

Notes

NORTHERN LIMITS ATTAINED BY NATIVE BRITISH PLANTS IN NORTH PEARY LAND, GREENLAND

In June 1995 I was able to visit North Peary Land, Greenland with an Arcturus Expedition led by Robert Burton. The botanists in the party were Dr Jean Balfour, Dr Hugh Lang, Dr Fritz and Mrs Elizabeth Schwarzenbach and myself. Our base camp was at the head of Frigg Fjord at 83° 11' N latitude some 50 km to the south of Kap Morris Jesup, the most northerly point of land in the world. Cape Columbia, the most northerly point of the Canadian arctic, on Ellesmere Island is at latitude 83° 08' N.

During our two week stay we recorded some 80 species of vascular plants. Twenty five of the species seen also occur in Britain and Ireland and of these, four were found at a new northern limit (Table 1). Apart from *Kobresia simpliciuscula* which also occurs in Upper Teesdale, these four species are confined to the Scottish Highlands. Christian Bay, a botanist with the Greenland Botanical Survey, had visited Frigg Fjord in 1985 and was impressed with the relative richness of the flora at this high latitude. He considered it to be a high arctic oasis. He also visited many other Peary Land localities including Kap Morris Jesup (Fredskild *et al.* 1986, 1987).

British Floras, e.g. Clapham, Tutin & Warburg (1952), Sell & Murrell (1996), continue to quote the same north latitude figures for several of the species found in North Peary Land. I have therefore

TABLE 1. THE NORTHERN LIMITS ATTAINED BY THE 25 NATIVE BRITISH PLANTS IN NORTH PEARY LAND, GREENLAND

Species	Site name	Northern limit
<i>Alopecurus borealis</i>	Kap Morris Jesup	83°39'N
<i>Cardamine pratensis</i>	Brainard Sund	82°58'N
* <i>Carex atrofusca</i>	Frigg Fjord	83°12'N
<i>Carex maritima</i>	Frigg Fjord	83°16'N
<i>Carex rupestris</i>	Brainard Sund	82°58'N
* <i>Carex saxatilis</i>	Frigg Fjord	83°16'N
<i>Cerastium arcticum</i> s.l.	Kap Morris Jesup	83°39'N
<i>Cystopteris fragilis</i> s.l.	Frigg Fjord	83°12'N
<i>Equisetum arvense</i>	Frigg Fjord	83°12'N
<i>Equisetum variegatum</i>	Frigg Fjord	83°16'N
<i>Juncus biglumis</i>	Kap Morris Jesup	83°39'N
* <i>Juncus castaneus</i>	Frigg Fjord	83°12'N
<i>Juncus triglumis</i>	Frigg Fjord	83°16'N
* <i>Kobresia simpliciuscula</i>	Frigg Fjord	83°12'N
<i>Koenigia islandica</i>	Frigg Fjord	83°12'N
<i>Minuartia rubella</i>	Kap Morris Jesup	83°39'N
<i>Oxyria digyna</i>	Constable Bugt	83°34'N
<i>Poa glauca</i>	Frigg Fjord	83°11'N
<i>Persicaria vivipara</i>	Constable Bugt	83°34'N
<i>Sagina nivalis</i>	Frigg Fjord	83°12'N
<i>Saxifraga cernua</i>	Kap Morris Jesup	83°39'N
<i>Saxifraga cespitosa</i>	Kap Morris Jesup	83°39'N
<i>Saxifraga nivalis</i>	Kap Morris Jesup	83°39'N
<i>Saxifraga oppositifolia</i>	Kap Morris Jesup	83°39'N
<i>Silene acaulis</i> (leg. O. Bennike 1984)	Nansen Land	83°09'N

The nomenclature of the species follows Stace (1991).

*New northern limit 1995.

documented updated information on these hardy members of the British flora found at the most northern botanical localities on earth. The information given in Table 1 is based on Bay (1992), Bay (pers. comm. 1997) and the 1995 field work at Frigg Fjord.

Not surprisingly 21 of the 25 species listed are members of the arctic-alpine or arctic-subarctic element of the British flora (Matthews 1955). *Equisetum variegatum* is a representative of the northern montane element and *Cardamine pratensis*, *Cystopteris fragilis* and *Equisetum arvense* are widespread (Birks 1973). Seventeen of the species are designated rare or scarce (Perring & Farrell 1983; Stewart *et al.* 1994). In addition to the three widespread species only *Juncus triglumis*, *Oxyria digyna*, *Persicaria vivipara*, *Saxifraga oppositifolia* and *Silene acaulis* are relatively common and widespread in the Scottish Highlands but much scarcer elsewhere in the British Isles being rare to very rare in Ireland from which *Juncus triglumis* is absent (Webb 1977).

