RESEARCH NOTE

Predation of flightless pink-footed geese (*Anser brachyrhynchus*) by Atlantic walruses (*Odobenus rosmarus rosmarus*) in southern Edgeøya, Svalbard

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Keywords
Anserinae; mortality; moult migration.

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doi:10.1111/j.1751-8369.2010.00180.x

Abstract

Observations of walrus (*Odobenus rosmarus rosmarus*) predation of flightless pink-footed geese (*Anser brachyrhynchus*) at an important moult site in southern Edgeøya, Svalbard, constitute the first documented evidence of flightless Anatidae being taken by this species.

A satellite telemetry study of Svalbard pink-footed geese (*Anser brachyrhynchus*) showed that tagged non-breeding geese moved approximately 200 km east from potential breeding areas in western Spitsbergen, mostly to Edgeøya, to undertake wing moult (Glahder et al. 2007). Those authors contended that the non-breeding geese, freed from allegiance to brood-rearing areas, moved east to exploit the delayed thaw compared with central and southern Spitsbergen, which resulted in the later development of the early stages of summer plant growth in those areas. In this way, moult migrant geese were able to exploit vegetation in habitats where the season is too short to support reproduction, but where plant production is sufficient to maintain moulting flightless geese while they replace wing feathers. At least three of the six geese tagged on the wintering grounds in Denmark moulted around the shores of Tjuvfjorden (Fig. 1), a large embayment at the southern end of Edgeøya that is rarely visited in July, when flightless moulting geese are in residence, but which was known to be a moulting place of 421 pink-footed and 109 barnacle geese (*Branta leucopsis*) in 1989 (Madsen et al. 1992).

After almost 350 years of unregulated exploitation by Europeans, the walrus (*Odobenus rosmarus rosmarus*) was brought to the brink of extinction in Svalbard, where it was protected in 1952 (Norderhaug 1969; Lydersen et al. 2008). Since then, numbers have increased under protection, and some 79 haul-outs are known around the coasts of Svalbard, amounting to an estimated total population of 2629 (95% confidence interval [CI] 2318–2998) individuals. One of the largest haul-outs is at Andreétangen (77°23′N, 22°37′E) in south-east Svalbard, where 125 were seen in August 2006 (Lydersen et al. 2008).

On 7 July 2009 we sailed in zodiacs around Zieglerøya (77°23′N, 22°26′E), Delitschøya (77°23′N, 22°31′E), a small un-named islet between Delitschøya and the mainland at 77°23′N, 22°34′E and the mainland beach at Andreétangen in Bjørnbukta, in the southern part of Tjuvfjorden (Fig. 1). Photographs were taken of all moulting goose flocks present (mainly on the snow banks along the shore, with some on the sea), and counts were undertaken afterwards, the results of which are presented in Table 1. In all, we found 1050 pink-footed geese and 142 barnacle geese, confirming the Bjørnbukta archipelago area supported more than 1% of the Svalbard pink-footed goose population during the early moult period in 2009, and substantially more of this goose species than 20 years ago (Madsen et al. 1992). We saw no moulting geese on the islands of Ryke Yseøyane or Halvmåneøya during close passes on 6 and 7 July.

