

## BIRD MONITORING AT ZACKENBERG, NORTHEAST GREENLAND, 2009<sup>1,2</sup>

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*Abstract.* In 2009, monitoring continued of bird populations in a 15.8 km<sup>2</sup> designated area at Zackenberg Research Station in central Northeast Greenland. Results are presented and compared with those from previous seasons (1995 – 2008). Despite the extremely limited spring snow cover in 2009, nest initiation was early for Dunlin (*Calidris alpina*) and Red Knot (*Calidris canutus*), very early in Ruddy Turnstone (*Arenaria interpes*), and close to average in Sanderling (*Calidris alba*). The all-wader nest success was extremely low in 2009. The mean wader clutch size was 3.91, which is a little above average. The total number of Barnacle Goose (*Branta leucopsis*) broods was nine, while the maximum number of goslings seen at any one time was only three. The mean brood size remained low throughout the season. This season was one of the four latest seasons in nest initiation for Long-tailed Skua (*Stercorarius longicaudus*), based on only two nests found. The low number of skua nests also reflected the low density of lemmings in the valley. This season the second lowest number of lemming winter nests ever was registered.

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

### MONITOREO DE AVES EN ZACKENBERG, NORESTE DE GROENLANDIA, 2009

*Resumen.* En 2009, el monitoreo de poblaciones de aves continuó en un área de 15.8 km<sup>2</sup> designada en la Estación de Investigación de Zackenberg, en el centro del noreste de Groenlandia. Los resultados presentados se comparan con los de temporadas anteriores (1995-2008). A pesar de que la cobertura de nieve en primavera fue extremadamente limitada en 2009, el inicio de la nidificación fue temprano para *Calidris alpina* y *C. canutus*, muy temprana para *Arenaria interpes*, y casi promedio en *Calidris alba*. El éxito reproductivo de zancudas fue extremadamente bajo en 2009, con una puesta promedio de 3.91, algo por debajo de

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la media. El número total de puestas de *Branta leucopsis* fue 9, mientras que el número máximo de pollos observado fue de solo 3. El tamaño de puesta promedio permaneció bajo durante toda la temporada. Esta temporada fue una de las más tardías en iniciación de nidos para *Stercorarius longicaudus* en base a dos nidos encontrados. El bajo número de nidos de skua también reflejó la baja densidad de leming en el valle. Esta temporada se registraron las segundas cifras de anidación de leming más bajas nunca registradas..

*Palabras clave:* : Groenlandia, monitoreo, Artico, zancudas, gansos, skua, perdiz nival, gorrión nival, clima.

## INTRODUCTION

The monitoring programme, Zackenberg Basic, based at the Zackenberg Research Station in central Northeast Greenland (Figure 1), was conducted for the 14th season. For details of the previous years, please refer to Hansen et al. (2010a).

This paper presents a summary of the bird monitoring part of the Biobasis programme from the 2009 season. The results presented here will also be available in the 15th ZERO Annual Report (Jensen and Rasch 2010). Similar reports from previous seasons are available for all previous field seasons (see [www.zackenberg.dk/publications.htm](http://www.zackenberg.dk/publications.htm)).

Details on Biobasis methodology are available at the home page of the research station (<http://www.zackenberg.dk/monitoring/biobasis/>), the current sampling protocol (Schmidt et al. 2010) is available through the authors, while the database is available online: <http://www.zackenberg.dk/data/>.

## METHODS

A complete initial census was performed between 8 and 19 June, which is a relatively early start date, and a normal last day of census. The weather prevented census work on several days in the period. The completion of the survey took 39 'man-hours', which is a near average. Almost the entire 15.8 km<sup>2</sup> census area was snow free, and the entire census was performed in good weather conditions.

In addition to the initial census, large parts of the census area were covered regularly during June, July and most of August, exceptions being the closed goose moulting area along the coast and the Aucellabjerg slopes above 350 m a.s.l. The latter were covered on only five occasions by

the BioBasis staff, but by many visits by Reneerkens and colleagues.

The total effort in June and July 2009 was a little higher in June (132 hrs) and lower in July (49 hrs) compared to recent years. The results of the initial census, supplemented with records during the rest of the season (see Schmidt et al. 2010), are presented in Table 1, and in Table 2, these are compared with the estimates of previous seasons.

