Nest sites of the newly established Canada Goose population in West Greenland

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(Med et dansk resumé: Redehabitat hos den nyetablerede bestand af Canadagås i Vestgrønland)

Until recently the only common goose species breeding in West Greenland was the Greenland White-fronted Goose *Anser albifrons flavirostris* (Salomonsen 1981). However, in recent years still more Canada Geese *Branta canadensis* have established themselves successfully in this part of the country (Bennike 1990, Boertmann 1994, Fox et al. 1996, Kristiansen 1998). Records now suggest a population of c. 2500 breeding pairs and a primary breeding range between 66°-70°N (Malecki et al. 2000).

Three subspecies of Canada Geese have been reported as breeding in Greenland (Boertmann 1994). In Isunngua (67°05'N, 50°30'W), an area just north of Kangerlussuaq, it is *B. c. interior* which has colonized successfully (Fox et al. 1996, Kristiansen et al. 1999). Since we know only little about the ecology of these new settlers (Kristiansen 1997), the aim of the present paper is to describe their nesting habitat and to discuss the potential of inter-specific competition for breeding sites with the endemic Greenland White-fronted Goose.

Study area and methods

The Isunngua area lies north and west of the airport of Kangerlussuaq adjacent to the ice-cap, in low arctic West Greenland. The area is characterised by gently sloping hills between 100 to 600 m above sea level with numerous marshes and lakes of varying size. The vegetation on the hill slopes is dominated by shrub such as *Salix glauca*, *Betula nana* and *Ledum palustre* intermingled with grasses like *Poa arctica* and *Calamagrostis* sp. The marsh areas are dominated by sedges such as *Carex rariflora*, *Eriophorum angustifolium* and *E. scheuchzeri*, often growing in moss carpets. Vegetation along the shore edges comprises either the marsh or shrub species. In some places the shore is bare rock. Details of the vegetation are found in Wright & Mitchell (1993) and Fredskild (1996).

Between 1 and 27 July 1998 we searched for nests within an area of 15.11 km^2 by walking around all lakes and ponds surveying a 50 m wide strip along the shore. Nests were identified to species by collecting samples of nest-down and subsequently comparing these with a reference

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collection at the Wildfowl & Wetlands Trust, Slimbridge, UK. In addition, one nest was occupied by an incubating female. At each nest the percentage cover of the vegetation was recorded in quadrates of 1 m^2 north, south, east and west of the nest. Percentage cover was estimated by eye for each plant species in the quadrates. Approximate altitude (height above sea level) was recorded from 1:100 000 maps to nearest 25 metres, and lake size, distance from water (measured from the centre of the nest) and height above water (lake) were also recorded.

Results

A total of 17 nests were found of which 14 had been used in 1998 (appeared newly built, contained down and/or egg shells), a density of at least 0.93 nest km^{-2}. However, it is likely that not all nests were found. The nests were positioned at altitudes between 375-500 m above sea level (mean 460 m) and always in close proximity (mean 191 cm) to lakes ranging from 0.4-12 ha (mean 6 ha) (Table 1). Often nests were situated on small peninsulas and one was on a small island. None of the nests were highly concealed and most were easily detected at some distance. Five nests were in *B. nana* and *S. glauca* dominated shrub vegetation. Four nests were in a shrub/grass mix (mainly *Calamagrostis* sp. or *Poa arctica*) and two in areas where tall *Calamagrostis* sp. grass was most prominent. Three extremely exposed nests were located in very short graminoid vegetation. One of these nests could be seen at a distance of c. 100 m.

Table 1. Habitat parameters of Greenland Canada Goose nests at Isunngua, West Greenland 1998.
Habitatparametre for reder af Canadagås, Vestgrønland 1998.

Nest *Rede*	Distance to water, cm *Afstand til vand, cm*	Height above water, cm *Højde over vand, cm*	Altitude above sea level m *Højde over havet, m*	Lake size ha *Sø-areal, ha*
1	250	70	375	11.8
2	100	82	475	9.0
3	164	98	475	9.0
4	247	85	475	7.7
5	98	77	500	9.1
6	150	150	475	7.7
7	250	100	500	6.6
8	130	50	450	9.3
9	490	90	475	9.0
10	167	33	500	0.4
11	39	22	500	0.4
12	90	35	375	7.7
13	360	145	500	0.9
14	140	115	375	3.1
X	191.1	82.3	460.7	6.55
SD	120.1	39.0	48.7	3.75

Discussion

With its numerous lakes and marshes the Isunngua area seem to provide the main habitat components essential for breeding Canada Geese suggested by C. S. Williams & C. A. Sooter (quoted in Kaminski & Weller 1992) and Williams & Nelson (1943). The Canada Geese in Isunngua selected nest sites typical of the species, close to open water and associated with lakes ranging from 0.2-12 ha, which compares reasonably well with other studies of nesting *interior* Canada Geese (Kaminski & Prince 1977, Raveling & Lumsden 1977). Open water in the vicinity of the nest is known to provide the incubating female with a safe means of escape from mammalian land predators (e.g. Hanson & Browning 1959, Lebeda & Ratti 1983). The Canada Goose nests found in Greenland were in relatively exposed positions, suggesting that high and dense vegetation was not of crucial importance to the birds. Such exposed positions provided the incubating female with good all-around visibility, enabling incubating geese to see approaching predators from a long way off. On the other hand, the nests must have been relatively easy to detect by the only potential predator in the area, the arctic fox *Alopex lagopus*. However, it is likely that the relatively large *interior* Canada Goose is capable of defending itself and its nest against this predator.