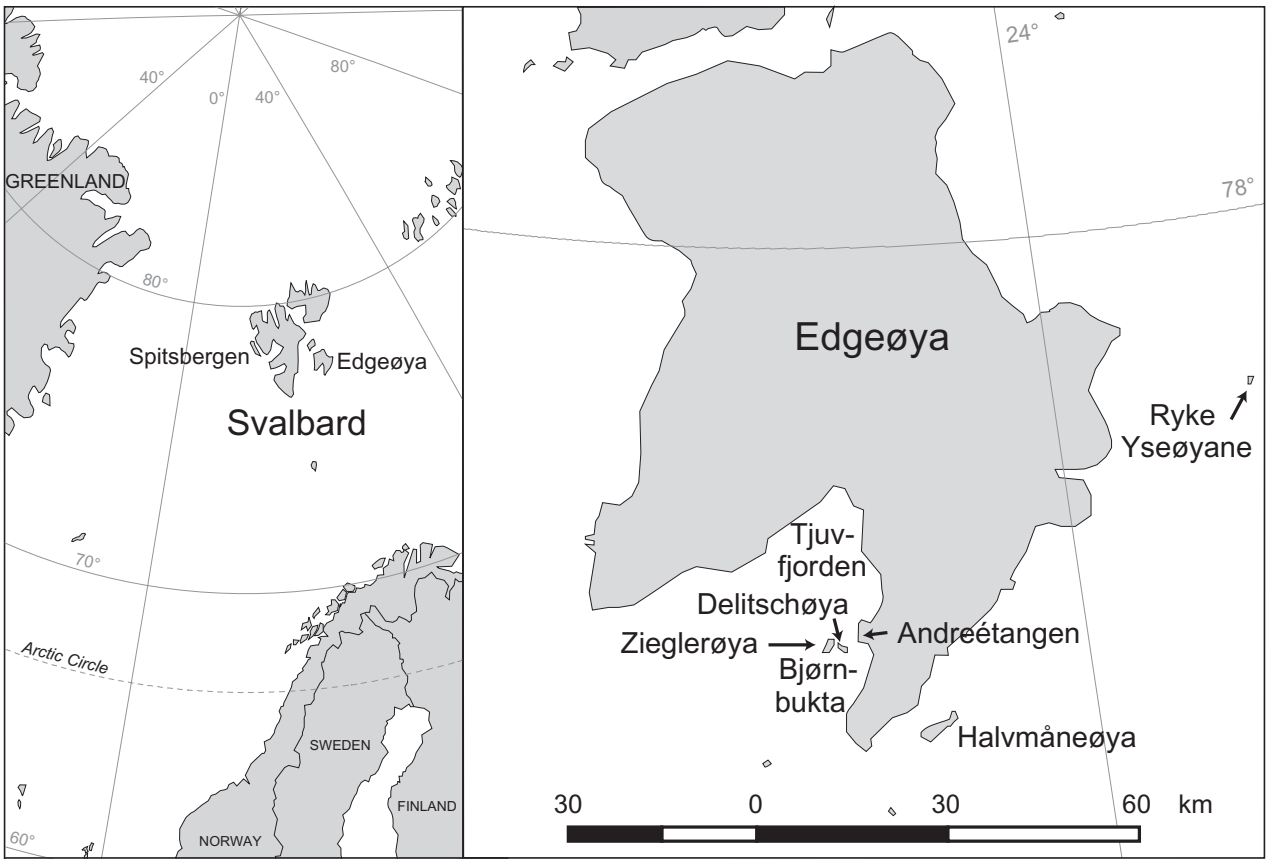

Fig. 1 Map of Edgeøya, showing locations of places named in the text.

Table 1 Counts from photographs of moulting geese present on the offshore islands from Andreétangen in Bjørnbukta in the southern part of Tjuvfjorden, south Edgeøya, Spitsbergen, 9 July 2009.

Site	Position	Pink-footed geese	Barnacle geese
Zieglerøya	77°23′N, 22°26′E	62	4
Delitschøya	77°23′N, 22°31′E	120	48
Un-named islet	77°23′N, 22°34′E	498	74
Off Andreétangen	77°23′N, 22°37′E	380	16
Total		1050	142

On the southern end of the sand and gravel beach at Andreétangen, there was a haul-out of at least 131 walruses, with many more circulating in the waters immediately adjacent to the islands. With 8–10× binoculars, we watched at least eight individual walruses (but potentially more) hunting one group of flightless pink-footed geese on the water. The walruses swam under water, breached the surface in the middle of the swimming goose flock and took a goose in the mouth or with the flippers, either handling the bird on the surface, or most often drawing it down underwater. It appeared difficult for the walruses to achieve an immediate kill, as in at least four instances the dazed goose was seen to bob to the surface and begin to swim away, whereupon the walrus would invariably repeat the attack until the goose no longer reappeared and the bird was considered dead and consumed. Two different walruses were also observed swimming on their backs manipulating the geese with their mouth, tusks and flippers. One goose eventually managed to escape and swim slowly to the shore, joining a dense flock on ice along the coast. However, we saw three geese disappear completely in this way, the victims of at least two different walruses, and it seemed likely that other individual walruses were hunting the geese in a similar fashion at the same time. It was not clear over what depths of waters these attacks took place, but clearly the water was deep enough to permit the animals to dive under the swimming geese. It seems likely that the seabed shelves steeply away from the islands, giving shelter to the geese from walrus attacks only in very shallow waters. Because our presence could have prolonged the period spent by geese on the water (and therefore increased the likelihood of them being

attacked by walruses), we were not willing to remain and make more detailed observations, such as the frequency and success of the attacks, nor were we able to find the remains of any geese consumed.

