

EDITORIAL

Wiltshire Botanical Society was founded in 1992. A large group of enthusiasts had been recruited and trained to observe and record wild plants in Wiltshire during the work for the 1993 Flora of Wiltshire. It was felt to be important to maintain this joint interest and activity. The Society was therefore inaugurated to act as a focus for its continuation.

The aims of the Society, as enshrined in its constitution, are;

- To encourage anyone interested in plants, both beginners and knowledgeable botanists.
- To be a forum where members can learn more about plants and exchange ideas and information, eg by holding field and indoor meetings and by producing a newsletter.
- To organize projects and working groups to study aspects of the Wiltshire flora.
- To encourage a respect for and conservation of the Wiltshire flora and habitats.
- To study and extend knowledge of the Wiltshire flora.

The Society has maintained its membership, which now numbers 80-90, and has organized a consistently interesting programme of events. An informative and interesting newsletter has appeared regularly. A wide range of detailed work on the Wiltshire flora has been undertaken. To encourage and coordinate this work, a Science Group was set up in 1994. Its aims, summarized from the more comprehensive account in its minutes, are:

- To encourage, advise and guide recording activities.
- To play a part in the planning of meetings and workshops to maximise their educational impact. To facilitate identification of plant material.
- To organize and publish records.
- To ensure that surveys and other projects are carried out in as effective and scientific a manner as possible.
- To publish articles on or closely related to Wiltshire botany which should have a more scientific content than material appropriate for the newsletter, but still be of interest to the general reader.

To further the last of these aims, it was decided to publish a journal, of which this is the first issue. At the moment, no commitment has been made to publish regularly, but it is hoped that sufficient further work will be undertaken and written up to produce further issues at intervals. Articles included might deal with research and/or practice in, for instance, plant identification, habitat and species surveys, updating of records, or habitat management.

This first issue illustrates well the wide range of work undertaken. Firstly, there are surveys of particular habitats - the Wiltshire part of the New Forest by Philip Wilson and Wiltshire riverside vegetation by Jack Oliver. David Green contributes a single species study - of Black Poplar (*Populus nigra* ssp *betulifolia*). There are articles which combine recording with conservation activities - control of Bracken (*Pteridium aquilinum*) and promotion of Autumn Saffron (*Colchicum autumnale*) in Bentley Wood by Pat Woodruffe, and conserving Green-winged Orchid (*Orchis morio*) on a Water Board site at Winsley by John Presland. John Presland also contributes an

Wiltshire Botany 1, 1997, pages 1-2

identification article, distinguishing Fodder Vetch (*Vicia villosa*), found at Trowbridge, from Tufted Vetch (*Vicia cracca*). An edited version of the Society's 1995 records is included.

Articles for future issues should be submitted to John Presland, 1 75c Ashley Lane, Winsley, Bradford-on-Avon, BA15 2HR, who will also be pleased to discuss proposed articles informally (Tel: 01225 865125). A leaflet is also available offering guidance to authors on the most helpful forms in which to submit articles.

WILTSHIRE RIVERSIDE FLORA IN THE 1990s

Jack Oliver

Introduction

The first Local “Agenda 21” conference recently held at Trowbridge focused on concerns about the effects of mankind on the environment (Wiltshire Forum 1996). Emphasis was put on the need for effective improvement programmes to include local research to provide baselines for the monitoring of future changes. Members of WBS with a particular interest in river and stream flora were involved in recording it in Wiltshire between 1992 and 1996. Here the results of their work are presented with the aim of providing an “Agenda 21” baseline for this habitat.

The provision of a baseline for Wiltshire rivers is necessary because previous recording has not provided data specifically for this purpose. Neither the County Flora written by Grose (1957), nor that of Gillam, Green and Hutchison (1993), recorded plants with this particular purpose in mind. Grose did produce lists of the flora of watery places, but his main species summaries did not distinguish rivers and streams from other “watery habitats”, and the frequencies of the floating and submerged aquatics were lumped in with those of the fringing and riverbank plants. Furthermore, marked changes in the plant populations have taken place since then.

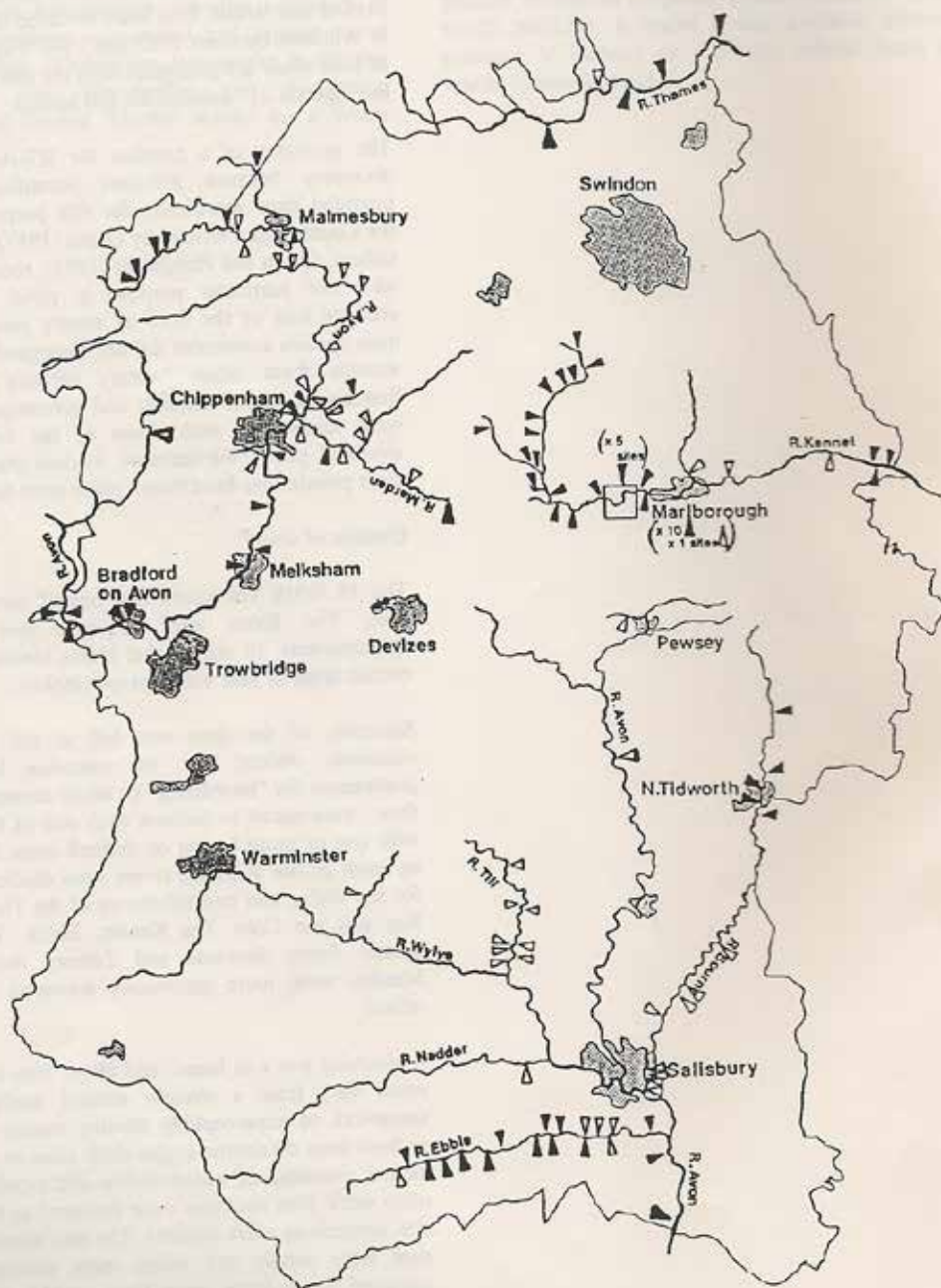
Outline of study

The 19 WBS volunteers and myself surveyed 129 sites. The forms used required four seasonal reassessments, to ensure that plants obvious only at certain times of year were not overlooked. Selection of the sites was left to the individual volunteer, except that, to overcome bias from preferences for “interesting” or easily accessible sites, they were asked to balance each one of these sites with one or more boring or difficult ones. Locations on most of the Wiltshire rivers were studied, except for the Wylye and two tributaries of the Thames, the Ray and the Cole. The Kennet, Ebbles, Till, main Bristol Avon, Sherston and Tetbury Avons, and Marden were more generously surveyed than the others.

A riverside site was linear, and about 50m long, and could vary from a straight vertical earthbank or stonework to imperceptibly slanting marshy ground; or from deep 60 degree angles ditch sides to complex natural riversides of varied widths and depths. Quite often extra 50m stretches were surveyed at the same site, comprising extra subsites. The map shows where sites were simple and where extra subsites were surveyed. In the latter cases, there could be immense variability between the two, three or four 50m subsites at (say) one bridge. 50m upstream (North bank) could be closely grazed to the water’s edge; 50m downstream (North bank) might be shaded by trees with branches over the water; 50m upstream (South bank) the water’s edge might be separated by rough vegetation from the ubiquitous barbed wire fence bounding an arable field; the remaining fourth bank might be partly managed for fishing and topped by a footpath.

Map of river sites surveyed 1992-1995

- ▼ = sites with riverside subsites
 ▽ = sites without riverside subsites



Three types of site were categorised by size of the river as follows:

- locations on rivers more than 10 metres across; mainly River Thames, (Bristol) Avon, Salisbury Avon, lower Kennet and River Nadder near Ugford (46 sites, 115 riverside subsites);
- rivers and streams less than 10m across, but flowing (63 sites, 110 riverside subsites);
- winterbournes and channels only flowing for quarter of the year (20 sites, 58 riverside subsites).

For the vascular plants, separate lists and frequency scores per species were made for the riversides and the river channels. The latter included the true aquatics (the floating and submerged plants), but also the emergent aquatics (rooted plants growing from out of the water). Terrestrial species also invaded the channels of winterbournes and slow-flow or drying-up streams, and the edges of larger river channels in summer. The channels were defined as those parts of the river, winterbourne, stream or ditch below the average winter water levels. Above the channels, the riversides included marshy edges, fringes, and the sloping (or sometimes vertical) parts of the banks. This paper is concerned with the riverside species frequencies, and therefore considers the following:

- Emergent aquatics which also spread to riversides and banks;
- Wet-loving plants;
- Terrestrial plants which invade rivers, streams and ditch sides.

Some species were very successful in colonizing both the banks and the channels. Scores for the latter habitat have not been included here, but mention is made of these species where their overall abundance (banks and channels together) takes them into a higher placing than competitors largely or completely confined to riversides.

As a special case, tree species (including suckers, seedlings and hedged species) and woody plants, but not grasses or herbs, were recorded from the tops of the banks as well as the sloping sides.

Each tree species was simply noted as absent, present, or more than one per subsite, and naturally occurring or planted.

For each and every herbaceous species, shrub and grass, quantitative estimates were made at each site and subsite. Grose's (1957) scoring system was used - at each site, each plant species was given a score according to whether it was abundant (10), frequent (6), occasional (3), or simply present (1). All the scores for each plant were totaled to give an overall frequency score for each of the three categories of sites, and for all sites combined.

Results: I. Trees

Including those shrubby trees capable of achieving 5-10m in height, 45 species of riverbank tree were recorded, or 56 taxa including hybrids and subspecies, in all from 17 families. The categories and numbers of species in each were as follows, the bracketed numbers indicating the additional hybrids and subspecies.

Naturally occurring 33 (39)

Planted but suckering extensively (mainly hybrid poplars) 6 (10)

Planted, non-natives usually (eg Weeping Willow, *Salix x sepucralis*) 6 (7)

Totals 45 (56)

In the 1990s the most common riverbank trees from the 129 sites and 283 possible (bank) subsites were found to be as follows.

1st. Hawthorn (*Crataegus monogyna*).

91 sites, 148 subsites. This was often in the form of a hedge on one side of a tributary or ditch, taking the adjacent field to the immediate edge of the water. However there were also numerous fruiting trees by the riversides, and Hawthorn berries were often seen floating on sluggish water or resting on mud. Seedlings seldom seen in the channels, but sometimes on banks.

2nd. Crack Willow (*Salix fragilis*).

79 sites, 131 subsites. Old trees or ancient pollards reaching the ends of their lives, some falling inwards and rooting in the channels. Separated rooting and leafing fragments in the channels also fairly commonly seen, the branchlets having snapped off upstream and remained viable.

3rd. Ash (*Fraxinus excelsior*).

69 sites, 111 subsites. Seedlings and saplings on the banks and on mud in the channels, but cleared as part of flood control measures whenever established in the channels.

4th. Elder (*Sambucus nigra*).

69 sites, 106 subsites. Seedlings and (usually shrubby) trees of all ages. Often also with hawthorn in bankside hedging.

5th. Sycamore (*Acer pseudoplatanus*).

44 sites, 72 subsites. Seeding on mud and banks common, often progressing to young trees.

6th. English Elm (*Ulmus procera*).

37 sites, 55 subsites. Common as suckering thickets and taller suckering young trees, but also sometimes another constituent of bankside hedging. Suckers sometimes invaded ditches, streams and river channels.

7th. Alder (*Alnus glutinosa*).

41 sites, 52 subsites. At 32% of sites and 8% of subsites; only few young trees, and the only 2 seedlings noted were on urban riverbanks on wet stonework. Seldom found upstream.

8th. White Willow (*Salix alba*).

41 sites, 52 subsites. As for Crack Willow above and often with it, but rooting less often as viable fragments in the river channels.

9th. Hazel (*Corylus avellana*).

31 sites, 37 subsites. Occasional young shrubby trees and seedlings, and sometimes a stream or ditchside hedging constituent.

10th. Grey Willow (*Salix cinerea*).

27 sites, 34 subsites.

11th. Field Maple (*Acer campestre*).

23 sites, 33 subsites. Seedlings seen on banks and in channel mud. Younger and older trees occurred, and sometimes a constituent of stream and ditchside hedging.

12th. Goat Willow (*Salix caprea*) &

13th. Osier (*S viminalis*).

22 sites, 28 subsites and 20 sites, 20 subsites respectively.

No other tree species was found at more than 16 (12% of) riverbank sites, but the next five species were, in order, Horse Chestnut (*Aesculus hippocastanum*, seedlings sometimes on banks or in mud), Oak (*Quercus robur*), Beech (*Fagus sylvatica*), Wych Elm (*Ulmus glabra*) and surprisingly Yew (*Taxus baccata*). A number of different Poplar species and non-native hybrids have also started to sucker along river banks, especially at village, suburban and plantation sites.

