

The hybrid sundew *Drosera xobovata* (yellow dots), showing the distribution of the parents *D. anglica* (pale blue), *D. rotundifolia* (dark blue), and both (red). See page 8 for a report on the hybrids project.

BSBI Recorder No. 15

A newsletter for county recorders, referees and herbarium curators in the Botanical Society of the British Isles

Spring 2011

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Summary

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Our usual list of action points....

1. Make a plan for Atlas 2020. All county recorders need to have some sort of strategy for getting around their county in the next nine years, if they have not done so in the last date class. If you cannot cope, then do consider standing down. We can make you an Emeritus Recorder if you want to keep in touch and continue with your own interests. But it is far better to have a county listed as vacant than to have someone trying to do the county recorder's job if they don't really have the time or inclination for it. You may think there is no-one else who could do it, but it's surprising how soon someone keen turns up.
2. Fill in a few Threatened Plants forms. This has been a huge project, welcomed by many county recorders. OK, quite a lot of work, but look at the detailed reports that Kevin has started to produce from it. Even if you're not terribly inspired by it yourself, it is worth doing some surveys to ensure that the geographical coverage is good. (I don't need to tell county recorders why cooperation benefits everyone – you *volunteered* to be part of our network, so you already know this.)
3. Set up a web page about your county. It is little work if you just want a minimal one. You don't need to know anything clever about computers, you just need to be able to type and ideally take a digital photograph. Things to put on your web page: how to contact you, when your field meetings are, any publications you have, scans of other botanical publications about your county, where a botanical visitor could stay and what they might hope to see. Think about what the reader wants from a web page.
4. Sign up for the eNewsletter. Takes just a few seconds, and then you get a monthly email from us with any news or information that you need. When your email address changes, you just log on to the eNews web page and change it. It's simple. If you are not already signed up, you have to contact me to get the address, as we do not publish it, in order to make life harder for spammers.

Maps Scheme report

Alex Lockton & Quentin Groom

It is intriguing to see that the number of 10 km smarties in each date class continues to grow, reflecting the ongoing computerisation of older records from herbaria and literature. Date Class 2 seems to be doing particularly well, with 20,000 records added in the last year, which is good news because it is the weakest period for recording. It seems likely that there were actually more records in DC2 than we can see, because it was common practice to compile a recording card over long periods of time, and the records were (very naturally, but not correctly) assigned to DC3 rather than DC2 when the Atlas project was launched.

Growth in the number of Maps Scheme smarties over the last six years.

	2005	2010	2011
DC0 (-1929)	-	251,233	265,333
DC1 (1930-1969)	325,148	1,564,319	1,568,099
DC2 (1970-1986)	186,464	917,456	938,707
DC3 (1987-1999)	1,818,116	2,194,252	2,212,395
DC4 (2000-2009)	316,154	1,168,662	1,242,853
DC5 (2010-2019)	-	1,431	18,1227

One pertinent question about the Maps Scheme is what use is it? Because we compile live data continuously a lot of erroneous records sneak in, especially for species with ambiguous names such as *Trichophorum cespitosum* and *Rorippa islandica*. There are often, therefore, duff dots on the maps. However, as we do compile data from a lot of sources, the correct records also get in and this is the only place where you can find out about them. So if you want to see where *Fumaria reuteri* has been recorded, for instance, there is nowhere else where you can go.

A criticism of the Maps Scheme that some people make is that it is collecting data for no purpose. Well, that is not entirely unfair. Botanical recording can be fun, and many botanists see it as an enjoyable challenge rather than a necessarily purposeful scientific activity. But having said that, we have never yet come across an academic researcher who wanted us to record less. We get many requests for data, and every single one of them says they wish we could do more recording, and standardise it more. Before the Maps Scheme started, there was no ongoing programme of repeated recording. Now we have the structure of the decade-long date classes. From the table above, it looks like we could aim to get 1.5 million smarties every decade. That will amount to a very useful data set after a while.

Here is a challenge for you: find someone who has the proven skill and ability to record for the Maps scheme who also thinks it is a waste of time. You need to be a good enough botanist to identify a huge range of species in the field, healthy and energetic enough to go out and do the work, skilled enough to computerise thousands of records a year, and sufficiently socially adept to be able cooperate with colleagues to help compile a national database like this. That's an impressive range of abilities, so those who are able to contribute to the maps definitely deserve a pat on the back.

Summary of the Maps Scheme Database by County and Date Class

VC	DC0	DC1	DC2	DC3	DC4	DC5	64	2214	16121	8912	27438	10205	3853
1	8435	14621	13319	16303	16624	255	65	938	11131	6097	12688	3270	98
2	9002	17073	12143	24015	21604	22	66	2589	15307	21072	18314	17423	5207
3	5773	25191	30960	37151	23382	4956	67	877	18164	13015	19087	14324	6262
4	3054	16821	23137	22329	14852	2911	68	1441	11244	8007	10788	7821	2206
5	1356	11814	6306	26541	15445	3111	69	1652	12827	24534	25302	7853	2
6	5854	15353	11646	28289	17285	7055	70	1127	19090	34013	35019	12073	2
7	526	11481	6827	14018	8500	1304	71	838	5974	1478	8324	2395	0
8	643	12869	9075	19463	11089	633	72	883	10547	4261	11425	7152	1000
9	2616	24603	11456	31615	14853	431	73	1060	11359	8085	16706	5935	45
10	1616	4934	2399	3017	6761	0	74	2507	6667	4084	8866	5631	0
11	7211	15368	8716	24992	20596	4802	75	441	11775	2533	15529	1421	6
12	6869	13444	10206	18290	14559	4453	76	159	2703	3789	5227	659	52
13	1414	14345	2218	16203	19400	2534	77	294	7226	2326	13767	1479	5
14	1856	16913	3549	16670	20517	2663	78	946	4883	4313	4487	960	1
15	1467	18514	6793	21441	15604	10	79	500	2295	1228	4126	2409	560
16	1343	13298	4823	15259	12376	2667	80	1659	7866	2624	10433	4509	1451
17	4063	20801	10302	24201	20636	9328	81	2353	8059	6141	10142	7662	2414
18	1208	10551	4694	13262	10786	4863	82	317	4876	2118	6296	2027	1
19	2002	15111	7613	22542	7948	1794	83	1236	6689	2999	6695	1169	2124
20	1526	12963	4656	18155	4753	2964	84	148	2315	2002	4668	1056	0
21	1511	8795	2314	7624	7716	4207	85	2436	9230	6650	13429	1501	130
22	1626	18841	8663	24173	23792	12	86	380	4267	1599	8347	4030	114
23	1875	19102	18820	17531	3619	5	87	1139	4595	8529	9006	4474	353
24	6658	14150	18601	21298	9732	457	88	4972	15005	11981	15426	11987	38
25	1996	21689	21460	21400	19139	0	89	2711	7812	8450	11432	7062	8
26	1455	13492	14000	13729	14089	0	90	1228	10469	2872	12149	8672	44
27	2498	15616	4447	27077	18447	7576	91	998	3902	1036	5858	6157	43
28	3696	15267	4523	26935	19971	3590	92	1075	8486	2522	8512	3199	773
29	3462	17012	12055	16666	12184	5316	93	353	6816	3377	11536	9897	71
30	689	10732	13614	13077	11288	0	94	6694	7960	9237	6880	8199	1776
31	1019	6266	8927	5491	6335	2425	95	2314	11099	4002	13695	9565	1713
32	5538	12167	7317	20503	8071	256	96	1059	19335	20285	13833	8799	377
33	1150	10605	6272	18136	11093	2210	97	812	16039	7793	15978	10245	1360
34	2012	11689	9829	19944	13518	3581	98	795	16772	2822	20495	10457	4397
35	2273	6385	3051	19356	1224	2043	99	221	3213	6145	6856	994	125
36	3325	10260	7619	20496	10934	3	100	723	4870	4122	7077	7254	815
37	1449	10354	5385	22455	21823	2	101	155	9780	4729	11100	4336	7
38	2889	22046	2160	15941	2796	1226	102	185	7083	1873	9699	650	0
39	1966	16145	5456	25293	31604	3189	103	453	11040	2996	9500	8659	2004
40	10185	3573	20376	20357	20843	7662	104	1740	14572	9446	14177	15005	3889
41	1651	13600	18837	18309	10758	4239	105	767	11777	2809	10009	1918	0
42	1503	8940	5119	12446	13635	0	106	2741	13232	5771	13763	15427	2967
43	517	8185	8944	9244	2165	0	107	347	8832	3594	7301	1408	5487
44	367	10430	3082	22929	13012	0	108	7992	11400	5257	13181	7701	10
45	495	11090	10136	15067	12113	0	109	758	5956	7552	3666	3114	0
46	609	9050	5055	20303	18305	0	110	1516	16673	5761	15166	16507	0
47	356	8474	3390	15698	5163	0	111	2321	7451	2922	8512	6590	1706
48	825	9263	3436	9096	1292	0	112	2205	7727	5741	10808	3702	0
49	1939	11721	4064	19423	16373	1	113	3590	5428	3905	9500	3881	2432
50	716	8164	13712	18494	9467	2929	114	902	1651	1425	2101	2033	0
51	318	5224	2752	6187	999	0	201	706	10162	824	13297	3836	0
52	662	5985	3232	9290	7824	2571	202	377	3356	573	14510	2605	0
53	716	14209	4319	19092	1404	0	203	261	9947	178	16953	3748	14
54	1550	22862	6988	28538	3417	0	204	171	5861	214	13172	419	0
55	1110	13160	17891	12336	1883	0	205	191	5894	211	12654	83	3
56	490	14853	1778	17397	2547	2	206	2114	6332	1516	14536	19194	819
57	2764	13619	5195	17954	16275	2	207	364	5002	188	7910	265	131
58	2329	14516	3588	23435	20932	0	208	349	5444	195	12059	2176	0
59	7311	14903	5130	25276	28892	23	209	1233	8701	1995	10896	6056	354
60	1793	9830	4207	12788	16296	0	210	859	4275	1401	13581	63	0
61	504	14543	14207	15771	9307	4186	211	1135	4723	155	7318	2005	0
62	1798	16140	3307	21763	23178	1	212	899	10174	2318	15555	11899	7976
63	1603	13450	13810	18346	17560	4	213	1156	4097	310	3153	545	0

214	914	4918	268	5222	1320	0	228	943	6947	366	10222	179	0
215	911	4894	250	6261	1873	0	229	961	3949	576	11347	388	0
216	1181	7858	2261	10410	4386	0	230	424	5289	126	6971	124	0
217	1164	5195	400	6670	2383	0	231	739	2098	505	5624	60	3
218	875	4865	80	9071	1766	0	232	147	2800	450	8601	3974	0
219	996	3488	2507	6577	1417	0	233	455	8475	5621	13195	716	0
220	1237	5655	447	11083	558	49	234	172	4901	181	11273	1371	163
221	816	3190	912	8576	341	2	235	381	9497	487	13359	82	948
222	622	4734	361	12423	124	0	236	780	9447	4168	22903	11572	0
223	923	5099	2727	9569	139	33	237	323	5724	2661	7803	482	0
224	568	2467	171	5480	0	0	238	772	10257	8740	17432	7981	0
225	1029	5983	189	10158	750	0	239	658	11405	11555	18927	4259	237
226	424	5293	380	7673	315	0	240	226	5843	5200	12192	3505	93
227	2084	11805	300	13040	453	0							

Introducing the Distribution Database

Kevin Walker, Alex Lockton & Tom Humphrey

The Distribution Database (DDB) (also known, confusingly, as the Big Database) is the next step in biological recording. For ten years or more there has not been an adequate way to compile all of the BSBI's records into one place, so we have deliberately shied away from committing ourselves to any one system. Mapmate has been a great success in allowing county recorders to collect and collate data for themselves simply, quickly and efficiently. Herbaria at Home has done the same thing for museum collections. And the Maps Scheme (aka Atlas Updating Project) has been our way of summarising all this data and putting it on display. However, none of these systems can do all that we want or compile all the data, in full detail, into one place. The DDB is our solution to that problem.

The key difference between the DDB and other biological recording databases is that lots of people can work on it simultaneously over the internet. It can collate and store all the records that exist, and you – the county recorder – will then log onto it to edit, correct, delete and add to the records. It has a facility to exchange data with Mapmate, so you could download everything for your county, work on it there, and then upload it again. Or you can simply work online, viewing records and distribution maps, and running analyses and filters. In the future, recorders may not have their own databases – they will simply log on to the DDB and work on that. Even when out in the field, you will have access to all the existing records over the internet, and you could input your field records as you work, storing them in your own temporary 'sandbox' until you're ready to share them with the rest of the world.

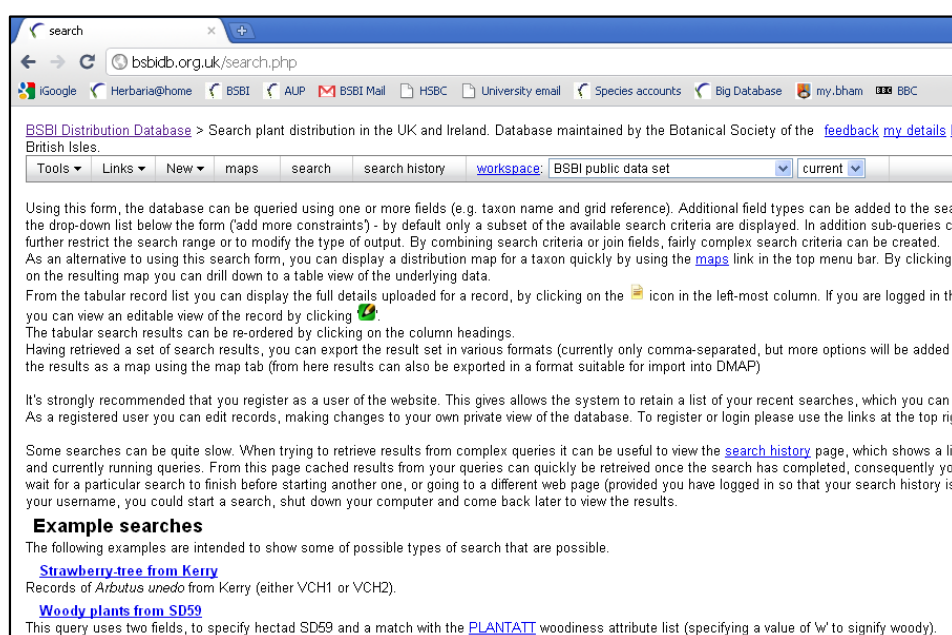
One issue with the DDB is that it now makes sharing so easy that we will have to adapt to new ways of working. The traditional model of a county recorder was for someone who would hold all the data for a county. Being in sole control of the records gives you a very exclusive and proprietorial role, which can be highly motivating, but which is also very arduous. However, that role has already changed in many places. Log on to the DDB and you'll find that there are other people collecting and managing records for your county that you don't even know about. When you probably have more knowledge than anyone else about a subject it is tempting to dismiss others as irrelevant, but there are, for example, really knowledgeable people on Herbaria at Home discussing when Augustin Ley came to your county, what he collected and where. Then there are taxonomists collecting specimens of *Bolboschoenus maritimus* (or whatever) and re-determining them as something new that doesn't even appear on the checklists yet. And there are conservationists recording in sites or planting out rare orchids without caring what the BSBI does or thinks.

