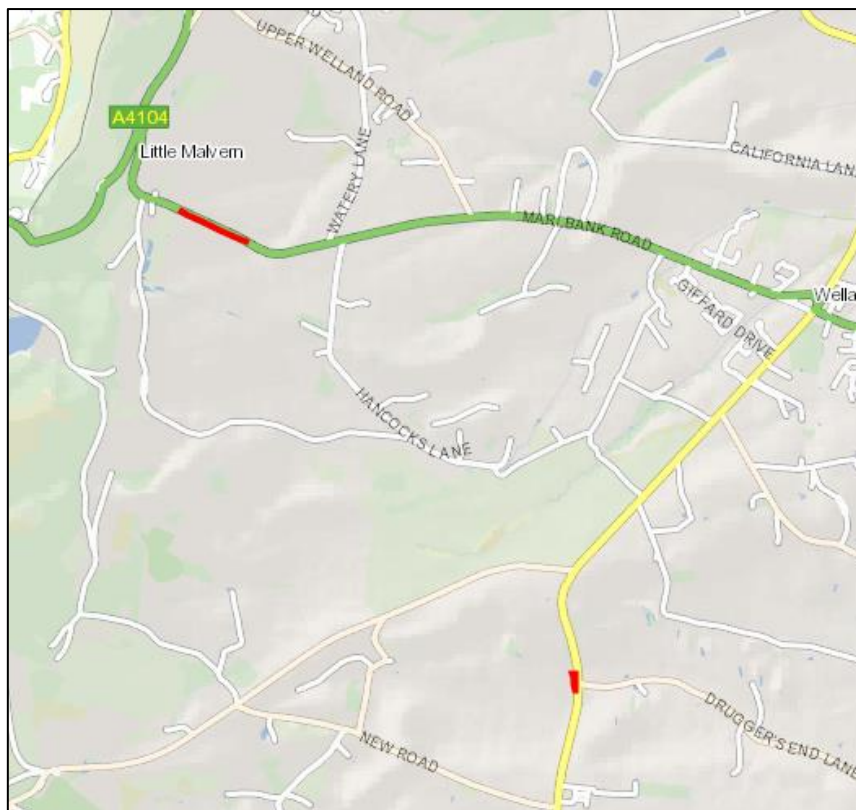


Malvern Hills AONB Verge Management Pilot Project

Monitoring species diversity on pilot project
verges: Little Malvern Priory and Drugger's End

2023



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Contents

1	Introduction.....	3
2	Methods.....	3
2.1	Survey limitations.....	3
3	Results.....	5
3.1	Botanical surveys.....	5
3.1.1	Little Malvern Priory	5
3.1.2	Drugger's End.....	8
4	Summary of results	Error! Bookmark not defined.
5	References	12

1 Introduction

In 2019 the Malvern Hills Area of Outstanding Natural Beauty (MH AONB) Partnership undertook a pilot study on two verges with the aim of increasing the number and diversity of wildflowers and grasses for the benefit of pollinators: the top-soil was stripped to reduce the nutrients, and seed from commercial sources was spread to introduce a less vigorous, more diverse sward. The plan was to cut the verge areas once per year and to remove the arisings to avoid re-enriching the soil, similar to traditional meadows managed by hay-cutting.

2 Methods

Two sites underwent soil stripping in 2019, followed by the reduced mowing regime and collection of arisings over subsequent years. These verges were re-visited on 26th June 2023 to collect data on the plant species present for comparison to the baseline surveys undertaken on 27th June 2018. Grid references for the verges are given in Table 1.

Table 1. Pilot study verge locations

Verge	Road number	National Grid Reference (at centre)
Near Little Malvern Priory	A4104	SO 77235 40358
Drugger's End	B4208	SO 78716 38500

The plant species growing on each verge were recorded. Surveys were conducted by walking the full length of a verge twice, zig-zagging across its width, identifying and noting every plant seen. Vegetation height was measured in three places on each verge. Each plant species recorded was checked against Day's 2001 'Checklist of Worcestershire Flora' and assigned a status according to its frequency in the county (Table 2).

Table 2. Species frequency classes (from Day, 2001)

Frequency class	Number of monads (out of 2000 monads [1km squares] in Worcestershire)	Percentage of monads
Very common	1501 +	>75 - 100
Common	1001 - 1500	>50 - 75
Widespread	501 - 1000	>25 - 50
Widespread but localised	201 - 500	>10 - 25
Uncommon	101 - 200	>5 - 10
Scarce	51 - 100	>2.5 - 5
Very scarce	26 - 50	>1.25 - 2.5
Rare	13 - 25	>0.6 - 1.25
Very rare	1 - 12	0.05 - 0.6
Extinct	0	0

2.1 Survey limitations

The Worcestershire status of recorded plant species is taken from the county checklist published in 2001 (Day, 2001). Clearly a species' status may have changed since the

checklist was produced, however none of the species present in 2018 justified maintaining current management practices rather than implementing changes to benefit biodiversity.

