Bird Populations 11:42-51

BIRD MONITORING AT ZACKENBERG, NORTHEAST GREENLAND, 2010, WITH COMPARRISON WITH 1996-2009[1,2]

JANNIK HANSEN[3], LARS HOLST HANSEN AND NIELS MARTIN SCHMIDT
Department of Bioscience
Aarhus University
P.O. Box 358
DK-4000 Roskilde, Denmark

JEROEN RENEERKENS
Animal Ecology Group
Centre for Ecological and Evolutionary Studies
University of Groningen
PO Box 14
9750 AA Haren, The Netherlands

Abstract. In 2010, bird populations continue to be monitored in a 15.8 km^2 designated area at Zackenberg Research Station in central Northeast Greenland. Results are presented and compared with those from previous seasons (1995 – 2009). The breeding bird census resulted in densities generally comparable with previous years, but with relatively high densities of Sanderling (*Calidris alba*) and Dunlin (*Calidris alpina*). For all wader species, nesting was early compared to previous years, but with extremely low nest success. The number of Long-tailed Skua (*Stercorarius longicaudus*) territories was lower than average, and only one pair nested (unsuccessfully) in the census area, reflecting a season with very low lemming numbers. For Barnacle Geese (*Branta leucopsis*), the mean brood size was low early in the season, but later in the season numbers were close to average.

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

MONITOREO DE AVES EN ZACKENBERG, NORESTE DE GROENLANDIA, 2010, CON UNA COMPARACION CON 1996-2009

Resumen. En 2010, el monitoreo de poblaciones de aves continuó en un área de 15.8 km^2 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 (1995-2009). El censo de aves reproductoras mostró densidades generalmente comparables a las de años anteriores, pero con densidades relativamente altas para *Calidris alba* y *C. alpina*. Para todas las zancudas, la nidificación fue temprana con respecto a años anteriores, pero con un éxito reproductivo extremadamente bajo. El número de territorio de *Stercorarius longicaudus* fue inferior a la media, y solo una pareja anidó (sin éxito) en el área de censo,

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[3]Corresponding author: jaha@dmu.dk

reflejando una temporada de pocos lemings. Para Branta leucopsis, el tamaño medio de puesta fue bajo a principio de temporada, pero hacia el final los números fueron cercanos al promedio.

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

INTRODUCTION

In central Northeast Greenland, the monitoring programme, Zackenberg Basic, based at the Zackenberg Research Station (74°30'N, 21°00'W), was conducted for the 15th consecutive season. For details of the previous years, and a summary of the bird monitoring part of the BioBasis programme, please refer to Hansen et al. (2010). The 16th ZERO Annual Report (Jensen and Rasch 2011) also presents these data. Reports from all previous seasons are available at www.zackenberg.dk/publications/

The methodologies used by BioBasis are available at the home page of the research station (http://www.zackenberg.dk/monitoring/biobasis/) and the current sampling protocol (Schmidt et al. 2010) is available through the authors. The database is available online: http://www.zackenberg.dk/data/

RESULTS AND DISCUSSION

BREEDING POPULATIONS

Between day 166 and 176 (15 June to 25 June), a complete initial census was carried out. That is a normal start and a slightly delayed last day of census. The entire census was performed on days with good weather conditions; poor weather was encountered only on a few days. The completion of the survey took 36 'man-hours', which is average. In addition, large parts of the census area were covered regularly during June, July and most of August, with the exception of avoiding a closed goose moulting area along the coast and the Aucellabjerg slopes above 350 m a.s.l. The latter were covered on only six occasions, in addition to the many visits by Reneerkens and colleagues.The total effort in June and July 2010 was average in June and lower in July compared to recent years.

The results of the initial census, supplemented with records from the rest of the season (see Meltofte et al. 2009), are presented in Table 1; and in Table 2, these are compared with the estimates of previous seasons.

The first Red-throated Diver (*Gavia stellata*) was observed day 150 (30 May). On day 156 (5 June), the first pair of Red-throated Divers settled in a fen near the research station. Three pairs attempted to breed within the census area and two nests were found. Both nests were eventually predated. In adjacent areas, a Red-throated Diver pair was recorded in the lake, Vesterport Sø. The pair nested briefly at the nest site used in the last few seasons (2007-09). Like the last couple of years, this attempt was unsuccessful due to predation.