So the role of the county recorder has changed, and this will be a good thing when we fully adapt to it. In future they are more likely to be receiving and checking records than necessarily making most of them. The gaps we have had in recording in the past have been so huge. Many counties have had a county Flora about every 100 years and often almost no recording in between. One person cannot do a

modern Flora on their own – they tend to do some areas and species really well, while other areas are often not well covered. Already, county recorders in the south of England have networks of recorders who each have a full copy of the database, and that gives the helpers an incentive to undertake recording projects of their own.

Our desire is to upload to the DDB all the records we have available – about 30 million at the last count. This entire database will be available to all county recorders and to people they choose to also give access to. It will probably not ever be accessible to the general public – they have the Maps Scheme and the NBN Gateway to provide carefully filtered data. The DDB is intended for expert botanists, and it will have very little in the way of filters to prevent you seeing records.

The Maps Scheme has shown us just how awful botanical records can be if they are not carefully checked and validated. But there is now a lot of expertise in automatically checking data, and we think this is going to become less of a problem. The best thing for a recorder is to have access to all known records, but to be able to check, correct and delete the ones they don't like, easily.



The distribution database. It looks complicated because it is designed with full functionality, not just as a way of viewing records, but for basic functions it is quick and simple.

Over the next year or so we intend to ask all county recorders to send us data to upload to the DDB, giving us a much better account of the state of recording in Britain and Ireland. Will there be problems? Possibly, and we would like to monitor progress to see how it works out. Some people fear that the data will be downloaded and used inappropriately. But is this likely? What can really go wrong? Plagiarism is by far the most likely thing. Someone can get hold of your records, put their own name on them, and then sell the data as consultancy work or write it up as a paper or article. This has always happened and always will – often inadvertently, but sometimes deliberately. It is not entirely obvious that the DDB will make it worse. If everyone knows that the records are available online, it will be a simple matter to check for plagiarism, and that has got to be a disincentive.

So, county recorders, please register for use of the Distribution Database and see how you get on with it. We are pretty sure it will transform biological recording beyond all recognition, but we do not know in exactly what ways. What unexpected outcomes will there be? It will be interesting to see.

Hybrid Project progress – May 2011

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The project progresses, though it has been a much bigger task than we first anticipated, and has had to be fitted in with many other deadlines. Clive Stace completed his text (covering the nomenclature, morphology, variation and identification, experimental studies, chromosome numbers and references) a year or so back, and we are up to *Euphrasia* (just over 60% of the way through) on our part, which includes assembling the data, often from herbaria, mapping it, querying oddities and then completing the distribution and habitat part of each account. Getting a feel for the habitat is often very elusive as it is so seldom recorded, and of course many of the aliens and garden escapes are in ruderal habitats. Inevitably this means many questions back to the vice-county recorders, but these are usually answered immediately – many thanks again. We are at present checking the ‘final’ maps for the first half of the species, and will meet in the near future to sign these off and to decide which are interesting enough to publish.

We have commissioned draft designs for the final work, but though we all like the idea of mapping the hybrids against the distribution of the parents, as shown on the map on the cover of this newsletter, we fear that the necessary reduction in size for the publication will obscure the hybrid records.

We are not going to give a date for completion, but it is not that far away!

Drosera rotundifolia L. × *D. anglica* Huds.

= *Drosera* × *obovata* Mert. & W.D.J. Koch

The leaves of this hybrid resemble in shape those of *D. intermedia* more closely than either parent, being narrowly obovate and about 2.5-3 times as long as wide, but as in *D. rotundifolia* the inflorescence arises more or less centrally and there are no stolons (Culham 1998). Rosenberg (1909) gave many details, including floral differences. The capsules are small and possess empty seeds.

There is broad overlap in both the geographical range and the habitat requirements of the parents in the British Isles. *Drosera anglica* is, however, restricted to permanently moist sites such as soakways and the edges of permanent pools; it extends on to blanket bog only in the areas of very high rainfall. Pearman & Rumsey (2004) described *D. × obovata* as frequent wherever the parents meet. Hybrid plants are rather more vigorous than those of the parents and are usually found as isolated individuals, but sometimes in small groups (Preston *et al.* 2002), at the edges of lakes, pools and runnels. Its parents reproduce vegetatively by adventitious buds in the leaf axils and (less frequently) by buds on the leaves, but we know of no observations on vegetative reproduction in the hybrid. Both parents have Circumpolar distributions and the hybrid is recorded from Europe, Asia and North America.

Illustrations: Rosenberg (1909); Shimamura (1941); Wood (1955), figs. 20-24; Slack (1986), p. 38; Kondo & Segawa (1988); Culham (1998), p. 106; Pearman & Rumsey (2004), p. 117.

Drosera rotundifolia 2n = 20; *D. anglica* 2n = 40; hybrid 2n = (30).

The hybrid appears to be completely sterile. Classic chromosome studies by Rosenberg (1909) showed that the diploid *D. rotundifolia* carries one of the ancestral genomes of the tetraploid *D. anglica*. Rosenberg (1909) and Shimamura (1941) found 10 bivalents and 10 univalents at meiosis, leading to irregular division and sterile pollen and embryo-sacs. *Drosera* species are autogamous and facultatively cleistogamous, thus reducing the chances of crossing.

Crowder *et al.* (1990) were unsuccessful in producing artificial hybrids, although F₁ seed was produced when *D. rotundifolia* was used as the female. Kondo & Segawa (1988) successfully produced triploid hybrids which displayed 10 bivalents and 10 univalents at meiosis, as in wild hybrids. Seeholzer (1993) showed that the hybrid stands isoenzymically between its two parents.

Axiophyte research

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The concept of axiophytes is on the one hand very simple and on the other hand rather subtly different to what we have had before. Many people have, for many years, had a feeling that there are important species, but they have often been confused with rare ones. Of course there are rare plants and they are, from the point of view of genetic conservation, very important indeed. But from the point of view of managing the countryside for its ecological value and ecosystem services, they are sometimes irrelevant.

In recent years the conservation agenda has shifted from rarity alone to 'rarity and threat,' which is a more efficient way of targeting resources. However this is again largely irrelevant to conservation in the British Isles, as we have few endemics. Threat is also dangerous if misunderstood, because it can lead one to try to protect very common and unimportant plants that happen to be declining because of changing land use practices.

We have also had the concept of habitat indicator species for many years. We saw lists of Ancient Woodland Indicators drawn up for various parts of southern England in the 1990s and many of us assumed that eventually similar lists would appear for all habitats of conservation value throughout Britain and Ireland. But they never materialised. No-one has ever successfully produced a list of, say, ancient swamp indicators for Scotland. The enthusiasts for indicator species lists had not anticipated just how difficult it would be to extend the concept beyond the examples they had used.

This is where the need for the axiophyte concept arose. Axiophytes are not rare species. They are not threatened species. They are not simply habitat indicator species. They are not native species. Nor are they necessarily even species of semi-natural habitats. They may be all of the above, but they do not have to be. They are the species that we want, because they are the ones that grow in the habitats that we want to protect.

So, to use the concept of axiophytes correctly, you have to understand that it is different to these

other aspects of ecology and conservation. Most plants are axiophytes in some part of their range and not in another place. You can be an axiophyte in a place where wetlands are in retreat and need to be protected, but an invasive weed where wetlands are commonplace and increasing. You can be an axiophyte of eutrophic farmed soils where farming is in decline, and a dreaded pest somewhere else. An invasive alien can be an axiophyte if it grows in mesotrophic lakes in gravel pits, if mesotrophic lakes in gravel pits are what you have decided, in your wisdom, to be desirable features of the landscape.

Think of axiophytes as analogous to people with specialised skills. If you need more carpenters or nurses, then they are the people you want. But if you are fighting a war, you probably want more soldiers instead. You can measure the success of your educational and political policies by their ability to get the right people into the right places at the right time. Similarly, we can measure the successes of conservation policy by its ability to deliver native grasses in wildflower meadows and mesotrophic freshwater macrophytes in the drinking water reservoirs.

The next few papers explore some aspects of the practical use of axiophytes. Jeremy Ison has found them to be an effective way of predicting (and sometimes improving upon) traditional methods of identifying county wildlife sites. Angus Hannah bent the rules for drawing up a county list of axiophytes and effectively drew up a list of habitat indicator species for a large site; this resulted in the problem that his site was too homogeneous for the analysis to work properly. Thus reinforcing the need for county lists of axiophytes, not local lists of habitat indicator species. Laura Belton has worked with real data to see if she could extract site lists from a survey that was conducted using grid-based recording methods. There are still many aspects of the practicalities of axiophytes that need to be tested, but these three studies give us useful tests of the system when applied to real-life situations.

Axiophyte diversity versus total species diversity in Devon

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The data presented here form part of the results of an investigation into whether a simple count of axiophytes (BSBI 2008) recorded at a site was sufficient to distinguish between sites worthy of County Wildlife Site (CWS) status and those that did not meet the necessary criteria.

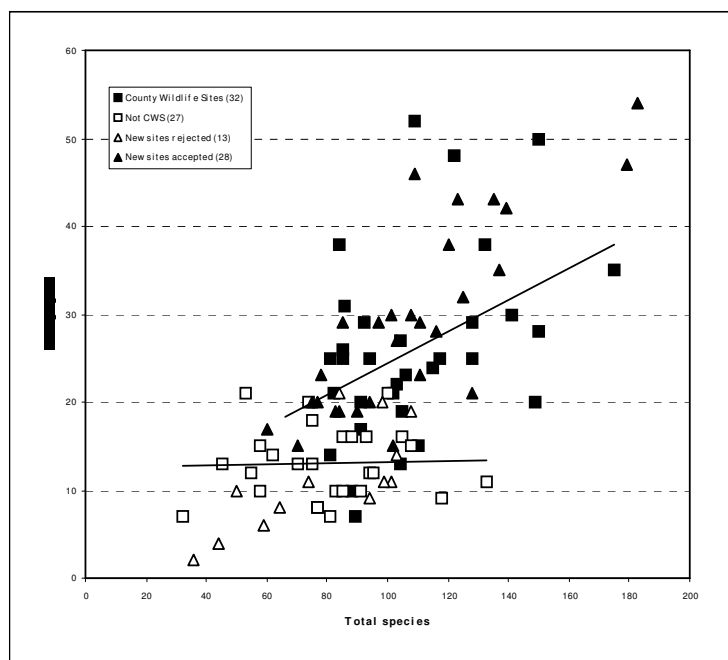
The numbers of axiophytes were compared with the total numbers of vascular plants for 29 sites designated as CWS and 23 sites that were considered not to have met the necessary criteria (DBRC 2008) over the period from 2003 to 2007. These results were used to predict that 20 or more axiophytes were needed for a site to be worthy of CWS status. Similar data were collected for 41 sites that had been surveyed in 2008 but had not yet been considered by the selection panel. The results are summarised here.

Apart from a few borderline cases, the axiophyte method was found to predict successfully which sites would be selected as County Wildlife sites. As yet, this approach has been tested only in comparison with the procedures currently used. More work is needed in order to assess its absolute validity as a measure of site condition.

A striking (and initially unexpected) result of this investigation was that the numbers of axiophytes recorded at a site did not necessarily correlate with the total species richness. In the rejected sites there was no correlation between the number of

axiophytes and the total number of species ($r_s = 0.095$). The County Wildlife Sites showed a positive correlation ($r_s = 0.428$), significant at the 5% level. The rejected sites included examples where there were long species lists with few axiophytes. Sites of conservation interest such as mires or saltmarsh may not have high species diversity, but a high proportion of the species present are axiophytes.

Species richness alone is not a good measure of the value of a site, but selecting the axiophytes from a species list provides a much more reliable indicator of a site's conservation interest.



Relationship between species richness and number of axiophytes. Number of axiophytes plotted against total number of species for County Wildlife Sites (CWS), rejected sites (not CWS), and new sites recorded in 2008.

References

Botanical Society of Britain and Ireland (BSBI) (2008). Axiophytes. <http://www.bsbi.org.uk/html/axiophytes.html> [Dec 2008].

Devon Biodiversity Records Centre (DBRC) (2008). The Devon Local Sites Manual: Policies and Procedures for the Identification and Designation of Wildlife Sites. Exeter: DBRC.

Trialling axiophytes on a Scottish island

Angus Hannah

The idea of axiophytes was nurtured in the soil of lowland England; how would it fare when transplanted to a Scottish island? As a result of my recording there over the last ten years, the island of Bute offered an opportunity to find out. The island comprises 153 monads with a significant land area, and an average of just over 200 species have been recorded in each within the last decade. Also available were species lists for 430 (mostly) small plots, chosen partly as habitat samples and partly to record associates of some interesting species.

The first step in compiling an axiophyte list is to select habitats 'of conservation interest' in one's locality. In the case of Bute, I defined these very broadly, and listed species typical of the following:

- Fresh water (still or slow: aquatic/emergent plants)
- Cultivated/disturbed ground/open vegetation (nutrient rich)
- Coastal (saline, including sandy, shingly and rocky shores)
- Marsh and fen
- Bog/wet heath
- Flushes and wet rock (mostly base-rich, at least slightly)
- Dry rock/turf/moorland (mostly acid, but including some calcareous exposures; nutrient poor)
- Shade (woodland/bracken/ravines/block scree)

Most of the local natives and archaeophytes, and a handful of neophytes, figured on one or other of these lists (a few more than once), the exceptions being ruderal plants not typical of any specific habitat, and those of such broad ecological amplitude that they are common nearly everywhere.

