

WILTSHIRE BOTANY

Journal of the Wiltshire Botanical Society

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EDITORIAL

Devotion to botany

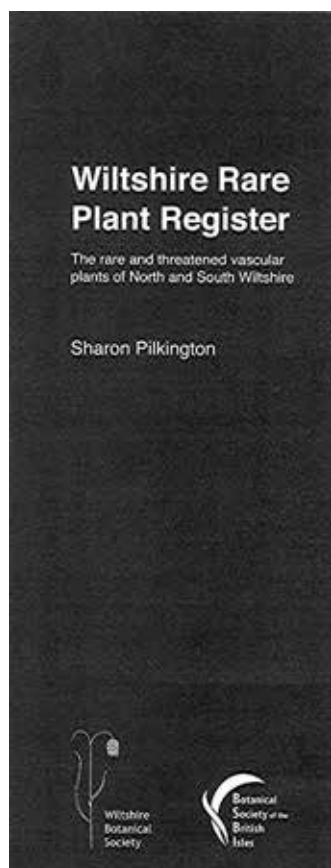
Most of this issue celebrates examples of devotion to botany. The editor, in his small way, has shown such devotion, as demonstrated by the photograph on the next page. Here, however, we are concerned with weightier contributions.

Botanical devotion is well illustrated by a book published in 2005, which should be on everyone's shelf. This is *The Secret Life of Trees* by Colin Tudge (Penguin 2005). It provides a comprehensive run-through of all the tree families in the world, showing how they relate to each other, and provides much interesting information about individual species. In addition, it gives a clear and up-to-date account, not only of the botany of trees, but of many of the key concepts of botany in general. Classification, plant names, evolution, the origin of life, the behavior of chromosomes and DNA, photosynthesis, what happens to water in plants, absorption of materials from the soil, growth, reproduction, hybridisation, toxicity, how plants respond to outside events and to each other, plant diversity, predator-prey relationships, other interactions with animals, and chemicals produced by plants are all described and explained clearly and interestingly, and their relevance to trees discussed. A section at the end explores the relationship between trees and man. The book is an excellent read and a valuable source of reference afterwards.

Joan Davies and Jack Oliver have shown their own devotion to trees locally, as their recent article "Large and special trees in the eastern part of the Kennett District" (*WANHS Magazine* No. 100, 2007, pp 42-64) demonstrates. It records over 100 trees in the area, native and introduced, which are of record size and/or of special historical interest. They invite others to send them information about further trees in any part of the county. Offprints of the article may still be available from the authors.

The Wiltshire Rare plants register

A major landmark and example of devotion in 2007 was the *Wiltshire Rare Plants Register* written and privately published by our county recorder Sharon Pilkington and funded jointly by the Wiltshire Botanical Society and the Wiltshire Natural History Publications Trust. This lists the location of 275 species of vascular plant recognised as rare or threatened either nationally or within Wiltshire. For each species, there is a brief account of its status and overall occurrence, the geographical locations in which it has been found, a map reference, date and recorder for the most recent record in that location and, where known, information on its abundance and habitat. These accounts are preceded by an introduction which describes the scope of the



publication, gives a botanical account of Wiltshire, and explains the source and selection of species and records and how the information is to be presented. The booklet looks attractive, with a colourful cover, easily readable layout and many colour photographs of plants featured. It is carefully researched, is full of interesting information, and is written with commendable clarity. The Society can be proud to be associated with it and to have contributed, through the devotion of its members, to the great majority of the records included.

Contents of this issue.

The society itself becomes the object of devotion in the opening article by Jack Oliver. Wiltshire Botanical Society (WBS) has now been in existence for 15 years. Jack looks at its history, explaining its origin, describing its core activities and other work, and drawing attention to reference materials produced by members, including records and contributions to botanical literature. He concludes with an evaluation of the overall work of the society and some discussion of the future.

A selection of the records added to the society's database in 2006 is further evidence of the devotion shown by our members and others. Over 13,500 records were received, so that the selection had to be restricted to records which had not previously been entered for the 10km squares in which they occurred. Apologies to those who contributed records which did not meet these criteria - they are still valuable. Also in this issue are further analyses of the most important plant records since the 1993 *Wiltshire Flora* - presented and examined in the previous two issues. Here we look at the records for specific groups of plants - willows and poplars, conifers and ferns and their allies.

Another contribution is our first account of attempts to create, rather than just study and conserve, habitats. Charlotte Bell describes a project for regenerating chalk grassland at Stonehenge. Also included are an investigation of the flora of dry stone walls in Winsley by John Presland and a follow-up by Pat Woodruffe to her article on Autumn Crocus in Issue No 1, describing the subsequent progress of the project.

Journal contents and index

The list for issues 1-5 in *Wiltshire Botany* 5 and the list at the end of this issue for issues 6-10 together document all the articles published since the journal began in 1997. A subject index to allow easy location of articles on particular topics is available separately from Sonia Heywood, who would also be glad to hear of mistakes or omissions you come

across in the index (sonia.heywood@tiscali.co.uk; 01380 830478).

Corrections for *Wiltshire Botany* 9

Perceptive readers may have noticed a mismatch between the contents page and individual article titles, which probably caused no problems with reading. The items under Supplement A in the contents should read:

Editorial and introduction to Supplement A

7. Brambles (*Rubus* species)
8. Arable weeds
9. Ancient woodland indicator plants
10. Refound taxa
11. Some special Wiltshire plants

On page 17, the article title should be numbered 9.

The next issue

Contributions on any topic are invited for the next issue. Themes which it is particularly hoped to develop, among others, are:

- spontaneous plant aberrations in wild and cultivated plants in Wiltshire.
- biodiversity, a term for the variety of wildlife which we ought to be maintaining and enhancing. It refers to the survival of a large number of species of living things, of the different communities of which they form a part, and of the environments which these species and communities require. It's a very live topic nationally at the moment.

Articles should be submitted to John Presland, 175c Ashley Lane, Winsley, Bradford-on-Avon, Wiltshire BA15 2HR. He will also be pleased to discuss proposed articles informally (Tel: 01225 865125). A leaflet is available offering guidance to authors on article design.

The editor photographing a plant



WILTSHIRE BOTANICAL SOCIETY

Origin, Activities and Progress

By Jack Oliver

***Fritillaria meleagris* (Fritillary) - the basis of the society logo**



Introduction

Wiltshire Botanical Society (WBS) has now been in existence for 15 years. It seemed time to have a look at its history and to use that to look forward to the future. To achieve this, I studied committee minutes, the society's newsletter and journal, a range of other documents held by the society and various other relevant literature. Here, the origin of the society is explained, its core activities described and other work (carried out by the society for or with other organisations or as individual initiatives) itemised. A range of reference materials produced by members is also described, as are contributions to botanical literature both locally and nationally. Reference is made to the importance of the collected records and their recent analysis for a future flora. Finally an evaluation is made of the overall work of the society and some concerns raised for the future.

Origin of the Society

In preparation for the most recent Wiltshire Flora (Gillam, Green and Hutchison 1993), an organized scheme for collecting records, known as the Wiltshire Flora Mapping Project (WFMP) was instituted. It recorded plants in tetrads (groups of four adjacent kilometre squares). These were grouped into 40 ten km squares and a co-ordinator identified for each, who organised the work of a group of volunteers to record in it. This well-organized and democratic endeavour attracted over 280 volunteers; but there were no plans for the WFMP group to continue after the publication of the Flora. Members of the Wiltshire Archaeological and Natural History Society (WANHS), in particular Joy Newton, approached Dave Green (North Wiltshire Vice-county Botanical Recorder) to form a permanent botanical group. Present at the first meeting were the following: - Dorothy Cooper, Dave Green, Rita Grose, Malcolm Hardstaff, Katie Hill (later Long), Joy Newton, Jack Oliver, John Presland, John Rayner, Audrey Summers and Phil Wilson. Some of these were already members of the Salisbury Plain Training Area (MOD) Natural History groups (SPTA groups), with field botany experience. This new association was the original nucleus of the Wiltshire Botanical Society (WBS), started informally at Lackham College of Agriculture on 14 March 1992.

Newsletter No. 1 (April 1992) recorded the proposed Constitution and Aims as follows:

“Our proposed constitution will allow for a wide range of botanical interest and activities. We hope it will become a forum for members to share and enjoy botanical pursuits, as well as encouraging and developing a knowledgeable approach.”

The officers at the start of the WBS in 1992 were as follows:-

Chairman: Dave Green
General Secretary: Jack Oliver
Membership Secretary: Katie Hill
Meetings Secretary: Joy Newton
Newsletter: Rita Grose

From the start, the WBS was to be wider in scope than a Wild Flower or a Rare Plant Group, with the flexibility to embrace aims in addition to the production of further species lists for the tetrads.

Projects proposed at the first formal meeting of the WBS were as follows:-

- Continuation of species recording within tetrads.
- Habitat surveys in conjunction with English Nature (NCC) and the Wiltshire Wildlife Trust (WWT).
- Road Verges. Monitoring of special sites.
- Set aside monitoring, mutual co-operation with farmers.
- Water courses, plant surveys.
- Churchyards Surveys. These originated with the Wiltshire Trust for Nature Conservation and the Diocesan Association, with organisers for the North, South, East and West of the County. Some work had been carried out by bryologists and lichenologists.

In addition programmes for winter meetings were requested, and the first summer excursion programme outline was initiated. As there had been so much attention to Wiltshire, Dave Green led the first two meetings at special sites just beyond the County boundaries, namely Charterhouse-on-Mendip in Somerset, and Matley Bog and Hatchett Ponds in Hampshire. Jack Oliver sank to hip level in Matley Bog, but his wallet and he were pulled out (Newsletter 2). Rod Stern led the first excursion on mosses, liverworts and lichens in Savernake Forest. The fourth expedition, led by Phil Wilson, was to the varied and unfamiliar flora within part of the New Forest, again over the border in Hampshire. In the early days of the WBS, there were about 25 members, but with the membership slowly but steadily increasing.

Core activities

By Newsletter 3 most (but not all) the core activities had been established. Core activities are as follows:

I. Spring, summer, autumn excursion meetings, similar in aim and scope to those of the Botanical Society of the British Isles (BSBI), but also occasionally including Mycology, Lichenology and Bryology. Four were held in 1992, rising to 18 in 2006 and 19 in 2007. In recent years Pat Woodruffe has taken over from Joy Newton as organiser of these Summer excursions, as well as the Winter meetings

and residential botanical holidays, taken together as perhaps at the heart of all the WBS commitments.

II. Winter meetings. Usually about 5 technical meetings, lectures and/or slide shows in the winter months. Most of these have been held in the Marlborough College Science Department.

III. Residential botanical holidays. Between 15 and 30 people take up these WBS organised residential arrangements, members and some husbands, wives or friends. These were started in 1999 and have included the following geographical locations:-

- Gower Peninsula in Wales
- Braunton Burrows in Devon
- Kingcombe
- Abergavenny in South Wales
- Kent
- Oxford
- SW France
- The Lizard, Cornwall

Organisers of these included Joy Newton, Pat Woodruffe, Monica Blake, Anne Appleyard and Jeremy Wood.

IV. Field records.

- Collected by WBS members and outsiders, whenever and wherever of interest.
- Collected by WBS members on a local or tetrad basis, and during field meetings.
- Collected by WBS members as part of special projects (see also ensuing).
- Collected by WBS members and others in connection with special reserves, wardenships and habitat surveys.

13,498 records were added by the WBS to its database in 2006 alone! The recording software package Mapmate used by the BSBI and many Wildlife Trusts was adapted by Richard Aisbitt to serve WBS records. Older systems started by the WFMP and the Wiltshire Biological Records Centre had been used by Jean Wall and Malcolm Hardstaff on behalf of the WBS, but were retarded by incompatibilities. More detail on the history of the society's recording is given in an article in *Wiltshire Botany* 5. Plant record data handling now works to perfection, with much improved retrieval of either individual finds or categories over the past few years, especially since 2000. Plant recording will probably always remain as one the most enduring of WBS activities.

V. Cohesion, encouragement, entertainment.

- WBS Newsletter and Programmes of Events. The WBS has always aimed to help beginners and expand expertise in a friendly and entertaining way. The Newsletter has become increasingly successful at disseminating WBS activities, balancing botany and human involvement. It is a

good read. In recent years, Richard Aisbitt took over from Michael Ponting as Editor.

- Annual General Meetings and the WBS Committee. Democracy, practical policies, friendliness and feedback have been the underlying principles.

VI. *Wiltshire Botany*, Editor John Presland. This WBS Journal encourages scientific articles in botany at a more thorough or detailed level than those appearing in the WBS Newsletter. Each issue also has one or more sections of the field records. Vascular plants are usually the main content, but other branches of botany are represented at irregular intervals. The journal also allows experts who are not WBS members to share their knowledge relating to Wiltshire. The first issue appeared in November 1997. WBS *Wiltshire Botany* is not as forbidding as the BSBI *Watsonia*!

VII. Rare and special plants. The WBS emblem from the start has been the Fritillary, but when county flowers were recently assigned by Plantlife and other national bodies, the Fritillary was appropriated by Oxfordshire, despite Wiltshire having the main populations. Four fields in VC 7 each had well over 100,000 plants. 2 small boys overheard Dave Green and Steve Whitworth discussing this species in 1989, and led them to a previously unknown 4-hectare meadow, again with over 100,000 plants. Another Wiltshire rarity, our second contender, was the Burnt Orchid, which became the County Flower. Admittedly the Burnt Orchid has a fairer distribution between VCs 7 and 8 than Fritillary, whose main concentrations are in the north of VC 7. Rare plants have always held a fascination for humans, and the front of WBS Newsletter 13 in 1998 launched members into renewed searches, "Keeping Track of Wiltshire's Rarities". Sharon Pilkington is now the Vice-county Botanical Recorder for N. Wiltshire (VC 7) and S. Wiltshire (VC 8). In 2004 she started the project of the detailed registration of rare Wiltshire native plant species. She reported in 2006 that this year had been excellent for new additions to her Wiltshire Rare Plants Register (Pilkington 2007), which by 2007 had 300 or so species. Some species have been taken off the Register, as record submissions have shown them to be no longer rare.

VIII. Conservation and commitment to special ecological sites. This category encompasses too great a range of stewardships to treat fairly, without overlooking the local commitments of some WBS members. It includes overlapping professional duties in connection the Wiltshire. Wildlife Trust (WWT) or English Nature (now Natural England), trusteeships, official wardens, unofficial site guardians, technical support and species lists given to farmers and landowners, and a handful of purely personal initiatives on privately owned land. A few examples

include Braydon Forest in the north, Bentley Wood in the south-east, High Clear Down in the north east, Jones' Mill near Pewsey, Lower Moor and Clattinger Farm WWT Reserves with their lake and hay meadow floras at the northern county boundary (Cotswold Water Park area).

