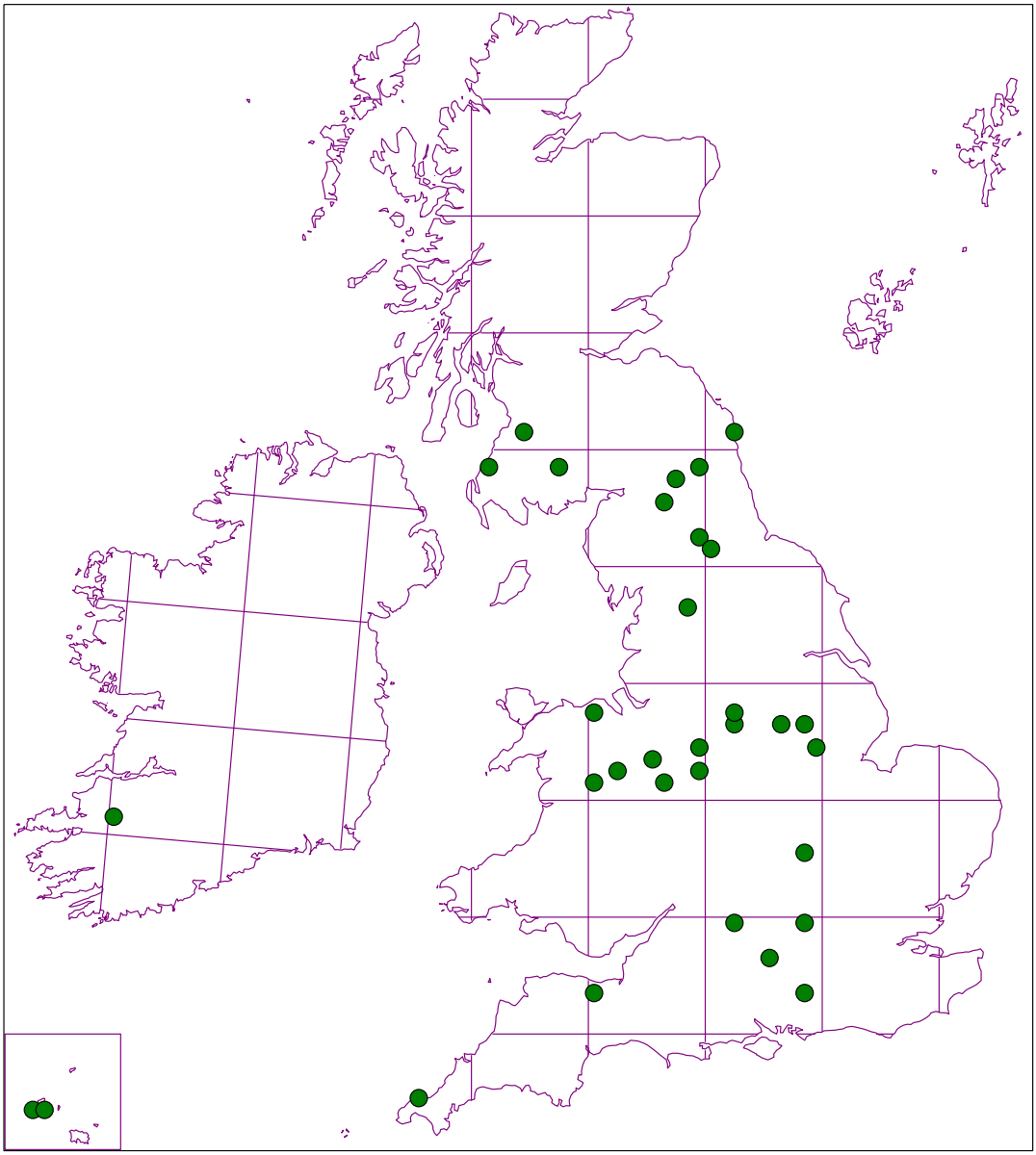
Latest Update – Bryophyte Habitats Survey

A recent short stay in hospital and subsequent period of lazy recuperation has provided an opportunity for me to review progress in the Bryophyte Habitats Survey and the related physiological work. Basically, progress in both areas has been continuing but at a relatively low rate. So far, 1246 quadrats have been recorded from 208 microhabitats spread over 32 hectads as shown in the map below.