Results: II. Commonest herbs, grasses, climbers and scrambling plants

There were 395 taxa (including subspecies and hybrids), or about 390 species from 62 families noted in all on riverbanks. The top 40, those found in greatest quantities are listed in the table. This table provides, in its six columns, the following information:

- Column 1 - the name of the species
- Column 2 - its status, i.e., whether
 - B - occurs on any sloping part of the banks or riverside down to the water's edge;
 - U - occurs usually only on the upper part of the slopes, or seldom inundated
 - C - occurs often also in the channels;
 - E - can also be an emergent species, growing from the water;
 - F - can also be a floating species;
 - S - can also be a submerged species, growing under the water.
- Column 3 - provides for each species, three numbers separated by dots. These show, for sites classified as upper winterbournes or having 6 months without flow, in the order of occurrence (from left to right):
 - the overall frequency score of the species; the number of subsites at which it was recorded;
 - the number of sites at which it was recorded.
- Column 4 - provides the same kinds of information as Column 3 for streams or rivers less than 10m across
- Column 5 - rivers more than 10m across
- Column 6 - provides the same kinds of information as Column 3 for all categories of site combined

Table summarizing data on the 40 commonest riverside species (excluding trees)

1 SPECIES	2 STATUS	3 UPPER WINTER- BOURNES OR 6 MONTHS WITH- OUT FLOW [580.58.20]	4 STREAMS OR RIVERS (less than 10m across) [1100.110.63]	5 SITES AT LARGER RIVERS (more than 10m across) [1150.115.46]	6 TOTALS, ALL SITES [2830.283.129]
<i>Urtica dioica</i>	BC	562.58.20	815.104.59	989.114.46	2366.276.125
<i>Galium aparine</i>	B	423.53.18	370.72.47	489.84.38	1282.209.103
<i>Epilobium hirsutum</i>	BC(E)	102.23.13	357.67.47	503.86.44	962.176.104
<i>Poa trivialis</i>	BC(E)(S)	205.47.18	332.56.35	392.89.38	929.192.91
<i>Phalaris arundinacea</i>	BCE	144.23.12	337.64.42	386.70.36	867.157.90
<i>Arrhenatherum elatius</i>	U	358.48.17	251.49.33	246.57.34	855.154.84
<i>Anthriscus sylvestris</i>	U	226.45.15	215.44.34	348.84.40	789.173.89
<i>Hedera helix</i>	B	85.16.9	292.56.42	383.60.35	760.132.86
<i>Ranunculus ficaria</i>	B	118.33.13	208.50.34	400.78.36	726.161.83
<i>Calystegia sepium</i>	B	204.41.16	220.45.35	277.57.31	701.143.82
<i>Lolium perenne</i>	U	62.24.16	301.54.35	286.64.37	651.142.88
<i>Ranunculus repens</i>	BC	100.25.16	259.61.44	259.69.37	618.155.97
<i>Rubus fruticosus</i>	B	45.10.7	271.58.46	274.60.33	590.128.86
<i>Dactylis glomerata</i>	U	128.33.18	217.54.41	244.72.41	589.159.100
<i>Agrostis stolonifera</i>	BCFS	97.21.16	230.46.31	255.62.35	582.129.82
<i>Cirsium arvense</i>	B	128.31.17	223.50.31	230.56.31	581.137.79
<i>Rumex obtusifolius</i>	BC(E)	149.36.17	196.51.36	229.63.40	574.150.93
<i>Lamium album</i>	U	133.35.16	160.43.35	174.59.35	467.137.86
<i>Solanum dulcamara</i>	BCE	116.32.17	130.45.30	217.63.35	463.140.82
<i>Elytrigia repens</i>	U	221.39.17	70.23.17	164.51.29	455.113.63
<i>Symphitum officinale</i>	B	13.4.4	161.36.30	237.57.31	411.97.65
<i>Heracleum sphondylium</i>	U	120.36.15	123.34.26	143.48.32	386.118.73
<i>Oenanthe crocata</i>	BCE	0.0.0	190.34.31	191.52.33	381.86.64
<i>Glyceria maxima</i>	BCE	1.1.1	110.25.25	256.44.31	367.70.57
<i>Holcus lanatus</i>	B	23.9.9	170.42.29	140.39.25	333.90.63

(continued)

1 SPECIES	2 STATUS	3 UPPER WINTER- BOURNES OR 6 MONTHS WITH- OUT FLOW [580.58.20]	4 STREAMS OR RIVERS (less than 10m across) [1100.110.63]	5 SITES AT LARGER RIVERS (more than 10m across) [1150.115.46]	6 TOTALS, ALL SITES [2830.283.129]
<i>Taraxacum officinale</i>	U	42.24.14	124.42.32	156.63.38	322.129.84
<i>Filipendula ulmaria</i>	BC	47.15.7	184.41.31	64.14.9	295.70.47
<i>Glechoma hederacea</i>	B	79.24.10	54.21.18	139.41.25	272.86.53
<i>Stachys sylvatica</i>	U	87.16.8	65.22.18	106.29.15	258.67.41
<i>Mentha aquatica</i>	BCE	5.3.3	123.37.36	118.33.23	246.73.62
<i>Rumex sanguineus</i>	B	25.8.6	59.22.16	158.47.22	242.77.44
<i>Apium nodiflorum</i>	BCES	24.9.6	106.35.30	90.34.20	220.78.56
<i>Alliaria petiolata</i>	U	16.8.6	80.19.17	118.36.23	214.63.46
<i>Cirsium vulgare</i>	B	58.19.12	91.37.28	63.33.24	212.89.64
<i>Rumex conglomeratus</i>	BC	38.12.7	78.32.26	91.33.20	207.77.53
<i>Myosotis scorpioides</i>	BCE(S)	0.0.0.	76.32.32	130.42.29	206.74.61
<i>Rorippa nasturtium-aquaticum</i>	BCE	11.7.6	117.36.36	63.24.24	191.67.66
<i>Rosa canina</i>	B	19.6.6	67.26.22	89.28.18	175.60.46
<i>Angelica sylvestris</i>	B	6.1.1	45.17.16	137.45.25	188.63.42
<i>Arum maculatum</i>	U	30.9.6	83.29.26	72.22.16	185.60.48

The commonest riverside species were as follows:

1st. Common Stinging-nettle (*Urtica dioica*).

The commonest and most ubiquitous riverside plant in Wiltshire in the 1990s, occurring at over 95% of sites and subsites most obviously May to November, these percentages exactly matching the independently organised findings by the Wiltshire Rivers' Monitoring Group in 1994 and 1995. Nettles could fringe the water, not just colonising the upper banks: the stinging nettle also was the 8th commonest river channel plant overall. Nettles could form clumps and fringes on grassy grazed riverbanks, surviving in dips and crevices even when farmers used Glyphosate. They infiltrated reeds, willow herbs, grasses, sedges and other riverside vegetation, but also often formed dense riverbank bands and nettle beds which could spread across the channels in drier upper reaches in late summer to meet from either side (Oliver 1993a). Stolon growth, not mentioned in most textbooks, could be phenomenal, even in winter months achieving 1.25 metres, fueled by the deeper yellow rhizome networks (Oliver 1993b, 1994a). Nettles on the lower riverbanks frequently reached face height or higher, averaging 0.3 - 0.6m taller than all textbook and flora maxima (Oliver 1994b, 1995). At Bodenham south of Salisbury on the Avon, some nettles were yet taller still, over 3.3 0m in height; the tallest reached 3 .38m (lift 31/2 ins. Oliver 1995, 1996). These Bodenham nettles, when measured in October 1994 had their lowest 30cms under the rising waters of the Avon, illustrating their vigour under conditions of intermittent inundation.

When continuously under water or in marsh, nettle leaves tend to go yellow, and stems above permanently waterlogged roots cease to elongate. However at cow-poached river margins, small rhizome arid stolon fragments and nettle seedlings survived on slightly raised turf clods and on damp or dry mud to recolonise with great rapidity. Nettles, (like Cleavers at no. 2 below) never appeared in any of Grose's (1957) top thirty river, stream, or canal bank or waterside lists.

2nd. Cleavers (*Galium aparine*).

Seen as a vigorous scrambler in summer cascading down banks and/or festooning nettles, reeds, willowherbs, and other riverbank vegetation, but also common as easily identifiable seedlings in winter and spring on banks and in the channels. Capable of crossing into the channels, or even over water by sprawling over reeds, reedmace (or Bulrush, *Typha latifolia*), Bur-reed (*Sparganium erectum*) or sedges (*Carex* spp). Nevertheless, more often in the upper reaches; and for riverbanks and channels together, not quite as common overall as Reed Canary-grass.

3rd. Great Hairy Willowherb (*Epilobium hirsutum*).

This is the fringing plant par excellence between riverbanks and channels, Grose's (1957) usual no. 1 for ditches, streams, rivers, and his overall no. I for all watery places combined. It probably competes with nettles where waterlogging is slightly more continuous than nettles can comfortably tolerate, but is now less than half as common as nettles as a riverbank plant, and less than quarter as common in and by ditches. Some stands were 2 - 2.3m high, these larger stands 0.5 - 0.8m higher than

standard flora maxima.

4th. Rough Meadow-grass (*Poa trivialis*).

This commonly survived under nettles and reeds, in shade, on grazed riverbanks, and I have even seen flowering panicles under water at East Kennett. It also commonly seeded on river mud in late summer, on riverbanks in most seasons, and was often the earliest coloniser of drying out streams and ditches.

5th. Reed Canary-grass (*Phalaris arundinacea*).

Now the commonest of all river channel plants in Wiltshire, an emergent aquatic in more sites than Watercresses, Water Starworts or Water crowfoots (*Rorippa*, *Callitriche* and *Ranunculus* spp) but also very common on banks. Sometimes (surprisingly) also found in zones above the nettle bands, and now the second most common plant associated with Wiltshire rivers overall. Strong deep roots and rhizomes stop it being washed away in heavy flows, and root aerenchyma keeps this reed healthy in rather anoxic stagnant and muddy waters. At 2m high it can compete with tall terrestrial vegetation and keep above the riverbank climbers and scramblers, and in this study was by far the most common reed in upper reaches, amongst nettles, grasses and willowherbs, and on cracked dried-out mud. This vigorous, nutrient-loving species came only between 14th and 19th on Grose's combined river/stream/canallpool habitat lists in the 1950s.

6th. False Oat-grass (*Arrhenatherum elatius*).

Common only on upper slopes, especially in upper reaches and where ditches, streams and rivers ran near roads.

7th. Cow Parsley (*Anthriscus sylvestris*).

As immediately above; seldom if ever on lower slopes, but common above inundated zones. Seedlings common.

8th. Ivy (*Hedera helix*).

The commonest upper slope ground cover in deep shade, but often trailing or established down steep or vertical banks to touch the water. Refuges also in and under dark crevices, overgrown drain outlets, bridges etc., even at some open subsites. Some seedlings noted on wet shaded stonework.

9th. Celandine (*Ranunculus ficaria*).

Root tubers enable the leaves of Celandine to start photosynthesizing in late winter. One of the (only) 5 plants in the riverbank top 40, only likely to be seen from February to April, but very common, and sometimes abundant on damp low-gradient banks. Only persisting in May, if at all, as an understorey to reeds, grasses, nettles and other tall vegetation, or under trees.

10th. Hedge Bindweed (*Calystegia sepium*).

The second commonest riverbank climber or scrambler, and like Cleavers sometimes invading the channels by means of festooning reeds, willowherbs, nettles and emergent plants. Vigorous perennial, and unlike Cleavers channel seedlings not seen.

11th. Rye Grass (*Lolium perenne*).

As the commonest agricultural grass, often abundant and continuous on riverbank tops (where not scored), but often seeding and spreading down the slopes, especially common on shallow gradients.

12th. Creeping Buttercup (*Ranunculus repens*).

Another common constituent of Grose's (1957) riverside lists. Competes with grasses and as an understorey to tall riverbank vegetation by vigorous fast-growing leaf's runners, rooting down into the channel in late summer. Seedlings also common, on banks and in the channels.

13th. Bramble (*Rubus fruticosus*).

Never rooting from within the soggy edges, but root suckers (*Rubus* subsection) and, more commonly arching stems (*Hiemales* subsection) often fringing or touching the water.

14th. Cocksfoot Grass (*Dactylis glomerata*)

Seen commonly as tussocks on most riverbanks, or sometimes as grazed turf on gradual gradients, but not touching the water (unless at flood levels).

15th. Creeping Bent (*Agrostis stolonifera*).

The 7th commonest Wiltshire river plant overall, capable of forming floating mats in stagnant water, or straggling but viable underwater stoloniferous rooting strands in running water, or soggy turf on waterlogged gradual-gradient grazed banks, or straggling stolons as a thin understorey through reeds and nettlebeds, and finally sometimes forming an untidy ragged dominant turf down ungrazed dry riverbanks in autumn. This grass was capable of spreading either from water to banks, or banks to water (other floating plants seen to do this were Flote grasses (*Glyceria*), Marsh Foxtail (*Alopecurus geniculatus*) and Amphibious Bistort (*Persicaria amphibia*). It was also one of the plants to compete well in ditches. At East Kennet, remarkable rates of stoloniferous growth were seen, as this grass grew from insignificant overlooked roadside pockets in summer 3 metres or more down into the River Kennet channel in September and October 1993 and 1994. This outstripped all other vegetation to form an extensive continuous sprawling turf from almost nothing in 6 autumn weeks. When winter water levels rose, stolons still attached at one end were flipped onto the upper banks again, or detached as straggling but viable fragments to recolonise downstream. Grose (1957) reported Creeping Bent at 16% of ditches and 8% of streambanks but this study found it to be much commoner, especially if looked for in autumn: 61% of sites, 40% of subsites (channels and/or banks) in the 1990s.

The occasional capacity of ungrazed Creeping Bent to form autumnal leafy stolons several metres long makes me think that Creeping Bent would be the most likely usual candidate for the historic Wiltshire “Long Grasses” discussed by Grose (1957, Ps 645-648).

Results: 3. Overall findings

Hawthorn was the commonest of the 56 riverside tree taxa (as well as being the species recorded for the most sites), generally found upstream and often hedged by farmers. Ash, Elder, Sycamore and Elm species together now seem more prevalent as riverside trees than Willows and Alders, except where these latter are given special conservation help. Old Crack and White Willows are still common in many places, but young ones are infrequent.

The 395 other riverside taxa can be categorized as follows, roughly so as some could fall into two or more categories

- Wetland, marshy or watermeadow species, and emergent aquatics which also colonize edges of rivers: 85 (22% of the riverside taxa).
- Arable and wayside weeds: 144 (36%).
- Woodland herbaceous plants: 46 (12%).
- Climbers, scramblers and woody shrubby plants: 31(8%).
- From other habitats, eg stonecrops, or chalk downland plants: 40 (10%).
- Non-natives, and occasional escaped crop plants: 40 (10%).
- Fern and Horsetail species: 9 (2%).

The most common non-natives on riversides (excluding trees) are now Snowberry (*Symphoricarpos albus*, 15 sites), Slender Speedwell (*Veronica filiformis*, 12 sites) and Narrow-leaved Michaelmas Daisy (*Aster lanceolatus*), unless Snowdrop (*Galanthus nivalis*) is considered to be a non-native species.

The grasses and reeds (*Poaceae*/*Gramineae*) with 46 riverside species had by far the greatest combined frequency scores for abundance. The dandelions, thistles, ragworts, etc (*Asteraceae*/*Compositae*) had the most riverside species, with 49. By contrast, only 11 riverside sedge species were identified, and the combined riverside abundance frequency scores for the entire Sedge family (*Cyperaceae*) was only 3% of that for the grasses and reeds.

Discussion

Comparison with Grose’s 1950 data in Wiltshire is difficult because he listed rank orders of frequencies of species in all areas in and around water for rivers, streams, canals, pools and lakes combined together in his summary lists. Details of the accounts provided by Grose and ourselves nevertheless reflect changes which are known to have occurred (ICI 1990, ARK 1992, Fowler 1992, Mantle and Mantle 1992, NRA 1992)

Terrestrial species are now more common by riversides than many plants more

traditionally regarded as aquatic. This contrasts strikingly with Grose's assertion that, though some non-aquatic species invade watery places (including riverbanks), "they are few in proportion to the true water-loving plants". The present study found that weeds of cultivation, especially the stinging nettle, docks, thistles, grasses, climbers and scramblers now predominate. Great Hairy Willowherb has continued to hold its high position over the last 50 years, and Reed Canary-grass has become much commoner, but most other water-loving plants at the top of Grose's lists have slipped many places by riversides (compare Mantle and Mantle 1992). Also, 35 of the top riverside plants were found to be of medium height, or more often tall, in the 1990s. Nettles, Reed Canary-grass and Great Hairy Willow-herb were all often over 2 metres high. Grose botanised through mainly ankle-high riverside vegetation. We in the 1990s waded through waist and face high tangles, our faces stung by nettles.

Many of the changes can be linked to agricultural practices. Grazing, hedging or the now ubiquitous barbed wire has been taken close to the edges of watercourses. Most of the front-runner trees are said to enjoy enriched soil, especially Hawthorn and Elder, but Ash is the exception according to Grime et al (1988). Improved drainage seems to have helped seeding and sapling establishment for Ash, Elder and Sycamore. The changes in the riverside tree populations would therefore seem to be due mainly to land drainage, the neglect of willows but the extending and maintaining of (mainly Hawthorn) hedges immediately next to streams and ditches, other plantings, and favourable conditions for the natural spread by seed or suckering of Hawthorn, Ash, Elder, Elm, Sycamore, Hazel and Field Maple along ditch, stream and riverbanks.

Plants other than trees show comparable trends. Of the 40 most important riverbank species shown in the table, 31 are known to be characteristic of highly enriched or highly productive soils; 19 from this group seldom grow in un-enriched conditions. Three species have so much genetic variability that they can thrive either on enriched or unproductive soils, and 3 are characteristic of moderately fertile soils (detail from Grime et al 1988 and Hanf 1983). I could not find any ecological and nutritional data for the remaining 3 species in the table.