A female and two male Pintail Ducks (*Anas acuta*) were seen around the study area from day 158 (7 June) until day 173 (22 June), after which one male disappeared. The remaining pair stayed until day 198 (17 July). No nest or other signs of nesting was found. This is the first time Pintail Ducks have been present in the study area during the breeding season (Table 2).

Sanderling (*Calidris alba*) territories were recorded at comparatively high numbers, which has been the trend in recent years (Table 2). Dunlin (*Calidris alpina*) territories were found in higher than average numbers (cf. Hansen et al. 2010, 2012). It should be noted that numbers from earlier years might have been underestimated (Meltofte 2006). The number of Common Ringed Plover (*Charadrius hiaticula*) territories was near average. Ruddy Turnstone (*Arenaria interpres*) territories were almost back to the average numbers, as were those of Red Knot (*Calidris canutus*) (Tables 1, 2).

No Red-necked Phalarope (*Phalaropus lobatus*) nests were found in 2010. A female was seen in ponds around the research station from day 159 (8 June), and with a male from day 162 (11 (DOY: 162). The pair was last seen on day 168 (17 June). One Red Phalarope (*Phalaropus fulicarius*) nest was found in the census area in 2010. In the

TABLE 1. Estimated numbers of pairs/territories in four sectors of the 15.8 km² census area in Zackenbergdalen, 2010.

Species	<50 m a.s.l. 7.77 km²	50-150 m a.s.l. 3.33 km²	150-300 m a.s.l. 2.51 km²	300-600 m a.s.l. 2.24 km²	Total
Red-throated Diver	3	0	0	0	3
Pintail Duck	1	0	0	0	1
King Eider	1-3	0	0	0	1-3
Long-tailed Duck	5	0	0	0	5
Rock Ptarmigan	1	0	0-1	0	1-2
Common Ringed Plover	12-14	3	4-5	8-9	27-31
Red Knot	4	10	7	3	24
Sanderling	31-38	2-3	9-12	12-13	55-67
Dunlin	64-70	21-23	2	0	87-95
Ruddy Turnstone	16	18-20	3	0	37-39
Red-necked Phalarope	1	0	0	0	1
Red Phalarope	1	0	0	0	1
Long-tailed Skua	7	6	0	0	13-19
Glaucous Gull	1	0	0	0	1
Arctic Redpoll	1	0	0	0	1
Snow Bunting	16-19	23	6-7	3	48-52
Lapland Bunting	1	0	0	0	1

census area, a female was seen in fens near the research station during day 166-171 (15-20 June), being with a male on day 168 (17 June). The nest was found fully laid on day 181 (30 June), and by day 185 (4 July) all four eggs were starred. However, on day 187 (6 July) the nest was found predated, and the nest cup smelled of Arctic Fox (*Alopex lagopus*) urine.

Long-tailed Skua (*Stercorarius longicaudus*) territories were found in lower numbers than usual (as low as 2009: 13-17 territories; Table 2). Only one pair nested in the census area (see below).

A Glaucous Gull (*Larus hyperboreus*) pair had a nest on an islet in the same stretch of Zackenbergelven, as it has had since at least 2004. No chicks were seen, and the nest is thought to have fallen victim to predation. This species was seen daily throughout the season.

The number of Rock Ptarmigan territories (*Lagopus muta*) was low. During the census, only one territory, and a possible second one, was found. The brood of the certain pair was encountered on day 216 (4 August). In adjacent areas, a female with a brood of 10 was found on the southern slopes of Mt. Zackenberg, at 50 m a.s.l. on day 209 (28 July).

Numbers of Snow Bunting (*Plectrophenax nivalis*) territories were below the average of the last few years, yet higher than the period 1996-2003 (Table 2, Figure 1). Juveniles of snow bunting were seen both within the census area and in adjacent areas – in fair numbers. No systematic counts of juveniles were made, but the impression is that snow buntings had a breeding season with a fair rate of successful fledging. Only one Arctic Redpoll (*Carduelis hornemanni*) territory was recorded this year (Table 2). For the first time since the start of BioBasis, a pair of Lapland Bunting (*Calcarius lapponicus*) bred in the study area. One pair nested on the lower slopes of Aucellabjerg. Fledglings were observed on day 199 (18 July). Unfortunately, we do not have the number of fledglings. This is the northernmost breeding record of the species (Boertmann 1994).

