Summary of Botanical Surveys at Sapperton Wilder

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Broad-leaved Helleborine (Epipactis helleborine), Photo: Peter Martin

Background

As an experimental project transitioning to regenerative agriculture practices, understanding the plant life, and specifically arable plants, at the start of the project is extremely important. This report will serve as a robust baseline, to which future data can be compared to.

Two master's students from the University of Gloucestershire undertook flowering plant surveys across the project in 2022 and 2023. These surveys used a different method (quadrat surveys), and also did not record grasses, so cannot be directly compared to Giles' results.

These data, however, are important in painting the picture of a baseline for the botanical communities on site at the start of the project.

Methods – What did we do?

Giles was commissioned by Sapperton Wilder to conduct botanical surveys of the 380 acres of former arable fields. Surveys took place mainly between June and July. There were a selection of fields which were surveyed twice – before and after cultivation of herbal leys.

Walkover surveys were conducted to cover as much of each field as possible, with all vascular plants recorded. Species frequency/abundance was also recorded using the DAFOR scale:

D: Dominant
A: Abundant
F: Frequent
O: Occasional
R: Rare

Any rare/scarce/threatened species were noted and mapped. An evaluation of the nature conservation value of arable fields (based on Plantlife's Important Arable Plant Areas (IAPA) methodology) was also provided. The land management occurring in each field has a direct effect on what plants are found, specifically arable plants. See Table 1 for field management. The codes (i.e. GS4, AB8) refer to Countryside Stewardship (CSS) and Sustainable Farming Incentive (SFI) codes. GS4 refers to herbal leys, AB8/IMP2 to wildflower mix, and AB9 to wild bird food mix.

Table 1: Summary of 2024 Field Management

Survey Block	Field	2024 Crop
Northern	Butterfly	left fallow
Northern	Stoat	left fallow
Northern	Buzzard	left fallow
Northern	Swallow	left fallow
Northern	Hawthorn	left fallow, part min. tillage
Northern	Bee	left fallow, part min. tillage
Northern	Bishop's Walk	n/a permanent grassland
Centre Western	Fox	GS4 with AB8 margins Sept 2023
Centre Western	Maple	GS4 with AB8 margins Sept 2023
Centre Western	Kingfisher	GS4 Sept 2023
Centre Western	Otter	AB9 August 2023
Centre Eastern	Newt	IPM2/AB8 Mar/Apr 2024, central part shallow cultivated and left fallow
Centre Eastern	Oak	left fallow, part min. tillage
Centre Eastern	Badger	GS4 Sept 2023, trees planted in centre
Southern	Finch	left fallow
Southern	Owl	left fallow bar northern strip AB8 March/April 2024
Southern	Beech	part left fallow, part spring barley (GS4), part GS4, part IPM2/AB8 March/April 2024
Southern	Kite	part left fallow, part GS4 March/April 2024
Southern	Woodpecker	spring barley (GS4) March/April 2024
Southern	Beetle	mostly IPM2/AB8 March/April 2024, central part shallow cultivated and left fallow

Results – What did we find?

In total, 288 taxa were recorded during fieldwork, with 13 nationally and/or county rare, scarce and/or threatened species. Correlation test results revealed no significant relationship between field size and number of taxa recorded (or rare species). Simply put, just because a field was bigger does not necessarily mean there were more taxa recorded. However, there was a very highly significant positive correlation between the number of taxa recorded and the number of rare/scarce/threatened species (Table 2). Thus the greater diversity of plants equals a greater chance of there being a species of high conservation interest.

Table 2: Summary of Species per Field (RST = Rare/Scarce/Threatened)

Field	Survey Date/s	No. Species	No. RST Species
Butterfly	25/06/2024	80	1
Stoat	25/06/2024	97	1
Buzzard	25/06/2024	103	2
Swallow	27/06/2024	78	0
Hawthorn	20/06/2024 and 26/07/2024	114	2
Bee	27/06/2024	121	1
Bishop's Walk	20/06/2024 and 26/07/2024	70	1
Fox	08/07/2024	115	3
Maple	08/07/2024	108	2
Kingfisher	10/07/2024	118	3
Otter	10/07/2024	119	4
Newt	12/07/2024	158	6
Oak	12/07/2024	118	3
Badger	17/07/2024	138	2
Finch	07/03/2024	74	2
Finch	19/07/2024	109	2
Owl	07/03/2024	70	3
Owl	19/07/2024	113	3
Beech	07/03/2024	75	2
Beech	19/07/2024 and 26/07/2024	153	6
Kite	06/03/2024	84	3
Kite	22/07/2024	133	6
Woodpecker	06/03/2024	77	2
Woodpecker	22/07/2024	134	4
Beetle	06/03/2024	64	1
Beetle	22/07/2024	121	3
Total		287	13

There were a number of notable species recorded on site. To learn more, please visit the BSBI Plant Atlas, from which the following information was sourced.

