Improving biodiversity & socioeconomic returns in the Cotswolds



# Background

There are over 2500 species of moth in the UK, with over 1700 species recorded in Gloucestershire. The State of Britain's Larger Moths 2021 report showed that over two-thirds of common and widespread larger species (also known as macro-moths) declined in the last 50 years (Butterfly Conservation).

These declines in moth numbers have ripple effects across the food chain, as they are important prey for many other species including amphibians, small mammals, bats, and birds. Moths also play a crucial part in our agricultural systems as pollinators. To read more, please check out https://butterfly-conservation.org/moths/why-moths-matter.



Website www.sappertonwilder.co.uk
Email info@sappertonwilder.co.uk

In order to get an understanding of what the moth populations are like at Sapperton Wilder, we need to form a baseline to know what is present. It will take 2-3 years to form this baseline. Then as the project progresses, we can observe changes species abundance and diversity.

# Methods

One of the most popular and effective ways to monitor moths is by using a "moth trap". These traps are non-lethal. They vary widely in their design, but in essence attract moths using a light source and the moths are then drawn into a container until morning when they can be identified and released. 12 trapping sites were selected to represent each of the various land management and habitat types. As recording wasn't structured or in any sort of scheme, trapping was done as and when volunteers were available.



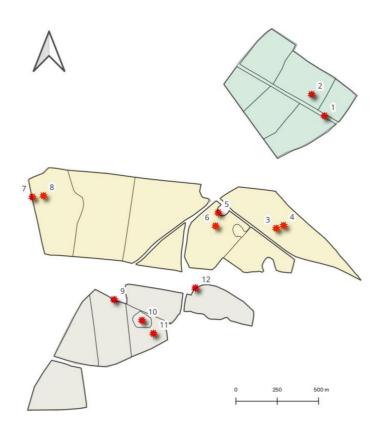


Figure 1: Moth trapping locations across the site



Peter Martin checking his moth traps. Photo: Charlie Nash

# Results

# Highlights in Numbers - 2024

3

Number of people involved

12

Number of trapping locations

85

Most recorded species (Hebrew Character)

249

Number of species recorded

1559

Total moth records

#### Most Common:

- 1. Hebrew Character (Orthosia gothica)
- 2. Common Swift (Korscheltellus lupulina)
- 3. Shaded Broad-bar (Scotopteryx chenopodiata)
- 4. Large Yellow Underwing (Noctua pronuba)
- 5. Scarce Footman (Eilema complana)

Best Month: July

Moths can be found all year round, some only emerging in the winter. However, the majority fly in the summer months. No moth trapping occurred in January or December, hence zero records. That's not to say there weren't moths flying during those months.



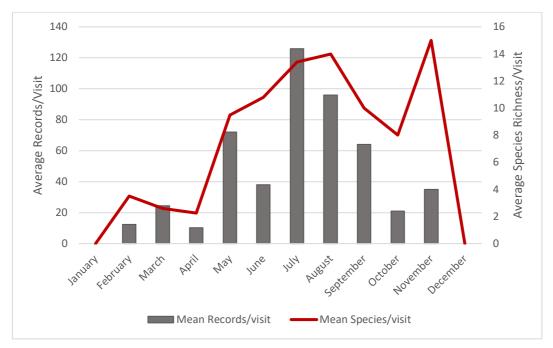


Figure 2: Average moth abundance (left axis) and diversity (right axis) per month

The data has been standardised on a monthly basis by taking the total number of records or species and dividing by the number of visits for that month.

# Discussion

Species diversity and abundance were relatively matched throughout the year, with an interesting spike in species diversity in November. The results from this first year of monitoring are more of a snapshot than a full understanding of what species are present and what their populations are. The most commonly recorded moths (detailed below) are all common and widespread.