REPRODUCTIVE PHENOLOGY IN WADERS

Nest initiation was early in all species (Table 3): 28.3% of all wader nests were initiated before 10 June, 86.6% before 20 June and just 10% after 20 June. The snow cover on 10 June 2010 was 72% and nest initiation was early compared to previous seasons (Table 4).

REPRODUCTIVE SUCCESS IN WADERS

The all-wader nest success was extremely low in 2010 – lower than ever before during the

TABLE 2. Estimated numbers of pairs/territories in the 15.8 km² census area in Zackenbergdalen; 2010 compared with the 1996-2009 averages.

Regular breeders				
Species	No. territories	Average min. and max. territories 1996-2009	Nests found[1]	Comments
Red-throated Diver	3	2.4-2.8	1	Chicks seen in adjacent areas
Pintail Duck	1	0	0	
Common Eider	0	0.4	0	
King Eider	1-3	1.2-1.9	0	
Long-tailed Duck	5	5.4-6.4	0	
Rock Ptarmigan	1-2	2.6-3.6	0	
Common Ringed Plover	27-31	28.7-35	1	
Red Knot	24	24.7-32	3	
Sanderling	55-67	50.3-58	17	
Dunlin	87-95	74-84.2	8	
Ruddy Turnstone	37-39	41.4-46.5	10	
Red-necked Phalarope	1	0.8-1.7	0	
Long-tailed Skua	13-19	18.1-22.1	1	
Glaucous Gull	1	0.4	1	
Common Raven	2	-	0	Nests outside the census area.
Arctic Redpoll	1	6.4-10.4	0	
Snow Bunting	48-51	42-47	1	Nests of passerines are only found oportunistically.
Irregular breeders				
Species	No. of territories	Average min. and max. no. territories 1996-2009	No of nests found[1]	Comments
Pink-footed Goose	0	0.1	0	
Eurasian Golden Plover	0	0.1	0	
Red Phalarope	1	0.6-0.8	1	
Snowy Owl	0	0.1	0	
Northern Wheatear	0	0.1-0.2	0	Territory recorded outside census area
Lapland bunting	1	0	1	

[1] Within the census area

BioBasis programme. Using the modified Mayfield method (Johnson 1979), 91% of the wader nests were subjected to predation.

Dunlin nests were less hard than hit other wader species, with 61.5% nest success, which is a fairly high success rate. It was another rough season for Sanderling nests (Table 5). Three Red Knot nests were found, all of which suffered predation. Just over a third of the Ruddy Turnstone nests were successful, the remainder having been predated. As described above, a single Red Phalarope nest was unsuccessful.

The number of Arctic fox encounters was relatively low. However, in these numbers we have excluded fox visits to the research station, which were pronounced this year. An adult fox brought pups – surprisingly young – to the research station as early as day 187 (6 July). The apparent "getting used to" the research station is an increasing problem – primarily linked to problems around the way our kitchen waste is being disposed of (Hansen 2011). Pups were recorded in three dens this season (Table 5). This would probably be the part of the reason for the high predation on wader eggs.

