kan förutsägas med större säkerhet från Sveriges västkust än från Vadehavet 300–500 km längre mot sydväst. Dessa faktorer skulle i så fall kunna ge honor en bättre möjlighet till att nå häckningsområdet med så stora näringsförråd som möjligt vilket kan öka chanserna för en lyckad häckning.

Öresundsområdet används uppenbarligen inte för någon större fettuppläggning av myrspovarna under vårarna. Förekomsten av korttidsrastlokaler med möjligheter till extra påfylling av förråden ska dock inte underskattas. Rastlokaler för vadare brukar bedömas efter det maximala antalet rastare vid ett tillfälle och kriteriet för att vara en internationellt betydelsefull lokal är att den ska hysa minst 1% av totalpopulationen (Smart 1976, Prater 1981). Används detta mått kvalificerar sig inte Lundåkrabukten-Salviken som internationellt betydelsefull för myrspovar. Ett alternativt bedömningssätt är att istället använda sig av det totala antalet fåglar som nyttjar lokalen under en säsong (Desholm 1998). Om vi applicerar detta på Öresundsbukterna finner vi att 1–3% av den europeiska myrspovpopulationen använder sig av dessa lokaler under vårarna. Detta förutsatt att de högre beräknade siffrorna angående det totala antalet fåglar i området ligger närmare sanningen än de lägre. För att med större säkerhet utreda om området är betydelsefullt för europeiska myrspovar krävs dock noggrannare studier med individmärkta fåglar sa att mått på rastningslängd mm kan insamlas.