#### The Top Five

(Photos by Peter Martin and John Bromley)

#### 1. Hebrew Character (Orthosia gothica)

- ♦ Common and widespread resident, flies mainly in Spring
- ♦ Caterpillar foodplant: variety of trees, shrubs, and plants including birch, aspen and oak.
- ♦ Named after the distinctive black mark on its wing that resembles the Hebrew character 'nun' or 'n'





#### 2. **Common Swift** (Korscheltellus lupulina)

- ♦ Common and abundant in the South of the UK
- ♦ Caterpillar foodplant: feeds on the roots of grasses and many other wild and cultivated herbaceous plants
- ♦ Sometimes a pest of agriculture or horticulture
- ♦ Adults fly in May and June
- ♦ The male moths are smaller and more colourful that the female moths that tend to be larger and much plainer in colour



#### 3. **Shaded Broad-bar** (Scotopteryx chenopodiata)

- ♦ Common and widespread
- ♦ Caterpillar foodplants: vetches and clovers
- ♦ Adults fly in July and August
- ♦ A distinctive 'delta' shaped moth with a broad brown central bar edges with narrower brown bars



# 4. Large Yellow Underwing (Noctua pronuba)

- ♦ Possibly the most abundant of our larger moths
- ♦ Caterpillar foodplants: a wide range of herbaceous plants and grasses including docks, marigolds, foxglove, and annual meadow-grass
- Adults fly from July to September (freely attracted to light, often hundreds arriving at the moth trap in peak season).





- ♦ Relatively common
- ♦ Caterpillar foodplants: lichens, moss and leaves of some low plants
- ♦ Adults fly in July and August
- ♦ Unlike like the name suggests, this is a very common moth
- ♦ Folds its wings tightly giving it an elongated shape, unlike the other common footman moths that are much more boat shaped



# What are the next steps?

The project has already begun land management geared towards the balancing of increasing biodiversity alongside food production. Actions such as not using pesticides, sowing herbal



Website www.sappertonwilder.co.uk
Email info@sappertonwilder.co.uk

leys and wildflower margins, letting the hedgerows expand with rotational topping, leaving uncut headlands, leaving certain fields fallow, and topping fields with a mosaic of topping heights, will provide an increasing level of habitat and plant diversity for all of the various moth species.

Annual monitoring will also help to paint a more comprehensive picture of butterfly species abundance and diversity, as well as hopefully capturing the presence of rare species or migrants. Results from moth trapping are submitted to the vice-county recorder. These then go to Butterfly Conservation and also get mapped for the Gloucestershire Moth Mapping Scheme.



Privet Hawk-moth (Sphinx ligustri). Photo: John Bromley

# Acknowledgements

A huge thank you to Peter Martin, who has led the moth trapping at Sapperton. He's generously given his time to help get moth monitoring set up and contribute to the records. Also a big thank you to John Bromley for moth trapping, contributing to writing newsletters and this report. Both Peter and John are brilliantly talented photographers of moths and have generously shared their photos. Thank you also to Sam Clark for moth trapping at Sapperton.

And thank you to Steve French, who has been so helpful in getting monitoring setup at Sapperton and connecting us with passionate moth trappers in the local area. Steve also organised the Gloucestershire Invertebrate Group visit to Sapperton.

