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No. 385

**BIOLOGICAL RECORDS
CENTRE**

**ANNUAL REPORT
2005-2006**

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FOREWORD

The work of the Biological Records Centre (BRC) takes place as a partnership between the Joint Nature Conservation Committee (JNCC) and the Centre for Ecology and Hydrology (CEH), a research centre of the Natural Environment Research Council (NERC).

The main purposes of BRC are to document species distributions and to interpret changes at the geographical scale in the United Kingdom. The work of BRC is possible, not only because of long-standing support from the funding partners, but also because of the commitment of volunteers, recording schemes, government departments, local records centres, academic researchers, and non-government conservation organizations to the large-scale documentation of biodiversity.

The period covered by this report is the first year of a new six-year partnership between CEH and JNCC. For this period, there is increased emphasis on targeted survey, on analysis and interpretation and on communications and outreach. These activities were always part of BRC's work, but they have been given greater prominence as a result of rapid developments in information technology. Data are increasingly reaching BRC in electronic form, so that the effort of data entry and collation is reduced.

Not only data collation but data dissemination is changing. BRC now relies mainly on the NBN Gateway to supply its data to others. Complex requests still have to be handled by BRC staff, but simple requests and map generation can be served by the Gateway.

The BRC partnership is the centre around which other BRC activities revolve. Some of the activities reported here, notably the work on the Harlequin Ladybird, have been done partly under the main partnership and partly with funding from other sources. Likewise, the projects done by BRC and collaborators on non-native species in England and more widely in Europe have been underpinned by the partnership. One of the great strengths of the BRC partnership is that it can be used to supplement and underpin other, more focussed activities.

In early March 2006, NERC Council announced that CEH's Monks Wood site would be closing. At the same time, Council reiterated their support for BRC, which will be moving to CEH Wallingford. The loss of Monks Wood, our home for more than 40 years, is inevitably a source of regret to members of staff. The timing of the move is not yet fixed, but it is likely to take place during the year 2008-9. On a positive note, the NERC consultation about the future of CEH elicited many messages of support for BRC from the public and from government bodies. NERC Council were left in no doubt that our work is valued.



Dr Mark Hill
Biological Records Centre



Dr Ian McLean
Joint Nature Conservation Committee

May 2006

INTRODUCTION

The Biological Records Centre (BRC), established in 1964, is the national focus in the UK for terrestrial and freshwater species recording (other than birds). It works with the voluntary recording community throughout Britain and, for some schemes, Ireland. The BRC Compilation Database contains about 14 million records of more than 12000 species.

The data, collected by many volunteers and then collated and analysed at BRC, document the changing status and distribution of plants and animals in Britain. Distribution maps are published in atlases and are available via the internet through the NBN Gateway. The effects of change or loss of habitats, the influence of climate change and the consequences of changing water quality are all examples of the environmental factors that affect our biodiversity and which BRC aims to document and understand. The results are vital for developing environmental policies, to support conservation, and for fundamental ecological research.

BRC is funded jointly by JNCC and NERC through a partnership based on a Memorandum of Agreement (MoA). The partnership started in 1973 when the Nature Conservancy was divided to form the successor bodies Nature Conservancy Council (NCC) and Institute of Terrestrial Ecology (ITE). NCC was in turn divided further to form JNCC and three Country Agencies, while ITE was merged with other NERC units to form CEH. Through all these changes, the partnership has been maintained. A six-year memorandum of agreement ended on 31 January 2005 (Hill *et al.* 2005). The present report covers the first full year, 2005-6, of the new agreement for 2005-2010.

Rapid progress in information technology continues to be highly beneficial for BRC, whose data are increasingly used by the UK country conservation agencies, environmental consultants, NGOs, research workers, policy makers and volunteers. It is gratifying to know that, through our ability to display data on the National Biodiversity Network (NBN) Gateway, some of our data suppliers now have immediate access to their own data in a convenient form.

The year 2005-6 has been one of steady progress, with new datasets added to BRC, substantial additions to existing data, and improved communication with the NBN Gateway. The most high-profile activity of the year has been the Harlequin Ladybird Survey, which has enabled us to observe the early stages of colonization by a mobile insect in greater detail than has been possible in any previous case.

ACKNOWLEDGEMENTS

The main data providers are volunteers, managed by National Schemes and Societies. In addition, BRC receives data from statutory agencies, from individuals and from colleagues in CEH. We thank all our data providers. Dr Peter Rothery of CEH Monks Wood provided much valuable statistical advice and analysis. Thanks to Philip Precey and Derbyshire Wildlife Trust for permission to use the photo of Harlequin Ladybird.

PROGRAMME 1: SUPPORTING AND DEVELOPING CAPACITY OF RECORDING SCHEMES AND VOLUNTEERS

Background and objectives

BRC's activities depend completely on our data providers, almost all of whom are voluntary schemes and societies. Although one or two data providers need little help other than a long-term warehousing facility, most of them benefit substantially from services provided by BRC. These are specified in the current MoA:-

1. production and circulation of newsletters;
2. hosting web pages;
3. participating in and supporting conferences and field meetings;
4. responding to requests for advice and support;
5. provision of data and information as feedback; and
6. analysis and interpretation of data, especially in connection with atlases.

Under the MoA BRC will provide an annual overview of the progress of data flow from recording schemes. Activity 6 is reported under Programme 4 below.

Methods and results

At the end of 2004, all Memoranda of Understanding with individual recording schemes and societies had lapsed. With smaller schemes, such memoranda are not necessary; BRC's services can be provided on a personal basis according to customary practice. However, an explicit Memorandum is useful for larger schemes, where it is helpful for both parties to have a clearly defined agreement to set out their respective contributions and activities. During the year, new Memoranda of Understanding were signed with the Bees, Wasps and Ants Recording Society (BWARS; January 2006) and with the Botanical Society of the British Isles (BSBI; March 2006). BRC's collaboration with these larger societies is one of the cornerstones of our work.

BRC continues to circulate newsletters, but many schemes are now using the Internet for communication. BRC hosts web pages for CAMSTARS (Caddisflies, Mayflies and Stoneflies), the UK Ladybird Survey and the Harlequin Ladybird Survey. For some groups, there is steady demand for record cards, which are supplied without charge to scheme organizers. During the year, updated cards were produced for bryophytes (3 British regions, 1 Irish), and for centipedes. These were produced as electronic documents as well as on card.

