The population of Long-tailed Skuas *Stercorarius longicaudus* at Kærelv, Scoresby Sund, East Greenland, 1979

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(Med et dansk resumé: Bestanden af Lille Kjove Stercorarius longicaudus *ved Kærelv, Scoresby Sund, Østgrønland, 1979)*

INTRODUCTION

The Long-tailed Skua *Stercorarius longicaudus* is a widespread breeding bird in arctic inland areas and in subarctic parts of the old world. It is known to depend much on microtine rodents in the breeding season and to show fluctuations in population density and breeding success that parallel the variations in prey abundance (Maher 1970, 1974; Andersson 1971, 1976a, 1981; de Korte 1977). Regarding reproductive tactics, it is characterized by a high inclination to return to the same territory each year, and by laying no more than two eggs in each clutch (Maher 1970, 1974; Andersson 1971, 1976a, 1976b, 1981). The adult mortality rate is low (Andersson 1976a, 1981).

In Greenland, the Long-tailed Skua breeds primarily in the high-arctic zone, i.e. the northern and north-eastern parts (de Korte 1977, Salomonsen 1981; but see also Kampp 1982). This distribution is almost identical with that of its main prey in Greenland, the collared lemming *Dicrostonyx groenlandicus* (Vibe 1981).

Few skua studies in Greenland have covered more than a single season in the same area. An exception is the three-year study carried out by J. de Korte at Scoresby Sund in 1973-75 (de Korte 1973, 1974, 1977, 1984; de Korte & Bosman 1975). During the summer of 1979 I, together with Niels Odder Jensen, visited part of the area studied by de Korte. Although the main purpose was to study waders (Hansen 1981), some attention was paid to the Long-tailed Skuas. This paper presents the results concerning breeding biology, with emphasis on the relation between reproductive output, food abundance and predation pressure.

ENVIRONMENTAL FACTORS

Study area and climate

The main 1979 census area (70°45'N, 22°30'W; Fig. 1) was limited by Kalkdal Elv to the north, by Damelv to the south and by the 200 m contour line to the east. To the west it was limited by the sea or, south of Kærelv, by the 100 m contour line. Most time was spent in the main area, but at regular intervals we visited the area around Ulveodden. The 36 km^2 large area in which skuas were censused in 1979 (Fig. 1) is part of the area censused by de Korte in 1975 (de Korte 1977).

The habitats and local climate were described by de Korte (1977), Hansen (1981) and de Korte et al. (1981). Only particulars of the 1979 weather will be mentioned here: the spring melt had already started when we arrived on 18 May, although some 80% of the area was still covered with snow. The precipitation was

small except on 21-23 June, when the ground became covered by a few centimetres af snow. The rivers were open from 21 May. The spring melt proceeded gradually and almost all snow had disappeared by the beginning of July. Openings in the sea ice arose by mid-June.

Potential foods

During the spring melt several winter nests of lemmings were found widely scattered over the lowlands. Omitting remains of preyed individuals and the lemmings living under our hut, we saw 18 lemmings in the course of the summer, most in early June. An apparent decline of the lemmings during the summer may not be real. In general, lemmings were timid, and most records in early summer were probably due to vernal flooding forcing the animals out of their holes; the true abundance may well have been constant during our stay. Although we did not see many lemmings in the field after the end of June, they crowded under the hut and were seen here almost daily. One female caught by us gave birth to five young on 4 August, which shows that the animals were still reproducing by then.

Comparing the data with those of Meltofte et al. (1981) from Hochstetter Forland in 1976, when lemmings were »superabundant«, and those of de Korte (1973, 1974) and de Korte & Bosman (1975), the Kærelv population in 1979 could probably be classified as moderately high.

Long-tailed Skuas were seen with caught lemmings on some occasions. One pair sharing a lemming was driven away from the prey, the entrails of which had been eaten.

In July, skuas were frequently observed jumping clumsily around hunting big insects, probably craneflies *Tipula* spp. One chick, a few days old, had remains of a cranefly in its beak.

Long-tailed Skuas were not seen fishing in the inlet, nor were they seen preying on chicks of waders or passerines or to perform piracy against any sea-bird.

Potential predators

We have no direct observations of predation upon skua nests. Potential avian predators present were Claucous Gulls *Larus hyperboreus,* Ravens *Corvus corax* and other Long-tailed Skuas, but probably the skuas are able to drive intruders belonging to these species away from their territories.