According to the BSBI guidelines, axiophytes should be selected from these lists by eliminating those species which are too common, to be precise, those found in more than 25% of tetrads in the county. In the present case, this might equate to 25% of monads on the island, at least for a first approximation. But a question was raised as soon as this rule was applied. An axiophyte list selected in this way is unable to identify any habitat, however good, which is too frequent locally, since many of that habitat's indicator species will have been ruled out of the local axiophyte list by the 25% bar. On Bute, samples of bog and wet heath are found in 65% of monads, and characteristic species of the habitat such as *Erica tetralix*, *Narthecium ossifragum*, *Eriophorum angustifolium*, *Viola palustris*, *Pedicularis sylvatica*, *Dactylorhiza maculata*, *Drosera rotundifolia* and *Trichophorum germanicum* all occur over 50% of monads. These and others would therefore be disqualified, leaving the habitat with a short axiophyte list of relatively uncommon species. All squares consisting largely of bog would have a low axiophyte score. But the fact that a good habitat is widespread locally does not reduce its inherent value. On the contrary, its conservation value may be increased by the very fact that it is extensive enough to support sustainable populations, not only of plants but more generally.

This problem has not been addressed because (I suspect) the concept of axiophytes was developed in lowland England, where it is a safe assumption that good habitat will not be widespread. It is a problem we have to think about in Scotland especially (but one we may be glad to have!). A possible solution is to adjust the bar selectively, so that in the case of the most widespread habitats, axiophytes may be admitted with up to 50%, or even 65% tetrad scores, as in the above case, while retaining a 25% (or even lower) limit for less frequent habitats. In fact, the axiophyte list used to generate the maps did not include any of the above-mentioned species, though the bar was raised to 50% for the more widespread habitats. Further experimentation and fine-tuning of the selection procedure might be worthwhile.

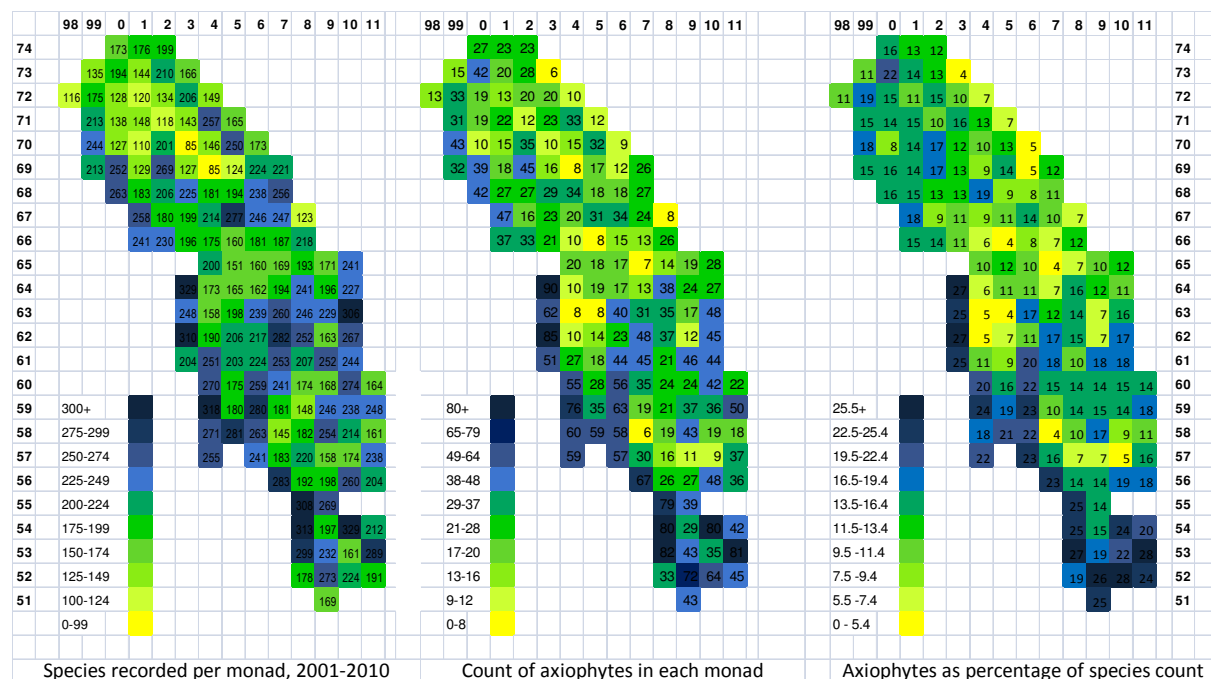


Figure 1: species richness vs axiophyte richness in each monad on Bute.

The maps show how axiophyte analysis works in an area that is well-recorded. Map 1 (on the left) plots species diversity within each monad; this indicates the variety of habitats present, and to a lesser degree, their species richness. Map 2, showing the number of axiophytes present, shifts the balance so that roughly equal weight is given to both these factors. Map 3, plotting axiophytes as a percentage of all species recorded in each square, is the most useful. Not only does it allow ‘fair’ treatment for partial squares at the margins, it eliminates altogether the variety factor, and focuses entirely on quality of habitat, so that squares with a single, relatively species-poor plant community may still score highly if the habitat is a good example of its kind.

A general glance at the maps will reveal that some squares in the north of the island, which score lowest of all on map 1, look less bad on map 2 and on map 3 score averagely. This is hill ground of no particular interest, but deserving to score more highly than the improved agricultural land in the central section of the island, which shows up yellow (poor) on map 2 and even more clearly on map 3, despite appearing of moderate richness on map 1. The best areas of Bute, the southern extremity and the shore in the mid-west, show up more distinctly on map 3. Conversely, the square 1063, midway up the east coast, promises well on map 1, with over 300 species recorded, but is seen on map 3 to be unremarkable, the high score being due to a rich variety of habitats in close proximity, rather than any of outstanding merit.

In general, map 3 conveys an accurate impression of the botanical quality of different parts of the island, and demonstrates the validity and usefulness of axiophyte analysis. However, it is only fair to point out that good general recording throughout the survey area is a prerequisite of this work, since the results would be skewed by any squares where records were deficient.

Analysis of species lists from the sample plots also provided some interesting results. About 50% had 0-1 axiophyte, while about 10% had 8 or more (up to 11). Most of these latter plots had 30-40 species in all, and so the axiophyte percentage was in the region of 25-30 (i.e. comparable to the best monads). These plots represented good examples of most of the habitat types initially selected. One outstanding plot had 20 axiophytes out of a total of 52 species, and indicated a site that clearly deserves monitoring.

An algorithm to enumerate axiophyte richness in SSSIs

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It is postulated that sites that are rich in axiophytes are worthy of conservation (BSBI, 2010), so given the conservation status of SSSIs one may wonder whether SSSIs have a rich axiophyte flora. However, little is known about what constitutes axiophyte richness (number of axiophytes) in SSSIs, or how and why axiophyte richness may vary between SSSIs. To this end, I have developed an algorithm to enumerate axiophyte richness in Shropshire's botanical SSSIs, and have performed initial analyses to constitute axiophyte richness in, and to assess how and why axiophyte richness may vary between, Shropshire's SSSIs. Here I present the algorithm methodology, and main results to date.

Figure 1: Decision tree for determining whether a site is of botanical or non-botanical interest. SSSI data variables (site designation, habitats) are used to determine each SSSI as botanical or non-botanical based on the fact that SSSIs may have one or more designation including a geological designation, and one or more habitats including any combination of “Earth Heritage”, aquatic habitats, or botanical habitats. Such a decision tree is required to identify SSSIs of botanical interest using a repeatable method, so that boundary-based data for botanical SSSI can be matched appropriately with BSBI species data.

The total number of axiophyte species recorded for the SSSIs was 238 out of 369, (64% of total axiophyte species in the Shropshire list (BSBI, 2010)). The minimum and maximum axiophyte richness was 2 and 103 respectively. The lower, median, and upper quartiles were 17, 32, and 52 respectively; the mean (standard deviation) number of axiophytes was 36.6 (24.8). In univariate analyses, an increase in area (ha), number of unique habitats, and species richness were found to be significantly associated with an increase in axiophyte richness. Given the extent of co-linearity between these covariates, multivariate analyses were not pursued on this occasion.

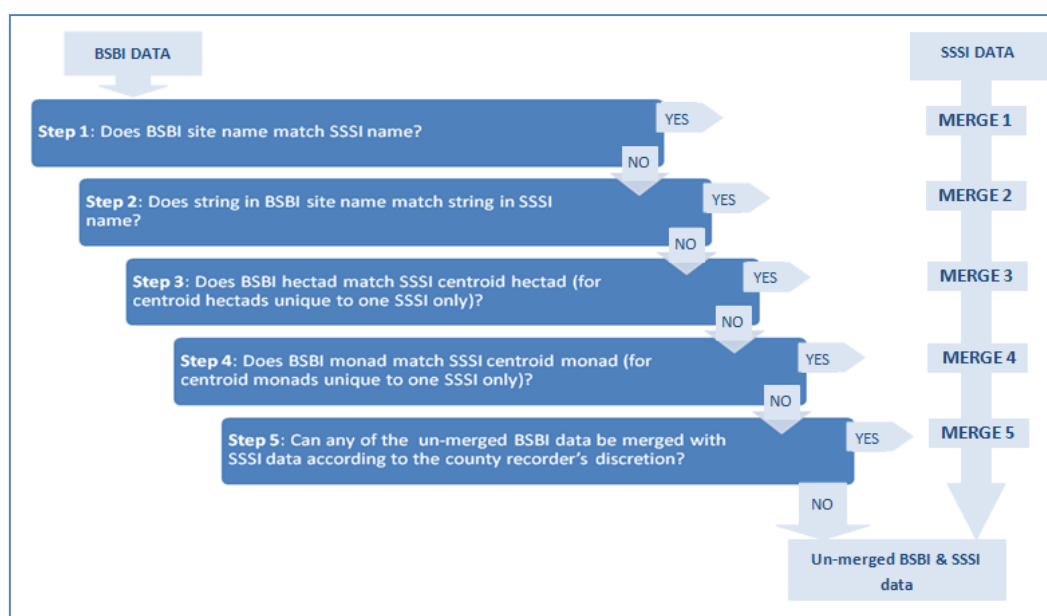


Figure 2: Algorithm for merging BSBI grid-based data with SSSI boundary-based data. BSBI data are merged at first, based on site name, or text string(s) in site name, or hectad grid reference, or monad grid reference, in a stepwise process to the SSSI data. Any unmerged data are then merged as necessary at the discretion of the county recorder. Such an algorithm aids the merging of grid-based records with SSSI boundary-based data.

References

- Botanical Society of the British Isles (2010) Axiophytes [online – accessed October 2010] <http://www.bsbi.org.uk/axiophytes.html>.
- Natural England (2010) Sites of Special Scientific Interest. Reports and Statistics [online – accessed October 2010] www.sssi.naturalengland.org.uk.

Threatened Plant Project: species accounts

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This is the first of a series of reports that we will be producing for species covered by the Threatened Plant Project. In the future we intend to publish these as pdfs on the website but we are including this one in Recorder to give you a chance to comment on both the content and style. We would also be interested in your views on the overall findings and conclusions regarding the conservation of this species.

Astragalus danicus Retz. Purple Milk-vetch

An attractive low-growing perennial of short calcareous grassland, basic rock outcrops, sand dunes and cliff-tops (Fig. 1). Inland populations extend from Salisbury Plain to Yorkshire with outliers on hills in the Eastern Scotland (Fig. 2). Coastal populations extend from Durham to the Moray Firth in Northern Scotland with outliers on the north and west coast and the Isle of Man. In Ireland it is restricted to the Arran Islands of the coast of the Burren, County Clare. Most populations are lowland but it extends to 710 m in Scotland and 2,400 m in the Alps. Its world distribution is circumpolar extending from Northwest Europe to Eastern Siberia and North America. All British and Irish populations belong to subsp. *danicus* which is endemic to Western Europe. Siberian and North American populations belong to subsp. *dasyglottis*. *Astragalus danicus* appears to have declined substantially in the southern half of its range, mainly due to agricultural changes. As a consequence it is now classified as a 'Vulnerable' Red Data List species (Cheffings & Farrell, 2005) and is included as a 'priority species' in the UK's Biodiversity Action Plan. However, very little is known about its ecological requirements, the extent of this decline or indeed the threats it currently faces. In order to answer these questions a national survey of populations was undertaken as part of the BSBI's Threatened Plant Project (TPP) in 2008. This report presents a summary of the main findings. Nomenclature for plants follows Stace (2010) including names for National Vegetation Classification (NVC) communities.



Figure 1: *Astragalus danicus* growing in short calcareous grassland on Salisbury Plain, Wiltshire. Photo by Sharon Pilkington.

Aims

The main aims of the survey were to quantify the extent of recent declines, assess trends in relation to geographic region, habitat and perceived threats, gather basic information on the size of populations, ecological requirements and management, and provide recommendations on current status, management and conservation.

The 2008 Survey

In 2008 vice-county recorders (VCRs) in 35 counties were asked to revisit 104 randomly selected sites for *A. danicus* (stratified by vice-county). The number of sites selected per vice-county was proportional to the number of 10 km grid squares in which *A. danicus* had been recorded in the past with the overall aim of achieving 100 sites nationally. These were selected randomly from a 'pool' of recent (post-1970) high resolution records (at least tetrad, preferably 100 m), although this was not possible in all vice-counties. Sixty-two random populations were resurveyed as well 35 additional sites recorded using exactly the same methodology (Table 1). With the exception of 9 sites (7 in 2009,

2 in 2010) all surveys took place in 2008, mainly in May (22%), June (52%) and July (15%) although the survey season extended from 6 May to 26 September. Some 57 surveyors took part in these surveys (see Acknowledgements). As Fig. 2 shows the survey included sites from the entire British and Irish range of *A. danicus*, including outlying populations on the west coasts of Scotland and

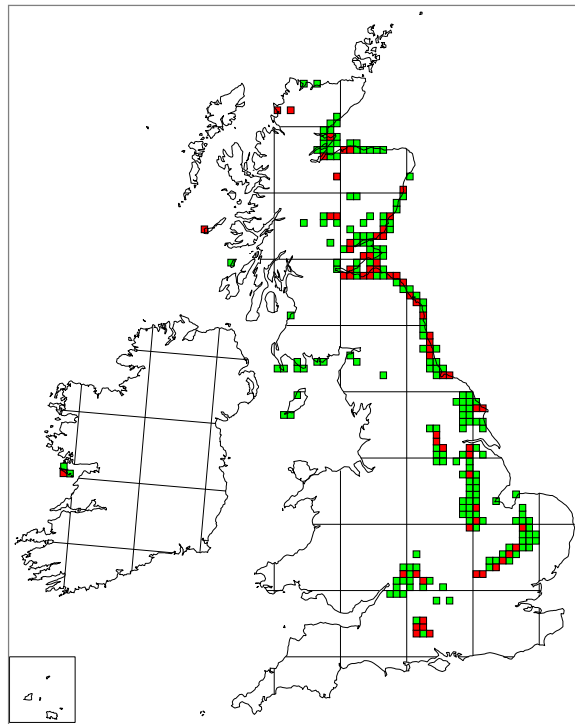


Figure 2: the hectad distribution of *A. danicus* in Britain & Ireland. Red squares denote hectads where populations were surveyed in 2008-10; green squares denote unsampled squares.