Parallel activities and surveys

The WBS as an organisation, subgroups, or individual members have seen their commitments as extending to co-operating with other natural history organisations, conservation bodies, farmers, officials and members of the public. Overlaps with other scientific disciplines such as Ecology, Forestry and Entomology have been frequent. Illustrations of these activities are provided by a short selection as follows:

IX. Conservation and special ecological sites. The WBS has often carried out special surveys for or with other organisations such as English Nature (now Natural England), the BSBI and especially its Atlas 2000 (Preston, Pearman and Dines 2002), WWT (the Wiltshire Wildlife Trust), the Forestry Authority, Plantlife, conservation volunteers, local bodies (such as The Seven Fields Group of Swindon), individual farmers and landowners. This has also extended to aquatic concerns, river and canal authorities, Cotswold Water park organisations and wetlands. Mutual co-operation between the Salisbury Plain Training Area Conservation Groups and the WBS has been effective since the foundation of the latter.

X. Some examples of these parallel surveys and studies were mentioned in the short list at the start of this account, the first formal meeting of the WBS, and appearing in Newsletter 1. To these should be added an extensive survey of Wiltshire Canal and River Flora, Hedgerow Surveys and monitoring, monitoring landscapes at Stonehenge and Cherhill, parish surveys, identifications of alien and/or noxious and/or invasive plants for members of the public (sometimes needing the help of Eric Clement, the BSBI Referee), the FWAG Arable Weed Biodiversity Unit) and an arable weed survey for the RSPB. Two WBS members are expert mycologists, and three have some grip on mosses, liverworts or lichens. In 2007, Pat Woodruffe and Anne Appleyard presented the completed survey on the scrub flora of Pepperbox Hill, prepared for the National Trust (Appleyard and Woodruffe 2007). A current project (also 2007) by John Presland involves surveys of Winsley dry stone walls, of which one is described in this issue. A guide to the botanical surveying and conservation of such walls has been published.

Special initiatives and research

Studies have been carried out by individual WBS members and associates. Much of this research has

been published in *Wiltshire Botany*, the Wiltshire Archaeological and Natural History Magazine, *BSBI News* and other national and international journals and books. At least five WBS members contribute articles on botany to wider readerships beyond the County boundaries. Some examples of individual activities follow (IX-XVI).

XI. Bramble microspecies. Few WBS members can face this work but Rob Randall's identifications give a good indication of the Wiltshire taxa. The status of 120 or so Wiltshire microspecies is analysed in Issue 9 of *Wiltshire Botany* (2007). Rob Randall is also a co-author of the 2004 Atlas of British and Irish Brambles.

XII. Bryology. Issue 6 of *Wiltshire Botany* contains the article by Rod Stern on the survey of moss and liverwort species found in South Wiltshire

XIII. Special species surveys. Individual initiatives include special work on Juniper, Tuberosus Thistle, Early Gentian and Bath Asparagus, all subject of 3 or more years' research. Common and very common species receiving the same attention have included Native Oaks and Stinging Nettles.

XIV. Aberrant plants. It is not easy to integrate the diverse phenomena, but substantial contributions have been made by WBS members to *BSBI News* and to the periodical *That Plant's Odd*, published privately by former member Martin Cragg-Barber.

XV. Trees. Work on the veteran trees with exceptional measurements is not yet included within the WBS "core activities". Standardisation of the records, according with the Tree Register of the British Isles (TROBI) recommendations has progressed well, but we are only in the very early stages of computerisation. There have so far been 15 publications in connection with Oak, Beech and other tree research studies and surveys in Savernake Forest and NE Wiltshire. Nine of these were in national journals, two international.

XVI. Microscopy studies of green roots, root chloroplasts and algal endophytes within angiosperm roots. Five articles with sets of colour microphotos have been published by the Botanical Society of the British Isles (BSBI).

Collections, keys, TV, pictorial records and websites

XVII. Several WBS members have special collections of living plants including the National Hellebore Collection. There is also an extensive nursery, and an arboretum, with a few trees from the Edinburgh Royal Botanic Garden expeditions as part of the World Conifer Conservation Programme.

XVIII. Herbarium collections are held at the Devizes Museum and by Marlborough College.

XIX. Pictorial records and keys, including the following:

- Beautiful colour photo series and drawings are held by at least 6 WBS members, numbers of these having been used in illustrated talks to the Society and others. To my knowledge, 60 of these have been used in scientific publications, although a few had to be converted to black and white. Several books of illustrations were prepared for the 2002 Salisbury "In Praise of Trees" Festival. More colour photos from Savernake Forest were demonstrated at the 4th International Oak Conference, and subsequently published (Oliver and Davies 2004) - but sadly, only black and white again!
- Some members have collections of foreign plant and habitat photos. In this context, special mention should be made of Maureen Ponting who has conducted international botanical tours in places as far afield as Kazakhstan and South Africa.
- A particular feature of some colour photography has been "close-ups" of floral parts. Even more extreme and specialized is the collection of over 200 colour micro photos at magnifications from x100 to x1500 of chloroplasts inside, and algae invading, aquatic angiosperm roots.
- Two WBS members have been active in producing identification keys with attractive drawings.
- We have also helped in the production and filming of the ITV programmed on Stinging Nettles. This was part of a 6-part Natural History series "Wildlife Uncovered" show on national TV networks in 2002 and 2004.

XX. Websites. There is one official WBS website (best accessed by entering "Wiltshire Botanical Society" in the search box and then selecting the appropriate alternative from those displayed) but at least one WBS member has his own (largely botanical) website in operation. In preparation, is another given over to the microscopy images.

Contributions to botanical literature

XXI. Beyond *Wiltshire Botany*. WBS members as authors and/or co-authors have had botanical articles published in *The Wiltshire (Country Life) Magazine*, *The Wiltshire Archaeological and Natural History (WANHS) Magazine*, *Botanical Society of the British Isles News (BSBI) News*, *Watsonia*, *British Wildlife*, and the Oak Conference Proceedings above. WBS members (previously WFMP) also were largely responsible for the Wiltshire Flora (1993) and The Field Guide to Rare Arable Flowers (Wilson and Sotherton 1994). The majority of contributions have been to

BSBI News - No. 104 had 4 contributions from 3 WBS members. (See also Sections X-XVI and XIX).

Data for a future Wiltshire flora

XXII. No less than 12 of the previous categories (IV, VI-XV, XXI) contain accounts of endeavours, which would provide detail for a future Wiltshire Flora. There already have been some changes which would seem to provide interesting contrasts with the 1993 Flora of Wiltshire. Many of these are included in the Rare Plants Register referred to earlier. Detailed analysis of many others has been carried out and the outcomes published in *Wiltshire Botany* issues 8, 9 and 10.

Evaluation, concerns and the future

The core activities (I–VIII) of the WBS are what keep the Society going. The range of core activities partly explains the large membership of over 100. Some members might only be involved in, or attracted to one category. For instance some are only seen at winter meeting, but others only attend the occasional summer excursion. Activities I, IV and VII are the staple diet of many county botanical societies, but II, III, V and VI hold the membership together providing stimuli, impetus and encouragement. Different levels of experience and expertise in separate aspects of botany and ecology are shared.

Categories IX to XXI are overwhelmingly initiatives by individual members, or small groups in some instances. They are scientific projects, sometimes with accompanying artistic flair. 50-100% of the work for any one of the many endeavours touched on in categories IX to XXI was carried out independently of the WBS core activities. These scientific activities add weight to the WBS as a worthwhile organisation. There is nothing wrong with the very English activity of a small group of slightly eccentric people meeting to walk out together in order to enthuse over unusually seen flowers or fungi. However, flora groups, and still more botanical societies, should incorporate such enthusiasm but widen and deepen their scope (as outlined in the preceding lines) if they are to remain viable and vigorous. So far, the WBS has achieved this aim.

I do, however, have some concerns for the future. Probably, over 60% of members have participated in some society activity or other over the past few years, but the proportion directly engaged in activities to increase botanical knowledge may be nearer to 30%. Some key activists are old, a feature of many voluntary groups and most (perhaps all) local botanical societies and groups. Recruitment is mainly from people around the age of retirement. A concentration of pre- and post-retirement members does not attract youngsters. However the WBS has at times

supported projects by young botanists, including their research work in articles in *Wiltshire Botany*. Perhaps transient associations working alongside and encouraging young botanists is the realistic aim.

Rather few activists, and none of these young, are considerations of potential future vulnerability. So far, we have performed well when matched with comparable groups - one county botanical group some years ago "was reduced to 4 members, 3 of them dead". The 22 WBS activities, commitments, surveys and research activities listed demonstrate a rich and diverse organisation. If we are not over-committed, there is a good chance we will maintain at least a proportion of our current successes.

References

WBS Newsletter - relevant items are too numerous to list here. The issues run from No. 1, April 1992 to No. 30, Summer 2007.

Wiltshire Botany - Again, there are many relevant items. Issues run from No. 1, November 1997 to No. 10, February 2008. Issue 5 lists all the articles in Issues 1-5 and Issue 10 all those in Issues 6-10. A detailed index covering all ten issues is available.

BSBI News - at least 45 contributions from members.

WANHS Magazine - at least 8 articles by members.

Other publications quoted are:

Gillam B, Green D and Hutchison A (1993) *The Wiltshire Flora*. Pisces Publications, Newbury

Appleyard A and Woodruffe P M (2007) *Pepperbox Hill: Survey of the Scrub*. WBS.

Newton A and Randall R D (2004) *Atlas of British and Irish Brambles*. BSBI, London.

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Acknowledgements

Many thanks to Joy Newton, Pat Woodruffe, Joan Davies and Maureen Ponting for helpful comments on my drafts.

AFTER THE FLORA: SUPPLEMENT B

12. WILLOWS (*SALIX SPP.*) AND POPLARS (*POPULUS SPP.*)

Populus nigra ssp. *betulifolium* (Black Poplar)



The family Salicaceae

Willows and poplars belong to the family *Salicaceae*, which consists of trees and shrubs with flowers in unisexual catkins on separate plants and mostly capable also of reproducing vegetatively. The flowers are made up, essentially, of an ovary for the female and stamens for the male, with no petals and sepals but supported by one or more bud scales. There is one such scale in *Salix* but several in *Populus*. *Salix* catkins are usually erect or spreading with several conspicuous bracts at the base, whereas *Populus* catkins are pendulous with no well-developed bracts. These differences are associated with differing pollination mechanisms, with *Populus* mainly wind-pollinated and *Salix* mainly insect-pollinated. *Salix* sometimes has yellow or reddish anthers to attract the insects and nectaries producing nectar for them to feed on are standard, whereas *Populus* has no nectaries and the stigmas on the ovary are usually longer and broader to catch the wind-borne pollen more effectively.

Willows

Willows are difficult to record for various reasons (Meikle 1984):

- Since male and female catkins are on different plants, material may need to be studied from at least two different sources, which also increases the risk of errors;
- Catkins and foliage are often produced at different times of year, necessitating more than one visit and therefore devices to ensure both are collected from the same plant and not allowed to become separate after collection;
- The stage of maturity of leaves and catkins, and the degree of shade and exposure affect their form, which can reduce the accuracy of identification;
- Willow hybrids outnumber those of any other British genus and can occur, in theory, between any two taxa, sometimes to the extent of making the boundaries between species and hybrids impossible to define.

Meikle asserted that no Willow key devised at the time at which he was writing would prove infallible, and seemed to imply that this was likely to remain the case.

In view of the situation above, it is not surprising that new tetrads for *Salix* taxa, given in the Record List in the previous issue of this journal (Wiltshire Botanical Society 2006), are uniformly low in number. The greatest number is 6 for the native (though also planted) *Salix purpurea* (Purple willow), which represents an addition to the 38 tetrads in the 1983-91 Flora Mapping on which the 1993 Wiltshire Flora was based (Gillam, Green and Hutchison 1993). No other taxon in the Record List has achieved more

than 3 new tetrads. This reflects the fact that willows are rarely recorded outside organised surveys or the efforts of lone enthusiasts.

There may be some significance in the absence of any new tetrads for another native, *S. aurita* (Eared willow) with 27 tetrads in the Flora Mapping, or it could simply reflect the general situation above. Other taxa with no new tetrads or only one had low numbers of tetrads in the Flora Mapping as well - 8 for *S. x sericans* (Broad-leaved Osier), 6 for *S. repens* (Creeping Willow), and 4 for *S. pentandra* (Bay Willow). All these are British natives, though *S. pentandra* is thought to be an introduction in Wiltshire. *S. repens* is restricted to wet acid grassland and heathland, which markedly restricts its opportunities to increase its range in Wiltshire.

Attempts to grapple with subspecies and varieties within some species has not brought much illumination. The introduced *Salix alba* has 2 varieties mentioned in the 1993 Flora - var. *caerulea* (Cricket-bat Willow) and var. *vitellina* (Golden Willow) - with one location each. The former has no new tetrads since and the latter only one. Var. *caerulea* must certainly be more common than these figures indicate, since it is common and widespread, but difficult to distinguish from the also common var. *alba*. Var. *vitellina* is popular in gardens, but it is not clear how common it is in the wild. *S. fragilis* var. *fragilis* and *S. cinerea* ssp. *cinerea* are not mentioned in the 1993 Flora, but the former has one new tetrad and the latter two. *S. fragilis* var. *fragilis* (Crack willow) is a common variety and must have been here all the time, but is very hard to separate from other varieties and hybrids. *S. cinerea* ssp. *cinerea* (Grey Sallow) presents similar difficulties, but is common enough to suggest that it has also been undetected in Wiltshire rather than absent. Both of these are native, though *S. fragilis* is more common as a planted tree in Wiltshire.

Much the same may be said of hybrids. *S. x rubra* (*S. purpurea* x *S. viminalis*) and the introduced *S. x rubens* (*S. alba* x *S. fragilis*) were both absent from the 1993 Flora, but have acquired a tetrad each since. Both were in Grose's (1957) Flora, so they were not previously unknown in the county. *Salix x rubra* is one of the commonest British hybrid willows, and will almost certainly have just been undetected in Wiltshire. *Salix x rubens* is widespread, but is thought to be a collective name for a variety of hybrids which merge in appearance with others not so named.

A species not in the Flora but noted in 2 tetrads since is *S. eleagnos*, but this is almost always cultivated and occurs in the wild only as a garden throwout. Its only known Wiltshire sites are both in Swindon, one on a development site and one on a disused railway line, both indications of discarded garden plants.

So far unmentioned are *S. x smithiana* (*S. viminalis* x *S. cinerea*), with 2 tetrads in the Flora and 2 since, and *Salix x reichardtii* (*S. caprea* x *S. cinerea*) with one in the Flora and 3 since. They are common native British hybrids, but easily confused with other taxa, and therefore probably overlooked.