## RESULTS AND DISCUSSION

### BREEDING POPULATIONS

The first diver (*Gavia* spp.) was observed 22 May (Day of year (DOY) 142; Table 3). The first pair of Red-throated Divers (*Gavia stellata*) to settle was a pair in a fen near the research station on 29 May (DOY 149). Up to four pairs attempted to breed within the census area and two nests were found. Both suffered predation. In adjacent areas, red-throated diver pairs were recorded in three lakes. In Vesterport Sø, a pair nested briefly at the nest site used in the last few seasons (2007-08). Most likely, the nest suffered predation. In Gâsesø, a pair nested for a few days, until the nest was lost to predation. Red-throated Divers started to form smaller flocks 26 July (DOY 207), just as in 2007. In the small lake, Træsko, a pair with two chicks was recorded on 24 August (DOY 236). The last two red-throated divers were seen on 2 September (DOY 246).

As in recent years, Sanderling (*Calidris alba*) territories were recorded at relatively high numbers (Table 4.17). The last five Sanderlings were seen 7 September, near Halvøen. Dunlin (*Calidris alpina*) territories were found in markedly lower numbers than in recent years, but close to the level of the early years (cf. Hansen et al. 2010a, but see Meltofte 2006).

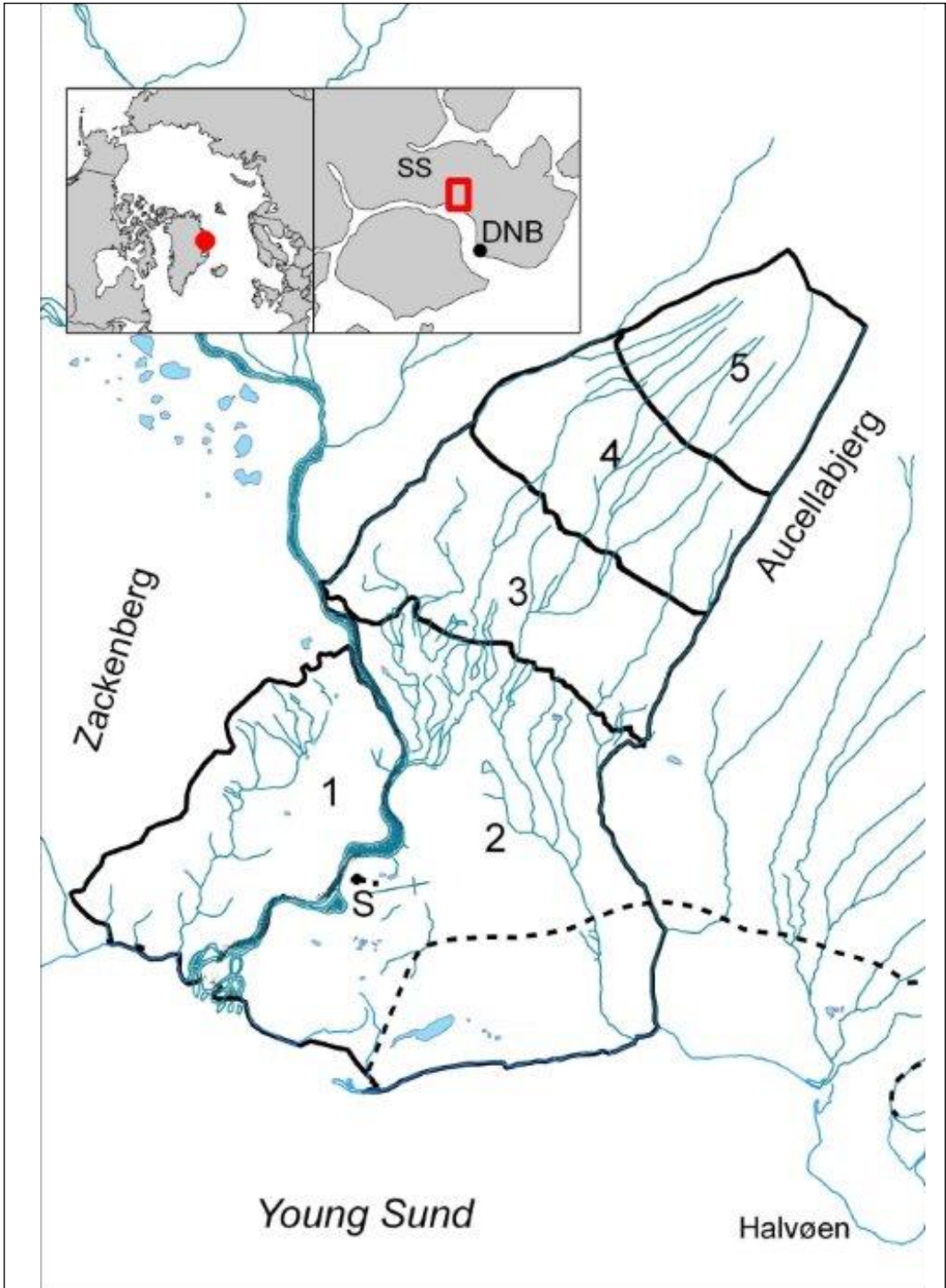


FIGURE 1. Map of the study area in Zackenbergdalen, central Northeast Greenland, with sections 1-5 of the bird census area. Also shown, selected place names mentioned in the text, the research station (S) and the border of the closed goose moulting area, 1c (broken line)..

TABLE 1. Estimated numbers of pairs/territories in four sectors of the 15.8 km<sup>2</sup> census area in Zackenbergdalen, 2009.

Species	<50 m a.s.l. 7.77 km <sup>2</sup>	50-150 m a.s.l. 3.33 km <sup>2</sup>	150-300 m a.s.l. 2.51 km <sup>2</sup>	300-600 m a.s.l. 2.24 km <sup>2</sup>	Total
Red-throated Diver	3-4	0	0	0	3-4
King Eider	0-1	0	0	0	0-1
Long-tailed Duck	4-6	0	0	0	4-6
Rock Ptarmigan	1	2	1	0	4
Common Ringed Plover	10-13	9	5-6	2	26-30
Red Knot	9-13	9-12	2	1	21-28
Sanderling	28-33	3-4	13	15	59-65
Dunlin	59-68	16	1-2	1	77-87
Ruddy Turnstone	19-26	17	1	0	37-44
Red-necked Phalarope	0-1	0	0	0	0-1
Long-tailed Skua	10-12	3-5	0	0	13-17
Glaucous Gull	1	0	0	0	1
Arctic Redpoll	2-1	1	0	0-1	3-5
Snow Bunting	13	20-22	12-13	4	49-52

Numbers of Common Ringed Plover (*Charadrius hiaticula*) territories have varied considerably, but in 2009 numbers were near average. Most common ringed plovers were gone by August, and only a few, late migrants were seen between 2 and 17 September (DOY 246-261).

