Bird Populations 10:56-67

BIRD MONITORING AT ZACKENBERG, NORTHEAST GREENLAND, 2007[1]

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Abstract. Bird populations were monitored during the breeding season of 2007 in the 15.8 km^2 designated bird census area at Zackenberg Research Station in central Northeast Greenland. The results are presented here and compared with the previous seasons 1995 to 2006.

The breeding bird census revealed relatively high numbers of Sanderling *Calidris alba* and Dunlin *Calidris alpina* territories, whereas territories of Ruddy Turnstone *Arenaria interpres* were found in average numbers. Red Knot *Calidris canutus* territories were a little above average in 2007. Long-tailed Skua *Stercorarius* longicaudus territories, with 15 pairs, were found in near-average numbers.

Corresponding to the early snow-melt, wader nest initiation in 2007 was fairly early, and median first egg dates were before 16 June in all four species. For Ruddy Turnstone, 2007 was the earliest year in terms of median first egg dates recorded so far. Wader nest success, however, was extremely low, and most nests were depredated. The mean clutch size was 3.9. Long-tailed Skua nests were initiated early as well; average clutch size was 1.64 eggs per nest and success was just below average. High numbers of Barnacle Goose *Branta leucopsis* broods were observed, but mean brood size was relatively low.

Key words: Monitoring, Arctic, waders, geese, Long-tailed Skua, Rock Ptarmigan, Snow Bunting, climate.

MONITOREO DE AVES EN ZACKENGER, NORESTE DE GROENLANDIA, 2007

Resumen. Se monitorizaron las poblaciones de aves durante la temporada reproductiva de 2007 en el área de censado de 15.8 km^2 en la Zackenber Research Station en el centro del noroeste de Groenlandia. Presentamos los resultados y los comparamos con temporadas previas de 1995 a 2006.

El censo de cría reveló un alto número de territorios de *Calidris alba* y *Calidris alpina*, mientras que los territorios de *Arenaria interpres* mostraron números promedio. Los territorios de *Calidris canutus* estuvieron ligeramente por encima de la media en 2007. Los territorios de *Stercorarius longicaudus*, con 15 parejas,

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estuvieron cercanos al promedio.

En correspondencia con el deshielo temprano, la iniciación de la nidificación de las limícolas en 2007 fue relativamente temprana, y las fechas medianas del primer huevo fueron anteriores al 16 de junio en las cuatro especies. Para *Arenaria interpres*, 2007 fue el año con la fecha mediana del primer huevo más temprana de las registrados hasta la fecha. El éxito de nidificación de las limícolas, sin embargo, fue extremadamente bajo, y la mayoría de los nidos fueron depredados. El tamaño de puesta promedio fue 3.9. Los nidos de *Stercorarius longicaudus* también si iniciaron pronto; el tamaño promedio fue de 1.64 huevos por nido y el éxito estuvo justo por debajo de la media. Grandes números de pollos de *Branta leucopsis* fueron observados, pero el tamaño medio de las polladas fue relativamente bajo.

Palabras clave: Monitoreo, Artico, limícolas, gansos, skua, perdiz nival, escribano, clima.

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INTRODUCTION

The monitoring programme, Zackenberg Basic, based at the Zackenberg Research Station in central Northeast Greenland (Figure 1), was initiated in 1995 in order to establish long-term data series on abiotic and biotic parameters in this high-arctic ecosystem in relation to climatic fluctuations and change. BioBasis is the biological part of Zackenberg Basic and monitors floral communities, invertebrate occurrence, and mammalian and avian breeding performance and population trends (Meltofte et al. 2008). Following the recommendations in the report from the International Evaluation Committee (Callaghan et al. 2006) and a workshop held at the National Environmental Research Institute, Aarhus University, in spring 2007, the BioBasis protocols were subjected to thorough revisions. Several changes were implemented and new monitoring initiatives were incorporated into the programme during the 2007 field season. Detailed information on the revised BioBasis methods and updated sampling protocols can be found in Meltofte et al. (2008).

This paper summarises the bird monitoring part of the BioBasis programme during 2007, the 13th consecutive season in the programme. The results presented here will also be available in the 13th ZERO Annual Report (Klitgaard and Rasch 2008). Similar reports from previous seasons are available for all previous field seasons (see www.zackenberg.dk/publications.htm#ZAR).

METHODS

Details on BioBasis methodology are available at the home page of NERI (http://biobasis.dmu.dk) and the current sampling protocol (Meltofte et al. 2008) as well as the database, is available online: http://zackenberg.dk/sw12805.asp.