Distinctions between *Salix* taxa not infrequently defeat experts on the subject, so it is not surprising that we have not really come to terms with this group in Wiltshire.

Poplars

The account of poplars in the 1993 Wiltshire Flora (Gillam, Green and Hutchison 1993) requires some clarification. However, this is difficult, because the literature is itself unclear. The main source of confusion is over Black poplars. Our native Black Poplar used to be called simply *P. nigra*, a species which extends to South and East Europe. However, it is now named *P. nigra* ssp. *betulifolia*, which is the variety of this species which is regarded as native (with some uncertainty) in Britain and Northern France. Meikle (1984) distinguished the subspecies from the more widespread "type" (ssp. *nigra*) by the thin and deciduous pubescence of the young shoots, petioles and rachises, as opposed to glabrous or nearly so. However, though the notion of a subspecies *betulifolia* has been around since the early 19th century, it seems not to have featured much in descriptions of the British flora until recently. The earlier British flora of Clapham, Tutin and Moore (1963), for instance, described the young shoots of British plants as glabrous, ie like "the type". As recently as 1990, Milne-Redhead (1990), in describing the BSBI Black Poplar Survey in 1973-1988, did not mention ssp. *betulifolia*. It is still questioned as to whether this is a valid subspecies or not (Tabbush 1998). Pubescent and glabrous shoots can appear on the same tree, and it is not clear whether the two subspecies are genetically distinct (Cooper 2006).

Also confusing is the fact that not all forms of *P. nigra* are called Black Poplar. The Lombardy Poplar, for instance, a sterile introduction of garden origin, is *P. nigra* var. *italica*. Additional complication has arisen from the name Black Poplar being applied to an assortment of hybrids collectively called *P. x canadensis*. Basically, these are horticultural forms of *P. x canadensis*, the hybrid between *P. nigra* and the North American *P. deltoides*. They are now more often called Hybrid Black Poplar, though the cultivar "Serotina" is known as Black-Italian Poplar. Stace (1991) provides a multi-access key for identifying these different forms.

Of the "Black Poplars", the 1993 Wiltshire Flora lists only *P. nigra* ssp. *betulifolia* and *P. x canadensis*.

The former was found in less than 1% of 1km squares and in 21 tetrads. *P. x canadensis* was not dealt with separately in the Flora, but grouped together with a number of other species as *Populus* agg., presumably more for convenience than because of botanical relationships. The others were *P. candicans* (Balm-of-Gilead), *P. trichocarpa* (Western Balsam-poplar) and *P. balsamifera x P. trichocarpa* (Hybrid Balsam-poplar). However, the Flora Mapping database does include individual records. *P. x canadensis* was found in 7 tetrads, *P. candicans* in 6 and *P. trichocarpa* in 4, but there were apparently no records of *P. balsamifera x P. trichocarpa*. The collection also included unidentified specimens - hardly surprising when the leaves and young shoots have most of the differentiating characteristics and are not always accessible without a ladder.

Populus nigra can usually be distinguished from its hybrids by the large swollen burrs on the often leaning trunk, its deeply fissured dark bark, and its large downward arching lower branches (Tabbush 1998). If the leaves can be seen, the presence of one or two small sessile glands on the leaf blade near the top of the petiole on many of the leaves means its one of the hybrids. The leaf serrations are said to be hooked in the hybrids but not in the native. Unfortunately, things are not always so straightforward. The trees in one or two of Cooper's (2006) photos have upward growing lower branches, there's a strain without burrs, glands can appear on leaves late in the season, and there are suspicions of hooks on the leaf serrations in Cooper's photo. Perhaps the best that can be said is that if a tree has all the characteristics listed it's the native. If some are missing, it might still be, or it might have elements of hybridisation in its history. This must apply, for instance, to a group of about 10 mature trees found beside the River Biss at Trowbridge in 2006, which had branch patterns entirely typical of the native, but almost smooth bark with small burrs.

Even during the Flora Mapping, a remarkable number of previously unknown specimens of *P. nigra* ssp *betulifolia* were added to the few known records in several areas in the North of the county. This has continued since the Flora. In 1993, Green (1997) carried out a survey in the Wylve Valley, where no native Black Poplars had previously been noted, and found 136 specimens in 26 kilometre squares. He includes distribution maps showing that, in 1995, it was known in 74 tetrads, compared with 21 in 1991. Two more tetrads were added in 1995, then no more to the end of 2003. In the county as a whole, 44 new tetrads have been entered in the records since the Flora - far more than the total number of 21 in the

Flora. It should be noted that this number is not shown in the Record List, since many of Green's records had not been entered into WBS records at the time it was drawn up. Furthermore, there are another 38 new tetrads shown on Green's 1995 distribution map which have not yet been transferred to the records. However, even the 23 new tetrads actually in the Record List exceeds the total tetrads in the 1993 Flora. The records during the Flora Mapping and subsequently are plainly not new individuals - Green states that all of his trees from the Wylve Valley were old - but have emerged because people have looked for the taxon in places where nobody had looked before. There could well be more if recorders sought them elsewhere.

Cooper (2006) says that the native Black Poplar is thought to be one of Britain's most endangered trees. Though around 7,000 are currently recorded, most are around 200 years old and therefore reaching the end of their lifespan. So many trees are lost each year and there has been little planting or natural regeneration over the past two centuries. Factors contributing to this have been clearing of floodplain forest, drainage and river engineering, the relative rarity of female specimens (perhaps because farmers found the fluff they produce a nuisance), the introduction of the faster growing and commercially more viable *P. x canadensis*, and hybridisation with non-native species.

In contrast, the other taxa in the Black Poplar group have been little recorded since the Flora, perhaps because of a growing feeling that introduced trees should not be recorded unless they are reproducing - though this would frequently exclude *P. nigra* itself, which does not reproduce itself sexually, and, though some vegetative propagation occurs spontaneously, the great majority of specimens have been propagated vegetatively by man (Cottrell et al 1997). *P. x canadensis* has been recorded in 2 tetrads, with no mention of its reproducing; *P. candicans* in 4 tetrads, suckering in 3; and *P. trichocarpa* in none. *Populus x canadensis* 'Serotina', has been recorded once, but only as mature trees, planted as a windbreak. Another interesting point about hybrids is that they can host Mistletoe, which the native (with one possible exception) does not.

The only other Poplar in the Record List, the introduced *P. alba*, has had 8 new tetrads added to the 15 in the Flora Mapping.

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See page 13 also.

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WILLOWS (*SALIX SPP.*)

Salix alba var. *caerulea* slo p170 [no record] ST 8844, vc8

Salix alba var. *vitellina* nrif [SU 0688], vc7

Salix aurita slo p172 [ST 8060, 8062, 8626, 8650, 8660, 9052, 9084, 9250, 9276, 9478, 9492, 9678, 9854, 9858, 9870, 9878, 9886, SU 0256, 0280, 0678, 0832, 0834, 1252, 2226, 2466, 2664, 2864], vc78

Salix cinerea ssp. *cinerea* nif SU 1482, 1880, vc7

Salix eleagnos * nif ST 9272, SU 1286, vc7

Salix fragilis var. *fragilis* ?* nif ST 8062, vc7

Salix pentandra slo p169 [ST 8478, 9478, 9678, SU 2870], vc7

Salix purpurea p171 SU 0222, 1468, 1624, 2246, 2482, 2660, vc78

Salix x reichardtii (*S. caprea* x *S. cinerea*) slo p170 [ST 9898] SU 1286, 2066, 2464, vc7

Salix repens p174, vc8

Salix x rubens * (*S. alba* x *S. fragilis*) nifg SU 1428, vc8

Salix x rubra (*S. purpurea* x *S. viminalis*) nifg SU 1880, vc7

Salix x sericans (*S. viminalis* x *S. caprea*) slo p170 [ST 9484, SU 0094, 0680, 1262, 1468, 1668, 1880, 2090] ST 9286, vc7

Salix x smithiana (*S. viminalis* x *S. cinerea*) slo p170 [ST 8280, SU 1680] SU 1668, 1868, vc7

POPLARS (*Populus* spp) - but from list updated till end of 2005 records.

Populus alba * nrif [ST 8462, 8664, 9022, 9264, 9286, 9822, 9868, SU 0280, 0832, 0896, 1062, 1090, 1284, 1658, 1680] ST 8860, 8886, 9682, SU 0268, 1466, 1468, 1680, 2450, vc78

Populus balsamifera & nif //SU 2864// vc7

Populus x canadensis (*P. deltoides* x *P. nigra*) * nrif [ST 8540, 9054, 9258, 9652, 9654, 9854, SU 0488] SU 1680, 1880, vc78

Populus x canadensis 'Serotina' (*P. deltoides* x *P. nigra*) nif SU 0820, vc8

Populus candicans * nrif [ST 8068, 9024, 9426, 9628, SU 0492, 0690] SU 1488, 1680, 1868, 2068, vc78

Populus nigra [included in *Populus* agg. in FMPC, but ssp. *betulifolia* recorded separately as below]. Records since Flora here exclude ssp. *betulifolia*, so add those from below: SU 0626, 1240, 1884, 2268, vc78

Populus nigra ssp. *betulifolia* p171. The new post-flora tetrads to 2003 shown below are the ones in the Record List, the ones entered for the 1993-2001 period subsequently (**bold**) and the further new tetrads shown on Green's 1995 distribution map but not yet in the records (*italics*). ST *8436, 8452, 8462, 8464, 8642, 9042, 9056, 9240, 9242, 9252, 9276, 9280, 9438, 9440, 9452, 9454, 9638, 9838, 9854*, SU *0036, 0038, 0056, 0080, 0236, 0258, 0436, 0458, 0462, 0482, 0492, 0494, 0634, 0636, 0658, 0660, 0662, 0666, 0680, 0682, 0690, 0692, 0830, 0832,*

0834, 0860, **0880, 1094**, *1228, 1230, 1232, 1234, 1236, 1238, 1250, 1252, 1254, 1256, 1282, 1284, 1426, 1428, 1440, 1444, 1468, 1668, 1680, 1694, 1834, 1856, 1882, 1884, 1894, 2036, 2068, 2084, 2086, 2088, 2268, 2284, 2286, 2470, 36, //SU 2862//* vc78

Populus x jackii (*P. balsamifera* x *P. deltoides*) * nif //SU 1866, 2468// vc7

Populus trichocarpa * slo p169 [ST 8068, SU 0084, 0488, 0690], vc7

AFTER THE FLORA: SUPPLEMENT B

13. CONIFERS (*PINOPSIDA*)

Juniperus communis (Juniper)



Introduction

Nomenclature and classification can be confusing in the conifer area. The term “Conifer” is often used as a popular name for the Gymnosperms. This literally means “naked seeds” and refers to the defining characteristic of the seeds lying on a scale leaf without any extra covering layer - as opposed to the angiosperms (flowering plants) where they are enclosed in an ovary. Both ovules and pollen sacs are borne on scale leaves, but, unlike angiosperms, have no petals or sepals. The pollen sacs and, in most species, the ovules and seeds are gathered together into cones - hence the name “conifer” (cone-bearing). Stace (1999) calls this group “*Pinopsida*”. Confusingly, the only species likely to be found as a native in Wiltshire, Yew (*Taxus baccata*), is the only one that does not have its ovules and seeds in cones, though the pollen sacs are in cones.

The group is of particular interest for recording, since most of the plants encountered are either introductions or the offspring of introduced plants, which raises a number of issues concerning which should actually be recorded. As far as conifers are concerned, the normal practice seems to be to record any individual plant growing in the wild, whether native or not (Gillam et al 1993; Clement and Foster 1994). The concept “in the wild” is not normally defined or discussed. However, forestry plantations appear to qualify, whereas gardens do not. On the face of it, since both are man-made and managed environments, the two are similar in character - but apparently not in status. Furthermore, the term “garden” is not without ambiguity. Some large gardens open to the public contain plantations

A coniferous tree planted by man, one might think, cannot realistically be regarded as wild. But what about its offspring? Once the parent plant is there, it is sometimes capable of reproducing without human help. The offspring might then be described as wild. Certainly, it is important to include in a record whether it is a planted individual or one arising from spontaneous reproduction. The latter may well have considerable significance for the future pattern of our flora, whereas the former can do little but stay where it is put. Current records do not always make the distinction, though it is likely that most records not mentioning reproduction are planted individuals. The issue is discussed further by Oliver (2007).

Below is an account of the 1993 Flora records and the subsequent new tetrads for each species from the Record List in the previous issue (Wiltshire Botanical Society 2006). Conifers in the 1993 Flora and those not in the Flora are dealt with separately.

Conifers in the 1993 Flora

No clear policy on what introduced plants to record is described in the 1993 Flora (Gillam et al 1993). In the end, it may have been mostly down to local recorders. Eleven conifers are included. Four of them - *Larix decidua*, *Picea abies*, *Pinus sylvestris* and *Taxus baccata* - were noted for 3% or more of the 1km squares in the county and are therefore outside the scope of this analysis. One might have been able to make a case for including the true native form of *Pinus sylvestris*, which was at the best extremely rare in the county, a tree in Spye Park, with a girth approaching 4m at a height of 5 feet above the ground and a height of 22m, being perhaps the last representative to occur in Wiltshire. However, this form has not been specifically recorded in any new tetrads since the 1993 Flora, so there is nothing to report.

Since this leaves only 7 taxa to consider, there is nothing to prevent each being commented on individually, as follows:

***Chamaecyparis lawsoniana* (Lawson's Cypress).** Recorded in 4 tetrads in the Flora, 3 new ones since - seedlings at Pewsey, Perham Down east of Tidworth and self-sown at Bentley Wood near the Winterbournes.

***Juniperus communis* (Juniper).** In 1% of 1km squares in the Flora, 4 new tetrads since - west of Alvediston, south of Compton Chamberlayne in the Southwest, near Martin in the South and at Oare between Marlborough and Pewsey. It is a native, found on unimproved chalk downland, producing seedlings only where there are no grazing rabbits and no too much in the way of competing scrub (Banks 2004). The 1993 Flora reported that the Porton Ranges had the largest colony in South England, and that a large colony at Beacon Hill at Larkhill had many seedlings. More recently, however, Banks (2004) reported that there was no lasting regeneration at either of these sites.

***Picea sitchensis* (Sitka Spruce).** Recorded in 2 tetrads in the Flora, one new tetrad since - at Longleat.

***Pinus nigra* (Black Pine, including Austrian and Corsican pines).** Recorded in 5 tetrads in the Flora, no new ones since.

***Pseudotsuga menziesii* (Douglas Fir).** Recorded in 13 tetrads in the Flora, 4 new tetrads since - at Stourhead, Longleat, near Axford east of Marlborough as self-sown treelets and self-sown at Bentley Wood near the Winterbournes.