It is important to note that ecological surveys based on a single site visit will typically under-represent the biodiversity of a site due to seasonal variations in plant growth forms and animal activity. Field surveys are considered to be a record of points of ecological interest available to record on the day.

The botanical surveys of pilot study verges was carried out in late June of both survey years, usually an optimum time for vegetation surveys, but in 2018 there was a heatwave and drought throughout June, and while June 2023 was the warmest June on record, it was accompanied by occasional thunderstorms and heavy rain. Therefore it is likely that some plant species died back earlier in 2018 than in 2023. The species lists produced are not exhaustive.

3 Results

3.1 Botanical surveys

Species lists were produced for both verges, effort was made to produce comprehensive lists, however they cannot be considered to be exhaustive. The total number of plant species recorded on each verge is given in Table 3 and full lists are given in Tables 5-8.

Table 3. Number of plant species recorded and vegetation height

Verge	Date	Number of plant species recorded	Vegetation height (cm)		
Little Malvern Priory	27/06/2018	30	140 (west)	55 (centre)	50 (east)
	26/07/2023	40	110	38	43
Drugger's End	27/06/2018	26	40 (south)	60 (north)	100 (at back)
	26/07/2023	42	45	58	90

3.1.1 Little Malvern Priory

A long verge (approximately 330m), which changes in character along its length: it slopes up towards the western end and is wetter on the top half; water is diverted off the verge approximately halfway down, and the lower section is drier.

Vegetation on this verge was dense and lush in June 2018, with all species recorded being widespread to very common in Worcestershire. In June 2023 the vegetation was mostly quite thin, with bare soil visible between plants – growth appeared to be suppressed, e.g. oxeye daisies were smaller than usual. The average height of vegetation was lower in 2023, approximately 18cm shorter than in 2018 (Table 3). Grasses were present, but without the thick growth seen in 2018. Only the 1m roadside safety cut area appeared to have been cut during 2023.

In 2018, 30 vegetation species were recorded on the verge. In 2023, 40 species were recorded. Table 4 gives a species list for each year. Species composition shifted towards more 'desirable' meadow species and fewer 'negative indicator' species, but with some less desirable additions too:

Positive indicator species gained include meadow foxtail (*Alopecurus pratensis*), crested dog's-tail (*Cynosurus cristatus*), wild carrot (*Daucus carota* subsp. *carota*), lady's bedstraw (*Galium verum*), common bird's foot trefoil (*Lotus corniculatus*), creeping cinquefoil (*Potentilla reptans*), cowslip (*Primula veris*), yellow rattle (*Rhinanthus minor*), salad burnet (*Sanguisorba minor* subsp. *minor*), and common vetch (*Vicia sativa* subsp. *segetalis*).

However, hedge bedstraw (*Galium album*) and lesser stitchwort (*Stellaria graminea*) are also positive indicator species and may have been lost from the verge between 2018 and 2023.

There were also four new species recorded in 2023 that may be considered negative indicator species in meadows (Creeping thistle *Cirsium arvense*, Yorkshire-fog *Holcus lanatus*, Common ragwort *Senecio jacobaea*, Common nettle *Urtica dioica*). None of these were very frequent on the verge, their appearance is typical of pioneer species exploiting the bare ground created by soil stripping. Vigorous grasses such as Yorkshire-fog will be prevented from becoming dominant by the semi-parasitic yellow rattle and collection of arisings to prevent nutrient loading.