Ireland and mountains in the eastern highlands of Scotland. Overall the sample represents 26% of the known historic range of *A. danicus* at the hectad scale with survey sites in 66 hectads in 31 vice-counties. In total 245 individual records were made at 10 m resolution within 97 hectares and 72 monads.

Population trends

Astragalus danicus could not be relocated on twenty-six of the 62 randomly selected sites giving an overall loss of 42%. The figure for the non-random sites was much lower (6%) but this is not surprising as recorders tended to choose sites where they knew *A. danicus* still occurred or had been seen recently. However, these losses were not distributed evenly with inland populations in southern, eastern and northern England having suffered much greater losses than predominantly coastal populations in Scotland (Table 1).

Table 1. The number of extant populations of *Astragalus danicus* in relation to random and non-random sites surveyed and UK region

	Extant	Lost	% lost
Random sites	36	26	42
Non-random sites	33	2	6
All sites	69	28	29
Region (random sites only):			
SE & SW England	6	7	54
East Anglia & East Midlands	3	6	67
Northern England	5	8	61
Scotland	21	5	19
Wales	Not present		
Ireland	1	0	0

Population size, extent and abundance

The average size of *A. danicus* populations was generally small with over three-quarters of populations surveyed supporting less than 500 individuals (Fig. 3a; see 'Regeneration' for a discussion of the units recorded). The largest populations (>1000) occurred on sand-dunes and sea-cliffs in the north as well as inland on Salisbury Plain and in East Anglia, as well as at 700 m on Meall an Daimh in Perthshire, the highest UK station, where it grows with *A. alpinus*. The extent of populations was also rather small, usually not exceeding 1 ha (Fig. 3b). Only three populations were larger: Ross Links, North Northumberland (14 ha), Silk Hill, South Wiltshire (12 ha), and Morrich More, East Ross (1.4 ha).

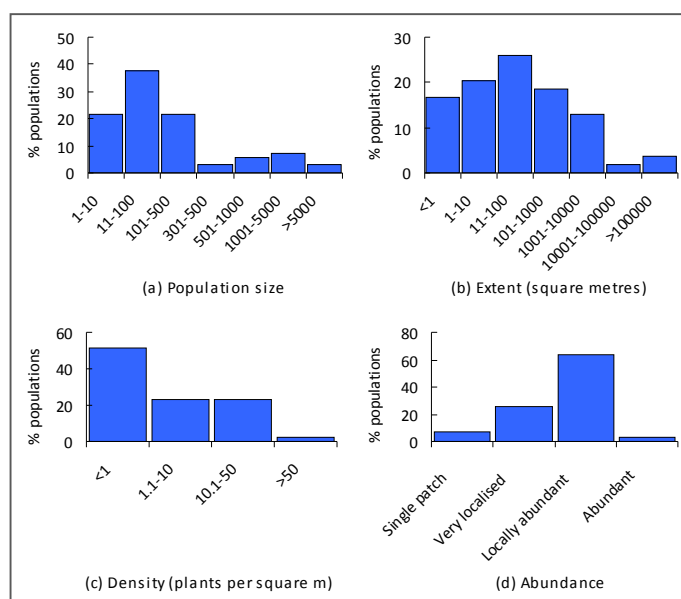


Figure 3: The size and extent of *Astragalus danicus* populations: (a) size, (b) extent, (c) density of plants, and (d) abundance (based on subjective assessments by surveyors). The density of plants across the whole survey areas was generally low (<1 clump m⁻²; Fig. 3c) but in reality *A. danicus* was locally abundant on most sites, occurring as scattered patches around rock outcrops, along paths, or in areas of very short vegetation, etc. (Fig. 3d).

Habitats

In the southern half of its range *A. danicus* is confined to shallow soils overlying chalk and limestone, including acidic 'blown sands' enriched by calcareous material (e.g. East Anglia, Lincolnshire). Northern populations occur on a range of basic rock types including basalt, andesite, mica-schists, calcareous sandstone and Old Red Sandstone. Coastal populations also occur on blown sands (dunes, cliff-tops) and low cliffs made of boulder clay. Most populations surveyed were on level or very gently sloping ground with a southerly aspect (Figs 4a & 4b). The altitudinal range was from sea-level to 710 m in Perthshire, although most populations occur between sea-level and 50 m (Fig. 5c).

A. danicus was recorded in ten broad habitats the most frequent being cliff-top coastal grassland, calcareous grassland, 'fixed' sand-dunes and acid grassland over calcareous substrates (Fig. 5). At a few sites it was recorded in montane grassland and on inland rock outcrops in Scotland, industrial waste on sand dunes in NE Yorkshire, and elsewhere in neutral grassland (including road verges) and coastal heath. Within all these habitats *A. danicus* was typically associated with very short vegetation (<10 cm) maintained by grazing, drought, or physical disturbance caused by trampling, mowing or animal activity (Fig. 4d).

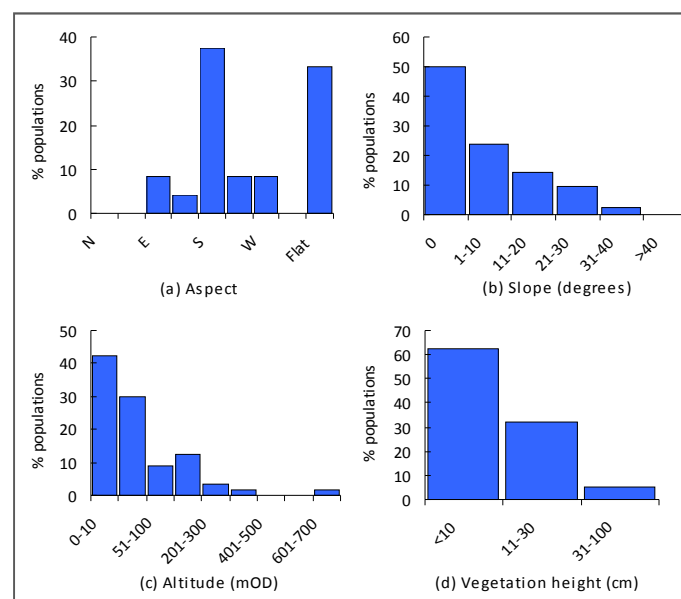


Figure 4: Physical characteristics of *Astragalus danicus* populations: (a) aspect, (b) slope, (c) altitude, and (d) height of the surrounding vegetation (cm).

Associated species

One hundred and eighty species were recorded with *A. danicus* (61 sites, 80 circular quadrats measuring 2 m in diameter). The average number of associates was 12.5 (± 0.7 ; range 3-34) although this varied depending on broad habitat type: plots in calcareous grasslands were the most diverse (18.1 ± 1.8) whereas dunes (14.4 ± 1.2), inland rock (12 ± 0.7) and acid grassland (11.1 ± 1.6) were intermediate. Coastal grassland was the least diverse of all the habitats surveyed (8.7 ± 0.9). The species most frequently associated with *A. danicus*, in over one third of quadrats, were *Lotus corniculatus*, *Festuca rubra*,

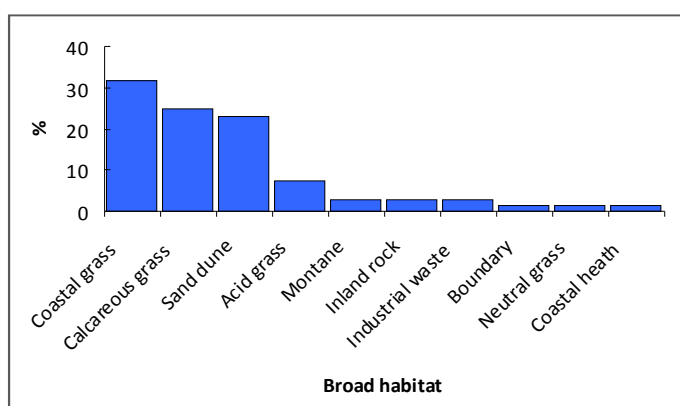


Figure 5: Broad habitats in which *Astragalus danicus* was recorded.

Galium verum and *Plantago lanceolata* (Table 2). Notable national rarities recorded with *A. danicus* included *Carex ericetorum*, *Dianthus deltoides*, *Juncus balticus* and *Pulsatilla vulgaris*.

Table 2. The most frequent associates of *Astragalus danicus* in 80 quadrats (species in >8 quadrats)

Species	%	Species	%
<i>Lotus corniculatus</i>	59	<i>Bromopsis erecta</i>	15
<i>Plantago lanceolata</i>	58	<i>Plantago coronopus</i>	15
<i>Galium verum</i>	54	<i>Carex flacca</i>	14
<i>Festuca rubra</i>	46	<i>Helianthemum nummularium</i>	14
<i>Thymus polytrichus</i>	31	<i>Luzula campestris</i>	14
<i>Armeria maritima</i>	28	<i>Anthoxanthum odoratum</i>	13
<i>Koeleria macrantha</i>	26	<i>Anthyllis vulneraria</i>	13
<i>Achillea millefolium</i>	25	<i>Arrhenatherum elatius</i>	13
<i>Trifolium repens</i>	24	<i>Centaurea nigra</i>	13
<i>Cerastium fontanum</i>	20	<i>Dactylis glomerata</i>	13
<i>Festuca ovina</i>	20	<i>Hypochaeris radicata</i>	13
<i>Linum catharticum</i>	19	<i>Ranunculus bulbosus</i>	13
<i>Briza media</i>	18	<i>Campanula rotundifolia</i>	11
<i>Taraxacum officinale</i>	18	<i>Carex arenaria</i>	11
<i>Agrostis capillaris</i>	16	<i>Holcus lanatus</i>	11
<i>Senecio jacobaea</i>	16	<i>Pilosella officinarum</i>	11
<i>Brachypodium pinnatum</i>	15	<i>Sanguisorba minor</i>	11

Figure 6 shows the relationships between these quadrats in relation to broad habitats. Two distinct clusters are apparent: vegetation on chalk, limestone or sands over chalk or limestone on the left hand-side of the first axis and coastal vegetation on the right, including some inland rock outcrops and acid grasslands with a maritime influence. On the second axis sand dune populations are separated from maritime grassland although there is much overlap between coastal vegetation types.

Vegetation types

Lists of associated species were assigned to British National Vegetation Classification (NVC) communities using the programme Tablefit (Hill, 1996). Twenty-one NVC communities were identified in seven of the main NVC groups, most notably calcareous grassland (CG), maritime communities (MC) and sand dunes (SD) (Fig. 7). On chalk *A. danicus* was found mainly within short *Bromopsis erecta* (CG3) grassland whereas limestone populations were usually associated with *Brachypodium pinnatum* (CG4) or *Bromopsis erecta* - *Brachypodium pinnatum* (CG5) grassland. In comparison, its occurrence in the stands of *Festuca-Hieracium-Thymus* grassland (CG7) were all on 'fixed' coastal sands in NE Scotland. At its altitudinal limit in Perthshire *A. danicus* occurred within *Festuca-Agrostis-Thymus* grassland (*Carex pulicaris* - *C. panicea* sub-community; CG10b), a species-rich submontane grassland that occurs on a wide range of calcareous bedrocks. A number of populations occurred within the *Pastinaca sativa* and *Centaurea nigra* subcommunities of mesotrophic *Arrhenatherum elatius* grassland (MG1e/d), reflecting the occurrence of *A. danicus* within unmanaged grassland sites in southern England. At Cranwich Heath in East Anglia, and on igneous rock outcrops at two sites in Scotland *A. danicus* occurred in *Festuca-Agrostis-Rumex acetosella* acid grassland (U1d). Most cliff top

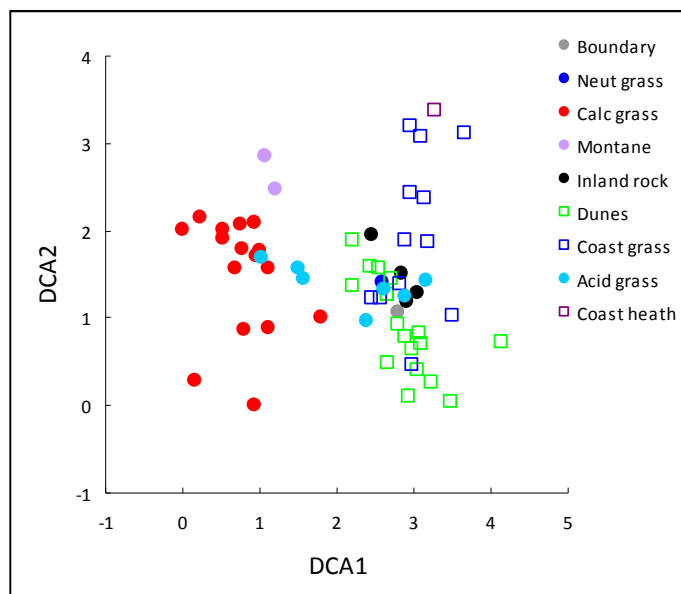


Figure 6: Ordination diagram showing the relationship between quadrats containing *Astragalus danicus* in relation to broad habitat type. The ordination plot was produced using Detrended Correspondence Analysis in Canoco (for Windows) and was based on DAFOR abundance scores converted to a numeric (1-5) scale.