***Thuja plicata* (Western Red-cedar).** Recorded in 5 tetrads in Flora, one new tetrad since - as seedlings and saplings from previous plantings at West Woods near Marlborough.

***Tsuga heterophylla* (Western Hemlock-spruce).** Recorded in one tetrad in the Flora, one new tetrad since at Stourhead.

Conifers not in the 1993 Flora

All of these are introduced.

***Abies cephalonica* (Greek Fir).** One tetrad at Berwick St James.

***Araucaria araucana* (Monkey-puzzle).** Two tetrads, both east of Marlborough, in parkland with a large collection of trees, parents and saplings.

***Pinus radiata* (Monterey pine).** One tetrad near Martin - two mature trees planted as windbreak.

***Sciadopitys verticillata* (Japanese Umbrella Tree).** One tetrad at Longleat. It hardly ever seeds in the UK.

***Sequoiadendron giganteum* (Wellingtonia).** One tetrad at Longleat. It never seeds in the UK - indeed the seeds do not even mature.

Conclusion

Apart from *Juniperus communis*, all the taxa in the main Record List with new tetrads recorded since the 1993 Flora are introduced. All relevant information from the records has been noted above. It will be apparent that it is not always clear whether the plants are reproducing or not or, if they are, whether the parents are also present. However, it is quite clear that *Pinus radiata* was found as mature trees, which raises the question of why this, rather than many other introduced non-native trees, was recorded. The same might be said of *Pinus nigra*, *Tsuga heterophylla*, *Abies cephalonica*, *Sciadopitys verticillata* and *Sequoiadendron giganteum*, where no reproduction is mentioned, and, in the latter case, known not to occur here.

The following taxa, on the other hand, are clearly reproducing in one or more of the recorded locations:

Chamaecyparis lawsoniana
Juniperus communis
Pseudotsuga menziesii
Thuja plicata
Araucaria araucana

There is little doubt that reproduction of introduced conifers has been under-recorded. Oliver (2007) working recently and just in selected areas in the northeast of the county, reports reproduction in the following taxa from the Record List additional to those from the post-Flora records:

Tsuga heterophylla
Picea sitchensis
Larix kaempferi (Japanese Larch)
Larix x marschlinsii (*L. decidua* x *L. kaempferi*) (hybrid of European and Japanese Larches)
Pinus nigra
Cryptomeria japonica (Japanese Redwood)

Wider surveys are needed for a fuller knowledge of these changes in the Wiltshire flora.

Portrait of Juniper (*Juniperus communis*)

Juniper is a plant of national importance still growing wild and native in Wiltshire. It is a grey-green evergreen shrub, 4-12 feet high with whorls of 3 short spine-tipped awl-shaped leaves. It has small, yellow, unisexual flowers at the leaf bases which produce berry-like cones which are at first green and finally blue-black. The taxon has been recorded in over 700 10km squares in Britain from 1987 onwards, growing in a wide range of habitats on both basic and acidic soil. and in 23 of the 57 such squares which are wholly or partly in Wiltshire. All the latter are ssp. *communis*, which is common throughout Britain, ssp *nana* being found mainly in the North and West and ssp *hemisphaerica* in a mere handful. It was in 39 tetrads in the Flora, and has 4 new tetrads since, all on the unimproved chalk downland it favours in this part of the world. Walker and Pywell (2000) reported 67 records of in the Salisbury plain Training Area alone in 1996-7. The 1993 Flora reported that the Porton Ranges had the largest colony in South England, and that a large colony at Beacon Hill at Larkhill had many seedlings. More recently, however, Banks (2004) reported that there was no lasting regeneration at either of these sites, most plants being of about the same age as each other. The numbers of plants occurring in 2002 were down to less than 40% of the numbers recorded at the same sites in 1972. No plants were found in a significant number of the 1972 sites. The decline seems to be linked to agricultural improvement measures and to neglect leading to development of scrub. Grazing rabbits produce areas of bareish ground which helps seedlings to occur, but the rabbits then eat them, so that they do not grow into mature plants. However, it produces seedlings only where there are no grazing rabbits and not too much in the way of competing scrub (Banks 2004). Banks provides more hope for the species in Wiltshire when describing the situation at two sites on road embankments which have appeared since the 1972 survey. Here, there is successful seedling establishment and apparent lasting regeneration, and this appears to be associated mostly with a slope of 25-30°, bare ground and absence of rabbit grazing. Local botanists are likely to keep an eye on it, and it should be looked for in other suitable sites.

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Pinus nigra (Black Pine)



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AFTER THE FLORA: SUPPLEMENT B

14. FERNS (*PTEROPSIDA*), HORSETAILS (*EQUISETOPSIDA*) AND CLUBMOSES (*LYCOPODIOPSIDA*)

Oreopteris limbosperma (Lemon-scented Fern)



Definition

The groups of taxa here are often referred to as 'lower plants'. This implies that they have a more simple, less highly evolved structure or reproductive cycle. They do superficially resemble higher plants; they have roots, stems and leaves, and they conduct water and minerals. However, they have two separate and distinct plant forms in the life cycle, the sporophyte, with which we are all familiar and, in most cases, the less well known gametophyte or prothallus. The latter is a small disc of tissue from which male and female reproductive structures are produced. The sporophyte, the form we normally see, reproduces only asexually - by means of spores produced in bodies called sporangia, which are borne either on the leaf surface or in cones. These two forms alternate in the life cycle. The process is illustrated by a diagram in a previous issue (Woodruffe 2005).

These taxa have traditionally been grouped together as the *Pteridophyta* and, later, the *Pteropsida*, but Stace (1999) now divides them into three different groups - the *Lycopodiopsida* (clubmosses and quillworts), the *Equisetopsida* (horsetails) and the *Pteropsida* (ferns). For Wiltshire purposes, the clubmosses are creeping plants with crowded, one-veined leaves, the horsetails are rhizomatous plants with whorls of short, one-veined leaves forming sheaths at the base at intervals up the stem, while the ferns mostly have separate leaves arising at ground level and with two to many veins.

Analysis of records

The records could be analysed in various ways. Much of the analysis which follows has already been reported in the previous issue (Wiltshire Botanical Society 2006), but, from the point of view of this group, bringing it all together here, should make it more easily accessible. Below, they are looked at in terms of the numbers of new tetrads found since the 1993 Flora, though the analysis brings in other aspects, such as difficulties in recording subspecies and hybrids, and the refind of the only taxon here qualifying as a nationally scarce plant - *Lycopodiella inundata* (Marsh Clubmoss) - which appeared to have been lost.

Taxa in more than 10 tetrads

For some taxa, 10 new tetrads since the 1993 Flora could indicate an extension of range and/or increased occurrence. However, this is unlikely to be the case with the two which meet that criterion here. *Dryopteris affinis* (Scaly Male-fern), with 13 new tetrads, could simply have been overlooked in the past because it grows in woods often difficult to access, though limited interest in and skill at identifying *Dryopteris* species could also have played

a part - and it was recorded in 53 tetrads during the Flora Mapping. *Polypodium interjectum* (a species of Polypody), with 14, is difficult to distinguish from *Polypodium vulgare* (Polypody) and the hybrid between them, and only accurately determined material was accepted for the 1993 Flora (only 9 records in 6 tetrads), which means that other genuine records could have been rejected. So some of the apparently new tetrads for these two ferns may not be so.

While, comparisons between 1993 Flora data and subsequent records is difficult, it is still reassuring that these two species could be reliably identified in a number of new tetrads. It is equally reassuring that species whose frequency was difficult to determine earlier because of identification problems can now be identified with greater certainty. This gives us the opportunity to determine their frequency more precisely.

Taxa with 2-9 new tetrads

For *Azolla filiculoides* (Water Fern) (14 tetrads in the Flora, 7 new), *Blechnum spicant* (Hard Fern) (36 tetrads in the Flora, 7 new), *Dryopteris carthusiana* (Narrow Buckler-fern) (31 tetrads in the Flora, 6 new), *Ophioglossum vulgatum* (Adder's-tongue) (52 tetrads in Flora, 8 new) and *Polystichum aculeatum* (Hard Shield-fern) (73 tetrads in the Flora, 7 new), the numbers of new tetrads are not surprising for taxa that can be fairly easily overlooked because of habitats difficult to access or identification difficulties or anxieties. Woodruffe (1993) describes how, at the time of the Flora Mapping, *Azolla* had spread to new sites and declined at former ones. This process may have continued.

The remaining taxa show this pattern of records because of problems in the recording of subspecies. *Dryopteris affinis* (Scaly Male-fern) has two subspecies, ssp. *affinis* and ssp. *borreri*, treated as *Dryopteris affinis* agg. in the Flora but recorded separately by some recorders since. The new tetrads could be accounted for simply by more accurate identification of populations which were there all the time.

Taxa with no new tetrads or one

There are 13 of these. Four are hybrids which were not in the 1993 Flora. They may have been overlooked during the Flora Mapping and simply recorded as one of the parent species, such as *Dryopteris x complexa* (*D. affinis* x *D. filix-mas*) *Dryopteris x mantoniae* (*D. filix-mas* x *D. oreades*) and *Polystichum x bicknellii* (*P. aculeatum* x *P. setiferum*). The other, *Polypodium x mantoniae* (*P. interjectum* x *P. vulgare*), could also be explained this way, but identification of species is very difficult and it may well have been recorded previously simply as

Polypodium agg. In none of these cases can we know whether they are new to the County or not.

Adiantum capillus-veneris (Maidenhair Fern), *Botrychium lunaria* (Moonwort), and *Dryopteris aemula* (Hay-scented Buckler-fern) were all in only one tetrad in the Flora Mapping, so one more does not tell us anything much. *Equisetum sylvaticum* (Wood Horsetail) was in 3 tetrads and *Oreopteris limbospermum* (Lemon-scented Fern) in 2, which again is not very striking. *Adiantum* was, in any case, only an introduction at the time of the Flora Mapping, recorded only on the wall of an old greenhouse attached to a house.

The records for *Cystopteris fragilis* (Brittle Bladder-fern) (5 tetrads in Flora), *Equisetum fluviatile* (Water Horsetail) (73 tetrads), and *Osmunda regalis* (Royal Fern) (9 tetrads), may be of more significance. Certainly, it looks as though they have not increased their range. If they have been lost to their previous locations, such as looks the case with *Equisetum fluviatile*, they may be at risk of disappearing from the county. Even during the Flora Mapping, *Osmunda regalis* occurred almost entirely in estates to which it had been introduced, so it is virtually lost as a wild plant. This was, in fact, already the position at the time of the Flora Mapping (Woodruffe 1993). It was, however, found in a single site in Wiltshire's New Forest in the 1995 English Nature survey of the area (Wilson 1997), an event which did not find its way into Wiltshire Botanical society's records.

The single record for *Lycopodiella inundata* (Marsh Clubmoss), on the other hand, is a positive find. It is one of the 57 taxa in the *Wiltshire Rare Plant Register* designated as Nationally Rare. A plant is regarded as nationally rare if it is in 16-100 10km squares in the British Isles. This taxon, however, is of more interest than most, because it was absent from the 1993 Flora, but known earlier and has now been refound. Grose (1957) called it *Lycopodium inundatum* and gave several locations in the extreme southeast of the county ie in the New forest area. The locations were Landford, Plaitford Common and Alderbury Common. The 1994 record is at Plaitford Common. The grid references make it clear that the refind is in the same area, though not necessarily at the same place within it. Refinds of the original population have been very rare events in Wiltshire. Perhaps this is not surprising, because the original population must have died out for a reason, usually some change in the environment. It is then unlikely that the original environment will be reinstated. If it is, there may be nothing left of the plants to recolonise it. It is significant that this instance is in an area where, not only could the continuity of the population have been overlooked, but there has been little change in the environment. Another pre-flora plant has been refound since the Record list was compiled - *Pilularia globulifera* (Pillwort)

Conclusions

Recording of clubmosses, horsetails and ferns since the 1993 Flora raises the question of whether there has been a decline in the population of *Equisetum fluviatile*, and possibly two other species, has refound a nationally scarce plant thought to be lost to the county, and highlighted a greater sophistication in some of our recorders. Given the time and application, more recorders could also improve their identification skills with this group, aided by the recent publication of a local key to ferns (Woodruffe 2005). We should then be in a position to map some taxa more effectively.

Portrait of Water Horsetail (*Equisetum fluviatile*)

The horsetails are rhizomatous plants, which send up many stems with whorls of short, one-veined leaves forming sheaths at their bases at regular intervals. The number of teeth at each sheath is the same as the number of ridges on the stem. Their most obvious reproductive bodies are terminal cones of sporangia, in which the spores are lodged. Water horsetail (*E. fluviatile*) can be confused with Marsh Horsetail (*E. palustre*), which can grow in a similar range of freshwater habitats. The former has stems either unbranched or with sparing branches which do not branch further and the latter is like this sometimes, while branching more profusely at others.

The two species can be distinguished by the diameter of the stems (more than 8 mm in *E. fluviatile*, rarely exceeding 8 mm in *E. palustre*), by the number of ridges on the stem (10-30 in *E. fluviatile*, 4-12 in *E. palustre*) and by the internal structure of the stem in cross-section. *E. fluviatile* has a large central hollow more than $\frac{3}{4}$ of the width of the stem and a ring of many tiny hollows round the margin. *E. palustre* has a central hollow usually less than half the stem width and a few peripheral hollows of similar size to that. Though hybridisation can produce intermediate forms, this has not been observed in Wiltshire.

E. fluviatile grows in lakes, ponds, ditches, marshes and backwaters, in or by the water. It was reported to be common throughout the British Isles as recently as 1999 (Stace 1999). The 1993 Wiltshire Flora described it as a localised but common component of every plant community in these habitats on more acidic heavy clays, sometimes covering entire ponds.

Equisetum fluviatile was recorded in 73 tetrads in the 1993 Flora and in 3% of the 1 km squares, but there is only a single new tetrad since - and that is present because it's in vc8, though actually in Hampshire. Either it has been seriously overlooked or it has not increased its range. Assuming the latter, it is important to know whether it has maintained its frequency in its old locations. If not, it may be at risk

of disappearing from the county. It is noteworthy that there have been only two records overall since the Flora. Additionally, however, an intensive survey of rivers in Wiltshire between 1992 and 1996 by twenty Wiltshire Botanical Society volunteers (Oliver 1997, 1999) did note it, though the precise number of records is not now retrievable, apart from being in between 1 and 3 of the 129 stretches of river 500m + long surveyed throughout the County. It is not really a river plant (Page 1988), and could have been overlooked in other aquatic habitats. Its future does not, however, look promising.