Blue Pimpernel (*Lysimachia foemina*)

Nationally Scarce. This usually annual arable weed has long been confused with the blue-flowering variant of its relative Scarlett Pimpernel (*Lysimachia arvensis* forma *azurea*). It is likely declining, probably due to more intensive weed control in arable fields, but the 1968 map only included confirmed records so it is difficult to assess long-term changes in distribution.

Shepherd's-needle (*Scandix pecten-veneris*)

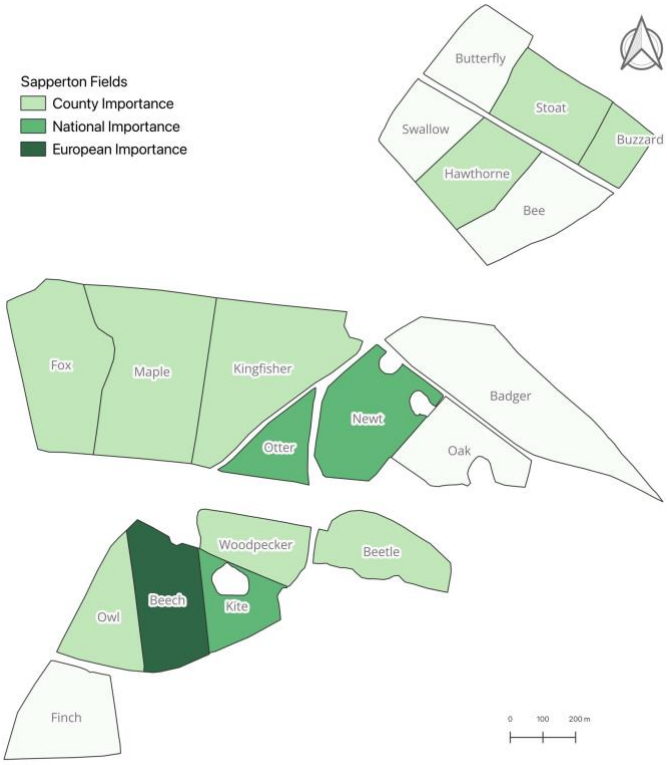
RDB Critically Endangered. This annual arable plant was common and locally abundant in Britain in and especially around chalky arable fields until the 1950's, to the extent that it could sometimes impede mechanical harvesting. It has since been in severe decline ever since, but there is evidence that it has benefitted from the introduction of conservation management as part of agri-environment schemes on some sites.

Narrow-fruited Cornsalad (*Valerianella dentata*)

RDB Endangered. An annual herb of arable land, especially on chalky or calcareous soils, usually in the corners of fields and along field margins which have escaped intensive management. It can germinate both in spring and autumn, but is most frequently found in spring-sown crops. It has been in accelerated decline since the 20th century due to the intensification of arable cropping from the 1950s onwards. It has survived only in areas with very light soils, particularly on the chalk, and in recent decades there has been evidence that it has benefitted from the introduction of low-intensity management for weeds in these areas, as part of agri-environment schemes.

Important Arable Plant Area (IAPA) Conservation Ratings

The map below shows IAPA conservation ratings, which are determined by which fields have high arable plant assemblages and the highest numbers of rare/scarce/threatened arable plants.



The differences in field IAPA scores appear largely due to management conducted prior to recording. Most of the field classified as being of European importance was cultivated in the Spring of 2024. Of the four other fields that were majority spring cultivated in 2024, two were assessed as being of national importance and two of county importance. The other field of National importance (Otter) was autumn cultivated and sown with wild bird seed mix in 2023 comprising only annuals. By contrast, all other autumn cultivated fields were sown with herbal leys dominated by perennials.

MSc Baseline Surveys

In 2022, 88 taxa of flowering plants (non-graminoids) were recorded across the site using quadrats. These methods were repeated by a different student the following year, with 113 species recorded. While these surveys are useful, they were undertaken by master's students rather than qualified botanists, so must be taken with a grain of salt. Additionally, they used a different method, so it is not possible to compare the data. However, it will be valuable in the future when either or both of these methods are repeated. Quadrat sampling tells a different story than NVC walking transects.

Discussion – What does it mean?

This report focuses on arable plants and their importance in a county, national, and European context. Collectively, the fields at Sapperton Wilder can be considered as being of National Importance for arable plants. It is likely that the surrounding area holds its own importance but would have never been surveyed.

