

SHROPSHIRE'S CHANGING BRYOFLORA

.... CHANGES? WHAT CHANGES?

by Mark Lawley

This paper was read at the BBS's Autumn Meeting at Preston Montford in 2004. That meeting's generic title was "recording bryological change", but natural historians often talk about "change" casually and imprecisely. We usually mean changes in species' abundance or distribution or both. Yet we seldom stop to wonder what caused these changes and only very rarely does anyone investigate why they may have occurred.

By default we attribute changes in distribution or abundance to secular ecological succession, but this smacks of tautology. There may be a number of reasons why succession occurs and a bryoflora seems to be changing. Evolution is one possibility – some species may be evolving or have recently evolved. Or abiotic environmental conditions may have changed, favouring some species while causing others to decline.

However, and thirdly, variations in the kind or quantity of bryological recording may lead us to erroneously suppose that a bryoflora is changing. The manner in and extent to which individual bryologists record plants greatly influence how we interpret the occurrences and distributions of species. In my opinion, by far the greater part of what we like to regard as "change" in a local bryoflora is attributable to changes in the activities of local bryologists, rather than in the bryoflora itself. Humankind has always tended to view the world anthropocentrically, wherefore field-bryologists suppose the world around them is changing, rather than themselves. Yet variations in how and how much we study wildlife do not spawn facts pertaining to the environmental world, but fictions in our mental world that distort our impressions of how (or indeed whether) bryofloras are changing.

Bias in recording particular species, habitats, and localities

Even in Britain – one of the best-recorded parts of the planet – recorder-bias is particularly significant in bryology because no district is over-run by actively recording field-bryologists. The individual recording foibles of each field-bryologist therefore become likely to distort our understanding of a district's bryoflora. Where a bryologist lives, the localities and habitats which he favours exploring, and his accuracy, experience, reliability - as well as his blind spots and unreliability - in finding and identifying species all influence what he records, fails to record, and misrecords.

In Shropshire, since I became recorder in 2000, nearly all the records from the county which I have forwarded for the national database at Monkswood have been my own. So our picture of Shropshire's bryoflora is becoming increasingly skewed according to my personal recording preferences and weaknesses. Regarding weaknesses, I have at least as many blind spots for recognising and identifying species as other botanists, and quail to think what I must fail to notice and record when exploring a locality. For instance, I often vacate eminently suitable

habitat without having recorded *Rhynchostegium confertum*. Was it really not there, or had I overlooked this unostentatious pleurocarp? Or worse, did I record it in error as another species? I further fear that neither *Orthotrichums* nor *Sphagnum*s can yet be counted among my strengths, and as for *Grimmias* and *Syntrichias*....

What I see and what I fail to notice have also changed with time, and will continue to do so. I am familiar with more species now than ten years ago at the start of my bryological career, and it pleases me to suppose that I overlook and misidentify fewer species now than formerly. But in years to come, when I am old, my eyesight and ability to explore rough terrain will deteriorate, so my recording will again become less reliable and thorough.

*“Where am I going? I don’t quite know.
Down to the stream where the king-cups grow –
Up on the hill where the pine-trees blow –
Anywhere, anywhere. I don’t know.”*

*“Where am I going? I don’t quite know.
What does it matter where people go?
Down to the wood where the blue-bells grow –
Anywhere, anywhere. I don’t know.”*

Such whimsical wandering may have satisfied Christopher Robin, but I am much more selective when I go botanising, and my preferences for exploring particular districts and habitats considerably influence our corporate knowledge of Shropshire’s bryoflora. I live at the county’s southern extremity, and mainly record in the beautiful pastoral landscape near my home. I make bee-lines for rocky outcrops and flushes in the hills, outcrops of limestone, wooded dingles, and riverbanks. I avoid poo-laden parks, *Lolium*-leys, verges of main roads with high volumes of noise and traffic, and will only enter the arable northern half of Shropshire when in masochistic mood or if told to do so by an arabologist. For all these reasons, the records I send to Monkswood do not give a balanced picture of Shropshire’s bryoflora, or even a picture which is unbalanced in the same ways as earlier impressions of its bryoflora created by bygone bryologists.

Fluctuations in the amount of recording

Another reason why bryologists confuse changes in their view of the bryoflora with real events in the environment is time itself. The quality and amount of recording in many districts fluctuate wildly down the years, according to the changing distribution and activity of local bryologists, rather than of bryophytes.