# Resources

Butterfly Conservation http://www.gloucestershire-butterflies.org.uk/index.php



Website www.sappertonwilder.co.uk
Email info@sappertonwilder.co.uk

# Appendix I: Species List

Scientific Name	Common Name	Туре	Total	No Glos Records
Orthosia gothica	Hebrew Character	Macro	85	66
Korscheltellus lupulina	Common Swift	Macro	64	74
Scotopteryx chenopodiata	Shaded Broad-bar	Macro	59	20
Noctua pronuba	Large Yellow Underwing	Macro	52	131
Eilema complana	Scarce Footman	Macro	48	56
Agapeta hamana	Garden Straw	Micro	37	74
Mythimna conigera	Brown-line Bright-eye	Macro	36	21
Opisthograptis luteolata	Brimstone Moth	Macro	33	104
Scoparia subfusca	Large Grey	Micro	32	13
Eilema lurideola	Common Footman	Macro	32	79
Thalpophila matura	Straw Underwing	Macro	27	57
Charanyca trigrammica	Treble Lines	Macro	27	81
Luperina testacea	Flounced Rustic	Macro	25	56
Eremobia ochroleuca	Dusky Sallow	Macro	24	29
Xestia c-nigrum	Setaceous Hebrew Character	Macro	24	78
Agriphila tristella	Common Grass-moth	Micro	21	73
Yponomeuta padella/malinellus/cagnagella	Orchard Ermine agg.	Micro	21	agg.
Xanthorhoe spadicearia	Red Twin-spot Carpet	Macro	20	65
Scoparia pyralella	Brown-spot Grey	Micro	19	31
Idaea aversata	Riband Wave	Macro	18	92
Mesapamea secalis agg.	Common Rustic agg	Macro	18	agg.
Alsophila aescularia	March Moth	Macro	16	40
Crambus perlella	Satin Grass-moth	Macro	16	47
Peribatodes rhomboidaria	Willow Beauty	Macro	16	101
Conistra vaccinii	Chestnut	Macro	15	49
Colocasia coryli	Nut-tree Tussock	Macro	15	75
Hydriomena furcata	July Highflyer	Macro	14	17
Lymantria monacha	Black Arches	Macro	14	56
Eudonia mercurella	Garden Grey	Micro	14	64
Colostygia pectinataria	Green Carpet	Macro	14	77
Mythimna pallens	Common Wainscot	Macro	14	89
Epirrhoe alternata	Common Carpet	Macro	13	63
Craniophora ligustri	Coronet	Macro	13	68
Eilema griseola	Dingy Footman	Macro	13	74
Xestia xanthographa	Square-spot Rustic	Macro	13	76
Hada plebeja	Shears	Macro	12	35
Phragmatobia fuliginosa	Ruby Tiger	Macro	12	60
Ochropleura plecta	Flame Shoulder	Macro	12	83
Horisme tersata	Fern	Macro	11	35
Sphinx ligustri	Privet Hawk-moth	Macro	11	52
Dysstroma truncata	Common Marbled Carpet	Macro	11	78



Apamea monoglypha	Dark Arches	Macro	10	89
Nudaria mundana	Muslin Footman	Macro	9	32
Acentria ephemerella	Water Veneer	Micro	9	37
Colotois pennaria	Feathered Thorn	Macro	9	43
Horisme vitalbata	Small Waved Umber	Macro	9	43
Plutella xylostella	Diamond-back Moth	Micro	9	47
Cnephasia sp.	Grey Tortrix agg.	Micro	9	agg.
Crassa unitella	Brown Bark Moth	Micro	8	38
Aporophyla nigra	Black Rustic	Macro	8	43
Ecliptopera silaceata	Small Phoenix	Macro	8	53
Alcis repandata	Mottled Beauty	Macro	8	54
Cosmia trapezina	Dun-bar	Macro	8	61
Chrysoteuchia culmella	Garden Grass-moth	Micro	8	114
Eupithecia dodoneata	Oak-tree Pug	Macro	7	25
Catoptria pinella	Pearl Grass-moth	Micro	7	26
Apamea sordens	Rustic Shoulder-knot	Macro	7	53
Eupithecia centaureata	Lime-speck Pug	Macro	7	56
Spilosoma lubricipeda	White Ermine	Macro	7	56
Chloroclysta siterata	Red-green Carpet	Macro	7	57
Orthosia cerasi	Common Quaker	Macro	7	62
Stenoptilia pterodactyla	Brown Plume	Micro	6	10
Diarsia mendica	Ingrailed Clay	Macro	6	37
Anorthoa munda	Twin-spotted Quaker	Macro	6	38
Xestia triangulum	Double Square-spot	Macro	6	48
Cilix glaucata	Chinese Character	Macro	6	54
Crambus lathoniellus	Meadow Grass-moth	Micro	6	62
Selenia dentaria	Early Thorn	Macro	6	63
Rivula sericealis	Straw Dot	Macro	6	82
Campaea margaritaria	Light Emerald	Macro	6	87
Agrotis exclamationis	Heart & Dart	Macro	6	96
Epirrita dilutata agg.	November Moth agg.	Macro	6	agg.
Earophila badiata	Shoulder Stripe	Macro	5	20
Aporophyla lutulenta	Deep-brown Dart	Macro	5	25
Mesoligia furuncula	Cloaked Minor	Macro	5	32
Cyclophora annularia	Mocha	Macro	5	36
Anticlea derivata	Streamer	Macro	5	38
Mythimna ferrago	Clay	Macro	5	48
Idaea biselata	Small Fan-footed Wave	Macro	5	49
Xylocampa areola	Early Grey	Macro	5	51
Triodia sylvina	Orange Swift	Macro	5	52
Lomaspilis marginata	Clouded Border	Macro	5	59
Phalera bucephala	Buff-tip	Macro	5	69
Spilosoma lutea	Buff Ermine	Macro	5	73
Eupsilia transversa	Satellite	Macro	4	20



