Observations of moulting Eider and breeding Common Eider *Somateria mollissima* at Nordaustlandet, Svalbard, in 1979

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A survey on the Common Eider *Somateria mollissima* in wing-feather moult and females with young was carried out in connection with Norsk Polarinstitutt's expedition to Svalbard in July and August 1979. A total of 3450 moulting eider were found on a water area of approximately 2500 km^2; 18% of these were flightless. Females dominated in the population with about 82%. Of the breeding population, 109 females with 336 young were found. The average ratio of female to young has been calculated at 1:3.08. This ratio in relation to other studies of eider productivity is discussed briefly.

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Introduction

The Common Eider *Somateria mollissima* is a frequent breeder in Svalbard. The population is very scattered along the coast of Nordaustlandet. Løvenskiold (1964) describes several authors' records of breeding eiders on various localities during recent decades.

Up to now, the largest colonies known in Svalbard have been found on Kapp Linné, where 550–600 pairs were recorded in 1969–70 (Hagelund & Norderhaug 1975a, 1975b). In Kongsfjorden a population of 3300 pairs was studied in 1964 and 1967 by Ahlén & Andersson (1970). On Forlandsøyane, about 1500 pairs of Common Eider were found in 1968 (Norderhaug 1982).

The biologists on Norsk Polarinstitutt's summer expedition to Svalbard in 1979 made a survey of the eider population on Nordaustlandet and in neighbouring localities. The aims of the survey were:

(1) to locate concentrations of moulting eiders,
(2) to estimate population size,
(3) to examine sex and age ratios in different sub-areas,
(4) to locate breeding grounds, and
(5) to examine the female to young ratio in different sub-areas.

The results of the observations of moulting eiders and females with young are published in this report. Some observations of resting eiders on Nordaustlandet in 1978 are used.

Material and methods

The study area

The information in this report was collected around Nordaustlandet in late July and August 1979, in two fjords in the northeastern part of Spitsbergen, and in some localities on Kongsøya. With the exception of Kongsøya, the investigated area lies between 79° and 80°40'N and is shown in Fig. 1. The total water area surveyed was approximately 2500 km^2.

Population counts

Most of the information on common eiders, moulting birds, and females with young, was collected from helicopter. All together about 26 hours were spent on aerial surveys. The aeriel surveys were carried out along the coast from altitudes of about 100 feet. In this way females with young resting on the beach or lying in the water nearby were easy to count. When flying parallel with the coast at the same altitude, covering the narrow fjords and shallow water areas, flocks of resting and moulting eiders were found.