In common with many other counties, Shropshire enjoyed a golden age of bryological recording at the end of the 19th and start of the 20th centuries, when William Phillips Hamilton, Richard de Gylpyn Benson, Arthur William Weyman (see <http://ralph.cs.cf.ac.uk/HOB/HOBBintro.htm>) and William Hunt Painter greatly advanced what was known of Shropshire’s bryoflora. But three of this gang of four were dead

by the outbreak of war in 1914, whereafter no bryologists took on the task of local recording. Instead, peoples' thoughts turned from investigating the beauties of nature to their own evermore pressing social and economic exigencies. John Bishop Duncan (see <http://ralph.cs.cf.ac.uk/HOB/HOBBintro.htm>) continued to make occasional sorties into Shropshire from his home in Worcestershire until he retired to the north country in the mid-1920s, but thereafter an era of investigative inertia and negligible bryological recording in Shropshire lasted until after the Second World War. Then prosperity replaced austerity, bringing more leisure and triggering renewed interest in natural history. As it happens, sustained bryological recording did not resume in Shropshire until late in the 20th century, and the Border Bryologists did not start up until the mid-1990s. The BBS had met at Oswestry in 1960, Ludlow in 1979, and Ellesmere in 1992, but their excursions amounted to only a few days of exploration amidst long years of void and neglect.

Since the meeting at Ellesmere in 1992, Shropshire has seen an increase in bryological recording, with numerous species recorded new to the county, or seen and vouched for the first time since before 1950. But are these new and rediscovered species evidence of changes in Shropshire's bryoflora, or merely of changes in the kind or amount of recording, consequences of the surge, lapse, and recent resurgence of interest and activity? True, many species do move around, abandoning one locality and appearing at another, both within the county and across its boundaries, but in taking a broad view of Shropshire's bryoflora, I suspect that what has appeared anew or "reappeared" lurked in the county all along, just waiting to be discovered, while much of what Hamilton and his henchmen found and has yet to be rediscovered is merely playing hard to get.

Since becoming recorder for Shropshire in 2000, I have tried to refind many of the species bracketed in the 1998 *Census Catalogue* (i.e. not vouched from the vice-county since before 1950). Species such as *Campylophyllum calcareum*, *Cryphaea heteromalla*, *Leucodon sciuroides*, *Racomitrium affine*, *R. aquaticum*, *R. ericoides*, *Tortula marginata* and *Scapania gracilis* may not be particularly common in the county, but neither do I suspect them of being rare. Yet none of them were vouched from Shropshire during the second half of the 20th century. Nevertheless, I am confident they were present throughout that period.

Other species certainly are rare in the county now and probably always have been. Augustin Ley and A.W. Weyman found *Tetraplodon mnioides* on Titterstone Clee Hill in 1893, as did J.B. Duncan a decade later, but that was the last sighting of this moss in the county for exactly 100 years, when it was refound in the same place. Yet I have no reason to suppose that *Tetraplodon* left Shropshire at any time during the intervening century. It was merely that no one looked. Probably the only "change" was in the carcass it grew upon. A few yards from the *Tetraplodon*, in Titterstone's scree, Duncan found *Rhabdoweisia crispata* new to Shropshire in 1904, and that moss too was not re-recorded there for nearly a century. So far from being evidence of change, these records are evidence of no change.

Another of J.B. Duncan's records from the early years of the 20th century is of *Seligeria donniana*, which he found on mildly basic sandstone outcrops at two sites in the Severn valley below Bridgnorth. In 2003 I refound this moss in Bowhills Dingle – one of Duncan's sites – and

as with the mosses on Titterstone, do not doubt that the *Seligeria* had lived quietly in its dingle throughout the 20th century.

So which (if any) species are becoming more or less widespread in Shropshire?

During my day in Bowhills Dingle, I noticed the frequency of *Platygyrium repens* on trunks and branches of many trees near the stream. Duncan was much too good a bryologist to have missed this moss, had it been there a century ago, so I am just as confident that *Platygyrium* was not in Bowhills Dingle in 1904 as I am that the *Seligeria* has been there continuously ever since. *P. repens* was not recorded in Britain until the mid-20th century, and although it was first found in Shropshire as long ago as 1976, we shall never know when it arrived in the county because so few people looked. Over the last few years this species seems to have been spreading on the English side of the Welsh border, and between 1997 and 2004 I found it at six sites in Shropshire, and several more in Herefordshire and Worcestershire. On the English side of the mid-Welsh border I now find myself half expecting to see *Platygyrium* when I explore sheltered, low-lying, humid, deciduous woodland near standing or running water. The change in *Platygyrium*'s local distribution seems to be real, unlike a majority of our bryophytes, whose "changes" in status are more attributable to variations in the activities of bryologists than to factual reality. On the other hand, there are very few records of *Platygyrium* from eastern Wales. Is it really rare or absent on the other side of the Welsh border, or overlooked and waiting to be found?