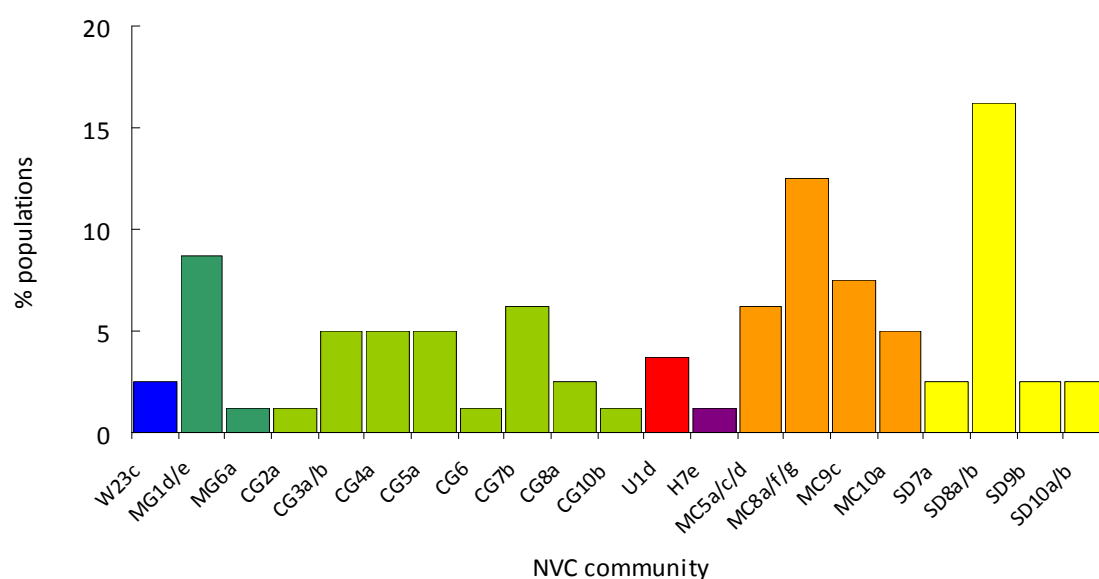


Figure 7: National Vegetation Classification (NVC) communities in which *Astragalus danicus* was recorded. Bars are colour-coded to show the main vegetation types: W = woodlands & scrub; MG = mesotrophic grassland; CG = calcareous grassland; U = acid grassland; H = heathlands; MC = maritime communities; SD = sand dunes.

populations occurred in *Festuca rubra*-*Armeria maritima* maritime grassland (MC8), extending into more droughted *Armeria maritima*-*Cerastium diffusum* therophyte community (MC5) at some sites. Cliff top colonies were also recorded in ranker *Festuca rubra*-*Holcus lanatus* cliff top grassland (MC9) and much shorter *F. rubra*-*Plantago* spp. turf (MC10) in grazed situations away from the cliff edge. Virtually all sand dune populations were confined to *Festuca rubra*-*Galium verum* fixed dune grassland (SD8), the characteristic grassland of stabilized coastal sands on dunes in Britain.

Regeneration

One of the main difficulties in estimating population sizes for a patch-forming species such as *A. danicus* is defining what we mean by an individual. In order to overcome this we asked recorders to note the unit counted: in nearly 80% of cases these were either ‘clumps’ (56%) or ‘rosettes’ (21%) which were presumably small patches. In 23% of cases recorders counted flowering/fruitlet spikes although the extent to which these were separate flowering/fruitlet patches or individual stems is unknown. This information should be borne in mind when interpreting the findings given below. *Astragalus danicus* appears to be regenerating well at most sites with flowering or fruitlet recorded at 66 of the 69 extant sites surveyed. Although information on the proportion of flowering and non-flowering individuals was very patchy some crude conclusions can be drawn from the limited data available: on average 38% (± 5) of patches had flowers (IQR = 0-65%) whereas only 12% (± 4) had fruits (IQR = 0-16%). However, these results should be treated with caution because of the small sample size and the differences in the dates of surveys which ranged between the 6 May and 26 September (90% of surveys were carried out between start of May and end of July). Very few immature or vegetative plants were recorded presumably because *A. danicus* is difficult to find when not in flower or fruit. However, the extent to which there is a genuine lack of recruitment requires further work. The occurrence of *A. danicus* in some recent or artificially created habitats such as clear-felled plantations, industrial waste deposits, abandoned runways, suggests it is able to colonise new habitats fairly readily from either seed bank (as on Cranwich heath) or by local dispersal of seed.

Management

Between 50-60% of *Astragalus danicus* sites surveyed were recorded as receiving some form of grazing either by livestock and/or wild grazers such as rabbits or deer (Table 3). Other management to control grass growth (e.g. cutting, burning) was carried out on about 10% of sites. Consequently between 30-40% of sites appear to be unmanaged which is surprising given the apparent poor competitive ability of *A. danicus* and its need for short vegetation. It can only be presumed that these sites are either in suboptimal condition and that consequently *A. danicus* is declining or that the physical conditions are so harsh that grass growth is severely restricted (e.g. due to exposure, soil depth, etc.). Over 90% of sites received either no or very low levels of shading and likewise over 50% showed virtually no evidence of disturbance of the grassland in which *A. danicus* occurred (Table 3).

Table 3. Summary of factors likely to influence the abundance of *Astragalus danicus*. Numbers of assessments made given in parentheses; figures are percentages.

Level	Grazing (57)	Shading (54)	Disturbance (52)
None	37	81	29
Low	28	13	33
Medium	14	6	25
High	21	0	13

Threats

Nineteen threats were listed as potentially affecting *Astragalus danicus* on 45 sites. By far the most important was under-grazing which was listed as a potential problem on 22% of these sites although this is more like 30% if scrub invasion, the third most important threat, is also included (Table 4a). In comparison, over-grazing was reported as a threat on 11% of sites. Other major threats related to human activities such as military activities (on Salisbury Plain), urban, road and recreational developments and trampling associated with recreational activities. In addition a small number of coastal populations appear susceptible to erosion. Interestingly few populations appear to be suffering from eutrophication, either from direct (agricultural) or indirect (atmospheric) sources, although the gradual nature of these effects means they are unlikely to be discernible on a single visit. Twenty-three reasons were listed for the loss of *A. danicus* on 28 sites (Table 4b). Again the most important was under-grazing which accounted for 16% of losses, but this increased to 24% when scrub invasion, the third most important reason, was added to the total. In comparison to threats, eutrophication was the second most important factor accounting for 14% of localized extinctions. Other reasons were similar to those listed under threats although succession to woodland and afforestation has clearly caused localized losses in some areas. At a small number of sites it was not clear if *A. danicus* was still present or indeed if the original record was correct. Interestingly invasive alien species were not listed as a threat or reason for loss at any sites whereas a competition with a number of native species appears to be causing declines on some sites (e.g. *Brachypodium pinnatum*, *Pteridium aquilinum*).

Table 4. Potential threats to extant populations of *Astragalus danicus* (a) and reason for loss on sites where *A. danicus* has disappeared (b). Only the top ten are displayed for each (in descending order of importance). Others are listed below the table.

(a) Threats	%	(b) Reason for loss	%
Under-grazing	22	Under-grazing	16
Over-grazing	11	Eutrophication	14
Scrub invasion	8	Scrub invasion	8
Military activities	8	Urban/road develop.	6
Urban/road development	7	Lack of wood mgt.	6
Recreation development	6	Afforestation	6
Trampling	6	Possibly overlooked	6
Burning	6	Recreation develop.	4
Eutrophication	4	Trampling	4
Coastal erosion	4	Recording error	4
Other threats: invasive species, drought, competition with <i>Brachypodium pinnatum</i> , vehicle damage, agricultural improvement, herbicide to control weeds, bracken, mineral extraction, species transient at this site.		Other reasons for loss: agricultural improvement, burning, coastal erosion, damage by military activities, increased grass growth (milder winters), invasive species, lack of disturbance, loss of habitat, over-grazing, quarry filled-in, sea defence works, unknown.	

Conclusions

Astragalus danicus suffered a dramatic decline in the southern and eastern part of its range in the British Isles, mainly as a result of reductions in the frequency and intensity of grazing on chalk and limestone grassland in lowland regions. This has resulted in many of its former sites being 'scrubbed-over'. On some sites it has also suffered from over-grazing, presumably by rabbits, and eutrophication. Coastal populations in northern England and Scotland have fared much better, and in some parts of Eastern Scotland it is still locally abundant and is not threatened.

In the southern half of its range, where it is threatened, the priority for conservation should be to ensure livestock grazing to maintain short swards (5-10 cm). There is probably much flexibility in how this can be achieved although winter sheep grazing (<5 sheep ha⁻¹) is probably ideal on most

sites. On smaller sites where grazing is impractical, mowing may be the only practical way of reducing the abundance of potential competitors. In the longer term the restoration of semi-natural habitats that connect existing populations and promote gene-flow via pollinators, may be needed to maintain the overall resilience of populations in the face of future land use and environmental changes.

Little is known about the regenerative ecology of *A. danicus* and further research is needed to assess its main requirements including pollination, reproductive system, regenerative strategy (seed versus vegetative) as well as seed production and germination requirements. An assessment of genetic and morphological variation within British and Irish populations, particularly coastal, inland, montane and western (West Scotland, Ireland), could also help to elucidate the post-glacial history of the history as well as placing British and Irish populations in a wider European context (from a taxonomic and ecological standpoint).

Acknowledgements

The BSBI are extremely grateful to the following recorders who surveyed *A. danicus* sites in 2008: P. Abbott, G.H. Ballantyne, B.R. Ballinger, C.B. Ballinger, G. Beckett, K. Beckett, P. Billingham, C.R. Boon, J. Bowler, M.E. Braithwaite, M. Button, M. Clarkson, J. Cook, J.L. Durkin, I.M. Evans, P.G. Evans, G.C. French, G. Gent, A. Godfrey, I.P. Green, S. Grinsted, R. Grose, A.M. Hall, S. Hartley, C. Hutchinson, H. Jackson, T.J. James, R. Jefferson, V. Jones, H.J. Killick, P. Kirby, C. Kitchen, M.A.R. Kitchen, A.C. Leslie, J. McIntosh, A.M. Meek, E.R. Meek, C. Metherell, R. Middleton, N. Millar, J.R. Moon, A.R.G. Mundell, J. Muscott, C.D. Preston, A.J. Richards, M.C. Robinson, E. Rollo, J. Squirrell, P. Stebbings, P. Stroh, A. Tree, K.J. Walker, D. Welch, M.F. Wildish, V. Wilkin, R. Wilson and M. Yates.

References

- Cheffings, C.M., Farrell, L. (Eds), 2005. The Vascular Plant Red Data List for Great Britain. *Species Status 7*: 1-116. Joint Nature Conservation Committee, Peterborough.
- Hill, M.O., 1996. *Tablefit. Version 1.0. For the Identification of Vegetation Types*. Institute of Terrestrial Ecology, Huntingdon.
- Stace, C. 2010. *New Flora of the British Isles*. Third Edition. Cambridge University Press, Cambridge.

The status of *Senecio cambrensis* Rosser, Welsh Groundsel

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Senecio cambrensis Rosser, a hybrid derivative of *Senecio vulgaris* L. and *Senecio squalidus* L., is endemic to the British Isles and has a Near Threatened status. It was first found in North Wales in 1948, and later discovered in Edinburgh in 1982. The Edinburgh population has since become extinct, and the North Wales population also appears to be in decline.

There have been three main surveys for *S. cambrensis* revisiting the known sites in North Wales. These were carried out by Ingram & Noltie in 1982-1984, by V. Morgan in 1987, and Abbott *et al.* in 2002-2004. Another survey has been carried out by Paul Ashton, but I am yet to follow up his records. There are also many additional records from a number of smaller surveys.

The main areas in which it was previously found include; the north Wales coast (at Mochdre and Llanddulas), near Wrexham (at Minera, Ffrith, Llanfynydd, Ruabon, Brymbo, Southsea, Brynteg, Pentre Broughton, Ffos-y-go, Rhostyllen, Stansty Park and Gwersyllt), and at Alltami/New Brighton, Chirk and Pentre. In all of these cases *S. cambrensis* was found along roadsides.

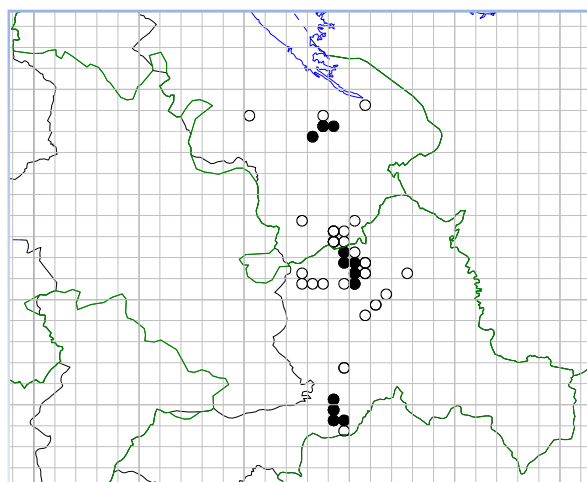


Figure 1: distribution of *Senecio cambrensis* in North Wales (v.cc. 50 and 51) (monads). Black dots are for current sites (2010).

During May/June 2010 I revisited and surveyed all known sites in North Wales and recorded the number of individuals found. For each site where the species was found, photos and voucher specimens were taken, which have been confirmed by Dr Tim Rich and donated to the National Museum of Wales.

The number of known sites (monads) has decreased from 27 in the 1980s to just 12 recorded in 2010 (Fig. 1). *Senecio cambrensis* was not found in Mochdre or Llanddulas on the north coast, and areas around Wrexham, Alltami and Chirk have greatly reduced. Although in Figure 2 the data does show that new sites are still being found, this may mean that the species is mobile, but it could also be due to varying recording effort. The number of sites lost is also increasing which could again indicate that the species is moving or that it is indeed disappearing. The rate of loss is increasing at a higher rate than the gain of new sites. If this trend were to continue *S. cambrensis* could be in danger of becoming extinct.

To be more confident in this conclusion, much more survey work is needed, to cover a wider area, and to search surrounding roads instead of just revisiting known sites.

I currently have records for *Senecio cambrensis* from the three surveys mentioned previously and various records donated by Alex Lockton and COFNOD. I would like to make an appeal, if anyone has any records for this species or knowledge of any potential sites I may have missed, please get in touch.

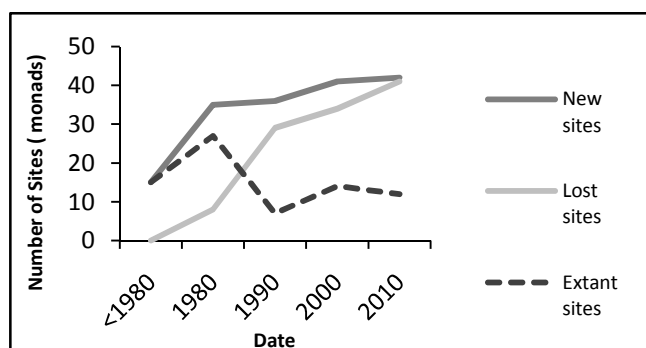


Figure 2: the number of new sites (monads) found (top line) for *Senecio cambrensis* and the number of sites lost (lower line). The dotted line shows the number of extant sites at any point

Are bumble bees robbing flowers in your neighbourhood?

Nic Charlton

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In the UK the buff-tailed bumble bee *Bombus terrestris* will often bite holes in the wildflower red campion *Silene dioica*. Nectar robbing allows these bees to remove nectar from flowers they wouldn't normally be able to feed from.

