

The spring migration of the Knot through south-east Iceland

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In this study the little known migration of Knots on five major intertidal mudflats in south-east Iceland in spring 1988 and 1989 is described. In Skardsfjörður and Hornafjörður a maximum of 800 Knots were recorded in spring. They usually stayed less than two days. Knots arrived at the end of the first week of May. Numbers declined after an early peak, but another, lower, peak in numbers followed in the end of May. Most Knots were gone after 28 May. No Knots were observed in Papafjörður, Lónsfjörður and Alftafjörður, and there is no evidence for Knot migration along the eastern coast. At Skardsfjörður, most Knots occurred in the west at Ægissída, possibly due to the local food conditions. In late May, however, most Knots were found in the eastern Skardsfjörður in both years.

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INTRODUCTION

Western Iceland is known to be an important staging area for the *islandica*-population of Knot *Calidris canutus*, breeding in the Nearctic (Gardarsson 1975; Wilson 1981; Cramp & Simmons 1983; Gardarsson & Nielsen 1989; Gudmundsson & Gardarsson 1992; Morrison & Wilson 1992). Eastern Iceland is believed to be of minor importance due to shortage of intertidal areas (Ingolfsson 1975; Wilson 1981).

However, Whitfield & Magnusson (1987) observed up to 1,800 Knots at Melrakkasletta in north-east Iceland in May. Except for some single observations (Timmermann 1949; Björnsson 1976; Ingolfsson *et al.* 1980; Wilson 1986), little is known about the migration of Knots through south-east Iceland in spring (Uttley *et al.* 1987; A. Gardarsson pers. comm.). The present study aims to fill this gap.

STUDY SITES AND METHODS

The study areas were five tidal lagoons, Hornafjörður, Skardsfjörður, Papafjörður, Lónsfjörður and Alftafjörður (64°14'N, 15°10'W to 64°36'N, 14°30'W; Figure 1). The lagoons are enclosed by sandbars and contain the largest intertidal mudflats in south-east Iceland.

The main study sites comprised 11 km² of intertidal flats in Skardsfjörður and eastern Hornafjörður, where standardized counts were carried out 24 times from 13 April to 31 May 1988, and 19 times from 20 April to 3 June 1989. The counting area covered about 90% of the local mudflats. In 1988, additional counts every 10 days took place from 8 April to 18 May at Papafjörður and Lónsfjörður and two times (on 8 and 18 May) at Alftafjörður.

Counts were carried out from a car and on foot, using a Celestron reflecting telescope. Observations were noted on maps of the study areas.

RESULTS

The major influx of Knots into the main study area at Skardsfjörður and eastern Hornafjörður did not begin before the end of the first week of May (Figure 2: 800 birds on 7 May 1988, 263 on 6 May 1989). Maximal numbers were reached in the second week of May in 1988 (800 on 7 May) and 1989 (505 on 13 May). After a decline, another but lower maximum occurred in the last week of May, reaching 351 on 26 May 1988 and 326 on 27 May 1989. Except for 8 Knots on 3 June 1989, no Knots were observed after 28 May. During the whole spring migration

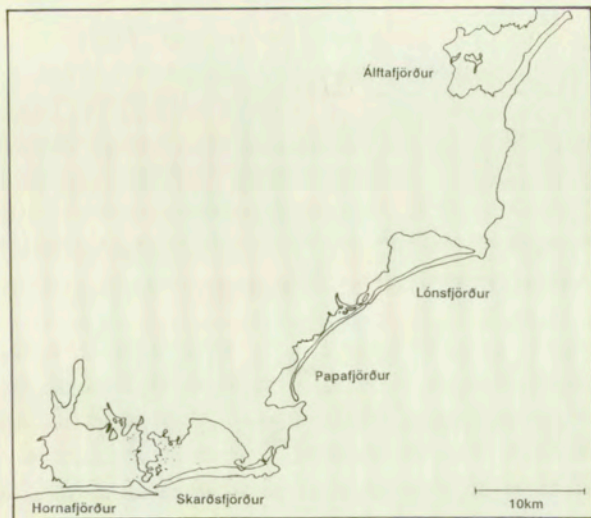


Figure 1. Iceland (top) and the study area (bottom).