While fields like Oak are not found to be of importance for arable plants, they still have high botanical value as grassland and headlands. Arable plants are typically annuals and require cultivation for germination. Many wildflowers thrive in areas of soil that are regularly disturbed by growing crops. Only quadrat sampling can truly determine whether a grassland is species rich.

One species to highlight is Yellow Rattle (*Rhinanthus minor*), found scattered in most of the fields and frequently in 'Oak' field. It is an important meadow wildflower, as it is hemi parasitic on grasses (partially parasitic – takes water and nutrients from host plant but still can photosynthesise). It weakens them, therefore giving other wildflowers a chance to compete and gradually establish themselves (Plantlife).

Yellow Rattle (Rhinanthus minor), Photo: Chenie Prudhomme

What are the next steps?

Sapperton Wilder's aims of transitioning to the regenerative principles of crop diversity, cover cropping, minimising tillage and chemicals, maintaining living roots and integrating livestock will hopefully provide enough of a 'mosaic' of different cropping rotations and habitats that will be beneficial not only for arable plants but other wildlife. Arable plants provide important nectar sources for, amongst others, pollinators, which are in turn prey for birds and bats.

We are looking into different stewardship options like AHW11 (Cultivated areas for arable plants) in SFI, which would allow us to continue with our wider site vision of regenerative agricultural practices while still managing specifically for those rare arable species which need regular disturbance.

We hope to repeat the botanical survey in 5 years, at which time we will be able to begin comparison to this baseline. In the meantime, it is recommended to undertake quadrat sampling to monitor the richness of the grassland. The results from this survey have been submitted to the county recorder.

Resources

BSBI Plant Atlas
https://plantatlas2020.org/

JNCC – National Vegetation Classification
https://jncc.gov.uk/our-work/nvc/

Plantlife - Yellow Rattle
https://www.plantlife.org.uk/plants-and-fungi/yellow-rattle/

Common Centaury (Centaurium erythraea), Photo: Chenie Prudhomme

Appendix I: List of all taxa

Graminoids (Grasses)

Agrostis capillaris
Agrostis gigantea
Agrostis stolonifera
Alopecurus myosuroides
Alopecurus pratensis
Anisantha diandra
Anisantha sterilis
Anthoxanthum odoratum
Arrhenatherum elatius
Avena fatua
Avenula pubescens
Brachypodium rupestre
Brachypodium sylvaticum
Bromopsis erecta
Bromus hordeaceus ssp. hordeaceus
Bromus racemosus
Bromus secalinus
Carex divulsa ssp. leersii
Carex flacca
Carex sylvatica
Cynosurus cristatus
Dactylis glomerata
Deschampsia cespitosa
Elymus repens
Festuca rubra
Holcus lanatus
Hordeum distichon
Lolium perenne
Luzula campestris
Phleum bertolonii
Phleum pratense
Poa angustifolia
Poa annua
Poa humilis
Poa pratensis
Poa trivialis
Schedonorus arundinaceus
Schedonorus pratensis
Trisetum flavescens
Triticum aestivum
Vulpia bromoides
Vulpia myuros

Non-graminoids (Flowering Plants)

Acer campestre
Acer pseudoplatanus
Achillea millefolium
Aegopodium podagraria
Aethusa cynapium ssp. cynapium
Agrimonia eupatoria
Allium vineale
Ammi majus
Anacamptis pyramidalis
Anthriscus sylvestris
Anthyllis vulneraria
Aphanes arvensis
Arctium lappa
Arctium minus agg.
Arenaria leptoclados
Arenaria serpyllifolia
Artemisia vulgaris
Arum maculatum
Atriplex patula
Bellis perennis
Betula pendula
Blackstonia perfoliata
Brassica napus
Brassica rapa
Buddleja davidii
Calystegia sepium
Calystegia silvatica
Calystegia x lucana
Cannabis sativa
Capsella bursa-pastoris
Cardamine flexuosus
Carduus crispus
Carduus nutans
Centaurea cyanus
Centaurea nigra agg.
Centaurea debeauxii
Centaurea nigra
Centaurea nigra x debeauxii
Centaurea scabiosa
Centaurium erythraea
Cerastium fontanum ssp. vulgare
Cerastium glomeratum
Chaenorhinum minus
Chaerophyllum temulum
Chamerion angustifolium
Chenopodium album
Cichorium intybus
Circaea lutetiana
Cirsium arvense
Cirsium eriophorum
Cirsium palustre
Cirsium vulgare
Clematis vitalba
Clinopodium vulgare
Convolvulus arvensis
Cornus sanguinea
Corylus avellana
Crataegus monogyna
Crepis spp.
Crepis biennis
Crepis capillaris
Crepis vesicaria
Dactylorhiza fuchsii
Daphne laureola
Daucus carota ssp. carota
Dryopteris filix-mas
Epilobium spp.
Epilobium ciliatum
Epilobium hirsutum
Epilobium montanum
Epilobium parviflorum
Epilobium tetragonum
Epipactis helleborine
Erigeron acris
Erigeron canadensis
Erodium cicutarium
Ervilla hirsuta
Ervum tetraspermum
Euonymus europaea
Eupatorium cannabinum
Euphorbia amygdaloides
Euphorbia exigua
Euphorbia helioscopia
Euphorbia peplus
Euphorbia platyphyllos
Fagus sylvatica
Fallopia convolvulus
Ficaria verna
Filago germanica
Fragaria vesca
Fraxinus excelsior
Fumaria officinalis
Galium album
Galium aparine
Galium odoratum
Galium verum
Geranium columbinum
Geranium dissectum
Geranium molle
Geranium pratense
Geranium pusillum
Geranium pyrenaicum
Geranium robertianum
Geum urbanum
Glechoma hederacea
Hedera helix
Helminthotheca echioides
Heracleum sphondylium
Hypericum androsaemum
Hypericum hirsutum

