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INVERTEBRATE SURVEY REPORT

Goitre Field - Merthyr (SO05020829)

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Prepared by

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APPENDIX

Appendix 1: Full list of invertebrate species recorded from **Goitre Field**

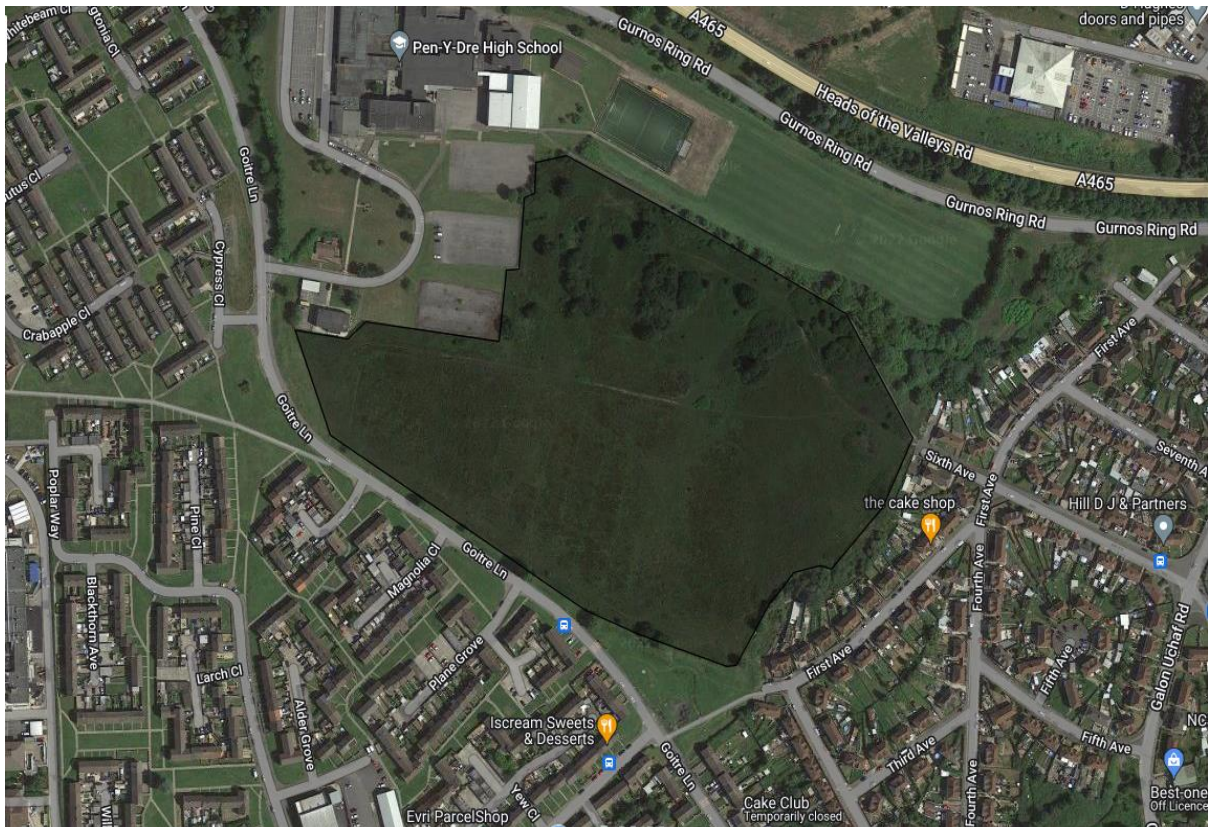
1.0 INTRODUCTION

1.1 Introductory comments

Christian Owen (**Christian Owen Bio-surveys**) was commissioned by **Ecological Services Ltd** to undertake an invertebrate survey of land adjacent to Pen Y Dre School, Merthyr Tydfil, South Wales – known as Goitre Field. The primary aim of this survey was to determine the presence or absence of any species of ‘conservation importance’ (i.e., species considered Nationally Local, Nationally Scarce or Nationally Rare, and/or listed under Section 7 of Environment (Wales) Act 2016 as ‘of’ ‘principal importance for the conservation of biological diversity in Wales’).

This report details the results of that survey, which was conducted on a single prolonged daytime visit during the month of August 2022, with an additional visit in late August 2022 to undertake a Marsh Fritillary (*Euphydryas aurinia*) larval web search. All invertebrate sampling and specimen identification was undertaken by the author of this report, Christian Owen – an experienced entomologist based in South Wales. It is anticipated that the results of this survey will be used to inform any future development proposals at Goitre Field.

Map 1. An aerial photograph showing the survey area of Goitre Field (outlined in black). The sample area measures approximately 8.0 hectares (ha). Image © Google Earth 2022



1.2 Site description

Goitre Field is horse grazed meadow situated south of Pen Y Dre School and between Galon Uchaf Housing Estate (east) and the Gurnos Estate (west) within Merthyr Tydfil County Borough, South Wales (national grid reference centred at SO05020829). Covering an area of approximately 8.0 hectares (ha) this field (**Map 1**) supports a mosaic of habitats, including Blackthorn (*Prunus spinosa*) and Bramble (*Rubus fruticosus agg*) scrub, marshy grassland, semi-improved neutral grassland and mature trees.

Historically the lower section of site (grid reference centred at SO05000823) contained a large deep pond, known as Goitre Pond - this was drained and infilled sometime in the 1960's.

1.3 Survey limitations

The aim of any invertebrate site assessment is to obtain a species list that is representative of the overall assemblage of species present at a site. As survey guidelines recommend, this is achieved through regular site visits at intervals of around two weeks or so for the entire year, with repeat sampling at the same intensity for at least one or two more years; this is done in order to obtain an adequate cross-seasonal representation of invertebrate species present. This level of coverage has not been achieved as part of this survey at Goitre Field, as sampling was only conducted a single visit in August - 2022. As such, only a small snapshot of the invertebrate fauna present within a limited time period was achieved. However, there was no intention to obtain a complete invertebrate species inventory. Caution needs to be taken, therefore, when interpreting the results of this survey since further species (including species of 'conservation importance') will undoubtedly be present.

Another limitation was the weather. Wales experienced below average rainfall in each of the months of May (73% of average), June (78% of average), July (53% of average), and August 2022 (36% of average) (Met Office, 2022a-d). This reduced rainfall is anticipated to have had a negative effect on the abundance and diversity of invertebrates present during the site visit in 2022. By late July, entomologists across England and Wales were reporting a distinct lack of invertebrates (especially in open habitats); this was believed to be tied to the loss of any wet habitat features (drying out) and the loss of foodplants (dying due to a lack of water). Personal observations suggest that invertebrate abundance and species diversity at the survey site was lower than would likely to be 'typical' in similar habitats at that time of year. As such, fewer invertebrate species may have been encountered than may actually be present at the survey site.

2.0 SAMPLING

2.1 Sampling methodology – main survey

Sampling was conducted by walking in a zigzag manner across the survey site, while deploying a variety of sampling techniques appropriate to the target invertebrate groups (outlined in **Section 2.3**). The aim was to cover as much ground as possible during the site visits in order to achieve a good coverage of habitats and target invertebrates.

Terrestrial invertebrates were sampled using several different active sampling techniques including:

- **Aerial netting** – a lightweight 40cm diameter net mounted on a meter long pole was used to catch flying insects as and when encountered.
- **Hand searching** – this involved sieving plant litter, looking under stones, under tree bark, debris etc., for invertebrates that may be feeding, resting or sheltering.
- **Suction-sampling** (i.e., vacuum sampling) – a modified leaf-blower was used to collect invertebrates from habitats that would otherwise be difficult to sample from using a sweep net (e.g., very short grass, tree trunks). This method is particularly effective at catching species which do not fly readily or which live in deep vegetation or bark crevices. Samples were emptied into a large white tray and target taxa removed using an aspirator.
- **Sweep netting** – a sturdy 40cm diameter net mounted on a meter long pole was moved vigorously through long vegetation and overhanging tree branches to dislodge invertebrates. Invertebrates were then selectively removed from the sweep net using an aspirator.
- **Visual searching** – insects were observed foraging, basking, nesting, hunting, mating etc. in their associated habitats without the need to deploy other sampling techniques (e.g., sweep netting).

Sampling methodology – Marsh Fritillary larval web search

The larval web search was conducted by walking across the survey area (**Map 4** below) at 1m and 2m intervals (depending on sward height) while carefully searching for Marsh Fritillary larval webs - according to Method One of UK Butterfly Monitoring Scheme (UKBMS) specifications.

2.2 Survey dates

The invertebrate survey at Goitre Field was conducted on a single prolonged daytime visit in August 2022, with an additional visit in late August 2022 to undertake a Marsh Fritillary larval web search. Invertebrate sampling was

undertaken during dry and sunny conditions wherever possible – it is during this time that invertebrates are generally most active.