In Southern England in general but in Wiltshire in particular, river levels have been falling over the past 45, and especially over the past 12, years (ARK 1992, Fowler 1992, Mantle and Mantle 1992, NRA 1992, BBC 1997). Most work has been carried out on the R. Kennet (ARK 1992, NRA 1992, BBC 1997). The controversies centre on the causes - reduced winter snow and diminished rainfall, or abstractions and diversions, or increased drainage causing rapid run-offs downstream; or all of these. In 1995 the botanical effects could be seen with great clarity on the Upper Kennet at Berwick Bassett. The outline of the ancient banks had long since become covered completely with trees and Ivy. The newer channel of about 15 years previously had more recently become invaded by a mixture of agricultural weeds, Reed Canary-grass, Reedmace, Willow-herbs and Nettles, and all densely festooned with scramblers such as Bindweed and Cleavers. Within this second channel, a muddy trickle from a ditch, two road drains and the uppermost Kennet formed a third channel only 2-3 feet across which flowed only intermittently even in winter, supporting a disappearing remnant of waterside species once abundant in the 1940s (Grose 1957).

At most subsites in the agricultural areas there was only a narrow zone or no zone at

all between intensively farmed areas and the river. Where stock could reach the water's edge, grasses dominated. Where barbed wire prevented this, nettles, climbers and scramblers, scrub or trees took over. Agricultural weeds and grasses, or climbers and scramblers, were usually dominant away from deep shade, when Ivy became a common riverside ground cover. By chance, Mantle and Mantle (1992) have an illustration of "A chalk stream in trouble" at one of our chosen sites, the River Kennet at East Kennett. The caption reads a channel filled with arable weeds" which had spread in from the banks.

Conclusions

Wiltshire rivers and streams have undergone many changes in the last 40 years, linked largely to reduced flows, increased land drainage, nutrient enrichment and other changes in agricultural practice. Intensive farming is usually now right up to the edges, and riverside marshy buffer areas have become uncommon. The survey described here has updated and made more detailed the state of our knowledge about the plants which grow in the various habitats encountered along them. Comments have been made on some of the changes noted. The information assembled, of which only a selection is included in this article, should provide a baseline enabling future changes to be monitored. The outcomes of such monitoring may contribute to changes in practice to maximise conservation of certain desirable persisting habitats and their living populations.

Acknowledgements

My thanks to Sally Scott-White for confirming the nettle size records, and for her help with the map. Appreciation is also given to the following workers; Jennifer Acornley, David Blackford, Brenda Chadwick, Tony and Stella Dale, Daphne Graiff, Malcolm Hardstaff Diana Hodgson, Barbara Last, Christine MeQuitty, Phillipa Parker, Maureen Ponting, Judith Robinson, Mary Robinson, Jean Wall, Winifred White, Civil Williamson and Gwyneth Yerrington.

References

- ARK (Action for the River Kennet) (1992) Technical Papers on Low Flow, Ground Water Abstraction and Decline between 1970 and 1991.
- BBC (1997) Deadline 2000. BBC Channel 4, 23rd July (Radio Times 19-25. 7.97, p95).
- Fowler S (1992) Rivers and Wetlands on Course for Disaster. Wiltshire Wildlife Trust and RSNK, Devizes.
- Gillam B, Green D and Hutchison A (1993) The Wiltshire Flora. Wiltshire Natural History Forum. Pisces, Newbury.
- Grime J P Hodgson J G & Hunt R (1988) Comparative Plant Ecology. Unwin Hyman, London.
- Grose D (1957, republished 1979) The Flora of Wiltshire. Wiltshire Archaeological & Natural History Society. E P Publishing Ltd, Wakefield.
- Hanf M (1983) The Arable Weeds of Europe. BASF (UK), Suffolk.
- ICI (1990) Nitrate and our Environment. ICI Fertilizers Division.
- NRA (National Rivers Authority) Thames Region (1992) Upper Kennet River Levels: Study Commissioned by WS Atkins Water, 6.92.

Oliver J E (1993a). Stinging Nettles along the River Kennet. Botanical Society of the British Isles News 63: 16.

Oliver J E (1993b) Stinging Nettles II: Midwinter growth. Botanical Society of the British Isles News 64: 29.

Oliver J E (1994a) Stinging Nettles III: Winter growth. Botanical Society of the British Isles News 67: 18-19.

Oliver J E (1994b) Increased abundance of stinging nettles. British Wildlife 5: 339.

Oliver J E (1995). Stinging nettles IV: 28 miles of nettles. Botanical Society of the British Isles News 68: 17.

Oliver J E (1996) The Common Stinging Nettle (*Urtica dioica* L) in Wiltshire, 1994. Wiltshire Archaeological & Natural History Magazine, 89: 114-129.

Wiltshire Forum, Local Agenda 21(1996) The local follow-up to the UN. Earth Summit at Rio, 1992. Trowbridge Civic Hall 10.2.96. 12

CONSERVING ORCHIDS AT WINSLEY

John Presland

Green-winged orchid *Orchis morio* is a nationally scarce plant which has suffered greatly from the agricultural improvement of grassland during this century. It is, therefore, heartening that the surveys for the Wiltshire Flora (Gillam 1993) found it to be unexpectedly widespread in the county. One of the more surprising locations is on a small area of land at Winsley (near Bradford upon Avon) owned by Wessex Water. The species was recorded from Winsley in Grose's Flora (Grose, 1957), and a single specimen was recorded as a weed on a Winsley lawn around 1980, but it is not currently known in Winsley away from this particular area.

The part of the site involved is occupied by two underground concrete reservoirs, on top of which is a layer of soil perhaps 30cm deep. They cover an area of approximately 30m x 40m. The grassland vegetation is mown at least once a year. The flora is typical of calcareous grassland with much Upright Brome *Bromus erectus* and a range of other species including Pyramidal Orchid *Anacamptis pyramidalis*, Glaucous Sedge *Carex flacca*, Common Broomrape *Orobanche minor*, Fairy Flax *Linum catharticum*, Hop Trefoil *Trifolium campestre*, Mouse-ear Hawkweed *Hieracium pilosella*, Rough Hawkbit *Leontodon hispidus* and Cowslip *Primula veris*. At the edges and elsewhere on the site where mowing does not occur are Musk Mallow *Malva mochata*, Perforate St John's Wort *Hypericum perforatum*, Common Toadflax *Linaria vulgaris*, Greater Knapweed *Centaurea scabiosa*, Hawkweed Oxtongue *Picris echinoides*, Wild Mignonette *Reseda luteola*, Smooth Hawkbit *Leontodon autumnalis*, Ox-eye Daisy *Leucanthemum vulgare*, Great Hedge Bedstraw *Galium mollugo*, Teasel *Dipsacus fullonum*, Wild Carrot *Daucus carota* and many others.

By 1993 the reservoirs had been there a long while and were in need of repair. Wessex Water is very aware of conservation and takes care to safeguard the natural history of its sites. For the work at Winsley Service Reservoir, therefore, they used a technique which had served this purpose well at other sites. In autumn 1993, the turf was removed in segments to a depth of 15cm, laid out on adjacent parts of the site of little conservation interest and covered with black polythene to protect it. Work on the reservoirs was then carried out over the winter, and the turf replaced in the spring.

At first things did not look too promising. The polythene was blown off much of the turf by the wind, and when the turf was replaced it quickly shrunk to a series of humps rather than continuous grassland. Orchids were not greatly in evidence in 1994 although there were some. In 1995, however, a substantial population was in evidence. In 1989 approximately 250 flowering spikes were counted by a somewhat inaccurate method. A more accurate method yielded an estimate of 250 spikes in 1995. Success of the transplantation was therefore complete. The vegetation over one of the reservoirs was richer than over the other and was long enough to have concealed orchid spikes, possibly leading to an underestimate. More than 25 spikes of Pyramidal Orchid *Anacamptis pyramidalis* were also found, a similar number, from memory, to those present in 1989.

References

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

Wiltshire Botany 1, 1997, pages 13-14

Grose D. (1957). The Flora of Wiltshire. WANHS, Devizes.

LATER ADDITION

In 1998 there must have been 7-800 spikes - I gave up counting - remember this is within an area of about 30 x 40 yds.

BRACKEN

Pteridium aquifolium

A problem weed in woodland conservation areas

Pat Woodruffe

The bracken problem

More and more woodlands are being managed, at least in part, with species conservation and biodiversity in mind. One of the most popular and well-documented ways of doing this is to establish a series of wide, sunny rides where flowers and shrubs have their place and insects, birds and small mammals can also flourish. In recent years this practice has become sufficiently accepted for Forestry Commission grant schemes to woodland owners and managers to acknowledge its importance by including up to 20% scrub (non-productive species in terms of timber production) and open space in the area for which grant-aid is sought.

The plants which are likely to respond to and grow in open space in woodland are not necessarily those which are most desired. Open space, especially that which is managed in order to make it a relatively permanent feature, is not a normal component of woodland. The variety of shrubs is rarely a problem since most have some advantages to confer; nectar, berries, foliage for larvae or just dense shelter. The herbaceous plants however are a different matter. Today most management is carried out using mechanised equipment and in consequence any reasonably sized clearing operation will bring with it a considerable amount of disturbance. As a result, opportunist plants such as thistles and heath groundsel may well be prevalent for a year or two, with a corresponding increase in some insects, notably butterflies and bees which take the nectar. What happens after this initial surge of growth depends to a large extent on how the area is managed. What is reasonably certain is that, unless the woodland has a strongly chalky soil, Bracken will become a significant component of the ride-side flora.

Bracken is considered to be one of the world's most aggressive weeds. Its invasion of agricultural land, particularly upland pastures, is well documented. There are two recommended ways of tackling the problem; frequent cutting and treatment with the herbicide Asulox. A combination of these approaches may be appropriate under some conditions. Up until mid-century Bracken was cut for bedding and was believed to deter insect parasites common in other such materials. This practice, together with liming of hillsides, undoubtedly helped to keep it in check. Whilst rabbits and sheep do not find Bracken palatable, cattle will graze the young shoots and also take dried material, so offering the farmer other uses for it and also additional methods of control.

In a woodland situation Bracken does not become a problem plant if cleared areas are allowed to regenerate, or are planted quickly. Under such conditions it will become shaded out as the canopy closes and may not survive until the next clearance takes place. The current interest in open space in woodlands gives the plant a perfect opportunity to grow, its extensive rhizome system ensuring that it spreads most effectively, possibly to become the dominant species. For the first few years after colonisation this may be quite acceptable: the plant dies down completely with the first frosts and does not reappear until late spring. Early species such as Violets (*Viola* spp.), Primroses (*Primula vulgaris*) and Celandines (*Ranunculus*

ficaria) are able to flower long before the shady fronds of Bracken emerge. Indeed, it would be possible to suggest that such shade is desirable in the height of summer. All this does not take into account the allelopathic tendencies of Bracken. The plant can release into the soil, from the dead remains of the fronds, substances which adversely affect the germination and development of other seedlings. For this reason, as well as a consequence of the large amount of dried remains which covers the ground, little grows under Bracken once it is well established and prospects of rides full of flowers and attendant insects are far from realised.

So can woodland managers use the same methods of control that are available to farmers? Of course they can, but will they give the desired results? I shall now relate how we have approached the problem in Bentley Wood.

Trials in Bentley Wood

Bentley Wood is a 1700 acre (688 hectare) ancient woodland site in which extensive planting by the Forestry Commission took place in 1950-60s. It is well known for its populations of butterflies and moths and was designated a Site of Special Scientific Interest (SSSI) by English Nature in 1985. Much of the wood overlies London Clay and Bracken became an increasing problem as conservation measures designed to enhance Lepidoptera populations were undertaken. Regular cutting, ideally three times during the growing season, can control Bracken, if not eliminate it, provided that the treatment is rigorously maintained. This is not only labour intensive and therefore costly but also creates other difficulties. Frequent management of this sort quickly favours grasses and allied species with low growing points which are unaffected by the treatment. Few herbaceous plants are able to survive the intense competition, especially when decapitated several times over a few months. The result is a grassy sward with limited floristic diversity or conservation value.

The alternative method, spraying with the herbicide Asulox, therefore seemed to be an attractive option. The chemical is believed to be specific to ferns but most of the reported research centred around agricultural land or heathland and did not indicate the susceptibility or resistance of typical woodland flora. I therefore decided, with a licence from English Nature, to carry out some preliminary trials before considering whether or not this was a potential management tool in a woodland context.

A ride with a wide range of species was selected for this project. In all seventy-six plants were recorded over an area measuring approx. 64 x 6 metres. Bracken was present in significant quantity throughout the area which also supported 10 different grasses, 6 sedges, one rush and one woodrush. Of the other plants, there were 12 woody species the rest being herbaceous, a few of which were annuals. No other ferns were present. The area was divided into eight equal quadrats each 8 x 6 metres and six of these were sprayed with Asulox at the beginning of July 1993. Care was taken to ensure that the edges of the ride, where there were many species growing but relatively little Bracken, received an equal treatment. Two quadrats, 3 and 6 in the line of eight, were not sprayed. In the week prior to spraying a full species list was made for each quadrat.

Trial results

Asulox does not act immediately but is translocated into the extensive rhizome system where it inhibits the formation of the buds which produce the fronds the following spring. At best a slight yellowing of the tips of the fronds is noted during the year of application. Patience is therefore required during the long wait for no frond growth. During May 1994 it became

apparent that a considerable degree of success had been achieved. Not only had many of the species clearly survived the treatment but also Bracken was conspicuous by its absence from all but the control plots. In June I was able to repeat the systematic recording of each quadrat and conclude that the only species which had noticeably suffered from the spray was in fact Bracken. A full list of the species present is appended.

Successful spraying and reduction of Bracken is not the end of the story however. Inevitably a few fronds will regenerate the following year. In this instance there were 6, 3, 66, 1, 2, 100, 6 and 4 fronds noted in the transects. The high numbers, 66 and 100, related to the control (unsprayed) plots which themselves had less Bracken than in the previous year because of translocation of the spray along the rhizomes from the treated into the untreated areas. It would be sensible to spot treat any residual fronds during the following year to prevent their regeneration and spread. Also of importance is the proximity of other Bracken fronds which almost inevitably would, if allowed, spread by spores or rhizomes from untreated areas.

Future management

It would be quite impractical to consider trying to eliminate the species from such a large wood and it is recognised that two or three years after treatment with Asulox an area might quickly be declining (ie. Bracken regenerating) if the follow-up management is not carefully considered. In Bentley we intend to carry out minimal management of sprayed areas for about four years after spraying, other than to consider spot spraying and to maintain the ride edge using a metre wide swipe in autumn. In this way the growth of shrubby species, including Brambles, will occur and plants important in the life cycles of butterflies, such as Primroses (Duke of Burgundy), Violets (several fritillaries) and Devils Bit Scabious (marsh fritillary) will thrive. When the growth of woody species threatens to shade out the herbaceous plants, and before management of the area becomes too difficult, ie. unsuited to a tractor-mounted swipe, the ride will be cut back. This should leave an area with open ground and only limited grassy growth in which the herbaceous plants can flourish. By carrying out this type of management in a staggered fashion, cutting back sections of a ride each year, the full range of development of the ride, from recently cut to fourth year growth, should be present within a 100 metre length. We also hope that after one or two cycles of this type of management, Bracken will no longer be a problem and will not require treatment by spraying with herbicide.

It is, however, recognized that Bracken is a plant which is frequented by some butterflies, particularly the early-season fritillaries, which enjoy basking in the sun on the fronds. For this reason Bracken will be left unsprayed towards the back of cleared areas, so that basking can take place in sunny south-facing corners sheltered by the close proximity of the trees.

References

Lowday J E & Marrs R H (1972) Control of bracken and the restoration of heathland. 1. Control of bracken. *Journal of applied Ecology*, 29: 95-203.