Hypericum perforatum
Hypochaeris radicata
Ilex aquifolium
Inula conyzae
Jacobaea erucifolia
Jacobaea vulgaris
Juglans regia
Kickxia elatine
Kickxia spuria
Knautia arvensis
Lactuca serriola
Lamium album
Lamium hybridum
Lamium amplexicaule
Lamium purpureum
Lapsana communis
Lathyrus pratensis
Legousia hybrida
Leontodon hispidus
Leucanthemum vulgare
Ligustrum vulgare
Linaria vulgaris
Linum catharticum
Linum usitatissimum
Lithospermum officinale
Lonicera periclymenum
Lotus corniculatus
Lotus corniculatus var. sativus
Lotus pedunculatus
Lysimachia arvensis
Lysimachia foemina
Malva moschata
Matricaria chamomilla
Matricaria discoidea
Medicago lupulina
Medicago sativa ssp. sativa
Mercurialis perennis
Myosotis arvensis
Odontites verna ssp. serotinus
Oenothera sp.
Onobrychis viciifolia
Ophrys apifera
Orobanche minor ssp. minor
Orobanche minor ssp. minor var. flava
Papaver lecoqii
Papaver rhoeas
Pastinaca sativa ssp. sylvestris
Pentaglottis sempervirens
Persicaria maculosa
Pilosella aurantiaca
Pilosella officinarum
Plantago lanceolata
Plantago major
Plantago media
Polygonum aviculare
Potentilla anserina
Potentilla reptans
Poterium sanguisorba ssp. sanguisorba
Primula veris
Primula vulgaris
Prunella vulgaris
Prunus avium
Prunus spinosa
Pteridium aquilinum
Pulicaria dysenterica
Quercus robur
Ranunculus acris
Ranunculus bulbosus
Ranunculus repens
Raphanus raphanistrum ssp. raphanistrum
Raphanus sativus
Rhinanthus minor ssp. minor
Rosa spp.
Rubus caesius
Rubus fruticosus agg.
Rumex acetosa ssp. acetosa
Rumex crispus ssp. crispus
Rumex obtusifolius
Rumex sanguineus
Rumex x pratensis
Salix caprea
Sambucus nigra
Sanicula europaea
Scandix pecten-veneris
Scorzoneroides autumnalis
Scrophularia auriculata
Senecio vulgaris
Sherardia arvensis
Silene dioica
Silene latifolia ssp. alba
Silene x hampeana
Sinapis alba
Sinapis arvensis
Sison segetum
Sisymbrium officinale
Solanum dulcamara
Solidago canadensis
Sonchus arvensis
Sonchus asper
Sonchus oleraceus
Stachys sylvatica
Stellaria media
Tamus communis
Taraxacum agg.
Taxus baccata
Thlaspi arvense
Torilis japonica
Tragopogon pratensis ssp. minor
Trifolium campestre
Trifolium dubium
Trifolium hybridum
Trifolium pratense
Trifolium pratense var. sativum
Trifolium repens
Tripleurospermum inodorum
Tussilago farfara
Ulmus procera
Urtica dioica ssp. dioica
Valerianella dentata
Verbascum thapsus
Veronica agrestis
Veronica arvensis
Veronica chamaedrys
Veronica montana
Veronica officinalis
Veronica persica
Veronica polita
Veronica serpyllifolia
Viburnum lantana
Viburnum opulus
Vicia cracca
Vicia sativa ssp. nigra
Vicia sativa ssp. segetalis
Vicia sepium
Viola arvensis
Viola hirta
Viola odorata
Viola riviniana
Viola tricolor ssp. tricolor