It is interesting because not only could they be cheating the plant by not pollinating the flowers, but these nectar robbing bees may also take nectar away from long-tongued species, such as the garden bumble bee *Bombus hortorum*.

Last year I asked for people's help in checking for holes in red campion flowers made by bumble bees. This involved following some simple instructions to collect information on flowers and whether they showed signs of robbery.



In total I received 63 records from 10 regions around the UK from 10 recorders. Of those 63 records, 26 showed some robbery, 10 of which had over 50% of flowers being robbed. In Scotland, there were very low robbery levels, which is interesting because the buff-tailed bumble bee, is less common in the North of the UK. But these 63 records are not enough, and I need your help to get more.

If you want to help collect records for this project then follow the instructions below and email me your results. The holes you are looking for are small, neat and rounded. I even want results that show no nectar robbing so we can see the places where it's not happening. It would be really great to get records of robbery from all around the UK, so when you're out and about and you see some red campion stop for a minute and have a look for nectar robbing holes.

Instructions

1. Find a patch of red campion flowers and count the number of open flowers as accurately as you can. Record this as 'number in patch'. For very large or long patches, an estimate to the nearest 50 is sufficient. Ignore small patches of less than 30 flowers.
2. Choose any 30 open flowers, ideally choose flowers that are spread across the patch, and check for signs of robbery. Record the number of robbed and unrobbed flowers. e.g. 25 robbed 5 unrobbed. This gives a measure of the level of robbery and 0 robbed flowers still counts as a record.
3. From the list below, choose a habitat which best describes where the patch is found, selecting from:
 - Woodland
 - Woodland edge
 - Hedgerow or verge
 - Grassland
 - Other, please describe
4. List any other common flowers close to the red campion. Only open flowers.
5. Please state the location of where the patch was recorded, e.g. A postcode, grid reference or address, and the date you checked the flowers.

Please email results to Nic.Charlton@bristol.ac.uk.

Additionally, if you see any bees in the act of robbing, please send details of the species and the location. Photos are also welcome.

Meet the BSBI



Lynne Farrell was born in Manchester in 1947, daughter of John, an electrical engineer and keen sportsman from Salford, and Lilian, short-hand typist and a gymnast in her younger days.

Lynne began work as botanical assistant at Monks Wood in 1965 working with Terry Wells and Derek Wells on chalk grassland, and later on wet and dry meadows, and long-term rare plant population studies. She later acquired a degree in Biology at the New University of Ulster in 1971 and then worked for a landscape architect and at the National Institute for Physical Planning in Dublin.

She produced the world's first Red Data Book (for vascular plants, of course) with Franklyn Perring, and also various other red data books and lists, and has worked since then mainly at the Nature Conservancy Council, English Nature and Scottish Natural Heritage, as both a scientist and a team manager.

Q: Apart from BSBI, what other organisations are you involved in?

A: Five Wildlife Trusts, Winston Churchill Fellows, Butterfly Conservation, Plantlife, Royal Horticultural Society, Young Explorers' Trust, Field Studies Council, University of the 3rd Age.

Q: You've been county recorder for mid Ebudes since 1996. What have been the highlights of that? And what are your ambitions now?

A: Exploring the island of Mull and its islets on foot, by boat, and by swimming. Reaching some of the more remote and beautiful spots that others do not reach. Meeting and getting to know the locals, who have all been supportive, and working with BSBI friends in the field.

Writing the New Flora of Mull. Only 37 tetrads left to do (at 28 Dec 2010), producing County Rare Plant Register, writing a popular plant guide to Mull.

Q: You have recently taken on the role of HGS of the BSBI. What does this involve?

A: Sitting at the computer rather more than I anticipated! Being 'on call' for most of the year, so field trips need careful planning. Busiest times are Jan - April, and Oct - Dec. Responding to queries and requests from the general public and BSBI members and officers. Sorting out all sorts of things with regard to the day-to-day working of the Society, producing reports and notes for information.

Q: What do you think is the main purpose of the BSBI?

A: To encourage people to enjoy and study plants through meetings and publications, and to produce useful information on botanical subjects.

Q: How do you think the BSBI and the government agencies should relate to each other, especially now there are cuts coming?

A: Need to find ways of working closely together using each group's strengths

Q: Women are not well represented in the BSBI. Why is that, and what (if anything) should we do about it?

A: The BSBI has been largely run by men for many years and they continue to nominate other males for vacancies. We do need a Society which has representatives of varied ages and backgrounds, both male and female, as general members and in working groups. We especially need to encourage and bring in younger members, who will take the society forward in the future.

Q: What do you do when you're not doing botany?

A: Gardening, felt-making, bookbinding, educational courses on music and astronomy, (just hung up my table tennis bat after 50 years of playing in a league), so now just watching sport. Recording butterflies and leaf miners, and helping manage Wildlife Trust Reserves in Cambs.



Mary Clare Sheahan spent her early years on the outskirts of Oxford. She writes 'My father loved the country and we often went for long walks at the weekend; I still find great enjoyment from walking.' She started off studying languages but took a botany degree in the 1980s at Imperial College (but they call it plant science to make it sound less of a soft subject).

Q: Apart from BSBI, what other organisations are you involved in?

A: Far too many – mainly concerned with local nature reserves and open spaces such as Barnes Common and Richmond Park; also in a more general way with local biodiversity and conservation issues. I'm an enthusiastic member of the London Natural History Society, and a founder member of Plantlife. It is all very time-consuming.

Q: You are responsible for managing the list of referees. How do you select new referees?

A: I make a note of anyone with particular expertise I hear or read about and I also consult people I know at Kew and the Natural History Museum. Mostly I rely on valuable advice from members of Records Committee who of course have to approve additions to the referees list.

A large part of the job is trying to keep everyone - referees and enquiring members - happy. It's not always easy.

Q: Are more referees needed?

A: There are gaps in the panel, and I often receive queries about taxa which don't have a referee. We are always interested to know of people who have made a detailed study of a particular plant group, and wish there were more of them. I have the feeling that there are a lot of people doing academic studies who aren't aware of the contributions to scholarship made by the BSBI, and I wish there was some way of accessing their skills and knowledge.

Q: Does the referee system work well?

A: I think it is one of the glories of the BSBI: we are extraordinarily lucky that so many people (not always BSBI members) are prepared to share their expertise in such a positive and productive way. On the whole the system works very well, though there can sometimes be problems when there is a mismatch between the expectations of members and of referees.

Q: What do you do when you're not doing botany?

A: I have a great love of music; I've sung with one choir or another almost all my life and will be sorry when it has to come to an end (as I suppose it must!). Reading is also a great pleasure, and I find belonging to a book group has opened my eyes to a number of books which I would probably not have thought of choosing to read myself. I'm now much involved with grandchildren, who are a great joy. One way and another I am very busy.



Gerry Sharkey was born in Finglas, on the north side of Dublin, in 1951, and he still lives there for part of the year. He writes, ‘At that time very few people from our area went on to third-level education, mostly for financial reasons, and after repeating my final year in the forlorn hope of a scholarship in about 1968/9 I went into the world of work armed with a second successful but uninspiring Leaving Certificate. I have no real idea where or even when my botanical interests originated, but one nick-name classmates had for me was The Flower Man. I am not sure that it was meant to be at all complimentary, but there were a lot worse!’

‘My glorious career has included work as a tobacconist, a merchandiser (shelf-packer!) and several jobs as storeman. In 1974 I joined the Volvo Construction Equipment agent in Ireland, Pat O’Donnell and Company, where I worked in stores, stock control and IT, eventually leading them through the transition from paper to electronic data processing and overseeing the installation of their first and second main computer systems. I more-or-less retired (early) about two years ago and continue to provide legacy systems support on a consultancy basis. But I am now delighted to describe myself as ‘a naturalist’.

Q: Apart from BSBI, what other organisations are you involved in?

A: Since 1965 I have been a member of the Dublin Naturalists’ Field Club and served at every possible level from junior member to Hon. President. I am currently DNFC legal Secretary and heavily involved with preparations for our 125th Anniversary in 2011. Except for a dodgy ‘black’ period in the 1990s involvement with DNFC has, against the odds, kept me relatively sane. I am also a member of the Irish Biogeographical Society, The Galway Naturalists’ Field Club, The Belfast Naturalists’ Field Club, The Irish Wildlife Trust, the British Bryological Society, Birdwatch Ireland, The Royal Entomological Society, the Bees Wasps and Ants Recording Society, the British Entomological and Natural History Society, the Amateur Entomological Society, the British Myriopod and Isopod Group, the Conchological Society, Butterfly Conservation and the Freshwater Biological Association. Well, you asked...

Q: Involvement in BSBI: what committees, roles, etc?

A: Former recorder for H10 North Tipperary, currently recorder for H26 East Mayo and H27 West Mayo. I have been a member of the Committee for Ireland for some years, and have just been elected vice-chairman. I organise weekend meetings in Mayo most years, and organised our very successful weekend of talks and field meetings in conjunction with the BSBI Committee for Ireland AGM, held in Mayo in 2010. During the ‘One in Nine’ survey I was one of the top contributors, but personal, work and family issues limited my contributions to Atlas2000 well below what I would have liked.

Q: You’ve been county recorder for Mayo since 1989. What have been the highlights of that?

A: The success of the 2010 AGM weekend was the most recent highlight. Having both D.E. Allen and Alan Newton drinking (tea?) in my front room, a particularly memorable visit by Clive Jeremy and the British Pteridological Society, a couple of visits by Tim Rich and friends, are all highlights for different reasons, during which I met new plants and people. But the real ‘highlight’ is happily repeated at least once every year, when the peace and quiet solitude of standing at a Mayo lake or sea shore in early spring sunshine reminds me that this is what I want to do, where I want to be.

Q: And what are your ambitions now?

A: I intend to produce a rare plants register for Mayo, and probably some sort of annotated flora check-list over the next few years. There remains a lot of exploration and recording of the Mayo flora (and fauna) to be done, and square-bashing needs to start now if a new BSBI Atlas is to be produced to the planned time-scale.

Most importantly I would hope to be in a position, when I can no longer do the job, to hand over my recorder’s positions to Mayo-born, or at least permanently Mayo-resident young botanist(s). Visiting botanists make valuable contributions and are always more than welcome, but committed locally-

resident botanists are needed to improve our knowledge of the flora beyond the level of a dot on the map.

Q: What do you see as the main function of the BSBI?

A: I worry that the current fixation on putting dots on smaller and smaller squares is diffusing our efforts and debasing our skills, wasting and ignoring a large part of the valuable information about the flora buried in the minds of recorders and members. In some ways it could be seen as the easy way to keep them occupied. Dots are easy to understand for the funding managers, of course, and in ensuring adequate coverage during projects. I'm not denying that the dots have their own place in the great scheme, and square-bashing at any level is a great training exercise in field craft and plant identification, but in the context of mapping the flora of the whole of Great Britain and Ireland the appropriate unit size is to me the ten-k square. I would prefer the BSBI to encourage the writing of knowledge-based floras and reports rather than the current apparent concentration on producing masses of uninterpreted data. It is possible to strike a good balance: Arthur Chater's *Flora of Cardiganshire* contains an enviable combination of knowledge and data, and sets a high standard for us all to aim at.

I see the BSBI having a very important role to fulfil in areas now being abandoned by third-level educational institutions, areas like general identification skills, related research, and plant taxonomy. We also should be fighting to maintain high standards, and refusing to comply with efforts to down-skill and degrade our work, including for example grossly insulting the public by encouraging the belief that they are incapable of using the scientific names of plants and animals. On the contrary the idea of having to learn a 'secret code' helps make them cool, a feeling I remember fondly.

Q: How do you see botany developing in Ireland?

A: I can only speak with knowledge of the Republic, where the short answer is 'with great difficulty'. As in many areas of public life, the administrators paid to take responsibility for our environment do not often function in any obvious way, or perhaps are prevented from doing so by vested interests. Politically, support for conservation and natural history concerns is frequently regarded as negative, anti-rural development, anti-agriculture and even unpatriotic. Education is the only way forward but I am not holding my breath!

Q: What do you do when you're not doing botany?

A: Entomology, conchology, etc., etc.! Up to 5 or 6 years ago the honest answer would have been 'Drink', but those days are over!

I do reserve some time to watch football. My Dublin team is Bohemians F.C. and West Ham are the English club I follow. I also love watching cricket, especially England's favourite Irish bat, Eoin Morgan. I'm writing this before the Ashes, so here's hoping this does not put the curse on him!

County Roundup

England

From **Cornwall**, Colin French and Ian Bennallick report that ‘members of the Botanical Cornwall Group are actively re-surveying the whole of Cornwall in order to publish the next Flora of Cornwall. There are 3,942 monads to be surveyed in total. Some 336 squares have yet to be visited by the survey team, whilst 54% (2,134 squares) have over 100 species recorded. Clearly it will be a number of years before this survey is completed. The largest gaps are in East Cornwall, particularly on Bodmin Moor, which is both inaccessible and species-poor. The Lizard Peninsula is proving to be very species rich; however, this observation is partly a result of the intensity of recording effort.

‘2010 was a record year for the number of flowering plant records added to the database with 134,991 records added. Of those, 88,132 records were from surveys conducted in 2010. Twelve new species were added to the Cornish list. *Taraxacum undulatum* and *Rubus lanaticaulis* were native additions and the rest were aliens, including *Lupinus albus*, *Callistephus chinensis*, *Saxifraga xarendsii* and *Poa imbecilla*. The number of new species discovered is gradually reducing year on year, which is probably an indication of how well Cornwall has been surveyed in recent decades.

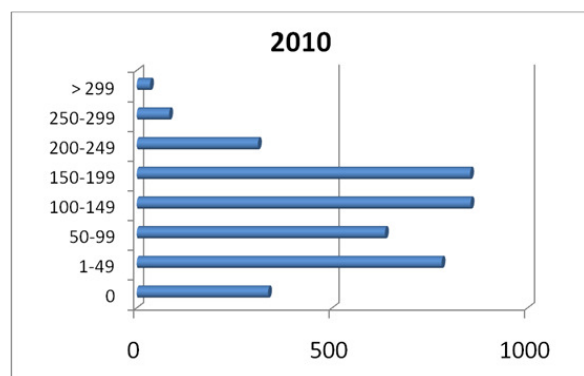


Figure 1: number of species recorded in 2010 per monad.

‘Ken Preston-Mafham surveyed over 100 monads, Colin Wild consolidated his survey of the Lizard Peninsula and beyond, Phil Hunt targeted under-recorded squares around St Austell and Phil Pullen continued to blitz south-east Cornwall. Considerable recording also took

place on SSSIs as a beneficial result of condition assessment surveys.

