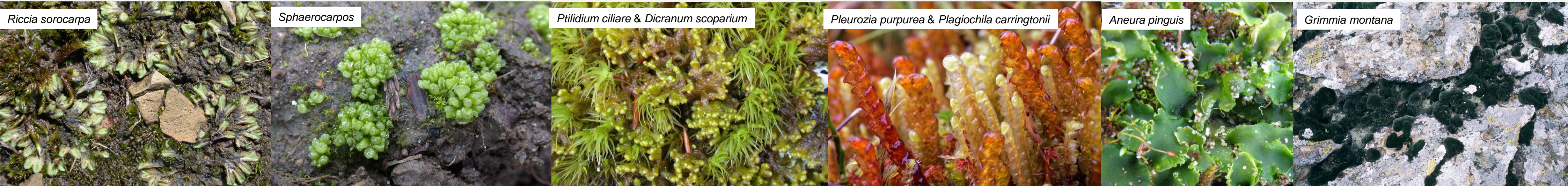


Tiny and Tangled: Unteasing Bryophytes for the Darwin Tree of Life

David Bell¹, Neil Bell¹, Laura L Forrest¹, Zoë Goodwin¹, Peter M Hollingsworth¹, David G Long¹, Alex Twyford², Michelle L Hart¹

1. Royal Botanic Garden Edinburgh, 20A Inverleith Row, Edinburgh EH3 3LR; 2. University of Edinburgh, Ashworth Laboratories, Charlotte Auerbach Road, Edinburgh EH9 3FL



As a Genome Acquisition Lab for the Wellcome Trust-funded Darwin Tree of Life project, a major focus at the Royal Botanic Garden Edinburgh is bryophytes, which comprise, in Britain and Ireland, 795 native and naturalised moss species, 297 liverworts, and four hornworts.

The diminutive sizes of these plants, measuring from millimetres to centimetres, and the inter-tangled mats in which they frequently grow, have practical implications. A clump of liverwort or moss usually comprises a community of several intertwined bryophyte species, epiphyllous and endogenous fungi and algae, and invertebrates.

There are also difficulties in recognising what constitutes a genetic “individual” of a species within the clump: Different stems may be clones, siblings, or unrelated. The only way to be sure stems are from the same genetic individual is if they are robustly connected physically; when plants grow from the tips, with older parts decaying, such connections are difficult to trace.



We obtain fresh high-quality material from collections of living plants, from wild habitats and from within the Gardens. These are carefully teased apart in our lab, cleaned of other organisms, and photographed, before parts of each collection are:

- flash-frozen in liquid nitrogen and shipped to the Wellcome Sanger Institute for genome sequencing;
- dried as herbarium voucher specimens;
- sampled for DNA barcoding;
- shipped to the Royal Botanic Garden Kew for genome sizing by flow cytometry.

Releases of genome sequences and associated data from this project will spotlight some of our exceptional British and Irish bryological diversity, including many oceanic species that are rare or absent in the rest of Europe.

Acknowledgements: The first phase of the Darwin Tree of Life is funded by Wellcome. Photo credits include Rebecca Yahr, Sharon Yardy and Des Callaghan. www.darwintreeoflife.org; www.earthbiogenome.org