Abraxas grossulariata	Magpie	Macro	4	28
Eupithecia icterata	Tawny Speckled Pug	Macro	4	28
Lampropteryx suffumata	Water Carpet	Macro	4	29
Selenia tetralunaria	Purple Thorn	Macro	4	30
Eilema depressa	Buff Footman	Macro	4	32
Euthrix potatoria	Drinker	Macro	4	35
Ptilodon capucina	Coxcomb Prominent	Macro	4	35
Acleris forsskaleana	Netted Tortrix	Micro	4	38
Diurnea fagella	Early Reveller	Micro	4	40
Scoparia ambigualis	Common Grey	Micro	4	48
Diarsia rubi	Small Square-spot	Macro	4	58
Mythimna impura	Smoky Wainscot	Macro	4	63
Eudonia lacustrata	Tawny Grey	Micro	4	69
Deilephila elpenor	Elephant Hawk-moth	Macro	4	71
Coleophora sp	Case-bearer	Micro	4	Grade 4
Idaea subsericeata	Satin Wave	Macro	3	4
Catoptria falsella	Chequered Grass-moth	Micro	3	17
Hemistola chrysoprasaria	Small Emerald	Macro	3	21
Eupithecia subfuscata	Grey Pug	Macro	3	25
Udea prunalis	Dusky Pearl	Micro	3	43
Laspeyria flexula	Beautiful Hook-tip	Macro	3	47
Euzophera pinguis	Ash-bark Knot-horn	Micro	3	50
Plagodis dolabraria	Scorched Wing	Macro	3	50
Diachrysia chrysitis	Burnished Brass	Macro	3	63
	Lesser Broad-bordered Yellow			
Noctua janthe	Underwing	Macro	3	72
Calliteara pudibunda	Pale Tussock	Macro	3	78
Camptogramma bilineata	Yellow Shell	Macro	3	97
Watsonalla uncunila	Spiny Hook-tip	Macro	2	1
Perizoma bifaciata	Barred Rivulet	Macro	2	2
Acompsia cinerella	The Cinerous	Micro	2	5
Dichrorampha petiverella	Yellow-spot Yarrow Moth	Micro	2	5
Cerastis rubricosa	Red Chestnut	Macro	2	8
Zelotherses paleana	Timothy Tortrix	Macro	2	8
Agonopterix heracliana/ciliella	Common Brindled Brown agg.	Micro	2	14
Nemophora degeerella	Yellow-banded Longhorn	Micro	2	15
Agrochola circellaris	Brick	Macro	2	19
Agapeta zoegana	Bright Straw	Micro	2	23
Eupithecia haworthiata	Haworth's Pug	Macro	2	23
Cochylichroa atricapitana	Black-fronted Straw	Micro	2	24
Agrotis ipsilon	Dark Sword-grass	Macro	2	25
Myelois circumvoluta	Thistle Ermine	Micro	2	25
Pandemis heparana	Dark Fruit-tree Tortrix	Micro	2	28
Ectropis crepuscularia	Engrailed	Macro	2	29
Erannis defoliaria	Mottled Umber	Macro	2	29