Knots spent 3,915 bird days in 1988 and 5,343 bird days in 1989 (calculated according to Nehls 1991) in the study area.

Only once were Knots actually observed during a migratory flight: a single flock of 800 birds arrived from the south on 7 May 1988, staying for a few minutes on the ground before leaving west. All other encountered flocks were stationary, either roosting or feeding.

Numbers of Knots usually differed considerably between successive counts. Only on two occasions did numbers of Knots observed at a study site remain similar during a counting sequence (23-25 May 1988: 130 - 137; 19-21 May 1989: 125 - 139; both at Ægissída).

Knots were unevenly distributed over the study area: 63% of all observed Knots (excluding the 800 birds that paused briefly on 7 May 1988) were seen at Ægissída, 0.8 km² bay in western Skarðsfjörður

adjacent to the town of Höfn. Another 20% occurred at Klif, the 1.7 km² eastern coastal mudflat in Skarðsfjörður.

There was a major difference in the timing of the use of the two main sites (Figure 3). At all sites but Klif, numbers of Knots declined after the early May peak. At Klif, Knots appeared only between 23 and 28 May. Furthermore, in the last week of May 87% of the Knots present were seen there, resulting in a later peak in both years of study. No Knots were ever seen at Papafjörður, Lónsfjörður and Alftafjörður.

DISCUSSION

Ingolfsson *et al.* (1980) found Knots at Skarðsfjörður in their counts of 9-11 May 1980, with a maximum of 800 on 11 May. This record and my observations show that the intertidal mudflats at Skarðsfjörður and Hornafjörður are regularly used as a stopover area by migrating Knots in spring.

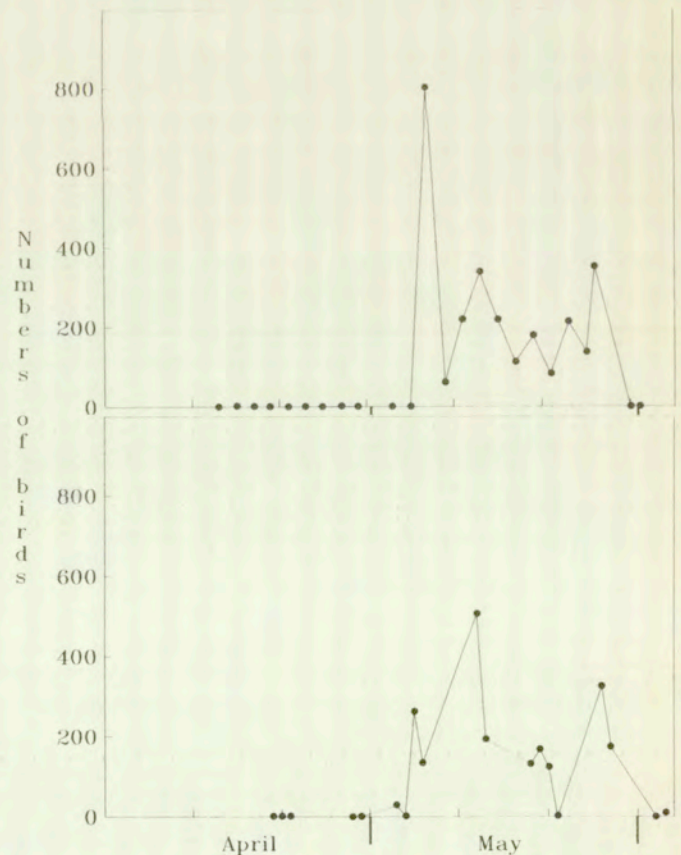


Figure 2. Total numbers of Knots recorded in the study area in south-east Iceland in 1988 (top) and 1989 (bottom).

