

SHORT COMMUNICATION

POTENTIAL FLIGHT RANGE OF SNOW BUNTINGS *Plectrophenax nivalis* OCCURRING IN THE AZORES ISLANDS IN LATE MARCH: A FIRST ANALYSIS

MARK BOLTON, RENATA MEDEIROS & HELDER FRAGA

BOLTON, M., R. MEDEIROS & H. FRAGA 2001. Potential flight range of Snow Buntings *Plectrophenax nivalis* occurring in the Azores in late March: a first analysis. *Arquipélago. Life and Marine Sciences* 18A: 93-95. Ponta Delgada. ISSN 0873-4704.

It has been known for many decades that Snow Buntings occur with some regularity in the Azores archipelago in winter, with flocks numbering up to 20 individuals on occasion. The majority of records are from the islands of Corvo and Faial. The origin and fate of these individuals is unknown and it is unclear whether the regular occurrence of such groups represents a wintering strategy, or rather, whether these birds have been blown off the course of their usual migration route. Seven individuals from a flock of ten Snow Buntings known to have been present on the island of Faial between 20th March and early May 2000 were trapped on March 30th 2000. Plumage characteristics indicated they were of the Greenland *P.n. nivalis* race. Measurements of body mass indicated that the fat reserves of these individuals were similar to those of Snow Buntings wintering in Scotland U.K. at the same time of year, just prior to departure to the breeding grounds. However the calculated potential flight range of the individuals from Faial varied from 500 km to 1.800 km, averaging 1.150 km for females and 1.640 km for males. Whilst these average ranges would be sufficient to make continental landfall if the birds followed an easterly route, such a heading is considered improbable, given their racial characteristics. The calculated energy reserves would be insufficient to sustain continuous flight on a northerly course to continental landfall. The presence of potentially suitable breeding habitat on the neighbouring island of Pico is highlighted.

Mark Bolton, Renata Medeiros, Universidade dos Açores, Departamento de Oceanografia e Pescas, Cais de Santa Cruz, PT - 9901-862 Horta - Helder Fraga, Direcção Regional do Ambiente, Direcção de Serviços de Conservação da Natureza, PT - 9930-210 Lajes do Pico, Açores, Portugal.

INTRODUCTION

It has been known for many of decades that the Snow Bunting *Plectrophenax nivalis* occurs in small numbers, during winter, in the Azores archipelago, almost 1000 km from the nearest continental land mass (GODMAN 1870; BANNERMAN & BANNERMAN 1966). The most regular records, both historical and contemporary, often involving flocks of up to 20 individuals, are from the westernmost island of Corvo

(BANNERMAN & BANNERMAN 1966; P. Domingos pers. comm.). The Snow Bunting is a montane breeding species, with known nesting grounds in Greenland, Iceland, Arctic Scandinavia and Scotland. It is migratory, or partially migratory (CRAMP & PERRINS 1994), wintering in coastal areas of Scandinavia, Britain, and extending southwards into northern France. Populations breeding in Greenland, Arctic Canada and Alaska winter in central North America. The origin and fate of birds occurring in winter in the Azores is

the subject of conjecture, as these birds would appear to be a very considerable distance from the nearest breeding grounds, and the likelihood that the Azores archipelago represents a regular, strategic wintering ground, seems remote. Despite the presence of montane habitat within the Azores archipelago (the summit of the island of Pico rises to some 2.351 metres) there has never been any evidence of local breeding and there is no suggestion in the literature that this species may possibly breed within the archipelago. Migrants wintering in northern France, are known to depart the wintering sites in February and March, as they begin the northward migration to the breeding grounds (CRAMP & PERRINS 1994).

METHODS

On 22nd January 2000 a single Snow Bunting was located at Caldeira, Faial by HF. On 20th March 2000 a flock of 10 individuals (three males and seven females) was present and this group was observed almost daily until early May (HF). On 30th March, when European breeding Snow Buntings would be expected to be close to departure from the wintering grounds, seven individuals (three males, four females) were trapped, under licence, and fitted with metal identification rings. The birds were trapped at 10.00hrs GMT. Wing length (maximum flattened cord) was measured to 0.5mm using a stopped rule and each bird was weighed to 0.1g using a *Pesola* spring balance. The mass of fat reserves was calculated as the difference between measured body mass, and published values for lean (starvation) mass (26 g for females, 30 g for males, SMITH & METCALFE 1997). The maximum flight range was calculated using Program 1 from PENNYCUICK (1989) assuming an average wingspan of 31.0 cm for females and 32.5 cm for males (BANKS et al. 1989).