The mean wader clutch size in 2010 was 3.80,

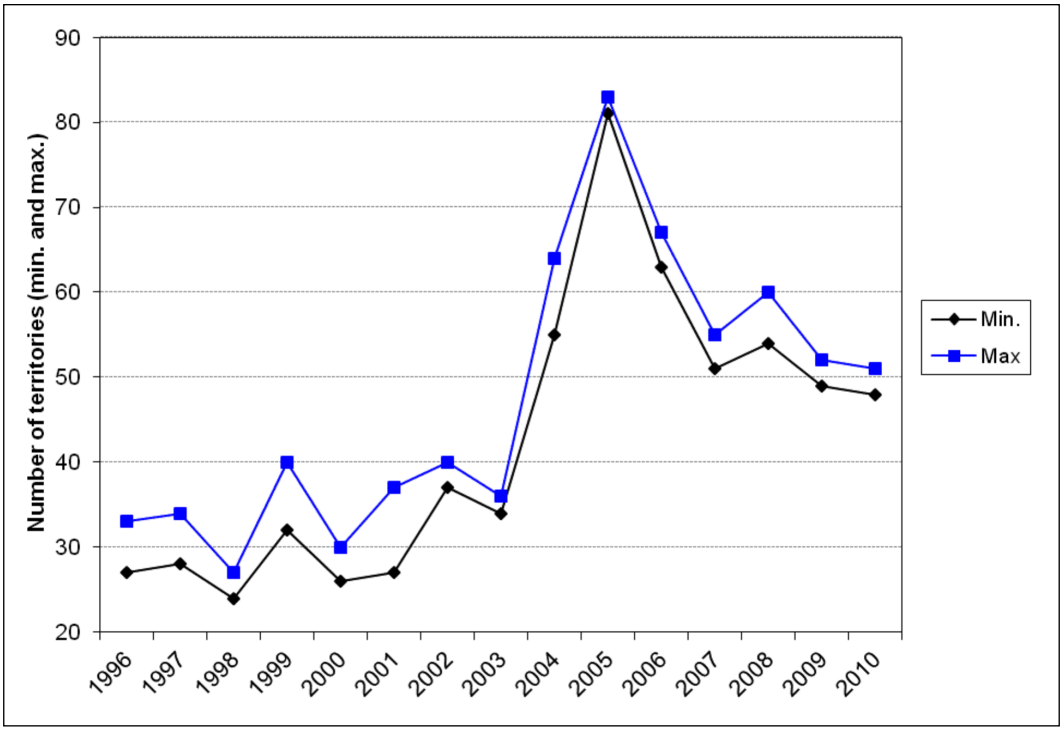

FIGURE 1. Numbers (minimum and maximum) of Snow Bunting territories in the census area at Zackenberg, 1996-2010.

TABLE 3. Median first egg dates for waders at Zackenberg 2010 as estimated from incomplete clutches, egg floating, hatching dates, as well as weights and observed sizes of pulli.

Species	Median date	Range	N	Average 1996-2009
Common Ringed Plover	162	162	1	166.8
Red Knot	163	161-166	3	166.8
Sanderling	163	152-178	29	168.7
Dunlin	164	152-177	13	166.7
Ruddy Turnstone	165	157-172	12	164.5

TABLE 4. Snow cover on 10 June together with median first egg dates for waders at Zackenberg 2010. Data based on < 10 nests/broods are in brackets, data when < 5 are omitted. The snow cover is pooled (weighted means) from section 1, 2, 3 and 4 (Sigsgaard et al. 2011), from where the vast majority of the egg laying phenology data originate. Refer to Hansen et al. (this issue) for data from previous seasons.

Species	2010
Snow cover on 10 June	72
Sanderling	163
Dunlin	165.5
Ruddy Turnstone	165

which is below average (Table 6). Nests containing fewer than four eggs were as follows: Sanderling, two nests of three eggs; Ruddy Turnstone, two nests of three eggs. A Ruddy Turnstone nest – unusually – contained five eggs. These three Ruddy Turnstone nests suffered predation.

In July and early August, alarming parents – and later juveniles – were found in the fens and marshes (Dunlins), and on the slopes of Aucellabjerg and in the dry lowlands (Common Ringed Plovers, Red Knots, Sanderlings, Dunlins, Turnstones).

Data on chick survival are scarce, and as early as day 168 (17 June), flocks of Long-tailed Skuas roamed the lower slopes of Aucellabjerg and the lowlands. The largest flock had 32 individuals.

REPRODUCTIVE PHENOLOGY AND SUCCESS IN LONG-TAILED SKUAS (STERCORARIUS LONGICAUDUS)

Only one nest was found initiated after the census period (later than the average of any preceding year; Table 7). The nest suffered predation. No Northern Collared Lemming (*Dicrostonyx groenlandicus*) was observed by the bird observer, reflecting a season with record low lemming winter nests found (Table 8). On day 223 (11 August), a large juvenile appeared in the area, seemingly coming from one of the adjacent valleys, Store Sødal or Lindemandsdal.