Weather conditions on the survey dates, and the activities undertaken, are provided in **Table 1**. The sampling techniques deployed at Goitre Fields are discussed in **Section 2.1** above.

Table 1. Weather conditions on the survey dates at Goitre Fields in 2022

Survey Date	Survey Time	Activity	Weather Conditions
4th August 2022	8 hours, 10 minutes	A variety of sampling techniques deployed (as outlined in section 2.1) by Christian Owen in order to sample for as many invertebrate taxa as possible	Sunny intervals throughout the day. Max air temperature 20°C. Wind speeds of around 9 miles per hour (mph) coming from a north-north-west direction
30th August 2022	4 hours, 35 minutes	A Marsh Fritillary larval web search conducted by Christian Owen using Method One of UKBMS specifications (as outlined in Section 2.2). Note: no larval webs found	Sunny intervals throughout the day. Max air temperature 23°C. Wind speeds of around 5 miles per hour (mph) coming from a north-north-east direction

2.3 Target groups

Principal target groups for the main invertebrate survey were Araneae (spiders), Coleoptera (beetles), Hemiptera (true bugs) and Hymenoptera (bees, wasps, ants etc.), though other invertebrate taxa were also recorded when encountered. By targeting these groups, a more balanced overview of the invertebrate fauna present will be achieved. With Marsh Fritillary (larvae) being the main target species on 30th August 2022

Where practical, invertebrates were identified in the field using a x20 hand lens. Where identification was not possible in the field, representative specimens were collected and later identified using a binocular microscope. Samples were either stored dry and later pinned to aid identification (e.g., flies), or stored in 70 to 90% isopropyl alcohol (e.g., bugs). Invertebrate identification was to species level wherever possible. All fieldwork, and the subsequent identification of specimens, was undertaken by Christian Owen using the appropriate identification keys (**Section 6.0**) and confirmed using verified voucher material wherever possible.

2.4 Sample area

As previously mentioned, Goitre Field supports a mosaic of habitats, including Blackthorn and Bramble scrub, marshy grassland, semi-improved neutral grassland and mature trees, and is bordered by various wire fencing - poorly maintained in places.

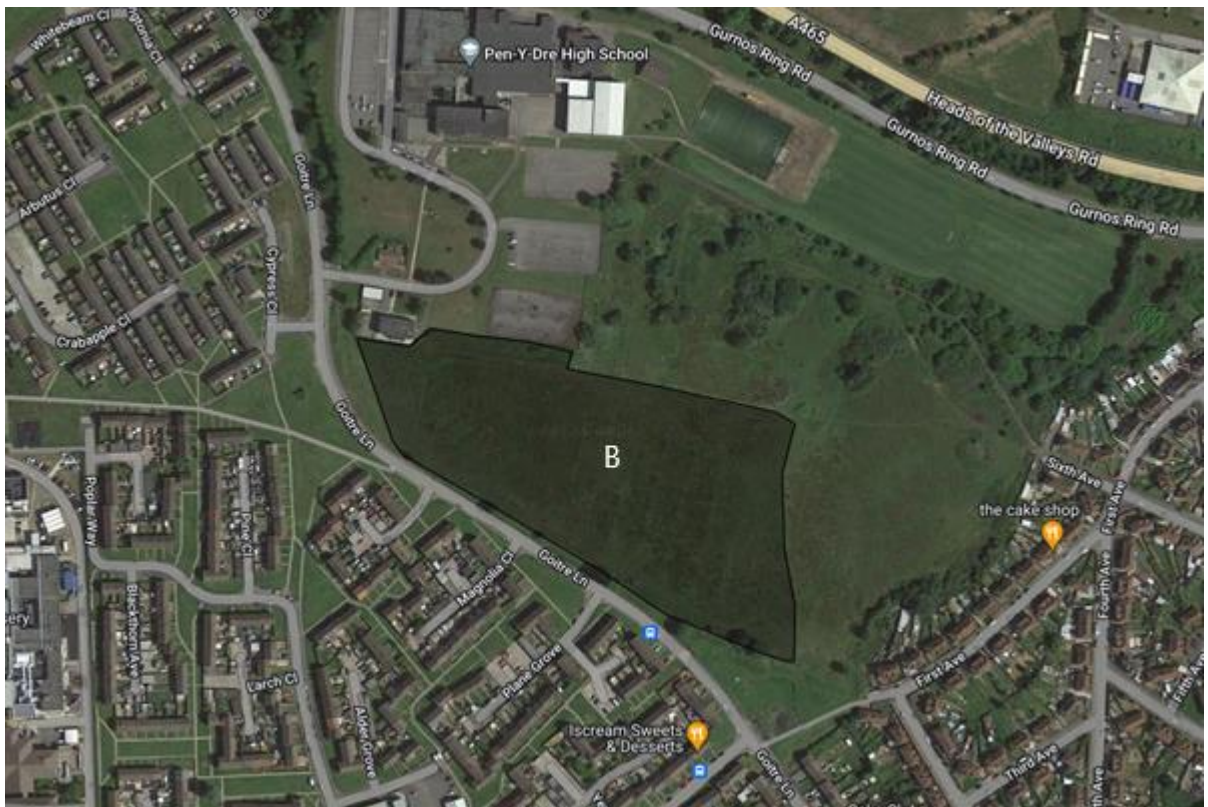
Due to the large size of the sample site (approximately 8 ha), it was divided into two sections - **A (Map 2)** and **B (Map 3)**. While the whole site was covered on the day, Area **A** received the most survey attention due to this section containing a more varied habitat and structure to that found in area **B**.

Area A - the northerly section. This area slopes gently upwards from area B, with both southern and western aspects of predominantly dry semi-improved neutral grassland. This section has a more varied habitat and structure to that found in area B, especially on the south facing side. Here the site contained mature trees and the remnants of an old hedge (as seen in **Figures 3,5,6 & 7**) (grid reference centred around SO05040838), with thick Bramble and Blackthorn scrub. While the western facing side (as seen in **Figure 2**) (grid reference centred around SO05140827) was predominantly open and mostly free from trees and scrub - except along the field boundary and top-most corner. Species present in area A includes (but is not limited to): alder (*Alnus*), buttercups (*Ranunculus*), clovers (*Trifolium*), Devil's-bit Scabious (*Succisa pratensis*), Hawthorn (*Crataegus monogyna*), Hazel (*Corylus avellana*), knapweed (*Centaurea*), oak (*Quercus*), ragwort (*Senecio*), Red Bartsia (*Odontites vernus*), Ribwort Plantain (*Plantago lanceolata*), Selfheal (*Prunella vulgaris*), Silverweed (*Argentina anserina*) and timothy grass (*Phleum*).

Area B - the southern section, is a large flat open semi-improved neutral grassland that contains both wet and dry habitats, that is dominated with rushes (*Juncus*) (**Figure 1**). Other species present here includes (but is not limited to): buttercups, clovers, docks (*Rumex*), Lesser Celandine (*Ficaria verna*), ragwort, Ribwort Plantain, thistles (*Cirsium*) and Watercress (*Nasturtium officinale agg*). One of the main features here is an area of boggy ground (**Figure 4**) that is being fed by a small stream or spring at grid reference centred around SO04920833.



Map 2: showing section **A** (outlined in black) of Goitre Field. Grid reference centred at SO05110835). Image © Google



Map 3: showing section **B** (outlined in black) of Goitre Field. Grid reference centred at SO04940828). Image © Google



Figure 1: view looking west across Goitre Field from grid reference SO04840827; photographed on 4th August 2022



Figure 2: view looking west across Goitre Field from grid reference SO05140831; photographed on 4th August 2022



Figure 3: view looking south east across Goitre Field from grid reference SO05000841; photographed on 4th August 2022



Figure 4: view looking east-south-east across Goitre Field from grid reference SO04920834; photographed on 4th August 2022



Figure 5: image showing a profusion of flowering Devil's-bit Scabious (*Succisa pratensis*) at grid reference SO05000841; photographed on 30th August 2022



Figure 6: view looking north-north-west across Goitre Field from grid reference SO05020835; photographed on 30th August 2022



Figure 7: view looking east-south-east across Goitre Field from grid reference SO05040842; photographed on 30th August 2022



Figure 8: image showing four of the seven horses that were grazing Goitre Field; photographed on 30th August 2022



Map 4. An aerial photograph showing the Marsh Fritillary web search area at Goitre Field (outlined in black), with approximate transect route taken (lined white). Sample area measuring approximately 2.3 hectares (ha). Image © Google Earth 2022

3.0 RESULTS

3.1 Overview

A total of **228** invertebrate species were identified during the survey at Goitre Field in 2022 - a full list of all recorded invertebrate species is presented in **Appendix 1**. The list is annotated with formal National Status codes, where applicable.