All the species are well distributed throughout most of the Arctic with *Juncus triglumis* being represented by the closely related *Juncus albescens* in the Canadian arctic (Polunin 1959). They are all common and widespread in Greenland with the following exceptions: *Alopecurus borealis* is absent from the southern half and *Cardamine pratensis*, *Carex atrofusca*, *C. rupestris*, *C. saxatilis*, *Juncus castaneus* and *Kobresia simpliciuscula* show disjunct patterns of distribution. This may be related to areas which have undergone little or no glacial erosion during the Weichselian (Devensian) glaciation (Bay 1992).

The reported increase in the northward range of these species is due to fieldwork conducted in new areas rather than new colonisation from possible climatic amelioration. The four species seen at a new northern limit in 1995 gave the appearance of being long established. The favourable south facing *Carex stans* mires irrigated by snow beds and melt from the underlying permafrost were in stark contrast to the areas of dry stony high arctic desert virtually devoid of plant life.

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POPULATION SIZES OF *GENTIANELLA ULIGINOSA* (WILLD.) BOERNER, DUNE GENTIAN, ON COLONSAY (V.C. 102) IN 1996

Gentianella uliginosa (Willd.) Boerner, Dune Gentian, has been recorded from five sites in South Wales (Lousley 1950; Abell 1954; Pritchard 1959; Kay 1972; Ellis 1983), three sites on Colonsay (Rose 1998) and two old sites in England (Rich 1996). In July and August 1996, a detailed survey of two of the three sites on Colonsay was undertaken as part of the Scottish Rare Plant Project (Lusby 1992) of the Royal Botanic Garden, Edinburgh.

At Balnahard Dunes seven populations were found, with a maximum separation of c. 300 m. 1709 plants were counted in the largest population by R. L. Gulliver and P. Lusby using a grid. Each plant had a dried chick pea placed beside it to avoid counting it twice. Individuals were assigned to *G. uliginosa* rather than *G. amarella* if the pedicel length was well above 50% of the plant height (Pritchard 1959; Stace 1991; cf. Pritchard & Tutin 1972). Most *G. uliginosa* and some *G. amarella* and *G. campestris* plants were single flowered and less than 8 cm tall. Occasionally specimens of *G. uliginosa* with only a single leaf at the base of the pedicel were encountered. (In one case a plant had a single leaf at the base of one of its pedicels and two leaves at the base of the other two, thus confirming the status of the single structures as leaves.)

The size of the other six populations was estimated, with values ranging between 200 and 1000. The total estimate for the site was 4509.

In 1994 the sizes of the two largest populations in South Wales, where numbers are known to vary greatly from year-to-year (Q. O. N. Kay, pers. comm., 1997) were 4000–8000 at Oxwich and 600–1000 at Whiteford (Kay & John 1995). Colonsay therefore contains one of the largest known populations of *G. uliginosa* in the British Isles.

The number of plants of all three species of *Gentianella* with fully developed corollas (in terms of length) and/or with capsules was recorded on 24 July, 9 August and 23 August 1996 from a fixed 2 × 2 m quadrat (Table 1). The values in Table 1 can increase in time as small flower buds grow to their full length; or decrease due to grazing. On 24 July none of the *G. uliginosa* plants recorded were in fruit, by 9 August half were completely in fruit and a further nine had capsules plus either closed or open corollas. By 23 August the majority of plants were in fruit. *G. campestris* was the latest flowering of the three species, with *G. amarella* occupying an intermediate position, though the number of plants present was small.

At Balnahard in 1996 sheep, cattle and rabbits were present and grazing levels were high in July and August. This seemed to act "preferentially" on the taller *G. amarella* thereby reducing the

TABLE 1. THE NUMBER OF PLANTS WITH FULLY DEVELOPED COROLLAS AND/OR CAPSULES OF *GENTIANELLA ULIGINOSA* IN A FIXED 2 × 2 M QUADRAT IN JULY AND AUGUST 1996 AT LEAC BHUIDHE, BALNAHARD DUNES, COLONSAY, V.C. 102, TOGETHER WITH NUMBERS OF *GENTIANELLA AMARELLA* AND *GENTIANELLA CAMPESTRIS* (SEE ALSO TEXT)