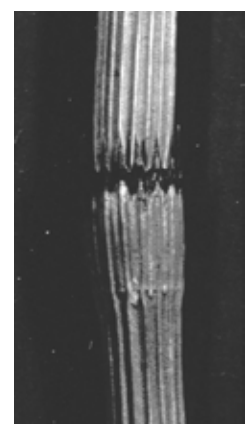
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***Equisetum palustre*
(Marsh Horsetail)**



***Equisetum fluviatile*
(Water Horsetail)**



THE STONEHENGE GRASSLAND REVERSION PROJECT

By Charlotte Bell

The Stonehenge Reversion Project

The Stonehenge area of Wiltshire is traditionally noted for its chalk grassland. Chalk grassland is one of the richest habitats in the UK, containing a great diversity of plants and animals. Soil is thin, poor and free-draining, restricting the growth of competitive species but favouring specialised lime-loving species. Thin soil captures heat quickly, creating perfect habitats for invertebrates such as ants and butterflies. However, chalk grassland is now very rare and fragmented and is of international conservation concern. It is dependent on appropriate grazing by livestock and is vulnerable to fertilisers and pesticides that enrich the soil and reduce the variety of plants and animals specialised to a nutrient-poor environment. In the absence of grazing, coarse grasses and shrubs rapidly become dominant, leading to a loss of the characteristic low-growing flora.

Chalk grassland has declined substantially due to a number of factors. Inter-war ploughing destroyed much of the habitat, and agricultural intensification since the Second World War encouraged farmers to produce crops faster and on a larger scale, at the expense of the environment. Changes from haymaking to silage production and from spring to autumn sowing have also led to the loss of many grassland species. Enrichment due to artificial fertilisers enables more competitive species to become dominant, and under-grazing allows coarser grasses and scrub to invade. Habitat fragmentation due to changes in farming and development means that many chalk grassland species are vulnerable to local extinctions.

Current estimates put the amount of lowland calcareous grassland left in the UK at around 39,500 ha, with 47% of this found in Wiltshire. Nearby Salisbury Plain, due to its long history of military operations, has been untouched by modern farming practices and at 13,000 ha represents the largest area of relict chalk downland in northwest Europe (Hill & Williams, 2005).

In 1995 the UK Government introduced a Biodiversity Action Plan (BAP) to protect, enhance and increase chalk grassland in Britain. Since then, 9000 ha of chalk grassland have been restored and 76% of grassland SSSIs are now in favourable condition. Lowland Calcareous Grassland is also a priority in Wiltshire's Biological Action Plan (BAP), with a Habitat Action Plan (HAP) drawn up to preserve and extend this type of habitat (www.swbiodiversity.org.uk/Regional/LBAPs/Wiltshire/wiltshire.htm).

**The Avenue monument damaged by ploughing.
(The original ditches several feet deep have been
flattened and worn away to shallow markings.)**

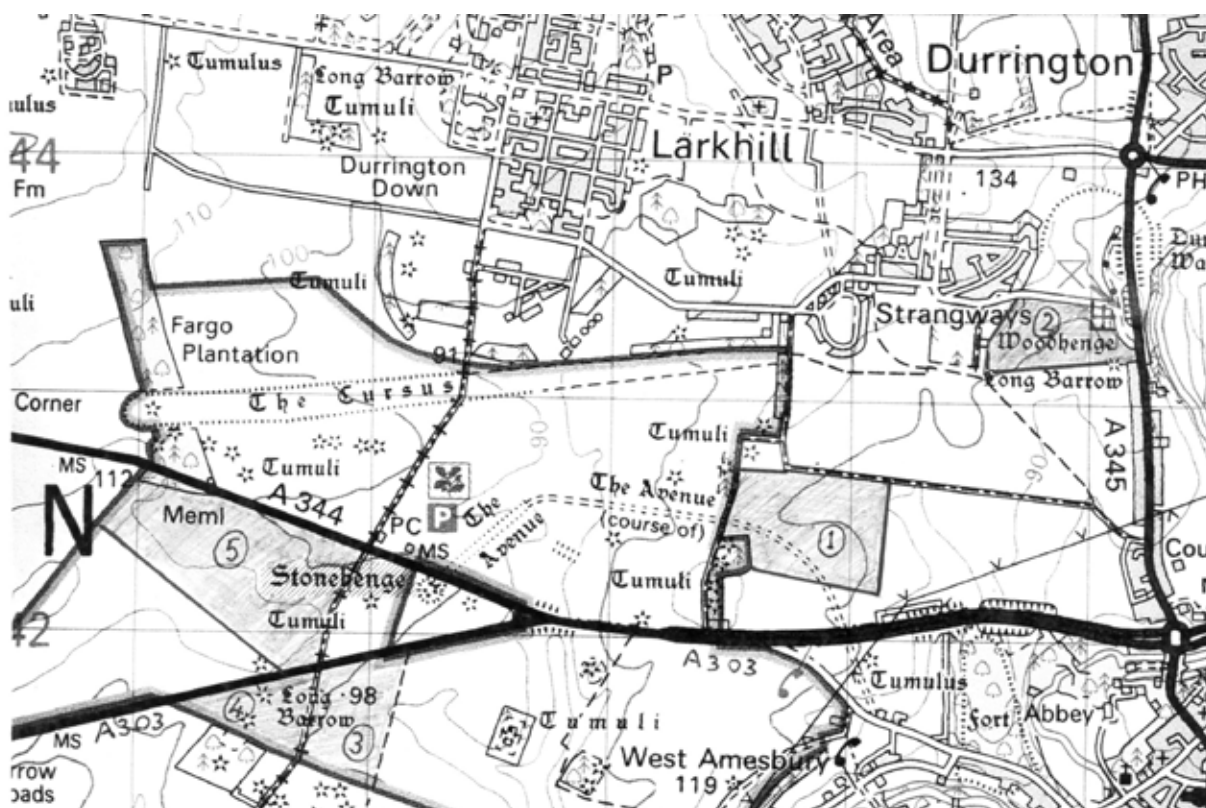


850 hectares of land surrounding Stonehenge are owned by the National Trust and of this a significant proportion has been reverted to chalk downland. A total of 340 hectares around Stonehenge (including some non-National Trust land) will have been reverted by 2011, making this the largest and most ambitious reversion project in Europe. So far five National Trust fields, have been reverted - the final fields will be reverted between 2007 and 2011. The map shows the five fields reverted to date.

The grassland reversion project's primary aim is to protect the surrounding archaeology from further plough damage. Stonehenge exists only as one feature in a landscape of prehistoric monuments, most of which are buried beneath the soil and

invisible to all but the most well-trained eye. Years of ploughing have inflicted great damage on many of these features. In total, 75 prehistoric monuments around Stonehenge will benefit from the end of plough damage. However there are countless other benefits to be gained from reverting fields to grassland. There are the obvious conservation advantages of creating areas of wildflowers and native chalk fauna, but the Stonehenge reversion scheme also has had another, less obvious achievement. Its success is testimony to the cooperation between the National Trust and the other people and organisations living and working in the WHS, namely tenant farmers, the Ministry of Defence, the RSPB, Natural England and English Heritage.

Map of all the National Trust's reversion fields around Stonehenge.



KEY: 1 = Seven Barrows, 2 = Cuckoo Stone, 3 = Noices Piece, 4 = Normanton Gorse, 5 = Large field West of Stonehenge

Before reversion commenced, field walking surveys and aerial photography of the site before the land use change were done, initially funded by English Heritage. The National Trust then decided on the desired grassland type after reversion - semi-natural pasture, with moderately flowery swards, roughly equivalent to 'Calcareous Grassland Type 2' (*Festuca ovina* - *Avenula pratensis* grassland) identified in the British National Vegetation Classification. The introduction of rare plants was not favoured - instead the focus would be on establishing robust wildflowers

and grasses in keeping with the soil type. Suitable areas of similar downland on Salisbury Plain were identified and, in 2000, the MOD granted a licence for harvesting seed to the National Trust. Seed collection was carried out over a 2 week period and the seed was then dried, cleaned and analysed for species composition by outside contractors.

Meanwhile the first trial field, named 'Seven Barrows' due to its proximity to the impressive King Barrows ridge, had been twice disced, harrowed and

rolled by the tenant. The harvested seed was mixed with organic fertiliser and sowed during late summer 2000. By November, the first signs of germination demonstrated a successful seeding. Apart from a few early problems with arable weeds such as Ragwort (*Senecio jacobaea*), controlled by intensive grazing with sheep, this first trial field has never looked back. Marvellous displays of wildflowers such as spring Cowslips (*Primula veris*) and Sainfoin (*Onobrychis viciifolia*) in the summer are reminiscent of an idyllic image of pastoral England. It is hoped that these wildflower displays will soon become a tourist attraction in their own right. Such was the success of Seven Barrows Field it was used as the donor field for all the National Trust's subsequent reversion fields around Stonehenge.

However, it is worth noting that the Stonehenge Land Use Plan also includes the retention of some areas of arable land. This maintains a diversity of habitats and provides a valuable refuge for farmland birds and arable weeds.

The biological and conservation benefits of the reversion project are already visible, and will surely only increase as the current grassland fields become better established and more fields are reverted. A number of important downland floral species are already established, such as Kidney Vetch (*Anthyllis vulneraria*), Knapweeds (*Centaurea* spp.), Birdsfoot Trefoil (*Lotus corniculatus*), Quaking Grass (*Briza media*), Yellow Rattle (*Rhinanthus minor*) and Salad Burnet (*Sanguisorba minor*).

It is hoped, indeed expected, that the increase in downland flora will be followed by a corresponding rise in insect and bird life, including some rare butterfly species such as Chalkhill Blue (*Lysandra coridon*) and Adonis Blue (*Lysandra bellargus*), the skylark, *Alauda arvensis*, now classed as a Red List species by the RSPB (www.rspb.org.uk), the Lapwing (*Vanellus vanellus*), the rare Stone Curlew (*Burhinus oediceumus*), and the Hen Harrier (*Circus cyaneus*). It can be expected that mammals currently seen around Stonehenge, such as bats, roe deer (*Capreolus capreolus*) and brown hares (*Lepus europaus*) (a priority species in the UK Biodiversity Action Plan, BAP), will continue to thrive.

The last field is expected to begin the reversion process in 2011. Even if no extra land is reverted, agreements signed to date will have returned 340 hectares of arable land to pasture by the project's completion. This is more than 20% of the land which was cultivated around Stonehenge before 2002. The long-term vision of the project is to see, eventually, an open rolling landscape of chalk grassland with archaeological features such as barrows no longer isolated in a sea of crops. It is in many ways a bigger and better extension of a scheme started in the 1980s, which changed the land use of nearby Stonehenge

Down from arable to grassland pasture, albeit not chalk downland. In the future it is hoped that this pasture will itself be reverted to chalk downland, forming part of a wider landscape including the current reversion fields.

Very little monitoring has so far been carried out on the National Trust's reversion fields. It is important that monitoring is carried out using a similar methodology on an annual basis so that accurate comparisons can be made between years, and the progress of reversion assessed. This will also aid decisions on the management regimes to be utilised. A monitoring programme was designed by Charlie Bell, Conservation Officer (a voluntary position), in spring/summer 2006. It is described fully in an unpublished National Trust report (Bell 2006), which gives an account of the methodology and results, as well as suggesting how the monitoring can be completed and analysed in subsequent years. The account here describes the ecological aspects of the project, presents broad results and offers some conclusions and recommendations. The reader is referred to the full report for more information.

Aims of the monitoring project

This Grassland Monitoring Project is a long-term project with the following aims:

- To begin a comprehensive monitoring project of the grassland around Stonehenge, as outlined in the Stonehenge Land Use Plan
- To allow the progress and success of the grassland reversion project to be monitored
- To highlight any potential problems e.g. unwanted dominant species
- To inform and advise decisions on the management and grazing regimes in the reversion fields
- To monitor the abundance and distribution of important species outlined in the Wiltshire BAP

Monitoring methodology

For each field, monitoring was done along a linear transect of the site, on a transect line running diagonally across the field. During the transect 1m² quadrats at roughly equally spaced positions were taken. These sampling positions were spaced so that 20 quadrats were performed for a roughly 20 hectare

Table 1 - DAFOR scale for vegetation monitoring

CLASSIFICATION	% COVER
DOMINANT	>50 %
ABUNDANT	31 -50 %
FREQUENT	11 - 30 %
OCCASIONAL	6 -10 %
RARE	1 - 5 %

field, 40 for a 40 hectare field, etc. DAFOR scores (see Table 1) for all vegetation and bare ground were recorded.

The time of year is often important, but in general April to October is appropriate for most habitats. Monitoring during the flowering period will aid identification, and monitoring of different fields should be done as close together as possible to allow for more accurate comparisons. June is suggested as

the best month for grassland monitoring as the fields will not yet have been topped.

Ideally it is hoped that this methodology can be performed on an annual basis. However, this report recognises that in future years the recording may be limited by time, biological survey experience or manpower. A calendar of events should be kept, recording the date and duration of events such as grazing (and details of type of stock used), cutting and topping. Table 2 shows the calendars for 2006.

Table 2 - Calendar of operations for the Stonehenge Reversion Fields 2006

Field	Date and duration		
	Topping/Cutting/ Harvesting	Grazed with sheep	Grazed with cattle
Seven Barrows	Brush harvested late July	Part of field grazed mid-late May until mid-July 2006	
Cuckoo Stone Field	Topped early July 2006		
Normanton Gorse	Topped in early July		Grazed with small herd of cattle from mid-May onwards
Noices Piece			Grazed with small herd of cattle
Large field West of Stonehenge	Ungrazed, topped in late June		

It is hoped that 2006 is only the start of a longer term monitoring programme for the Stonehenge reversion fields. Ideally this methodology (or a revised one that is comparable to it) will be implemented on an annual basis until the final reversion field, due to start reversion in 2011, has achieved its desired state. Continuation up to 20 years in the future would provide a valuable and relatively unique resource, but it may prove impractical.

Results

Table 3 gives a summary of the results for the five fields. For Seven Barrows, a small area was partitioned to prevent grazing in 2006, and the results for the grazed and ungrazed areas are provided separately.

Table 3 - Comparison of species number in all reversion fields

Field Name	Years into reversion	Total no. species	No. herb species	No. grass Species	% Herbs	% Grasses	% Bare Ground
Seven Barrows Grazed	6	39	29	10	74	26	0
Seven Barrows Ungrazed	6	28	20	8	71	29	0
Cuckoo Stone	4	34	21	13	62	38	0
Normanton Gorse	3	55	36	19	65	35	50
Noices Piece	3	41	24	17	59	41	85
West of Stonehenge	1	41	32	9	78	22	100

Twelve species were present in every reversion field (common names will be used for ease): Common Mouse-Ear, Black Medick, Sainfoin, Ribwort Plantain, Bulbous Buttercup, Yellow Rattle, Dandelion, Hop Trefoil, White Clover, Upright Brome, Red Fescue, and Yorkshire Fog. No species found in any of the fields were Nationally Scarce as classified by the Wiltshire Flora (Gillam, 1993).