In 2007, the breeding bird census area was reduced in size by excluding the area west of the river, Zackenbergelven (see Meltofte and Berg 2004, Meltofte et al. 2008). Birds in that area were followed but less intensively; the main effort is kept to the 15.8 km^2 census area, sections 2-5 (Fig. 1). Also, the estimation of wader fledging success and the transect routes Zackenberg – Store Sødal and Daneborg – Zackenberg were omitted from the monitoring programme in 2007 onwards (Hansen et al. 2008).

A complete initial census was performed between 12 and 21 June. This represents a normal start, but a little later ending than usual, but adverse weather prevented census work on several days. The completion of the survey took 45 person-hours, which is a little above average, considering that the census period lasted more than one day less than previous seasons. Most parts of the 15.8 km^2 census area were snow free. The entire census was performed in good weather conditions.

Large parts of the census area were covered regularly also during June, July and most of August, exceptions being a closed goose moulting area (Fig. 1) along the coast and the slopes of local mountain Aucellabjerg above 350 m a.s.l. The latter were covered on only six occasions by the census taker (J. Hansen), however J. Reneerkens and colleagues visited this area regularly during their stay.

The total effort in June and July 2007 was similar to recent years.

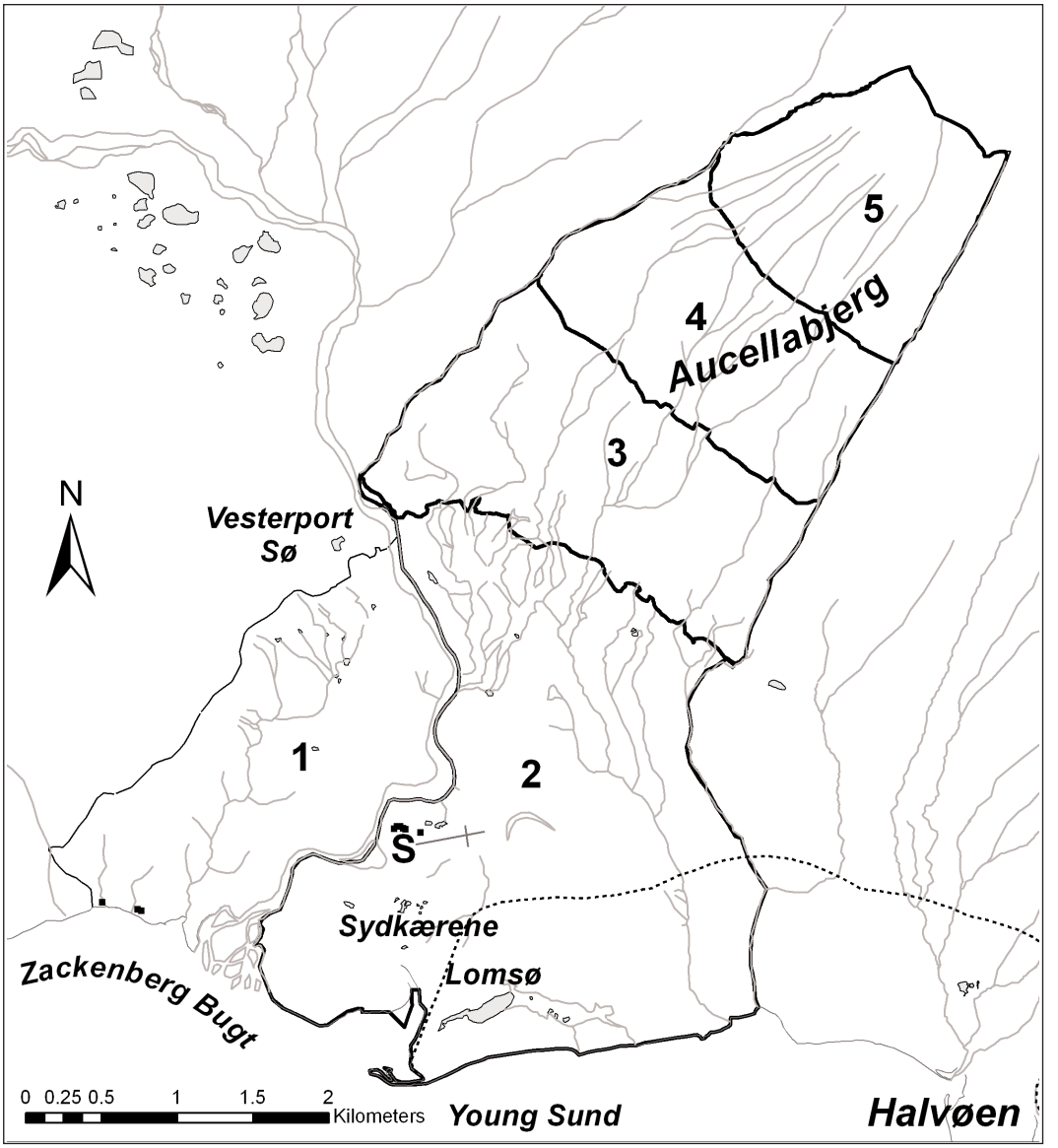

FIGURE 1. The study area in Zackenbergdalen, central Northeast Greenland, showing sections 1-5 of the bird census area. Also shown are place names mentioned in the text and the border of the closed goose molting area (broken line).

