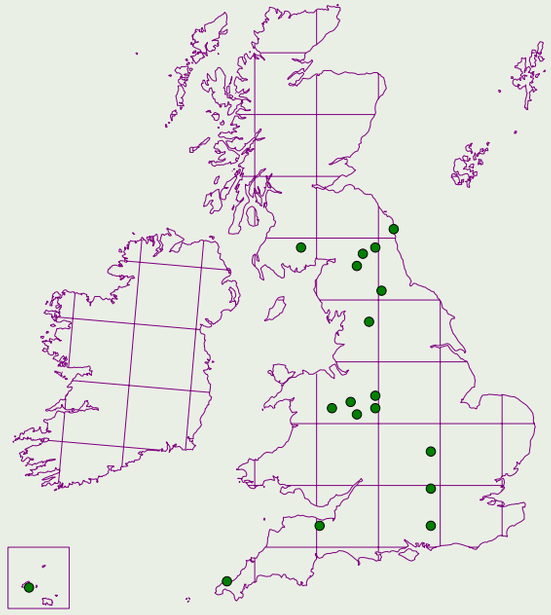
A progress report on the Bryophyte Habitats Survey

With unusually bitter autumn weather discouraging more static types of field work, my thoughts turned to analysing preliminary results from the Bryophyte Habitats Survey. Launched in March 2007, with the objective of defining the niches and associations of our common bryophytes, it seems appropriate, after 20 months, to provide members with a brief assessment of progress. An account of the methodology was given in an earlier article (Bates, 2008) and fuller details may be obtained from the BBS website under 'Activities'.

The map (Fig. 1) shows that quadrat records have been obtained so far from 18 hectads (10× 10-km squares), a modest but encouraging start. These consist of a mixture of 'official' target hectads and others chosen by the recorder. They represent 125 field cards, each summarizing data from one to ten quadrats made in a particular microhabitat. The total number of quadrats recorded thus far is 753, representing 2,685 individual species 'hits'. The samples obtained range from sea level to 483 m altitude. My own experience working in typical target hectads in southern England is that it can be fairly hard work finding microhabitats extensive enough to sample in a meaningful way, beyond the obvious ones of tree boles, decaying logs and soil surface in woodland. However, I am sure it will not be the same in moist and rocky upland districts which have yet to be assailed to any extent. So far, the greatest number of microhabitats (=field cards) sampled in one hectad is 20 (from the uplands) and this is also the maximum number of species recorded within any one microhabitat in a given grid square. Neither record is likely to survive for long.



△ Fig. 1. Map showing the hectads from which some samples have been obtained in the habitats survey.

While considering the statistics, let us give credit to the recorders. Most of the field cards sent in for the project bear the names of one to three recorders. Twenty-four names are recorded in the database so far. One of them is the 'Northumberland Bryophyte Group', an enthusiastic consortium led by John O'Reilly. In terms of numbers of field cards completed the top five contributors are: Martin Godfrey (40); the present author (33); Rachel Carter (17); the Northumberland group (11); and, in tied fifth place, John O'Reilly (10) and Liz Kungu (10). John's contribution is obviously underestimated.

What of the data themselves? Even though our sample (Fig. 1) is by no means representative of Britain as a whole (and no records have yet been forthcoming from Ireland), it is very tempting to sneak a preview at the broader patterns emerging. What, for instance, are the most common bryophytes? The top eight in terms of frequency within the 753 quadrats are listed in Table 1. No great surprises there, but note that abundance in terms of total percentage cover is not closely correlated with frequency within this cohort. Some of the most frequent species owe their high rank partly to occurrences in trace amounts in many samples. In terms of total percentage cover, the six most abundant bryophytes are (in decreasing order) *Hypnum cupressiforme*, *Kindbergia praelonga*, *Hypnum jutlandicum*, *Brachythecium rutabulum*, *Hypnum andoi* (frequency only 40) and *Rhytidiadelphus squarrosus*. Both series will doubtless change as the data accumulate further and it is likely that other species, of more upland character, will move into contention because the currently better-sampled lowlands comprise only about half of the total land area.

