

CANADA GEESE IN A ROSS'S GOOSE COLONY; A PROTECTIVE NESTING ASSOCIATION?

Frank B. Baldwin^{1**}, James O. Leafloor², Ray T. Alisauskas³

¹Department of Biology, 112 Science Place, University of Saskatchewan, Saskatoon, SK, S7N 5E2,

²Canadian Wildlife Service, Suite 150, 123 Main St., Winnipeg, MB, R3C 4W2,

³Canadian Wildlife Service, 115 Perimeter Road, Saskatoon, SK, S7N 0X4.

Key words: Canada geese, McConnell River, protective nesting association.

Abstract: The active association' hypothesis suggests that some birds have higher egg survival and nest success when nesting in association with colonial species than when nesting alone. We sought to determine if nesting Canada geese (*Branta hutchinsii*) occurred in higher density within a Ross's goose (*Chen rossii*) colony than those nesting solitarily outside the colony, and whether they derived reproductive benefits from this association. Canada geese could receive reproductive benefits when nesting in dense areas of the colony because of increased predator detection and deterrence by Ross's geese, or reduced nest detection by predators because of dilution effects.

In 2004, Canada goose nest surveys were conducted within (11.5 km²) and outside (10 km²) a Ross's goose colony at McConnell River, Nunavut. We used a distance-based estimator to determine nest densities of Canada geese in each area, and recorded densities of Ross's geese within 30 m of each Canada goose nest. In addition, we monitored 194 Canada goose nests, surrounded by varying densities of nesting Ross's geese, throughout incubation and hatch. We compare Canada goose nest density within and outside the Ross's goose colony, and nest success in relation to the density of neighboring Ross's geese to test the 'active association' hypothesis.

LONG DISTANCE BROOD MOVEMENTS IN GREATER SNOW GEESE: EFFECTS ON GOSLING GROWTH AND SURVIVAL

Julien Mainguy^{1**}, Gilles Gauthier¹, Jean-François Giroux², and Joël Bêty³

¹ Département de Biologie and Centre d'Études Nordiques, Université Laval, Québec, QC, G1K 7P4, Canada

² Département des sciences biologiques, Université du Québec à Montréal, Montréal, QC, H3C 3P8, Canada

³ Département de biologie and Centre d'Études Nordiques, Université du Québec à Rimouski, Rimouski, QC G5L 3A1, Canada

Abstract: We studied overland movements of broods the nesting and rearing areas, and the associated costs and benefits in Greater Snow Geese (*Chen caerulescens atlantica*) breeding on Bylot Island, Nunavut. We monitored the movements of 51 radio-marked females between 1997 and 2001, and evaluated if distance moved affected gosling survival and growth by recapturing marked broods shortly before fledging. Movements from nesting to brood-rearing areas were fairly rapid (most ≤ 6 d) but their amplitude was highly variable among individuals (range: 2.6–52.5 km). Movements were reduced once broods had settled on a rearing area. Gosling survival was not related to distance moved between nesting and brood-rearing areas but gosling growth differed according to areas used and distance moved. Geese nesting close to the main brood-rearing area generally reared heavier and larger goslings than those that nested at the main colony and made extensive overland movements to the main brood-rearing area (~ 30 km). However, goslings leaving the main nesting colony were heavier than those that stayed there throughout brood rearing in one of two years. Our results suggest that long distance brood movements can be either beneficial or costly for goslings depending on conditions encountered at their hatching site during brood rearing.

EFFECT OF CLIMATIC VARIABLES ON THE PHENOLOGY AND REPRODUCTIVE SUCCESS OF GREATER SNOW GEESE (*CHEN CAERULESCENS ATLANTICA*)

Marie-Hélène Dickey ** and Gilles Gauthier

Département de Biologie and Centre d'études nordiques, Université Laval, Québec, Québec, G1K 7P4, Canada

Abstract: Most global climatic models foresee that climate changes will be strongest in Arctic regions. Several studies have already reported some effects of climate changes on boreal and arctic bird species. In this study, we examine the relationship between climatic and reproductive variables in Greater Snow Geese nesting in the High Arctic on Bylot Island, Nunavut. A 16-year database is available to evaluate the relative importance of local and regional climatic variables on the reproduction of geese at different periods of their breeding cycle. Reproductive variables considered are associated with the phenology (laying date, hatching date) and reproductive success (nest density, clutch size, nesting success, brood size at hatch and fledging, and gosling size). Local climatic variables considered include snow cover on the ground, mean, maximum and minimum air temperature, number of frost-free days, solar radiation, wind speed and precipitation calculated on a monthly basis throughout the summer. The Arctic Oscillation is used as an index of regional climatic fluctuations. At our study site, mean summer temperature has increased by 1.8°C over the past 26 years. We predict that climatic effects on goose reproduction will be strongest early in the reproductive cycle.

CONSEQUENCES OF INDIVIDUAL CHOICE OF BROOD REARING AREAS AND CARRYOVER EFFECTS OF THESE DECISIONS ON REPRODUCTIVE MEASURES IN BLACK BRANT.