	24 July	9 August	23 August
<i>Gentianella uliginosa</i>			
Corolla(s) closed (fully expanded but not open), no capsules	22	8	0
Corolla(s) open, no capsules	0	0	4
Corolla(s) closed, capsules also present	0	8	0
Corolla(s) open, capsules also present	0	1	0
Total number of plants, flowering or about to flower	22	17	5
Capsules (only)	0	17	28
Total number of <i>Gentianella uliginosa</i> plants with fully expanded corolla(s)	22	34	33
<i>Gentianella amarella</i>			
Corolla(s) present	+	4	5
<i>Gentianella campestris</i>			
Corolla(s) present	+	25	62

Note + indicates present, no count undertaken.

possibility of introgression between the two species, which is reported to be affecting *G. uliginosa* populations in South Wales (Pritchard 1959, 1972). On the other hand Kay & John (1995) report more or less pure stands of *G. uliginosa* from South Wales with little or no signs of introgression, even when surrounded by *G. amarella*. Grazed examples of *G. uliginosa* were noted on all three visits.

In 1996 the locations of the Balnahard populations (slopes, mini-plateaux and dry hollows) were all very dry. They frequently contained small gaps in the dune turf in which annuals could establish. In South Wales the plants usually grow in dune slacks with *Salix repens* present, though the water table is often well below the surface all the year round (Q. O. N. Kay, pers. comm., 1997). Lousley (1950) reported some plants on dry dune grassland at Oxwich Burrows.

On Colonsay no *G. uliginosa* was found at the second site, Traigh nam Barc, where it was reported in 1981 by Rose (1998); though *G. amarella*, *G. campestris* and *Coeloglossum viride* which are associated with it at Balnahard Dunes were present.

Kiloran Bay (Traigh Ban), the third site with a 1981 record by Rose (1998), has been examined repeatedly between 1991 and 1996. Neither *G. uliginosa*, *G. amarella* nor *Coeloglossum viride* have been located. However *G. campestris* has recently (1997) been found (A. Skrimshire, pers. comm., 1997).

G. uliginosa is a British *Red data book* species which has been included on the list of species to receive special conservation attention as part of the United Kingdom's contribution to the United Nations Convention on Biological Diversity. More information on year-to-year fluctuations in population numbers, the precise habitat/management requirements of the species, and on the extent of hybridization with *G. amarella* are urgently needed, especially as Colonsay represents the only known station for this rare and elusive plant in Scotland, where it is at the most north west edge of its global distribution (Hulten & Fries 1986).

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× *AGROPOGON ROBINSONII* (DRUCE) MELDERIS & D. C. McCLINT.

The southern European and Mediterranean grass *Polypogon viridis* (Gouan) Breistr. (Poaceae) is now locally frequent as an established plant of damp rough ground in the Channel Islands, and is sporadic in Britain on rubbish tips and similar places as a casual from wool, cotton, grain and probably other sources. There is a good drawing of it in Hubbard (1984, p. 304). It is distinct from other species of *Polypogon* in its entire (not 2-lobed), awnless (not awned) glumes, and was formerly included in *Agrostis* (as *A. semiverticillata* (Forssk.) C. Chr.). It is placed in *Polypogon* mainly on account of its spikelet disarticulation, which is well below the glumes rather than at the base of the floret. The species is readily recognized by its distinctive, rigid, dense, much-branched panicles, and by the minutely rough (i.e. strongly papillate) glumes.

Sometimes it is accompanied on rubbish tips in Britain by another grass with a very similar habit and similarly papillate glumes, but with slightly notched glumes each with an awn up to 2 mm long. This is the hybrid *Agrostis stolonifera* L. × *Polypogon monspeliensis* (L.) Desf. (= × *Agropogon littoralis* (Sm.) C. E. Hubb.), which is also found as a rare native in southern Britain within the range of *P. monspeliensis*.

The hybrid *Agrostis stolonifera* × *P. viridis* (= × *Agropogon robinsonii* (Druce) Melderis & D. C. McClint.) is a very rare grass, having been reported on only three previous occasions, all in Guernsey (McClintock 1975, 1987). It was discovered by F. Robinson in 1924 at St Sampson (N. E. Guernsey) and determined and named as *Agrostis* × *robinsonii* (but written in error as × *F. robinsonii*) by Druce (1925), confirmed by J. Fraser and E. D. Marquand. The specimen is in BM, seen by C.A.S. The second record was made in 1953 at Vazon (W. Guernsey) (not at Grandes Rocques as stated by McClintock (1975)) by C. E. Hubbard (specimen in K, seen by C.A.S.), and the third in 1958 at Grandes Rocques (N.W. Guernsey) by D. McClintock, confirmed by A. Melderis (specimen in STP, seen by C.A.S.).