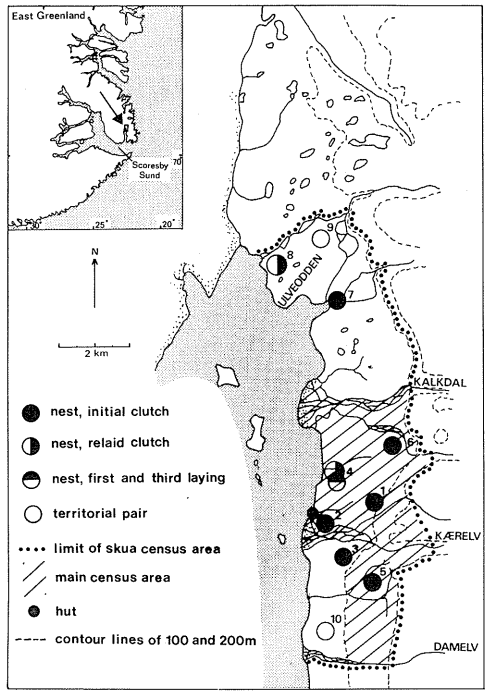


Fig. 1. The Long-tailed Skua census area 1979. *Undersøgelsesområdet ved Hurry Inlet, Scoresby Sund, 1979. Hovedområdet, hvor rederne besøgtes med få dages mellemrum, er skraveret. Placeringen af de enkelte pars territorier (reder) er angivet (jvf. Tab. 1).*

A brood of ermine *Mustela erminea* was found not far from nest 1, which was predated. The arctic fox *Alopex lagopus,* however, presented the most obvious threat to the eggs and chicks of the skuas. In 1979, one pair whelped north of Kærelv. This pair – and maybe other foxes – were frequently seen hunting in the area between Kærelv and Kalkdal Elv, and occasionally south of Kærelv.

METHODS

We stayed at Kærelv from 18 May to 3 August, except for a few survey trips of up to two or three days duration. With a few exceptions both of us worked daily in the main census area for five to ten hours. The progress of the breeding of the Long-tailed Skuas was recorded. In June, all territories and breeding pairs were easily recognized and counted. Nests were localized as early as possible and thereafter vis-

Tab. 1. Data on laying and hatching for the Long-tailed Skuas at Kærelv, 1979. None of the chicks fledged. *Data vedr. æglægning og klækning. Ingen af ungerne overlevede til flyvedygtig alder.*

Pair no. *Par nr.*	Laying dates *Æglægning (dato)*	Egg size (mm) *Æggenes mål (mm)*		Chicks hatched *Klækkede unger*	Comments *Bemærkninger*
1	pri. June	55.0×42.3	55.3×38.6	0	
2	c. 15 and 17 June	51.8×37.9[a]	50.0×38.9[b]	0	
3	pri. June	58.2×40.2	58.8×40.4	0	
4	c. 9 and 11 June	58.8×38.0[a]	58.6×39.0[b]	0	
	ult. June	55.4×38.8		0	replacement *omlagt*
	pri. July	(1 egg)		0	replacement *omlagt*
5	c. 8 June	58.9×38.3	55.5×38.8	1	
6	c. 10 and 11 June	54.2×37.9[a]	54.0×38.7[b]	2	
7	c. 12 and 14 June	(2 eggs)		1	
8	pri. July (?)	44.0×36.2		0	(replacement *omlagt* ?)
9	–	–		–	not breed. *ikke yngl.*
10	–	–		–	not breed. *ikke yngl.*

a) first-laid egg *førstlagte æg* b) second-laid egg *sidstlagte æg*

ited at intervals of a few days (main census area) or weeks (north of Kalkdal Elv).

Eggs were measured with caliper rulers and weighted with a spring balance (Tab. 1). – Adults and chicks were caught, and various measures and ringing details are given elsewhere (Hansen 1981).

BREEDING CHRONOLOGY

Arrival and dispersal

In the spring of 1979 all Long-tailed Skuas arrived at Kærelv single or pairwise. No immatures were seen in the course of the summer.

The first single bird was recorded near Kærelv on 28 May. On the next day, a pair was seen mobbing a Snowy Owl *Nyctea scandiaca* near that place. By 1 June, many pairs and some singles had dispersed over the tundra. Courtship (hunched and tail-raising postures, cf. Andersson 1971) was noticed for the first time on 31 May. Aggressive aerial displays involving two pairs were also seen on that day.

Population density

Ten pairs established territories in the census area (Fig. 1), and eight of them nested, yielding 0.28 territorial and 0.22 breeding pairs per km^2.

By the middle of June, six nests (labelled 1 to 6 in Fig. 1) had been localized in the main census area. Two nests (7 and 8) near Ulveodden were found on 6 July. Two additional pairs (9 and 10) claimed territories at least until the middle of July.

Five distances between nests of nearest neighbours (measured on aerial photos, 1:50,000) were 900-2300 m, on average 1500 m (accuracy ± 100 m).

Eggs

Four egg-laying dates were recorded directly and four were calculated from the hatching dates, assuming an incubation period of 24 days (Maher 1974). On this basis, and further assuming that the first egg was laid two days before the second in a clutch (Manniche 1910, Andersson 1976a), the laying dates were estimated as shown in Tab. 1.