As anticipated (being the target groups), Araneae (spiders), Coleoptera (beetles) and Hemiptera (true bugs) were particularly well represented with a total of **22** species, **62** species and **55** species recorded respectively (**Table 2**). However, fewer Hymenoptera (bees, wasps etc.) were encountered than what would have been expected (**12** species); this could partly be explained by the below average rainfall between May and August – 2022. By late July, flowering plants had either died or stopped flowering because of the drought. As such, there was a lack of forage for many species.

Table 2. Analysis of invertebrate species showing results at a glance from the survey at Goitre Field in 2022.

Number of species	Goitre Field
Total Species	228
Species of 'Conservation' Interest	33
Araneae (spiders)	22
Coleoptera (beetles)	62
Diptera (flies)	24
Hemiptera (true bugs)	55
Hymenoptera (bees, wasps and ants)	12
Other	53

Overview – Marsh Fritillary larval web search

No Marsh Fritillary larval webs were encountered on this particular search. However, a nil score does not mean the butterfly is absent at site - an absence of evidence is not evidence of absence.

3.3 Species of conservation interest

Of the **228** invertebrate species recorded at **Goitre Field** in 2022, **36** (~16%) are deemed to be of 'conservation interest' (i.e., species considered to be Nationally Local, Scarce or Rare, and/or are listed under Section 7 of the Environment (Wales) Act 2016 as species of 'principal importance for the conservation of biological diversity in Wales'). These species are summarised in **Table 3**. The list is annotated with formal National Status codes (explained in **Appendix 1**). Species deemed to be of greatest 'conservation importance' at Goitre Field are highlighted in **bold (Table 3)** and discussed in further detail below.

Table 3. List of species of 'conservation importance' at Goitre Field in 2022 (ordered alphabetically by Order, Family and then Species).

Species	Family	Order	Conservation Status	Habitat

<i>Agalenatea redii</i>	Araneidae	Araneae	Locally common	
<i>Araneus quadratus</i>	Araneidae	Araneae	Local common	
<i>Floronia bucculenta</i>	Linyphiidae	Araneae	Local; generally uncommon	tall sward & scrub
<i>Pirata piraticus</i>	Lycosidae	Araneae	Local	acid & sedge peats
<i>Tibellus oblongus</i>	Philodromidae	Araneae	Local in Wales	tall sward & scrub
<i>Enoplognatha latimana</i>	Theridiidae	Araneae	Locally common	tall sward & scrub
<i>Syntomus foveatus</i>	Carabidae	Coleoptera	Local	short sward & bare ground
<i>Hydrothassa glabra</i>	Chrysomelidae	Coleoptera	Local; scarce in Duff	tall sward & scrub
<i>Phyllotreta tetrastigma</i>	Chrysomelidae	Coleoptera	Local	tall sward & scrub
<i>Graptus triguttatus</i>	Curculionidae	Coleoptera	Local; scarce in Duff	tall sward & scrub
<i>Philonthus albipes</i>	Staphylinidae	Coleoptera	Local in Wales	tall sward & scrub
<i>Rugilus erichsonii</i>	Staphylinidae	Coleoptera	Locally frequent	acid & sedge peats
<i>Limnia paludicola</i>	Sciomyzidae	Diptera	Locally common	shaded woodland floor
<i>Limnia unguicornis</i>	Sciomyzidae	Diptera	Locally common	acid & sedge peats; marshland; running water
<i>Tetanocera punctifrons</i>	Sciomyzidae	Diptera	Notable	acid & sedge peats
<i>Sphenella marginata</i>	Tephritidae	Diptera	Local in Wales	tall sward & scrub
<i>Xylocoris galactinus</i>	Anthocoridae	Hemiptera	Local in Wales	

<i>Berytinus minor</i>	Berytidae	Hemiptera	Local	short sward & bare ground
<i>Alebra wahlbergi</i>	Cicadellidae	Hemiptera	Local in Wales	arboreal
<i>Anoscopus flavostriatus</i>	Cicadellidae	Hemiptera	Local	tall sward & scrub
<i>Aphrodes bicincta</i>	Cicadellidae	Hemiptera	Local in Wales	tall sward & scrub
<i>Macrosteles laevis</i>	Cicadellidae	Hemiptera	Local in Wales	tall sward & scrub
<i>Megophthalmus scabripennis</i>	Cicadellidae	Hemiptera	Local in Wales	tall sward & scrub
<i>Streptanus aemulans</i>	Cicadellidae	Hemiptera	Local; possible new VC record?	tall sward & scrub
<i>Kelisia pallidula</i>	Delphacidae	Hemiptera	Local, scarce in Wales	
<i>Adelphocoris quadripunctatus</i>	Miridae	Hemiptera	Local; current status unclear	
<i>Calocoris roseomaculatus</i>	Miridae	Hemiptera	Locally frequent	short sward & bare ground
<i>Cyrtorhinus caricis</i>	Miridae	Hemiptera	Local	tall sward & scrub
<i>Miridius quadrivirgatus</i>	Miridae	Hemiptera	Local	tall sward & scrub
<i>Oncotylus viridiflavus</i>	Miridae	Hemiptera	Local	tall sward & scrub
<i>Tytthus pygmaeus</i>	Miridae	Hemiptera	Local in Wales	acid & sedge peats
<i>Saldula orthochila</i>	Saldidae	Hemiptera	NS	short sward & bare ground
<i>Leptothorax acervorum</i>	Formicidae	Hymenoptera	Locally frequent	short sward & bare ground

<i>Leptoiulus belgicus</i>	Julidae	Julida	NS	shaded woodland floor
<i>Tyria jacobaeae</i>	Erebidae	Lepidoptera	LC (Global); Section 41 Priority Species - research only	tall sward & scrub
<i>Ceramica pisi</i>	Noctuidae	Lepidoptera	Section 41 Priority Species - research only; VU	

3.3.1 Species of Principal Importance in Wales under Section 7 of the Environment (Wales) Act 2016

Section 7 of the Environment (Wales) Act 2016 includes a statutory list of species deemed to be “of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales”. This replaces Section 42 of the Natural Environment and Rural Communities (NERC) Act 2006 and places a duty on Welsh Ministers to take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section, and encourage others to take such steps.

A total of **2** invertebrate species recorded during the survey are listed under Section 7 of the Environment (Wales) Act 2016.

***Ceramica pisi* (Lepidoptera: Noctuidae), Broom Moth, S7 - research only; VU**

Broom Moth is listed under Section 7 of the Environment (Wales) Act 2016 as a species of ‘principal importance for the conservation of biological diversity in Wales’. It should be noted, however, that its original inclusion in Section 42 of the NERC Act 2006 was for ‘research purposes only’ – this list of Section 42 species was subsequently adopted into the Environment (Wales) Act 2016. The Broom Moth is mainly a heath and moorland species, but it can also occur in a wide variety of open and wooded habitats. The larvae utilise a wide variety of plants include, Bilberry (*Vaccinium myrtillus*), birches (*Betula*), Bracken (*Pteridium aquilinum*), Broom (*Cytisus scoparius*), docks (*Rumex*), and Common Toadflax (*Linaria vulgaris*). The moth is considered to be common in Britain, but has declined severely in abundance in recent years. At **Goitre Fields**, several larvae were encountered by sweeping the vegetation at grid reference centred around SO04900833 on 4th August 2022.

Tyria jacobaeae (Lepidoptera: Erebidae), Cinnabar Moth, S7 - research only

Cinnabar Moth is listed under Section 7 of the Environment (Wales) Act 2016 as a species of 'principal importance for the conservation of biological diversity in Wales'. It should be noted, however, that its original inclusion in Section 42 of the NERC Act 2006 was for 'research purposes only' – this list of Section 42 species was subsequently adopted into the Environment (Wales) Act 2016. Cinnabar Moth occurs in many open habitats that contain its larval foodplant, Common Ragwort (*Senecio jacobaea*), and it remains a common and widespread species across much of Britain, including in Wales. At **Goitre Fields**, a number of larvae were encountered at various areas of the site on Common Ragwort on 4th August 2022.

3.3.2 Nationally Scarce species

A total of **3** invertebrate species recorded during the survey are designated as 'Nationally Scarce'.