One observation of a third-calendar year bird – in a flock of four birds – is the only observation of immatures this season.

TABLE 5. Mean nest success (%) 2010 according to the modified Mayfield method (Johnson 1979), compared to the 1996-2010 average. Poor data (< 125 nest days or five predations) are given in brackets. Data from species with < 50 nest days have been omitted. If no nest was found, it is indicated by "-". 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. Refer to Hansen et al. (this issue) for data from previous seasons.

Species	2010	1996-2010
Common Ringed Plover		45-48
Red Knot		18.5
Sanderling	3	15.5-16.5
Dunlin	(61.5)	57-62
Ruddy Turnstone	(33.7)	35-40
Red-necked Phalarope	-	0.8
Red Phalarope		42.2
All waders	9	31.4
N nests	46	42.3
N nest days	306.5	373.3
Fox encounters	9	
Fox dens with pups	3	

TABLE 6. Mean clutch sizes in waders at Zackenberg 2010 compared to the weighted mean of previous seasons. Samples of < 5 clutches are given in brackets.

Species	2010	Weigted mean
Common Ringed Plover	4.00*	3.88
Red Knot	4.00*	4.00
Sanderling	3.92	4.28
Dunlin	4.00	4.01
Ruddy Turnstone	3.92	4.10
Weighted mean	3.80	4.13

TABLE 7. Egg-laying phenology, breeding effort and success in Long-tailed Skuas at Zackenberg 2010. Median egg laying date is the date when half the supposed first clutches were laid. 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. For lemming winter nests, see Table 9. Refer to Hansen et al. (this issue) for data from previous seasons.

Variable	2010
Median 1st egg date	172
No. of clutches found	1
No. of young hatched	0
Nest success % (Mayfield)	0
Estimated no. of young fledged	0

TABLE 8. Annual numbers of collared lemming winter nests recorded within the 1.06 km^2 census area in Zackenbergdalen 1996-2010, together with the numbers of animals encountered by one person with comparable effort each year within the 15.8 km^2 bird census area during June-July.

Year	New winter nests	Old winter nests	Animals seen
1996	84	154	0
1997	202	60	1
1998	428	67	43
1999	205	36	9
2000	107	38	1
2001	208	13	11
2002	169	20	4
2003	51	19	1
2004	238	15	23
2005	98	83	1
2006	161	40	3
2007	251	21	1
2008	80	20	4
2009	55	9	0
2010	27	23	0

BARNACLE GEESE (*BRANTA LEUCOPSIS*)

No activity was seen at the Barnacle Goose colony on the southern face of the mountain Zackenbergfjeldet. However, it was probably active, since birds were frequently seen flying towards that part of the mountain, and families with pulli were seen at the foot of the mountain later in the season. For further, recent details on the colony, see Hansen et al. (2009).

In Zackenbergdalen, the first families with goslings were seen on day 180 (29 June). This year, 18 broods were seen (Table 9), and the maximum number of goslings seen at one time, was 6. The mean brood size was low early in the season, but numbers were close to, and even above, the average later in the season (Table 9).

Southward migrating Barnacle Geese were seen from day 220 (8 August), when four flew over the present delta. At total of 144 geese were seen migrating southwards in 2010. The last four flew over the research station on day 258 (15 September). On Isle of Islay, Western Scotland, the percentage of young in the wintering flocks was relatively high (Table 9; Ogilvie 2011).

Immature barnacle geese moulted in numbers below average (1995-2009 average: 209) in 2010 (Table 10).

COMMON BIRDS, NOT BREEDING IN THE CENSUS AREA

Between day 156 (5 June) and day 182 (1 July), 2066 individual immature Pink-footed Geese

TABLE 9. Average brood sizes of Barnacle Geese in Zackenbergdalen during July and early August, 2010, 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 (Ogilvie 2011, pers. comm.). Refer to Hansen et al. (this issue) for data from previous seasons.