In three clutches where the laying sequence of the two eggs is known, the last egg had the largest volume.

In pair 4, relaying was observed twice (Tab. 1). The initial clutch, completed on 11 June, was accidentally destroyed by the observer on 15 June. A second clutch was found on 1 July and was lost by 5 July. A third clutch was then found on 14 July, on the same spot as the initial clutch, but was lost again by 26 July. One unusually small and poorly attended egg of pair 8, found on 6 July, was probably another relay.

All clutches completed before 18 June consisted of two eggs; these were probably all initial ones. Assumed replacement clutches had one egg each.

Incubation

Two nests were found between the laying of the first and the second egg. One of these was followed to the beginning of the hatching. After

21 days the second egg was pipped, while the first egg was adled. As observations on other nests suggest one or two days elapse between pipping and hatching, the incubation time for individual eggs can be estimated at 23-24 days.

Chicks

Four chicks hatched in the census area; they were all found in or just outside the nests one or two days after hatching. The hatching took place in the first week of July. Two siblings hatched within an interval of no more than 24 hours.

We did nok succeed in finding any of the four chicks during the fledging period, and no juveniles were observed on the northeastern coast of Hurry Inlet. However, we saw one fledged juvenile attended by both parents at Gåseelv on 31 July.

Breeding success

Eight of the ten pairs in the census area nested. Three produced chicks, the success of initial clutches being 38%. Three unsuccessful clutches were probably predated, one was destroyed by us, and one failed to hatch. Assuming that all initial clutches had two eggs, six of 16 eggs were probably lost to predators, two were lost due to our activities, and three were adled. Finally, the hatching failed for one egg. The success of eggs of initial clutches hence was 25%.

Three replacements, each of one egg, were all unsuccessful. Including replacement eggs, the total egg success was 21%.

Probably none of the four chicks survived to fledging.

Departure

All breeding pairs between Kalkdal Elv and Damelv probably still held their territories when we left the area on 3 August, and no migratory movements had been noticed by then.

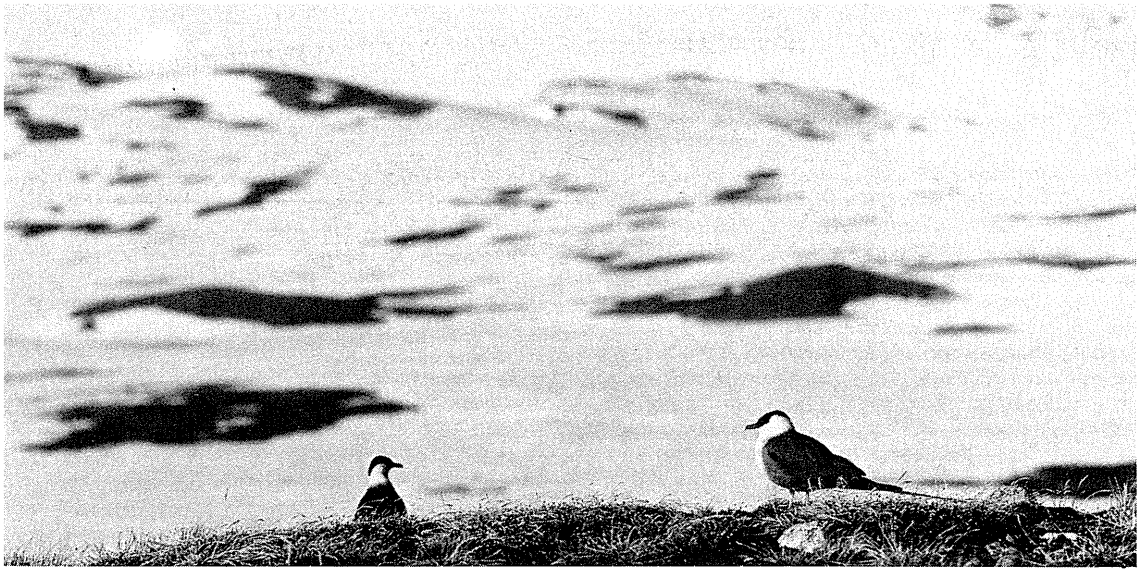
DISCUSSION

The highest breeding density of Long-tailed Skuas in Greenland (1.7 pairs per km^2) has been reported by Manniche (1910) from the south coast of Germania Land. A recent study showed a breeding density of 0.8 pairs per km^2 on Hochstetter Forland during a »superabundance« of lemmings (Meltofte et al. 1981). In 1975, at Kærelv, de Korte (1977) found 0.48 territorial pairs and 0.42 breeding pairs per km^2 (recalculated after revision of the area). In 1979, the population in this area was lower (0.28 territorial pairs and 0.22 breeding pairs per km^2). In the part of our census area overlapping that of de Korte, only seven territories were present, compared with 12 in 1975.