Numbers of Ruddy Turnstone (*Arenaria interpres*) territories were higher than in the previous few years, although breeding success for this species was lower (below). Red knot (*Calidris canutus*) territory numbers were near average (Tables 1, 2).

No Red-necked Phalarope (*Phalaropus lobatus*) nests were found in the census area in 2009. However, in a fen west of Zackenbergelven, a nest of three eggs was discovered. This nest was later found to have suffered predation. In the census area, a female was seen in fens near the research station on 5-6 June (DOY 156-157). No certain Red Phalarope (*Phalaropus fulicarius*) observations were made in 2009. On 10 June (DOY 161), a pair of unidentified phalaropes was seen near the research station.

Long-tailed Skua (*Stercorarius longicaudus*) territories were found in lower than average numbers (Table 2). Only one pair nested in the census area (see below); another nested west of the river, Zackenbergelven.

A Glaucous Gull (*Larus hyperboreus*) pair has been breeding on an islet in Zackenbergelven at least since 2004. It is not unlikely that a pair was breeding at that location prior to 2004, but had

been overlooked (H. Meltofte, pers. comm.). In 2009, the pair was back with a nest on an islet in the same stretch of the river. No chicks were seen, and the nest is thought to have fallen victim to predation. Glaucous Gulls were seen almost daily throughout the season. In mid-September numbers of observations dropped, and by the last week of September none was observed.

The number of Rock Ptarmigan (*Lagopus mutus*) territories was a little higher than in recent years. During the census, four pairs were registered, and two broods were found in the census area. In adjacent areas, a nest was found on the slopes of Zackenbergfjeld.

The number of Snow Bunting (*Plectrophenax nivalis*) territories was equal to the last few years, but higher than the period 1996-2003 (Table 2). Juvenile buntings were seen both within the census area and in adjacent areas – in numbers suggesting a good season for this species with a high rate of successful fledging. In September, flocks of thousands were seen around the valley. The first day, 4 September (DOY 248), had the highest numbers. According to journal notes, “thousands” were observed. On a few days, only few were seen, while on most days until 1 October (DOY 275) flocks of tens to hundreds were reported from the entire valley. From 2 October only two were recorded daily until the last four were recorded on 9 October (DOY 283).