<i>Person</i>	<i>Society</i>
Gavin Broad	National Insect Week Steering Group Committee member, International Society of Hymenopterists Committee member, European Invertebrate Survey Committee member, National Federation for Biological Recording Executive Committee member, Invertebrate Link
Paul Harding (CEH Fellow)	Secretary, National Federation for Biological Recording Two committees of National Biodiversity Network Treasurer, British Myriapod and Isopod Group
Mark Hill	Recording Secretary, British Bryological Society Four committees of National Biodiversity Network Atlas Working Group of BTO Participant, International Designations Group SubCommittee on Biological Recording
Trevor James	Vice-chair, National Federation for Biological Recording Five committees of National Biodiversity Network BBC Wildlife Magazine Editorial Advisory Board Botanical Society of the British Isles Records Committee Chair, Hertfordshire Natural History Society Records Committee
Richard Ostler	NBN Gateway Technical Steering Group
Chris Preston	President, British Bryological Society (BBS; to December 2005) Member, BBS Conservation and Recording Committee Council and Vice-President, Botanical Society of the British Isles Records, Publications and Executive Committees, BSBI
David Roy	NBN Gateway Technical Steering Group

Table 1. Committee work by BRC staff other than Trevor James.

BRC supports schemes and societies in many other ways, partly by attending society meetings, but also by serving on NBN committees and attending meetings of national societies such as Butterfly Conservation, the British Ecological Society and the National Federation for Biological Recording (Table 1). In these matters we work closely with Trevor James, NBN Development Officer for Societies and Recording Schemes. He is a member of BRC, but his work is funded by the NBN under a different arrangement and does not form part of the present report.

Advice and support were given by BRC to many enquirers, who may be members of schemes supported by BRC. A frequent type of request is for all data for a particular vice-county. Most enquiries can be dealt with quickly, but in some cases, data extraction can take up to a day.

Website: <http://www.brc.ac.uk/hostedSchemes.htm>

Contact: Henry Arnold Email: brc@ceh.ac.uk



PROGRAMME 2: DATA CAPTURE AND DATABASE MANAGEMENT

Background

Improvements in information technology have vastly facilitated data capture, so that most data received by BRC are supplied in electronic form. At present, such data arrive in a bewildering variety of formats, and there is no immediate prospect that this will change. A standard data exchange format has been proposed by the NBN, but it is not yet widely used. We plan that by 2010, all BRC data will be in a format that can be exchanged freely and simply with the NBN Gateway.

Objectives

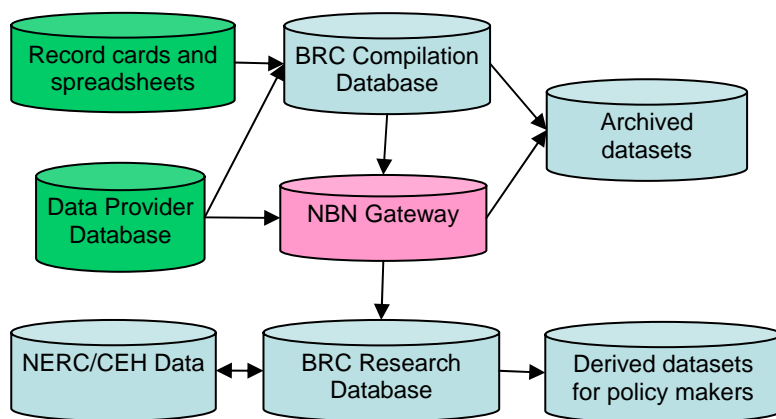
For the first year of the MoU, we planned to:-

1. produce a database development plan;
2. review database security;
3. develop proposals for archiving NBN data in BRC;
4. set out proposals for taking forward the Phytophagous Insects Database (PIDB);
5. write metadata statements for remaining datasets in the BRC compilation dataset; and
6. demonstrate a prototype system for databasing quadrat data.

Except for objective 6, all these aims were met. Selected NBN data are now being transferred to the BRC Research Database (see below).

Development plan for BRC database

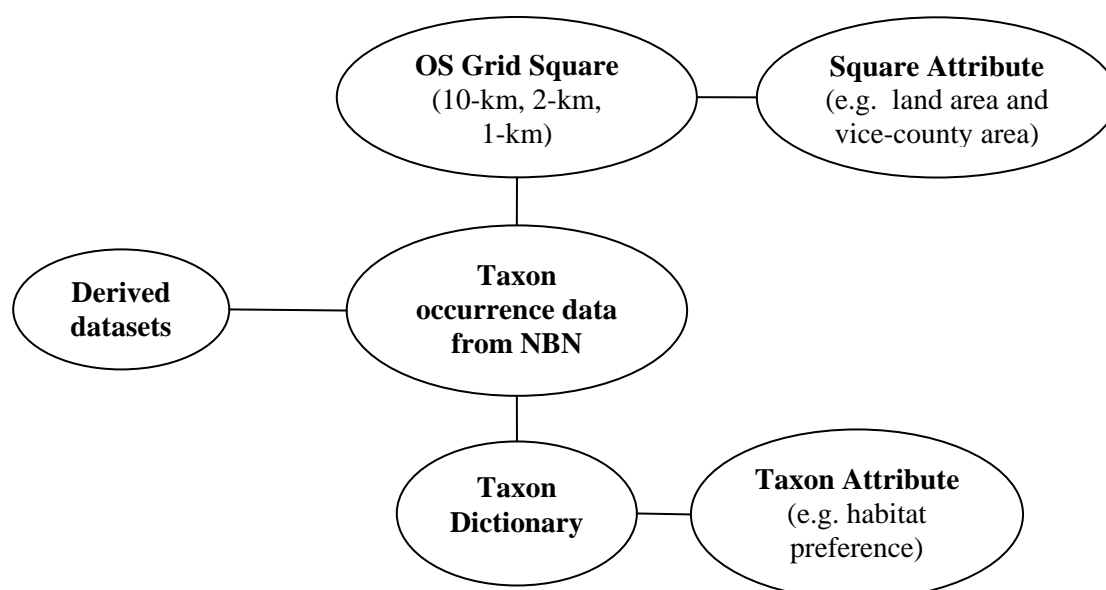
A development plan for the BRC database has been produced, identifying three core functions: data compilation, data archiving, and support for research applications. These are shown in the accompanying diagram. The Compilation Database is essentially the traditional BRC database, and it serves two main purposes. It underpins BRC atlases and it serves as a means for assembling and checking data destined for the NBN Gateway. Several datasets in the Compilation Database have been specially extended to ensure compatibility with the NBN Standard Exchange Format http://www.searchnbn.net/library/guide_to_the_NBN/3-NBNExchangeFormat.doc. These datasets can now be readily uploaded to the Gateway using established data transformation routines. In the process, they are automatically subjected to NBN standard validation procedures. A regime of rapid update has been set up for recording schemes that were particularly active during 2005, e.g. bryophytes and ladybirds. It will be extended to all other datasets in the coming year. The BRC Compilation Database remains the main source of data to the Gateway.