***Leptoiulus belgicus* (Julida: Julidae), a millipede, NS**

Leptoiulus belgicus is a millipede associated with a wide range of different habitats, with no particular preference evident. *Leptoiulus belgicus* is a common species in southwest England and much of South Wales. In Wales, it can often be encountered under logs and from sieving leaf litter, especially in the Valley's - a much rarer species elsewhere. At **Goitre Field**, specimens were encountered by suction-sampling the grassland within grid reference SO051082 on 4th August 2022

***Saldula orthochila* (Hemiptera: Saldidae), a shorebug, NS**

The shorebug *Saldula orthochila* is the only saldid species to be associated with dry habitats, such as grasslands, sand dunes and wastelands. It is a widespread species in Britain, but more commonly found in the north (British Bugs, 2022a). At **Goitre Field**, one adult was encountered by suction-sampling the grassland within grid reference SO051082 on 4th August 2022

***Tetanocera punctifrons* (Diptera: Sciomyzidae), a snail-killing fly, Notable**

Tetanocera punctifrons is a widespread and sometimes common snail-killing fly that is found in a wide variety of habitats include true wetlands as well as other damp habitats, such as small flushes and farm ditches (Falk, 2021). Currently considered Notable, it may have increased in frequency over recent decades and its conservation status may require downgrading. The hosts are unknown but could include aquatic pulmonate snails or terrestrial snails of damp habitats. At

Goitre Field, two adults were encountered by sweep-netting the vegetation at grid reference centered around SO04910832 on 4th August 2022

3.3.3 Nationally Local species

A total of **31** invertebrate species recorded during the survey are designated as 'Nationally Local'. Here I have discussed some of the more interesting finds - **18** in total.

***Adelphocoris quadripunctatus* (Hemiptera: Miridae) a plant bug, local; current status unclear**

The plant bug *Adelphocoris quadripunctatus* was unknown in Britain until 2016, when populations were found at various sites in Glamorgan, South Wales, suggesting that the species was locally well-established. *Adelphocoris quadripunctatus* were associated with both Common Bird's-foot-trefoil (*Lotus corniculatus*) and Greater Bird's-foot-trefoil (*Lotus pedunculatus*). Several overlooked specimens from southern England were found in the Natural History Museum archives, these had been collected back in the 19th century and were misidentified as *Adelphocoris lineolatus*. "Further records of this species are of great interest since its current status is unclear" (British Bugs, 2022b). At **Goitre Field**, specimens were encountered by visual searching and sweeping netting the vegetation within grid reference SO051083 and SO051082 on 4th August.

***Alebra wahlbergi* (Hemiptera: Cicadellidae), a leafhopper, local in Wales**

The leafhopper *Alebra wahlbergi* is a species associated with a range of trees, especially, elm (*Ulmus*), Horse Chestnut (*Aesculus hippocastanum*), maples (*Acer*), Sycamore (*Acer pseudoplatanus*), but not on oak (*Quercus*) (British Bugs, 2022c). At **Goitre Field**, several adults were encountered by sweeping the trees within grid reference SO050083 on 4th August 2022.

***Anoscopus flavostriatus* (Hemiptera: Cicadellidae), a leafhopper, local**

The leafhopper *Anoscopus flavostriatus* is a local species associated with various species of grass across Britain, usually in damp areas (British Bugs, 2022d). At **Goitre Field**, two adults were encountered by suction-sampling within grid reference SO049082 on 4th August 2022.

***Aphrodes bicincta* (Hemiptera: Cicadellidae), a leafhopper, local in Wales**

The leafhopper *Aphrodes bicinctus* is associated with grasses in well vegetated sites, and is considered to be common across Britain, with regional variations depending on precise habitat (Nature Spot, 2022a). At **Goitre Fields**, three adults were encountered by suction-sampling the grassland within grid reference SO051082 on 4th August 2022

***Berytinus minor* (Hemiptera: Berytidae), a stiltbug, local**

The stilt bug *Berytinus minor* is associated with clover (*Trifolium*), Common Restharrow (*Ononis repens*) and Lesser Yellow Trefoil (*Trifolium dubium*) in a variety of grassland habitats. *Berytinus minor* is considered to be the commonest and most widespread UK stilt bug in Britain (British Bugs, 2022e). At **Goitre Fields**, several adults were encountered by sweeping the vegetation within grid reference SO051082 and SO050083 on 4th August 2022.

***Cyrtorhinus caricis* (Hemiptera: Miridae) a plant bug, local**

The plant bug *Cyrtorhinus caricis* is a widely scattered species that can be found throughout Britain in damp habitats with rushes (*Juncus*) and sedges (*Carex*). It is a predatory bug that feeds mainly on the eggs of planthoppers (Delphacids) (British Bugs, 2022f). At **Goitre Fields**, a single adult was encountered by suction-sampling within grid reference SO049082 on 4th August 2022.

***Floronia bucculenta* (Araneae: Linyphiidae), a money spider, local**

Floronia bucculenta is a money spider that occurs in a variety of damp habitats i.e., rough unmanaged grassland with scrub and tall herbaceous vegetation, low vegetation in marshy areas, open woodland, and grass and tall heather. This spider is widespread in much of England, but apparently scarce in the south-west, absent from central and much of eastern Wales, with very scattered records coming from north of Yorkshire up as far as Perthshire in Scotland, but is considered to be very local and generally uncommon (Spider and Harvestman Recording Scheme, 2022). At **Goitre Field**, specimens were encountered by sweeping the vegetation within grid reference SO049082 on 4th August 2022.

***Graptus triguttatus* (Coleoptera: Curculionidae), a weevil, local; scarce in Duff**

The weevil *Graptus triguttatus* is a local species associated with the roots of various plants, often on Ribwort Plantain (*Plantago lanceolata*) in grassy places (Duff, 2016). At **Goitre Field**, a single adult was encountered by suction-sampling within grid reference SO051082 on 4th August 2022.

***Hydrothassa glabra* (Coleoptera: Chrysomelidae), a leaf beetle, local; scarce in Duff**

The leaf beetle *Hydrothassa glabra* is associated with Ranunculaceae, especially Creeping Buttercup (*Ranunculus repens*) and Meadow Buttercup (*Ranunculus acris*) in a wide variety of grassy habitats (Duff, 2016). *Hydrothassa glabra* is a widely scattered species in Britain; not threatened but may be declining in part of its range (UK Beetle Recording, 2022). At **Goitre Field**, specimens were encountered by suction-sampling within grid reference SO051082 and SO049083 on 4th August 2022.

***Kelisia pallidula* (Hemiptera: Delphacidae), a planthopper, local, scarce in Wales**

The planthopper *Kelisia pallidula* is a species associated with sedges (*Carex*) in transition mires and peat meadows (Biedermann et al., 2009). It has a very widely scattered distribution in Britain, with seemingly few records. At **Goitre Field**, three adults were encountered by suction-sampling within grid reference SO049082 and SO048083 on 4th August 2022.

***Macrosteles laevis* (Hemiptera: Cicadellidae), a leafhopper, local in Wales**

The leafhopper *Macrosteles laevis* is a species associated with a range of grasses (Poaceae), sedges (*Carex*) and rushes (*Juncus*) in various habitats. It has a very widespread distribution in Britain, and characteristic of drier hillsides. It is also among the more rapid colonisers of disturbed ground, and can be found on brownfield sites (British Bugs, 2022g). At **Goitre Fields**, several adults were suction-sampled within grid reference SO050083 on 4th August 2022

***Miridius quadrivirgatus* (Hemiptera: Miridae) a plant bug, local**

The plant bug *Miridius quadrivirgatus* is species with a southerly distribution in Britain and is found locally between Pembrokeshire and Suffolk, where it is associated with various grasses in dry grasslands. Historically this bug was mainly coastal, recently becoming more common inland. Numbers tend to fluctuate greatly between years (British Bugs, 2022h). At **Goitre Field**, five specimens were encountered by sweeping the vegetation within grid reference SO049082 and SO051082 on 4th August 2022.

***Philonthus albipes* (Coleoptera: Staphylinidae), a rove beetle, local in Wales**

The rove beetle *Philonthus albipes* is a widely scattered species in Britain where it is associated with dung and litter piles in various habitats (Lott & Anderson, 2011). At **Goitre Field**, several adults were found on Horse dung within grid reference SO051083 on 4th August 2022.

***Phyllotreta tetrastigma* (Coleopter: Chrysomelidae), a flea beetle, local**

The flea beetle *Phyllotreta tetrastigma* is associated with various species of Brassicaceae; usually on bitter-cress (*Cardamine*), water-cresses (*Nasturtium*) and sometimes radishes (*Raphanus*). The beetle is a widespread species in central and southern England becoming more local in the rest of the country, where it can be found in various habitats, mainly (but not only) in wet habitats such as wet meadows and wet woodland (Duff, 2016). At **Goitre Field**, five adults were encountered by visual searching a stand of water-cress at grid reference centered around SO04920834 (**Figure 4**) on 4th August 2022

***Sphenella marginata* (Diptera: Tephritidae), a fruit fly, local in Wales**

The fruit fly *Sphenella marginata* is associated with ragworts and groundsels (*Senecio*) in various well vegetated habitats – the fly larvae mine the flowers. Most records for this species come from the southern half of Britain (Nature Spot, 2022b), and mainly coastal in South Wales. At **Goitre Field**, two adults were encountered by sweeping the vegetation within grid reference SO051082 on 4th August 2022.