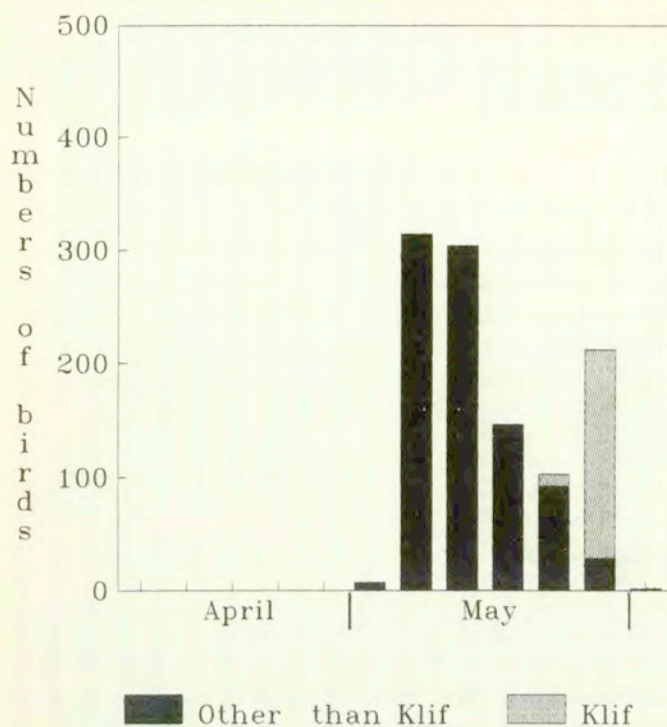


Figure 3. The numbers of Knots in the western part of Skardsfjörður and Hornafjörður ('other than Klif') and in the eastern part of Skardsfjörður ('Klif') averaged per five-day period over the two years.

In south-east Iceland the main influx of Knots appears between 6-10 May. This is a similar timing as in south-west Iceland (Timmermann 1949; Wilson 1981; Hjálmarsson 1982; Gardarsson & Nielsen 1989; Morrison & Wilson 1992; Gudmundsson & Alerstam 1992). This is well correlated with the timing of the departure of Knots from the German Wadden Sea in early May (Prokosch 1988; Piersma *et al.* 1991). Knots marked there were recaptured or observed both in west and north-east Iceland (Davidson & Piersma 1986; Whitfield & Magnusson 1987; Prokosch 1988). This may also be the source of the Knots in south-east Iceland.

The concentration of Knots at Ægissida (37 bird days/ha on average compared to 3 bird days/ha in the remaining part of Skardsfjörður), is possibly

Table 1. Knot days/ha (average for May 1988 and May 1989) and the mean number of zoobenthic organisms/m² in Skardsfjörður. The benthic data refer to the top 10 cm of sediment sieved over a 1 mm mesh (Tiedemann 1990).

	Ægissida	Other areas
Bird days/ha	37	3
Zoobenthic density	28,941	2,025

related to local differences in benthos (Table 1). Although zoobenthic densities are a fifteen-fold higher at Ægissida, 71% of them consist of Oligochaetes. Small bivalves are rare in the mudflats of Skardsfjörður (0-10 individuals/m² of *Mya arenaria* and *Mytilus edulis*, according to Tiedemann 1990). Nothing is known about the diet of Knots in that area.

No Knots were observed in the more eastern areas during this study, nor were there any Knots on mudflats at Djúpivogur, Breiddalsvik, Stöðvarfjörður and Fáskrúdsfjörður, about 5-40 km northeast of the study area, during several visits between 2 May and 3 June 1986 (Helgason *et al.* 1988), or on mudflats at Hamarsfjörður, the next fjord adjacent to the study area, during two counts on 8 and 18 May 1988 (pers. obs.). Only Wilson (1986) recorded 100 Knots in Papafjörður on 22 May 1971. This lack of positive observations and the departure of 800 Knots due west, suggest that very few Knots migrate along the eastern coast of Iceland. It is more likely that the Knots staging for short periods in south-east Iceland, go west along the southern shores and possibly join the big numbers of migrating Knots in south-west Iceland.

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