BRC's role in data compilation, archiving and research.

The second major function of the BRC database is to provide a long-term archive. During 2005, the Compilation Database was backed up for security. Annual back-ups will be retained as an archive.

The third major function of BRC is to provide efficient system to support interpretation and research. The main components of the Research Database were assembled during the year and are shown below as a conceptual model. The core components of the database are populated by an export routine from the NBN Gateway, giving access to 18.4 million records. Sourcing data from the Gateway ensures that they are presented in a standard format. It also gives access to data not in the Compilation Database that have been loaded directly to the NBN Gateway, e.g. the Butterflies for the New Millennium (BNM) dataset. The BRC Research Database will be extended during 2006 to include species attribute data (e.g. PlantAtt and BryoAtt, which are databases of attributes for vascular plants and bryophytes, and the Phytophagous Insects Database). Spatial environmental data associated with grid cells (e.g. the CEH Land Cover Map) and derived datasets such as the species richness per 10-km grid cell for different taxonomic groups will also be added.



Conceptual model of the BRC Research Database; all datasets have metadata, not shown here.

Key Results

Large additions can be seen for the Bryophyta, Ephemeroptera, Plecoptera and for three groups of moths, namely pyralids, plume moths and scarce macro-moths (Tables 2, 3). The bryophyte additions result from the first stages of preparation for a new atlas. Those for pyralids and plume moths are due to the efforts of a very active scheme organizer, working towards a Provisional Atlas. Scarce macro-moth data were added following an NBN project, funded by Defra. Ephemeroptera and Plecoptera data are from the CAMSTARS scheme <http://www.brc.ac.uk/schemes/CAMSTARS/homepage.htm>, hosted on the BRC website.

NBN	Taxonomic group	Common name	No. of taxa	Ire-land	Records added	Total records
Plants, fungi and simple organisms						
	Protozoa: dinoflagellates	dinoflagellates	236		0	27845
✓	Algae: marine	seaweeds	724	Y	0	255097
	Ascomycetes	ascomycete fungi	13		0	1217
	Myxomycetes	slime moulds	96		0	22725
	Charophyta	stoneworts (algae)	52		5	9438
✓	Bryophyta	mosses & liverworts	1250	Y	180398	1118127
✓	Tracheophyta	vascular plants	6750	Y	11048	9364669
Vertebrates (terrestrial & freshwater)						
✓	Amphibia & Reptilia	herptiles	18		0	53592
✓	Fish	fish			0	280671
✓	Mammalia	mammals	72	partial	6463	135855
Invertebrates (exc. crustacea and insects)						
	Platyhelminthes	flatworms	10		0	496
✓	Mollusca (non-marine)	slugs, snails, etc	227	Y	16807	218047
	Annelida: Hirudinea	leeches	16	Y	0	4414
	Acariformes	ticks	1		0	4231
✓	Araneae	spiders	255		2	517838
	Opiliones	harvestmen	25	Y	8024	25556
	Myriapoda	millipedes & centipedes	98		1359	64845
Crustacea						
	Amphipoda	amphipods	7		743	1798
	<i>Chirocephalus</i>	fairy shrimp	1		0	163
	Cladocera	water-fleas	86		4464	14021
✓	Decapoda	crayfish	6		10	10861
	Isopoda: <i>Asellus</i> spp.	water-slaters	3		0	3538
	Isopoda: Oniscidea	woodlice	37	Y	0	59136

Table 2. Data for taxonomic groups other than insects in the BRC Compilation Database, March 2006. Records added are added since the report for 1999-2004. The number of fish records is lower than previously reported because nil returns had been incorrectly included. Taxonomic groups in bold are those for which datasets are available on the NBN Gateway. Data for groups marked ✓ are routed to the Gateway through the BRC Compilation Database.

NBN	Taxonomic group	Common name	No. of taxa	Ireland	Records added	Total records
Coleoptera (beetles)						
✓	Atomariinae	atomariine beetles	48	Y	0	10814
✓	Cantharoidea etc.	soldier and jewel beetles	72	Y	0	41071
✓	Carabidae	ground-beetles	354	partial	0	181555
✓	Cerambycidae	longhorn beetles	66	partial	0	12867
	Chrysomelidae etc.	leaf- and seed-beetles	280	Y	806	129745
	Coleoptera: Ciidae	ciid beetles	5		0	736
✓	Coccinellidae	ladybirds	44		8026	17426
	Staphylinidae: Omaliinae	omaliine rove beetles	84		0	8644
	(miscellaneous)		10		0	1030
NBN	Aquatic species	water beetles	[946]		Gateway	[284968]
Hymenoptera (wasps, bees, ants)						
	Bombinae (unverified)	bumblebees	27		0	18505
	Aculeata	bees, wasps and ants	22	Y	0	2054
	Parasitica	parasitic wasps	3		0	431
Lepidoptera (butterflies, moths)						
NBN	Rhopalocera	butterflies	70	Y	Gateway	[1866406]
	larger moths (unverified)	macro-moths	773		0	378549
✓	Lepidoptera in part	scarce moths	1760		254819	279013
	Pyralidae (new data)	pyralid moths	181	Y	130113	130113
	Pterophoridae (new data)	plume moths	41		20902	23658
	Zygaenidae	burnet-moths	42		0	5520
Diptera (flies)						
	Brachycera (larger spp.)	horse-flies, soldier-flies	149	Y	0	20980
	Dixidae	meniscus midges	14		0	1463
	Empididae etc.	'dollies and empids'	20		0	582
	Muscidae	muscid flies	8		0	2259
	Sepsidae	sepsid flies	27	Y	0	6083
NBN	Syrphidae	hoverflies	316		Gateway	[446887]
	Tephritidae	picture-winged flies	65		0	4921
	Tipulidae	craneflies	344	Y	41410	75110
Other insect groups						
✓	Ephemeroptera	mayflies	68		214917	214917
✓	Heteroptera	aquatic bugs	61		1	45364
	Neuroptera etc.	lacewings, etc	82	Y	0	18893
NBN	Odonata	dragonflies	58	Y	Gateway	[363959]
✓	Orthoptera etc.	grasshoppers, etc	59	Y	100	46448
✓	Plecoptera	stoneflies	32		38199	38199
	Siphonaptera	fleas	37		0	21146
✓	Trichoptera	caddisflies	207		0	18665