***Streptanus aemulans* (Hemiptera: Cicadellidae), a leafhopper, local - possible new VC record?**

The leafhopper *Streptanus aemulans* is a species associated with various grasses usually in damp habitats, but can occasionally be found in drier conditions. The leafhopper has a widespread but local distribution in Britain (British Bugs, 2022i). At **Goitre Field**, three adults were encountered by suction-sampling at sweeping the vegetation within grid reference SO051082 and SO051083 on 4th August 2022. This appears to be the first recorded occurrence of *Streptanus aemulans* in the vice-county of Glamorganshire (VC41).

***Tytthus pygmaeus* (Hemiptera: Miridae) a plant bug, local in Wales**

The plant bug *Tytthus pygmaeus* is a very widely scattered species in Britain, where it is particularly associated with damp marshy habitats. It is predatory bug that feeds on the eggs of leafhoppers (Cicadellidae). At **Goitre Field**, on adult was suction sampled within grid reference SO049083 on 4th August 2022.

***Xylocoris galactinus* (Hemiptera: Anthocoridae), Hot-bed Bug, local in Wales**

The Hot-bed Bug (*Xylocoris galactinus*) is a widely scattered species in Britain, where it is mostly associated with manure heaps and other places where the temperature is high, but can be found in other habitats when dispersing. It is considered to be a common species in Britain; however, there are seemingly few records for this species in Wales. At **Goitre Field**, a single adult was suction sampled from grid reference centred around SO05000840 on 4th August 2022.

4.0 ANALYSIS OF SPECIES DATA

4.1 Pantheon

The list of **228** invertebrate species were entered into the novel invertebrate assemblage analysis online tool known as Pantheon (see description below). This allowed for analysis of the invertebrate species assemblages to determine information such as the habitats present.

What is Pantheon? – Pantheon is an analytical tool developed by the Centre for Ecology and Hydrology (CEH) and Natural England to assist invertebrate nature conservation. Users import a list of invertebrates into Pantheon, which can then

be used to analyse the species, conservation statuses, associated habitats and resources and other data. Please note: ISIS (Invertebrate Species-habitat Information System), which was previously used for recognising invertebrate assemblage types in species lists, has now been replaced by Pantheon.

Of the **228** species entered into Pantheon, **218** had habitat scores - meaning they could subsequently be analysed. I used Pantheon to identify the Habitat assemblage types (characterised by more widespread species) present at Plateau 2. It should be noted that the Broad assemblage types (BATs) used in ISIS have been replaced with Habitats in Pantheon, which have the same function but include more species than the original BATs.

Using the **218** invertebrate species, Pantheon has generated the following results (**Table 4**)

Table 4. Analysis of some of the main Habitat assemblage types identified to be present at Goitre Field are:

Broad biotope	Habitat	No. of species	% Representation of national species pool	SQI Species Quality Index (SQI)
open habitats	tall sward & scrub	124	5	100
open habitats	short sward & bare ground	18	1	117
wetland	acid & sedge peats	14	1	121
wetland	marshland	11	1	143
tree-associated	arboreal	10	<1	100
tree-associated	shaded woodland floor	7	<1	143
tree-associated	decaying wood	4	<1	100
wetland	running water	2	<1	100

tree-associated	wet woodland	2	<1	100
wetland	wet woodland	2	<1	100

The largest assemblage (**124** species) is associated with 'tall sward and scrub' habitat. The second (**18** species) and third (**14** species) largest habitat assemblages are associated with 'short sward & bare ground' and 'acid & sedge peats' respectively, with **36** species in total showing to be associated with some form of wet habitat. A mosaic of habitats is clearly evident at Goitre Fields, with no less than 10 habitats present. Such habitat mosaics are important for invertebrates, many of which require two or more habitats to complete their lifecycle.

4.0 DISUCSSION

A total of **228** invertebrate species were recorded at Goitre Field in 2022 – this is considered to be a fairly reasonable figure given the limited time available for sampling at this location and survey limitations highlighted in **section 1.3**. Of the **228** species recorded, **36** (~16%) are deemed to be of 'conservation importance', with **1** seemingly new for the vice-county of Monmouthshire (VC35). **Please note:** an absence of records for a vice-county does not necessarily mean that a record is new to that vice-county, as previous records may have not yet been submitted to the appropriate recording schemes, record centre etc.

Species deemed to be of 'conservation importance' at Goitre Field include:

- **2 x Section 7** species - research only;
- **3 x Nationally Scarce (NS)** or **Notable (Na or Nb)** species; and
- **31 x Nationally/Wales Local** species (**including 1 new VC41 record?**).

It is clear from the results presented herein, that **Goitre Field** is an important site for a number of scarce and local invertebrate species and is clearly providing suitable habitats for a wide range of invertebrates. These species were found to have diverse habitat associations which include – acid & sedge peats; acid & sedge peats-marshland-running water; shaded woodland floor; short sward and bare ground; and tall sward and scrub.

While all of Goitre Field was found to support species of 'conservation importance' (**Table 3**), this invertebrate conservation value is not evenly distributed and some areas support a greater number of these species than

others. These key habitats and areas considered to be of greatest conservation value to invertebrates at Goitre Field are highlighted in **Map 4** (as seen in **Figures 2-7**).



Map 4: An aerial view showing key habitats and areas considered to be of greatest conservation value to invertebrates at Goitre Field (outlined in black). Image © Google 2022.

The presence of **36** species of 'conservation importance', which is considered to be a respectable figure, suggests that Goitre Field is an important refuge for uncommon invertebrates declining in the wider countryside and/or habitat specialists with restricted distributions in Britain. Some of these species are particularly noteworthy in a regional (vice-county), Welsh and/or British context. Human interference through the intensification of farming has led to the loss of many flower-rich grasslands, leaving sites like Goitre Field as a last refuge for many species. Industrial estates, car parks, shopping centres, housing and flood defences, to name just a few, have left many species with nowhere else to go, and they have become reliant on places like Goitre Field for their continued survival.

Should resources allow, I recommend that Goitre Field receive further monitoring, with a more comprehensive survey implemented in order to obtain a more adequate cross-seasonal representation of invertebrate species present; this will enable a more informed assessment of the invertebrate conservation value of Goitre Field to be made.

6.0 IDENTIFICATION KEYS

The following identification keys were used to identify invertebrate specimens collected at Goitre Field, in addition to unpublished keys sourced from organisers of national recording schemes:

Arachnida

- Hillyard, P.D. & Sankey, J.H.P. (1989). Harvestmen. Synopses of the British Fauna (New Series) 4 (2nd edition). London: Linnean Society of London.
- Roberts, M. J. (2001). Collins Field Guide to the Spiders of Britain and Northern Europe. London: HarperCollins Publishers Ltd.

Coleoptera

- Duff, A. G. (2012). Beetles of Britain and Ireland, Volume 1: Sphaeriidae to Silphidae. A. G. Publishing.
- Duff, A. G. (2016). Beetles of Britain and Ireland, Volume 4: Cerambycidae to Curculionidae. A. G. Publishing.
- Duff, A. G. (2016). Beetles of Britain and Ireland, Volume 4: Cerambycidae to Curculionidae. A.G. Duff Publishing.
- Duff, A. G. (2020). Beetles of Britain and Ireland, Volume 3: Geotrupidae to Scaptiidae. A.G. Duff Publishing.
- Lott, D. A. and Anderson, R. (2011). Handbooks for the identification of British insects, vol. 12, part 7 The Staphylinidae (rove beetles) of Britain and Ireland. Parts 7 & 8: Oxyporinae, Steninae, Euaesthetinae, Pseudopsinae, Paederinae, Staphylininae. Royal Entomological Society.

Collembola

- Hopkin, S. P. (2007). A key to the Collembola (Springtails) of Britain and Ireland. Shrewsbury: Field Studies Council.

Diptera

- Ball, S. and Morris, R. (2015). Britain's hoverflies: a field guide. Princeton University Press.
- Stubbs, A. E. & Falk, S. (2002). British hoverflies, an illustrated identification guide. Second edition. Reading: British Entomological and Natural History Society.
- White, I. M. (1988). Handbooks for the Identification of British Insects. Tephritid Flies, Diptera: Tephritidae, 1-134. Vol. X, Part 5(a). Royal Entomological Society London.