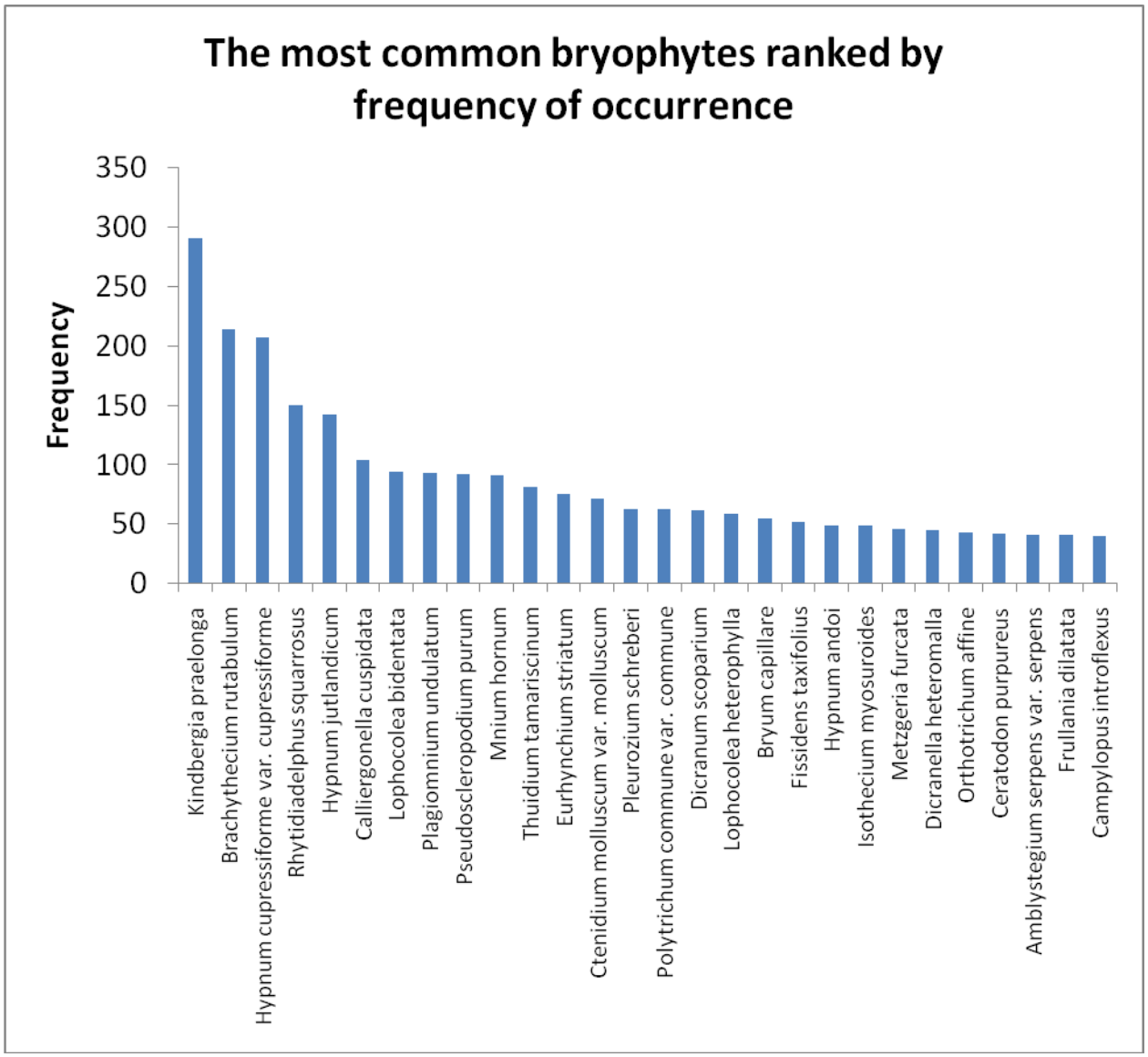
Situation Map, June 2010



Just as last year, the 2010 Spring Meeting, which was centred on Newark-on-Trent, provided a focus for recording activities although I regret that I was unable to attend myself.