RESULTS AND DISCUSSION

BREEDING POPULATIONS

The results of the initial census, supplemented with records during the rest of the season (see Meltofte et al. 2008), are presented in Table 1 and 2, and are compared with the estimates of previous seasons.

The first pair of red-throated divers (*Gavia stellata*) to settle was a pair in Sydkærene, i.e. the fens south of the research station, on 6 June, five days after the first red-throated divers were observed (Table 4). All in all, three to four pairs attempted to breed within the census area in 2007, but no nests could be located. In adjacent areas, red-throated diver pairs were recorded in

TABLE 1. Estimated numbers of pairs/territories in four sectors of the 15.8 km² census area in Zackenbergdalen, 2007. Altitude shown in m a.s.l.

Species	<50 m a.s.l. 7.77 km²	50-150 m a.s.l. 3.33 km²	150-300m a.s.l. 2.51 km²	300-600 m a.s.l. 2.24 km²	Total
Red-throated Diver	3-4	0	0	0	3-4
King Eider	1-2	0	0	0	1-2
Long-tailed Duck	4-7	0	0	0	4-7
Rock Ptarmigan	0	0	0	2	2
Common Ringed Plover	15-17	2	6-7	3	26-29
Red Knot	3-6	12-15	11-12	1-2	27-35
Sanderling	26-32	3-4	12	21-22	62-70
Dunlin	74-93	12-14	1-2	2	89-111
Ruddy Turnstone	12-15	26-32	3	1	42-51
Red-necked Phalarope	1	0	0	0	0-1
Red Phalarope	0	0	0	0	0
Long-tailed Skua	9-11	5-7	2-5	1-2	17-25
Glaucous Gull	1	0	0	0	1
Arctic Redpoll	1-3	1	0	0	1-4
Snow Bunting	19	19-22	9	4-5	51-55

four lakes and ponds. In Vesterport Sø, which is a lake just outside the census area, a pair nested briefly. Most likely this nest suffered predation. Red-throated divers started to form smaller flocks on 21 July, culminating in the largest number of birds (five), on 18 August.

For the second year running, Sanderling (*Calidris alba*) territories were recorded at comparatively high numbers, comparable to the previous two peak years, 2003 and 2006 (Table 2). Since 2002, Dunlin (*Calidris alpine*) territories have appeared in high numbers and 2007 was no exception. Meltofte (2006a) suggests that the numbers were underestimated in early years, thus explaining the increase seen in numbers as a possible artefact of this underestimation. Highly varying numbers of common ringed plover (*Charadrius hiaticula*) territories have been found over the years, and in this season the numbers were near average. Ruddy turnstone (*Arenaria interpres*) territories were found in average numbers, following a two-year peak with above average numbers. In some years, e.g. 2006, large proportions of the population seemingly did not breed. In 2007, most but not all Ruddy Turnstone pairs bred. Red Knot (*Calidris canutus*) territory numbers were a little above average in 2007 (Tables 2 and 3).

As usual (cf. Meltofte and Høye 2007), Long-tailed Skua (*Stercorarius longicaudus*) territories, at 15 pairs, were found in near-average numbers (Table 2). A pair of Glaucous gulls (Larus hyperboreus) bred on an islet in the river, Zackenbergelven, as they have done since 2004. This year, no chicks were seen, and the fate of the nest is uncertain.

The number of Rock Ptarmigan territories (*Lagopus mutus*) was lower than in 2006, but the population is still higher than the low period of 2002-2005. At the opening of the station, a few ptarmigan remains were found at the active Arctic fox (*Alopex lagopus*) dens and other parts of the valley. They were found in much lower numbers than last year, however. During the census, two pairs were registered. One brood was found in the census area. The pair was first seen on 6 July with 10 pulli, and again on 11 July with 8 pulli, on the slopes of upper Aucellabjerg.

Fairly stable numbers of snow bunting (*Plectrophenax nivlais*) territories through the period 1996-2003, was followed by a rise in numbers that, so far, seem to have peaked in 2005. Numbers were lower in 2007, although still above average (Table 2).

Reproductive Phenology in Waders

Nest initiation in 2007 was fairly early for waders. Nearly 24% of egg laying in all wader nests was initiated before 10 June, just under 57% before 16 June, and medians of the first egg

TABLE 2. Estimated numbers of pairs/territories in the 15.8 km² census area in Zackenbergdalen, 1996-2007. Please note, that numbers for 1996-2006 are numbers of breeding pairs in the current bird census area. Numbers previously published included pairs breeding in the area west of river Zackenbergelven that is monitored extensively only from 2007 onward.