Hemiptera

- Biedermann, R. & Niedringhaus, R. (2009). The Plant- and Leafhoppers of Germany – Identification key to all species. Wissenschaftlich Akademischer Buchvertrieb-Fründ, Scheeßel.
- Southwood, T. R. E. & Leston, D. (1959). Land and Water Bugs of the British Isles. Frederick Warne & Co. Ltd.
- Wilson, M., Stewart, A., Biederman, R., Nickel, H. and Niedringhaus, R. (2015). The Planthoppers and Leafhoppers of Britain and Ireland - Identification keys to all families and genera and all British and Irish species not recorded from Germany. Wissenschaftlich Akademischer Buchvertrieb-Fründ, Scheeßel.

Hymenoptera

- Benson, R.B., 1952. Handbooks for the Identification of British Insects. Hymenoptera, Symphyta, Vol 6, Section 2 (a-c), Royal Entomological Society, London
- Falk, S. J. (2015). Field Guide to the Bees of Great Britain and Ireland. British Wildlife Field Guide. London: British Wildlife Publishing.
- Skinner, G. J. & Allen, G. W. (1996). Naturalists Handbooks 24: Ants. Richmond Publishing Co. Ltd.

Myriapoda

- Blower, J. G. (1985). Millipedes. Synopses of the British Fauna (New Series) 35. London: The Linnean Society of London.
- Lee, P. (2015). A review of the millipedes (Diplopoda), centipedes (Chilopoda) and woodlice (Isopoda) of Great Britain (NECR186). Available online: <http://publications.naturalengland.org.uk/file/4507712818774016>

Various

- Mike's Insect Keys [online] Available at: <https://sites.google.com/view/mikes-insect-keys>

7.0 REFERENCES

British Bugs. (2022a). *Saldula orthochila*. [online] Available at: https://www.britishbugs.org.uk/heteroptera/Saldidae/Saldula_orthochila.html [Accessed 5th October 2022].

British Bugs. (2022b). *Adelphocoris quadripunctatus*. [online] Available at: https://www.britishbugs.org.uk/heteroptera/Miridae/adelphocoris_quadripunctatus.html [Accessed 5th October 2022].

British Bugs. (2022c). *Alebra wahlbergi*. [online] Available at: https://www.britishbugs.org.uk/homoptera/Cicadellidae/Alebra_wahlbergi.html [Accessed 5th October 2022].

British Bugs. (2022d). *Aphrodes flavostriatus*. [online] Available at: https://www.britishbugs.org.uk/homoptera/Cicadellidae/Aphrodes_flavostriatus.html [Accessed 5th October 2022].

British Bugs. (2022e). *Berytinus minor*. [online] Available at: https://www.britishbugs.org.uk/heteroptera/Berytidae/berytinus_minor.html [Accessed 5th October 2022].

British Bugs. (2022f). *Cyrtorhinus caricis*. [online] Available at: https://www.britishbugs.org.uk/heteroptera/Miridae/Cyrtorhinus_caricis.html [Accessed 5th October 2022].

British Bugs. (2022g). *Macrosteles laevis*. [online] Available at: https://www.britishbugs.org.uk/homoptera/Cicadellidae/Macrosteles_laevis.html [Accessed 5th October 2022].

British Bugs. (2022h). *Miridius quadrivirgatus*. [online] Available at: https://www.britishbugs.org.uk/heteroptera/Miridae/miridius_quadrivirgatus.html [Accessed 5th October 2022].

British Bugs. (2022i). *Streptanus aemulans*. [online] Available at: https://www.britishbugs.org.uk/homoptera/Cicadellidae/Streptanus_aemulans.html [Accessed 5th October 2022].

Falk, S. J. (2022). *Tetanocera punctifrons*. [online] Available at: <https://www.flickr.com/photos/63075200@N07/albums/72157677779132402/> [Accessed 5th October 2022].

Nature Spot. (2022a). *Aphrodes bicinctus*. [online] Available at: <https://www.naturespot.org.uk/species/aphrodes-bicinctus> [Accessed 5th October 2022].

Nature Spot. (2022b). *Sphenella marginata*. [online] Available at: <https://www.naturespot.org.uk/species/sphenella-marginata> [Accessed 5th October 2022].

Spider and Harvestman Recording Scheme. (2022). Summary for *Floronia bucculenta*. [online] Available at: <https://srs.britishspiders.org.uk/portal.php/p/Summary/s/Floronia+bucculenta> [Accessed 5th October 2022]

UK Beetle Recording (2022). *Hydrothassa glabra*. [online] Available at: <https://www.coleoptera.org.uk/species/hydrothassa-glabra> [Accessed 5th October 2022]

UK Butterfly Monitoring Scheme. (2022). Monitoring Marsh Fritillary larval webs. [online] Available at: <https://ukbms.org/sites/default/files/downloads/UKBMS%20Ng2%20-%20Marsh%20Frit%20Webs%20guidance%20notes.pdf> [Accessed 5th October 2022].

Appendix 1. Full List of invertebrate species recorded from Goitre Field in 2022. Species of 'conservation interest' are highlighted in bold.

National status codes:

- **Local** = Species which, whilst fairly common, are evidently less widespread than truly common species, but also not qualifying as Nationally Scarce having been recorded from over 100, but less than 300, ten-kilometre squares of the British National Grid system since 1970.
- **Nationally Rare** (NR) or RDB3 = Taxa with small populations which are not at present endangered or vulnerable but which are at risk. These are species which are estimated to occur in 15 or fewer ten-kilometre squares of the British National Grid system since 1970.
- **Nationally Scarce** (NS) or Notable (Na or Nb) = Species occurring within the range of 16 to 100 ten-kilometre squares of the British National Grid system since 1970.
- **Near Threatened (NT)** = Species which do not qualify for Critically Endangered, Endangered or Vulnerable now but are close to qualifying for, or are likely to qualify for, a threatened category in the near future.
- **Section 7** = Species listed under Section 7 of Environment (Wales) Act 2016 as 'species of principal importance for conservation of biological diversity in Wales'.

Species	Family	Order	Conservation status	Habitat
<i>Agalenatea redii</i>	Araneidae	Araneae	Locally common	
<i>Araneus diadematus</i>	Araneidae	Araneae	Common	
<i>Araneus quadratus</i>	Araneidae	Araneae	Local common	

<i>Clubiona reclusa</i>	Clubionidae	Araneae	Common	acid & sedge peats
<i>Dictyna arundinacea</i>	Dictynidae	Araneae	Common	tall sward & scrub
<i>Erigone atra</i>	Linyphiidae	Araneae	Common	
<i>Floronia bucculenta</i>	Linyphiidae	Araneae	Local; generally uncommon	tall sward & scrub
<i>Gonatium rubens</i>	Linyphiidae	Araneae	Common	tall sward & scrub; upland
<i>Linyphia triangularis</i>	Linyphiidae	Araneae	Common	
<i>Oedothorax fuscus</i>	Linyphiidae	Araneae	Common	
<i>Palliduphantes ericaeus</i>	Linyphiidae	Araneae	Common	tall sward & scrub
<i>Tenuiphantes tenuis</i>	Linyphiidae	Araneae	Common	tall sward & scrub
<i>Pardosa amentata</i>	Lycosidae	Araneae	Common	acid & sedge peats
<i>Pirata piraticus</i>	Lycosidae	Araneae	Local	acid & sedge peats
<i>Trochosa terricola</i>	Lycosidae	Araneae	Common	
<i>Tibellus oblongus</i>	Philodromidae	Araneae	Local	tall sward & scrub
<i>Pisaura mirabilis</i>	Pisauridae	Araneae	Common	tall sward & scrub
<i>Pachygnatha degeeri</i>	Tetragnathidae	Araneae	Common	
<i>Enoplognatha latimana</i>	Theridiidae	Araneae	Locally common	tall sward & scrub
<i>Enoplognatha ovata sensu lato</i>	Theridiidae	Araneae	Common	tall sward & scrub
<i>Neottiura bimaculata</i>	Theridiidae	Araneae	Common	tall sward & scrub
<i>Paidiscura pallens</i>	Theridiidae	Araneae	Common	arboreal
<i>Apion frumentarium</i>	Apionidae	Coleoptera	Common	tall sward & scrub
<i>Ceratapion onopordi</i>	Apionidae	Coleoptera	Frequent	tall sward & scrub