Full list of species present in the trial plots

Anthoxanthum odoratum
Arrhenatherum elatior

Brachypodium sylvaticum
Bromus ramosus
Cynosurus cristatus
Dactylis glomerata
Deschampsia cespitosa
Holcus lanatus
Lolium perenne
Poa pratensis
Carex viridula spp. oedocarpa
Carex flacca
Carex hirta
Carex ovalis
Carex pallescens
Carex sylvatica
Juncus effusus
Luzula multiflora
Pteridium aquilinum
Achillea millefolium
Achillea ptarmica
Ajuga reptans
Anemone nemorosa
Betula pendula
Centaurea nigra
Centaurium erythraea
Cirsium arvense
Cirsium palustre
Corylus avellana
Crataegus monogyna
Dactylorhiza fuchsii
Euphorbia amygdaloides
Fragaria vesca
Frangula alnus
Galium palustre
Hypericum perforatum
Hypericum pulchrum
Hypericum tetrapterum
Hypochaeris radicata
Leucanthemum vulgare
Linum catharticum
Lonicera periclymenum
Lotus uliginosus
Lysimachia nummularia
Medicago lupulina
Mentha species
Odontites verna
Pastinaca sativa
Picea abies
Rubus fruticosus

Salix species
Scrophularia nodosa
Senecio jacobaea
Sonchus oleraceus
Stachys sylvatica
Succisa pratensis
Taraxacum officinale
Teucrium scorodonia
Trifolium campestre
Trifolium medium
Ulex europaeus
Veronica chamaedrys
Vicia sativa
Vila spp

BLACK POPLAR

POPULUS NIGRA SSP BETULIFOLIA

David Green

Status and history

The distribution of this species has been literally re-discovered in Britain over the last twenty years. In the 1970's Mr Edgar Milne Redhead, then president of the Botanical Society of the British Isles, asked its members through the BSBI Newsletter to send him records of this tree so that he could map its national distribution. At that time little was known of the tree's history or distribution, although the lack of records over the previous fifty years suggested that it was rare. It was evident, however, that it had long been known in folklore and was familiar to country people in past centuries. It had fallen out of favour with farmers and landowners by the twentieth century and by the early 1970s the species did not seem to be recognised by the country people whose predecessors had planted it.

The Black Poplar, which even when pollarded is a large and majestic tree, is characteristic of flood plains across Britain and was propagated in the past by a cut branch being plunged into the soft, rich silts of river banks and flooded pastures. Much of this type of land has been drained over the last century and now the Black Poplar often occurs as a solitary standard in a hedgerow amongst a sea of wheat or a Rye-grass pasture.

Publicity over the last decade has yielded a vast number of records from across lowland Britain (see maps 1 and 2). In Wiltshire the situation until recently remained very much as it did with D Grose's Flora of Wiltshire 1957. The first county record was made in 1921 and between then and 1953 only thirteen locations were noted.

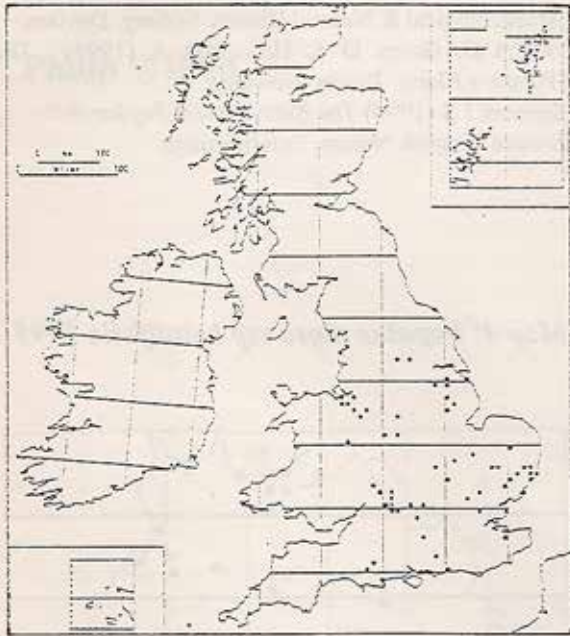
During the Wiltshire Flora Mapping Project, with the encouragement of Sonia Holland, Recorder for North Gloucestershire (VC 33), I started looking for Black Poplars. I began the quest in the Cotswold Water Park and continued to search likely lowland habitats throughout North Wiltshire, VC7. I discovered unexpected numbers of specimens in previously unrecorded locations and, continuing the search, I have been rewarded ever since with similar finds.

In South Wiltshire VC8 records gathered during the WFMP showed that an area around Pottern, Echilhampton and Patney supports a smattering of previously unknown trees. Another colony, in an isolated location at Gomeldon on the River Bourne, was re-found from an original record by Grose.

Recent surveys in Wiltshire

In 1993 I was commissioned (in my professional capacity as an ecologist) by the DoT to carry out an ecological survey along the A36 between Codford St Mary and Wylve in South Wiltshire. Having previously noticed Black Poplars along the R. Wylve whilst driving along this road, I now supplemented a morning's field study by recording 26 specimens in nine separate tetrads. On checking both Grose (1957) and the Wiltshire Flora (1993) it was evident that, other than three records in 1941, no-one had reported a native population of Black Poplars from the Wylve valley. I returned to search the area by car along the roads of the valley floor and within four hours I found 136 specimens in 26 1km squares. All these trees are old, some overmature and with lost limbs. Many of these were huge, unpollarded trees. I also found some huge felled trunks lying on the valley floor.

**Map 1: The distribution of
Populus Nigra in Britain
(all female records)**
(GB 58; Ir 0; CIs 0)



**Map 2: The distribution of
Populus Nigra in Britain
(all records)**
(GB 461; Ir 52; CIs 0)



All the specimens I have found so far are male: the only females found in the county to date are in the extreme north. The seeds are shed with an accompaniment of a kapok-like substance and, because of this, they may have been planted less frequently or were felled as a matter of course since the mass of white fluff was considered a nuisance.

I reported the findings of the survey to the Wiltshire Botanical Society winter AGM in 1993, and pointed out that Grose recorded that *P nigra* was known in a number of locations along the Salisbury Avon. I had been aware for some years of three specimens near the Southampton Road leaving Salisbury.

A subsequent meeting in the summer of 1994 with the Salisbury Plain Conservation Group on the upper reaches of the Avon yielded seven specimens, several of which correlated with historic locations recorded in Grose (1957). The same year, English Nature commissioned a survey of unimproved neutral meadows along the Avon Wylde and Nadder which yielded further records, as did visits by myself and others to the Avon Wylde and the Bourne.

Conclusions

The information gathered has been forwarded to the national Black Poplar survey group. Maps 3 and 4 show the comparative known distribution of the native Black Poplar in Wiltshire in 1991 (when all the records for the WFMP were first computerised) and at the end of 1995.

The population within the Avon watershed is now known to be of considerable size - to date 231 trees. From a conversation I had with an arboriculturalist associated with the Black Poplar project, it appears that others in his profession are interested to ascertain whether this population represents a distinct clone.

My thanks in searching for Black Poplars in the Salisbury basin are due to:

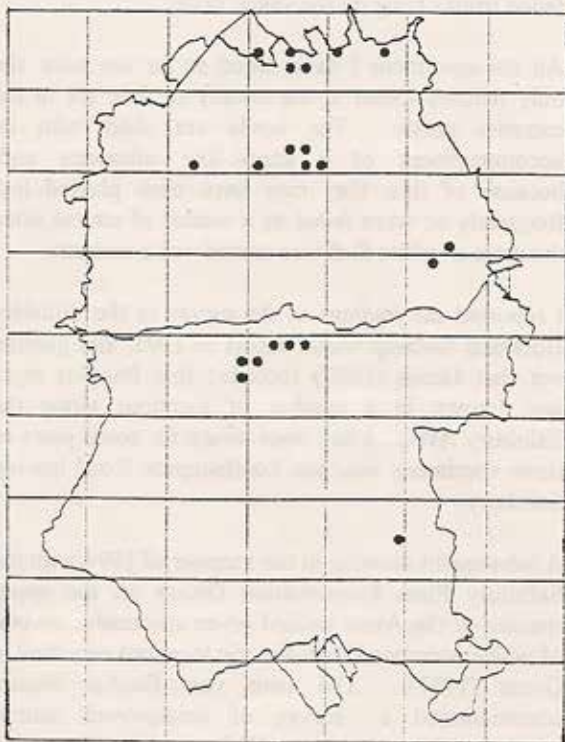
Barbara Last	Pat Froud
Audrey Summers	Rita Grose
Phil Wilson	Marion Reed
Prue Palmer	

And in North Wilts to
Steve Whitworth Paul Darby

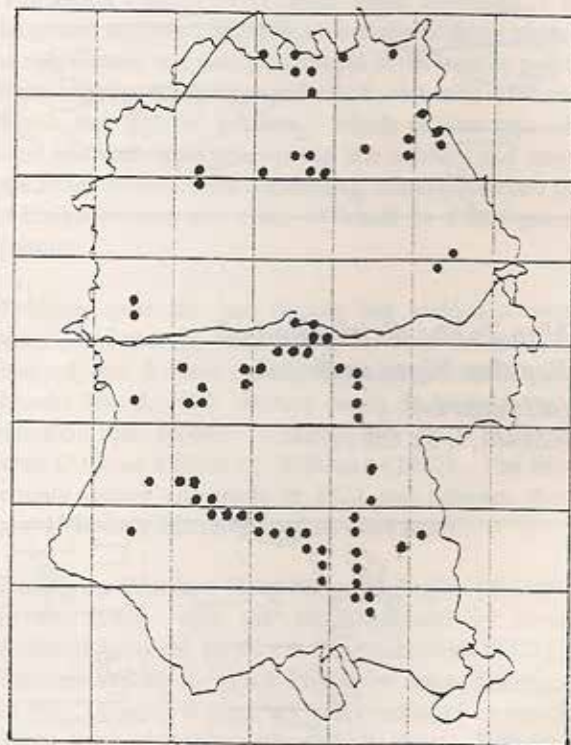
References

- Grose D. (1957). The Flora of Wiltshire. WANHS, Devizes.
Gillam B. Green D. & Hutchison A. (1993). The Wiltshire Flora. Pisces, Newbury.
Spencer J.S. (1994) The Native Black Poplar in Britain. English Nature, Peterborough.

Map 3: Populus nigra ssp betulifolia 1991



Map 4: Populus nigra ssp betulifolia 1995



WILTSHIRE'S NEW FOREST

The English Nature survey of grasslands and related habitats in the south-eastern corner of Wiltshire

Philip Wilson

Introduction

The extreme south-eastern corner of Wiltshire adjacent to the New Forest between the A36 (Salisbury-Southampton road) and Redlynch has, for reasons of difficulty of access, been incompletely surveyed in the past. In 1995, English Nature commissioned a botanical and habitat survey of all the agriculturally unimproved non-woodland habitats on the neutral and acidic soils of this region. Much of this area is now included within the New Forest Heritage Area, and this acknowledges the close links that it has with the unenclosed New Forest.

The landscape of the region is dominated by woodland, and this occupies over 50% of the land surface. Although much of this is coniferous plantation, the NNR and SSSI woodlands of Langley Wood, Loosehanger Copse and Whiteparish Common are an outstanding feature, and this core of ancient woodland is continuous with the unenclosed woodlands of the New Forest proper. This is one of the largest continuous tracts of high quality woodland in lowland Britain. The unimproved grasslands and mires are set in this matrix in much the same way as lawns and heathlands are related to the woodlands of the adjacent New Forest. The two areas are therefore very closely related, despite having had very different histories of management, especially during the last 150 years.

There were formerly far larger areas of unimproved open habitat, much of which would have acted as "back-land" grazing for the New Forest commoners, land to which they could withdraw their stock during periods of grazing shortage on the New Forest proper. Many commoners lived in the nearby Wiltshire villages and numerous properties in the area still have common rights to the Forest. In addition to the unenclosed New Forest, much of the land between Landford and Loosehanger Copse was once open common land until the mid 19th century, Hamptworth Common, Franchises Common and Loosehanger Common having been afforested comparatively recently. Many of the surviving areas of unimproved open habitat are relics of this former common land, and it is probable that a considerable amount of heathland and mire could still be restored with clearance of the conifer plantation.

Grazing is the major land-use after forestry and perhaps one half of this grazed land is semi-improved or unimproved. There are approximately 56ha of unimproved open habitat within the Wiltshire New Forest Heritage Area and a further 24ha to the north of the Heritage Area boundary.

Many of the remaining sites are small, but there are several larger areas of unimproved habitat. Most are linked by the River Blackwater and several contain the areas in which

tributaries of this river rise, either as springs, flush lines or areas in which water collects. These areas appear to be where water draining through the overlying Reading Beds, Bagshot Beds and Bracklesham Sands meets the impermeable London Clay: this geology, combined with impeded drainage, has discouraged their agricultural improvement. The poor soils of the Bagshot Beds and Bracklesham Sands between Pound Bottom and Hamptworth Common have saved this area from agricultural improvement, but forestry has caused the loss of all but a few fragments of the semi-natural vegetation.

Many of the agriculturally unimproved fields still form part of a traditionally managed landscape of small farms but, increasingly, fields are being rented or sold as units which are not agriculturally viable and which are only usable for horse grazing. While this is a suitable form of land-use in the short-term, it is perhaps not so encouraging for their long-term future.

Plant communities (Table 1)

The plant communities found were classified according to the National Vegetation Classification (NVC)(Rodwell, 1991 & 1992).

The most abundant semi-natural vegetation type in the area is M23a Sharp-flowered Rush - Marsh Bedstraw (*Juncus acutiflorus*-*Galium palustre*) pasture, which is typical of areas permanently flushed with non-calcareous water. It can occasionally occupy larger areas of relatively flat topography, where it is usually grazed by horses or cut for hay. Sharp-flowered Rush *Juncus acutiflorus* is dominant, forming a canopy layer, occasionally with tussocks of Purple Moor-grass *Molinia caerulea* and Soft Rush *Juncus effusus*. The understorey of this community is very varied, and may depend on the nutrient status of the ground-water. Species such as Marsh Bedstraw *Galium palustre*, Fen Bedstraw *G. uliginosum*, Water Mint *Mentha aquatica*, Whorled Mint *M. X verticillata* and Fleabane *Pulicaria dysenterica* are generally constant. In some sites the understorey can have abundant Velvet Bent *Agrostis canina*, Common Bent *A. capillaris*, Devil's Bit Scabious *Succisa pratensis*, Yorkshire Fog *Holcus lanatus*, Carnation Sedge *Carex panicea* and Marsh Pennywort *Hydrocotyle vulgaris*, and can approach M24c (Purple Moor-grass - Meadow Thistle *Molinia caerulea* - *Cirsium dissectum* mire, Cross-leaved Heath *Erica tetralix* sub-community - see below). In less base-poor situations, species including Meadowsweet *Filipendula ulmaria*, Marsh-marigold *Caltha palustris*, Brown Sedge *Carex disticha*, Wild Angelica *Angelica sylvestris* and MarshValerian *Valeriana dioica* can become abundant.

M24c appears to develop best where there are springs or seepages of water, although at some sites it occupies larger areas, sometimes as a mosaic with M23a. Purple Moor-grass *Molinia* is always dominant. Where grazed this forms an open and species-rich sward, but where ungrazed the Purple Moor-grass *Molinia* forms dense tussocks with a deep layer of litter. Velvet Bent *Agrostis canina*, Yorkshire Fog *Holcus lanatus*, Sweet Vernal Grass *Anthoxanthum odoratum*, Marsh Pennywort *Hydrocotyle vulgaris*, Meadow Thistle *Cirsium dissectum*, Tormentil *Potentilla erecta*, Devil's Bit Scabios *Succisa pratensis*, Common Sedge *C. nigra* and *Juncus acutiflorus* are Sharp-flowered Rush generally abundant. Some stands are very species-rich with a good representation of

heathland and acidic mire species including Heather *Calluna vulgaris*, Cross-leaved Heath *Erica tetralix*, Lousewort *Pedicularis sylvatica*, Creeping Willow *Salix repens*, Scarlet Pimpernel *Anagallis tenella*, *Sphagnum auriculatum*, Flea Sedge *Carex pulicaris* and *Aulocomnium palustre*, and one site has both Petty Whin *Genista anglica* and Marsh Violet *Viola palustris*. A species-rich Purple Moor-grass *Molinia* dominated flush near Redlynch is of particular interest as the only example of M24b (typical sub-community) recorded in the survey, with additional associated species including Marsh Valerian *Valeriana dioica*, Meadow Sweet *Filipendula ulmaria*, Wild Angelica *Angelica sylvestris*, Tufted Vetch *Vicia cracca* and most exceptionally Tawny Sedge *Carex hostiana*. The very species-poor Purple Moor-grass *Molinia* tussock community at Landford Bog was classified as M25a (Purple Moor-grass - Tormentil *Molinia caerulea* - *Potentilla erecta* mire). Such Purple Moor-grass *Molinia* dominated communities are typical of the nearby New Forest, where they occur in mosaics and zonation sequences along with a range of heathland types.

