

## LETTER TO THE EDITOR

### A flourishing population of sea mayweed (*Tripleurospermum maritimum* ssp. *phaeocephalum*) close to its northern limit in north-east Greenland

During a British Arcturus Expedition to Eskimones on the south coast of Clavering Island, north-east Greenland in July 2003, the sandy south-facing coastal strip to the west of the ruined old trapper's hut known as the Storholts Hus (Mikkelsen 2008) at 74°9'N, 21°33'W and west of Granatdal was noted to have an abundance of flowering plants of the Arctic subspecies of *Tripleurospermum*: *Tripleurospermum maritimum* ssp. *phaeocephalum* (Rupr.) Hämet-Ahti, *Matricaria maritima* ssp. *phaeocephala* (Rupr.) Rauchert, *M. ambigua* (Led.) Kryl. They carpeted the ground over some 100 m with 1000 or more flowers (Figs. 1, 2). The unexpected abundance of a sporadic species only found between 71° north latitude to just over 74° north latitude in East Greenland (Böcher et al. 1968), only about 22 km south of its northern limit (Bay 1992), was noteworthy. The site is fully exposed and open to the south across the 12-km wide Godthåbs Golf. Associated species were scattered plants of *Arnica alpina* (L.) Olin coll. and *Chamerion latifolium* (L.) Th. Fries & Lge. in full flower on the rather dry, moderately basic, sandy soil derived from the Devonian sedimentary rocks of this area (Henricksen 2008). There was no sign of seedlings.

The south coast of Clavering Island was intensively examined by the Danish botanists Paul Gelting and Thorvald Sørensen during the Lauge Koch Danish Three-Year Expedition of 1931–34 (Gelting 1934) and by the Norwegian botanist Jakob Vaage with the Norwegian Scientific Expeditions of 1929 and 1930 (Vaage 1932). Due to the rarity of *Tripleurospermum*, detailed accounts of its distribution and performance were made in their accounts of the flora. For example, Gelting described how the frequency of flowering specimens of *Tripleurospermum* varied from year to year and gave the example of how Vaage found only a single specimen in 1930 at Dødemandsbugten, to the east of Eskimones, whereas he saw 20 specimens with withered flowers there in 1931 but several hundred in 1932. A similar difference was observed by him at the Granatdal site. He also commented that in dry and warm years the

#### Correspondence

Roderick Corner, Hawthorn Hill, 36 Wordsworth Street, Penrith, Cumbria CA11 7QY, UK. E-mail: rod@hawthornhill.net



**Fig. 1** *Tripleurospermum maritimum* ssp. *phaeocephalum* west of Granatdal, Clavering Island, Greenland, on 21 July 2003.



**Fig. 2** The total extent of *Tripleurospermum maritimum* ssp. *phaeocephalum* extending into the distance above the strandline west of Granatdal, looking west, on 27 July 2003. Note the presence of sea fog.

production of ripe seed is abundant and how the plants shun prolonged snow covering, describing how one site was free of snow in the month of February. The Granatdal locality was probably close to or at the actual site where the observations in 2003 were made after an interval of 70 yrs. Gelting and Vaage noted that the *Tripleurospermum* can be associated with old Inuit sites but there was no evidence of any such association here. Fritz Schwarzenbach (pers. comm.) considers it to be a long-lived halophyte well able to withstand competition from other strand species.

Although the Greenland Botanical Survey (1962–1996) covered large areas of Greenland (Fredskild 1996), this area was not revisited. The recently observed population of *Tripleurospermum* shown in Figs. 1 and 2 was far in excess of that observed in the 1930s and may reflect some recent amelioration of the climate. There has been a warming of 2.25°C in the annual mean in this area of Greenland since 1991 and the five warmest years

within the last century were all within the last 10 yrs (Meltofte et al. 2008). It may be significant that the summer of 2003 was the warmest recorded for the period 1996–2005 at the Danish meteorological station at Zackenberg, some 45 km to the north-east of Clavering Island (Hansen et al. 2008). In 2003 the frost-free period—the temperature never dropping below 0°C—was easily the longest, lasting 60 days from 27 June to 26 August. This compares with the shortest period of 15 days in 2001, the average being 35 days (Hansen et al. 2008). The same year had one of the smallest accumulations of snow recorded at Zackenberg, with 45 cm on 1 June, whereas on that day in 2002 the snow depth on was 87 cm (Hinkler et al. 2008).