	2010
Primo July	1.5*
Medio July	1.8*
Ultimo July	1.4*
Primo August	1.6*
No. of broods	18
Scotland	2.26
Percent juveniles	11.2

TABLE 10. The number of immature Pink-footed Geese and Barnacle Geese moulting in the study area at Zackenberg 2010. The closed area is zone 1c (see http://www.zackenberg.dk/fileadmin/Resources/DMU/GEM/Zackenberg/pdf/mapzoner_stor_opl.jpg). Refer to Hansen et al. (this issue) for data from previous seasons.

	2010
PINK-FOOTED GOOSE	
Closed moulting area and further east	10
Coast west of closed area	0
Upper Zackenbergdalen	0
Pink-footed Goose total	10
BARNACLE GOOSE	
Closed area at Lomsø and Kystkærene	80
Coast east of closed area	13
Coast west of closed area	0
Upper Zackenbergdalen	0
Barnacle Goose total	93

(*Anser brachyrhynchus*) (recorded unsystematically) on northbound moult migration flew over Zackenbergdalen. Only 10 immature Pink-footed Geese were found moulting in the Zackenberg area (Table 10). Immature Pink-footed Geese on southward migration were recorded from late July and on day 226 (14 August), and a hundred were seen in the former delta. No more records were made in 2010.

On day 170 (19 June), the first pair of Common Eiders (*Somateria mollissima*) was seen in Kystkærene, but no ducklings were seen at or near Zackenberg. A male and three female King Eiders (*Somateria spectabilis*) were seen on day 161 (10 June). No nesting attempts were recorded, and no ducklings were seen. For both eider species, small flocks were seen from June to ultimo July (king eider)/mid-August (common eider).

Long-tailed Ducks (*Clangula hyemalis*) were seen from day 154 (3 June), after which pairs were seen almost daily until mid-July. In late July and August, only a few pairs were seen but no nest or ducklings were seen.

We estimate that two pairs of Common Raven (*Corvus corax*) nested in areas beyond the borders of the census area, with home ranges well within our study area. The first three juvenile birds were seen on day 217 (3 August) at Sydkærene.

VISITORS AND VAGRANTS

In Table 11 we present data on avian visitors and vagrants. A single Pectoral Sandpiper (*Calidris*

TABLE 11. Numbers of individuals and observations of avian visitors and vagrants at Zackenberg 2010. Multiple observations reasonably believed to have been of the same individual have been reported as one individual. Refer to Hansen et al. (this issue) for data from previous seasons.

Visitors and vagrants		
	2010	
Species	No. individuals	No. of observations
Great Northern Diver	1	1
Whooper Swan	0	0
Greylag Goose	1	1
Snow Goose	0[a]	0
Canada Goose	0	0
Merlin	0	0
Gyr Falcon	3	4
Pintail Duck	3	11
Common Teal	0	0
Eurasian Golden Plover	2	2
White-rumped Sandpiper	0	0
Pectoral Sandpiper	1	3
Purple Sandpiper	0	0
Red Phalarope	2	3
Common Snipe	0	0
Whimbrel	0	0
Eurasian Curlew	0	0
Redshank	0	0
Pomarine Skua	0	0
Arctic Skua	0	0
Great Skua	0	0
Lesser Black-backed Gull	0	0
Iceland Gull	0	0
Great Black-backed Gull	0	0
Black-legged Kittiwake	0	0
Arctic Tern	0	0
Snowy Owl	0	0
Meadow Pipit	0	0
White Wagtail	0	0
Northern Wheatear	5[b]	7
Lapland Longspur	2[c]	7

[a] Two outside census area

[b] Three juveniles, all from pair(s) outside the census area

[c] At least one territory, possible territory or breeding found, see Table 1

melanotos) (likely female) was seen day 159 (8 June) and day 160 (9 June). Photo evidence was obtained at the first sighting. On day 163 (12 June), the bird was spotted again at the same site as day 160 (T. Roslin, pers. comm.). This is the only notable rarity in 2010.

VALIDATION OF SIGHTINGS FROM PREVIOUS SEASONS

The Rarities Committee for Denmark, Faroe Islands and Greenland (under BirdLife Denmark) has officially recognised two observations of Pectoral Sandpiper from 2009

(Hansen et al. 2012) and the one from 2010 described above. All submitted rarities from Zackenberg over the years are now officially recognised sightings.

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