

# Monitoring the impacts of ash dieback on epiphytic bryophytes

**Oliver Pescott & Chris Preston**

outline a new epiphyte monitoring project and how to get involved

The arrival of ash dieback (*Hymenoscyphus albidus*, the sexual, epidemiologically significant stage of the asexual morph *Chalara fraxinea*) in Britain from the continent in the autumn of 2012 seems now to have been an inevitable stage of its journey across Europe, and since its arrival its spread has continued apace. At the end of 2013 its presence had been confirmed in 16 English counties, with 244 occurrences deemed to be in the 'wider environment' (Forestry Commission, 2013). Models that attempt to predict the future spread of local ash dieback epidemics across Britain suggest that the disease could be well-established throughout the east and south-east of England by 2017 (Defra 2013). Reviews of the bryophytes thought to be most threatened by ash dieback in

△Above: Epiphytic mosses on Ash. D Callaghan

the UK have been quickly produced (Bosanquet, 2013; Mitchell *et al.*, 2014). Bosanquet (2013) presented a list of 26 mosses and four liverworts assembled on the basis of expert opinion, whilst Mitchell *et al.* (2014) listed 40 mosses and 18 liverworts based on data on host associations in the BBS database and information from the Bryophyte Atlas (Hill *et al.*, 1991–94). Thirteen species appeared on both lists, with *Lejeunea mandonii*, *Habrodon perpusillus* and *Rhyncostegium rotundifolium* being flagged as particularly vulnerable in both studies. Both reports also commented on the potential impacts of ash dieback on populations of many of our commoner epiphytes, with Mitchell *et al.* (2014) expressing particular concern for species that have been regaining lost ground due to improving air quality, and for small leafy liverworts of Atlantic woodlands. Bosanquet (2013) also pointed out that reductions in the species richness and abundance of epiphytes in some habitats could



△Above left: Ash with *Leptodon smithii* at Stackpole, Pembrokeshire. S Bosanquet. △Above right: Ash trees with *Marchesinia mackaii* at Castlemartin, Pembrokeshire. S Bosanquet

have considerable impacts on other groups of organisms.

The arrival of ash dieback has clearly created concern amongst naturalists, many of whom have witnessed the huge impacts that Dutch Elm disease has had on the landscape and biodiversity of Britain and Ireland. Despite the potentially saddening aspects of ash dieback, it has presented the bryological community with an opportunity to investigate the impacts that the spread of this fungal pathogen could have on epiphyte communities. Whilst much information on epiphyte associations with their woody hosts exists, much of this has been collected in an unstructured manner over a protracted period, making the quantification of current bryophyte-host associations across the country subject to some uncertainty. One exception to this is the 'tetrad transect', organised and conducted by the BBS in the early 1990s (Bates *et al.*, 1997, 2004). Whilst this study provided many key insights into the distributions, environmental controls on, and host associations of epiphytes at the time of the survey, large changes in epiphyte

distributions since then mean that these data are unlikely to provide a good baseline from which to predict the effects of ash dieback on typical epiphyte communities. This is, however, an approach that has recently been undertaken for lichens in Sweden, where historical survey data have been used to investigate the effects of different scenarios of ash loss on lichen communities (Jönsson & Thor, 2012).

To our knowledge no European country has yet implemented a nationwide programme to monitor systematically the changes to epiphyte communities that might occur as a result of this disease. Furthermore, even at a global level information on the consequences of the loss of tree species on associated organisms appears to be scarce (Ellison *et al.*, 2005). To this end, the BBS and other volunteer societies (the Botanical Society of Britain and Ireland and the British Lichen Society) have been working with the Biological Records Centre to develop a survey method to enable the identification of the long-term impacts of ash dieback on epiphytes associated with ash trees in woodlands