Table 3. Data for insect groups in the BRC Compilation Database, March 2006. Records added are added since the report for 1999-2004. Taxonomic groups in bold are those for which datasets are available on the NBN Gateway. Those labelled NBN are not, or only partly, held in the BRC Compilation Database. Data for groups marked ✓ are routed to the Gateway through the BRC Compilation Database. Data for groups marked NBN are compiled outside the BRC Compilation Database and sent directly to the Gateway; these groups are included for completeness.

Area of vice-counties in Ordnance Survey grid squares

A useful dataset has been derived from the digitized Watsonian vice-county boundaries generated in 2004 by an NBN Trust project, funded by Defra. For each 1-km, 2-km and 10-km grid square in Great Britain, the area of sea is given, as well as the area of land in each vice-county. Just one 1-km square, TM0479, has land in 4 vice-counties, in East and West Norfolk and in East and West Suffolk. We are using this dataset to check the consistency of grid references and vice-counties during data compilation. It is likely to be of general use to the biological recording community and will be made available to download from the BRC website in the coming year.

Staff involved: Henry Arnold (database manager), Val Burton (data entry), Jon Cooper, Cassie Hoyland, Richard Ostler, Francis Rowland, David Roy.

Contact:

BRC enquiries Email: brc@ceh.ac.uk

David Roy, Head of database and web development Email: dbr@ceh.ac.uk



PROGRAMME 3: TARGETED SURVEY

Background

Knowledge of some species and groups requires special, targeted survey. In 2005, targeted surveys were the Survey of Bryophytes of Arable Land (SBAL), whose fieldwork finished in May 2005, and the Harlequin Ladybird survey, on which we have collaborated with Cambridge University (Dr Mike Majerus) and Anglia Ruskin University (Dr Helen Roy). The ladybird project was funded mainly by Defra through the NBN Trust, with substantial support from the main BRC partnership.

Key Results

Results of SBAL are reported below under Programme 4. The Harlequin Ladybird survey is reported fully on its own website. Only a brief summary is given here.

Harlequin Ladybird Survey

The Harlequin Ladybird *Harmonia axyridis* originated from southeast Asia. It was introduced to North America and subsequently to Europe, where it has spread rapidly. There is evidence that as



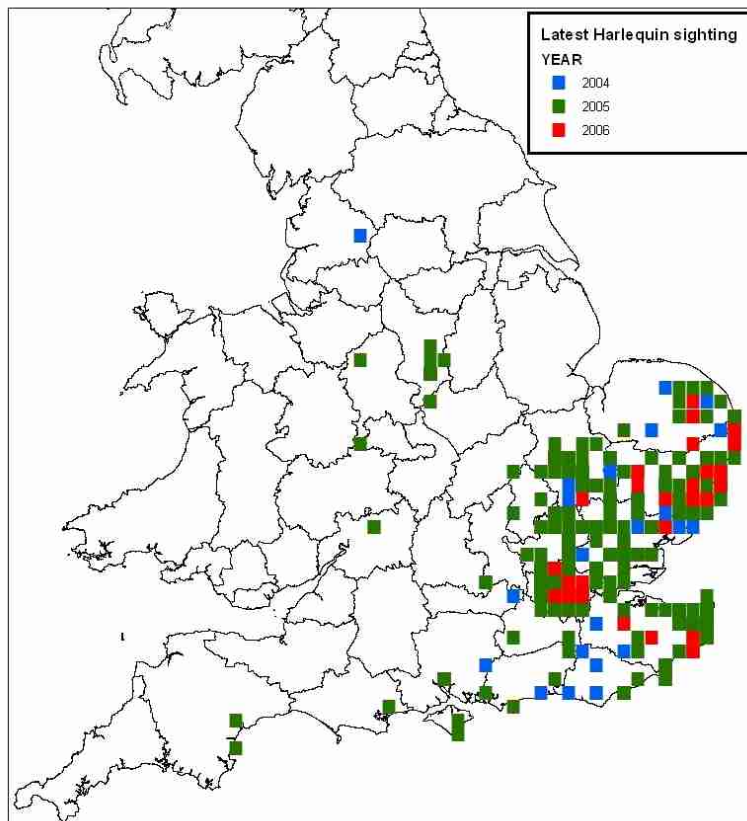
Harlequin Ladybirds *Harmonia axyridis* on Derby Cathedral, 28 October 2005 (Photo Philip Precey/ Derbyshire Wildlife Trust)

well as feeding voraciously on aphids, Harlequin Ladybirds also attack other aphid-feeding insects and hence may reduce populations of lacewings and other ladybirds. Thus, the arrival of the species in Britain prompted the establishment of a special survey to document its spread and to contribute to an assessment of its impacts on native species.

The Harlequin Ladybird is now widespread in southeast England, and is increasing in both number and range. We are fairly sure that it first established in Britain in 2004. It arrived by a variety of routes, partly by flight from the Continent, and partly on goods from both the European continent and North America. It bred in several localities in 2004. In some parts of London, Suffolk, Essex and Kent, numerous individuals that had developed from eggs laid in England then overwintered.

An isolated colony reported in Derby in 2004 increased in 2005 and appears to have spread, with new records coming from other parts of Derbyshire. The most northerly record was from Lancashire in 2004, but no further records were received from there, so there is no evidence that Harlequins established there. The same applies to other outlying areas with isolated records, such as Devon.

In the 12 months since the website was launched, 2711 records were entered online. Of these, 40% were verified by receipt of a specimen or photograph. Further records were received from beetle recorders, mainly from the London and Essex Ladybird Survey. In total 1295 verified Harlequin Ladybird records had been received by the end of 2005.



Harlequin Ladybird spread up to January 2006; records in winter 2006 are mainly from people's houses. They are almost all from squares in which the Harlequin was already known by 2005.