Although I regularly receive offers of help with the 'BRECOG' field recording, most of these fail to materialise and I am indebted to a very small band of enthusiasts for the majority of the data obtained over the past year. In order to make definitive statements about the ecologies of our major species I estimate that we need a dataset around ten times the size of the present one and also one that is more evenly dispersed over the two countries. There is therefore still much to do and we would greatly value any further help that BBS members can give. Hopefully, my recent retirement from full-time academic employment will mean that I am able to find rather more time for travelling about and recording in future.

What can be gleaned from the data you have contributed so far? Although many patterns are becoming evident, a summary at this stage would clearly be wildly premature. I am therefore limiting myself to the simple chart below. This shows the rank order of the 28 most



common bryophytes based on their frequencies (that's simple presence, not cover) in the 1246 quadrats. If the sum of their individual percentage cover values is used instead of frequency, a somewhat different rank ordering is obtained with *Hypnum cupressiforme* coming out as the most common species. In general, species that naturally form large continuous patches move up the 'pecking order' compared to those that do not, when cover is used instead of a frequency count. While those concerned with conservation of rare species might consider these bryophytes to be of very little interest, as enlightened Darwinian ecologists we could make the argument that these are among our most successful species and therefore worthy of our respect and, indeed, of further study to uncover their secrets! However, we won't just now because the data are clearly not yet complete and we must redouble our efforts to collect many further samples before we can make a full and proper analysis. If you wish to contribute, full details of the methodology and a downloadable recording form are available on the website.

You will probably be aware that, behind the scenes, the BRECOG project also involves making standardised measurements of several physiological attributes of bryophytes that will eventually be combined with the results of the Habitats Survey. In previous years the data on desiccation tolerance and response to light intensity were gathered by two Imperial College undergraduates working under a 'summer employment' scheme. In 2009 the Bequest Fund agreed to cover the expenses of a third summer student but in the event this individual pulled out at a late stage for health reasons. However, towards the end of 2009, an external student, Stephen Blackmore, approached me and the Bequest Fund kindly offered him a small grant to cover travel expenses between his home and Imperial College where he became an occasional student. The two of us worked as a team and we completed measurements on a set of ten previously unstudied species the day before I retired! This 'hands-on' experience was useful as I have now set up a small laboratory at home to make further measurements myself. This year I have completed an appreciable number of 'photosynthetic light response curves' based as usual on chlorophyll fluorescence measurements. These include 're-runs' where earlier ones were deficient in one or more respects. I have also nearly completed another full desiccation experiment. The light response curve for a species can easily be obtained in a day whereas the desiccation experiments, involving sets of ten species, require a 46-day run without interruptions on specific days, and so future progress is likely to be only 20-30 species per year for the latter. My 'bryophyte ecophysiology database', summarising both published data and our own unpublished results, now contains light response curves for 111 species and desiccation tolerance information for 67 taxa.

During my recent talks I have argued in favour of obtaining a measure of relative growth rate or *R* (essentially growth rate under ideal conditions) as a useful predictor of the ecological

behaviour of bryophyte species. Earlier work by J.P. Grime and colleagues suggests that bryophyte species that have low inherent growth rates are restricted to hard substrata and poor conditions where competition from other plants is low. It would be valuable to extend the available information to appreciably more than the 40 species that have been studied hitherto. Direct measurements of this are very demanding to achieve and are essentially unrealistic for large-scale screening of species, and so I have sought an easier alternative. I have now settled on making measurements of net photosynthesis as a surrogate for *R* using an infra-red gas-analyser to monitor CO_2 uptake and an optimum light intensity derived from the light curve studies. Potentially, this could be achieved quite quickly. I hope to be able to report progress on this aspect in my next update.

Jeff Bates, 23 June 2010

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