and in more open habitats, such as hedgerows, parklands and woodland edges. By monitoring plots both in stands of ash and stands of other broad-leaved tree species, we hope to measure the impacts of the disease, whilst providing a control for changes that may be due to other drivers, such as climate and air quality. The scheme is ambitious, in that 220 monads, a stratified random selection based on the abundance of ash in vice-counties predicted from plots of the National Forest Inventory, have been selected, in the hope of achieving a baseline survey within three years. We expect that the plots will then be revisited in the future. We hope that this article will encourage people to leave a couple of free days in their field calendars to enable them to participate at some point in the next three years. The minimum survey comprises a single field visit to a single monad or adjoining area, although visits to several monads are welcome. The project website should be open for registrations by the time this article appears; a project overview, specific instructions for the bryophyte survey, and a recording form, will certainly be available for download (see <http://www.brc.ac.uk/splash>). A list and accompanying map of 'core' monads that we aim to survey can also be found at that address. If you are interested in taking part, monads can be also reserved by emailing [ash-survey@ceh.ac.uk](mailto:ash-survey@ceh.ac.uk). Additional monads selected by surveyors can also be contributed to the project (for Ireland as well as for Britain), so do not despair if the core monads near you appear to have already been taken. Even at this early stage many surveyors have been in contact, and the project looks likely to be an excellent opportunity for relatively inexperienced bryologists to improve their skills by focusing on a relatively restricted set of species. We look forward to working with all members who are keen to take part in this project.

## References

- Bates, J.W., Proctor, M.C.F., Preston, C.D., Hodgetts, N.G. & Perry, A.R. (1997)** Occurrence of epiphytic bryophytes in a "tetrad" transect across southern Britain. 1. Geographical trends in abundance and evidence of recent change. *Journal of Bryology* **19**: 685–714.
- Bates, J.W., Roy, D.B. & Preston, C.D. (2004)** Occurrence of epiphytic bryophytes in a "tetrad" transect across southern Britain. 2. Analysis and modelling of epiphyte–environment relationships. *Journal of Bryology* **26**: 181–197.
- Bosanquet, S. (2013)** Ash and its host species. A look at three groups that may be affected by Ash dieback: Bryophytes. *British Wildlife* **24**: 247–250.
- DEFRA (2013)** *Chalara Management Plan*. <https://www.gov.uk/government/publications/chalara-management-plan> [Accessed 28 February 2014].
- Ellison, A.M., Bank, M.S., Clinton, B.D., Colburn, E.A., Elliott, K., Ford, C.R., Foster, D.R., Kloeppel, B.D., Knoepp, J.D. & Lovett, G.M. (2005)** Loss of foundation species: consequences for the structure and dynamics of forested ecosystems. *Frontiers in Ecology and the Environment* **3**: 479–486.
- Forestry Commission. (2013)** *Ash dieback* (*Chalara fraxinea*). <http://www.forestry.gov.uk/chalara> [Accessed 28 February 2014].
- Hill, M.O., Preston, C.D., & Smith, A.J.E. (1991–1994)** *Atlas of the bryophytes of Britain and Ireland*. 3 vols. Colchester: Harley Books.
- Jönsson, M.T. & Thor, G. (2012)** *Estimating coextinction risks from epidemic tree death: affiliate lichen communities among diseased host tree populations of Fraxinus excelsior*. PLoS ONE **7**(9): e45701. doi:10.1371/journal.pone.0045701
- Mitchell, R.J., Bailey, S., Beaton, J.K., Bellamy, P.E., Brooker, R.W., Broome, A., Chetcuti, J., Eaton, S., Ellis, C.J., Faren, J., Gimona, A., Goldberg, E., Hall, J., Harmer, R., Hester, A.J., Hewison, R.L., Hodgetts, N.G., Hooper, R.J., Howe, L., Iason, G.R., Kerr, G., Littlewood, N.A., Morgan, V., Newey, S., Potts, J.M., Pozgai, G., Ray, D., Sim, D.A., Stockan, J.A., Taylor, A.F.S. & Woodward, S. (2014)** *The potential ecological impact of ash dieback in the UK*. Peterborough: JNCC.

**Oliver L. Pescott and Chris D. Preston**  
 e [olipes@ceh.ac.uk](mailto:olipes@ceh.ac.uk)