Regular breeders				
Species	No. of territories	Average min. and max. no. territories 1996-2006	No of nests found[a]	Comments
Red-throated Diver	3-4	2-2.5	0	
Common Eider	0	0.5-0.55	0	Flocks seen in June, females with chicks in August
King Eider	1-2	1.5-2.2	0	
Long-tailed Duck	4-7	5.5-6.9	0	Broods seen from 30 July
Rock Ptarmigan	2	2.6-3.6	2	
Common Ringed Plover	26-29	33.3-37.2	1	
Red Knot	27-35	24.9-32.5	2	
Sanderling	62-70	47.5-55.5	32	
Dunlin	89-111	70.3-79.3	12	
Ruddy Turnstone	42-51	43.1-48.2	7	
Red-necked Phalarope	0.1	0.9-1.8	0	
Long-tailed Skua	17-25	18.6-22	15	
Glaucous Gull	1	0.3	1	
Common Raven	2	-	0	Nests outside the census area.
Snow Bunting	51-55	39.5-44.6	0	Nests of passerines are only found oportunistically.
Irregular breeders				
Species	No. of territories	Average min. and max. no. territories 1996-2006	No of nests found[a]	Comments
Pink-footed Goose	0	0.2	0	Min. 1120 immatures migrated northwards over the area
Eurasian Golden Plover	0	0.1	0	1 individual, 1-9 June.
Red Phalarope	0	0.6-0.9	0	
Snowy Owl	0	0.1	0	
Northern Wheatear	0	-	0	
Arctic Redpoll	1-4	0.1-0.3	0	One additional observation in adjacent areas

[a] Within the census area

dates were before 16 June in all four species in which nests were found (Table 4). For Ruddy Turnstone, 2007 was the earliest year recorded in terms of median first egg dates. The melting of the snow was early in 2007 and nest initiation was near or earlier than the average of previous seasons (Table 5).

Reproductive Success in Waders

Overall wader nest success was extremely low in 2007. Only the 2005 season exhibited an equally low nest success; 36 of 60 nests were predated. Using the modified Mayfield method (Johnson 1979), 82% of the wader nests fell victim to predation. Dunlin suffered the lowest level of predation of the three main study species; 52.2% of the nest had full predation, a somewhat higher than average for 1996-2007. Sanderling and Ruddy Turnstone nests suffered extremely from predation, losing more nests than previously recorded at Zackenberg (Table 6). A single Sanderling nest was abandoned during laying

TABLE 3. Dates of first observation of selected species at Zackenberg 1996-2007.

Species	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Red-throated Diver	≤3.6	30.5	3.6	4.6	6.6	3.6	1.6	≤4.6	≤1.6	29.5	4.6	1.6
Pink-footed Goose	≤3.6	≤28.5	27.5	3.6	4.6	3.6	1.6	≤3.6	≤1.6	≤19.5	≤26.5	≤25.5
Common Eider	13.6	2.6	24.6	29.6	11.6	10.6	12.6	12.6	17.6	4.6	12.6	21.6
King Eider	12.6	4.6	15.6	16.6	≤22.6	9.6	11.6	≤13.6	14.6	21.6	12.6	22.6
Long-tailed Duck	≤1.6	30.5	2.6	6.6	6.6	7.6	3.6	7.6	2.6	1.6	7.6	5.6
Red-necked Phalarope	5.6	30.5	5.6	10.6	7.6	4.6	5.6	11.6	≤1.6	27.5	6.6	28.5

TABLE 4. Median first egg dates for waders at Zackenberg 2007 as estimated from incomplete clutches, egg floating, hatching dates, as well as weights and observed sizes of pulli.* Based on observations of a single fledgling.

Species	Median date	Range	N
Common Ringed Plover	23 May	23 May	1
Red Knot	6.5 June	2.6-21.6	10
Sanderling	15 June	5.6-4.7	48
Dunlin	15 June	6.6-2.7	17
Ruddy Turnstone	7 June	5.6-21.6	13

TABLE 5. Snow cover on 10 June together with median first egg dates in June for waders at Zackenberg 1995-2007. Data based on <0 nests/broods are in brackets, those <5 are omitted. The snow cover is pooled (weighted means) from section 1, 2, 3 and 4 (see Klitgaard and Rasch 2008, section 2.2), from where the vast majority of the egg laying phenology data originate.