Pete Brown

Staff involved:

Survey of Bryophytes of Arable Land (SBAL) - Chris Preston and Mark Hill
Harlequin Ladybird Survey - Peter Brown, Juliet Francis, Trevor James, Francis Rowland, David Roy

Websites:

SBAL <http://www.jonathan.sleath.btinternet.co.uk/SBAL/intro.htm>

Harlequin Ladybird Survey <http://www.harlequin-survey.org/>

Contact:

SBAL - Chris Preston cdpr@ceh.ac.uk

Harlequin Ladybird Survey - Pete Brown pmb@ceh.ac.uk

PROGRAMME 4: ANALYSIS AND INTERPRETATION

Background and objectives

With data capture less onerous than it used to be, there is a greater requirement on BRC for interpretation. At the beginning of the year the following objectives were identified:-

1. analysis of survey of Survey of Bryophytes of Arable Land substantially complete, with one paper ready for publication;
2. submission of paper on loss of boreal plant species in southern Britain; and
3. submission of two papers by BRC-based Ph.D. students.

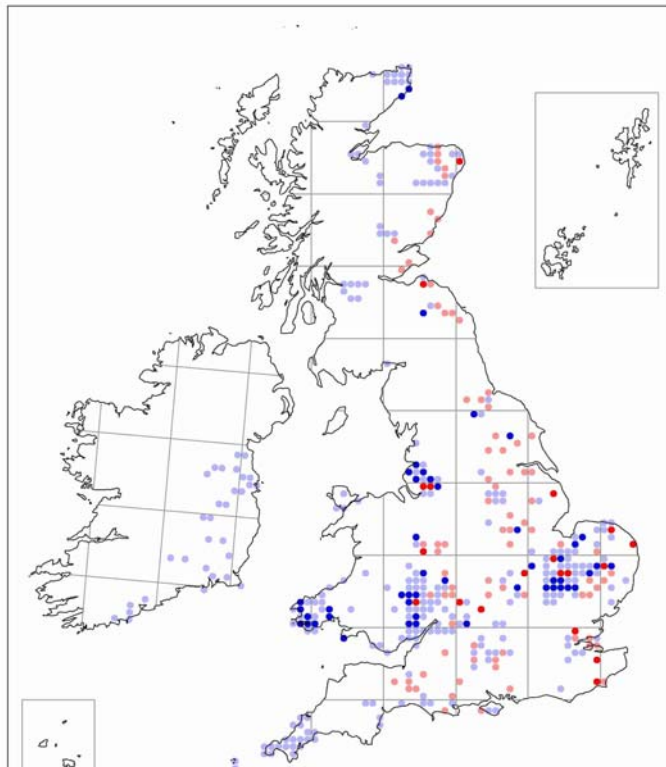
In the event, there was slippage on objective 2, and a major unforeseen activity was added, the analysis of data from the Local Change project of the BSBI.

Results

Survey of the bryophytes of arable land

The survey was completed in May 2005. During the pilot year (2001-2) and the three main field seasons (2002-3, 2003-4 and 2004-5) members of the British Bryological Society recorded the bryophyte flora of 820 arable fields in Britain and Ireland. These comprised 200 samples in randomly selected tetrads in the main arable areas of Britain, with a further 626 samples both in the arable heartlands and in areas where arable crops are infrequent. For each field, additional information was

collected on the soil, including texture and pH, and the crop or crops. The data were computerised and incorporated into the BRC database. The results were analysed with the assistance of Dr Peter Rothery with a view to identifying the main bryophyte assemblages on arable land, the factors affecting species diversity and the ecological niches of the main arable species.



Coverage achieved for the Survey of Bryophytes of Arable Land (SBAL); 10-km squares are marked as red (random) or blue (additional), with darker colours signifying those from which more than 2 individual fields were sampled.

Classification of the arable fields on the basis of the bryophytes present has led us to recognise six species' assemblages. Two of these are found on acidic soils in northern and western Britain and in Ireland. They are species-rich and characterised by hornworts (*Anthoceros* and *Phaeoceros* species), liverworts (*Fossombronia* and *Riccia* species) and a suite of arable mosses. Other assemblages have a more southern and eastern distribution. One, on circum-neutral or basic and often heavy soils, has few characteristic species. Another, typically on chalk or calcareous clay, is characterised by minute annual mosses of the genus *Microbryum*. Common, not specifically arable weedy species are frequent in one of the two remaining assemblages, which is often found on sandy soils in eastern England. Finally, there is an assemblage characterised by creeping perennial mosses, and this is often found on set-aside land.

The survey documented a habitat that had never previously been studied by systematic survey. Future changes can be judged by direct comparison with the results from 2001-5. We found that fields in the north and west of Britain are richer than those in the southeast. Analysis is not yet complete, but it is clear that winter stubbles are of great value to bryophytes; they also are more frequent in the north and west. It was observed that most herbicides used in arable fields have no effect on bryophytes. Indeed, they may even be beneficial by removing vascular plants that could pre-empt space.



Anthoceros punctatus, a species of hornwort, was found to be more frequent in the arable fields of western and northern Britain than had been anticipated (photo Des Callaghan).

BSBI 'Local Change' Survey

In the 'Local Change' survey, funded mainly by the Heritage Lottery Fund, members of the Botanical Society of the British Isles recorded the flora of a sample of tetrads (2-km squares) in a regular grid across Britain. The tetrads were first surveyed in 1987-88 and the survey was repeated in 2003-04. The results were computerised by BSBI members and have been analysed by BSBI and BRC in partnership. We are again grateful for the assistance of Dr Peter Rothery.

Results from 635 tetrads were analysed. Species that were too rare or too common to allow a reliable estimate of change within this sample, and species affected by changes in recording methodology, were excluded from the dataset. This left 726 native species and archaeophytes and 134 neophytes on which we based the analysis. The native species and archaeophytes have been grouped according to their Broad Habitat preferences. Within Broad Habitats, species were classified according to their distributions, and changes within groups with similar ranges were assessed. These changes provide much new information on the factors that have affected the distribution of the British flora in recent years. For the first time, the effects of recent climate change on our flora are clearly apparent in the results of a national survey, with species favoured by higher temperatures (particularly warmer winters) showing increases in their range. The survey also provides further evidence for the effects of eutrophication on infertile, semi-natural habitats such as chalk grassland. The detailed results of the

study are set out in a 400-page book *Change in the British flora 1987-2004*, by M.E. Braithwaite, R.W. Ellis and C.D. Preston, published by BSBI on 26 April 2006.