Why were the skuas so few in 1979? The weather was fairly good in early June, and the spring melt started much as in 1975. Neither seems the reason to have been a scarcity of lemmings. We saw more lemmings than did de Korte & Bosman (1975) in 1975. The high proportion of two-egg clutches is similarly indicative of favourable breeding conditions in 1979 (cf. Maher 1970; Andersson 1976a, 1981); in 1975, when few lemmings were seen at Kærelv, seven of 18 clutches consisted of one egg, while all initial clutches in 1979 had two. – A further point, probably indicating an adequate food supply, was the fairly well synchronized initial clutches in 1979, spanning two weeks. High synchonization of initial clutches during microtine peaks has been reported by Schaaning (1915-16), Andersson (1971) and Meltofte et al. (1981), while breeding was poorly synchronized at Kap Stewart, Scoresby Sund, in 1973, when lemmings were rare (de Korte 1977). Asynchronous laying during a rodent year has, however, been described by Maher (1974).

A more likely explanation of the relatively small number of breeding skuas at Kærelv in 1979 is that the population had actually declined. This could be caused by a low breeding success for several years in succession, to which the species may be especially liable, at least locally, due to its reproductive tactics: a large fraction of all chicks are raised during lemming peaks (Maher 1970; Andersson 1976a, 1981), and failing lemming peaks, unfavourable weather or heavy predation during a series of the crucial years must occur occasionally.

Admittedly, the offered explanation of the reduced skua population is speculative, and unequivocal evidence in support of it is missing. This applies to the local lemming cycles as well as to predation pressures in the area. Concerning the latter, arctic foxes have been found to cause total breeding failures in Long-tailed Skuas during lemming peaks elsewhere (Meltofte et al. 1981), and in 1979 foxes appeared to be responsible for much of the nest and brood losses of the skuas. Possibly, the investigation itself has aggravated the situation;



Kalkdal, Hurry Inlet, 26 May 1975. Photo: Magnus Elander.

at least, humans have been suggested to have guided foxes to bird territories and nests elsewhere (de Korte et al. 1981).

SUMMARY

A population of ten pairs of Long-tailed Skuas was studied from 18 May to 3 August at Kærelv, Scoresby Sund, East Greenland, during a moderate lemming peak.

All initial clutches held two eggs. The egg-laying was quite synchronized and took place in early June. Replacements of lost clutches were observed in two pairs, in one of them even twice. The incubation period was estimated at 23-24 days. Of a total of 19 eggs, four (21%) hatched. Probably, no fledglings were produced.

Comparisons with studies performed by de Korte in the same area in 1975 showed a lower breeding density in 1979 (0.22 breeding pairs per km^2, compared with 0.42 in 1975), despite a higher lemming abundance. This may be due to a suppression of the breeding population after several years of low breeding success.

The main factor limiting the breeding success in 1979 seemed to be predation of eggs (probably by arctic foxes), but adled eggs and loss of chicks were involved too.

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DANSK RESUMÉ

Bestanden af Lille Kjove *Stercorarius longicaudus* ved Kærelv, Scoresby Sund, Østgrønland, 1979

En bestand på ti par af Lille Kjove blev studeret fra 18. maj til 3. august 1979 i et 36 km^2 stort område ved Kærelv, Scoresby Sund, under et moderat maximum af halsbåndslemminger.

Den første kjove blev set 28. maj. Inden 1. juni var mange af årets ynglende kjover ankommet enkeltvis eller i par og spredte sig straks ud over tundraen. Æglægningen foregik temmelig synkroniseret i de første par uger af juni. Alle førstlagte kuld bestod af to æg. Omlægning blev observeret hos to par, hos det ene endda to gange, senest i anden uge af juli. Omlagte kuld bestod af ét æg.

I et enkelt tilfælde blev rugetiden bestemt til 23-24 dage. Af i alt 19 æg klækkede fire (21%). Sandsynligvis overlevede ingen af ungerne i undersøgelsesområdet til de blev flyvefærdige.

Sammenligning med studier foretaget af de Korte (1977) i det samme område i 1975 viste, at ynglebestanden var lavere i 1979 (0,22 ynglepar/km^2 mod 0,42 i 1975) på trods af, at lemmingerne var mere talrige. Dette skyldes muligvis en nedgang i den potentielle ynglebestand som følge af fejlslagen ynglen i en længere forudgående årrække.

Den vigtigste faktor, der begrænsede ynglesuccesen i 1979, var ægprædation (sandsynligvis forårsaget af polarræv). Andre faktorer var uklækkede æg og ungedødelighed.

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