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Snow cover on 10 June (cm)	84	82	76	80	91	53	84	79	83	48	28	na	na
Sanderling		(16)	18	18	23.5	16	22.5	17	13	8	(15)	30	15
Dunlin	(18)	11.5	13	16.5	22	11.5	25	8	12	12	12	27	15
Ruddy Turnstone	(12)	18.5	13	12.5	24	11	23	9	8	8	11	(21)	7

TABLE 6. Mean nest success (%), 1996-2007, according to the modified Mayfield method (Johnson 1979). Poor data (<125 nest days or five predations) are given in brackets. Data from species with <50 nest days have been omitted (dash = no nests found). Nests with at least one pipped egg or one hatched young are considered successful. Also given are total numbers of adult foxes observed by the bird observer in the bird census area during June-July (away from the research station proper), along with the number of fox dens holding pups.

Species	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	1996-2007
Common Ringed Plover				(60)		(38)				-	(100)	-	62-67
Red Knot	-	-			-		-			-	-	(100)	(28)
Sanderling	(72)	(33-100)	(88)	40	(46)	19	(33)	45	71-85		(7.4)	3.4	27-29
Dunlin			28-47	65	68	(75)		63	93	(43)	47	48	60-65
Ruddy Turnstone	21-68	67-100	16	23-28	29	(60)	52	21-27	83			36	58-64
Red-necked Phalarope	-	-	-		-	-	-	-	-		-	-	
Red Phalarope	-	-	-	-	-	-	-	-	-	-		-	
All waders	33-63	52-100	32-37	42-44	44	43	43	42-44	87-90	22	37	18	41-45
N nests	17	31	44	44	47	32	21	51	55	15	28	60	445
N nest days	163	274	334	521	375	328	179	552	700	104	332	533	4392,5
Fox encounters	14	5	7	13	11	14	21	11	16	18	22	23	
Fox dens with pups	2	0	1	0	2	2	0-1	2	3	0	2	3	

and the fates of one Dunlin (outside the census area) and one sanderling nest is unknown. Only four nests of Red Knot were found this season, and all hatched successfully. No Common Ringed Plover, Red Phalarope (*Phalaropus fulicarius*) nor Red-necked Phalarope (*Phalaropus lobatus*) nests were found in 2007. However, a Common Ringed Plover juvenile – with downy neck and still accompanied by two adults – was seen on 11 July. This suggests that the bird was approximately 20 d old, giving a first egg date around 23 May. That would be the earliest first egg estimated for Zackenberg.

The Arctic fox is the most likely predator of most nests, as only few nests were found with clear signs of avian predators. The number of fox encounters in the bird census area was also high (Table 6).

The mean clutch size was 3.9 in 2007 (Table 7). Nests for Sanderling containing <4 eggs were as follows: two nests of three eggs, one of two eggs, and two of one egg; and for Dunlin: three nests of three eggs.

In July and early August alarming parents – and later juveniles – were found in the fens and marshes (Dunlins), on the slopes of Aucellabjerg and in the dry lowlands (Common Ringed Plovers, Sanderlings and Dunlins). Turnstone juveniles were seen only late in the season, most often in connection with low tide feeding.

Reproductive Phenology and Success in Long-Tailed Skuas

Eight (40 %) of the Long-tailed Skua nests were initiated prior to the census period. Timing of breeding was average (Table 8), with 11 of 15 nests (73%) initiated before 20 June [Considering nests found outside the census area, 18 of 22 (82%) were initiated prior to 20 June]. From 22 June, flocks of up to 34 skuas roamed the lower slopes of Aucellabjerg and the lowlands.

A single observation of a lemming (*Dicrostonyx groenlandicus*, the main food resource for Long-tailed Skuas) by the chief bird observer (J. Hansen) does not reflect the otherwise intermediate lemming season (Table 8). The skuas' average clutch size was 1.64 eggs per nest. Eleven chicks hatched, and nest success was just below average (average nest success 1996-2007: 55%; Table 8). Ten of 11 hatched chicks, however, likely were predated. This last young was spotted on 19 August, at an age of likely 44 d, the only observation of a juvenile bird in 2007.

Four observations of one third- year bird were probably of the same individual: an unringed bird, which must have hatched in the 2005 season, in which fledging success was low (Table. 9).

Barnacle Geese

Conditions did not allow a visit to a barnacle goose (*Branta leucopsis*) colony on the southern face of the mountain Zackenbergfjeldet this season. Previous visits in 2005 and 2006 suggested that the colony is still in use (Hansen et al. 2008).

The first families with goslings were seen on 25 June. The number of broods was as high as 28 (Table 9), and the maximum number of goslings seen at one time, was 13.

The mean 2007 brood size was in the lower end of the scale until late July. With 3.3 young per brood, the highest average brood size recorded in late July was reached this year (Table 9). From Isle of Islay, Western Scotland, it was reported that the percentage of young in the flocks arriving at their wintering quarters was 9.8% (Table 9; Ogilvie, 2008).