In describing the vegetation of Arctic shores, Crawford (2008) emphasized that it is the low shores nearest to the sea that have the shortest polar growing season. Proximity to the cold sea causes snow and ice to persist longer and sea fog reduces the temperature still further and he described how in some areas the shore is now experiencing an earlier start to the growing season and produces remarkable flowering displays. This Arctic subspecies of *Tripleurospermum* on the High Arctic shores in East Greenland would therefore be expected to respond to climatic change in the way suggested by Crawford. Hansen et al. (2008) conclude that the expected reduction in sea ice suggests that the physical conditions in Zackenberg will become similar to present-day conditions further south in East Greenland, for example, at Illoq-ooroomuit/Scoresbysund about 450 km distant. They point out that north–south transects in this region may be highly valuable in evaluating adaptations in ecological processes to different physical settings in relation to future climate change in the Arctic.

Comparing his observations with Gelting's in 1931–32, Schwarzenbach noted an altitudinal shift upwards of higher plant species on the nearby Rust Plateau on Clavering Island in 2001 (pers. comm.). These observations and the very significant increase in the population of the *Tripleurospermum* at sea level would appear to show that climate change is affecting plant distribution in this part of Greenland. It should be borne in mind that more intensive fieldwork in previously un-worked areas may also play a role in the extensions to the northern limits of vascular plants that are reported periodically from north-east Greenland.

It would be interesting to monitor this population of *Tripleurospermum* but the remote location would make this difficult. However, an interested party from a cruise ship using photographic evidence could take part in such

a study or possibly botanically-minded members of the Danish Sirius Patrol, who have year-round access to this area, could assist.

### Acknowledgements

I wish to thank Robert Burton, Kathleen and Neville Cartwright of Arcturus Expeditions for making the visit to Clavering Island possible, Geoffrey Halliday for the loan of Gelting's paper and Bent Fredskild for his encouragement.

### References

- Bay C. 1992. *A phytogeographical study of the vascular plants of northern Greenland—north of 74° northern latitude*. *Meddelelser om Grønland Bioscience* 36. Copenhagen: Commission for Scientific Research in Greenland.
- Böcher T.W., Holmen K. & Jakobsen K. 1968. *The flora of Greenland*. Copenhagen: P. Haase & Son.
- Crawford R.M.M. 2008. *Plants at the margin. Ecological limits and climate change*. Cambridge: Cambridge University Press.
- Fredskild B. 1996. *Grønlands botaniske undersøgelse 1995–1996*. (*Greenland's botanical studies 1995–1996*.) Copenhagen: Botanical Museum.
- Gelting P. 1934. Studies in the vascular plants of East Greenland between Franz Joseph Fjord and Dove Bay (Lat. 73°15'–76°20' N). *Meddelelser om Grønland* 101(2). Copenhagen: Commission for Scientific Research in Greenland.
- Hansen B.U., Sigsgaard C., Rasmussen L., Cappellen J., Hinkler J., Mernild S.H., Petersen D., Tamstorf M.P., Rasch M. & Hasholt B. 2008. Present-day climate at Zackenberg. In H. Meltofte et al. (eds.): *High-Arctic ecosystem dynamics in a changing climate. Advances in ecological research* 40. Pp. 111–149. London: Elsevier.
- Henricksen N. 2008. *Geological history of Greenland*. Copenhagen: Geological Survey of Denmark and Greenland.
- Hinkler J., Hansen B.U., Tamsdorf M.P., Sigsgaard C. & Petersen D. 2008. Snow and snow-cover in central northeast Greenland. In H. Meltofte et al. (eds.): *High-Arctic ecosystem dynamics in a changing climate. Advances in ecological research* 40. Pp. 175–195. London: Elsevier.
- Meltofte H., Christiansen T.R., Elbering B., Forchhammer M.C. & Rasch M. (eds.) 2008. *High-Arctic ecosystem dynamics in a changing climate. Advances in ecological research* 40. London: Academic Press.
- Mikkelsen P.S. 2008. *North-east Greenland 1908–60. The trapper era*. Cambridge: Scott Polar Research Institute.
- Vaage J. 1932. *Vascular plants from Eirik Raudes Land. Skrifter om Svalbard og Ishavet* 48. Oslo: Norwegian Polar Institute.