Observations of breeding eiders and eiders with

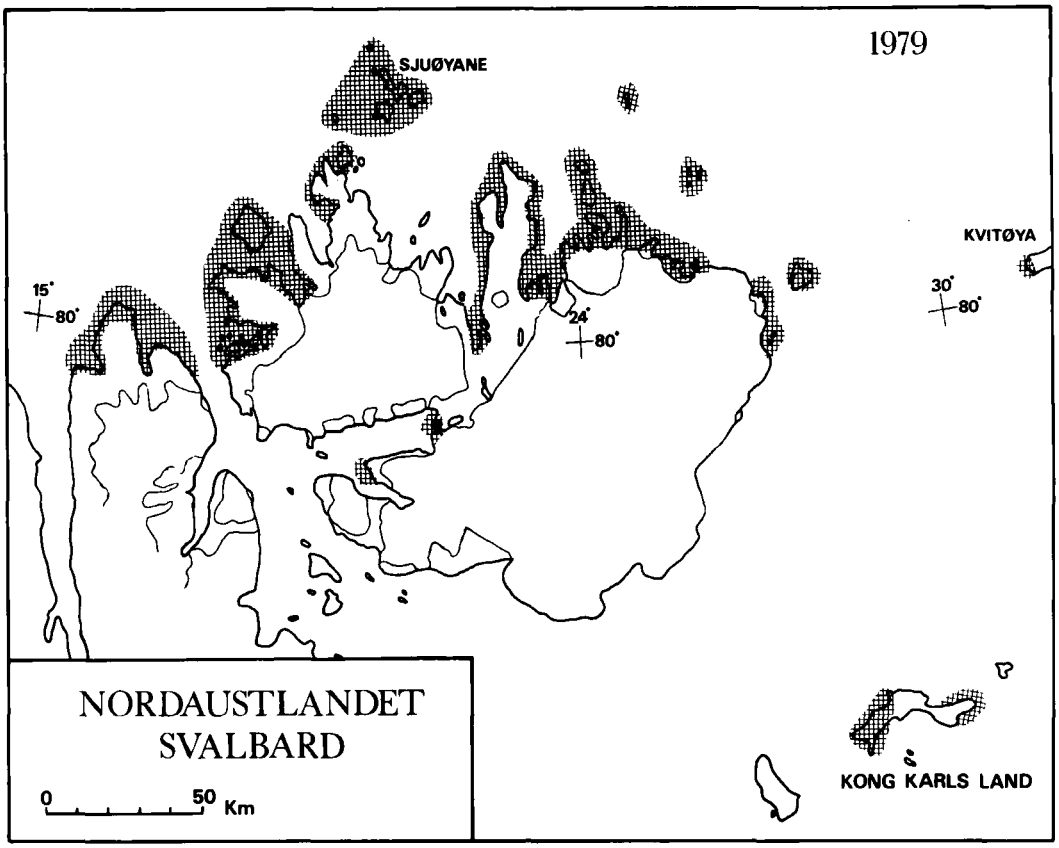

Fig. 1. Waters and coastal areas around Nordaustlandet surveyed by helicopter and boat in 1979.

ducklings were also made in connection with registrations of sea bird colonies on Nordaustlandet when 25 localities were visited in 1979 (Jepsen & Mobæk 1983).

Influence of weather

When the common eiders and other species of diving birds are flightless, they are more difficult to observe than flying birds, since they will often try to escape from the disturbing aircraft by diving. The weather conditions during flight have a great influence on the quality of the observations. When visibility is poor, birds may be overlooked, first and foremost because of the eiders' dark and well-camouflaged summer plumage giving an inferior contrast to the dark water. In all cases the figures obtained represent minimum numbers for eiders present in the areas covered. We surveyed the areas under conditions with good visibility and a calm surface.

Observations of females with young can be made with a higher degree of success, because flocks will not try to escape unless the aircraft is just above them.

Results and discussion

Disturbance by aircraft

Use of aircraft is the only method by which the population of eiders on the coast and adjacent waters can be surveyed and assessed. This is particularly the case in situations where very little time is available for observations, perhaps only a few days during the short arctic summer. The use of helicopters in aerial registrations of birds creates more disturbance than the use of fixed-wing aircraft, mostly because of the noise and turbulence from the rotor-blades, when flying at low altitudes.

