

Buxbaumia viridis hot-spot survives severe flooding

The survival of a large population of this rare moss on National Trust for Scotland's Mar Lodge Estate in Braemar was cause for concern following recent floodings. **John Agnew and Shaila Rao report on findings.**

The nationally scarce green-shield moss *Buxbaumia viridis* is rated as Endangered in the bryophyte Red Data Book (Church *et al.*, 2001), listed on Annex II of the EU Habitats Directive and on Schedule 8 of the Wildlife and Countryside Act (1981). Since the re-discovery of *B. viridis* by Francis Rose on Alvie Estate near Aviemore in 1951 there has been an impressive increase in finds in the Cairngorms, particularly by Stewart Taylor who has doggedly pursued the moss. Thanks to Stewart and others (Gordon Rothero, Andy Amphlett and Dave Genney), there are now records from over 140 locations on the RSPB's Abernethy Forest Reserve, including finds on 14

△Fig. 1: Liz, Richard and NTS staff gather around a *B. viridis* find on Mar Lodge Estate. S. Rao & J. Agnew

different substrates comprising 12 tree species (Taylor, 2010; Taylor 2012). In 2015 one new site in Abernethy produced a minimum of 155 capsules, mainly on one root buttress of a felled Norway spruce, possibly forming the biggest single population found to date.

Thanks to the impressive search effort enjoyed by Abernethy the bulk of records are from the RSPB Reserve and *B. viridis* is most likely under-recorded elsewhere. The moss has been found at over 40 other sites, from Garve in the north-west (NH4458) to Kincardine O'Neil in the east (NO5798). The National Biodiversity

Network (NBN) lists 136 individual locations with unique grid references which have been recorded since rediscovery and this is certainly a minimum. The majority of these were by Stewart and this represents a remarkable cataloguing of a species which was considered extremely rare until very recently.

Deeside hosts extensive areas of semi-native and plantation woodland, which are likely to contain undiscovered *B. viridis* populations. In 2007 Gordon Rothero visited The National Trust for Scotland's Mar Lodge Estate (MLE) to search for *B. viridis* as part of a bigger search project for Scottish Natural Heritage (SNH) on Donside and Deeside (Rothero, 2007). During this time he searched Glens Derry, Luibeg, Quoich and Dubh Ghleann and although he found several sites of suitably decayed deadwood habitat, he came across none of the elusive moss.

After a crash-course at Abernethy in searching for and identifying *B. viridis* from Stewart, we set out in early 2014 with determination to find some on MLE. Our initial search in the mature, semi-natural pinewood of Dubh Ghleann (NO0795) was fruitless and little of the pine deadwood appeared to be at a suitable stage of decay. Following this a quick search of a habitat suggested as a possibility by Stewart, the 'policy' woodland immediately around Mar

Lodge, we found two sites with *B. viridis* present (NO0989 and NO0990). Along with NTS staff we recruited Stewart, Liz Holden and Richard Marriot and set off to see how much *B. viridis* was present in the policy woodland. Our search was rewarded with a gold-mine: 12 populations at the two sites totalling 200 capsules. The bulk of these were on large logs of fallen Norway spruce (*Picea abies*) and stumps of undetermined conifers, although they were also found on Grand Fir (*Abies grandis*) and small pieces of undetermined conifer species.

We were pleased with our *Buxbaumia* hot-spot and so following a severe rain event in August 2014 (one month of rain fell overnight) were concerned that one of the sites would be decimated. The river Dee burst through defensive banks and flooded the policy woodland, moving logs and submerging the habitat. We predicted that this would result in a fall in the population so were pleased to find an increase in the total number of capsules to 206 in 2015. The flood resulted in significant change in the habitat, moving and disturbing deadwood, some of which supported *B. viridis* in 2014. This may have contributed to the change we observed in the size of populations on individual logs – a reduction from 51 capsules to 2 on one log and a corresponding increase elsewhere. This

▽ Fig. 2: *B. viridis* capsules. S. Rao & J. Agnew



suggests that due to the highly transient nature of its habitat, *B. viridis* is able to cope with extreme and rare events such as a woodland flood. The woodland also suffered a flood during heavy rainfall in early January 2016, so we will be watching closely to see how this affects the population.

Our findings on MLE confer with Stewart's conclusion that Norway spruce is a favoured habitat for the moss. To date we haven't found any populations in the more 'pristine' semi-native pine-dominated woodland. They all occur in the policy woodland around the lodge where non-native conifer species are present. In 2015 several large Norway spruce logs were felled and left in the vicinity of the larger *B. viridis* population with the hope of providing suitable habitat in the future. Our finds also suggest that there may be much more *B. viridis* out there still to be discovered, see Stewart's 2010 article (Taylor, 2010) for tips. SNH have commissioned a survey of woodland to the west of known *B. viridis* sites for 2016 which intends to determine the western extent of the moss. Happy hunting!

References

- Church, J.M., Hodgetts, N.G., Preston, C.D., Steward, N.F. (2001). *British Red Data Books Mosses and Liverworts*. Peterborough, UK: Joint Nature Conservation Committee.
- Rothero, G. (2007). *Survey of suitable habitats for Green Shield-moss Buxbaumia viridis on Deeside and Donside*. Scottish Natural Heritage Commissioned Report No.279 (ROAME No. F06LF07).
- Taylor, S. (2010). *Buxbaumia viridis* in Abernethy Forest and other sites in northern Scotland. *Field Bryology* 100, 9–14.
- Taylor, S. (2012). Records of *Buxbaumia viridis* growing on new substrates. *Field Bryology* 107, 21–22.

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Top to bottom Δ Fig. 3: *B. viridis* find on large fallen Norway spruce log. Δ Fig. 4: *B. viridis* find on a stump of an unknown conifer. Δ Fig. 5: *B. viridis* capsules. All credited to S. Rao & J. Agnew