Websites:

SBAL <http://www.jonathan.sleath.btinternet.co.uk/SBAL/intro.htm>

Local Change <http://www.bsbi-projects.org/localchange.html>

Contact: Chris Preston, Head of Research. Email: cdpr@ceh.ac.uk



PROGRAMME 5: COMMUNICATIONS AND OUTREACH

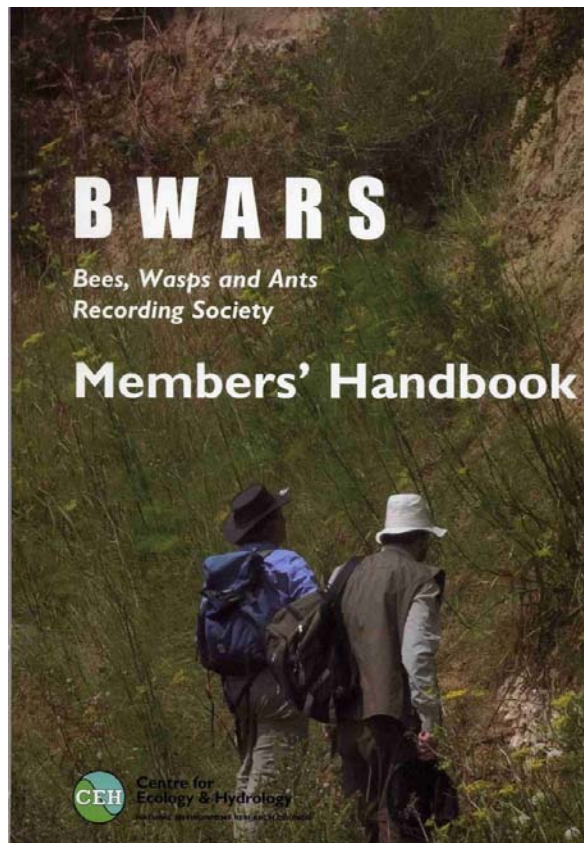
Background and objectives

BRC communicates with recorders and the wider public through its website and its atlases. It also aims to stimulate biological recording by running schemes for high-profile species. Specific objectives for the period were:-

1. two high-profile organisms with active individual recording schemes in progress;
2. two provisional or final atlases published; and
3. plans in place for at least one more high-profile species to be added in 2006.

Results

The main high-profile survey, which was also the main targeted survey, was the Harlequin Ladybird survey, reported above. This achieved much national publicity and, as a spin-off, had the effect of reviving the UK Ladybird Survey <http://www.ladybird-survey.org/>. In addition, a small targeted project on the liverwort genus *Conocephalum* has been set up, following the discovery that this, the original liverwort (known in the early 18th century as *Hepatica*, from its resemblance to liver lobes), consists of two cryptic species, *C. conicum* and *C. salebrosum* (Blackstock *et al.*, 2005).



Atlas publication has progressed as planned during the year, with the fifth BWARS provisional atlas and the handbook of Harvestmen. At the time of writing (April 2006) the text of the final atlas of Bruchid and Chrysomelid beetles is ready, and the book is being prepared for the press.

BRC's plans for documenting high-profile animals in 2006 are centred round National Insect Week. We propose a project with Web data entry for recording of the mayfly Blue Winged Olive *Serratella ignita* and the damselfly Banded Demsoiselle *Calopteryx splendens*.

A notable output was BRC's contribution to the 3rd edition of the **BWARS Members Handbook**, whose cover is figured here.

Staff involved:

Gavin Broad, Pete Brown, Juliet Francis,
Mark Hill, Chris Preston, Francis Rowland

Websites

Harlequin Survey

<http://www.harlequin-survey.org/>

Conocephalum

<http://www.britishbryologicalsociety.org.uk/>



Contact

Email :

Francis Rowland (websites) fro@ceh.ac.uk

Gavin Broad (books) gabro@ceh.ac.uk

BRC PUBLICATIONS 2005

The following list contains books, papers and reports, including those that result from projects other than the BRC core project. The work of BRC is highly integrated, and it is often difficult to say that a publication was the result of any one particular project, because several may have contributed. The list also includes three substantial web publications. Several other reports and papers were published on the Internet rather than as paper documents.

Atlases, starter packs, identification manuals

BWARS 2005. *Bees, Wasps and Ants Recording Society Members' Handbook*. 3 edn, revised by Michael Archer. Huntingdon: Centre for Ecology and Hydrology.

Edwards, R. & Broad, G.R. 2005. *Provisional atlas of the aculeate Hymenoptera of Britain and Ireland. Part 5*. Huntingdon: Biological Records Centre.

Hillyard, P.D. 2005. *Harvestmen*. Shrewsbury: Field Studies Council. [Each species account is illustrated by a map from the BRC database.]

Red data book with substantial BRC input

Cheffings, C.M. & Farrell, L. (editors), **Dines, T.D., Jones, R.A., Leach, S.J., McKean, D.R., Pearman, D.A., Preston, C.D., Rumsey, F.J. & Taylor, I. 2005.** *The vascular plant red data list for Great Britain. Species Status no. 7*. Joint Nature Conservation Committee, Peterborough.

Books and book chapters other than BRC atlases

Dines, T.D., Pearman, D.A. & Preston, C.D. 2005. *Hybridization and the flora of the British Isles. Collecting records for a new edition of Clive Stace's 1975 work*. London: Botanical Society of the British Isles.

Greatorex-Davies, N. 2005. Changes in the Lepidoptera of Monks Wood. In: *Ten years of change: Woodland research at Monks Wood NNR, 1993-2003*, ed. C. Gardiner & T. Sparks, pp. 90-110. Proceedings of the 50th Anniversary Symposium, December 2003. Peterborough: English Nature Research Report no. 613.

Preston, C.D. & Walker, K.J. 2005. Bryophytes. In: *Ten years of change: Woodland research at Monks Wood NNR, 1993-2003*, ed. C. Gardiner & T. Sparks, pp. 146-156. Proceedings of the 50th Anniversary Symposium, December 2003. Peterborough: English Nature Research Report no. 613.