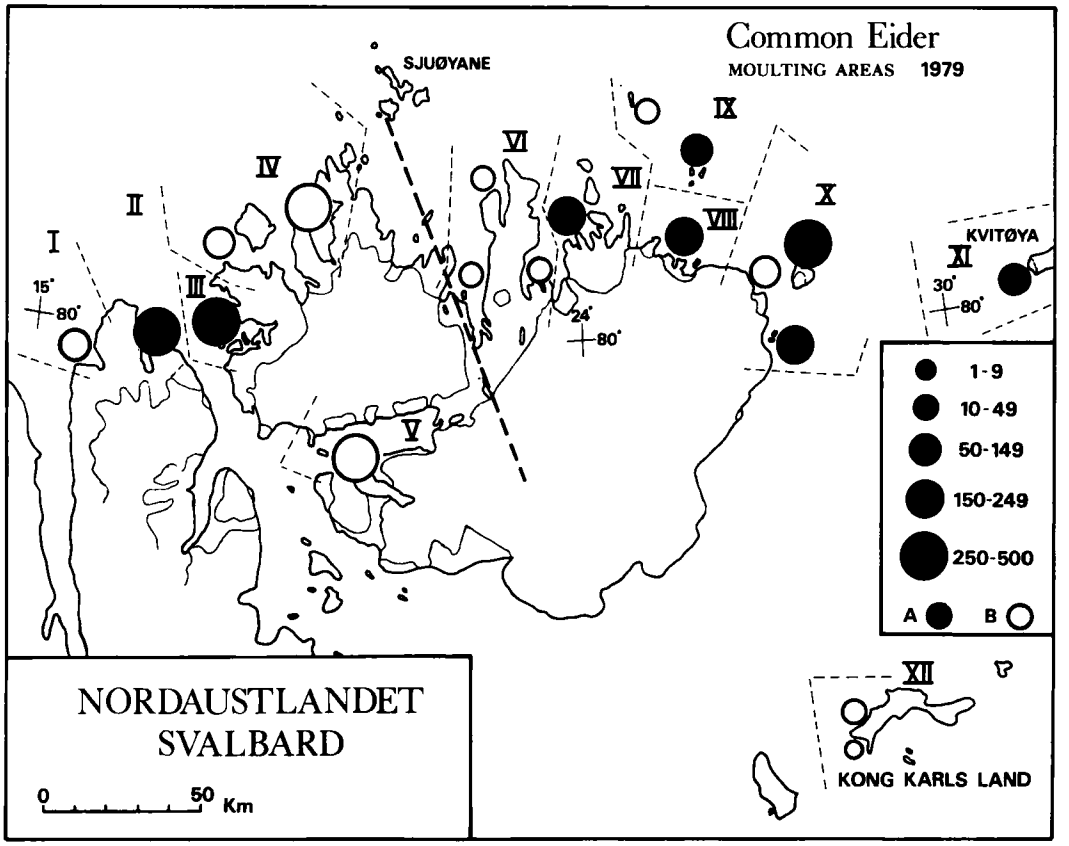

Fig. 2. The distribution and numbers of moulting Common Eider recorded during surveys in July and August 1979. A: areas where flightless birds were observed, B: areas in which the presence of moulting birds was not definitely established. I-XII correspond to geographical areas in Table 1.

Moulting Common Eiders

Population size and geographical distribution – Estimated population size is the minimum, because in a study of this type it must be assumed that flocks of common eiders are overlooked.

In Fig. 2 the distribution of moulting eiders is presented. Table 1 and Fig. 2 summarize the geographical distribution and number of eiders in wing-feather moult in 1979; Table 2 and Fig. 3 show similar figures for the distribution of localities where females with young were observed.

The observations seem to indicate that the moulting eiders this year were concentrated in three separate areas:

(1) the western fjords of Nordaustlandet and Sorgfjorden,
(2) the waters northeast of Nordaustlandet (sub-areas VII-X in Fig. 2), and
(3) the waters west of Kvitøya.

A total of 3450 moulting eiders were observed in the investigated areas, and among these birds, as a minimum 610 or 18% were flightless.

Most of the fjord areas and shorelines where breeding common eiders were found are low-land with beach ridges, lagoons, and small sandy islands (Fig. 6). A great number of breeding eiders were observed at small islands north of Soraberget (area VIII in Fig. 2).

In general, the breeding grounds were sparsely vegetated, and nests might have been hidden by driftwood, seaweed or small rocks.

In the summer, the Common Eider rests in fjords and inlets during the wing-feather moult.

Table 1. Localities at which Eider (*Somateria mollissima*) in the period of wing-feather moult were observed in July and August 1979. The number of flightless birds is indicated in parentheses.