In three sites there are significant areas of mire that has similarities to M23a, but with very little Sharp-flowered Rush *Juncus acutiflorus*. This was classified as M27c (Meadow Sweet - Wild Angelica *Filipendula ulmaria*/ *Angelica sylvestris* mire, Soft Rush - Yorkshire Fog *Juncus effusus*/*Holcus lanatus* sub-community). At one of these sites, Lesser Pond -sedge *Carex acutiformis* had invaded and formed a substantial proportion of the vegetation.

M22b Blunt-flowered Rush - Marsh Thistle (*Juncus subnodulosus* - *Cirsium palustre* fen meadow, Quaking Grass - Clover *Briza media* - *Trifolium* sub-community) resembles M23a in many respects, the chief difference between the two being the dominant Rush *Juncus* species, which in M22 is normally Hard Rush *Juncus inflexus* (Blunt-flowered Rush *J. subnodulosus* is extremely rare in Wiltshire). This community is typically found where the ground-water is base-rich, and tends to replace M23 in these situations. Both M22 and M23 can occur in close proximity and it may be that in these sites there are two sources of ground-water filtering through separate strata and with differing chemical compositions. Hard Rush *Juncus inflexus* tussocks are generally dominant, with abundant Meadow Sweet *Filipendula ulmaria*, Red Fescue *Festuca rubra*, Common Sedge *Carex nigra*, Water Avens *Geum rivale*, Yorkshire Fog, *Holcus lanatus*, Water Mint *Mentha aquatica*, Fleabane *Pulicaria dysenterica*, Marsh Thistle *Cirsium palustre* and Greater Bird's Foot Trefoil *Lotus uliginosus*. Individual stands have abundant Marsh Marigold *Caltha palustris*, Marsh Valerian *Valeriana dioica*, Common Spike-rush *Eleocharis palustris* and Brown Sedge *Carex disticha*.

Unimproved vegetation in drier parts of fields is in most cases MG5 (Common Knapweed - Crested Dog's Tail *Centaurea nigra* - *Cynosurus cristatus* grassland). Because most of the unimproved fields in the New Forest Fringes are poorly drained, areas of MG5 are small, although at two sites there are more than 1ha of MG5c (Heath Grass *Danthonia decumbens* sub-community) and two others have more than 1ha of MG5a (Meadow Vetchling *Lathyrus pratensis* sub-community) or MG5a/c. Only a single field is now managed by hay-cutting while other areas are grazed. The majority however are suffering from chronic lack of management. The community tends to be dominated by a mixture of

grasses, chiefly Common Bent *Agrostis capillaris*, Red Fescue *Festuca rubra*, Sweet Vernal Grass *Anthoxanthum odoratum*, Yorkshire Fog *Holcus lanatus* and Crested Dog's Tail *Cynosurus cristatus*, the sub-communities being distinguished by the abundances of the dicotyledonous component. In this area MG5c typically has abundant Devil's Bit Scabious *Succisa pratensis*, Betony *Stachys officinalis*, Tormential *Potentilla erecta* and Pignut *Conopodium majus*. Heath Grass *Danthonia decumbens* is uncommon in this vegetation in the region but occasionally the rosette forming herbs can be dominant. Dyer's Greenweed *Genista tinctoria*, Quaking Grass *Briza media*, Sneezewort *Achillea ptarmica*, Yellow Rattle *Rhinanthus minor* and Meadow Thistle *Cirsium dissectum* are locally present. MG5a is typified by the presence of Meadow Vetchling *Lathyrus pratensis* and Perennial Rye-grass *Lolium perenne*, and Dyer's Greenweed *G. tinctoria*, Quaking Grass *B. media* and Adder's Tongue *Ophioglossum vulgatum* are locally present. One site has a large area of intermediate MG5a/c with abundant Devil's Bit Scabious *S. pratensis*, Meadow Thistle *Cirsium dissectum*, Meadow Vetchling *L. pratensis* and Perennial Rye-grass *L. perenne*.

MG4 and MG8 are rare grassland communities typical of sites which are regularly inundated by base-rich water. MG4 (Meadow Foxtail - Great Burnet *Alopecurus pratensis* - *Sanguisorba officinalis* hay-meadow) was recorded in one site, even though it is more characteristic of alluvial meadows in the north of the county, most notably the "fritillary meadows" in the Upper Thames Valley. It is dominated by Meadow Foxtail *Alopecurus pratensis*, Meadow Fescue *Festuca pratensis*, Crested Dog's Tail *Cynosurus cristatus*, Perennial Rye-grass *Lolium perenne*, Meadow Buttercup *Ranunculus acris*, White Clover *rifolium repens* and Meadow Sweet *Filipendula ulmaria* with abundant Pepper-saxifrage *Silaum silaus*, Water Avens *Geum rivale* and Common Sedge *Carex nigra*. Great Burnet *Sanguisorba officinalis* is not found in south Wiltshire. Reasonably well-developed MG8 (Marsh Marigold - Crested Dog's Tail *Caltha palustris* - *Cynosurus cristatus* flood-meadow) is present in two sites, although it differs in some respects from the more typical stands in the Avon Valley. Red Fescue *Festuca rubra*, Common Bent *Agrostis capillaris*, Creeping Bent *A. stolonifera*, Yorkshire Fog *Holcus lanatus*, Meadow Sweet *F. ulmaria* are generally dominant, with frequent Marsh Marigold *Caltha palustris*, Fleabane *Pulicaria dysenterica*, Buttercup *Ranunculus spp.*, Jointed Rush *Juncus articulatus*, Meadow Vetchling *Lathyrus pratensis* and Cuckoo Flower *Cardamine pratensis*. Southern Marsh Orchid *Dactylorhiza praetermissa* and Marsh Pennywort *Hydrocotyle vulgaris* are both present locally. It has obvious affinities with M22b, being distinguished only by the relative grassiness or rushiness of the sward, and transition between the two may simply be a question of intensity of grazing pressure.

Heath and related communities are represented largely on the acidic sands and clays adjacent to the New Forest itself.

The Wiltshire Wildlife Trust reserve of Landford Bog contains one of very few valley mires in lowland Europe outside the New Forest (Tubbs, 1986). This contains an area of M21 (Asphodel - Sphagnum *Narthecium ossifragum* - *Sphagnum papillosum* valley mire), a community typical of valley bottoms with impeded drainage and acidic, nutrient-poor water. There is much surface water and the community is dominated by *Sphagnum*

papillosum and other *Sphagnum* species, with Common Cotton-grass *Eriophorum angustifolium*, Purple Moorgrass *Molinia*, Asphodel *Narthecium ossifragum*, Round-leaved Sundew *Drosera rotundifolium*, Pale Butterwort *Pinguicula lusitanica* and liverworts, and Cross-leaved Heath *Erica tetralix* and Heather *Calluna vulgaris* in drier areas. M25b dominated by tussocky Purple Moorgrass *Molinia* surrounds the M21 and merges into it via a mosaic. Other tussocky Purple Moorgrass *Molinia* communities nearby are M16 (Cross-leaved Heath - *Sphagnum Erica tetralix/Sphagnum compactum* wet heath), a typically species-poor vegetation type with the few associates including Heather *C. vulgaris*, Cross-leaved Heath *E. tetralix*, Asphodel *N. ossifragum*, Common Cottongrass *E. angustifolium* and locally *Sphagnum spp*, Deergrass *Trichophorum caespitosum*, Bog Myrtle *Myrica gale* and Round-leaved Sundew *D. rotundifolium*. This vegetation is closely related to the more species-rich M21, and may be a result of lack of grazing of this community with a consequent increase in Purple Moorgrass *Molinia* and *Molinia* litter. Unimproved farmland to the west contains one flushed area of M6d (Star Sedge - *Sphagnum* - Sharp-flowered Rush *Carex echinata/ Sphagnum auriculatum, Juncus acutiflorus* sub-community). This vegetation is very varied ranging from dominant *S. auriculatum* with acidic mire species including Common Cottongrass *E. angustifolium* and Round-leaved Sundew *D. rotundifolium*, to vegetation with a canopy of Sharp-flowered Rush *Juncus acutiflorus* and with a greater representation of mesotrophic mire species within a ground flora of *Sphagnum spp*. A small flush near Redlynch has unusual vegetation dominated by *Sphagnum subnitens*, *Calliargon cuspidatum*, Carnation Sedge *Carex panicea* and Purple Moorgrass *M. caerulea*, with *S. auriculatum*, Star Sedge *Carex echinata*, Flea Sedge *C. pulicaris*, Bog Pimpernel *Anagallis tenella*, Sharp-flowered Rush *J. acutiflorus* and the bryophytes *Riccardia multifida* and *Plagiomnium elatum*.

Small patches of heath are also present in the area of the former Loosehanger Common. Until the 1980s Pound Bottom was a large area of heathland and acidic mire continuous with the New Forest but, since the extensive extraction of sand and gravel and subsequent landfilling there are now only tiny relics. Nearby however there is still a significant area of H2c, a typically species-poor humid heath community, dominated here by Purple Moorgrass *Molinia caerulea* with the few associates including Heather *Calluna vulgaris*, Cross-leaved Heath *Erica tetralix*, *Hypnum cupressiforme* and *Leucobryum glaucum*. A further small area of H2c on the Plateau Gravels is part of a mosaic with U1f (Sheep's Fescue *Festuca ovina*, Common Bent *Agrostis capillaris*, Sheep's Sorrel *Rumex acetosella* grassland, Common Cat's Ear *Hypochaeris radicata* sub-community) and Gorse *Ulex europaeus* scrub. This mosaic is well grazed and open with the U1f component containing annual species such as Squirreltail Fescue *Vulpia bromoides* and Early Hair-grass *Aira praecox*.

Notable Plants

The fringes of the New Forest contain numerous plant species which are otherwise uncommon in Wiltshire, although several are frequent in the New Forest proper. It is a characteristic of inland mesotrophic grasslands and mires however, that they do not contain many nationally scarce (Stewart et al., 1994) or red data book species (Perring &

Farrell, 1983). The only nationally scarce species recorded during these surveys was Bristle Bent *Agrostis curtisii* which is however locally abundant on heaths in the south-west of Britain. It is well distributed on heathland relics and still survives in conifer plantations in the New Forest Fringes.

Heather *Calluna vulgaris*, Heath species *Erica* spp, and Purple Moorgrass *Molinia caerulea* are all frequent. Other heathland and heathy mire species including Star Sedge *Carex echinata*, Lousewort *Pedicularis sylvatica*, Yellow Sedge *Carex viridula* spp. *oedocarpa*, Meadow Thistle *Cirsium dissectum* and Bog Pimpernel *Anagallis tenella* are all present in several sites, while Bog Myrtle *Myrica gale*, Marsh Speedwell *Veronica scutellata*, Green-ribbed Sedge *Carex binervis*, Flea Sedge *Carex pulicaris*, Bog Pondweed *Potamogeton polygonifolius*, Creeping Willow *Salix repens*, Dwarf Gorse *Ulex minor*, Asphodel *Narthecium ossifragum*, Deergrass *Trichophorum caespitosum*, Round-leaved Sundew *Drosera rotundifolia* and Common Cottongrass *Eriophorum angustifolium* are less frequent. Western Gorse *Ulex gallii*, Heath Rush *Juncus squarrosus*, White Beak-sedge *Rhynchospora alba*, Oblong-leaved Sundew *Drosera intermedia*, Many-stalked Spike-rush *Eleocharis multicaulis*, Royal Fern *Osmunda regalis*, Marsh Violet *Viola palustris*, Petty Whin *Genista anglica*, Pale Butterwort *Pinguicula lusitanica*, Bogbean *Menyanthes trifoliata* and Tawny Sedge *Carex hostiana* were all recorded at single sites only. The Landford Bog Wiltshire Wildlife Trust Reserve is a particularly rich site.

The area is similarly rich in many bryophytes which although common in the New Forest itself, are increasingly uncommon in the rest of lowland England. A good range of *Sphagnum* species was recorded, with *S. auriculatum* being the most frequent, and *S. recurvum* and *S. papillosum* in a few localities mainly to the south of the area. *S. subnitens* and *S. compactum* were each recorded in two sites, as was the very local *S. magellanicum*. Well developed *Sphagnum* in the more acidic heathy mires often contained a good variety of minute liverworts, and those recorded included *Kurzia pauciflora*, *Odontoschisma sphagni* and *Cephalozia connivens*. One very unusual flush community contained *Riccardia multifida* and *Plagiomnium elatum*.

Threats and Recent Damage

The sites covered during this survey represent survivals of formerly much more widespread vegetation types. The processes of agricultural improvement including nitrogen application (slurry or artificial), ploughing, herbicide use and afforestation, which have led to the present rarity of these habitats still threaten their continued existence. The greatest danger is often when site ownership changes and former low-intensity management is replaced by more intensive methods.

Many of the surveyed sites are in situations where drainage or topography make agricultural improvement less likely. However, of the 33 sites recorded, 20 are at least partially threatened by abandonment and successional processes. Communities such as MG1 and MG9 are typical of grasslands and mires which have been allowed to deteriorate. The threat of neglect increases as the grazing of small fields becomes less economically viable and their owners become older and less motivated to manage them.

Other problems resulting from abandonment are invasion by scrub and on drier soils by Bracken *Pteridium*. The non-afforested remnants of Hamptworth Common are examples of both of these threats. It is worthwhile to note that where heath and heathy mire has been afforested or invaded by scrub, large quantities of heath species such as Purple Moorgrass *Molinia caerulea*, Dwarf Gorse *Ulex minor*, Heather *Calluna vulgaris*, Heaths *Erica spp*, Bristle Bent *Agrostis curtisii*, Green-ribbed Sedge *Carex binervis* and Yellow Sedge *C. viridula spp. oedocarpa* can still persist, and prospects for the recovery of heathland communities would be good if scrub and planted trees were to be removed.

Conclusions

The south-eastern extremity of Wiltshire retains a diversity of habitats that would be hard to match elsewhere in lowland Britain. Were it not for the arbitrary location of the boundary of the New Forest perambulation, this area would form a natural part of the New Forest, and would have received the same level of protection and similar management. The major reason for the lack of recognition of this area has been the lack of public access to almost all of the more interesting sites. Quite simply their existence was unknown, and this is reflected in the relative paucity of records in Grose's flora (Grose, 1957). The number of noteworthy Wiltshire species present is remarkable and includes several species not to be found elsewhere in the county.

Lack of recognition has meant that the area has been very vulnerable to changes in land-use, chief among which have been afforestation, agricultural improvement and more recently, abandonment. Much of the afforestation dates from the mid-19th century, and agricultural improvement has been most prevalent on the richer soils, and it is remarkable how so much habitat has survived these threats. Recent efforts by the owners of the two major estates which cover the area are largely responsible for these survivals. Other areas have remained as part of a landscape of low-intensity small farms, and are becoming increasingly vulnerable to abandonment.

References

- Gillam B. et al. (1993). The Wiltshire Flora. Pisces Publications.
Grose D. (1957). The Flora of Wiltshire. WANHS, Devizes.
Perring F.H. & Farrell L. (1983). British Red Data Books : 1, Vascular Plants. RSNC, Nettleham, Lincoln.
Rodwell J.S. (ed.)(1991). British Plant Communities Volume 2, Mires and Heaths. Cambridge University Press.
Rodwell J.S. (ed.)(1992). British Plant Communities Volume 3, Grasslands and Montane Communities. Cambridge University Press.
Stewart A., Pearman D.A. & Preston C.D. (1994). Scarce Plants in Britain. JNCC, Peterborough.
Tubbs C. (1986). The New Forest. Collins New Naturalist series. London.

Table 1. Areas of NVC communities recorded in New Forest Fringe sites in 1995.