Results for the five fields

The results for the five reversion fields are discussed below. More data and detailed descriptions were provided for each field in the full report. For Seven Barrows, a small area of the field was partitioned with an electric fence during 2006 to prevent grazing, the rest of the field being grazed with sheep. The

results for the grazed and ungrazed areas are provided separately.

Seven Barrows (Grazed)

- The grazed area, representing the majority of the entire field, contained 39 species of which 10 were grasses and 29 herbs.
- Three species were present in 100% of quadrats: White Clover, Sainfoin and Bulbous Buttercup.
- Nine species were present in between 75 and 99% of quadrats: Common Mouse-ear, Rough Hawkbit, Black Medick, Ribwort Plantain, Yellow Rattle, Dandelion, Upright Brome, Crested Dogstail and Cocksfoot.
- Eight species were present in one quadrat i.e. (5% of quadrats): Yarrow, Smooth Hawksbeard, Horseshoe Vetch, Oxeye Daisy, an unidentified Mallow species, Field Forget-me-not, Burnet Saxifrage and Timothy.
- Six species were found only in this field: Yarrow, Field Mouse-Ear, Horseshoe Vetch, an unidentified Mallow species, Burnet Saxifrage, and Quaking Grass.
- There was no bare ground.

Seven Barrows (Ungrazed)

- The ungrazed area contained 28 species, of which 8 were grasses and 20 herbs.
- Six species were present in 100% of quadrats (i.e. 20 quadrats): Sainfoin, Ribwort Plantain, Yellow Rattle, Dandelion, White Clover and Upright Brome.
- Two species were present in between 75 and 99% of quadrats: Common Mouse-ear and Cocksfoot.
- Seven species were present in only one quadrat (i.e. 20% of quadrats): Dropwort, Cowslip, Germander Speedwell, Common Bent, Meadow Brome, Yorkshire Fog and Yellow Oatgrass.
- One species, Dropwort, was found only in this field.
- There was no bare ground.

Two species were found only in Seven Barrows field: Cowslip and Salad Burnet.

Cuckoo Stone Field

- Cuckoo Stone Field contained 34 species, of which 13 were grasses and 21 herbs.
- Only one species, Upright Brome, was present in 100% of quadrats.
- Three species were present in between 75 and 99% of quadrats: Ribwort Plantain, Yellow Rattle and Cocksfoot.
- Thirteen species were present in only one quadrat (i.e. 5% of quadrats): Common Mouse-ear, Lesser Hawkbit, Common Sorrel, Ragwort, Smooth Sow-thistle, Dovesfoot Cranesbill, Bladder

Campion, Common Centaury, Creeping Buttercup, Sweet Vernal Grass, Meadow Oatgrass, Sheep's Fescue and Fine-leaved Sheep's Fescue.

- Four species were found only in this field: Dovesfoot Cranesbill, Bladder Campion, Common Centaury and Fine-leaved Sheep's Fescue.
- There was no bare ground.

Noices Piece

- Noices Piece contained 41 species, of which 17 were grasses and 24 herbs.
- Two species, White Clover and Ribwort Plantain, were present in 100% of quadrats.
- Five species were present in between 75 and 99% of quadrats: Sainfoin, Upright Brome, Crested Dogstail, Cocksfoot and Yorkshire Fog.
- Ten species were present in only one quadrats (i.e. 5% of quadrats): Field Mouse-ear, Woolly Thistle, Rough and Lesser Hawkbit, Bulbous and Creeping Buttercup, Common Sorrel, Field Pansy, Sheep's Fescue and Timothy.
- One species, Field Madder, was found only in this field.
- Bare ground was present in 85% of quadrats.

Normanton Gorse

- Normanton Gorse contained 55 species, of which 19 were grasses and 36 herbs.
- No species were present in 100% of quadrats.
- Five species were present in between 75 and 99% of quadrats: Common Mouse-Ear, Ribwort Plantain, Sainfoin, Cocksfoot and Red Fescue.
- Twenty-one species were present in only one quadrat (i.e. 8.5% of quadrats): Parsley Piert, Thyme-leaved Sandwort, Musk Thistle, Greater Knapweed, Rough Chervil, Fat Hen, Common Catsear, Rough Hawkbit, Black Medick, Field Forget-me-not, Knotgrass, Hedge Mustard, Upright Hedge Parsley, Goatsbeard, Nettle, Field Pansy, Creeping Bent, Sweet Vernal Grass, Small Catstail, Annual Meadow Grass and Rough Meadow Grass.
- Fifteen species were only found in this field: Parsley Piert, Thyme-leaved Sandwort, Greater Knapweed, Rough Chervil, Creeping Thistle, Common Catsear, Common Toadflax, Prickly Sow-Thistle, Hedge Mustard, Upright Hedge Parsley, Goatsbeard, Nettle, Common Couch, Creeping Bent and Small Catstail.
- Bare ground was present in 50% of quadrats.

Field West of Stonehenge

- The large field West of Stonehenge contained 41 species, of which 9 were grasses and 32 herbs.
- No species were present in 100% of quadrats.

- Only one species, Black Bindweed, was present in between 75 and 99% of quadrats.
- Fifteen species were present in 5% or less of the quadrats (i.e. one or two quadrats): Common Mouse-Ear, Dwarf and Spear Thistle, Smooth Hawksbeard, Cut-leaved Cranesbill, Rough Hawkbit, Bulbous Buttercup, Wild Madder, Groundsel, Smooth Sow-Thistle, Lesser Trefoil, Upright Brome, Soft Brome, Meadow Fescue and Meadow Oatgrass.
- Thirteen species were found only in this field: Black Bindweed, Oilseed Rape, Dwarf and Spear Thistle, Common Fumitory, Common Cleavers, Henbit Dead-Nettle, Venus' Looking Glass, Common Poppy, Wild Madder, Groundsel, Oats and Wheat (crops).
- Bare ground was present in 100% of quadrats.

Conclusions and recommendations

The results from this first season of monitoring are very encouraging. The species diversity of all fields exceeded expectation, and the quality of Seven Barrows field after only six years of reversion justifies not only the method of reversion used but also the use of Seven Barrows as a donor field for the other sites. There were no real unexpected results - the quality of chalk grassland decreases as the age of the reversion field decreases, which is what would be expected. If the monitoring is repeated in future years it will be very interesting to see whether in two years Cuckoo Stone field resembles this year's Seven Barrows field, and so on. An interesting graph to produce in later years may be one illustrating the relative amounts of 'good' and 'bad' grassland species and their change over time.

The grazing and topping regimes don't seem to be having any real adverse effects, although this will become more apparent in future years as the management regimes are recorded and compared. The grazing of part of Seven Barrows, with some field left ungrazed, is a useful tool for comparative studies, and possibly this area of study could be explored in future years - it could form an entire project in itself to really look at the impacts of sheep grazing on chalk downland.

The number of arable weed species found in the more recent reversion fields is extremely encouraging news for this group of species, indicating that despite intensive arable farming the seed bank of such species is relatively intact. Arable weed species are declining nationally and in many ways it is unfortunate that these species will disappear from the fields as reversion progresses - chalk downland is too nutrient-poor and competition from grassland species is too great for arable weeds, many of which also require disturbance of the soil. Those reviewing the National Trust's Land Use Plan may possibly wish to

consider this and the possibility of maintaining some areas of arable land, perhaps farmed organically or at least sympathetically to the needs of these arable species and their associated wildlife. However, the priority for Stonehenge Landscape is the restoration of chalk downland, so any enhancement of arable species must not interfere with this long-term project.

The grazing regime most often quoted as the ideal for grazing chalk downland is 'summer cattle and winter sheep'. This could limit the poaching of barrows and other features if cattle only graze in the drier summer months, with the hardier sheep grazing through the winter. In future years this could be a possibility at Stonehenge, and it would be interesting to monitor the results and effects of such a regime.

The most important conclusion of this report is that it is essential that monitoring continues on an annual basis. The importance of this reversion project both nationally and internationally should not be forgotten, and priority should be given to the monitoring of the grassland and analysis of results. Ideally in a few years there should be an archive of data that can be analysed statistically and used effectively to advise both the National Trust and others on the best methods of reversion, grazing and management.

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Sainfoin in Seven Barrows Field Summer 2005



Photos - Felicitas Rohder

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COLCHICUM AUTUMNALE – A TWENTY YEAR STUDY IN BENTLEY WOOD

Pat Woodruffe

Introduction

It was far back in 1988 that we first decided to record the ups and downs of a population of Meadow Saffron (*Colchicum autumnale*) growing along one of the tracks in Bentley Wood. Bentley Wood occupies a large area east of Salisbury and south of the Winterbournes. As I described in Wiltshire Botany No. 1 (1997) the population has been well documented in the past, both in Donald Grose's flora in 1957 and, more recently in the 1993 flora (Gillam et al) although, to my knowledge, no-one had attempted to measure population size on an annual basis or to survey fluctuations within the population.

Methodology

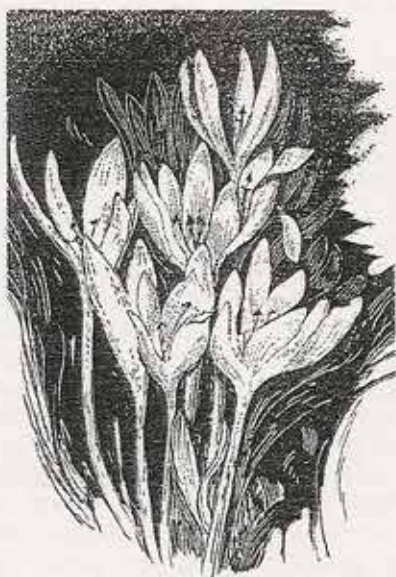
The main task undertaken has been a simple one - to record the number of flowers at the point when they reach a maximum each year. This is usually around late August and requires several checks within about a week to ensure that the best figure is obtained. I have found that it is preferable to wait until the flowers are a little past their best and then to count both dead ones and buds as well as those in full bloom. In addition, from time to time, the vegetative plants have been counted and also the number of capsules present. The plants are best assessed early in April before the surrounding vegetation springs into life but the capsule counts must wait until May or June if they are to be fully developed. Fortunately, the poisonous nature of all parts of the plant means that there is little predation and counts are reliable and thus comparable from year to year.

Over the years the population has been subdivided so that the progress of different sections within the site can be assessed. In particular, records have been made separately for north and south populations. The track along which they grow runs in an east - west direction and the population occurs on both sides, thus there are plants with both a southerly and a northerly aspect. In addition, there are many more trees on the south side and this leads to a situation in which the plants on the north side (south facing) are in a more open grassy sward whilst those on the south side (north facing) are under the canopy. Both the common name, Meadow Saffron, and the widespread distribution of the plant in alpine meadows indicate that the species prefers an open habitat and it is generally believed that in Britain open woodland is a last refuge for the species.

Management

Management of the population in Bentley has entailed an annual cut of the ride side vegetation in July, when the seeds are ripe and ready for distribution. If necessary, this is followed by further swiping during the autumn months, once flowering

Line art drawing of Meadow Saffron
(Roger Pearce)



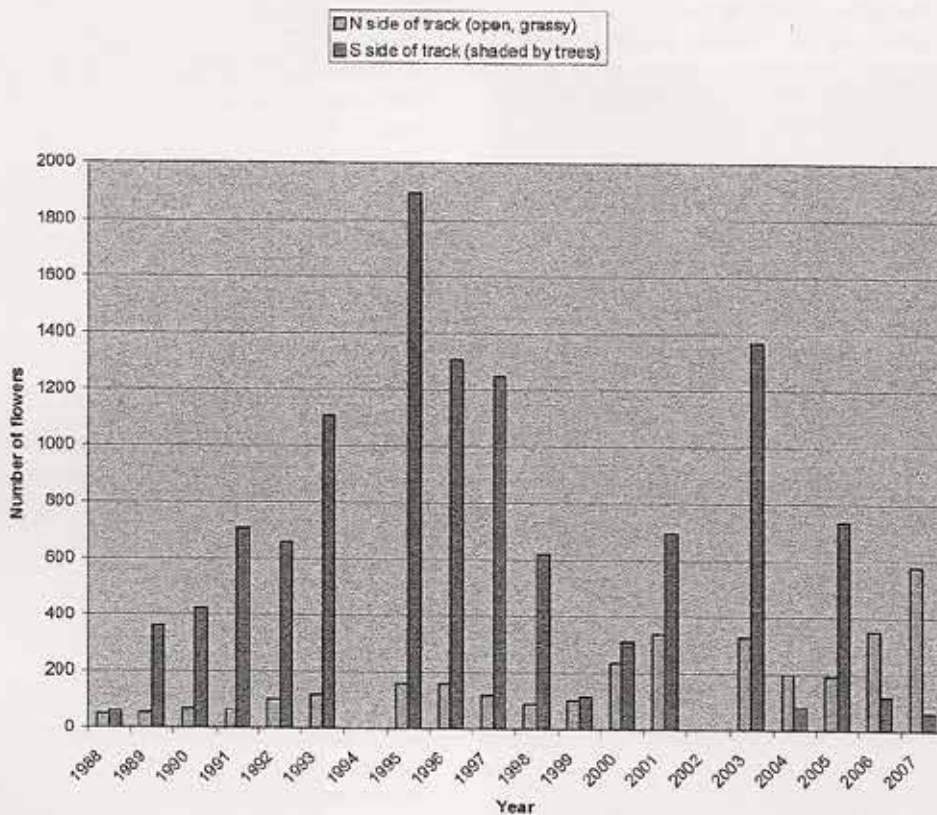
has ceased. In recent years the arisings have been removed. In January 1989 trees on the south side were thinned to reduce the canopy cover and allow more light to reach the forest floor. This has enabled a tractor and flail to be manipulated through the trees and the vegetation to be controlled. Underneath the trees the flora is fairly sparse and consists mainly of *Brachypodium sylvaticum* and *Pteridium aquilinum*. The growth of the latter is kept to a minimum both by the summer swipe and by the low light levels and, as a result, the flowers are able to develop in an open sward. On the northern side of the track, where there are few trees and the light levels are correspondingly higher, the growth of *B. sylvaticum* is more dense and the competition for space in which to flower is much more acute. The plants are probably more tolerant of these conditions than might be imagined because the leaves develop very early in the year and are almost fully developed before the rest of the ground flora, particularly the coarse grasses and bracken, make much impact.

Results

The results are shown in the table and graph below.