Localities		Date	Investigated area in km² (approx).	Total no. of Eider	ad♂	ad/juv♀	juv♂	Not determined
I	Mosselbukta	29.7		50	30	20		
	– lagunen	30.7	400	51	6	45		
II	Sorgfjorden	28.7		340 (120)				340 (120)
	– –	29.7		450 (135)	160 (50)	175 (35)	45 (35)	70 (15)
III	Murchisonfdn.	2.8		325 (70)	25 (10)	300 (60)		
IV	Depotodden	2.8	800	440	75	265		100
	Lågøya	2.8		120	30	90		
V	Wahlenbergfdn.	7.8	150	425 (50)	75	100		250 (50)
	Palanderbukta	8.8						
VI	Rijpfjorden	9.8		48	15	23	10	
	Kapp Wrede	23.8	500	10		10		
	Djupkilen	23.8		20	5	15		
VII	Damflya and Repøyane	21.8	300	170 (35)		170 (35)		
VIII	Kapp Bruun	21.8	150	210 (70)		210 (70)		
IX	Foynøya-Brochøya	17–18.8	30	90 (30)		90 (30)		
	Karl XII Øyane	19.8	20	25		25		
X	Kapp Laura	13.8	70	100		100		
	Frostøyane	13.8		165 (40)		165 (40)		
	Storøya	13.8	30	260 (50)		260 (50)		
XI	Kvitøya (Andreneset)	20.8	30	130 (10)		130 (10)		
XII	Kongsøya	16.8	50	25		25		
	Total		2530	3454 (610)	421 (60)	2218 (330)	55 (35)	760 (185)

Moulting eiders were observed mostly in the same areas. In the wing-feather moulting period, Common Eiders usually go on shore to trim the plumage. This behaviour is observed among moulting diving ducks in Danish waters (Joensen 1973; Jepsen 1975). Joensen (1973) also found that moulting eiders are generally found in waters of 1–2 metres depth, rarely more than 5 metres.

Table 2. Eider females with young observed on Nordaustlandet and neighbouring localities in the summer 1979.

Date	Sub-area (Fig. 2)	Frequency Female	Young	Ratio of female to young
29/7	I	3	15	1:5.00
6/8	IV	3	6	1:2.00
9/8	VI	1	3	1:3.00
12–13/8	X	14	50	1:3.57
17–19/8	IX	26	64	1:2.46
20/8	XI	10	42	1:4.20
21/8	VIII	22	69	1:3.16
21/8	VII	23	64	1:2.78
16–20/8	XII	7	23	1:3.28
Total		109	336	1:3.08

Sex and age ratio. – During the helicopter flights the sex and age ratio of the flocks was determined as far as possible. The moulting eiders were separated into the following categories:

(1) sub-adult and adult males (older than 17 months),
(2) juvenile males (13–17 months old),
(3) females (older than one year), and
(4) unclassified birds.

A variation in sex and age ratio in the population of eiders in the sub-areas was found (Table 1).

In the eider population, females (ad/juv) dominated with approximately 82% of the sex and age determined part. The observations show that nearly the whole eider population (99%) in the eastern regions of Nordaustlandet (on the right-hand side of the heavy broken line in Fig. 2) comprised females, while in the western fjords and along the northeastern coast of Spitsbergen

the moulting flocks had about 31% males. In sub-areas II and III males were concentrated in dense flocks, whereas females were mostly scattered in smaller flocks, e.g. northeast of Nordaustlandet. These facts indicate a southwest moult migration among males to the northeastern fjords of Spitsbergen and in the Hinlopen Strait. A smaller number of moulting females was observed among females with ducklings.

As mentioned before, the registrations of eiders in wing-feather moult were carried out over a period of about five weeks, and it was not possible to observe the progress and the culmination of the moult. Løvenskiold (1964) stated that the moult does not seem to start earlier than mid-July, and during August most of the birds will be flightless. Jung (1939) found males in nuptial plumage near Gråhuken as late as mid-August 1936.

In Danish waters Joensen (1973) found that the moulting in adult males of Common Eider culminated at the end of July and in the first days of August. The adult females moult simultaneously in the last half of August and in September.

Breeding Common Eiders

Only very few nests of Common Eiders were observed in the survey area. Of five nests examined at the end of the breeding season four contained three eggs and one had five eggs.