Walrus have occasionally been found eating seabirds such as black guillemot (*Cepphus grille*; Fay et al. 1990) as well as young (Donaldson et al. 1995) and adult (Mallory et al. 2004) Brunnich's guillemot (*Uria lomvia*) in Canada, but this appears to be the first account of walruses taking flightless moulting geese in the Palearctic. Mallory et al. (2004) reported the walruses consuming only the soft parts of Brunnich's guillemots, leaving feathers, skin and bones floating on the water, but we were not able to confirm this for geese.

The observations confirm that the trait of walruses predating vertebrates may be more geographically widespread than previously considered (Gray 1927; Vibe 1950) in both Pacific (*Odobenus rosmarus divergens*) and Atlantic (*O. r. rosmarus*) walrus (Lowry & Fay 1984; Muir et al. 1995). We cannot assess the nature, frequency or importance of this source of prey to the walruses here, but it is perhaps no coincidence that this behaviour was observed at the southern edge of an area known to be increasingly important for moulting pink-footed geese, and where a consistently large regular haul-out of walruses occurs. This familiarity with a source of prey rendered temporarily flightless during wing moult probably explains the hunting trait amongst different individuals at this site. The Svalbard pink-footed goose population breeds almost exclusively on the archipelago, and has increased in recent years, so the numbers of moult migrants to this area will also have increased (Trinder & Madsen 2008). Given the presence of Arctic fox (*Alopex lagopus*) tracks on the snow of Zieglerøya and the contemporaneous presence of a polar bear (*Ursus maritimus*) on the island at the time of these observations, it may be that depredation by walruses could represent an additional (albeit intermittent) source of predation on water, which otherwise represents a safe refuge for flightless geese from the terrestrial predators of the Arctic.

References

Donaldson G.M., Chapdelaine G. & Andrews J.D. 1995. Predation of thick-billed murres, *Uria lomvia*, at two breeding colonies by polar bears, *Ursus maritimus*, and walruses, *Odobenus rosmarus*. *Canadian Field Naturalist 109*, 112–114.

Fay F.H., Sease J.L. & Merrick R.L. 1990. Predation on a ringed seal, *Phoca hispida*, and a black guillemot, *Cepphus grille*, by a Pacific walrus, *Odobenus rosmarus divergens*. *Marine Mammal Science 75*, 1166–1175.

Glahder C.M., Fox A.D., O'Connell M., Jespersen M. & Madsen J. 2007. Eastward moult migration of non-breeding pink-footed geese (*Anser brachyrhynchus*) in Svalbard. *Polar Research 26*, 31–36.

Gray R.W. 1927. The walrus. *Nature 11*, 923.

Lowry L.F. & Fay F.H. 1984. Seal eating by walruses in the Bering and Chukchi seas. *Polar Biology 3*, 11–18.

Lydersen C., Aars J. & Kovacs K.M. 2008. Estimating the numbers of walruses in Svalbard from aerial surveys and behavioural data from satellite telemetry. *Arctic 61*, 119–128.

Madsen J., Bregnballe T. & Hastrup A. 1992. Impact of the Arctic fox *Alopex lagopus* on nesting success of geese in southeast Svalbard, 1989. *Polar Research 11*, 35–39.

Mallory M.L., Woo K., Gaston A.J., Davies W.E. & Mineau P. 2004. Walrus (*Odobenus rosmarus*) predation on adult thick-billed murres (*Uria lomvie*) at Coats Island, Nunavut, Canada. *Polar Research 23*, 111–114.

Muir D.G.C., Segstro M.D., Hobson K.A., Ford C.A., Stewart R.E.A. & Olpinksi S. 1995. Can seal eating explain levels of PCBs and organochlorine pesticides in walrus blubber from eastern Hudson Bay (Canada)? *Environmental Pollution 90*, 335–348.

Norderhaug M. 1969. Hvalrossens (*Odobenus rosmarus*) forekomst i Svalbardområdet 1960–1967. (The occurence of the walrus [*Odobenus rosmarus*] in the Svalbard area 1960–1967.) *Norsk Polarinstitutts Årbok 1969*, 146–150.

Trinder M.N. & Madsen J. 2008. Predictive modelling of the Svalbard pink-footed goose *Anser brachyrhynchus* population: an evaluation of the potential impacts of increased hunting pressure. *Vogelwelt 129*, 158–168.

Vibe C. 1950. *The marine mammals and the marine fauna in the Thule district (northwest Greenland) with observations on ice conditions in 1939–41. Meddelelser om Grønland 150(6)*. Copenhagen: Commission for Scientific Investigations in Greenland.