

Up-rooted Common Cotton-grass *Eriophorum angustifolium* as evidence of goose feeding in Britain and Ireland

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A number of northern-nesting goose species feed on the growing shoots of the circumpolar Common Cotton-grass *Eriophorum angustifolium* during the summer. Geese characteristically up-root the plants and nip off the lower part of the shoot and the 'stem-base'. The stem-base is an anatomically defined part of the shoot from which the roots, rhizomes and leafy shoots emanate.¹ It is rich in protein and carbohydrates and is the main over-wintering storage organ for Common Cotton-grass.²

Based on his observations from 1917 onwards, Ruttledge³ first described the Greenland White-fronted Goose *Anser albifrons flavirostris* feeding on the lower stem of the Common Cotton-grass in winter. The distinctive presence of the remaining above-ground parts of the plant left by the geese on mire surfaces has since become an indicator of the presence of bog-feeding Greenland White-fronts throughout their range.

Although Ruttledge³ and others refer to the roots of *Eriophorum angustifolium* being taken, recent work (D.A. Stroud, unpublished data) has found no selection for roots in the strict sense by geese, rather the stem-base, lower shoot and in some circumstances the young rhizomes are taken.

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Salter⁴ recorded 'evidence that there must have been a lot of wild geese' feeding in the centre of Cors Fochno, north Dyfed, while Cadman⁵⁻⁷ and Pollard and Davis⁸ reported Greenland White-fronted Geese feeding on Common Cotton-grass on Cors Caron, also in central Wales. Since then, this method of feeding has been described from a variety of wintering sites for the race throughout Britain and Ireland, as well as in Iceland on migration⁹ and in Greenland during the breeding season where it forms a major element of the early summer diet.¹⁰

Although the Curlew *Numenius arquata* has been reported feeding on the stem-base of Common Cotton-grass¹¹ and in some circumstances Red Deer *Cervus elephus* eat clumps of the Common Sedge *Carex nigra* from bog pools (D.A. Stroud, unpublished data), it has been generally considered that the up-rooting of *Eriophorum* shoots in winter almost certainly relates to feeding activity of Greenland White-fronts. We here report 3 sets of observations which suggest that other goose species may also be involved in Britain.

The first relates to Greylag Geese *Anser anser* in the Caithness peatlands. In February 1988, Greylag Goose droppings were found in association with uprooted *Eriophorum angustifolium* leaves at Moss of Killimster (T. Talbot, in litt. to Lesley Cranna). Up to 500 Greylags had been using the area and based on goose use and on dropping size, the observer was satisfied that Greenland White-fronts were not involved in Cotton-grass feeding at the site.

At 2 separate sites, both patterned mires with well defined pools of *Sphagnum cuspidatum* and abundant non-flowering *Eriophorum angustifolium*, family parties of Greylag Geese were watched up-rooting Common Cotton-grass stems and consuming the lower part of the shoot in July 1988. Faecal material collected at the time was found to contain high proportions of Common Cotton-grass epidermis (> 32% after Owen¹²) in some samples. Greylag Geese showed some selection for acidic lochs amongst the peatlands areas where more eutrophic quality waters were available; *Eriophorum angustifolium* favours acidic waterlogged conditions.¹³

The third instance involved the first recorded breeding of Canada Geese *Branta canadensis* on Cors Fochno during summer 1989. Two of us (ISF/ADF) discovered abundant newly up-rooted *Eriophorum angustifolium* on 3 June 1989 close to a brood of Canada Geese. Although direct evidence from faecal examination is lacking, it is very likely that these geese had been feeding on this food source. There have been no records of Greenland White-fronted Geese from the mire since 1982;¹⁴ the area is impenetrable to domestic stock, and no other species present on this part of the bog are likely to feed on this material. Canada Geese of the race *parvipes* from the Perry River have been recorded feeding on *Eriophorum*.¹⁵

There is no doubt that Greenland White-fronted Geese traditionally fed on the overwintering perennating organs of Cotton-grass (as well as other mire monocotyledonous plants) before drainage and 'reclamation' modified their wintering distribution and habits. Feeding on such highly nutritious plant storage organs offers a high quality food resource in an otherwise nutrient depauperate environment. As the geese winter in a mild oceanic climate, the soft bog-pool substrate is rarely frozen but generally waterlogged,¹⁶ easing extraction of such food items.

As well as the Greenland White-front, the Greater Snow Goose *Anser caerulescens* of the Qanaq area of north-west Greenland also feed on *Eriophorum* (S.A. Elborne, in litt.), a staple element in the diet of the Baffin Island population,¹⁷ Ross' Goose in the Perry River¹⁵ and the Red-breasted Goose *Branta ruficollis* in its Russian breeding areas.¹⁸ The Greylag Goose com-

monly feeds on the below-ground parts of a range of plant species throughout its range,^{19,20} including *Eriophorum*²¹ and the Canada Goose, although an introduced species, is known to feed on *Eriophorum* in its natural North American geographical range.¹⁵ It is therefore not surprising that these two species have adapted to eating Common Cotton-grass during the breeding season in Britain.

From these observations, we recommend that the interpretation of up-rooted Cotton-grass as sole evidence of habitat use by Greenland White-fronted Geese in Britain and Ireland should therefore be considered with caution. However, the presence of such remains within the range of Greenland White-fronts remains a useful indicator of goose use. Several previously unknown Greenland White-Front wintering sites have recently been discovered using *Eriophorum* remains to guide winter surveys.

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