Figure 1. Little Malvern Priory verge in 2018



Figure 2. Little Malvern Priory verge in 2023

Table 4. Flora recorded on Little Malvern Priory pilot verge

Common name	Scientific name (following Stace, 2010)	2018	2023	Status in Worcestershire (Day, 2001)
Yarrow	<i>Achillea millefolium</i>	✓	✓	Very common
Common bent	<i>Agrostis capillaris</i>		✓	Very Common
Meadow foxtail	<i>Alopecurus pratensis</i>		✓	Very Common
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>	✓	✓	Common
Cow parsley	<i>Anthriscus sylvestris</i>	✓		Very common
Common knapweed	<i>Centaurea nigra</i>	✓	✓	Very common
Common centaury	<i>Centaurium erythraea</i>	✓	✓	Widespread
Creeping thistle	<i>Cirsium arvense</i>		✓	Very Common
Hawthorn	<i>Crataegus monogyna</i>	✓	✓	Very common
Crested dog's-tail	<i>Cynosurus cristatus</i>		✓	Very Common
Cock's-foot	<i>Dactylis glomerata</i>	✓	✓	Very common
Wild carrot	<i>Daucus carota</i> subsp. <i>carota</i>		✓	Widespread
Common couch	<i>Elytrigia repens</i>		✓	Very Common
Hedge bedstraw	<i>Galium album</i>	✓		Widespread
Lady's bedstraw	<i>Galium verum</i>		✓	Common
Hogweed	<i>Heracleum sphondylium</i>	✓	✓	Very common
Yorkshire-fog	<i>Holcus lanatus</i>		✓	Very Common
Cat's-ear	<i>Hypochaeris radicata</i>		✓	Very Common
Compact rush	<i>Juncus conglomeratus</i>	✓	✓	Widespread
Meadow vetchling	<i>Lathyrus pratensis</i>	✓	✓	Very common
Oxeye daisy	<i>Leucanthemum vulgare</i>	✓	✓	Common
Common bird's foot trefoil	<i>Lotus corniculatus</i>		✓	Very Common
Black medick	<i>Medicago lupulina</i>	✓	✓	Very common
Timothy	<i>Phleum pratense</i>	✓		Very common
Ribwort plantain	<i>Plantago lanceolata</i>	✓	✓	Very common
Creeping cinquefoil	<i>Potentilla reptans</i>		✓	Very Common
Cowslip	<i>Primula veris</i>		✓	Widespread
Selfheal	<i>Prunella vulgaris</i>	✓	✓	Very common
Blackthorn	<i>Prunus spinosa</i>	✓	✓	Very common
Meadow buttercup	<i>Ranunculus acris</i>	✓	✓	Very common
Creeping buttercup	<i>Ranunculus repens</i>	✓		Very common
Yellow rattle	<i>Rhinanthus minor</i>		✓	Widespread but Localised
Bramble	<i>Rubus fruticosus</i> agg.	✓	✓	Very common
Common sorrel	<i>Rumex acetosa</i> subsp. <i>acetosa</i>	✓	✓	Very common
Curled dock	<i>Rumex crispus</i>	✓	✓	Very common
Broad-leaved dock	<i>Rumex obtusifolius</i>	✓		Very common
Elder	<i>Sambucus nigra</i>	✓	✓	Very common
Salad burnet	<i>Sanguisorba minor</i> subsp. <i>minor</i>		✓	Widespread but Localised
Common ragwort	<i>Senecio jacobaea</i>		✓	Very Common
Prickly sow-thistle	<i>Sonchus asper</i>	✓		Very common
Lesser stitchwort	<i>Stellaria graminea</i>	✓		Common
Dandelion	<i>Taraxacum officinale</i> agg.	✓	✓	Very common
Red clover	<i>Trifolium pratense</i>	✓	✓	Very common
White clover	<i>Trifolium repens</i>	✓	✓	Very common
Common nettle	<i>Urtica dioica</i>		✓	Very Common
Hairy tare	<i>Vicia hirsuta</i>	✓	✓	Common
Common vetch	<i>Vicia sativa</i> subsp. <i>segetalis</i>		✓	Common
Total number of species:		30	40	

3.1.2 *Drugger's End*

Located opposite residential dwellings, this verge was previously managed by residents, with regular mowing leading to a lawn-like appearance. In 2018 the vegetation was allowed to grow long, and when surveyed three species of interest were found: imperforate St John's-wort (*Hypericum maculatum*), grass vetchling (*Lathyrus nissolia*), and greater burnet-saxifrage (*Pimpinella major*), mostly in the corner at the back of the north end of the verge. When the top-soil was stripped, the north corner was left in order to retain these species.

In 2023 the grasses were less vigorous and floral diversity greater, although the vegetation height remained similar (Table 3). The number of plant species recorded increased from 26 in 2018 to 42 in 2023, with a number of 'desirable' meadow indicator species gained, but also some apparently lost:

Positive additions include: yarrow (*Achillea millefolium*), agrimony (*Agrimonia eupatoria*), meadow foxtail (*Alopecurus pratensis*), common knapweed (*Centaurea nigra*), wild carrot (*Daucus carota* subsp. *carota*), hedge bedstraw (*Galium mollugo*), lady's bedstraw (*Galium verum*), meadow crane's-bill (*Geranium pratense*), square-stalked St John's-wort (*Hypericum tetrapterum*), greater bird's-foot-trefoil (*Lotus pedunculatus*), yellow-rattle (*Rhinanthus minor*), common sorrel (*Rumex acetosa* subsp. *acetosa*), salad burnet (*Sanguisorba minor* subsp. *minor*), and common vetch (*Vicia sativa* subsp. *segetalis*).