Web publications

Blackstock, T.H., Rothero, G.P. & Hill, M.O. 2005. *Census catalogue of British and Irish bryophytes. Updated 2005*. British Bryological Society. Web publication. <http://www.britishbryologicalsociety.org.uk>

- Broad, G. R. 2005.** *Checklist of British and Irish Ichneumonidae (Hymenoptera)*. Biological Records Centre. Web publication. http://www.brc.ac.uk/downloads/Ichneumonidae_checklist.pdf
- Hill, M.O. & Šmilauer, P. 2005.** *WinTwins Version 2.3. TWINSPAN for Windows*. Software and user Guide. Web publication. <http://www.ceh.ac.uk/products/software/wintwins.html>

Papers in the open literature (selected)

- Cooper, J., Brewer, A., Ostler, R., Rowland, F. & Wilkinson, S. 2005.** Britain's wildlife on the internet. The NBN Gateway. *British Wildlife*, **17**, 1-5.
- Dennis, R.L.H., Shreeve, T.G., Arnold, H. & Roy, D.B. 2005.** Does diet breadth control herbivorous insect range size? Life history and resource outlets for specialist butterflies. *Journal of Insect Conservation*, **9**, 187-200.
- Hann, J.P., Greated-Davies, J.N. & Sparks, T.H. 2005.** Linear hotspots? The floral and butterfly diversity of green lanes. *Biological Conservation*, **121**, 579-584
- Hickling R., Roy D.B., Hill J.K. & Thomas C.D. 2005.** A northward shift of range margins in British Odonata. *Global Change Biology*, **11**, 502-506.
- Roy, H., Rowland, F., Brown, P., Ware, R. & Majerus, M. 2005.** Ecology of the Harlequin Ladybird: a new invasive species. *British Wildlife*, **16**, 403-407.
- Roy, H.E., Brown, P.M.J., James, T.J., Munford, J. & Majerus, M.E.N. 2005.** Monitoring an alien: *Harmonia axyridis*. *Journal of Practical Ecology and Conservation Special Series*, **4**, 77-82.
- Sparks, T.H., Roy, D.B. & Dennis, R.L.H. 2005.** The influence of temperature on migration of Lepidoptera into Britain. *Global Change Biology*, **11**, 507-514.
- Westgarth-Smith, A.R., Leroy, S.A.G., Collins, P.E.F. & Roy, D.B. 2005.** Mechanisms for the control of U.K. Butterfly abundance by the North Atlantic Oscillation. *Antenna*, **29**, 257-266.
- Westgarth-Smith, A.R., Leroy, S.A.G., Collins, P.E.F. & Roy, D.B. 2005.** The North Atlantic Oscillation and UK butterfly life cycles, pigmentation, morphology, behaviour and conservation. *Antenna*, **29**, 186-196.

Contract reports

- Hill, M., Baker, R., Broad, G., Chandler, P.J., Copp, G.H., Ellis, J., Jones, D., Hoyland, C., Laing, I., Longshaw, M., Moore, N., Parrott, D., Pearman, D., Preston, C., Smith, R.M. & Waters, R. 2005.** Audit of non-native species in England. *English Nature Research Reports*, **662**, 1-81.
- Hill, M.O., Arnold, H.R., Broad, G.R., Burton, V.J., James, T.J., McLean, I.F.G., Preston, C.D., Rowland, F. & Roy, D.B. 2005.** Biological Records Centre: Report 1999-2004. *JNCC Report 370*. <http://www.jncc.gov.uk/page-3319>.
- Morecroft, M.D., Cape, J.N., Parr, T.W., Brown, J.C., Caporn, S.J.M., Carroll, J.A., Emmett, Harmens, H., Hill, M.O., Lane, A.M.J., Leith, I.D., Mills, G.E., Reynolds, B., Sheppard, L.J., Smart, S.M. & Wolseley, P.A. 2005.** *Monitoring the impacts of air pollution (acidification, eutrophication and ground-level ozone) on terrestrial habitats in the UK: a scoping study*. Defra, JNCC, Environment Agency, Environment & Heritage Service Northern Ireland & English Nature. www.jncc.gov.uk/pdf/airpollution_impactsscopingstudyreportfinal.pdf

Other publications in ISI journals (not BRC Core Project)

- Bohan, D.A., Boffey, C.W.H., Brooks, D.R., Clark, S.J., Dewar, A.M., Firbank, L.G., Haughton, A.J., Hawes, C., Heard, M.S., May, M.J., Osborne, J.L., Perry, J.N., Rothery, P., Roy, D.B., Scott, R.J., Squire, G.R., Woiod, I.P., & Champion, G.T. 2005.** Effects on weed and invertebrate abundance and diversity of herbicide management in genetically modified herbicide-tolerant winter-sown oilseed rape. *Proceedings of the Royal Society of London, Series B*, **272**, 463-474.
- Broad, G. R. & M. R. Shaw. 2005.** The species of four genera of Metopiinae (Hymenoptera: Ichneumonidae) in Britain, with new host records and descriptions of four new species. *Journal of Natural History*, **39**, 2389-2407.

- Dennis, R.L.H., Shreeve, T.G., Isaac, N., Roy, D.B., Hardy, P.B., Fox, R. & Fant, J.B., Kamau, E.M. & Preston, C.D. 2005.** Chloroplast evidence for the multiple origins of the hybrid *Potamogeton x fluitans*. *Aquatic Botany* **83**, 154-160.
- Quicke, D. L. J., Fitton, M.G., Broad, G.R., Crocker, B., Laurenne, N.M. & Miah, M.I. 2005.** The parasitic wasp genera *Skiapus*, *Hellwigia*, *Nonnus*, *Chriodes*, and *Klutiana* (Hymenoptera, Ichneumonidae): Recognition of the Nesomesochorinae stat. rev. and Nonninae stat. nov. and transfer of *Skiapus* and *Hellwigia* to the Ophioninae. *Journal of Natural History*, **39**, 2559-2578.
- Woodcock, B.A., Pywell, R.F., Roy, D.B, Rose, R.J. and Bell, D. 2005.** Grazing management of calcareous grasslands and its implications for the conservation of beetle communities. *Biological Conservation*, **125**, 193-202.