TABLE 2. Estimated numbers of pairs/territories in the 15.8 km<sup>2</sup> census area in Zackenbergdalen in 2009 compared to the 1996-2008 averages.

Regular breeders				
Species	No. of territories	Average min. and max. no. territories 1996-2008	No nests found <sup>1</sup>	Comments
Red-throated Diver	3-4	2.3-2.7	1	Chicks seen in adjacent areas
Common Eider	0	0.4-0.5	0	Flocks seen in June and July, no chicks seen
King Eider	0-1	1.3-2	0	
Long-tailed Duck	4-6	5.5-6.5	0	
Rock Ptarmigan	4	2.5-3.5	0	
Common Ringed Plover	26-30	29.8-35.4	0	
Red Knot	21-28	25-32.3	1	
Sanderling	59-65	49.6-57.5	25	
Dunlin	77-87	73.8-84	6	
Ruddy Turnstone	37-44	41.5-46.7	8	
Red-necked Phalarope	0-1	0.6-0.8	0	
Long-tailed Skua	13-17	18.5-22.5	1	
Glaucous Gull	1	0.4	1	
Common Raven	2	-	0	Nests outside the census area.
Snow Bunting	49-52	41.5-46.6	0	Nests of passerines are only found oportunistically.

Irregular breeders				
Species	No. of territories	Average min. and max. no. territories 1996-2008	No of nests found <sup>a</sup>	Comments
Pink-footed Goose	0	0.2	0	Min. 3175 immatures migrated northwards over the area
Eurasian Golden Plover	0	0.1	0	
Red Phalarope	0	0.6-0.8	0	
Snowy Owl	0	0.1	0	
Northern Wheatear	0-1	0.1	0	Nests of passerines are only found oportunistically
Arctic Redpoll	3-5	1.1-3.3	0	Nests of passerines are only found oportunistically

<sup>1</sup> Within the census area

Arctic Redpoll (*Carduelis hornemanni*) territories were found in slightly higher numbers than usual (Table 2). The last flock of minimally 10 Arctic Redpolls were seen on 16 September on the eastern face of Zackenbergfjeld.

REPRODUCTIVE PHENOLOGY IN WADERS

Nest initiation was fairly early in Dunlin and Red Knot, very early in Ruddy Turnstone, and close to average in Sanderling (Table 4). Just over 5% of all wader nests were initiated before 1 June, 28.8% before 10 June and 22.7% after 20 June. The snow cover on 10 June 2009 was

extremely low (4%), and nest initiation was near average (Table 5).

REPRODUCTIVE SUCCESS IN WADERS

The all-wader nest success was extremely low in 2009. On the basis of the modified Mayfield method (Johnson 1979), 86% of the wader nests were subjected to predation. Dunlin nests were hit less hard than others this season, with 80% nest success. That is a very high success rate. Sanderling nests suffered extremely from predation again this season, although they faired better than in the last few seasons (Table 6). Four

TABLE 3. Dates of first observation of selected species at Zackenberg 1996-2009.

Species	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Red-throated Diver	≤155	150	154	155	158	154	152	≤155	≤153	149	155	152	152	142
Pink-footed Goose	≤155	≤148	147	154	156	154	152	≤154	≤153	≤139	≤146	≤145	136	≤132
Common Eider	165	153	175	180	163	161	163	163	169	155	163	172	164	176
King Eider	164	155	166	167	≤174	160	152	≤164	166	172	163	173	170	168
Long-tailed Duck	≤153	150	153	157	158	158	154	158	154	152	158	156	155	151
Red-necked Phalarope	157	150	156	161	159	155	156	162	≤153	147	157	148	153	156

TABLE 4. Median first egg dates for waders at Zackenberg 2009 as estimated from incomplete clutches, egg floating, hatching dates, as well as weights and observed sizes of chicks.

Species	Median date	Range	N
Common Ringed Plover	—	—	—
Red Knot	156	150-160	4
Sanderling	167	152-181	63
Dunlin	162	151-180	18
Ruddy Turnstone	154	149-162	11

TABLE 5. Snow cover on 10 June, together with median first egg dates for waders at Zackenberg 1995-2009. Data based on fewer than 10 nests/broods are marked with \*, fewer than five are omitted. The snow cover is the weighted means of area 1, 2, 3 and 4 (see 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	2008	2009
Snow cover on 10 June	84	82	76	80	91	53	84	79	83	48	28	85	48	71	4
Sanderling		168*	169	169	174.5	168	173.5	168	164	160	166'	181	166	169	167
Dunlin	169*	163.5	164	167.5	173	163.5	176	159	163	164	163	178	166	169	162
Ruddy Turnstone	163*	170.5	164	163.5	175	163	174	160	159	160	162	172*	158	170	154