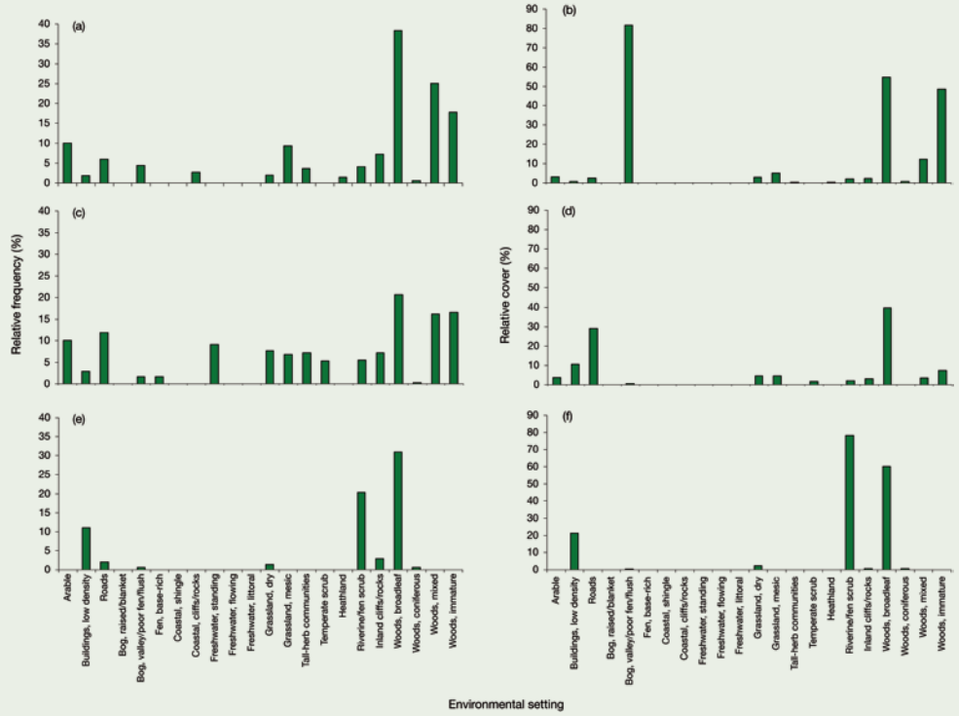
Table 1. The eight most frequent bryophyte species recorded so far in the Bryophyte Habitats Survey

Key: F, frequency (presence) in 753 quadrats; Cover, summed percentage cover; Fruiting, the numbers of quadrats in which one or more sporophytes or perianths were observed, expressed as a percentage of F.

Species	F	Cover	Fruiting (%)
Kindbergia praelonga	164	2,685	7.9
Brachythecium rutabulum	122	1,816	21.3
Hypnum cupressiforme	117	2,925	25.6
Rhytidiadelphus squarrosus	82	1,470	0
Hypnum jutlandicum	82	2,080	1.11
Calliergonella cuspidata	70	780	0
Lophocolea bidentata	68	336	0.03
Plagiomnium undulatum	67	639	0

As an example of what can be gleaned from the data, simple habitat profiles are shown (Fig. 2) for the three most frequent bryophytes, the seemingly ubiquitous mosses *K. praelonga*, *B. rutabulum* and *H. cupressiforme*. The left-hand graphs show profiles based on frequencies (presence in quadrats) falling into each of the main habitat categories sampled so far. This approach gives equal weighting to quadrats containing only a trace of the species and those containing high cover abundance, obviously not ideal. In contrast, the right-hand graphs use the total percentage cover of the species under consideration within each habitat category expressed as a percentage of the combined cover of all species present in that habitat. This is arguably the more sensitive approach. The resultant graphs can be imagined as ecological 'fingerprints' of each species and they reveal a number of major differences among the species, especially for *H. cupressiforme* in comparison with the other two. The approach is valuable as it invites one to come up with hypotheses to account for these differences between taxa. The foregoing analysis takes no account of the different substrata available to the bryophytes and it could clearly be refined by inclusion of this information. Many analyses could be performed to explore interspecific associations and species–environment correlations, but these can wait until a much more representative body of data has accumulated.

We are also collecting information on reproduction from our quadrats which will provide an objective picture of when, where and how often fruiting and gemma production occur. Already I am gaining the impression that fruiting is of



△ Fig. 2. Habitat profiles for the three most frequent bryophyte species so far recorded in the survey. (a, b) *K. praelonga*; (c, d) *B. rutabulum*; (e, f) *H. cupressiforme*. Relative frequency is the frequency of the species in quadrats sampled within a habitat category expressed as a percentage of the frequencies of all species in the habitat; relative cover is total cover of the species in a habitat expressed as a percentage of the combined cover totals of all species in the habitat.

very infrequent occurrence in most bryophytes. However, some of the most frequent bryophytes show relatively high sporophyte frequency (Table 1). Others, like *R. squarrosus* probably proliferate by fragmentation, but for some (e.g. *Calliergonella cuspidata*) it is not altogether clear how their relatively high frequency comes about. At least we are now thinking about it!

In summary, a useful start has been made with this project, but there is still a long way to go to achieve a reasonable coverage of British bryophyte habitats. We hope that further BBS members can be persuaded to contribute data. Quadrat sampling is a fairly intensive and therefore tiring activity, and the way to go about it is to decide upon your target hectad and then to visit it several times over 2 or 3 years. A couple of hours devoted to quadrat sampling one or two microhabitats within a site that you are recording more generally would be a sensible approach. Pick some good weather to do the work and I think you will find that the activity provides new perspectives to your appreciation of bryophytes as well as putting your chosen patch on the map. We hope to offer alternative BRECOG days at forthcoming spring meetings of the Society, so please join us if you would like an introduction to the methodology or to help get the job done.

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Reference

Bates, J. W. (2008). A BBS survey of bryophyte habitats. *Field Bryology* **94**, 36–38.