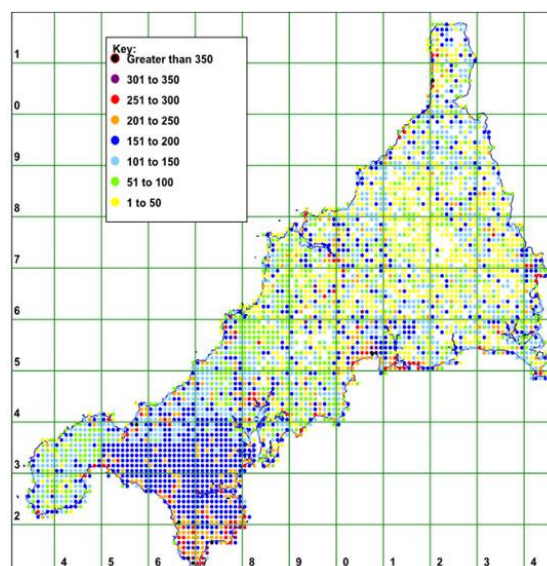


Figure 2: number of taxa so far recorded in each monad in Cornwall.

‘Along with the rediscovery of *Phegopteris connectilis* another highlight of 2010 was the chance finding (though in a known site) of two populations of *Centaurea scilloides* at Gwennap Head. Not seen in Cornwall since at least 1962, it appears that it has always been present but is difficult to see when not in flower – the large showy pink flowers flowering *en masse* are a joyful sight, but the leaves are insignificant compared to them. There was quite a lot of publicity about the sighting and this brought in a record from an entomologist who when recording invertebrates at the same site in 2003 couldn’t resist photographing these showy flowers – though he hadn’t realised the significance of them. In September samples from a few plants were taken for DNA analysis by Dr Tim Rich of the National Museum of Wales, and this now completes the set of samples for this species in its known native range.

‘Another highlight of the year was the news that Rose Murphy had been awarded the Marsh Botany. This award is run by the Marsh Christian Trust in association with Royal Botanic Gardens, Kew and was started in November 2000. The award recognises an individual’s lifetime achievement and outstanding contribution in the field of botanical conservation. Rose collected her award at Kew in November 2010 and

enjoyed herself thoroughly, and will be spending her award money on more books.

‘With the increase in specimens from various herbaria made available on the Herbaria@Home website, this has been a useful source of obtaining details of records that were once only vague and non-localised records in various Floras and or reports. Ian Bennallick has gone through almost all the specimens that are visible on the website and has corrected where the details were wrongly interpreted – mostly place names or people’s names. There is still a lot to extract but this is an ongoing task.’

Helena Crouch says an exciting find in **Somerset** (v.c. 6) ‘was *Potamogeton obtusifolius* at Ham Walls RSPB Reserve. This species was first recorded in Somerset by H.W. Boon in 1973, at Norton Fitzwarren in v.c.5, so it is a relative newcomer; the recent record was the first for v.c. 6. Alas, the VCR can claim no credit: it was discovered by an entomologist. My own new species for Somerset was an alien fern: *Pteris tremula* in a basement in Bath.

‘Two other species new to Somerset possibly both arrived as weeds of Mediterranean pot plants. In April, *Urtica membranacea* was discovered in Nailsea, growing from the crack between the pavement and a shop wall, looking exactly like the illustration in BSBI News 103. In May, Fred Rumsey found *Galium murale* growing on the pavement of the Royal Crescent in Bath. Both of these species appear to be spreading and are worth looking for early in the year.

‘The focus of meetings of Somerset Rare Plants Group was the ongoing task of updating records for the Somerset Rare Plant Register. I have now written about 75 species accounts, so progress on the RPR is steady but slow. The list of species and the finished accounts can be viewed on the SRPG website (somerse Rareplantsgroup.org.uk). SRPG had 13 field meetings this year, some of them general recording meetings and all of them catering for varied levels of interest. We also organised some identification workshops which were hugely popular and attracted a slightly different mix of members and friends. More workshops are planned (and more experts are needed, so if anyone fancies a “working” visit to Somerset, please get in touch!) Meanwhile, other groups in Somerset had regular botanical meetings: in v.c. 6 these included Cam Valley Wildlife Group, Bristol Naturalists’ Society and

Somerset Botany Group. Records from all of these reach the BSBI via Mapmate. I have input over 15,000 records for 2010 in v.c. 6 alone (and obviously I still have a backlog to tackle), but thankfully others input records in Somerset as well so the total number of records for Somerset last year is perhaps more than twice that.

‘My priorities this year must include writing many more species accounts for the RPR, working towards some kind of data exchange with record centres, sending records to NJB, being more diligent about visiting the targeted TPP sites, tackling some of my identification blind spots, masses of fieldwork concentrating on species on the RPR list, yet also ensuring I record in all 33 hectads of North Somerset, and helping build my new study. I am sure I have missed something.’

Sharon Pilkington’s report on **Wiltshire** (v.cc. 7 & 8) begins: ‘The year started on a victorious note when I succeeded in importing more than 260,000 plant records into my copy of Mapmate and thence onward and upward to the BSBI Hub. These records represented the culmination of years of dogged hard work on the part of our local BRC to deliver a useable database that could efficiently exchange data with recorders; until then the relationship had been a bit one-sided to say the least. Most of the records were detailed site surveys undertaken since the Wiltshire Flora Mapping Project in the 80’s by survey teams for the Wiltshire Wildlife Trust and the then English Nature.

‘Unfortunately things went a bit downhill after that due in no small part to our house-move in March and all the usual upheaval and hassles associated with that. With that, and distractions caused by family illness, I was unable to organise much in the way of structured botanical surveys in the county over the summer and regrettably only managed to get to a few of my rare plant sites. However, the Wiltshire Botanical Society is now in the habit of recording all species whenever they have a field meeting and I am aiming for full hectad coverage by the end of the current date-class.’

From **Kent**, v.cc. 15 & 16, Geoffrey Kitchener writes: ‘2010 was my first full year of operation as recorder. A county recording network has now been set up. The Kent Botanical Recording Group (KBRG) was established with 37 members at an inaugural meeting on 13 March 2010. By the end of the year it had expanded to

61 members, held five recording meetings and was publicised through a webpage on the BSBI site. The webpage includes newsletters and an account of the year's records and botanical developments (Kent Botany 2010). Relationships have been established with other relevant organisations, including the Kent and Medway Biological Records Centre. Feedback from those involved in the group has been very positive.

'By the end of January 2011, over 12,000 records for 2010 had been input to Mapmate. Plant records were received, directly or indirectly, from over 50 recorders, mostly KBRG members. The focus has not been on square-bashing, given the availability of an excellent set of recent tetrad records upon publication of Eric Philp's *A New Atlas of the Kent Flora* (2010). Instead, encouragement has been given to updating and more precise recording for the rarer plants. A consultation has been issued on the establishment of a rare plant register, a draft list of taxa issued, and 889 related records for 2010 have been received, which has enabled drafting the register to be started. During the year Sue Buckingham was appointed joint recorder for v.c. 15 (East Kent), which has helped spread the workload.'

Ann Sankey reports that the **Surrey** (v.c. 17) Botanical Society 'organised a record number of 17 field meetings in 2010, including some mid-week half-days, so there was plenty for members to choose from. All meetings have a teaching element where needed but there was one specific teaching meeting for grasses at Chertsey Meads, one of our best sites for these. In addition, there were many informal meetings. A feature of recording in 2010 that sticks in my mind, perhaps because the events occurred at the beginning and end of the season, was the re-finding of species at locations where they had not been recorded since the early 1960s. Two such species, *Stellaria neglecta* and *Oreopteris limbosperma*, may be good at persisting but it does make decisions as to what to include in the Scarce category of the Rare Plant Register more difficult. If one of the purposes of a RPR is to encourage botanists to search out these old sites, then they should be listed, even if this does make for a lot of records to include. Despite much activity over the last few years, we have not been able to get round all sites for all species in our draft RPR list.

'Apart from the above recording, so far, general recording has been on a fairly ad hoc basis. Now,

in DC5, we plan to hold at least one field meeting in every hectad of v.c. 17, except perhaps those that are being well-covered by Mark Spencer and his London Natural History Society team. We also aim to encourage members to record in their own home monad by publishing a list of members and the monad in which they live. This way, we may get them "over the hump" of sending in records. Take-up for the use of the Mapmate import spreadsheet for the submission of records has been slow but encouraging.'

Middlesex (v.c. 21, Mark Spencer): 'In addition to my role as BSBI Middlesex Recorder I am also the London Natural History Society's vascular plant recorder. Overall the two roles are complementary. In late 2008 the LNHS Botany committee and I decided that the time had come to start planning for an update of Rodney Burton's *Flora of the London Area* (1983). Since the publication of that work, the plant life of Greater London and the surrounding region has changed massively, the abundance of many non-native plants has increased, whereas many of our rarer native species continue declining and some have become extinct; thus, the publication of a new flora seems necessary. Since 2008 there have been a series of planning meeting that have investigated a wide range of issues such as the geographic scope of the project, the taxonomic coverage and methods of recording. As you can imagine these discussions have generated a diversity of opinions and some matters remain to be resolved. If you would like to learn more or are not on the e-mail circulation please do contact me (lnhs_plant_recorder@hotmail.co.uk). Also, we are hoping to have a series of web pages on the LNHS website in the future that will provide information on the project and its progress.

'As is often the case, I seem to be playing catch up with several significant tasks, namely updating the Middlesex Plant Records and compiling my returns for the Threatened Plants Project. On the positive side, I have managed to fit in a little recording and have arranged several training sessions for beginners and more specialist sessions on taxa such as Cotoneaster.'

John Durkin has a very active programme of recording in **Co. Durham** (v.c. 66). 'Special attention was given to the least recorded hectads this year, as recording coverage since 2000 has been good but patchy. All hectads were brought

up to a minimum of 20% of records being 2000 on. This ensures that “boring” parts of the county are also covered. The average Durham hectad has 682 taxa recorded, with 10,000 records, of which 42% are 2000 on. Also, sixteen random monads were surveyed for the North East Flora common plants survey.

‘Special surveys of *Woodsia ilvensis*, *Dryopteris expansa*, *Polystichum lonchitis* and *Sorbus rupicola* were undertaken, in Teesdale. Andy Mclay re-found the region’s only *Jasione montana*, not seen for several years, and he has almost completed his field work for his Flora of Gateshead. Margaret Bradshaw has a new account of the flora of Upper Teesdale in preparation. A second county site flora, covering Chopwell Woods, was produced.’

Meanwhile, in v.c. 67, **South Northumberland**, Quentin Groom writes: ‘This year has seen the start of the North-east Common Plants Survey. The spur for this was the recognition that our region lacks detailed records of common plants. It was also recognised that the data we have is not suitable for monitoring change because it is too geographically and taxonomically biased. To correct this, we decided on a monad sampling strategy and, in collaboration with John Durkin (v.c. 66), we have randomly selected 200 sampling sites to be surveyed over four years in the two counties.

‘By conducting intensive surveys of small sampling sites over a short time period, we hope to have a minimally biased dataset that is produced in a repeatable manner. This approach avoids many of the systematic biases of county floras, where the data is collected over many years and there is no mechanism for avoiding bias and no way of monitoring change during the production of the flora. How often do we see detailed maps in floras along with the words increasing or declining? Yet, while there is plenty of data supporting the maps, there is usually no data or analysis supporting the assessment of change.

‘Volunteer participation in the first year has been enthusiastic both from BSBI members and from members of the Northumbria Wildlife Trust. Progress is good and we are on track to finish in four years. We intend to use the data to make maps of the regions common plants and also model their requirements to predict changes. In the future, such data will make an invaluable baseline with which to measure change, but even

in the short term the results will contribute significantly to our goals for tetrad and hectad mapping nationally.

‘Another significant step this year was that we entered in a data sharing agreement with the North-East Environmental Records Information Centre. They gain from having access to our records, while we benefit from access to theirs. Also, we can ensure that all the records for the county are validated, not just our own. Considering the amount of time and energy that goes in to collecting and collating our records it is good to know that they are used.

‘Work on a Rare Plant Register is continuing and is expected to be put online in 2011 [it’s now on the web site]. To this aim John Richards has resurveyed and assessed populations of *Ribes spicatum*, *Festuca altissima* and *Crepis mollis*. Also, many old sites of other RPR species have been revisited. John O’Reilly has been conducting vegetation sampling in western Northumberland and adjacent areas in order to get a clearer picture of the composition of local habitats. His expertise in bryophytes is ideal for upland areas, where mosses are often dominant. John has also revisited several Border mires in search of rare sedges. It was during such a survey that he discovered a new site for *Calamagrostis canescens*, simultaneously ticking boxes for the Rare Plant Register and the Common Plants Survey. Clare O’Reilly is improving the regions knowledge on charophytes by encouraging collection of specimens and by getting them refereed. This is a difficult and under-recorded group, but nevertheless interesting in terms of water quality and phytogeography.’

Wales

From v.c. 44

(**Carmarthenshire**), Richard Pryce writes, ‘The most important event was the

retirement of George Hutchinson from NMW and his disappearance from the botanical scene. As far as v.c. 44 is concerned, this is a major blow as it means the loss of the joint County Flora writer as well as the determiner and verifier of many new and critical records. NMW does not appear minded to replace him or offer a similar service in future or, indeed, even employ a keeper for the British Vascular Plant Herbarium.

‘Otherwise the year was relatively uneventful. The TPP was disappointing – didn’t refind any

Hordeum marinum sites and I think all the past records refer to *H. secalinum* as this was present (often abundant) in all sites and had not been recorded previously. *Chrysanthemum segetum* was not seen at all in 2010. *Melittis mellisophyllum* continues to hang on at its only site.

‘The BIRM & ABS sheets on Herbaria @ Home have produced some important new (old!) records including the second record for *Pseudorchis albida* (Ley, 1896), the previous being by Knight in 1908. I’m steadily working through all of the nearly 500 sheets now posted.

‘We were presented by the LRC with nearly 34,000 records to verify, all recently input from NC/NCC/CCW paper records. Most are unverifiable except by the recorders themselves (some of whom must by now be dead). Problem is that these records mostly duplicate already databased ones but often have site-centroid grid refs and so confuse existing records with precise grid refs. Although Steve Coker has written a routine in Biorecs to sort these records into ten categories ranging from “accept without question” through to “obvious error: expunge”, not surprisingly we (I) have not had time to carry out the requested verification. Despite this, all these records have been posted on the NBN Gateway (admittedly as “unverified”) so CCW can report that it is fulfilling its commitment to digitize its paper data.’