Colchicum annual counts 1988-2007

Year	N side of track (open, grassy)	S side of track (shad-ed by trees)	Total
1988	51	65	116
1989	54	360	414
1990	72	422	494
1991	69	709	778
1992	105	659	764
1993	119	1111	1230
1994			820
1995	162	1894	2056
1996	160	1304	1466
1997	122	1249	1371
1998	93	617	710
1999	102	115	217
2000	235	311	546
2001	337	691	1028
2002			
2003	328	1368	1702
2004	197	82	284
2005	192	738	930
2006	351	122	498
2007	578	63	654



Looking at the overall results – total number of flowers each year – it is clear from the data provided in the table and the graph that the annual display varies greatly from year to year. The intensity of the fluctuations is however much greater where the trees cast shade than it is in the more open situation. In the latter situation it might be suggested that a ten year cycle is developing in which a gradual increase in numbers is followed by a decline for a few years and then a further increase. The overall effect has been an increase from 51 flowers to 578 over the 20 years. Interestingly though, the three groups of flowers remain discrete and it is likely that reproduction is predominately vegetative, rather than by seed.

Under the canopy, the changes in flower numbers can be very marked from year to year. In 1988 just 65 flowers were recorded but, after some thinning work during the following winter, there were 360 the following August. Over the next seven years the numbers increased to almost 1900 only to be followed by several years of severe decline and then a marked increase followed by yet another decline. Up to this point it does seem that the two groups of plants, one on each side of the track, are following a more or less similar pattern although the precise year in which they each hit their highs and lows may not coincide exactly. This could lead us to think that weather conditions are the most important influence – and it certainly is a significant issue - but there are several other points to bear in mind:

- the peaks for the flowers growing under the canopy have diminished – even in good years the high of 1900 in 1995 has not been exceeded
- the lows for this group of plants have been very low indeed and on two occasions (2004 and 2007) have been close to the original number of 65.

These trends have culminated in 2007 in the most surprising set of data; the highest numbers recorded for the flowers in the more open situation contrasted with the worst set of records for those in the shade.

Adding to the picture

My immediate reaction, following a particularly poor display of flowers, has been to wonder just what we have done that is so wrong and to follow this with a resolve to look closely at the distribution of vegetative plants during the following spring. I did this in April 2005 and was considerably reassured.

Obtaining quantitative data that can be compared from year to year is much more difficult when trying to count plants rather than flowers. It is probably better to map groups of leaves and note their approximate size.

My first discovery was that there were many more groups of leaves than there were corresponding groups of flowers and that several of these had never been known to flower. It was clear that even where flowering had decreased dramatically, the plants were alive and well. The size of the leaves was also of interest, some were small and unlikely to support flowers whilst others were much more robust.

Reproduction: vegetative or by seed?

Richard Mabey (1996) likens the etiolated flowers of *Colchicum* that are growing in the shade to flowering toadstools. Their long, pallid stalks can scarcely bear the weight of the flowers, which quickly bend over and die. In 1997 I commented on the difference in ability to bear capsules when plants growing in shade and more open areas are compared. A check in 1992/3 revealed that 71 plants (discrete groups of leaves) growing in the shade produced only 8 capsules whilst in more open ground 10 plants produced 8 capsules and another group of 18 plants produced 35 capsules. This paucity of fruits from plants in the shade has been noted time and time again over the years.

The seed produced is viable and some that was planted by a 'Watch Group' of youngsters now flowers, some 10 years later, although I have not included this population in my counts. The seed is heavy and there seems to be little opportunity for natural dissemination – although in the hay field there is plenty of opportunity at harvest - explaining why the groups of plants, although often enlarged, are still easily identified and have seldom merged. Growing *Colchicum* in the garden also aids understanding of corm development. I know that I bought just 3 and, a few years later, could find a dozen. Thus the small leaves often found in some groups could either be from seedlings or from newly developed/split corms.

Some conclusions

I believe that light levels are critical to the development of flowers, although the plants can survive for a long time in the vegetative state. This explains the 2007 results in particular. We plan to remove some trees in the winter months and await next season's flowers with interest.

Plants growing in good light will flower more consistently and produce larger quantities of seed but colony expansion is possibly inhibited by the surrounding vegetation.

All colonies will have good and bad years that might be influenced by several factors such as weather conditions and splitting of large corms. A very wet

summer has certainly not deterred flowering in 2007 although, had data been available only from the shaded side, it might have been tempting to draw a different conclusion. I suspect, but cannot prove, that very dry weather, particularly in late summer is more detrimental to flower development.

It seems that the plants are well adapted to grow in open shade and, as long as the light levels are maintained, can proliferate at a greater rate than those which have to face stiff competition from the surrounding vegetation. The view that woodland is the last refuge for the species would appear to be upheld.

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Flowers in close-up - note the 6 stamens which distinguish it from *Crocus nudiflorus*, which has 3.



Group of flowers



Fruit



PLANT RECORDS 2006

Explanatory notes

- Y The following is a selection from WBS records received in 2006. For new pre-2006 records, the year is inserted in brackets after the recorder.
- Y Because of the enormous number of records received, only 1st 10 km square records are included. Where a 1st 10 km square record is identified, this is relative to the period since the flora mapping in the 1980s and 1990s for the 1993 Wiltshire Flora and recorded there.
- Y Where a record is also a 1st county or vice-county record, an unqualified statement means that it is the first record ever, as far as is known. Where the word "recent" is inserted, it means that it is the first since the flora mapping began, but had been recorded before this period.
- Where a recording square is only partly in Wiltshire, any comment on record status applies only to the part within Wiltshire.

Recorders are identified by initials as follows.

- | | |
|---|-------------------------|
| AB - Andy Byfield | AD - Tony Dale |
| ADe - A Deakin | AF - Alison Fowler |
| AM - Ailsa McKee | BG - Beatrice Gillam |
| BGo - B Goater | BL - Barbara Last |
| CB - C Bealey | CC - C Carvell |
| CCh - Clive Chatters | CG - C Greenwell |
| CK - Clare Kitchen | CMh - C McHardyDBr |
| D Broughton | DLa - David Lambert |
| DNe - David Nesbitt | DOG - Daphne Graiff |
| DWP - D W Price | ER - Eileen Rollo |
| FR - Francis Rose | GC - G Copley |
| Gareth Harris | GH - G Harris |
| GL - G Lee | |
| GY - Gwyneth Yerrington | HEt - H Etherington |
| HFG - Hants Flora Group | HP - Hannah Price |
| JEO - Jack Oliver | JFo - Jenny Ford |
| JGo - J Goater | JN - Joy Newton |
| JNo - John Notman | JO - John Ounsted |
| JP - John Presland | JPi - Jack Pile |
| JRM - John Moon | JW - Jean Wall |
| KJW - Kevin Walker | LMa - L Mantle |
| LSm - Linda Smith | MHe - Margaret Hedges |
| MK - Mark Kitchen | MM - M Mobsby |
| MMi - M Millett | MNb - Marion Nesbitt |
| MWa - Marjorie Waters | MWR - Martin Rand |
| NC - Nigel Cope | NS - N Stewart |
| PBu - Philip Budd | PG - Paul Goodhugh |
| PGr - Paul Green | PMW - Pat Woodruffe |
| PS - Phyllida Sneyd | PSe - Pete Selby |
| PSk - Paul Skelton | PW - Phil Wilson |
| RAi - Richard Aisbitt | RDu - Rosemary Duckett |
| RE - Richard Elkins | RFPy - Richard Pywell |
| RL - Rob Large | RV - Roger Veall |
| RW - R Walls | SHe - Sonia Heywood |
| SL - Simon Leach | SPi - Sharon Pilkington |
| SY - S Young | TR - T Reynolds |
| VH - Val Hopkinson | |
| WBS - Wiltshire Botanical Society (excursion) | |

Echinochloa crus-galli (Cockspur Grass)



NNR stands for National Nature Reserve
CWP stands for Cotswold water Park

Vc 7

Abies grandis; JEO; E of Marlborough; Savernake Forest, 3 seedlings; 1st county record.

Alisma lanceolatum; NS/MMi (2004); Oaksey; CWP, Lake; NS; Ashton Keynes; CWP, pool and lake.

Anemone apennina; JEO; Great Bedwyn; grassy embankment; 1st recent county record.

Barbarea intermedia; MK/CK (2003); Brokenborough; arable field.

Bassia scoparia; SL; Sutton Benger; M4 motor-way; 1st county record.

Berberis daewinii, JEO; West Kennet; roadside; 1st county record.

Bolboschoenus maritimus; WBS; Ashton Keynes; CWP, in Phragmites.

Borago officinalis; JEO; Marlborough; road-wall angles.

Catabrosa aquatica; SPi/JN; Ashton Keynes; CWP, lake, plenty in shallow water/mud.

Cornus sericea; DBr; Ramsbury; river.

Cotoneaster simonsii; JN; Ogbourne Maizey; railway path, 6 foot bush - known many years.

Crocsmia x crocosmiiflora (C. pottsii x C. aurea); JEO; Ashton Keynes; reedswamp, 2 clumps.

Cyclamen repandum; JEO; Lockeridge; forestry earth barrier; 1st vice-county record.

Cyperus eragrostis; GH (2005); Ashton Keynes; one plant, lake.

Cystopteris fragilis; CK/MK (2003); Tetbury; bridge.

Datura stramonium; JN; Ramsbury; several in gravel path, from bird seed.

Echinochloa crus-galli; JP; Little Ashley; one clump at roadside.

Epilobium brunescens; SPi/JN; Ashton Keynes; CWP, quite common in open ground between trees; 1st county record.

Epilobium montanum x E. ciliatum; JEO; Preshute East; among parent plants; 1st county record.

Epilobium x limosum (E. parviflorum x E. montanum); JEO; Preshute East; among parent plants; 1st recent county record, 1st vice-county record.

Eschscholzia californica; JEO; West Overton; wall-road angles; 1st recent county record, 1st vice-county record.

Euphorbia thymifolia; PGr (2005); Atworth; weed in nursery; 1st county record.

Fallopia x bohémica (F. japonica x F. sachalinensis); SPi; Martinslade; several clumps 2m across beside canal towpath; 1st vice-county record.

Fumaria densiflora; TR; Cannings; 2 plants; SPi; West Overton; one in very stony field margin.

Galinsoga parviflora; GY; Bradford-on-Avon; gutter of a layby.

Geranium pusillum; RAi; Wroughton; wheat field.

Geranium versicolor; RAi; Wroughton; long grass/nettles, 1m patch, roadside.

Helleborus foetidus; CK/MK (2003); Brokenborough; at roadside, probably introduced with dumped material; JEO; Lockeridge; hedge, 2 plants, possibly old garden escapes.

Helleborus orientalis; JEO; 2 clumps, woodland.

Helleborus viridis; SPi; Slaughterford; small colony at top of laneside bank. 2m x 1m; JEO; Lockeridge; woodland, 3 patches.

Hieracium scotostictum; JEO; Lockeridge; road-wall angles, increasing; 1st county record.

Hypericum elodes; RL (2005); Froxfield.

Juncus subnodulosus; RAi; Wroughton; wet flush below springs from chalk, 10 x 10m patch.

Kickxia elatine; JN; Chiseldon; edge of rape field; SY; Slaughterford.

Kickxia spuria; JN; Chiseldon; edge of rape field.

Lathyrus sylvestris; RAi; Wroughton; wood,.

Legousia hybrida; TR; Berwick Bassett; 3 plants; Cannings; rare.

Leucjum aestivum subsp. aestivum; RAi; Swindon, west; wet area between cycle track/railway, 100s of clumps, typically with 50 flower stalks.

Linaria pelisseriana; JN; Ogbourne St George; waste ground, one; 1st county record.

Lysimachia punctata; JEO; Lockeridge; woodland.

Mentha x verticillata (M. arvensis x M. aquatica); NS/MMi (2004); CWP, 4 places.

Myosotis secunda; WBS; Ashton Keynes; CWP, lake.

Nymphaea marliacea; WBS; E of Marlborough; Savernake Forest, pond; 1st county record.

Nymphoides peltata; NS (2004); Ashton Keynes; CWP, lake.

Oenothera glazioviana; JN; Ogbourne St George; waste ground.

Orchis ustulata; GL/LMa; Minety; meadow, one.

Ornithogalum angustifolium; JEO, JW; Turleigh; shaded hedgerow, extending 2-3 metres.

Papaver hybridum; TR; Bishops Cannings; rare.

Petasites fragrans; RAi; Wroughton; extensive at edge of wood around clearing.

Petroselinum segetum; SPi; Chippenham; c.7 in mown grassland next to kerb.

Phacelia tanacetifolia; JN; Axford; rape field.

Platanthera bifolia; JFo (2004); Avoncliff; wood edge.

Poa angustifolia; SPi; Chippenham; a few clumps on top of limestone wall.

Poa compressa; JEO (2004); Malmesbury; JW (2005); Malmesbury; wall top.

Polypodium interjectum; JP; Conkwell; several plants on several dry stone walls.

Polystichum aculeatum; RAi; Wroughton; wood, several in steep dry gully.

Puccinellia distans; SPi; Melksham; A350, frequent in cracks in central reservation and traffic island.

Ranunculus circinatus; NS/MMi (2004 and 2006); Ashton Keynes; CWP, lake, 6 places.

Ranunculus peltatus; RL; Castle Combe; several large plants in mid-stream.

Ranunculus penicillatus subsp. pseudofluitans; DBr; Mildenhall; river; Ramsbury; river.

Rosa micrantha; JN; Great Bedwyn; old track.

Rosa rubiginosa; JN; Cherhill; track to down..

Rumex hydrolapathum; WBS; CWP, lake.

Rumex x ruhmeri; JEO; Oaksey; Common; Minety; common.

Salvia pratensis; ADe; Swindon N; one plant in species-rich neutral grassland . possibly sown with wildflower seed; 1st recent vice-county record.

Schoenoplectus tabernaemontani; JN; Swindon; pond, over 5 square metres.

Sedum forsterianum; JEO; Marlborough; wall-road angle and pavement.

Senecio inaequidens; SPi; Chippenham; Cattle-market, spreading; 1st county record; Trowbridge; one by roadside.

Solidago gigantea; JEO; Ramsbury; field/roadside.

Symphytum grandiflorum; JN; Bromham; market gardens, large area at edge of field near houses.

Teucrium chamaedrys x T. lucidum; JEO; Lock-eridge; vertical garden wall, garden escape, for over 37 years. 1st county record.

Thalictrum minus; JEO; Clatford; small patch, grassland.

Tilia cordata; RAi; Wroughton; wood, pathside, among large beech trees, main trunk about 3m in circumference.

Valerianella carinata; SPi; Rudloe; beside gateway to house, patch of 10+ plants.

Vulpia bromoides; SPi/JN; CWP Lake; small colony on bank.

X Festulolium loliaceum (Festuca pratensis x Lolium perenne); JN; Malmesbury; wet meadow.

Vc8.

Aconitum napellus; RDu/PS; Erlestoke; 30 in field.

Anthemis arvensis; TR; Bulford.

Asplenium adiantum-nigrum; RV (2002); Whits-bury; roadside bank.