<i>Perapion hydrolapathi</i>	Apionidae	Coleoptera	Frequent	tall sward & scrub
<i>Protapion fulvipes</i>	Apionidae	Coleoptera	Common	tall sward & scrub
<i>Rhagonycha fulva</i>	Cantharidae	Coleoptera	Common	tall sward & scrub
<i>Agonum emarginatum</i>	Carabidae	Coleoptera	Frequent	marshland
<i>Amara communis</i>	Carabidae	Coleoptera	Frequent	tall sward & scrub
<i>Bembidion guttula</i>	Carabidae	Coleoptera	Common	marshland
<i>Bembidion lampros</i>	Carabidae	Coleoptera	Common	short sward & bare ground
<i>Bembidion mannerheimii</i>	Carabidae	Coleoptera	Common	acid & sedge peats; shaded woodland floor; wet woodland
<i>Bembidion properans</i>	Carabidae	Coleoptera	Frequent	short sward & bare ground
<i>Calathus melanocephalus</i>	Carabidae	Coleoptera	Frequent	
<i>Curtonotus aulicus</i>	Carabidae	Coleoptera	Frequent	tall sward & scrub
<i>Notiophilus substriatus</i>	Carabidae	Coleoptera	Frequent	short sward & bare ground
<i>Pterostichus diligens</i>	Carabidae	Coleoptera	Common	acid & sedge peats
<i>Pterostichus rhaeticus</i>	Carabidae	Coleoptera	Frequent	
<i>Pterostichus strenuus</i>	Carabidae	Coleoptera	Common	tall sward & scrub
<i>Syntomus foveatus</i>	Carabidae	Coleoptera	Local	short sward & bare ground
<i>Altica lythri</i>	Chrysomelidae	Coleoptera	Common	tall sward & scrub
<i>Cassida vibex</i>	Chrysomelidae	Coleoptera	Frequent	short sward & bare ground
<i>Chaetocnema hortensis</i>	Chrysomelidae	Coleoptera	Common	tall sward & scrub

<i>Hydrothassa glabra</i>	Chrysomelidae	Coleoptera	Local; scarce in Duff	tall sward & scrub
<i>Longitarsus jacobaeae</i>	Chrysomelidae	Coleoptera	Common	short sward & bare ground
<i>Longitarsus luridus</i>	Chrysomelidae	Coleoptera	Common	tall sward & scrub
<i>Neocrepidodera ferruginea</i>	Chrysomelidae	Coleoptera	Common	tall sward & scrub
<i>Neocrepidodera transversa</i>	Chrysomelidae	Coleoptera	Common	tall sward & scrub
<i>Phyllotreta tetrastigma</i>	Chrysomelidae	Coleoptera	Local	tall sward & scrub
<i>Sphaeroderma rubidum</i>	Chrysomelidae	Coleoptera	Frequent	tall sward & scrub
<i>Sphaeroderma testaceum</i>	Chrysomelidae	Coleoptera	Frequent	tall sward & scrub
<i>Adalia decempunctata</i>	Coccinellidae	Coleoptera	Common	arboreal
<i>Rhyzobius litura</i>	Coccinellidae	Coleoptera	Common	tall sward & scrub
<i>Coelositona cambricus</i>	Curculionidae	Coleoptera	Common	tall sward & scrub
<i>Graptus triguttatus</i>	Curculionidae	Coleoptera	Local; scarce in Duff	tall sward & scrub
<i>Hypera plantaginis</i>	Curculionidae	Coleoptera	Frequent	tall sward & scrub
<i>Mecinus pascuorum</i>	Curculionidae	Coleoptera	Common	tall sward & scrub
<i>Mecinus pyraeter</i>	Curculionidae	Coleoptera	Frequent	tall sward & scrub
<i>Nedus quadrimaculatus</i>	Curculionidae	Coleoptera	Common	tall sward & scrub
<i>Sitona lepidus</i>	Curculionidae	Coleoptera	Common	tall sward & scrub
<i>Anacaena globulus</i>	Hydrophilidae	Coleoptera	Common	marshland
<i>Cryptopleurum minutum</i>	Hydrophilidae	Coleoptera	Frequent	tall sward & scrub

<i>Corticarina minuta</i>	Latridiidae	Coleoptera	Common	
<i>Enicmus transversus</i>	Latridiidae	Coleoptera	Frequent	
<i>Oedemera lurida</i>	Oedemeridae	Coleoptera	Common	tall sward & scrub
<i>Oedemera nobilis</i>	Oedemeridae	Coleoptera	Common	tall sward & scrub
<i>Anotylus rugosus</i>	Staphylinidae	Coleoptera	Common	marshland
<i>Philonthus albipes</i>	Staphylinidae	Coleoptera	Local in Wales	tall sward & scrub
<i>Philonthus carbonarius</i>	Staphylinidae	Coleoptera	Frequent	tall sward & scrub
<i>Philonthus cognatus</i>	Staphylinidae	Coleoptera	Common	tall sward & scrub
<i>Philonthus decorus</i>	Staphylinidae	Coleoptera	Common	shaded woodland floor
<i>Quedius boops</i>	Staphylinidae	Coleoptera	Frequent	
<i>Quedius schatzmayri</i>	Staphylinidae	Coleoptera	Frequent	tall sward & scrub
<i>Rugilus erichsonii</i>	Staphylinidae	Coleoptera	Locally frequent	acid & sedge peats
<i>Stenus bimaculatus</i>	Staphylinidae	Coleoptera	Frequent	marshland; shaded woodland floor; wet woodland
<i>Stenus brunnipes</i>	Staphylinidae	Coleoptera	Common	
<i>Stenus cicindeloides</i>	Staphylinidae	Coleoptera	Common	acid & sedge peats
<i>Stenus fulvicornis</i>	Staphylinidae	Coleoptera	Common	tall sward & scrub
<i>Stenus latifrons</i>	Staphylinidae	Coleoptera	Common	acid & sedge peats
<i>Stenus nanus</i>	Staphylinidae	Coleoptera	Frequent	tall sward & scrub
<i>Stenus ossium</i>	Staphylinidae	Coleoptera	Common	tall sward & scrub
<i>Stenus pallipes</i>	Staphylinidae	Coleoptera	Common	marshland
<i>Stenus providus</i>	Staphylinidae	Coleoptera	Common	marshland
<i>Tachyporus dispar</i>	Staphylinidae	Coleoptera	Common	tall sward & scrub
<i>Forficula auricularia</i>	Forficulidae	Dermaptera	Common	

<i>Lucilia sericata</i>	Calliphoridae	Diptera	Frequent	
<i>Sicus ferrugineus</i>	Conopidae	Diptera	Frequent	short sward & bare ground
<i>Dolichopus plumipes</i>	Dolichopodidae	Diptera	Common	marshland
<i>Empis livida</i>	Empididae	Diptera	Common	tall sward & scrub
<i>Geomyza balachowskyi</i>	Opomyzidae	Diptera	Common	tall sward & scrub
<i>Opomyza petrei</i>	Opomyzidae	Diptera	Common	tall sward & scrub
<i>Rhagio tringarius</i>	Rhagionidae	Diptera	Common	tall sward & scrub
<i>Limnia paludicola</i>	Sciomyzidae	Diptera	Locally common	shaded woodland floor
<i>Limnia unguicornis</i>	Sciomyzidae	Diptera	Locally common	acid & sedge peats; marshland; running water
<i>Tetanocera punctifrons</i>	Sciomyzidae	Diptera	Notable	acid & sedge peats
<i>Chloromyia formosa</i>	Stratiomyidae	Diptera	Common	tall sward & scrub
<i>Eupeodes latifasciatus</i>	Syrphidae	Diptera	Common	tall sward & scrub
<i>Melanostoma mellinum</i>	Syrphidae	Diptera	Common	tall sward & scrub
<i>Platycheirus granditarsus</i>	Syrphidae	Diptera	Common	acid & sedge peats; marshland
<i>Sericomyia silentis</i>	Syrphidae	Diptera	Frequent	acid & sedge peats
<i>Sericomyia superbiens</i>	Syrphidae	Diptera	Frequent	acid & sedge peats; running water
<i>Sphaerophoria interrupta</i>	Syrphidae	Diptera	Common	tall sward & scrub
<i>Syritta pipiens</i>	Syrphidae	Diptera	Common	tall sward & scrub
<i>Volucella pellucens</i>	Syrphidae	Diptera	Common	shaded woodland floor