Pseudargyrotoza conwagana	Yellow-spotted Tortrix	Micro	2	31
Leucania comma	Shoulder-striped Wainscot	Macro	2	35
Eilema sororcula	Orange Footman	Macro	2	37
Miltochrista miniata	Rosy Footman	Macro	2	39
Allophyes oxyacanthae	Green-brindled Crescent	Macro	2	43
Stauropus fagi	Lobster Moth	Macro	2	45
Xanthorhoe montanata	Silver-ground Carpet	Macro	2	46
Herminia tarsipennalis	Fan-foot	Macro	2	47
Blastobasis adustella	Common Masoner	Micro	2	49
Hedya pruniana	Plum Tortrix	Micro	2	49
Parapoynx stratiotata	Ringed China-mark	Micro	2	49
Idaea dimidiata	Single-dotted Wave	Macro	2	51
Agriphila geniculea	Chevron Grass-moth	Micro	2	52
Lycia hirtaria	Brindled Beauty	Macro	2	52
Acasis viretata	Yellow-Barred Brindle	Macro	2	53
Cabera pusaria	Common White Wave	Macro	2	54
Lomographa temerata	Clouded Silver	Macro	2	55
Crocallis elinguaria	Scalloped Oak	Macro	2	56
Udea olivalis	Garden Pearl	Micro	2	58
Timandra comae	Blood-vein	Macro	2	62
Agrotis clavis	Heart & Club	Macro	2	64
Agriphila straminella	Straw Grass-moth	Micro	2	71
Hypena proboscidalis	Snout	Macro	2	76
Autographa gamma	Silver Y	Macro	2	168
Hoplodrina octogenaria/blanda	Uncertain / Rustic agg.	Macro	2	agg.
Oligia strigilis agg.	Marbled Minor agg.	Macro	2	agg.
eucosma sp.	"bell" species	Micro	2	Grade 1 / 2
Eucosma conterminana	Lettuce Tortrix	Micro	1	0
Eupithecia venosata	Netted Pug	Macro	1	1
Agonopterix liturosa	Purple-shaded Brown	Micro	1	2
Elachista atricomella	Cock's-foot Miner	Micro	1	2
Stenoptilia bipunctidactyla	Twin-spotted Plume	Micro	1	2
Aethes rubigana	Burdock Straw	Micro	1	3
Ypsolopha nemorella	Pale Honeyuckle Moth	Micro	1	3
Cleorodes lichenaria	Brussels Lace	Macro	1	4
Semioscopis steinkellneriana	Black-marked Diviner	Micro	1	4
Xanthorhoe quadrifasiata	Large Twin-spot Carpet	Macro	1	4
Epirrhoe galiata	Galium Carpet	Macro	1	5
Gillmeria pallidactyla	Yarrow Plume	Micro	1	5
Plagodis pulveraria	Barred Umber	Macro	1	5
Alabonia geoffrella	Hedge Beauty	Micro	1	6
Bucculatrix nigricomella	Daisy Tuft	Micro	1	6
Neocochylis dubitana	White-faced Straw	Micro	1	7
Scopula floslactata	Cream wave	Macro	1	8



Aspilapteryx tringipennella	Ribwort Stilt	Micro	1	9
Lithosia quadra	Four-spotted Footman	Macro	1	9
Macaria alternata	Sharp-angled Peacock	Micro	1	9
Selenia lunularia	Lunar Thorn	Macro	1	9
Eupithecia absinthiata	Wormwood Pug	Macro	1	11
Melanthia procellata	Pretty Chalk Carpet	Macro	1	11
Anaplectoides prasina	Green Arches	Macro	1	12
Coleophora mayrella	Case-bearer	Micro	1	12
Cydia fagiglandana	Beech Mast Piercer	Micro	1	12
Lobesia abscisana	Thistle Marble	Micro	1	12
Theria primaria	Early Moth	Macro	1	12
Paraswammerdamia albicapitella	White-headed Drab	Micro	1	13
Lithophane socia	Pale Pinion	Macro	1	14
Perizoma flavofasciata	Sandy Carpet	Macro	1	14
Eucosma hohenwartiana	Common Knapweed Tortrix	Micro	1	15
Mythimna vitellina	Delicate	Macro	1	15
Polia nebulosa	Grey Arches	Macro	1	15
Watsonalla cultraria	Barred Hook-tip	Macro	1	15
Eupithecia inturbata	Maple Pug	Macro	1	19
Acleris sparsana	Lead-coloured Tortrix	Micro	1	20
Hecatera bicolorata	Broad-barred White	Macro	1	20
Orthosia gracilis	Powdered Quaker	Macro	1	20
Phycita roborella	Oak Knot-horn	Micro	1	20
Plemyria rubiginata	Blue-bordered Carpet	Macro	1	21
Bryotropha terrella	Brown Moss-moth	Micro	1	25
Ennomos quercinaria	August Thorn	Macro	1	25
Furcula furcula	Sallow Kitten	Macro	1	25
Rusina ferruginea	Brown Rustic	Macro	1	25
Agriopis marginaria	Dotted Border	Macro	1	26
Ochropacha duplaris	Common Lutestring	Macro	1	26
Nematopogon swammerdamella	Large Longhorn	Micro	1	27
Habrosyne pyritoides	Buff Arches	Macro	1	28
Agrochola macilenta	Yellow-line Quaker	Macro	1	30
Cyclophora linearia	Clay Triple-lines	Macro	1	31
Cosmorhoe ocellata	Purple Bar	Macro	1	32
Biston strataria	Oak Beauty	Macro	1	33
Hadena bicruris	Lychnis	Macro	1	33
Yponomeuta evonymella	Bird-cherry Ermine	Micro	1	34
Apamea lithoxylaea	Light Arches	Macro	1	35
Hydraecia micacea	Rosy Rustic	Macro	1	35
Hedya nubiferana	Marbled Orchard Tortrix	Micro	1	37
Poecilocampa populi	December Moth	Macro	1	37
Anania coronata	Elder Pearl	Micro	1	39
Acleris variegana	Garden Rose Tortrix	Micro	1	40