Other publications (non ISI)

- Arnold, H.R. & Jefferies, D.J. 2005.** Mammal report for 2004. *Annual Report, Huntingdonshire Flora and Fauna Society*, **57**, 55-59
- Bellamy, P.E., Preston, C.D., Gurney, M. & Hinsley, S.A. 2005.** A naturalised population of oxlip, *Primula elatior*, in Huntingdonshire (v.c. 31). *Annual Report, Huntingdonshire Flora and Fauna Society*, **57**, 10-14.
- Blackstock, T.H., Bosanquet, S.D.S., Long, D.G. & Preston, C.D. 2005.** *Conocephalum* in Britain and Ireland: a BBS mini-survey. *Field Bryology*, **87**, 11-14.
- Bosanquet, S.D.S., Kungu, E.M. & Preston, C.D. 2005.** Extreme arable bryology: a brief visit to the cereal fields of Caithness. *Field Bryology*, **86**, 18-21.
- Bosanquet, S.D.S. & Preston, C.D. 2005.** *Weissia squarrosa* in Britain: a re-evaluation of its identification and ecology in the light of recent records. *Field Bryology*, **86**, 2-13.
- Hill, M.O. 2005.** Rare and interesting bryophytes in Britain and Ireland. *Field Bryology*, **86**, 43-45.
- James, T. 2005.** A long road - the way forward in support of societies and recording schemes. *NBN News*, **26**, 6.
- James, T. 2005.** Developments in the NBN: web-services and their potential uses. *National Federation for Biological Recording Newsletter*, **33**, 20.
- James, T. 2005.** More about the Environmental Information Regulations. *National Federation for Biological Recording Newsletter*, **33**, 5-6.
- James, T. 2005.** The Harlequin Ladybird Project. *NBN News*, **24**, 5.
- James, T. 2005.** The National Biodiversity Network. *Newsletter of the London Natural History Society*, **188**, 5-6.
- James, T. 2005.** Tracking the progress of the Harlequin Ladybird. *National Federation for Biological Recording Newsletter*, **33**, 12-13.
- James, T. 2005.** How real are your records? Exploring data quality. Summary report of the 4th NBN Conference for National Societies and Recording Schemes, held at The Natural History Museum, London, 19th November 2004. <http://www.nbn.org.uk/>
- Preston, C.D. & Hill, M.O. 2005.** Bryophyte records. *Nature in Cambridgeshire*, **47**, 92-95.
- Preston, C.D. 2005.** Council Newsletter no. 22. *Field Bryology*, **87**, 30.
- Preston, C.D. 2005.** New bryophyte recording cards. *Field Bryology*, **86**, 48.
- Preston, C.D. 2005.** SBAL meeting at Turriff, North Aberdeenshire, October 2004. *Field Bryology*, **85**, 34-36.
- Rowland, F. 2005.** Britain's ladybirds face a deadly invader. *Planet Earth*, Summer 2005, 30.

FINANCIAL STATEMENT

The figures presented here (Table 4) are the costs of running the Core Project of BRC. Other, separately funded activities such as BRC's work on the Butterfly Monitoring scheme are not reported here. During the year, BRC received substantial funding from Defra and the NBN to support the Harlequin Ladybird Survey project officer, Peter Brown. This work is not included in the financial statement, but results are included in this report because BRC's input to the project came from core funding. Additional work was supported by other funding, notably the NBN Networking Naturalists project, NBN Gateway development, and the Butterfly Monitoring Scheme. During the year, BRC also received funds from and English Nature and the European Union for work on inventories of non-native species.

Total	JNCC	CEH
2005 (Feb.-Mar.)		
£50,000	£25,000	£25,000
2005/06 (full year)		
£320,000	£160,000	£160,000

Table 4. Expenditure on the core project of BRC, 2005-6. The Memorandum of Agreement, starting on 1 February 2005, is written so that contributions by JNCC and CEH are equal.

MEMBERS OF THE BIOLOGICAL RECORDS CENTRE 2005-6

All members of BRC contributed to the work described in this report. The only staff change during the period was Peter Brown, who joined us as Harlequin Ladybird Survey project officer from April 2005 to February 2006. Peter will continue to work at BRC, but as an outposted employee of Anglia Ruskin University. During the year, Chris Preston was awarded the degree of Sc.D. by Cambridge University. David Roy received a Ph.D. from Southampton University. Paul Harding was appointed to be the first Honorary Member of the NBN Trust in summer 2005.

Name	Band	Area of speciality	Joined
Hill, Dr Mark Oliver	4	Head of BRC / bryologist	Jul-03
Preston, Dr Christopher David (Chris)	4	Head of research / botanist	Sep-80
Roy, Dr David Brian	5	Head of database and web development / Butterfly Monitoring Scheme / climate change research	Jul-03
Arnold, Henry Richard	6	Database manager	Feb-72
Broad, Dr Gavin Roy	6	Coordinator of zoological data & research / Hymenoptera specialist	Sep-03
Cooper, Jonathan (Jon)	6	Information scientist / web interfaces for GIS	Jun-99
Greatorex-Davies, John Nicholas (Nick)	6	Lepidoptera specialist	Jan-95
Hoyland, Cassandra Jane (Cassie)	6	Environmental data scientist	Feb-04
James, Trevor John	6	NBN development officer	Oct-01
Ostler, Richard James	6	Database specialist / web interfaces for databases	Oct-99
Brown, Peter	7	Project officer, Harlequin Survey	Apr-05
Rowland, Francis	7	Websites / technical liaison with schemes and societies	Apr-03
Burton, Valerie Jean (Val)	8	Data processor / archivist	Apr-86
Francis, Juliet	8	Section administrator	Apr-04

CEH Fellows affiliated with BRC

CEH fellows affiliated with BRC	Area of speciality	Appointed
Dennis, Dr Roger L.H.	Lepidoptera	May-05
Harding, Paul T. MBE	Crustacea and Myriapods	Jul-03

Ph. D. students supervised by BRC staff 2005-6

Name	Univer- sity	BRC Super- visor	University Supervisor	Dates	Thesis Title
Finnie, Tom	Imperial Silwood	Preston	Prof. M J Crawley	Sep-02	Colonization and extinction: the large-scale dynamics of the British flora.
Hickling, Rachael	Leeds	Roy	Dr J K Hill	Oct-03	Analysing changes at species' southern boundaries: importance of spatial and temporal scale.
Jewell, Carolyn	York	Roy	Dr J K Hill	Oct-04	Evolution of migration in a changing climate
McMullan, John	Leicester	Preston	Dr R J Gornall	Sep-02	Metapopulation structure and gene flow in a discontinuous aquatic habitat.
Musgrove, Nick	Wolver- hampton	Hill	Prof. I Trueman	Oct-99	The influence of land use on the vegetation of the Long Mynd region of Shropshire
Walker, Kevin	Durham	Preston & Hill	Prof. Brian Huntley	Oct-97	Long Term Floristic Change (Part-time Ph.D., based at Monks Wood)