Immature barnacle geese moulted in lower than average numbers in 2007 (Table 10). The coastal area west of the closed area has seen increasing numbers of moulting barnacle geese in recent years.

TABLE 7. Mean clutch sizes in waders at Zackenberg 1995-2007. Samples of fewer than five clutches are given in brackets.

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Mean
Common Ringed Plover	(4.00)	(4.00)	(3.50)	(4.00)	(3.50)	(4.00)	(3.50)	(4.00)	(4.00)	(4.00)		(3.75)		3.84
Red Knot				(4.00)	(4.00)		(4.00)		(4.00)	(4.00)			(4.00)	4.00
Sanderling	(4.00)	4.00	3.86	4.00	3.67	4.00	3.43	3.83	4.00	4.00	3.75	3.63	3.73	3.84
Dunlin		(4.00)	(3.75)	3.90	3.70	3.93	3.63	(4.00)	4.00	3.92	4.00	3.13	3.79	3.81
Ruddy Turnstone		3.71	3.79	3.82	3.58	3.80	3.75	4.00	3.77	3.92	3.86	(3.00)	(4.00)	3.75
Average	4.00	3.93	3.73	3.94	3.69	3.93	3.66	3.96	3.95	3.97	3.87	3.38	3.88	3.83

TABLE 8. Egg-laying phenology, breeding effort and success in Long-tailed Skuas at Zackenberg, 1996-2007. Median egg laying is the date when half the supposed first clutches were initiated. Number of clutches found includes replacement clutches. Mean hatching success according to the modified Mayfield method (Johnson 1979). Poor data (<125 nest days or five predations) are given in brackets. Nests with at least one pipped egg or one hatched young are considered successful. Also given, are numbers of lemming winter nests within the 2 km² lemming monitoring area (see section 3.4). Please note that numbers for 1996-2006 are numbers breeding within the currently used census area. Data previously numbers included the now omitted area west of river Zackenbergelven.

Long-tailed skua breeding	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Median 1st egg date		7.6	12.6	17.6	18.6	15.6	9.6	15.6	8.6	8.6	19.6	12.6
No. of clutches found	8	17	23	8	5	21	14	7	21	8	2	15
No. of young hatched	1	25	16	2	2	18	14	5	36	6	1	11
Nest success % (Mayfield)		(80.6)	24.1	(18.1)	(17.5)	39.5	44.1	(76.2)	(100)	(51.8)	(100)	52.9
Estimated no. of young fledged	0	5	6	1	0	5	4	2	22	1	0	1
Lemming winter nests/km²	224.5	247.2	467	227.4	136.8	208.5	178.3	66	238.7	170.8	189.6	236.8

TABLE 9. Average brood sizes of Barnacle Geese in Zackenbergdalen during July and early August, 1995-2007, together with the total number of broods brought to the valley. Samples of <10 broods are given in brackets. Average brood size data from autumn on the Isle of Islay in Scotland are given for comparison, including the percentage of juveniles in the population (M. Ogilvie 2008, pers. comm.).

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Early July		(3.0)	3.1	(2.9)	1.9	(3.2)	(1.8)	2.4	(1.8)	2.6	(1.7)	(2.0)	1.3
Middle July		(2.3)	2.7	2.3	1.8	(3.1)	(1.7)	2.4	(1.2)	2.3	2.7	(1.5)	1.5
Late July	(2.0)	(3.0)	2.6	2.2	1.7	3.1		2.3	(1.1)	2.3	(2.2)	(1.1)	(3.3)
Early August	(2.3)	(2.3)	2.4		1.8		(2.0)	2.2	(1.2)	(1.9)		(1.5)	-
No. of broods	≥7	6-7	19-21	≥18	29	11	4	32	8	26	14	9	28
Scotland	2.00	2.30	1.95	2.28	1.92	2.20	1.94	2.23	1.59	2.35	1.67	1.15	2.14
Per cent juv.	7.2	10.3	6.1	10.5	8.1	10.8	7.1	12.5	6.4	15.9	6.3	3.23	9.8

COMMON BIRDS, NOT BREEDING IN THE CENSUS AREA

In 2007, immature Pink-footed Geese (*Anser brachyrhynchus*) migrated in lower than average numbers, with 1,120 individuals passing over Zackenbergdalen northwards. Only two immature Pink-footed Geese were found moulting at Zackenberg this year (Table 10).