Positive indicator species found in 2018 but not in 2022 are: bugle (*Ajuga reptans*), common mouse-ear (*Cerastium fontanum*), greater burnet-saxifrage (*Pimpinella major*), and lesser stitchwort (*Stellaria graminea*).



Figure 3. Drugger's End verge in 2018



Figure 4. Drugger's End verge in 2023

Table 5. Flora recorded on Druggers End pilot verge

Common name	Scientific name (following Stace, 2010)	2018	2023	Status in Worcestershire (Day, 2001)
Yarrow	<i>Achillea millefolium</i>		✓	Very Common
Agrimony	<i>Agrimonia eupatoria</i>		✓	Widespread
Common bent	<i>Agrostis capillaris</i>		✓	Very Common
Bugle	<i>Ajuga reptans</i>	✓		Widespread
Meadow foxtail	<i>Alopecurus pratensis</i>		✓	Very Common
Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>		✓	Common
Common knapweed	<i>Centaurea nigra</i>		✓	Very Common
Common mouse-ear	<i>Cerastium fontanum</i>	✓		Very common
Creeping thistle	<i>Cirsium arvense</i>		✓	Very Common
Spear thistle	<i>Cirsium vulgare</i>	✓		Very common
Field bindweed	<i>Convolvulus arvensis</i>		✓	Very Common
Cock's-foot	<i>Dactylis glomerata</i>	✓	✓	Very common
Cock's-foot	<i>Dactylis glomerata</i>		✓	Very Common
Wild carrot	<i>Daucus carota</i> subsp. <i>carota</i>		✓	Widespread
Common couch	<i>Elytrigia repens</i>		✓	Very Common
Red fescue	<i>Festuca rubra</i>	✓	✓	Very common
Hedge bedstraw	<i>Galium mollugo</i>		✓	Widespread
Lady's bedstraw	<i>Galium verum</i>		✓	Common
Cut-leaved crane's-bill	<i>Geranium dissectum</i>	✓	✓	Very common
Meadow crane's-bill	<i>Geranium pratense</i>		✓	Widespread but Localised
Herb-Robert	<i>Geranium robertianum</i>		✓	Very Common
Hogweed	<i>Heracleum sphondylium</i>	✓		Very common
Yorkshire-fog	<i>Holcus lanatus</i>	✓	✓	Very common
Imperforate St John's-wort	<i>Hypericum maculatum</i>	✓	✓	Widespread but localised
Square-stalked St John's-wort	<i>Hypericum tetrapterum</i>		✓	Widespread
Grass vetchling	<i>Lathyrus nissolia</i>	✓	✓	Widespread but localised
Oxeye daisy	<i>Leucanthemum vulgare</i>	✓	✓	Common
Perennial rye-grass	<i>Lolium perenne</i>	✓		Very common
Common Bird's-foot-trefoil	<i>Lotus corniculatus</i>	✓	✓	Very common
Greater Bird's-foot-trefoil	<i>Lotus pedunculatus</i>		✓	Widespread
Black medick	<i>Medicago lupulina</i>	✓	✓	Very common
Timothy	<i>Phleum pratense</i>		✓	Very Common
Greater burnet-saxifrage	<i>Pimpinella major</i>	✓		Scarce
Ribwort plantain	<i>Plantago lanceolata</i>	✓	✓	Very common
Creeping cinquefoil	<i>Potentilla reptans</i>	✓	✓	Very common
Selfheal	<i>Prunella vulgaris</i>	✓	✓	Very common
Meadow buttercup	<i>Ranunculus acris</i>	✓	✓	Very common
Creeping buttercup	<i>Ranunculus repens</i>	✓	✓	Very common
Yellow-rattle	<i>Rhinanthus minor</i>		✓	Widespread but Localised
Common sorrel	<i>Rumex acetosa</i> subsp. <i>acetosa</i>		✓	Very Common
Broad-leaved dock	<i>Rumex obtusifolius</i>	✓	✓	Very common
Salad burnet	<i>Sanguisorba minor</i> subsp. <i>minor</i>		✓	Widespread but Localised
Prickly sow-thistle	<i>Sonchus asper</i>		✓	Very Common
Lesser stitchwort	<i>Stellaria graminea</i>	✓		Common
Red clover	<i>Trifolium pratense</i>	✓	✓	Very common
White clover	<i>Trifolium repens</i>	✓	✓	Very common

Common name	Scientific name (following Stace, 2010)	2018	2023	Status in Worcestershire (Day, 2001)
Common nettle	<i>Urtica dioica</i>	✓	✓	Very common
Germander speedwell	<i>Veronica chamaedrys</i>	✓	✓	Very common
Common vetch	<i>Vicia sativa</i> subsp. <i>segetalis</i>		✓	Common
Total number of species:		26	42	

4 References

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