Females with ducklings mostly newly hatched, small or small to half-grown, were observed in several localities on Nordaustlandet. A total of 109 females with 336 ducklings were found, and the ratio of females to young was 1:3.08 (range 1:2.00–1:5.00). The ratios in the sub-areas (Fig. 2) are shown in Table 2. The most important breeding grounds for eiders in the investigated

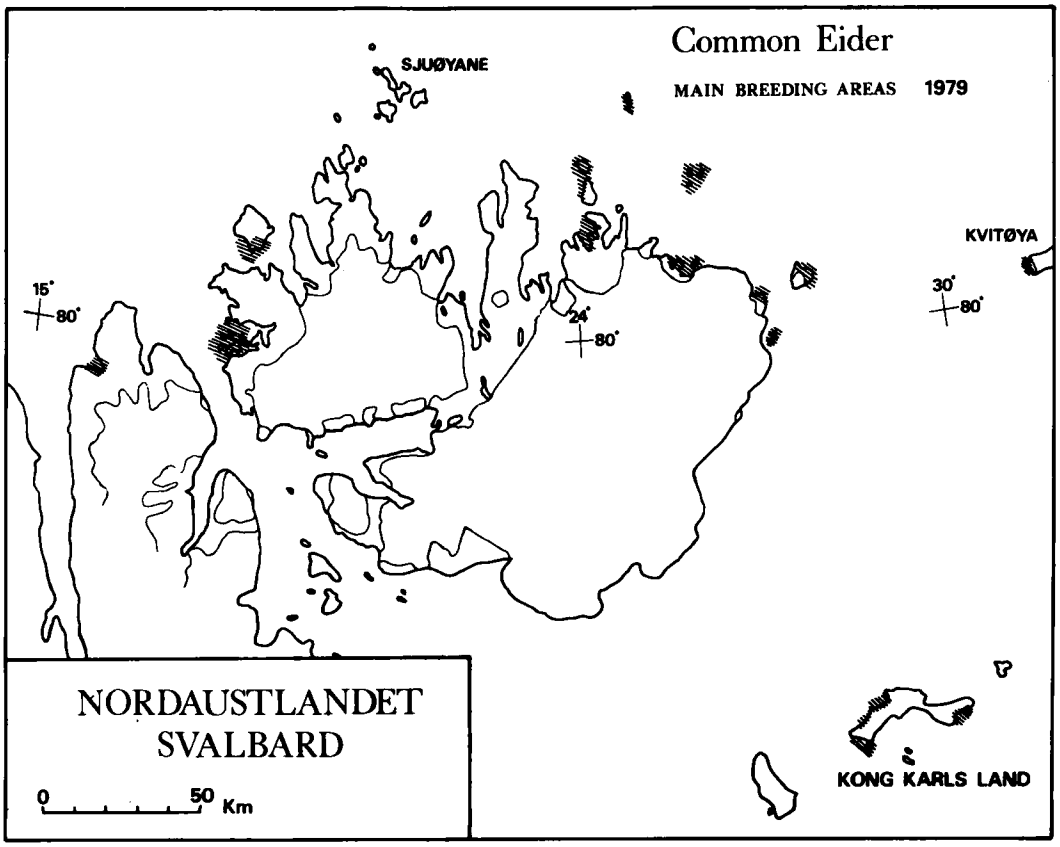

Fig. 3. Main breeding areas for Common Eider registered in 1979.