NVC type	Name of community	Area (ha)
----------	-------------------	-----------

U1f	<i>Festuca ovina</i> / <i>Agrostis capillaris</i> / <i>Rumex acetosella</i> grassland, <i>Hypochaeris radicata</i> sub-community	0.6
U4	<i>Festuca ovina</i> / <i>Agrostis capillaris</i> / <i>Galium saxatile</i> grassland	0.32
U4a/MG5c	Species-rich mown grassland with abundant <i>Calluna vulgaris</i> .	1.2
H2c	<i>Calluna vulgaris</i> / <i>Ulex minor</i> heath, <i>Molinia caerulea</i> sub-community	3.48
H3c	<i>Ulex minor</i> / <i>Agrostis curtisii</i> heath, <i>A. curtisii</i> sub-community	0.12
M6d	<i>Carex echinata</i> / <i>Sphagnum auriculatum</i> mire, <i>Sphagnum auriculatum</i> sub-community	0.48
M16b	<i>Erica tetralix</i> / <i>Sphagnum compactum</i> wet heath	0.76
M21b	<i>Sphagnum papillosum</i> / <i>Narthecium ossifragum</i> valley mire, <i>Vaccinium oxycoccus</i> sub-community	0.48
M21/16/25	Ungrazed, degraded valley mire dominated by <i>Molinia</i> tussocks	6.68
M22b	<i>Juncus subnodulosus</i> fen-meadow, <i>Briza media</i> / <i>Trifolium repens</i> sub-community	4.60
M23a	<i>Juncus acutiflorus</i> / <i>Galium palustre</i> rush pasture, <i>J. acutiflorus</i> sub-community	25.06
M23b	<i>Juncus acutiflorus</i> / <i>Galium palustre</i> rush pasture, <i>J. effusus</i> sub-community	0.88
M24a	<i>Molinia caerulea</i> / <i>Cirsium dissectum</i> fen-meadow, typical sub-community.	0.6
M24c	<i>Molinia caerulea</i> / <i>Cirsium dissectum</i> fen-meadow, <i>Erica tetralix</i> sub-community	5.04
M25	<i>Molinia caerulea</i> / <i>Potentilla erecta</i> mire.	2.36
M27	<i>Filipendula ulmaria</i> / <i>Angelica sylvestris</i> mire	2.16

MG1/9	Tall, unmanaged grasslands either with abundant <i>Arrhenatherum elatius</i> or <i>Deschampsia cespitosa</i>	6.52
MG4	<i>Alopecurus pratensis</i> / <i>Sanguisorba officinalis</i> flood-meadow	0.8
MG5a	<i>Centaurea nigra</i> / <i>Cynosurus cristatus</i> meadow, <i>Lathyrus pratensis</i> sub-community.	2.08
NVC type	Name of community	Area (ha)
MG5c	<i>Centaurea nigra</i> / <i>Cynosurus cristatus</i> meadow, <i>Danthonia decumbens</i> sub-community.	8.14
MG5a/c	<i>Centaurea nigra</i> / <i>Cynosurus cristatus</i> meadow, intermediate sub-community.	3.92
MG8	<i>Caltha palustris</i> / <i>Cynosurus cristatus</i> flood pasture	2.92
S7	<i>Carex acutiformis</i> swamp	1.32
Total		79.52

MEADOW SAFFRON COLCHICUM AUTUMNALE IN BENTLEY WOOD

Pat Woodruffe

Past surveys

In 'The Flora of Wiltshire' (1957) Donald Grose noted that the distribution of *Colchicum autumnale* was 85% woodland and 13% meadow. He commented 'the distribution is in striking contrast to that in adjoining counties where the plant is normally pratal'. He also published a distribution map, which indicates 78 sites, the majority in North Wiltshire (VC7), but including both Clarendon and Bentley Woods to the SE of Salisbury (VC8).

In 1993, at the time of the publication of 'The Wiltshire Flora' the distribution of sites does not appear to have changed a great deal since there were records from 67 1km squares. The system of recording was of course different, making comparisons difficult. Once again, the sites were almost entirely ancient woodland, note of just two meadows in VC7 being made. It does seem likely that the plant has been eradicated from pasture land because of its poisonous nature and that changes in agricultural practices, including the development of herbicides, have done little to encourage its survival. This makes successful management of the existing woodland sites a priority if the species is to remain reasonably widespread within the county.

In Bentley Wood there has been a population for many years although, surprisingly perhaps, it is confined to one small area and I do wonder whether or not it was introduced at some time past. The record published by Grose (1957) is by Mrs. P.R. Farquharson who lived in Salisbury and recorded from 1948. During the 1950 - 60s the area of the wood where Meadow Saffron occurs today was largely clearfelled and then replanted with a mixture of conifers and hardwoods. When the wood was purchased by the current Trustees from the Forestry Commission in 1983 these trees were some 30 years old and badly in need of thinning. It is likely therefore that the population was present before planting by the Forestry Commission and subsequently was much reduced because of shading.

The first detailed records were made during the flowering period of 1988 when a total of 116 flowers was noted. It was to prove particularly interesting that, at this time, the colony was split roughly equally on the two sides of a hard track. The conditions on each side were quite different since the track runs almost due east / west and therefore one side faces south while the other side faces north. In addition, the south-facing side had been cleared back for 10 metres, leaving a wide grassy verge in front of a plantation of beech and Norway spruce. The north-facing side was wooded up to the edge of the track with a mixture of species including Oak, Hawthorn, Willow, Crab Apple, Hazel and Lawson's Cypress.

Recent studies in Bentley wood

Before management of the area could be considered in detail we realised that we had to find out more about the life history of the species. One of its common names is 'Naked Ladies' because of its habit of flowering without accompanying leaves. We knew, of course its flowering period but not exactly when the leaves emerged, when the fruits would be ripe or when the leaves died back. During the winter of 1988-89 we found the answer to the first of these questions the hard way. Work was in progress thinning some of the trees to the south of the track, in order to let more light in and, hopefully, allow an increase in the plants, when we noted in early February that the shoots were coming through and were in danger of being damaged. It was a surprise to realise that both

these and Bluebells *Hyacinthoides non-scripta* put forth leaves at the same time although the Bluebell flowers much earlier in the year. Needless to say, work was abandoned and the plants left to their own devices.

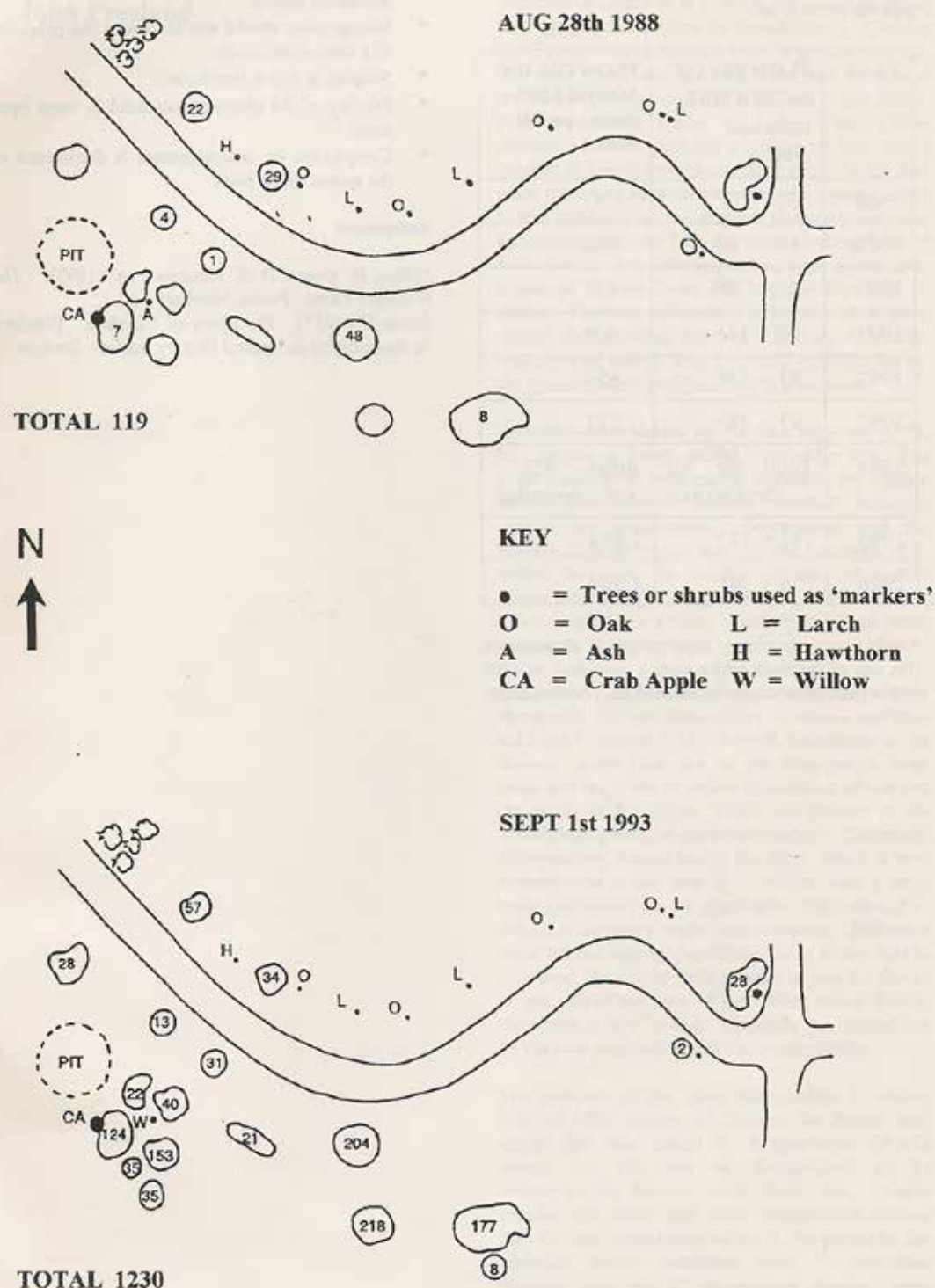
The fruits of the flowers which had been pollinated the previous August - September finally started to show themselves the following May but did not become fully ripe until mid-July, at the same time as the leaves yellowed and died. This meant that ride-side cutting had to be limited to the period mid-July to early August (since the first flowers appear then) or between October and January. In the mildest of winters, emergent leaves have been seen by mid-January. We knew that it was essential to cut back the vegetation during the brief summer respite because the delicate flowers would otherwise have to compete with the season's growth of grasses, bracken and many herbs. This could lead to poor pollination since it was noticeable that those plants which developed in shade and / or amongst competitors became etiolated from the base of the petal tube, often causing them to topple over quickly. We were concerned that this might be detrimental to the growth of the pollen tube down the style which would limit the chances of fertilisation.

The summer of 1989 brought rewards far in excess of anything anticipated: on August 18th 418 blooms were counted. The limited amount of clearance carried out the previous winter had allowed a nine-fold increase in the number of flowers on the south side, whilst on the north side (south-facing) both conditions and number of flowers had remained more or less constant. The summer of 1990 produced another improvement in flower numbers and during this year I also kept note of the number of fruiting capsules in May / June. I was very surprised to count 433 capsules on the south side where only 360 flowers had been noted the previous August / September. The flowers come and go over a period of several weeks so it is quite likely that some errors will occur but during 1989 the flowers had been recorded meticulously on four separate occasions. I wrote to Christopher Brickell, Director General of the Royal Horticultural Society, asking his opinion. He suggested that some flowers hardly emerge above the ground, or have very reduced petals but are fertile and therefore produce capsules. I now record a little after the peak flowering period, when dead heads, mature flowers and young buds are all visible and hope that the count is reasonably accurate and, most importantly, comparable from year to year.

Over the past few years management has continued with further thinning of the trees to the south and annual ride cutting in the summer. The plants have responded by increasing in size and by spreading into the newly cleared areas, presumably both vegetative reproduction and seed formation are important in this process. Each year, with one notable exception, has seen an overall increase in the number of flowers. Details are given in the accompanying table. The extent of this increase is far less on the north side of the ride and suggests that vigorous grasses are detrimental to the spread of the species. Hence on the south side every effort is made to balance the advantageous effect of increased light, provided by thinning the canopy, with a possible increase in invasive species such as Bracken, Bramble and coarse grasses. The aim is to provide a sparse ground flora amongst which the *Colchicum* can thrive.

In 1992/3 I investigated the possibility that there was a difference in the fertility of plants growing in more open areas compared with those growing in shade. I found that 71 plants growing under a crab apple tree produced only 8 capsules whilst in more open ground 10 plants produced 12 capsules and another group of 18 plants produced 35 capsules, so seeming to prove the point. It is difficult to define a 'plant' because vegetative reproduction of the corms allows several to grow together. For this purpose a plant is a discrete group of leaves.

Maps showing changes in distribution of Meadow Saffron



* refers to a completely separate group of plants on this side of the track which were new 'find' in 1989 rather than an extension of those already documented.

Over the years we have been recording not just in two blocks, one on either side of the track, but in much smaller units. This has allowed us to monitor the Progress of small groups of plants. We are able to conclude that after several good flowering years there can be a temporary reduction in the number of flowers and then subsequent improvement. Over the time we have been recording, we have not found a permanent decrease in flowering ability at any of the sub-sites.

Table showing numbers of Colchicum plants recorded

YEAR	FLOWERS ON NORTH SIDE (open and grassy)	FLOWERS ON SOUTH SIDE (trees - partial shade)
1988	51	65
1989	50 + 4*	360
1990	65 + 7*	422
1991	58 + 11*	709
1992	91 + 14*	659
1993	91 + 28*	1,111
1994	Total for all areas 820 - breakdown not recorded	
1995	151 + 11*	1,894
1996	156 + 4*	1,304

* refers to a completely separate group of plants on this side of the track which were a new 'find' in 1989 rather than an extension of those already documented.

Some conclusions

- With simple management it is possible to encourage the expansion of Meadow Saffron in a woodland habitat.
- Management should aim to favour the provision of a semi-open habitat.
- Swiping in July is beneficial.
- Fertility of the plants is increased in more open areas.
- Competition by coarse grasses is detrimental to the spread of the plant.

References

Gillam B, Green D & Hutchison A (1993). The Wiltshire Flora. Pisces, Newbury.
Grose D (1957). The Flora of Wiltshire. Wiltshire Archaeological & Natural History Society, Devizes.

VICIA VILLOSA IN TROWBRIDGE

John Presland

In 1995 I came upon a number of plants of Fodder Vetch or Lesser Tufted Vetch *Vicia villosa* on a building site in Trowbridge. An uncommon alien casual of arable and waste places, it was not recorded in Gillam et al (1993), and was only noted at single site in Salisbury by Grose (1957). Clement and Foster (1994) describe it as “a persistent grain, bird-seed, wool and tan-bark alien and an escape from cultivation”, native in Eurasia and North Africa. It is superficially similar to Tufted Vetch *Vicia cracca* and it is probably a matter of luck that I thought its identity worth checking at all. In the first place there was no other vegetation to support it and it was sprawled on the ground, giving an appearance different from the usual climbing habit of *V. cracca*. My attention having been drawn to it, it seemed to have fewer and larger leaflets than *V. cracca*. This was sufficient to make me look at more crucial distinguishing features. Luckily *V. cracca* was growing nearby, also atypically sprawled out on the ground which facilitated the comparison.

The silhouettes shown are of the two species as found on the Trowbridge site. The close similarity is immediately apparent; the pinnate leaves with narrow leaflets, terminal branched tendrils and long-stalked inflorescences with the flowers all lying on one side. In this specimen of *V. villosa* however, the number of pairs of leaflets ranges from 4 to 8, whereas in this specimen of *V. cracca* there are always more than 8 and most commonly 11 or 12.