On 21 June, first Common Eiders (*Somateria mollissima*) were seen migrating along the coast and up along river Zackenbergelven. In the following month pairs and smaller flocks of up to 14 individuals were seen regularly. A possible nest was never confirmed, and no hatchings seem to have taken place. Seven young – most likely from the Daneborg or Sandøen colonies (c. 25-30 km east of Zackenberg) – were recorded with an adult female in the bay, Zackenberg Bugt, on 31 August. The last adult male was seen on 6 July. In late September, after the usual monitoring season, approximately 70 eiders assembled in a flock on Young Sund. At Daneborg, the Common Eider colony between the dog pens was once again censused by the Sirius Dog Sledge Patrol, and found to include 2,700 nests (Average nest number for the period 2002-2006 is 2,019). At Daneborg, the first eider ducklings were seen on 18 July.

Two female and one male King Eider (*Somateria spectabilis*) arrived at Zackenberg on 22 June, a date later than usual (Table 3; 1996-2006 average arrival date: 13 June). A pair stayed in the area around the research station until 30 June, occasionally accompanied by an extra female. No nesting attempts were recorded. A single female was seen west of the area on 6 July. The last record was a flock of 9 females and 3 males near the peninsula Halvøen, east of Zackenberg, on 15 July.

There was an estimated two pairs of Common

TABLE 10. The number of immature pink-footed geese and barnacle geese moulting in the study area at Zackenberg 1995-2006. The close area is zone 1c (see http://www.zackenberg.dk/grafik/MapZoner.jpg.

Study area	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PINK-FOOTED GOOSE													
Closed moulting area and further east	310	246	247	5	127	35	0	30	41	11	17	27	0
Coast west of closed area	230	40	60?	0	29	0	0	0	0	10	0	3	2
Upper Zackenbergdalen	0	0	15	0	0	0	0	0	0	0	0	1	0
Pink-footed Goose total	540	286	322	5	156	35	0	30	41	21	17	31	2
BARNACLE GOOSE													
Closed area at Lomsø and Kystkærene	21	0	29	21	60	84	137	86	120	81	87	148	66
Coast east of closed area	>120	150?	96	55	66	0	109	80	45	0	2	218	46
Coast west of closed area	0	0	0	0	0	30	0	0	0	0	29	29	106
Upper Zackenbergdalen	41	85	2	75	<57	27	60	0	14	0	25	30	6
Barnacle Goose total	>182	235?	127	151	<183	141	306	166	179	81	143	425	224

Raven (*Corvus corax*) covering the valley, both assumed to be nesting in adjacent areas. A possible third pair would have been based in a third, neighbouring valley. The first six young birds were seen on 4 July near the research station. During July, August and into September, this flock was seen regularly around the valley, with numbers varying from three to six.

VISITORS AND VAGRANTS

A Common Snipe (Gallinago gallinago) was seen at the research station on 22 June 2007. This is a very rare sighting in Northeast Greenland (cf. Boertmann 1994) and the first record for Zackenberg (Table 11).

Two Great Northern Divers (*Gavia immer*) were observed flying up the river Zackenbergelven on 11 June. Great Northern Divers are recorded occasionally near Zackenberg, and have been known to breed in adjacent areas (Meltofte 2006b).

On 27 June a Snow Goose (*Anser caerulescens*) and an apparent Snow Goose x Barnacle Goose (*Branta leucopsis*) hybrid flew over the research station. After circling above the station, the hybrid continued eastwards, while the Snow Goose landed in the centre of the research station. The goose was apparently tame, and followed researchers around in the study area for three days.

Canada Geese (*Branta Canadensis*) were recorded for the 3rd consecutive season at Zackenberg, with a single bird in a fen north of the research station on 13 June, and a pair at the coast on 26 June (Table 11).

On 26 May a female Pintail Duck (*Anas acuta*) was seen in a fen just north of the research station, where it stayed until 7 June. This is only the 2nd record at Zackenberg (Meltofte 1999), equalling the northernmost observation (cf. Boertmann 1994).

Gyr Falcons (*Falco rusticolus*) were spotted several times during the season. In June, single individuals were seen on 8 and 19 June and 31 August near the research station. After the normal monitoring season, Gyr Falcons were recorded on 11 occasions, one time with three individuals at once (19 September, at the research station). The other ten observations are thought to be of one individual, most often seen at the research station.

Among waders, the Eurasian Golden Plover (*Pluvialis apricaria*) was once again recorded with a single individual, from 1 to 9 June, near the research station.

A Pectoral Sandpiper (*Calidris melanotos*) – presumably a male – was recorded on 12 and 19 June, in fens near the research station. On 19 June, the sandpiper displayed behaviour (towards a Dunlin), similar to courtship behaviour (H. Schekkerman, pers. comm.). The observation will be submitted to the rarities committee for Denmark, Greenland and Faroe Islands at DOF (BirdLife Denmark). At Zackenberg, this was only the third record of this rare visitor to Greenland.

For the fifth season in 12 years (Table 11), a Whimbrel (*Numenius phaeopus*) was seen on 16 and 17 June, and heard again on 18 June, on the slopes of Aucellabjerg.