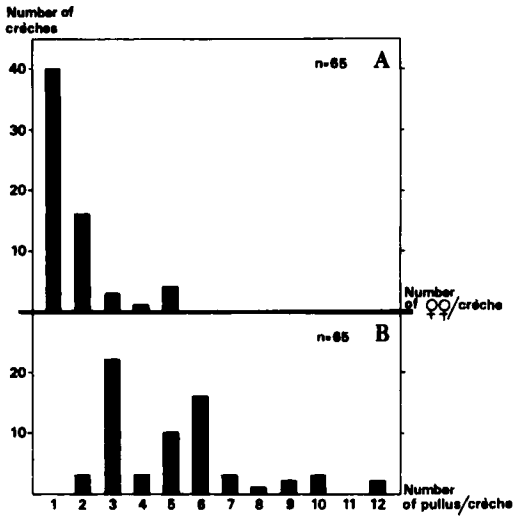

Fig. 4. A: The number of females in the crèches of Common Eider observed in 1979. B: The number of ducklings in the crèches of Common Eider observed in 1979.

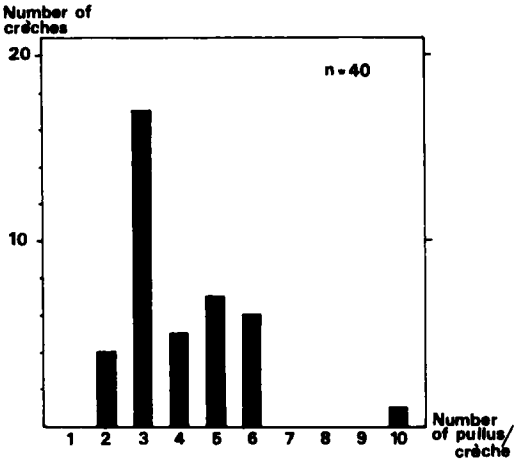

Fig. 5. The observed number of ducklings in crèches of Common Eider with only one female in 1979.

areas according to the relatively extensive study are shown in Fig. 3. The localities most densely populated were flat sandy islands and coastal areas with rocks east of Kapp Bruun.

The present study can only give an indication of the breeding success. Hagelund & Norderhaug's (1975b) investigation of the productivity in an eider colony on Kapp Linné shows that the average clutch size by hatching was 2.87 (3) ducklings per nest.

Studies of breeding success in other parts of

Fig. 6. Aerial view from the area east of Kapp Bruun, August 1979. Soraberget is seen in the background. The area is a typical breeding locality for Common Eider on Nordaustlandet. Photo: Palle Uhd Jepsen.

the Holarctic area show a higher clutch size by hatching. On Christiansø, near Bornholm in Denmark, Franzmann (1980) found, during a period of seven years (1973–1979), an average of 4.30 ducklings per nest, and in 1973 and 1974 Mendenhall (1975) found in northeast Scotland 2.47 and 3.31 ducklings per nest, respectively, by hatching.

Ahlén & Andersson (1970) maintain that 'aunts' can prevent predation by the Glaucous Gull, while Campbell (1975) mentions that the presence of 'aunts' at the nest and at the time when the brood moves from the nest site to the water did not have any significant anti-predation effect.

The normal pattern of behaviour for females of the Common Eider is that females collect the ducklings in crèches (Ahlén & Andersson 1970; Campbell 1975; Mendenhall 1975; Franzmann 1980). The presence of extra females or 'aunts' together with young is also well-known and described by several authors.

On Nordaustlandet in 1979 we had 40 observations of crèches in the company of only one female. This fact might indicate that the predation pressure is relatively low. Figs. 4A and 4B show the number of females in 65 crèches and the number of ducklings in the single crèches. In Fig. 5 the observed number of ducklings in crèches with only one female is presented.

Mendenhall (1975) found in northeast Scotland that small crèches (up to 20) occurred in all circumstances of density and habitat, but crèches above this size were seen only at high duckling densities. Mendenhall also describes how dispersion of ducklings from the attending females increased with crèche size, which might increase the risk of predation.

In large Danish eider colonies, e.g. Christiansø and Samsø, it is also normal behaviour for females to gather ducklings in crèches of more than ten ducklings (Franzmann, pers. comm.)

During the aerial surveys on Nordaustlandet in 1979, in several cases extra females were found in the same areas as females with ducklings. These birds, however, were often gathered in small dense flocks, and were possibly pre-moulting sub-adult females.

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