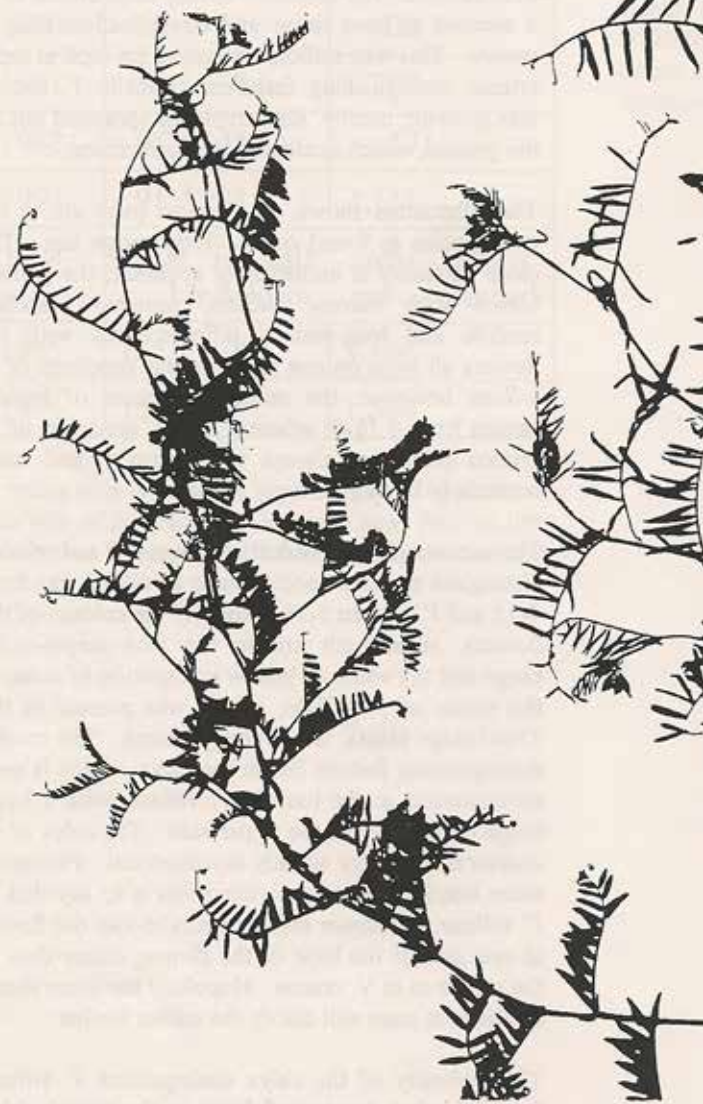
The number of pairs of leaflets alone will not reliably distinguish the two species since *V. villosa* can have 4-12 and *V. cracca* 5-15. Nor will the colours of the flowers, since both are in the blue-purple-violet range and the white or yellow colouration of some of the petals of *V. villosa*, which was present in the Trowbridge plants, is not always found. The crucial distinguishing feature lies in the calyx which is very asymmetrical at the base in *V. villosa*, with a large bulge (gibbosity) on the upper side. The calyx of *V. cracca* is only very slightly asymmetrical. Perhaps a more helpful way of describing this is to say that in *V. villosa*, the flower stalk appears to join the flower at one side of the base of the flower, rather than in the centre as in *V. cracca*. Hopefully the illustrations will clarify the matter further.

The gibbosity of the calyx distinguishes *V. villosa* from all other species of *Vicia* in the British Isles except the rare casual *V. benghalensis* (purple vetch), but this can be distinguished by its reddish-purple flowers with black tips, shaggy stipules and calyx, and each inflorescence shorter than the leaf immediately below it. In particular the gibbosity avoids confusion with *V. parviflora* (slender tare) and *V. tetrasperma* (smooth tare) which have also been noted at Trowbridge in recent years.

References

- Clement E.J. & Foster M.C. (1994). Alien plants of the British Isles. BSBI, London.
- Gillam B., Green D. & Hutchison A. (1993). The Wiltshire Flora. Pisces, Newbury.
- Grose D. (1957). The Flora of Wiltshire. WANHS, Devizes.

Vicia cracca



Vicia villosa



PLANT RECORDS 1995

Explanatory notes

- The following is a selection from the records made by members of Wiltshire Botanical Society in 1995. Records of common species and updates of 1993 Wiltshire Flora are not included unless there is some special reason. Unconfirmed records have been omitted.
- An asterisk indicates that the species is not native.
- Recorders are identified by initials as follows:

AH - Ann Hutchison
MW - Al. Wood
AS - Audrey Summers
BC - Brenda Chadwick
BG - Beatrice Gillam
BL - Barbara Last
CK - Clare Kitchen
CMc - Christine McQuitty
DF - Diana Forbes
DG - David Green
DGra - Daphne Graiff
DJW - D.J. Wood
DS - not known
DSi - David Simpson
EB - not known
EG-E. Gange
ENST - English Nature Survey Team ER - Eileen Rob
GWG - Gilbert Green
IDW - I.D. Wood
JA - Jennifer Acornley
JAK - John Akeroyd
JCPR - J.C.P. Rollinson
JH - June Hodgkinson
JNo - John Notman
JN - Joy Newton
JEO - Jack Oliver
JLP - John Presland
JO - John Ounsted
JT - J. Tucker
JW - Jean Wall
MH - Malcom Hardstaff
MK - Mark Kitchen
MPr - Mrs Pragnell
MR - Marion Reed
ND - North Dixon
PD - Paul Darby
PDS - Paul Stanley
PH - Pamela Hawkings
PMW - Pat Woodruffe

PP - Pru Palmes
PRS - Phyllida Sneyd
PW - Phil Wilson
RCS - Rod Stern
RG - Rita Grose
RMV - Roger Veall
RW - R. Walls
SG - Sarah Grinsted
SH - S. Hunt
SW - Steve Whitworth

Vc 7 records

Aconitum napellus - PD, Clyffe Pypard, Clyffe Pypard Wood, west, at edge of regenerating woodland block, 4 plants at edge of road, garden throwouts
Agrimonia procera - JN, Savernake Forest, abundant in Savernake
Alisma plantago-aquatica - JN, Kennet; JN, side of stream at Axford, 1 plant
Allium sphaerocephalon * - JN, Marlborough, by newly made path
Alopecurus aequalis - TN, Aldbourne, Aldbourne Chase, dewpond, 1st recent vc record, 2nd county record
Anacamptis pyramidalis - AG, Great Somerford, nr gravel pit; SD, Sutton Benger, 10 plants; DG/SW, Ashton Keynes
Anacamptis x *Gymnadenia* = *G. anacamptis* - JN, Aldbourne, in wild garden, 90 plants with both parents
Azolla filiculoides * - JW, Stan Bridge, R. Avon; JEO, NE of Melksham, R. Avon; JEO, Central Melksham, R. Avon; JEO, Malmesbury, Cow Bridge, R. Avon
Betula pubescens - JN, Savernake Forest, fairly frequent, especially in the Northern strip
Blackstonia perfoliata - JLP, Murhill, roadside bank, several
Blechnum spicant - PMW/DJW, Whiteparish, Bushy Copse
Bromus commutatus - JN, Swindon, Coate Water; JEO, Clatford, large numbers appearing in water meadow after partial nettle control
Brunnera grandiflora * - JLP, Murhill, roadside, one plant, probably garden throw-out
Campanula portenschlagiana * - JLP, Winsley, naturalised on wall, locally abundant
Campanula poscharskyana * - JLP, Bradford-on-Avon, naturalised on wall, 1 patch; JEO, Marlborough, R. Kennet, River Park, -garden escape to river bank; JEO, Marlborough-R. Kennet at Town Mill, escape down walls, seeding.
Campanula rapunculoides * - EB, Swindon, car park, Bridge St/Harding St
Care pilulifera - JW/PD, Seagry Wood, Seagry Wood; JN, Aldbourne, Chisbury Wood, several patches; JN, Savernake Forest, new area
Carex pseudocyperus - DG/SW, Ashton Keynes, Cotswold water Park, many 100s of clumps growing along shallow edge; PD, Corston, pond at Quarry House, 1 large stand
Carpinus betulus - JN, Murhill, roadside bank, several
Cephalanthera damasonium - JN, Aldbourne, Highclear Down, 7 flowers on steep bank by track to Down, not seen in 15 yrs of using track, one on other side a few yrs ago
Clinopodium ascendens - DH, Sherston, R. Avon nr. Cowage Farm
Cotoneaster horizontalis * - JEO, Semington, on stonework, bridge and walls (also vc8)
Cuscuta epithyium - BG, nr Chippenham, 0.5msq, c. 12m apart, a new site - 8th on

downland

Cynoglossum officinale - liP, Turleigh, frequent

Dactylorhiza fuchsii - SW/DG, Ashton Keynes, Cotswold Water Park, on gravel, edge of gravel pit, 10s of 1,000s of plants

Dactylorhiza incarnata ssp *pulchella* - DG/SW, Ashton Keynes, Cotswold Water Park, in *Salix* scrub on gravel. Site also contained hybrid with *D. fuchsii*

Dipsacus pilosus - JLP, Bradford on Avon, wood and shaded roadside, locally abundant

*Doronicum pardalianches** - DS, Moredon, (via J Fraser); PMW/DJW, Deny Hill

Eccremocarpus seaber * - JEO, Marlborough, High St. natural seedling, no plants nearby

Epipactis helleborine - JN, Savernake Forest, extreme Northern edge, 12± plants; JLP, Winsley, 4 plants, wood edge and hedgerow

Epipactis palustris - DG/SW, Ashton Keynes, Cotswold Water Park, on shallow gravel pit edge, over 200 plants in 2 sq.metres, some in very wet conditions, 2nd vc record

Erigeron acer - DG/SW, Ashton Keynes, Cotswold Water Park on gravel

Euphorbia cyparissias - JLP, Murhill, roadside, one clump, garden throw-out in this part of Wilts.

X Festulolium loliaceum - JEO, Clatford Junction, water meadows, occasional

Fiipendula vulgaris - JEO, Clatford Junction, water meadow, along deep ruts, not introduced

Galium saxatile - PD, Seagry Wood, Seagry Wood, locally abundant on wall

Genista tinctoria - PD, Melksham, nr Hack Farm, field edge with tormentil, betony, pignut

Gentianella anglica - JN, Aldbourne, Highclear Down, approx. 3,000 plants

Geranium endressii * - JEO, Marlborough, R. Kennet, River Park

Glyceria notata (*plicata*) - JEO, Alton Barnes, Dewpond N. of Walker's Hill White Horse

Hypericum humfusus - JN, Mildenhall, Hens Wood, a few, not previously recorded here; PD/IW, Seagry Wood, sparsely distributed *Hypericum pukhrum* - JN, Mildenhall, Hens Wood

Iris foetidissima - JEO, Preshute, R. Kennet at W. bridge; JLP, Murhill, roadside beneath trees, I plant *Juncus bulbosus* - PD, Seagry, Seagry Wood, in recently cleared area, several plants

Juncus subnodulosus - DG, Swindon, Coate Water, New Lake

Lagarosiphon major - JN, Aldbourne, village pond, planted

Lemna minuta * - JEO, Alton Barnes, Dewpond N. of Walker's Hill White Horse; JN!JEO, Swindon, Coate Water S. on mud and in water; JN, Aldbourne, Aldbourne Chase, dewpond; JN, Snap, dewpond

Linum usitatissimum - JEO, S. of Marlborough, Clench Common, crop escape, roadsides

Lysimachia vulgaris - JT, below Kellaways, Avon river bank, growing on bank edge on West side only visible from East. Not seen in location for many years
- ref in Grose p392

Medicago sativa ssp *varia* * JT, Chippenham, in pavement crack by the Avon bridge. Has survived for some years (J Tucker), 1st recent vc rec.

Melilotus albus - JEO, East Kennet, roadside; DG/SW, Ashton Keynes, Cotswold Water Park, made land, large population

Mentha x smithiana - JN, Aldbourne, in bed of dried up Bourne, confirmed record of

D. Grose

Myosotis sylvatica - JEO, Chilton Foliat, R. Kennet at bridge, SE bank; JEO, nr Silbury Hill *Myriophyllum spicatum* - JEO, Christian Malford, Bristol Avon ; JEO, Axford, R. Kennet; JEO, Ramsbury, R. Kennet; JBO, Chilton Foliat, R. Kennet; JEO, Halfpenny Bridge, R. Thames *Nymphoides peltata* - JN/JEO, Swindon, Coate Water, SE lake

Oenanthe pimpinelloides - PD, Melksham, nr Hack Farm; PD, Hilperton; DG, between Whaddon and Staverton, marshy field, 1 plant

Oenothera cambrica * - JEO, Fyfield, Lockeridge, Clatford, occasional garden weed

Onopordum acanthium - JLP, Winsley, several on deposited soil at edge of field; JN, Derry Hill, appears on different verge each year

Ophrys apjfera - BG, Great Somerford, gravel pits, 3 spikes; PD/CWP/DG/SW, Christian Malford, gravel pits

Orchis mono - JN, Boydon, Bailey Hill

Orobanche minor - JN, Witcha, cottage garden, area of grass under fruit trees, cut twice yearly, 6+ spikes

Oxalis incarnata - * JLP, Bradford-on-Avon, naturalised on wall, locally abundant

Papaver dubium ssp. *lecoqii* - JN, Ogbourne St George, one plant in cornfield

Petasites fragrans - * MH, Marlborough, bank of Kennet nr. Esso petrol station

Potamogeton pusilus - JN, Mildenhall, *Quercus rubra* - * JN/JEO, Swindon, Coate Water

Ranunculus lingua - JEO, Sherston, R. Avon, Lower Stanbridge Farm

Ranunculus trichophyllus - JN, Cricklade *Ribes sanguineum* - * JEO, Kellaways, R. Avon; JEO, Marlborough, R. Kennet at Town Mill; JEO, Preshute NW, R. Kennet

Rosa tomentosa - DG, Ashton Keynes, Cotswold Water Park, made land, 1 bush

Salix cinerea ssp. *cinerea* - JN/JEO, Swindon, Coate Water, 1st vc record since 1953

Salix purpurea - JN, Clatford Farm, R. Kennet at Clatford Farm ; JEO, Clatford Junction (A4), R.

Kennet; JEO, Clatford, R. Kennet at Plough Cottage; JEO, Hannington Bridge, R. Thames; MP, Manton-Preshute, R. Kennet

Salix x sericans (*S. viminalis* x *S. caprea*) - JEO - Lockeridge, R. Kennet at Lockeridge House; JEO, Clatford junction (A4), R. Kennet

Salix x smithiana (*S. viminalis* x *S. cinerea*) - JEO, Marlborough, R. Og

Samolus valerandii - DG/SW, Ashton Keynes, Cotswold Water Park, on gravel, many 100s of plants

Saponaria officinalis - JN, Kennet, path near river

Schoenoplectus tabernaemontani - DG/SW, Ashton Keynes, Cotswold Water Park, shallow lake edge, large population, also two other sites

Sedum telephium - PD, Seagrey, Seagrey Wood, refind of 1994 WTNC record, side of main ride, both sides of ditch; JEO, Winterbourne Monkton, by R. Kennet

Sparganium emersum - JEO, Stitchcombe, R. Kennet; JEO, R. Thames ; JEO,

Halfpenny Bridge, R. Thames; JEO, Limpley Stoke, R. Avon; JEO, Melksham NE, R. Avon; JEO, Melksham, Centre R. Avon

Spergularia rubra - JN, Savernake Forest, felled area, 2nd vc record

Spiranthes spiralis - JN, Aldboume, Highclear Down, 4 plants

Spirodela polyrhiza - JEO, Alton Barnes, Dewpond N. of Walker's Hill White Horse

Trifolium fragiferum - 1W, W. of Sherston, R. Avon

Verbascum nigrum - PD, Christian Melford, gravel pit, 1 plant; DG/SW, Ashton Keynes, Cotswold Water Park, 10 plants

Veronica austriaca * JEO, Clatford Junction, water meadow, from dumped earth

Vicia tetrasperma - JN, Aldbourne, Chisbury Wood, abundant throughout

Viola canina - DG, Brinkworth, Somerford Common, roadside

Viscum album - MKJCK, Leigh Delamere Services, adjacent M4, single clump on S. side of motorway. New 10K; DW, Stanton St. Quintin, on *Crataegus*-tree in grazed field nr. hedge

Vc 8 records

Agrostemma githago - * JLP, Trowbridge, building site, 2 plants

Agrostis castellana - * RMV, Whitsbury Aira caryophyllea - BL/PMW, Broad Chalke, Middleton Down

Allium triquetrum * - PMW, Winterbourne, Bentley Wood, 1 plant on ride, presumably introduction

Anagallis tenella - PWJMR, Redlynch, Langley Wood, flushes in opened-up woodland

Anaphalis margaritacea - * PMW/DJW, Whiteparish, Dean Hill, abandoned farmland

Athyrium filix-femina - DJW, Redlynch, East Copse; DJW, Landford, McReath Wood; DJW, Whiteparish, Moor Copse; DJW/PMW, Whiteparish, Bushy Copse; DJW, Parley, Hazel Hill Copse

Azolla filiculoides - * JN, Burbage, Seymour Pond

Berberis vulgaris - JNo, nr Standlynch, hedge, old record not found in 1980s flora mapping

Betonica (Stachys) officinalis - PMW/DJW, Poulshot, East Copse; PMW/DJW, Little Sherwood;