TABLE 6. Mean nest success (%) 1996-2009 according to the modified Mayfield method (Johnson 1979). Poor data (below 125 nest days or five predations) are marked with \*. Data from species with fewer than 50 nest days have been omitted ("—" indicates no nests at all). 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	2008	2009	1996-2009
Common Ringed Plover				60*		38*				—	0*	—	2*	—	47-51
Red Knot	—	—			—		—			—	—	100*			26
Sanderling	72*	33-100*	88*	40	46*	19	33*	45	71-85		7*	3	5	7.5	18-19
Dunlin			28-47	65	68	75*		63	93	43*	47	48	17	80*	57-62
Ruddy Turnstone	21-68	67-100	16	23-28	29	60*	52	21-27	83			36	22*	27*	35-40
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	16	14	33-36
N nests	17	31	44	44	47	32	21	51	55	15	28	60	58	66	569
N nest days	163	228	334	520.8	375	328.4	178.9	552	700	104	332.2	532.7	423.5	508.5	5281
Fox encounters	14	5	7	13	11	14	21	11	16	18	22	23	20	11	
Fox dens with pups	2	0	1	0	2	2	0-1	2	3	0	2	3	5	3	

Sanderling nests were abandoned before hatching. Only two nests of Red Knot were found in 2009, and one suffered predation. Ruddy Turnstones suffered predation to a relatively high level: only 27% nests were successful. One Red-necked Phalarope nest was found, eventually falling victim to predation.

The number of fox (*Alopex lagopus*) encounters was relatively low, but this species – the most likely predator of most nests – had pups in three dens this season (Table 6). This certainly added to the high predation rate, not least in the early stages of the wader breeding season.

The wader mean clutch size was 3.91 in 2009; a little above average (Table 7). Nests containing fewer than four eggs were: Sanderling, two nest of three eggs and one nest of two eggs; Dunlin, one nest of one eggs (abandoned during laying); Ruddy Turnstone, three nests of three eggs; Red-necked Phalarope, one nest of three eggs.

In July and early August, alarm-calling 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, Red Knots, Sanderlings, Dunlins, Ruddy Turnstones).

Data on chick survival is scarce, and as early as 12 June, flocks of Long-tailed Skuas roamed the lower slopes of Aucellabjerg and the lowlands. The largest flock contained 37 individuals. The many skuas would be consistent with the high predation pressure on wader chicks.

REPRODUCTIVE PHENOLOGY AND SUCCESS IN LONG-TAILED SKUAS

None of the Long-tailed Skua nests was initiated prior to the census period, and 2009 was one of the four latest seasons for nest initiation in this species (Table 8), despite the fact that only two nests were found.

No Collared Lemming (*Dicrostonyx groenlandicus*) was observed by the bird observer, reflecting a season with record low lemmings (Table 8). Consistent with that pattern, both skua nests had one egg each, but only one chick hatched. Nest success in 2009 was among the lowest recorded (average nest success 1996-2008: 47.1%; Table 8). The last observation of a chick (accompanied by an adult) was on 12 July. This young bird would be six days old. Whether it survived to fledging is unknown.

One observation of a 3<sup>rd</sup>-year bird is the only observation of immature skuas in the study area.

BARNACLE GOOSE

A Barnacle Goose (*Branta leucopsis*) colony on the southern face of the mountain Zackenbergfjeldet was probably active, based on observations on birds flying towards that part of the mountain. The colony was not properly visited this year, due to failing ice conditions early in the season. For further, recent details on the colony, see Hansen et al. (2010a).

In Zackenbergdalen, the first families with goslings were seen on 29 June (DOY 180). The total number of broods recorded was nine (Table 9), while the maximum number of goslings seen at one time, was only three. The mean brood size was low throughout the period (Table 9).

Southward migrating Barnacle Geese were seen from 10 August (DOY 222) onwards, when 15 flew over Cardiocerasbjerg. In late August and the beginning of September, flocks migrated over and rested in the census area, peaking on 30 August (DOY 242) with four flying over the area, and 105 foraging in the valley. A total of 3,530 geese were recorded (unsystematically) on southward migration in 2009. The last observation of the season was of seven Barnacle Geese foraging in a fen near the research station on 9 September (DOY 252).