Scotland

From **Berwickshire** (v.c. 81) Michael Braithwaite reports ‘resurveys of NT53 (mostly by Luke Gaskell), NT56, NT73 (part by Melanie Findlay) and NT96, with special emphasis on monitoring Rare and Scarce populations. Total area sampled: 171 monads. A handful of records submitted by other recorders. Dedicated survey for *Sedum villosum* completed. Some 8,239 records entered Mapmate for 2010. Threatened Plants Project participation: just two relatively recent sites for *Chrysanthemum segetum* to visit, no plants found. There will be no TPP work to do in 2011 or 2012, except to complete forms for *Sedum villosum* sites visited in 2009 and 2010. Axiophyte list completed.

‘BRC, per Chris Preston, has now provided photocopies of all v.c. 81 field cards for 1962 Atlas. There are many more than expected. As anticipated, those for the BSBI field meeting

August 1960 prove the most interesting, as a proportion of the cards relate to sites of tetrad scale or finer. Work is now planned to input to Mapmate those records which can be upgraded to sites rather than hectad; 26 field cards fall into this category.

‘TWIC has failed in 2010 as the record centre for Lothians and Borders. Offer of BSBI 2009 and 2010 records not yet taken up. A multi-discipline TWIC recording group has been out across the Lothians and Borders on a few Sundays, which does not suit me. I have received records from one such outing in Berwickshire thanks to my contacts with individuals. Sadly it was a site I had resurveyed a few weeks earlier in greater detail. However the orchids had come into flower and a few records were added.’

‘Berwickshire BSBI Botanical Site Register (CBSR). This project has come forward by leaps and bounds in 2010, with the axiophyte concept now included. Work is progressing hectad by hectad: 19 of 23 hectads are now written up in draft, including all those so far resurveyed in the current recording cycle. The plan is to complete this by Easter 2011 and to issue it as a provisional register, about 350 pp A4, printed economically by a print-on-demand service. Circulation to be limited to 30 copies donated to potential users. To be updated when resurvey finished and analysis added. Part of this project is a hectad by hectad overview in about four pages for a full hectad. This may be offered to the BSBI website as a PDF available for download.’

David Welch (**Kincardineshire** and **North Aberdeenshire**, v.cc. 91 & 93) writes, ‘I am concerned about the shift to a new publication, and the experience in Scotland of moving from the local *Bot J. Scotland* to *Plant Ecology & Diversity* fuels my concerns. Despite reassurances from the new publishers that there would be a continuing slot for papers majored on Scotland, I found that my paper which had passed referees and was likely to occupy 10 pages in this section was suddenly given an edict of “at most two pages”. After argument, it appeared as 4 and a bit pages, with the fuller account available electronically.’

‘Cutbacks are reaching down to affect botanical and conservation activities. The North-East Scotland Biological Records Centre is already much reduced in staffing compared to its heyday four to six years back, and could well suffer more in the 2011-2012 cuts. I was also shocked

last autumn to find that the lecturer and technician running the Aberdeen University herbarium were both retiring, one of them early, so the expertise built up over many years is lost even if the equivalent staffing level continues.

‘The Trump development has been scarring the Menie coast, though some good habitat remains. There’s been plenty of publicity, with resignations or sackings of Trump staff, arrests of two filmmakers working on a documentary for Channel 4, and the stout resistance of some householders who still refuse to sell out to Donald.

‘Robert Gordon’s University (Aberdeen’s junior one) decided to give Trump an honorary degree, but this was so controversial that the time for the ceremony was not announced and enquiries were stonewalled. I went early, and saw the man arrive before most of the media came. Which meant he was able to boast to the diligent BBC team that the opposition was reduced to one man and a dog. But the presence of eight large muscular men whose speech was American betrayed Donald’s anxiety. As more TV crews arrived, there came also some Tripping-up-Trump leaders in a van. This carried some 50,000 copies of a newspaper being conveyed from printers to the Aberdeen post office for delivery to local households, and with youthful naivety got parked next to the bouncers’ vehicles. In the scrum they never suspected.

‘Another conservation issue has been the steering of a planned long-distance footpath around flushes that hold the best local population of whorled caraway *Carum verticillatum*, a rare species in eastern Scotland. Finds of new species have been more of incomers than natives. A one-day opening of Inchmarlo House near Banchory allowed me to explore the policies, in which I was surprised to find *Acaena ovalifolium* and *Tropaeolum speciosum* rampant, and some nicely displaying *Matteuccia struthiopteris*. Another shock was at a high-lying new plantation near Wells of Ythan where two Southern England brambles, *Rubus cardiophyllus* and *Rubus surrejanus*, had become well established next to edge planting of amenity deciduous trees.’

Andy Amphlett (**Banffshire**, v.c. 94) says, ‘I think BSBI needs to investigate sources of funding so as to at least contribute something towards travel costs of those engaged in plant recording for specific projects, e.g. Local Change or TPP. Where there are only one or two active

recorders to cover a whole county, then BSBI needs to look to sources of funding to employ specialist surveyors to ensure coverage of sites. I am much more interested in, and willing to carry out, general botanical recording across the county, than I am to carry out specific BSBI surveys. The latter, involve more time and expense than I sometimes am comfortable with. It also feels like work.

‘In the last couple of year 7,765 records of 734 taxa were made, entered to Mapmate and synched to BSBI. 99% of these records were made by Andy Amphlett & Ian Green. 89% of total records (and 100% of Andy’s records) had site grid references at minimum 6 figure resolution. Few might guess that the species with the most records (82) was *Alchemilla glabra*. I was very surprised myself.

‘Two new natives were recorded, *Polypodium xmantoniae* and *Utricularia australis*. New aliens of interest included *Chenopodium polyspermum*, *Lemna minuta* and *Trifolium resupinatum*. A Checklist for the county was compiled, including a list of axiophytes and a Rare Plant Register checklist was compiled. Alex created a v.c. 94 web page in January 2010. These two documents are available for download from there. Also written and published on the web page were several species accounts and maps showing distribution of records. Several threatened plant project sites surveyed, but I continue to be rubbish at returning any forms ...

‘From the outset, I have wanted the recording I do to be useful to others. I also wanted BSBI to be acknowledged as a data supplier. With that in mind, in November 2007 I signed a data sharing agreement with my LRC (NESBReC). Three years on the outcomes have been rather one-sided, having supplied c.80 000 records to them, and received just c.9 000 in return. The major body of detailed new survey data, which is what I was after from the outset, remains unavailable. Jim McIntosh has been trying to exert some gentle pressure on them to fulfil their part of the agreement, but there is no real evidence of any progress. A disappointing and frustrating situation, in which I feel the LRC is taking advantage of me personally and of BSBI. So regrettably I am supplying no further data to them until the situation is resolved.

‘I found the over-hasty rush to adopt Stace 3 names rather annoying. Reasons are: it is not the only authoritative source of names, and does not

cover all taxa; contrary to some statements, names will continue to change for a variety of reasons, so Stace 3 is not the last word. Interested users of BSBI resources e.g. the excellent Atlas web pages, may be put off by not being able to find the maps they want as there is no synonymy provided. And Stace 3 is so expensive. By keeping on about moving to this latest, and no doubt transient “last word on species names” we make BSBI seem unnecessarily elitist. There have been a few other frustrations this year, but I won’t go on!’

In the **Mid Ebudes** (v.c. 103) Lynne Farrell found that ‘only 2 of the TPP species selected for 2010 occurred in the v.c., *Chrysanthemum segetum* (as it was in 2009 when the list came round), and *Polystichum lonchitis*. I was asked to update the *C. segetum* records for Tiree, which we did on the BSBI field meeting held there in 2009, but my island reporter also added more records in 2010. There are no recent records for *P. lonchitis* and the only previous records in the Flora (1972) are from Ardmearach peninsula and Ben More, of which both areas have been surveyed in detail over the past 15 years, so an even more diligent search will need to be undertaken to see whether the species is extant.

‘Tetrad recording continued mainly from May until Sept with a total of 43 previously unvisited tetrads being recorded, more than in any other previous year since 1995, when I took over as VCR. It must be something to do with being retired! There are now only 37 tetrads left to visit- will I be able to survey them all in 2011?

‘There were some extremely good finds on Mull, Coll and Tiree. Claudia Ferguson-Smyth on Tiree valiantly tackled *Taraxacum* with John Richards’s help. David Pearman continued his trips to the excellent Coll hotel under the guise of recording more trees on the island- sounds like a good excuse to me. On Mull several good records were made by botanists on family holidays. Rob Corner finding *Carex disticha* in the north near Glengorm, in a tetrad I was to visit just one week later. Anand Prasad, who lives in the NW part, found *Lathyrus japonicus* at Carsiag- the nearest site in UK being in Donegal, Ireland. He also checked and relocated *Vaccinium oxycoccos* at its only known site, after I fell down a hidden hole and could not walk for several weeks.

‘I did, of course, manage to find some good records myself, and concentrated on the Glen

Forsa area on Mull later in the year, as this was an area not explored recently. Gordon Rothero and I ascended some of the eastern hills, locating strong populations of *Minuartia sedoides*, which is declining on Mull. Other species found in this area were *Cryptogramma crispa*, *Persicaria vivipara*, *Cystopteris fragilis*, *Luzula spicata* and *Salix herbacea*, none of which are particularly common on the island. In the valley, Mark and Clare Kitchen found a new spot for *Hammarbya paludosa*, and lots of *Teesdalia nudicaulis* on the river gravels, confirming its old sites. I would like to thank those people who have helped during 2010- we have had some excellent finds between us.’

Brian Ballinger submitted a report on **Easter Ross** (v.c. 106) for 2010 on behalf of himself and his wife, Barbara. ‘This was a difficult year because of Barbara’s illness and subsequent death from cancer in October. Nevertheless we managed to fit in quite a lot of botanical recording in the new date class, concentrating on the more easily accessible sites. We were pleased to be able to take part in a repeat of the Kyle of Sutherland Site Condition Monitoring together with Mary Dean, confirming the presence of the very large population of *Carex recta* and re-finding *Pilularia globulifera* in all its previous unusual estuarine sites. We managed to lead some field trips for other societies and, with some help from other members, got round most of the rather demanding threatened plant sites, although one *Sibbaldia procumbens* location awaits a visit.

‘We produced both a website and a printed version of our v.c. 106 Plant Checklist with the aim of updating it regularly. We also developed a tentative first version of an axiophyte list. I have agreed to continue as recorder and have just finished entering the 2010 Mapmate data. Now I am sole recorder I will also need to work on some of my skills.’

Ireland

In **Co. Waterford** (v.c. H6) Paul Green ‘did a short talk on the local Waterford radio station in April in Dungarvan on edible plants found growing wild in the county. While there *Gnaphalium luteoabum* was found in pavement cracks, last recorded from Dungarvan in 2001. Also in 2010 *Mycelis muralis* turned up on walls in the town. It was found on a road verge on the edge of the town in 2005 where it had come in with a grass seed mix.

It goes to show how plants can take hold and the damage sowing of non-native grass seed mixtures can cause. The only new county record in 2010 was the finding of *Diphysastrum alpinum* in the Comeragh Mountains by Jenni Roche.'

Meanwhile, in **Co. Wexford** (v.c. H12), he continues: 'there were many good records made during 2010. *Trifolium glomeratum* from lawns of a sports centre at Rosslare was the first reported record in the area since it was found there in 1897 by E.S. Marshall. *Conyza bonariensis* at Rosslare Harbour was a new county record. Here it was growing with *C. canadensis*, *C. floribunda* and *C. sumatrensis*. Seeing all four *Conyza* growing together certainly has made it easier now to see the differences and 'jizz' of each. *Conyza floribunda* × *Erigeron acris* from an old lime working on the edge of New Ross, found by Jenny Seawright, is according to Clive Stace a new hybrid to science. *Bromopsis inermis* established on a road verge at Holmestown where it was sown with a wild flower seed mix in 2007 was a new county record and *Pimpinella peregrina* from the same site is the first record for Ireland.

'A red flowered *Potentilla* found on the side of a forest track took some time to identify. The internet came to my rescue. I scrolled down a large list of *Potentilla* photos until I found red coloured flowering plants and came to the conclusion that it was *P. nepalensis*. Later in the year I saw it labelled in a botanic garden, very pleased the internet had given the correct answer.

'I gave up the idea of filling in forms for Corn Marigolds for the Threatened Plants Projects, as 2010 seemed to be the Year of the Corn Marigold in Co. Wexford, turning many cultivated fields yellow. If I had been given a Euro for each Corn Marigold I saw I could have taken early retirement.'

Ian McNeill, in **Co. Tyrone** (v.c. H36), writes about a familiar issue: 'Damian McFerran has recently sent the latest version of the Tyrone botany database, including the complete record for 2000-2009. In view of the fact that hectads are still the principal publishing unit, I asked

Damian to incorporate records for all hectads that include any Tyrone territory. This is with agreement from the recorders in neighbouring counties.

'As I am constantly amending older records, some pre-2000 records may have changed from the earlier download sent to you two or three years ago. Most of these changes might be improvements in knowledge. Possibly a few completely new entries from earlier eras. I think I have apologised before for the quality of the pre-2000 Tyrone records. I was very conscious, perhaps overly so, that I should avoid overloading the system. I opted for a system that recorded common plants at 5km x 5km level. You may notice that in recent years I have altered my approach so that most plants are now entered with 4 fig. grid refs. As they stand, the Tyrone records should map satisfactorily at hectad level, but will give a strange result at tetrad or monad level.'

Referees

Geoffrey Kitchener, referee for *Epilobium* and *Rumex*, reports: during 2010 three requests for determination of *Epilobium*

specimens and one for *Rumex* were received. I also made field records for hybrids in each genus in v.cc. 15 and 16, and for *Epilobium* hybrids in v.cc. 2 and 38. A database of *Epilobium* hybrid records continues to be maintained. The most interesting material was a package of seedlings of a willowherb abundant in the Colchester area which on maturity were identified as *Epilobium brachycarpum*, a North American taxon spreading in mainland Europe and new to the British Isles.

Rose Murphy is actively seeking specimens of *Oenothera*, especially anything unusual, as she is working on a mini-Handbook of this genus. Dried specimens are not always useful, apparently, so do contact Rose if you have anything potentially interesting and send a fresh piece if required.



Some British habitats of *Astragalus danicus*: from left to right, cliff-top grassland Dowlaw Dean, Berwickshire (photograph © Michael Braithwaite); short limestone grassland, Lime Roach Hills SSSI, Mid-west Yorkshire (photograph ©Kevin Walker); basic rock outcrops, Tiree, Mid-Ebudes (photograph © Lynne Farrell); Bulford Ranges, Salisbury Plain MoD Training Area (photograph ©Sharon Pilkington).