In July 1994 P.M. discovered a single plant of a grass (**herb. P.M.**) that closely resembles *P. viridis* in habit in a long-abandoned industrial site in Shieldhall, Glasgow, Lanarks, v.c. 77. It grew 20 m from the edge of a lorry park in current use and c. 750 m from the nearest dock on the River Clyde. The habitat was scrubby grassland dominated by *Holcus lanatus* with a few plants of *Agrostis stolonifera* and very few of *A. capillaris*. No other grasses were present in the immediate vicinity. Other associates, one to a few plants in each case, were *Artemisia vulgaris*, *Cirsium arvense*, *Chamerion angustifolium*, *Dactylorhiza fuchsii*, *D. × venusta*, *Epilobium montanum*, *Equisetum arvense*, *Luzula multiflora*, *Senecio jacobaea*, *Trifolium hybridum* and *Tussilago farfara*. Scattered in the area were *Salix caprea*, *S. cinerea* subsp. *oleifolia* and *S. × reichardtii*, ranging in height approximately 1–3 m.

The plant differs from *P. viridis* in its scarcely papillate glumes, lemma entire (not minutely toothed) at apex, palea c. 3/4 as long as lemma (not nearly as long) and anthers c. 1.2 mm (not c. 0.6 mm) long. The pollen grains are empty, and the plant is clearly a hybrid between *P. viridis* and a grass with non-papillate glumes, lemma entire at apex and much longer than palea, and anthers >1 mm long. *Agrostis stolonifera* fits this perfectly: glumes not papillate; lemma entire at apex; palea c. 2/3 as long as lemma; anthers 1–1.5 mm long.

The Scottish plant closely resembles the 1924 and 1953 Guernsey specimens of × *A. robinsonii*. The glumes are not bifid and awned as stated by Sell & Murrell (1996) in any of these specimens. The 1958 Guernsey plant, on the other hand, is obviously a slightly unusual specimen of *Agrostis stolonifera*, being fertile and having all the diagnostic spikelet characters of that species.

The Glasgow plant is therefore only the third known record of × *A. robinsonii* (Stace 1997). It must be considered a casual, having arrived at the site presumably as hybrid seed, unlike the native Guernsey records. An intensive search of the site and surrounds was carried out by P.M. in 1996, but no further plants were found. Although the hybrid is endemic to the British Isles as far as is

TABLE 1. DIAGNOSTIC CHARACTERS OF \times *AGROPOGON ROBINSONII* (TAKEN FROM THE 1953 GUERNSEY AND 1994 SCOTTISH MATERIAL) AND ITS PARENTS

	<i>Agrostis stolonifera</i>	\times <i>Agropogon robinsonii</i>	<i>Polygogon viridis</i>
Spikelet disarticulation	below floret	none	near pedicel base
Spikelet length (mm)	1.8–3	1.8–2.3	1.5–2.2
Glumes	\pm smooth	scarcely papillate	conspicuously papillate
Lemma length (mm)	1.3–1.8, c. 0.6–0.8 \times as long as glumes	1.2–1.5, c. 0.6–0.7 \times as long as glumes	0.7–1.0, c. 0.5–0.6 \times as long as glumes
Lemma apex	\pm entire, sometimes awned	entire, awnless	denticulate, awnless
Palea length (mm)	0.8–1.2, c. 0.6–0.7 \times as long as lemma	0.9–1.1, c. 0.7–0.8 \times as long as lemma	0.6–0.9, c. 0.8–0.9 \times as long as lemma
Anther length (mm)	1–1.5	0.9–1.2	0.5–0.7
Pollen grains	full	empty	full
Caryopsis	c. 1 mm	not formed	c. 1 mm

known, it probably occurs in southern Europe where *P. viridis* is native, and whence the Glasgow plant might have been introduced.

The diagnostic characters are listed in Table 1; see also Bradshaw (1975).