TABLE 7. Weighted mean clutch sizes in waders at Zackenberg 1995-2009. Samples of fewer than five clutches are marked with \*.

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	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*		3.75*		3.76
Red Knot				4.00*	4.00*		4.00*		4.00*	4.00*			4.00*	4.00*	4.00*	3.14
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	3.77	3.91	3.83
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	3.67	4.00	3.78
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*	3.71	3.78	3.78
Mean	4.00	4.00	3.76	3.90	3.65	3.89	3.63	3.95	3.94	3.94	3.89	3.33	3.76	3.74	3.91	3.80

TABLE 8. Egg-laying phenology, breeding effort and success in Long-tailed Skuas at Zackenberg 1996-2009. Median egg laying date is the date when half the supposed first clutches were laid. Clutches found includes replacement clutches. Mean hatching success according to the modified Mayfield method (Johnson 1979). Poor data (fewer than 125 nest days or five predations) are marked with \*. Nests with at least one pipped egg or one hatched young are considered successful. Also given, are numbers of lemming winter nests within the lemming census area. Data from 1996-2006 are from the original 18.8 km<sup>2</sup>, while data from 2007 onwards is from the reduced area, 15.8 km<sup>2</sup>. Please note that in 2006, only one of two eggs hatched (other never hatched)..

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Median 1st egg date		158	163	168	170	166	160	166	160	159	170	163	164	168
No. of clutches found	8	17	23	8	5	21	14	7	21	8	2	15	9	2
No. of young hatched	1	25	16	2	2	18	14	5	36	6	1	11	3	1
Nest success % (Mayfield)		80.6*	26.7	18.1*	17.5*	39.5	44.1	76.2*	94*	51.8*	100*	23	33	25.9
Estimated no. of young fledged	0	5	6	1	0	5	4	2	22	1	0	1	2	1
1Lemming winter nests/km <sup>2</sup>	224.5	247.2	467	227.4	136.8	208.5	178.3	66	238.7	170.8	189.6	236.8	75.5	49.1

TABLE 9. Average brood sizes of Barnacle Geese in Zackenbergdalen during July and early August, 1995-2009, together with the total number of broods brought to the valley. Samples of <10 broods are marked with \*. 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 (Ogilvie, pers. comm.).

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Primo 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	4*	1*
Medio 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	1.6	1.33*
Ultimo 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*	1.5*	1*
Primo August	2.3*	2.3*	2.4		1.8		2.0*	2.2	1.2*	1.9*		1.5*	-	1*	1.5*
No. broods	≥7	6-7	19-21	≥18	29	11	4	32	8	26	14	9	28	15	9
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	1.9	1.9
% 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	8.2	3.8

On Isle of Islay, western Scotland, the percentage of young in wintering flocks was very low (Table 9; M. Ogilvie, pers. comm.). Immature geese moulted in numbers well above average (1995-2007 average: 196) in 2009 (Table 10).

#### COMMON BIRDS, NOT BREEDING IN THE CENSUS AREA

Pink-footed Geese (*Anser brachyrhynchus*) were recorded unsystematically; on northbound moult migration 3175 immature individuals flew over Zackenbergdalen. The northward migration took place from 5 June (DOY 156) until 10 July (DOY 191). In the general Zackenberg area, only two immature Pink-footed Geese were found moulting in 2009 (Table 10). Immature geese on southward migration were recorded from 26 August (DOY 239), when 70 were seen in the former delta. During the following days large

flocks of roosting immatures were seen (maximum: 110 in two flocks 28 August [DOY 241]), in addition to migrating flocks. A total of 3483 immatures were recorded (unsystematically) on southward migration, which ended with nine immatures on 14 September (DOY 258).

On 25 June (DOY 176), the first Common Eiders (*Somateria mollissima*) were seen flying up Zackenbergelven – five females and a male. In the following month pairs and smaller flocks were seen regularly. On 11 July (DOY 192) 21 females and 18 males were observed in a flock on Young Sund, constituting the largest adult flock of the season. The last five adult males were seen on 14 July. A flock of eight adults and 29 ducklings were seen on 10 August (DOY 222), and a single adult with an unknown number of ducklings were seen on 30 August (DOY 242). The last ducklings were seen on 8



TABLE 10. The number of immature Pink-footed Geese and Barnacle Geese moulting in the study area at Zackenberg 1995-2009. The closed area is zone 1c (see map, <http://www.zackenberg.dk>).