RESULTS

Plumage characteristic of the birds trapped indicated that they were of the Greenland race *P. n. nivalis* (R. Smith pers. comm.). Mean body masses were 33.1 g (range 28.9 g – 37.0 g) and

42.2 g (range 40.0 - 43.7 g) for females and males respectively. These values give calculated subcutaneous fat masses of 7.1 g for females (range 2.9 – 11.0 g) and 12.2 g for males (range 10.0 – 13.7 g). Assuming powered flight at a speed to maximise range in still air, the mean flight range was calculated as 1.150 km (range 500 – 1.670 km) for females and 1.640 (range 1.380 – 1.800 km) for males. Given a calculated range-optimising flight speed of 10.2 and 10.6 m/s for females and males respectively, the mean non-stop flight periods would be 1.3 and 1.8 days respectively.

DISCUSSION

The average body mass of male Snow Buntings trapped on Faial in late March was similar to that recorded by BANKS et al. (1989) for male Snow Buntings in Highland Region, Scotland and by SMITH (1994) in Cairngorm, Scotland at the end of March, just prior to departure for the breeding grounds (between 38 g and 43 g). The values recorded for females in the Azores were substantially lower than the corresponding weights of females in Highland Region (approximately 38 g) although similar to the value recorded in Cairngorm (approximately 34 g).

Given the remote location of the Azores archipelago from both the main breeding areas of the Snow Bunting, and from the nearest continental landfall, the use of these islands as a regular, strategic wintering ground seems a remote possibility. The minimum distance to a known, continental wintering site (Brittany, France) is 1.800 km. Greenland, the presumed breeding grounds of these individuals, is nearly 3.000 km distant. The presence of Snow Buntings in the Azores during winter would appear to be more likely to result from the displacement of individuals from their usual route. One might therefore expect birds appearing in the Azores to be in particularly poor condition, and one would not predict the return of the same individuals in successive winters. The body condition of Snow Buntings on arrival in the Azores is currently unknown, though it may be relevant in this context, that five of the trapped individuals had

broken tail feathers and the lightest individual in the sample had a healed wound to the pectoral muscle. Such features would certainly have impaired the birds' flight ability. The levels of fat reserves calculated for these individuals appear insufficient to sustain non-stop flight to either wintering or breeding areas in continental Europe or Greenland. The continued presence of the group of ten individuals as late as early May suggests that these birds would not have returned to northerly nesting grounds to breed in the summer. There remains the intriguing possibility that the neighbouring island of Pico, rising to some 2.351 m may furnish adequate nesting habitat for this species, although no evidence of breeding has ever been published. It is hoped that further trapping and ringing of individuals will help to resolve these issues.

ACKNOWLEDGEMENTS

We are grateful to Rik Smith for valuable discussion and comments.

REFERENCES

- BANKS, K., H. CLARK, I. R. K. MACKAY, S. G. MACKAY, & R. M. SELLERS 1989. Biometrics and pre-migratory fattening in the Snow Bunting *Plectrophenax nivalis*. *Ringing and Migration* 10: 141-157.
- BANNERMAN, D. A. & W. M. BANNERMAN 1966. *Birds of the Atlantic Islands Vol. 3. A History of the Birds of the Azores*. Oliver and Boyd. London. i-xix + 262 pp.
- CRAMP, S. & C. M. PERRINS 1994. *The Birds of the Western Palearctic* Vol. IX. Oxford University Press, Oxford.
- GODMAN, F. DU CANE 1870. *Natural History of the Azores or Western Islands*. London.
- PENNYCUICK, C. J. 1989. *Bird Flight Performance. A Practical Calculation Manual*. Oxford University Press, Oxford.
- SMITH, R. D. 1994. *Snow Buntings *Plectrophenax nivalis*: the behavioural ecology and site use of an itinerant flock species in the non-breeding season*. Unpublished Ph.D. thesis, University of Glasgow.
- SMITH, R. D. & N. METCALFE 1997. Diurnal, seasonal and altitudinal variation in energy reserves of wintering Snow Buntings. *Journal of Avian Biology* 28: 216-222.

Accepted 27 April 2001.