Nicolai, Christopher A.^{1**}, James S. Sedinger^{1,2}, and Jason L. Schamber³

¹Program in Ecology, Evolution, and Conservation Biology, University of Nevada Reno, Reno, NV 89512 USA

²Dept. of Natural Resources Sciences and Environmental Science, University of Nevada Reno, Reno, NV 89512 USA

³USGS, Alaska Science Center, Anchorage, AK 99503 USA

Abstract: Ideal free distribution theory predicts that individuals should make decisions that promote individual fitness in the long term. Previous studies have described variation in forage quality (Person et al. 1998) and gosling size (Herzog and Sedinger 2003, Nicolai et al. in review) among brood rearing areas and across years on brood rearing areas for Black Brant (*Branta bernicla nigricans*) on the Yukon-Kuskokwim Delta, Alaska. Little is known about the effects of selecting these brood rearing areas on attending adult females. Adult female Black Brant are typically at their lowest annual body condition at hatch. We investigated effects of selection and use of these brood rearing areas on adult female body condition by comparing changes in body condition of adult females measured on the day their clutches hatched and again during banding operations approximately 35 days later. Our results indicate substantial variation in changes in body condition among brood rearing areas for female Black Brant during the period of gosling growth and adult remigial molt (Δ residual body mass -300 to 300 grams). We further investigate effects of selecting a brood rearing area in year i and reproductive measures in year $i+1$ utilizing a robust design approach.

WARMING OF ARCTIC AND WRANGEL ISLAND SNOW GOOSE POPULATION

Vasiliy V. Baranyuk. Wrangel Island Nature Reserve

Abstract: Currently, on Wrangel Island, there is just one large Snow goose colony located in the Tundra River valley, where at least 90 % of birds of the Wrangel Island Snow Goose (WISG) population nest. In years with low lemming abundance and snowy owls do not breed, snow geese nest just on the main colony. The dynamics of the WISG population, first of all, depends on the nesting success of the geese on the Tundra River colony. A monitoring program for the geese of the Tundra River colony was instituted in 1969. During this period, fluctuations in the number of geese were observed. Snow goose numbers were reduced from 150,000 birds to 56,000 in the 1970's, increased back up to about 100,000 in the 1980's, and fell again to 60,000 in the 1990's. Recently, numbers have increased again, and numbers currently total between 115,000-200,000. During the 36-year monitoring, 19 (53 %) years were classified as having favorable nesting conditions and 13 (36 %) with poor nesting conditions. During the last decade, 7 seasons were classified as having good nesting conditions. The last poor nesting conditions were observed in 1995. As a result, the WISG population has doubled since the early 1990's. Good conditions for breeding are an early spring following a winter with low snow cover. Recently, winters on Wrangel Island have been relatively mild with low snow cover. This may be a manifestation of the global processes being observed in many facets of the Arctic regions. Such changes of a climate, probably, will lead to the further growth of number WISG population.

ARCTIC FOX DIETS REVEALED THROUGH STABLE ISOTOPES: THE IMPORTANCE OF CACHED FOODS

Gustaf Samelius^{1**}, Ray T. Alisauskas^{1,2}, Keith A. Hobson^{1,2}, and Serge Larivière^{1,3}

¹Department of Biology, University of Saskatchewan, Saskatoon, Saskatchewan, Canada.

²Canadian Wildlife Service, Saskatoon, Saskatchewan, Canada.

³Federation des Trappeurs Gestionnaires du Quebec, Sainte-Foy, Quebec, Canada.

ABSTRACT: Food storing (also termed food hoarding and food caching) is common among many birds and mammals and may be adaptive to avoid food shortage in environments where foods fluctuate greatly; use of stored foods allows animals to remain in familiar areas without having to put on large amounts of body fat and is an alternative strategy to migration, torpor, hibernation, and fat storage. Arctic foxes commonly cache foods when foods are abundant. This behaviour appears to be especially common at large bird colonies where arctic foxes cache >1,000 eggs per fox each nesting season. We examined how arctic foxes used cached foods in fall and spring by comparing stable isotope ratios ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) of fox tissues (blood and winter fur) to that of available foods. Mass balance mixing models in Program IsoSource revealed that goose eggs cached in summer made up ca 30-50% and 0-30% of arctic fox diets in fall and spring, respectively. The use of cached eggs appeared to be greater in years of low small mammal abundance. This is the first study to provide an estimate of use of stored foods by any carnivore and illustrates the benefits of stable isotopes in ecological studies.

Breeding in relation to upstream stopovers in barnacle geese, an individual-based study relying on resightings and geolocators.

Götz Eichhorn ¹, Vsevolod Afanasyev ², Henk van der Jeugd ¹ and Rudi Drent ¹

1) Centre for Ecological and Evolutionary Studies, Zoological Laboratory, University of Groningen, P.O. Box 14, 9750 AA Haren, The Netherlands

2) British Antarctic Survey, Natural Environment Research Council, High Cross, Madingley Road, Cambridge, CB3 0ET, UK

Abstract : For successful reproduction, Arctic geese are supposed to rely to a large extent on body stores brought along to the breeding grounds. Body stores are deposited at pre-migratory/ wintering sites and are further accumulated or re-fueled at stopover sites along the migratory route. Beside an adequate breeding condition, the timing of arrival in the breeding colony and subsequent activities plays a major role in determining an individual's reproductive prospects. This study investigates possible relationships between individual performance on the breeding grounds (e.g. timing, condition, clutch size) and preceding migration of barnacle geese belonging to colonies in the Russian Sub-Arctic. While the application of leg-bands is sufficient to gather individually based information of birds on the breeding site as well as to receive a number of re-sights from the wintering area, we rely on a tracking system in order to describe the spatial-temporal pattern of the migratory journey followed by these birds. For this purpose we decided to explore the application of so-called geolocation loggers (Global Location Sensing or GLS logging). Archival tags record light-level data, from which dusk and dawn events are estimated which form the basis to calculate the geographical location twice per day; day length determines the latitude and time of local midday the longitude.