Aster x versicolor (A. laevis x A. novi-belgii); RV (2002); West Wellow; roadside.

Astragalus danicus; JRM; N of Bulford; 1 beside track; ER; NW of Tidworth; abundant by track.

Bassia scoparia; SL; A303 road verges, from Wylve to Thruxton for about a mile and several plants in two locations at Amesbury; 2nd county record, 1st vice-county record.

Berberis vulgaris; RL; Salisbury; two bushes on the edge of a woodland ride.

Betula pubescens; PW (2001 and 2005); S of Winterbournes; Bentley Wood, 9 places.

Blechnum spicant; DLa (2004 and 2006); S of Winterbournes; Bentley Wood, 3 places.

Carex humilis; NC (2005); Great Cheverill; down-land, 3 places; SPi/ PMW; Gasper.

Carex pallescens; SPi/ PMW; Gasper.

Carex paniculata; SPi; South Newton; occasional on river bank.

Carex pilulifera; PW; S of Winterbournes; Bentley Wood, beech stand.

Catapodium rigidum; SPi; Heytesbury; BL; Martin; SPi; Bulford.

Centaurea cyanus; SPi; Bishops Cannings; plentiful in weedy headland strip, obviously sown.

Cerastium arvense; SPi; Imber; in near-bare chalk at edge of well-used track.

Cerastium pumilum; SPi; Tidworth; locally frequ-ent in tank-tracks; 1st recent vice-county record; Heytesbury; hundreds of flowering plants in a very small gravelly area; ER; Tidworth; chalky track/earthwork, small population.

Ceratophyllum demersum; SPi/ PMW; Stourton; Most common macrophyte in pond.

Chamaecyparis lawsoniana; PW (2001); S of Winterbournes; Bentley Wood, 3 sites, including edge of cleared area.

Cirsium tuberosum; KJW, RFPy/CC (2001); Warminster; 10 pure plants, with 12 hybrids, on small arms range, in area cut for training and 1 plant on level downland, 150cm diameter 56 flowering stems; Heytesbury; 5 on firing range; Market Lavington; downland, over 300 plants, extending 200m along W-facing slope/valley bottom.

Cirsium x medium (C. tuberosum x C. acaule); KJW/ RFPy/CC (2001); Market Lavington; c.20 among big colony of C. tuberosum; Warminster; 12 plants, with similar number of pure tuberosum; LSm (2004); Martin; NNR, downland, one flowering plant.

Coeloglossum viride; SPi; Warminster; a few, on earthwork.

Consolida ajacis; VH; Tisbury; edge of wheat crop, probably introduced with the grain.

Crassula helmsii; SPi (2004); Trowbridge; spread-ing from edge of old pond.

Cynoglossum officinale; PSe/BGo/JGo (2000); Martin Down; JP; Iford; several at edge of meadow.

Cyperus fuscus; CCh/AF; Breamore; marsh; 1st county record.

Danthonia decumbens; SPi/MWa/SY; Martin; NNR.

Datura stramonium; RE; Redlynch; garden, poss-ible bird seed origin.

Diplotaxis muralis; SPi; Trowbridge; 1 plant in wall-pavement angle.

Dryopteris affinis; RV (2002); Whitsbury; on valley gravel in strip of woodland.

Echinochloa crus-galli; SL; Amesbury; A303 road verges; SPi; Warminster; one plant in garden; A36, on verge in salt-spray zone, for several km.

Erodium cicutarium; JO/ PSe (2000); E Martin.

Eruca vesicaria; SPi/JFo; Wedhampton; plentiful in weedy field margin; SPi; Eastcott; field margin, light soils, also other fields nearby; Urchfont; corner of cornfield, and other fields in the area.

Fumaria densiflora; WBS (2005); Henley; RL; Pewsey; several in cultivated margin, amongst lots of

F. officinalis; SPi; Winterbourne Stoke; margin of field of fodder legumes; JRM/TR; Bulford, several places; RDU; Tidworth; recently ploughed game plot.
Galeopsis angustifolia; PSk; Tilshead; 1 on track.
Galinsoga quadriradiata; MHe (2002); West Wellow; in plenty in large vegetable patch.
Galium mollugo subsp. erectum; BGo/JGo (2000); Martin; NNR, 3 places; 1st vice-county record; HFG (2004); Porton.
Gentianella anglica; BGo/JGo (2002); Martin; NNR, one patch in short calcareous turf.
Gentianella germanica; MNb/DNe; Martin; NNR, 11 plants, on edge of a chalky track; 10k
Geum x intermedium (G. urbanum x G. rivale); SPi; Ludgershall; wood, beside a vehicular track, both parents nearby.
Glyceria declinata; SPi/JFo; Milston; Small patch on river bank.
Glyceria x pedicellata (Fluitans x G. notata); PW (2001); S of Winterbournes; Bentley wood, 2 places.
Hieracium sabaudum; PMW (2005); S of Winterbournes; Bentley Wood, 3 places.
Hyacinthoides x massartiana; JEO (2003); Tollard Royal; small colonies fringing woods.
Hypericum androsaemum; SPi/PMW; Stourton; 1 immature plant by track.
Isatis tinctoria; RL/HP; Pewsey; several on chalk spoil, seed planted from local archaeological dig.
Isolepis setacea; PBU (2002); Damerham; JFo (2005); W of Warminster; Longleat, damp track.
Juncus bulbosus; SPi/PMW; Stourton; damp track.
Juniperus communis; BGo/JGo (2002); Martin; NNR, one large bush.
Kickxia elatine; JFo; Heytesbury.
Kickxia spuria; VH; Tisbury; Upper Chicksgrove.
Lamium hybridum; SPi; Warminster; edge of wild bird/game strip.
Lilium martagon; JP; Iford; locally abundant along pathsides in woods, presumably introduced when gardens planted in 19th Century, but very naturalised.
Linum bienne; SPi; Heytesbury; a few plants, trackside; Imber; frequent; SPi/RDU; Chitterne; many plants, local in disturbed ground trackside.
Lonicera nitida; MWR; Damerham; wood.
Lotus glaber; SPi; Warminster; a few plants, nr heavily disturbed ground; Heytesbury; one plant; SPi/HET; PSk; Imber; 2 plants.
Lunaria rediviva; RDU; Bratton; several plants, not nr houses on lane bank; 1st county record.
Lupinus polyphyllus; BL; Fovant; road verge.
Luzula sylvatica; PW; S of Winterbournes; Bentley Wood, 3 places.
Lythrum portula; SPi/PMW; Stourton; very wet muddy rut nr track.
Melissa officinalis; JNo (2001); S of Winterbournes; Bentley Wood.
Mentha spicata; RV (2002); West Wellow; road verge.
Minuartia hybrida; NC (2005); Stokehill North; Great Cheverill; SPi/JFo (2005 and 2006); Imber;

plentiful beside track; SPi; Heytesbury; very short vegetation, many thousands; Tidworth; Tidworth; Tilshead; 5 places, plentiful or occasional on track, on anthill and tank-disturbed ground; Shrewton; chalky banks by track. SPi/RDU; Chitterne; many plants, local in disturbed trackside; SPi/PSk; Warminster; 3 places, reasonably common in disturbed ground and on track.
Narcissus x incomparabilis (N. poeticus x N. pseudonarcissus); JEO; Manningford Bruce; roadside, railway embankments, field sides, dozens.
Narcissus poeticus; JEO (2003); Tollard royal; small colonies fringing woods.
Narcissus pseudonarcissus; AM; Semley.
Narcissus pseudonarcissus subsp. major; JEO; Manningford Bruce; 9 places on railway embankments, roadsides and field sides, often 100s.
Narcissus pseudonarcissus ssp. pseudonarcissus; JEO; Manningford Bruce; 6 places, roadsides and railway embankments clumps, dozens; Sharcott; railway embankments, dozens.
Neckera complanata; SPi (2005); Limpley Stoke; 2 places, 1 on limestone wall; 1st county record.
Nepeta cataria; JRM; Bulford; field margin.
Oenothera glazioviana; MHe (2001); West Wellow; JN; Ogbourne St George; waste ground.
Ophioglossum vulgatum; NC (2005); Great Cheverill; downland; JPi; Bratton; downland, large patch in gorse; Warminster; 2 patches in old orchard.
Orchis morio; BGo/JGo (2002); Martin; NNR; NC (2005); Great Cheverill; downland; Erlestoke.
Orchis ustulata; FR (2000); Martin; NNR, 1-3 spikes at 12 places; NC (2005) Stokes Hill N.
Ornithogalum angustifolium; GC; Martin; side of green lane, fairly frequent.
Ornithogalum pyrenaicum; JPi (2002); Bratton; hedge.
Papaver argemone; JRM; Bulford; 10k
Papaver dubium subsp. lecoqii; RDU; Westbury; weed in several gardens.
Pinus nigra; PW/PMW (2000 and 2001); S of Winterbournes; Bentley wood, 5 places.
Platanthera bifolia; SPi/JFo; Heytesbury; in very species-rich grassland - very orchid-rich.
Platanthera chlorantha; PSe (2000); Martin; NNR..
Poa humilis; PW (2001); S of Winterbournes; Bentley Wood.
Polygonum rurivagum; JRM; Bulford; SPi/HET; Tilshead; abundant in game plot, huge population.
Polypodium interjectum; MWR; Damerham; wooded bank on side of lane.
Polypogon monspeliensis; JFo; Farley; arable field margins; 1st recent county record.
Polypogon viridis; SPi; Trowbridge; side of road and wall-pavement angles, seems to be spreading in the town; 1st county record.
Populus nigra ssp. betulifolia; TR; Teffont Evias; 2 mature trees on a farm.
Populus x canadensis (P. deltoides x P. nigra); JP; Trowbridge; row of about 10 mature trees in park.

Potamogeton berchtoldii; PMW (2004 and 2005); S of Winterbournes; Bentley Wood, pond + scrapes; SPi/ PMW; Stourton.

Potamogeton lucens; SPi (2004); Freshford; river, many.

Pseudosasa japonica; RV (2002); West Wellow; common, many small plants from next property; 1st county record.

Puccinellia distans; SPi/JFo; Amesbury; 1 plant in paved area of road bridge; 1st vice-county record; Upton Lovell and Deptford; frequent in salt-spray zone for miles along A36 SPi; Warminster and Stapleford, A36, frequent in salt-spray zone for many miles PMW; Alderbury; A36 for several miles, growing with *Spergularia marina*.

Pulicaria vulgaris; MWR/RW (2005); Bramshaw; group of 8; 1st recent vice-county record.

Pulsatilla vulgaris; SPi/MWa/SY/BL/AD; Martin; NNR, 2 on earthwork; 1st recent county record; 1st vice-county record

Ranunculus arvensis; SHE; Rushall; frequent.

Ranunculus penicillatus subsp. pseudofluitans; SPi; Newton Tony; abundant in river channel; SPi; Norton Bavant; river.

Ranunculus trichophyllus; SPi (2004); Southwick Trowbridge; one on mud at bottom of dried out pond.

Rosa micrantha; BGo/JGo (2000); Martin; NNR, occasional in scrub.

Rubus purbeckensis; BGo/JGo (2002); Martin; NNR, track alongside wood; 1st county record.

Sagina nodosa; PSk; Bratton; track; Imber; track.

Salix x reichardtii (S. caprea x S. cinerea); SPi; North Bradley; embankment, one shrub; 1st vice-county record.

Saxifraga tridactylites; JPi; Bratton; downland; JPi; Erlestoke; old tanks/ant-hills. SPi/JFo; Imber; large bomb crater; SPi/JFo/RDu/CMh; Market Lavington; shell craters.

Senecio inaequidens; SPi; Trowbridge; roadside, one; 1st vice-county record.

Senecio viscosus; JRM; Bulford; field.

Silene noctiflora; JRM; Bulford; headland and field margins, 6 places.

Smyrniololus atrum; SPi; Freshford; side of canal.

Spergularia marina; SL(2005); Fonthill Bishop to Cholderton, and Salisbury; A303 road verges, various places; 1st county record; SPi; Warminster and Deptford; A36, frequent in salt-spray zone for many miles, often with *Puccinellia distans*; PMW; Alderbury and W Grimstead; A36, large quantities often with *Puccinellia distans*.

Spiranthes spiralis; SPi; Warminster; 5 places on downland, including species-rich CG2.

Stachys arvensis; SHE; Rushall; shady field track.

Tephrosia integrifolia; BGo/JGo (2000); Martin; NNR, short calcareous turf.

Thesium humifusum; DOG (2005); Newton Tony.

Thuja plicata; PW/PMW (2001 and 2005); S of Winterbournes; Bentley Wood.

Trifolium medium; NC (2005); Great Cheverill; 2 places.

Tsuga heterophylla; PW (2001); S of Winterbournes; Bentley Wood, 3 places.

Ulex gallii; WBS; Landford; bog.

Vaccinium myrtillus; SPi/ PMW; Stourton; heathy bank by track.

Valerianella dentata; TR; Bulford; occasional; Winterbourne Stoke; downland, locally frequent.

Veronica agrestis; SHE; Rushall; field; SPi/HET; Tilshead; uncommon, in very species-rich game plot.

Veronica x lackschewitzii; SPi/JFo; Amesbury; river.

Viola palustris ssp. palustris; RV (2005); West Wellow/Plaitford; commons, 8 places, including beside boundary stream, hundreds or thousands; 1st county record.

Viola tricolor; AB/DWP; Charlton-All-Saints; arable field margin.

Viola x bavarica (V. reichenbachiana x V. riviniana); SPi; Ludgershall; both parents plentiful nearby; 1st recent county record.

Viola x contempta (V. arvensis x V. tricolor); JRM; Bulford; field margin; 1st recent county record.

Vulpia bromoides; SPi; Tidworth; Occasional in tank scuffs; Trowbridge; trackway.

Vulpia myuros; SPi; Trowbridge; kerbside, a few, and side of road, in wall-pavement angle.

Zannichellia palustris; SPi; Steeple Langford; river; Upper Woodford; abundant in parts of the channel; South Newton; abundant in river.

NOTES

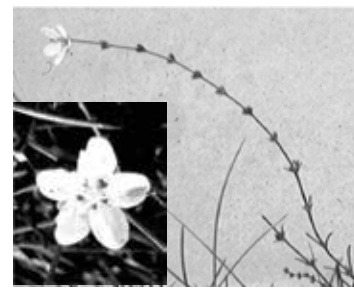
While they are not new records, it is worth mentioning 2006 refinds of **Arabis glabra** at Chittoe (Jenny Ford and Dominic Price) and **Herminium monorchis** near Shalbourne (Sarah Priest).

It would greatly help the compiling of these reports if recorders could state the nearest town or village.

Senecio inaequidens



Sagina nodosa
(Knotted Pearlwort)



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