Although Canada Geese and White-fronted Geese in West Greenland have widely overlapping distributions, they are usually segregated at a local scale during the nesting phase (Malecki et al. 2000). Unfortunately we found no Greenland White-fronted Goose nests during our search, so we cannot compare the nesting habitats of the two species at a local scale. However, nests of Greenland White-fronted Geese c. 70 km north of Isunngua were located relatively far from open water (Fox & Stroud 1988), in contrast to the Canada Goose nests. There was no apparent difference in the vegetation communities surrounding the nests of the two species, and altitudes were similar. Therefore, although based on rather limited data, there seems to be no competition for actual nest sites between the two

Nest af Canada Goose by a lake in Greenland. Photo: Jens Nyeland Kristiansen.
Canadagæssene i Grønland placerer altid deres reder i umiddelbar nærhed af søer.

species. However, in Isunngua most Canada Goose nests were located in areas that are known to have been used as brood-rearing sites by White-fronted Geese (A. D. Fox & J. N. Kristiansen unpubl. data). Therefore, there may be competition for brood-rearing sites when the White-front families move to these sites after hatching. Breeding Canada Geese are extremely aggressive and are unlikely to permit the White-fronted Geese to enter their brood-rearing areas, which may be the reason for the decreasing number of White-front families in the area during 1988-1999, and the reason that we observed no sympatric broodrearing sites in 1998 and 1999 (own unpubl. data).

Once a rare breeder in Greenland the Canada Goose population has increased enormously during the last decade. If this population increase continues it will be interesting to follow the consequences for the breeding population of the endemic Greenland White-fronted Goose.

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Resumé

Redehabitat hos den nyetablerede bestand af Canadagås i Vestgrønland

Canadagåsen *Branta canadensis*, specielt underarten *B. c. interior*, har i løbet af de seneste 10-15 år for alvor etableret sig som ynglefugl i Vestgrønland, men endnu er vor viden om denne bestands biologi begrænset. I denne artikel præsenteres en beskrivelse af Canadagæssenes redehabitat i Isunngua, et område lige nord for Kangerlussuaq (Sdr. Strømfjord), og på baggrund af dette diskuteres mulighederne for konkurrence med den Grønlandske Blisgås *Anser albifrons flavirostris*. Mellem 1. og 27. juli 1998 ledte vi efter reder i et område på 15 km^2. I alt fandt vi 17 reder, hvoraf de 14 var benyttet det pågældende år, svarende til en tæthed på 0,93 reder pr km^2 . Rederne var i gennemsnit placeret 460 meter over havet og altid i umiddelbar nærhed af søer på 0,4-12 ha (gennemsnitlig afstand 191 cm). Alle reder lå relativt

eksponeret og kunne tydeligt ses på nogen afstand. De fleste reder var placeret på mindre halvøer, og vegetationen omkring dem var som regel dværgbuske (*Betula nana* og *Salix glauc*a), en blanding af dværgbuske og græs, eller domineret af græsser eller halvgræsser.

Placeringen af reden nær åbent vand giver den rugende gås mulighed for at søge tilflugt på søen i tilfælde af angreb fra eventuelle landrovdyr. Selvom den eksponerede placering betyder, at reden nemt opdages af rovdyr, giver det samtidig gåsen mulighed for at opdage en trussel i god tid. Ved at placere reden på en halvø behøver gåsen kun at holde udkig mod landsiden (polarræven er det eneste potentielle rovdyr i området). Formentlig sætter denne placering også gåsen i stand til lettere at forsvare reden.

Vi fandt desværre ingen reder af Blisgås i området, hvorfor en artssammenligning i studieområdet ikke var mulig. Blisgåsereder i Eqalummiut Nunaat cirka 70 km nord for Isunngua var placeret i nogenlunde samme vegetationstyper og højde over havet, men oftest meget langt fra åbent vand. Dette kan betyde, at der ikke er konkurrence om selve redepladserne mellem de to arter. Imidlertid var alle Canadagåserederne i Isunngua placeret ved søer, der tidligere er benyttet som ungeopfostringsområder for Blisgæs, og det er tvilvsomt, om de meget aggressive Canadagæs vil tillade Blisgåsefamilier i deres områder. Dette kan være årsagen til den markante nedgang i antallet af Blisgæs i Isunngua i perioden 1988-1999, og til at der i 1998 og 1999 ikke blev fundet områder, hvor familier af begge arter sameksisterede. Hvis den grønlandske bestand af Canadagæs fortsætter den markante stigning, bliver det interessant at følge konsekvenserne for ynglebestanden af den endemiske Grønlandske Blisgås.

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