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GENTIANELLA ULIGINOSA (WILLD.) BOERNER (GENTIANACEAE) FOUND IN COLONSAY (V.C. 102), NEW TO SCOTLAND

On 4 September 1978 the late E. C. Wallace and I were surveying various sites on Colonsay (v.c. 102) for a week. We found *Gentianella uliginosa* (Willd.) Boerner, new to Scotland, in the flushed "machair" on the south facing slopes of Leac Bhuidhe, NW of Balnahard Bay, NM/426.004 on 4 September 1978. We were both quite convinced of its identity, but we sent specimens to the *Gentianella* specialist Dr Noel Pritchard who provisionally agreed with the identification but expressed a desire to see living material before fully confirming its identity. I was not able to revisit Colonsay until 1981, when I collected more material and sent it to him, and he has recently agreed that the Colonsay plants were good *G. uliginosa*. When I visited Colonsay in 1981 I also found *G. uliginosa* in machair type grassland at Traigh nam Barc (NR/355.909), and possible plants of it at Traigh Ban [Kiloran Bay] (NR/404.982) with much *G. amarella*.

In 1978 we estimated that there were 30–40 plants at Leac Bhuidhe; in 1981 I counted 36 plants in the part of the site I studied. On 15 June 1989 I was surprised to see many plants coming into flower, but as most were not yet out, no proper count could be made, especially as rabbit grazing was then

TABLE 1. PLANT SPECIES OCCURRING IN A 1 M² QUADRAT WITH *GENTIANELLA ULIGINOSA* IN COLONSAY (V.C. 102)

The first figure indicates cover and the second indicates sociability on the Braun-Blanquet scale (Shimwell 1971)

Vascular plants		Bryophytes	
<i>Gentianella uliginosa</i>	5 plants	<i>Ditrichum flexicaule</i> agg.	2-2
<i>Schoenus nigricans</i>	3-2	<i>Hypnum cupressiforme</i> var. <i>lacunosum</i>	2-2
<i>Festuca ovina</i> agg.	2-2	<i>Entodon concinnus</i>	1-2
<i>Lotus corniculatus</i>	2-2	<i>Pseudoscleropodium purum</i>	1-2
<i>Thymus polytrichus</i>	2-2	<i>Ctenidium molluscum</i>	+ -2
<i>Pilosella officinarum</i>	1-2	<i>Rhytidiadelphus triquetrus</i>	+ -2
<i>Bellis perennis</i>	1-1	<i>Trichostomum crispulum</i>	+ -2
<i>Euphrasia</i> sp.	1-1		
<i>Linum catharticum</i>	1-1		
<i>Plantago lanceolata</i>	1-1		
<i>Ammophila arenaria</i>	+ -2		
<i>Campanula rotundifolia</i>	+ -2		
<i>Plantago maritima</i>	+ -2		
<i>Polygala vulgaris</i>	+ -2		
<i>Centaurium erythraea</i>	+		
<i>Prunella vulgaris</i>	+		

Species recorded outside the quadrat, but in the same community, included: *Anagallis arvensis*, *Carex flacca*, *Galium verum*, *Gentianella campestris*, *Pinguicula vulgaris*, *Plantago coronopus*, *Selaginella selaginoides*; with the bryophytes (in a wetter hollow): *Cratoneuron commutatum* subsp. *falcatum* and *Drepanocladus revolvens*; and the lichens: *Diploschistes muscorum* and *Squamarina cartilaginea*.

Nomenclature follows Stace (1991) for vascular plants, Corley & Hill (1981) for bryophytes and Purvis, Coppins & James (1993) for lichens.

severe, and many were bitten off. At Traigh nam Barc on 28 August 1981 B. J. Coppins, P. Wormell and I estimated that there were at least 40 plants.

COMMUNITIES

At Leac Bhuidhe on 26 August 1981, we noted that the *G. uliginosa* grew mostly on and around *Schoenus nigricans* tussocks in sloping flushes on blown sand on a south to south-east facing slope. A 1 m² quadrat was recorded on this date, Table 1. This vegetation probably equates to the *Festuca rubra* - *Galium verum* fixed dune grassland *Prunella vulgaris* sub community of the N.V.C. (Rodwell 1998, in press) but is more flushed and damper than the above community, with *Schoenus nigricans*, *Selaginella selaginoides*, etc., and approaches the character of dune slack vegetation in places.

At Traigh nam Barc in 1981, the communities were rather similar but less flushed, and *Schoenus nigricans* was not seen at this exact location; however, *Selaginella selaginoides*, *Antennaria dioica*, and a rich bryophyte and lichen flora occurred on the damp calcareous machair, which at the time was a quite open community. It is worth noting here that, at the time of our visit, the machair areas of Colonsay were very fine, some of the best I have seen in western Scotland, and little disturbed by any human factors for a long time.

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