TABLE 11. Numbers of individuals and observations of avian visitors and vagrants at Zackenberg 2007, compared with the numbers of individuals observed in the preceding seasons, 1995-2006. Multiple observations reasonably believed to have been of the same individual have been reported as one individual.

	Visitors and vagrants													
	Previous records												2007	
Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	No individual	No. observations
Great northern diver	0	0	0	0	0	0	1	0	0	0	0	0	2	1
Wooper swan	0	0	0	0	0	4	0	0	0	0	0	0	0	0
Snow goose[a]	0	0	0	0	0	2	11	0	23	0	0	0	1	1[b]
Canada goose	0	0	0	0	0	0	0	0	0	0	0	9	3	2[c]
Pintail duck[e]	0	0	0	1	0	0	0	0	0	0	0	0	1	3
Common teal	0	0	0	0	0	0	0	1	0	0	0	0	0	0[g]
Merlin	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Gyr falcon	1	1	>1	3-4	>5	4-6	5	2	4	4	2	0	3	2[l]
Eurasian golden plover	0	3	1	4	1	0	2[a]	1	0	1	1	1	1	3
White-rumped sandpiper	0	0	0	0	0	0	1	0	0	0	1	0	0	0
Pectoral sandpiper	0	0	0	1	0	0	0	2	0	0	0	1	1	2
Purple sandpiper	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Red phalarope	0	0	0	4-5[a]	0	0	4[a]	0	1	0	2[f]	11[f]	0	0
Common snipe	0	0	0	0	0	0	0	0	0	0	0	0	1	1[d]
Eurasian curlew	0	0	1	0	1	0	0	0	0	0	0	0	1	3
Whimbrel	0	0	0	0	0	1	1	0	0	2	1	0	0	0
Pomarine skua	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Arctic skua	0	0	12	6	0	2	7	4	3	2	0	1	0	0
Great skua	0	0	0	4	0	0	0	2	0	0	0	0	0	0
Lesser black-backed gull[j]	0	0	0	0	0	0	4	0	1	2	1	4	0	0[e]
Iceland gull	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Great black-backed gull	0	0	0	0	1	1	3	0	0	0	0	0	0	0
Black-legged kittiwake	0	0	0	0	0	0	0	0	14[f]	0	0	0	0	0[f]
Arctic tern	≈200	2	1	2	0	14	0	0	32	17	0	0	0	0
Snowy owl	0	0	2	1	1	1-2	>4[a]	0	0	2	0	0	1	1[j]
Meadow pipit[e]	0	0	0	1	0	0	0	0	0	0	1	1	0	0[g]
White wagtail	0	1	1	0	0	0	0	0	0	0	0	0	1	1
Northern wheatear[e]	4	8	2	>3	1	0[h]	0	0	0	0	2	1	4[k]	1
Arctic redpoll	7	9	16	>11[a]	9	5	4	6	31[i]	12	3[a]	2	8	7[m]
Lapland longspur	0	0	0	0	1-2	0	1-2	0	0	0	1	1	0	0

[a] At least one territory, possible territory or breeding found, see table 1;
[b] Circled over station with a snow goose/barnacle goose hybrid. The snow goose landed in camp and stayed for 3 days. Tame. See text.

TABLE 11. Continued.

Species	Visitors and vagrants													
	Previous records												2007	
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	No individual	No. observations

[c] Subspecies interior
[d] First ever record at Zackenberg
[e] Increasing in East Greenland (Boertmann in press)
[f] 10 adults, 4 juveniles 28 August 2003.
[g] Northernmost records in East Greenland (cf. Bortmann 1994)
[h] One dead individual found
[i] 20 of these, a flock of juveniles in August
[j] Additionally, one individual in neigbouring valley on 22 June and another one in Zackenbergelven 25 September 2007 (outside monitoring programme season).
[k] Uncertain identification
[l] Another 11 observations of 4 individuals in September 2007 (outside monitoring programme season).
[m] A further four observerd on 25 September 2007 (outside monitoring programme season).

A Great Black-backed Gull (*Larus marinus*) was observed 30 June at Lomsø, a lake south of the research station.

Twice during the normal season, Snowy Owls (*Nyctea scandiaca*) were seen. On 22 July, a single individual was seen in neighbouring valley, Cardiocerasdal, while the other bird was spotted on the slopes of Aucellabjerg on 22 August. In the time after the usual monitoring period, a Snowy Owl was seen on the lower slopes of Aucellabjerg, 25 September.

A White Wagtail (*Motacilla alba*) visited Zackenberg on 31 May. This is only the 2nd record for Zackenberg. The White Wagtail is a rare visitor to Northeast Greenland, although it might have bred in Daneborg in 1996 (Meltofte 1997) – c. 25 km from Zackenberg.

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