Rufous Tortrix	Micro	1	40
	Macro	1	40
Barred Straw	Macro	1	40
Bramble Shoot Moth	Micro	1	40
Spruce Carpet	Macro	1	40
<u> </u>	Micro	1	41
Waved Umber		1	43
Hawthorn Knot-horn		1	45
White Plume	Micro	1	46
V-Pug	Macro	1	47
- J			48
			49
			56
			57
			58
<u> </u>			58
			62
<u> </u>			64
<u> </u>			65
			65
			65
· ·			66
			66
			70
			72
			77
<u> </u>			82
			agg.
, , , , , ,			Grade 4
,			Grade 4
			Mostly Grade 2
			Mostly Grade 4
		1	59
	Bramble Shoot Moth  Spruce Carpet  Common Purple & Gold  Waved Umber  Hawthorn Knot-horn	White-spotted Pug Barred Straw Bramble Shoot Moth Spruce Carpet Common Purple & Gold Waved Umber Hawthorn Knot-horn White Plume V-Pug Macro Macro Macro Macro Macro Macro Macro Macro Waiden's Blush Scorched Carpet Macro Green Oak Tortrix Micro Spectacle Common Pug Macro Macro Macro Macro Macro Macro Macro Common Marble Macro Common Marble Macro Macro Macro Macro Macro Macro Macro Macro Common Marble Micro Common Marble Micro Macro Macro Macro Common Pug Macro Macro Common Marble Micro Common Marble Micro Common Marble Micro Common Macro Macro Vine's Rustic Macro Dark Dagger / Grey Dagger agg. Macro Macro Macro Macro Macro Dark Dagger / Grey Dagger agg. Macro Micro Micro "Neb" species Micro Micro "Reb" species Micro Micro "grass-miner" species	White-spotted PugMacro1Barred StrawMacro1Bramble Shoot MothMicro1Spruce CarpetMacro1Common Purple & GoldMicro1Waved UmberMacro1Hawthorn Knot-hornMicro1White PlumeMicro1V-PugMacro1Oak LonghornMicro1Red-barred TortrixMacro1Maiden's BlushMacro1Swallow-tailed MothMacro1Scorched CarpetMacro1Green Oak TortrixMicro1SpectacleMacro1Common PugMacro1Bee MothMicro1Common MarbleMicro1Garden CarpetMacro1Vine's RusticMacro1Lesser Yellow UnderwingMacro1Knot GrassMacro1Mother of PearlMicro1Small MagpieMicro1CinnabarMacro1Dark Dagger / Grey Dagger agg.Macro1Orange-spotted Daisy MothMicro1Hawthorn DrabMicro1"Neb" speciesMicro1"grass-miner" speciesMicro1