Other species which also seem to really be spreading in Shropshire include the epiphytes *Dicranum montanum*, *D. tauricum* and *Ulota phyllantha*. J.B. Duncan twice recorded *D. montanum* in south-east Shropshire early in the 20th century, but *D. tauricum* and *Ulota phyllantha* were not recorded from the county until 1979.

Two liverworts, *Nowellia curvifolia* and *Diplophyllum obtusifolium* have also probably spread and become more common. The *Diplophyllum* is a fairly frequent early colonist on banks of bare soil beside forestry tracks, where it gives way to *D. albicans* unless the ground is disturbed afresh. Commercial forestry did not become widespread until the Forestry Commission was established after the First World War, but even so, *D. obtusifolium* was not recorded in Shropshire until the close of the 20th century. It may well be commoner in the county than formerly, but have been present for much longer than we know.

Indeed, Hamilton, Benson, Weyman and Painter laboured without the benefit of MacVicar's *Handbook*, and paid much more attention to mosses than liverworts. Therefore liverworts which have been added to the list of species known from Shropshire only in the last few years were very probably present long before then - *Barbilophozia atlantica*, *Cladopodiella francisci*, *Fossombronia caespitiformis*, *Gymnomitrium obtusum*, *Jamesoniella undulifolia*, *Lejeunea lamacerina*, *Lepidozia cupressina*, *Metzgeria temperata*, *Saccogyna viticulosa*, and the hornwort *Phaeoceros carolinianus*. Indeed, the *Metzgeria* was not distinguished as a taxon a century ago.

Other species which have only been distinguished fairly recently and added to the county's flora include some of the bulbiferous and tuberous *Bryums* and *Pohlias*, *Didymodon tomaculosus* and

Fissidens celticus, none of which were recognised as distinct species a century ago. As with *Metzgeria temperata*, we cannot be sure that these mosses were formerly absent, and therefore cannot claim that their geographical distributions are changing. Many of these species are extremely similar to some of their congeners, a similarity which may explain why they were overlooked (assuming that they were!). On the other hand, species such as *Amblystegium confervoides*, *Didymodon australasiae* var. *umbrosus*, *Ephemerum recurvifolium*, *Leptobarbula berica*, *Pottiopsis caespitosa*, *Tetradontium brownianum* and *Weissia longifolia* var. *longifolia* are easily overlooked because of their diminutive size, rather than confused with and overlooked as similar species. So these species too may not be spreading in Shropshire.

Of course, not all species with locally changing distributions are spreading. Some plants seem to have been lost from Shropshire. Practically all the *Orthodontium* is now *O. lineare*, not *O. gracile*. Nor can I find *Antitrichia curtispindula* or *Splachnum ampullaceum*.

Nevertheless, we are justified in presuming that Britain's bryoflora changed as some habitats became rare and others replaced them. Much deciduous woodland was felled during the First World War and later replaced by softwood plantations. Mires were drained, water-courses altered, and towns and villages have spread. Hedges have been uprooted, arable fields replaced many pastures, and changing techniques of husbandry further altered the floras of both arable and pastoral land. Botanists therefore suppose that the frequency and distribution of most (if not all) species have changed - at least to some small extent - and will continue to do so, either qualitatively in terms of their distribution or quantitatively in terms of abundance, or both. But without evidence we are not entitled to replace this supposition with unequivocal statements of fact. On a national scale, the reappearance of numerous epiphytic species in districts where they had not been seen for many years is indeed unequivocal, but for the most part we will never know and can only speculate how or how much bryofloras have changed, for not enough recording took place before these changes began. Grid-based recording, which began in earnest in the second half of the 20th century, will in future offer a means of assessing changes in distribution, as surveys are repeated (*pace* their numerous limitations, which I discuss in this paper), but only with great caution will we then be entitled to extrapolate any detected changes back in time before the earliest surveys.

Publishing local bryofloras

The format (and form) in which regional bryofloras are planned influence how we gather records for these publications. This in turn influences which species we find and how often we find them. Many regional bryofloras now include dot-distribution maps for species, so authors make a point of recording in as many of the grid-squares in their chosen district as possible. This has the merit of prompting visits to sites which might not otherwise be explored, so that discoveries are made which otherwise would not have been.

Furthermore, smaller-scale dot-maps showing the geographical distributions of species by hectad over hundreds of square kilometres of country (as in the *Atlas of Bryophytes of Britain and Ireland*) are valuable in showing where species have been found, and interesting for indicating where they may be expected to occur. Grid-recording therefore does have some merit, even

though these national maps incorporate local recorder-bias. However, distribution-maps mislead whenever we cannot be confident that white gaps are as significant as black spots, for absence of evidence does not constitute evidence of absence. Many blank 10 km squares in the distribution-maps of the three-volume *Atlas* do not indicate boundaries or gaps in occurrence, but gaps in our understanding of the distribution of species – markers of ignorance rather than absence.