Study area	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>PINK-FOOTED GOOSE</b>															
Closed moulting area and further east	310	246	247	5	127	35	0	30	41	11	17	27	0	0	1
Coast west of closed area	230	40	60?	0	29	0	0	0	0	10	0	3	2	0	0
Upper Zackenbergdalen	230	40	60?	0	29	0	0	0	0	10	0	3	2	0	0
Pink-footed Goose total	540	286	322	5	156	35	0	30	41	21	17	31	2	2	2
<b>BARNACLE GOOSE</b>															
Closed area at Lomsø and Kystkærene	21	0	29	21	60	84	137	86	120	81	87	148	66	106	70
Coast east of closed area	>120	150?	96	55	66	0	109	80	45	0	2	218	46	125	77
Coast west of closed area	0	0	0	0	0	30	0	0	0	0	29	29	106	65	34
Upper Zackenbergdalen	41	85	2	75	<57	27	60	0	14	0	25	30	6	41	51
Barnacle Goose total	>182	235?	127	151	<183	141	306	166	179	81	143	425	224	337	232

September (DOY 251). During September, flocks of females were seen regularly, peaking with more than 13 individuals on 17 September (DOY 260), ending with the last five females in Zackenberg Bugt on 27 September (DOY 270; see also the paragraph on Daneborg in Hansen et al. 2010b).

A male and two female King Eiders (*Somateria spectabilis*) were seen on 17 June (DOY 168), a date that is a little later than usual (Table 3; 1996-2008 average arrival date: 14 June [DOY 165]). Two days later a pair was still present in the former delta. This was the last we saw of King Eiders in 2009. No nesting attempts were recorded.

Long-tailed Ducks (*Clangula hyemalis*) were seen from 31 May (DOY 151; Table 3), with pairs seen regularly – almost daily – until late June. In early July, only a few pairs were seen, although regularly so. The last male was seen on 11 July (DOY 192). Later in July, only females were seen, in flocks of up to 17 birds (former delta, 17 July [DOY 198]). The last Long-tailed Duck of the season was a lone bird on Lomsø on 22 August (DOY 234). No chicks were seen in 2009.

We estimated that two pairs of Common Raven (*Corvus corax*) covered the valley, both assumed to nest in areas beyond the borders of the census area. The first six juvenile birds were seen on 6 July (DOY 187) at the research station. During July, August, September, and until the last bird observer left the research station on 11 October, either one or two birds from this flock were seen regularly around the valley.

#### VISITORS AND VAGRANTS

A Canada Goose (*Branta canadensis*) was seen on 5 June (DOY 156) flying to a temporary pond west of the census area. This is only the third season at Zackenberg during which this species was seen (Table 11).

Gyr Falcons (*Falco rusticolus*) were spotted several times during the season. There was a single observation of one grey Gyr Falcon on 8 June (DOY 159). Two different individuals were seen around the valley on 18 June (DOY 169) – one white morph, one grey. A white morph bird was observed by several people at the station on 25 July (DOY 206). In September, several birds were seen regularly. On 4 September (DOY 248), a group of four (two white morphs, a grey and a very dark bird) was seen, and later the same day a single white bird was seen. Another 14 observations of Gyr Falcons followed until 24 September. Eleven of these were of light-morphed birds, one was dark and the last observation came without any morph indication. They seemed to follow the peaks of Snow Bunting immatures in the valley, sometimes staying for a few days.

Eurasian Golden Plover (*Pluvialis apricaria*) was recorded with an uncertain observation of a pair on 30 June (DOY 181), at the foot of Aucellabjerg, and with a certain observation of one individual, 2 July (DOY 183). Eurasian Golden Plovers have been recorded at Zackenberg almost every year since 1996 (Table 11).

A single (possible female) Pectoral Sandpiper (*Calidris melanotos*) was seen on at least two

TABLE 11. Numbers of individuals and observations of avian visitors and vagrants at Zackenberg 2009, compared with the numbers of individuals observed in the preceding seasons, 1995-2008. Multiple observations reasonably believed to have been of the same individual have been reported as one individual.