PMW/DJW, Landford, Earldoms; PMW/DJW, Landford, Oakridge Copse

Betula pubescens - ENST, Trowbridge, Green Lane Wood

Bidens cernua - SG, Salisbury, R. Avon

Blechnum spicant - PMW/DJW, Whiteparish, Bushy Copse; PMW/DJW, Landford, Earldoms

Bromopsis inermis - PW/MR, Salisbury, Avon Project

Calamagrostis epigejos - WT, Trowbridge, Biss Wood; RCS, Salisbury, Clarendon Park, Beechy Dean Copse; PMW/DJW, Farley, Hazel Hill Copse

Carex divulsa ssp. *leersii* - *Carex divulsa* ssp. *Leersi* - JEO, Limpley Stoke, R. Avon; RMV, Redlynch, Redlynch Farm, on banks of pond; RMV, Whiteparish, Battscroft Copse, on verge of track; RMV, Salisbury, Odstock hospital; Britford, beside track, frequent

Carex humilis - BL, Broad Chalke, Knowle Down, Lots

Carex laevigata - PMW/DJW, Landford, Earldoms

Carex pallescens - PMW/DJW, Poulshot, East Copse; PMW/DJW, Farley, Hazel Hill Copse; DJW, Little Sherwood; DJW, Redlynch, Thorns Copse; PMW/DJW, Landford, Oakridge Copse

Carex strigosa - PW,MR, Redlynch, Langley Wood, very wet sunken lane/footpath through wood

Carpinus betulus - PMW/DJW, Parley, Hazel Hill Copse

Catabrosa aquatica - PW/MR, Britford, water meadow ditch

Cephalanthera damasonium - BL, Perham Down; DSi, Newbridge Hospital roundabout, 2 dozen spikes; JEO, Perham Down

Cicerbita macrophylla * - JEO, Manton, roadside and nettlebeds

Cirsium tuberosum x *C. acaule* (*C* x *medium*) - DG, W of Tisbury, c. 40 plants in perhaps a new site

- Coichicum autumnalis* - DF, W. of Tisbury, Pits Wood
Cotoneaster horizontalis * - JEO, Semington, bridge, on stonework and walls. (also vc7)
Crepis biennis - JEO, Perham Down
Cruciata laevipes - DGra, Porton
Cynoglossum officinale - BL, Nunton, on walls of church and elsewhere; JEO, S. Tidworth, Furze Hill and Warren Hill around badger diggings
Dactylorhiza incarnata - PW/MR, E. Harnham, meadows, several places; PWIMR, Salisbury, old water meadow; PW/MR, Salisbury, meadows to the west of the Avon
Dactylorhiza praetermissa - PWJMR, E. Harnham, several places; PW/MR, Salisbury, Avon Project; PW/MR, Whitsbury, meadows to the west of the Avon; PWiMR, Lower Woodford, SSSI, species-rich corner; PW,MR, West Amesbury, unimproved meadow
Dactylorhiza praetermissa ssp *juniales* - SHJBL, Longbridge Deverill to ST 867413, 30 spikes
Datura stramonium - DG, Longleat, Centre Parcs, 20 plants at Nockatt Plain; CMC, Burbage, in a newly made garden
Doronicum pardalianches * - PMW/DJW Whiteparish, Battscroft
Dryopteris carthusiana - PMW/DJW, Landford, Oakridge Copse
Epiobium palustre - BL, Bishopstone
Epipactis phyllanthos - BL, Pewsey, Jones's Mill, new record for the reserve
Epipactis purpurata - GWG, Trowbridge, Biss Wood, 1st authenticated vc record
Erigeron acer - JR. Harnham, chalkpit
Erucastrum gallicum * - DGra, Porton and Boscombe Down. Disturbed soil on SPTA. Species spreading.
Galega officinalis * - JLP, Trowbridge, 1 plant, roadside
Galinsoga quadriradiata * - AH, near Mere, 12 plants in flower bed, an example of occurrence in imported, often sandy, soil
Gaudinia fragilis * - PP. Mere, unimproved hay meadow, 1st vc record
Genista tinctoria - DJW/PMW, Landford, Sherwood Copse; DJW/PMW, Landford, Hasletts Row
Gentianella amarella (white flowered) - JNo, Porton, Easton Down
Gentianella anglica; IH, Harnham, chalkpit; AS, Broad Chailce, Knowle Down, several; PRS, Great Cheverell, Great Cheverell Hill; JLP, Great Cheverell, Great Cheverell Hill, c. six plants
Geranium columbinum - JEO, Perham Down
Geranium endressii * - JEO, N. Tidworth, R. Boume
Geranium versicolor * - EG, Tilshead, Churchyard; BL, Berwick St. James, R. Till; BL, Stockton, R. Wylie; JEO, N. Tidworth, R. Bourne
Geum rivale - JEO, Perham Down; MP, Fordbrook
Geum x intermedium - RCS, Salisbury, Clarendon Park, Home Copse; JEO, Perham Down
Glyceria x pedicellata - JEO, Warminster, Smallbrook Meadows
Helleborus foetidus - PW/MR, Porton, in young scrubby woodland, just in Wilts
Hieracium maculatum, RCS, Netheravon, Lavington Folly, NW, moving target area; BL, Fovant, chalkpit, good population
Hypericum androsaemum - DJW, Whiteparish, Moor Copse; DJW, Redlynch, Haslett's Row; PMW, Whiteparish, Mean Wood
Hypericum humifusum - BL, Redlynch, Redlynch churchyard; BL/PMW, Broad Chalke, Middleton Down; DJW, Redlynch, East Copse

Hypericum pulchrum - ENST, Trowbridge, Green Lane Wood, local; BLJPMW, Broad Chalke, Middleton Down, DJW, Whiteparish, Moor Copse; DJW, Whiteparish, Battscroft; PMW, Whiteparish, Mean Wood; DJW, Little Sherwood; PMW/DJW, Landford, Earldoms; DJW/PMW, Whaddon, Oakridge Copse; PMW, Farley, Hazel Hill Copse; PMW/DJW, Whiteparish, Bushy Copse
Hypericum x desetangii - RMV, Whitsbury, Martin Down car park, 2nd vc record, 1st vc record near Whitsbury in 1990
Impatiens capensis * - PW/MR, Broad Chalke, Boy's meadow, withy bed
Iris foetidissima - PMW, Whiteparish, Mean Wood; RMV, Whiteparish, in lay-by, non-native location
Isolepis setacea - PW/MR, Redlynch, Langley Wood, small unimproved meadow near wood
Juncus subnodulosus - DG, Pewsey, Jones Mill, 50+ plants, new ye record
Lactuca serriola * - RMV, Salisbury, Odstock Hospital, base of garden wall near main entrance
Lathraea squamaria - JNo, Winterslow, Bentley Wood, large colonies
Legousia hybrida - BL, Burcombe; ER, E. of E. Chisbury, Salisbury Plain, , MOD disturbed soil to make hardcore road
Lemna minuta * - RG/AS, Littleton Pannell, in source of the Mill Race, Summerham Brook.
Lobelia erinus * - RCS, Alderbury, ditchbank, Common Plantation, one plant
Lonicera xylosteum * - RCS, Fonthill, Beacon Hill, summit, one bush
Luzula noltzflora - ENST, Trowbridge, Green Lane Wood, occasional
Luzula sylvatica DG, Donhead St Mary, Great Hanging; DG, Great Wincombe, Wincombe Park; DG, S of Warminster, Southleigh Wood, steep bank, large population; PMW/DJW, N. of Redlynch, Cheyne's Wood
Medicago arabica - JEO, S. Tidworth, R. Bourne, sewerage works; JEO, S. Tidworth, R. Bourne, sewerage works
Menyanthes trifoliata - PW/MR., Hamham, Hamham Meadows. Large patch in one water meadow ditch only
Monotropa hypopitys - JNo, Downton, old railway line
Muscari comosum * - AJW/JDW, Great Cheverell, near Great Cheverell Hill, deserted garden by track. 1' vc record
Myosotis ramosissima - BL, S. of Broad Chalke, Chickengrove Bottom; JEO, Perham Down, military hard standing and plantation and downland
Myosurus minimus - RG, Woodborough, on footpath through hayfield, 1 plant conf DG
Myriophyllum spicatum - JA, nr. Ugford, R. Nadder
Narcissus pseudonarcissus - PMW/DJW, W. of Redlynch, Cheyne's Wood
Neottia nidus-avis - BL, Perham Down, records scarcer than suggested in Grose; PMW/DJW, Whaddon, Oakridge Copse
Nicandra physalodes * - JCPR, Mere, 1 bush in garden
Oenanthe fluviatilis - PWIMR, Woodford, Heale House, large clump in main channel of Avon
Ophioglossum vulgatum - BG, Biss Wood ride; LB/GWG, Trowbridge, Green Lane Wood, main E-W ride; PW/MR, Harnham, E. meadows, small population in overgrown water meadow
Ophrys aperea - BL, Fovant, chalkpit
Orchis mascula - RMV, Nunton, strip of woodland west of Longford Farm, 1 plant
Ornithogalum umbellatum - JLP, Great Cheverell, Great Cheverell Hill, 1 clump,

roadside

Oxalis exilis * - RMV, Nunton, church near porch and SE corner, apparently a weed

Papaver dubium ssp *lecoquii* - JEO, Perham Down, military hard standing and plantation and downland

Papaver hybridum - JEO, Perham Down; BL/PMW, Broad Chalke, Middleton Down

Parentucellia viscosa - PM, Longleat, Centre Parcs. c.10 plants in sandy soil. Only 3rd rec. for vc8

Pedicularis sylvatica - PMW, Farley, Hazel Hill Copse

Phacelia tanacetifolia * - RG, Easton Royal, Conygre Farm, Burbage Rd., planted on set-aside but 1 000s of plants spread to roadside verges, 1 previous Wilts, record;

MPr, Winterbourne Earls, on set-aside but also outside field headland

Phyteuma orbiculare - DGra, Porton Ranges, two new sites, perhaps seeded from a known Winterslow site

Platanthera chlorantha - BL, S. of Broad Chalke, Chickengrove Bottom, 5 spikes;

JEO, Perham Down; PMW/DJW, Battscoft

Poa angustifolia - RMV, Britford

Polygonatum multiflorum - DJW, Whiteparish, Moor Copse; DF, Stockton; JLP, Trowbridge, Green Lane Wood, locally abundant; EG, Winterslow, Bentley Wood; DJW, Whiteparish, Battscoft; DJW, Landford, Sherwood Copse; DJW, Redlynch, Thorns Copse; DJW, Landford, McReath's Wood; PMW/DJW, Landford, Oakridge Copse

Polygonum minor - RMV, West Wellow, Common, another site, on drying mud in damp hollow

Polypodium interjectum - JEO/RW, Tisbury

Polystichum aculeatum - JO, Tisbury, up muddy path from Tisbury to Castle Ditches, 2-3 plants

Potamogeton crispus - PWIMR, E. Harnham, with *P. perfoliatus*; JEO/WBS, Warminster, Smallbrook Meadows

Potamogeton perfoliatus - PW/MR, E. Harnham, in Avon navigation near bridge; PW/MR, Woodford, Heale House with *O. fluviatilis*

Radiola linoides - PW/MR, Redlynch, Langley Wood, open heathy ride through wood, in Wilts, previous records in this locality in Hants

Ranunculus aquatilis - JN, Burbage, Seymour Pond *Ranunculus auricomus* - RMV, Nunton, in strip of woodland west of Longford Farm, c. 70 plants; JN, Winterslow, Bentley Wood

Ranunculus ficaria chrysocephala - JAK, Ansty, Tisbury

Ribes uva-crispa - RMV, Britford and Nunton, between on wooded bank of main road

Rosa agrestis - PDS, Whitsbury/Damerham area, 5 records on vc8/ 11 borders of 14 plants, 1st record since c. turn of century, RDB status

Rosa rubiginosa - DG, Great Dumford, 1 bush on chalk in hedgebank north of Ham

Wood *Rosa sherardii* - DG, Lower Westwood, 1 bush, field side of Farleigh

Hungerford/Lower Westwood, 1 bush, updates 2 previous records by some 70 years

Rosa x bishopii (*R. agrestis* x *R. micrantha*) - PDS, nr Martin, 1st VC record of a rare hybrid

Rosa x verticillacantha (*R. arvensis* x *R. canina*) - DS, near Whiteparish, 3rd vc record

Rumex sanguineus var *sanguineus* - JEO - Redlynch, Langley Woods, layby

Salix purpurea JA, Bowerchalke, R. Ebble; JA, Combe Bissett, R. Ebble; JEO, S.

Tidworth, R. Boume (sewerage works); JEO, Bodenhams, Salisbury Avon; JN, Great Bedwyn, Wilton Water, 3 bushes

Salix triandra - JN, Great Bedwyn, Wilton Water, 1 seen

Scirpus sylvaticus - DG, W. of Stourton, nr Alfred's Tower, S., next to a pond
Silybum marianum - BL, Berwick St James, on field edge' non-native in Wilts
Sorbus torminalis - DJW, Landford, McReath's Wood; PMW/DJW, Whiteparish, Bushy Copse, mature specimen
Sparganium emersum - JA, Stoke Farthing, R. Ebble; IA, Bishopstone, R. Ebble; JA, Combe Bissett, R. Ebble at Coombe Farm Bridge; IA, Combe Bissett, R. Ebble; IA, R. Ebble at Homington, JA, Avonpath, R. Ebble; JA, Odstock, R. Ebble at Odstock Field
Stachys arvensis - IA, Stoke farthing, R. Ebble; JA, Fifield Bavant, R. Ebble
Stellaria neglecta - JLP, Trowbridge, Green Lane Wood, several plants
Symphytum tuberosum * - RCS, Fonthill, Old Fonthill Abbey, old woodland
Thalictrum flavum - JA, Combe Bissett, R. Ebble
Thesium humfusus - JNo, Porton, Easton Down
Tilia cordata - RCS, Redlynch, Grove Copse, several coppice stools
Tragopogon porrifolius * - PH, Mere, Castle Hill, bare ground has allowed this opportunist a chance. *Trifolium fragiferum* - PW/MR, Salisbury, large patch in horse-grazed water meadow; PW/MR, Stapleford, small patch in semi-improved field; JH, Salisbury, Salisbury Butts water meadow
Triglochin palustre - PW/MR, Hamham, throughout Harnham Meadows in great abundance; PW/MR, West Amesbury. Common in unimproved old water meadow; PW/MR, Woodford, wet ditch sides
Ulex gallii - DG, Gare Hill area; DG, W. of Stourton, Alfred's Tower S., in a woodland area
Umbilicus rupestris - BL/JA, Tisbury, patch 2x3m W of steep track leading down to Ansty from Swallowcliff
Utricularia minor - RMV, Nomansland, Cadnam Common; RMV, Nomansland, Furzley Common, wet bog, locally frequent, a second site for the species
Valeriana dioica - PW/MR, Hamham, E. Hamham Meadows. In several ditches near Menyanthes
Veronica scutellata - DG, Semley, Semley Common, opposite Chaldicotts Farm, 20 plants
Vicia villosa * - JLP, Trowbridge, c. 6 plants on building site
Viscum album - RMV, Whiteparish, Golden's Farm, on *Malus domestica*, old orchard; RMV, Landford, New Rd, on *M. domestica* in garden; RMV, Cowersfield Gate, on *Crataegus monogyna* and *Malus domestica*; RMV, West Wellow, Manry's Lane, on *M. domestica* & *C. monogyna* in garden and garden of Paddock Fm., 1 plant on *Malus domestica*; BL, Downton, Trafalgar Woods, 18 plants on *Tilia*; BL, Amesbury, Roundabout, 2 plants on 2 young poplars; BL, Middlechase Farm garden, 2 plants on old apple, 2 plants on old Hawthorn; BL, Downton, Barford Farm, 26 plants on old Lime, 1 each on 2 poplars; BL, Stapleford, 4 plants on old Apple; BL, Dinton, 7 plants on large lime, 15 plants on apple, 3 plants on apple in garden, 1 large plant on apple in garden, 8 plants on 2 *Crataegus*, 20 plants on 10 *Crataegus*, 10 on *A.campestre*, 1 on *M.sylvestris*, 32 plants on 5 *Malus sylvestris* in garden, 5 plants on 2 *M. sylvestris* in garden, Nat. Trust, 2 plants on *Tilia vulgaris*, by river Ebble, several plants on Willow and *Crataegus*; BL, Bodenham, Longford Castle, 2 plants on Lime