This ineradicable fault in distribution-maps becomes much more apparent at the larger-scale of vice-comital grid-maps, rather in the manner that a photograph dissolves into a meaningless mass of tiny dots when one looks at it too closely. With field-bryologists so thin on the ground, and the objects of our affection so small and inconspicuous, many dot-maps purporting to show the distributions of species at county rather than country-level are likely to be unreliable and misleading. A small handful of bryologists cannot comprehensively quarter several hundred tetrads in a county, and therefore cannot expect to produce accurate distribution-maps. And unless superhuman, a lone bryologist can reasonably expect only to produce an annotated list of records from his home county, collated from databases, publications, herbaria, and his own contemporary recording.

In the publishing world form is as important as format, and electronic publishing has the advantage of enabling public dissemination of up-to-date information which paper-publication cannot match. This may affect how we perceive changes in the bryoflora. For example, a revised edition of Shropshire's bryoflora is published on the BBS's web-site each year. Each new edition includes the previous year's discoveries, and with errors and omissions corrected, thus making and keeping Shropshire's published bryoflora the most up-to-date in the kingdom. This continual revision of documents in the public domain is not feasible with hard copy, and while the latter is likely to remain the more durable form of publication for the foreseeable future, electronic publishing is endlessly editable, making it a most useful ally of paper-publishing.

Summary

I am the only bryologist now regularly recording Shropshire's bryoflora and sending in records for the database at Monkswood. So our impression of what occurs where and the distributional status of each species in the county depend on my individual foibles as a field-bryologist. Where I explore in the county, which habitats I prefer to record in, my strengths and weaknesses in identifying different species all colour what we think we know of Shropshire's bryoflora. Furthermore, in trying to assess changes in the local bryoflora, my strengths and weaknesses have to be measured against those of bryologists who were formerly active in Shropshire. Such a comparison is virtually impossible, so I counsel against drawing facile conclusions about many apparent changes in the county's bryoflora, which may not be changes at all.

Changes in dotted maps do not constitute evidence of changes in our bryoflora. Nor do they enable us to decide whether a change of distribution is attributable to secular succession or evolution (or both), or whether a change is apparent rather than real, a consequence of change in the kind or quantity (or both) of recording. Judicious interpretation of records suggests that some species have indeed spread in Shropshire over the last century, and that others have become

rarer. But clear-cut evidence of substantial successional changes exists for only a minority of species in Shropshire, while no evidence of any kind exists for contemporary evolutionary changes in Shropshire's bryoflora.

Professional reputations and salaries may even depend upon sustaining the myth that much of our bryoflora is changing significantly. Bryologists beware. Don't be duped by a farrago of pap, for most of these changes are not of the natural world, but products of fevered imaginations – of what we see and do not see in our environment, and how we like to study it. We have become much too inclined to assess all “change” in terms of dots appearing on and disappearing from distribution-maps, just as some people use these maps to “prove” that distributions are consequences of climate, geology, etc. These maps may be products of years of painstaking work in the field, but they are not works of unimpeachable scientific accuracy. Instead they are a paradigm with pathological limitations, one which burnishes our explorations with a diaphanous veneer of scientific respectability. Really, does anyone still seriously suppose that all this endeavour is leading inexorably to some wonderful new law of biogeography?

If you have contracted a bad case of Spotty Map Syndrome, be aware that very few of these maps accurately portray changes in distributions. Moreover, they tell us nothing about the causes of apparent changes - that few if any changes are certainly attributable to evolution, that some (and only some) are attributable to secular ecological succession, and that most are largely a consequence of changes in the quality and quantity of our bryological activities and how we interpret our environment, rather than of changes in the bryoflora, or within bryophytes themselves. Natural historians achieve their aims merely by recording facts and events they are interested in, but fail as biologists the moment they neglect to enquire why the changes which they notice have occurred, and to what causes they may be attributed.

Bibliography

For more detailed discussion of the differences between succession and evolution, and how they are identified, studied, and often confused, see *The History of Nature* at <http://ralph.cs.cf.ac.uk/HON/Hon.html> *The History of Nature* also relates how interest in natural history has waxed and waned down the years, in response to fluctuating economic and social conditions.

For further discussion of the history of bryological exploration, and fluctuations in the extent of interest in bryological recording in Britain, see *A Social and Biographical History of British and Irish Field-bryologists* at <http://ralph.cs.cf.ac.uk/HOB/HOBBintro.htm>
<http://ralph.cs.cf.ac.uk/HOB/HOBB.pdf>

For details of Shropshire's bryoflora, go to www.britishbryologicalsociety.org.uk
Follow links to UK bryodiversity and the vice-county map, and then click on vc 40.