Species	Visitors and vagrants																
	Previous records																2009
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	No individual	No. observations	
Great Northern Diver	0	0	0	0	0	0	1	0	0	0	0	0	2	2	0	0	
Whooper Swan	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	
Snow Goose	0	0	0	0	0	2	11	0	23	0	0	0	1	0	0	0	
Canada Goose	0	0	0	0	0	0	0	0	0	0	0	4 <sup>e</sup>	3 <sup>e</sup>	0	1	1	
Merlin	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
Gyr Falcon	1	1	1	3	0	4	5	1	3	4	2	0	3 <sup>e</sup>	2 <sup>c</sup>	4	4	
Pintail Duck	0	0	0	1 <sup>d</sup>	0	0	0	0	0	0	0	0	3 <sup>d</sup>	0	0	0	
Common Teal	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
Eurasian Golden Plover	0	3	1	3	1	0	3 <sup>e</sup>	1	0	1	1	1	1	1	2	1	
White-rumped Sandpiper	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	
Pectoral Sandpiper	0	0	0	1	0	0	0	2	0	0	0	1	1	0	1	3	
Purple Sandpiper	0	0	0	0	0	0	0	1 <sup>f</sup>	0	0	0	0	0	0	0	0	
Red Phalarope	0	0	0	4 <sup>5</sup>	0	0	4 <sup>e</sup>	0	1	0	2 <sup>c</sup>	11 <sup>e</sup>	0	2	0	0	
Common Snipe	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Whimbrel	0	0	0	0	0	1	1	0	0	2	1	0	1	2	0	0	
Eurasian Curlew	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
Redshank	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
Pomarine Skua	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	
Arctic Skua	0	0	11	6	0	2	7	4	3	2	0	1	0	0 <sup>g</sup>	0	0	
Great Skua	0	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	
Lesser Black-backed Gull	0	0	0	0	0	0	1	0	1	2	1	4	0	0	0	0	
Iceland Gull	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	
Great Black-backed Gull	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	
Black-legged Kittiwake	0	0	0	0	0	0	0	0	14 <sup>h</sup>	0	0	0	0	0	0	0	
Arctic Tern	≈200	2	1	2	0	14	0	0	32	0	0	0	0	57	0	0	
Snowy Owl	0	0	2	1	1	1-2	≥4 <sup>f</sup>	0	0	0	0	0	1 <sup>b</sup>	0	0	0	
Meadow Pipit	0	0	0	1	0	0	0	0	0	0	1 <sup>c</sup>	1 <sup>c</sup>	0	0	0	0	

TABLE 11. Continued.

Species	Visitors and vagrants													2009		
	Previous records													No individual	No. observations	
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007			2008
White Wagtail	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Northern Wheatear	4	8 <sup>c</sup>	4	3 <sup>c</sup>	1-2 <sup>c</sup>	0 <sup>b</sup>	0	0	0	0	2	1	4 <sup>b</sup>	2	2 <sup>d</sup>	3
Lapland Longspur	0	0	0	0	1-2	0	1	0	0	0	1	0	0	0	0	0

<sup>a</sup> Subspecies interior

<sup>b</sup> See Hansen et al. 2009

<sup>c</sup> After regular season, 4 observations of 1-3 birds.

<sup>d</sup> Northernmost records in East Greenland (cf. Bortmann 1994)

<sup>e</sup> At least one territory, possible territory or breeding found, see Table 1

<sup>f</sup> Juvenile

<sup>g</sup> Before the regular season, 1 in adjacent areas

<sup>h</sup> One dead individual found

<sup>i</sup> Further more another to pairs plus 2 juveniles in adjacent areas.

occasions in 2009; 8 and 12 June (DOY 159 and 163), as well as an uncertain observation on 24 July (DOY 205).

On 17 June (DOY 168), a light morph Arctic Skua (*Stercorarius parasiticus*) was seen in the central part of the census area.

Northern Wheatear (*Oenanthe oenanthe*) was back as a breeding bird in 2009, albeit outside of the census area. At least three different pairs were seen, and at least one pair had fledged young. Inside the census area a single bird was seen near the research station on three occasions: 14 May, 19 June and 28 June (DOY 134, 170 and 179). This is considered to be a bird from the pair that was seen regularly at the Zackenberg trapping station – the likely parents of the fledged young. On 22 September (DOY 265) a Northern Wheatear was found dead – in fresh condition – under the porch of the accommodation building. The specimen was collected.

#### VALIDATION OF SIGHTINGS FROM PREVIOUS SEASONS

The Rarities Committee for Denmark and Greenland (BirdLife Denmark) have approved the observations of Pectoral Sandpipers (2006, 2007) and White-rumped Sandpiper (*Calidris fuscicollis*) (2005) from Zackenberg (Kristensen et al. 2007, 2009). All rare birds reported in the annual reports from Zackenberg have been approved, and are considered true observations. This season’s observation of a Pectoral Sandpiper is currently under review.

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