<i>Xylota segnis</i>	Syrphidae	Diptera	Common	decaying wood
<i>Eriothrix rufomaculata</i>	Tachinidae	Diptera	Common	
<i>Anomoia purmunda</i>	Tephritidae	Diptera	Frequent	arboreal
<i>Chaetostomella cylindrica</i>	Tephritidae	Diptera	Frequent	short sward & bare ground; tall sward & scrub
<i>Sphenella marginata</i>	Tephritidae	Diptera	Local in Wales	tall sward & scrub
<i>Pogonognathellus longicornis</i>	Tomoceridae	Entomobryomorpha	Common	
<i>Geophilus flavus</i>	Geophilidae	Geophilomorpha	Common	tall sward & scrub
<i>Anthocoris nemorum</i>	Anthocoridae	Hemiptera	Common	
<i>Xylocoris galactinus</i>	Anthocoridae	Hemiptera	Local in Wales	
<i>Neophilaenus lineatus</i>	Aphrophoridae	Hemiptera	Common	tall sward & scrub
<i>Philaenus spumarius</i>	Aphrophoridae	Hemiptera	Common	
<i>Berytinus minor</i>	Berytidae	Hemiptera	Local	short sward & bare ground
<i>Alebra albostriella</i>	Cicadellidae	Hemiptera	Common	arboreal
<i>Alebra wahlbergi</i>	Cicadellidae	Hemiptera	Local in Wales	arboreal
<i>Anoscopus flavostriatus</i>	Cicadellidae	Hemiptera	Local	tall sward & scrub
<i>Aphrodes bicincta</i>	Cicadellidae	Hemiptera	Local in Wales	tall sward & scrub
<i>Aphrodes makarovi</i>	Cicadellidae	Hemiptera	Frequent	tall sward & scrub
<i>Arthaldeus pascuellus</i>	Cicadellidae	Hemiptera	Common	tall sward & scrub
<i>Cicadella viridis</i>	Cicadellidae	Hemiptera	Common	

<i>Cicadula persimilis</i>	Cicadellidae	Hemiptera	Frequent	tall sward & scrub
<i>Conosanus obsoletus</i>	Cicadellidae	Hemiptera	Common	tall sward & scrub
<i>Euscelis incisus</i>	Cicadellidae	Hemiptera	Common	tall sward & scrub
<i>Iassus lanio</i>	Cicadellidae	Hemiptera	Common	arboreal
<i>Macrosteles laevis</i>	Cicadellidae	Hemiptera	Local in Wales	tall sward & scrub
<i>Megophthalmus scabripennis</i>	Cicadellidae	Hemiptera	Local in Wales	tall sward & scrub
<i>Psammotettix confinis</i>	Cicadellidae	Hemiptera	Frequent	tall sward & scrub
<i>Streptanus aemulans</i>	Cicadellidae	Hemiptera	Local; possible new VC record?	tall sward & scrub
<i>Streptanus sordidus</i>	Cicadellidae	Hemiptera	Frequent	tall sward & scrub
<i>Cixius nervosus</i>	Cixiidae	Hemiptera	Frequent	arboreal
<i>Coreus marginatus</i>	Coreidae	Hemiptera	Common	tall sward & scrub
<i>Conomelus anceps</i>	Delphacidae	Hemiptera	Common	
<i>Javesella pellucida</i>	Delphacidae	Hemiptera	Common	tall sward & scrub
<i>Kelisia guttula</i>	Delphacidae	Hemiptera	Frequent	short sward & bare ground
<i>Kelisia pallidula</i>	Delphacidae	Hemiptera	Local, scarce in Wales	
<i>Drymus sylvaticus</i>	Lygaeidae	Hemiptera	Common	tall sward & scrub
<i>Stygnocoris fuliginus</i>	Lygaeidae	Hemiptera	Frequent	tall sward & scrub
<i>Adelphocoris lineolatus</i>	Miridae	Hemiptera	Common	tall sward & scrub
<i>Adelphocoris quadripunctatus</i>	Miridae	Hemiptera	Local; current status unclear	

<i>Calocoris roseomaculatus</i>	Miridae	Hemiptera	Locally frequent	short sward & bare ground
<i>Closterotomus norwegicus</i>	Miridae	Hemiptera	Common	tall sward & scrub
<i>Cyrtorhinus caricis</i>	Miridae	Hemiptera	Local	tall sward & scrub
<i>Leptopterna dolabrata</i>	Miridae	Hemiptera	Common	tall sward & scrub
<i>Liocoris tripustulatus</i>	Miridae	Hemiptera	Common	tall sward & scrub
<i>Lopus decolor</i>	Miridae	Hemiptera	Frequent	tall sward & scrub
<i>Miridius quadrivirgatus</i>	Miridae	Hemiptera	Local	tall sward & scrub
<i>Oncotylus viridiflavus</i>	Miridae	Hemiptera	Local	tall sward & scrub
<i>Pachytomella parallela</i>	Miridae	Hemiptera	Common	short sward & bare ground
<i>Phytocoris varipes</i>	Miridae	Hemiptera	Common	tall sward & scrub
<i>Pinalitus cervinus</i>	Miridae	Hemiptera	Frequent	arboreal
<i>Pithanus maerkelii</i>	Miridae	Hemiptera	Common	tall sward & scrub
<i>Plagiognathus arbustorum</i>	Miridae	Hemiptera	Common	tall sward & scrub
<i>Plagiognathus chrysanthemi</i>	Miridae	Hemiptera	Common	short sward & bare ground
<i>Stenodema (Brachystira) calcarata</i>	Miridae	Hemiptera	Common	tall sward & scrub
<i>Stenodema (Stenodema) laevigata</i>	Miridae	Hemiptera	Common	tall sward & scrub
<i>Stenotus binotatus</i>	Miridae	Hemiptera	Common	tall sward & scrub
<i>Tytthus pygmaeus</i>	Miridae	Hemiptera	Local in Wales	acid & sedge peats

<i>Himacerus (Anaptus) major</i>	Nabidae	Hemiptera	Frequent	tall sward & scrub
<i>Nabis limbatus</i>	Nabidae	Hemiptera	Common	tall sward & scrub
<i>Nabis flavomarginatus</i>	Nabidae	Hemiptera	Common	tall sward & scrub
<i>Aelia acuminata</i>	Pentatomidae	Hemiptera	Frequent	tall sward & scrub
<i>Palomena prasina</i>	Pentatomidae	Hemiptera	Common	tall sward & scrub
<i>Saldula orthochila</i>	Saldidae	Hemiptera	NS	short sward & bare ground
<i>Eurygaster testudinaria</i>	Scutelleridae	Hemiptera	Frequent	tall sward & scrub
<i>Apis mellifera</i>	Apidae	Hymenoptera	Common	
<i>Bombus lapidarius</i>	Apidae	Hymenoptera	Common	tall sward & scrub
<i>Bombus pascuorum</i>	Apidae	Hymenoptera	Common	tall sward & scrub
<i>Bombus pratorum</i>	Apidae	Hymenoptera	Common	shaded woodland floor; tall sward & scrub
<i>Bombus terrestris</i>	Apidae	Hymenoptera	Common	tall sward & scrub
<i>Lasius niger</i>	Formicidae	Hymenoptera	Common	short sward & bare ground
<i>Lasius platythorax</i>	Formicidae	Hymenoptera	Frequent	short sward & bare ground
<i>Leptothorax acervorum</i>	Formicidae	Hymenoptera	Locally frequent	short sward & bare ground
<i>Myrmica scabrinodis</i>	Formicidae	Hymenoptera	Common	tall sward & scrub
<i>Megachile centuncularis</i>	Megachilidae	Hymenoptera	Frequent	decaying wood
<i>Athalia cordata</i>	Tenthredinidae	Hymenoptera	Common	
<i>Vespula vulgaris</i>	Vespidae	Hymenoptera	Common	tall sward & scrub
<i>Oniscus asellus</i>	Oniscidae	Isopoda	Common	
<i>Philoscia muscorum</i>	Philosciidae	Isopoda	Common	

<i>Porcellio scaber</i>	Porcellionidae	Isopoda	Common	
<i>Trichoniscus pusillus sensu lato</i>	Trichoniscidae	Isopoda	Common	
<i>Proteroiulus fuscus</i>	Blaniulidae	Julida	Common	decaying wood
<i>Cylindroiulus britannicus</i>	Julidae	Julida	Common	decaying wood
<i>Leptoiulus belgicus</i>	Julidae	Julida	NS	shaded woodland floor
<i>Tyria jacobaeae</i>	Erebidae	Lepidoptera	LC (Global); Section 41 Priority Species - research only	tall sward & scrub
<i>Ochlodes sylvanus</i>	Hesperiidae	Lepidoptera	Common	tall sward & scrub
<i>Thymelicus sylvestris</i>	Hesperiidae	Lepidoptera	Common	tall sward & scrub
<i>Macrothylacia rubi</i>	Lasiocampidae	Lepidoptera	LC (Global)	tall sward & scrub
<i>Polyommatus icarus</i>	Lycaenidae	Lepidoptera	Common	short sward & bare ground
<i>Autographa gamma</i>	Noctuidae	Lepidoptera	Common	
<i>Ceramica pisi</i>	Noctuidae	Lepidoptera	Section 41 Priority Species - research only; VU	
<i>Aglais io</i>	Nymphalidae	Lepidoptera	Common	tall sward & scrub
<i>Aglais urticae</i>	Nymphalidae	Lepidoptera	Common	tall sward & scrub
<i>Aphantopus hyperantus</i>	Nymphalidae	Lepidoptera	Common	tall sward & scrub
<i>Maniola jurtina</i>	Nymphalidae	Lepidoptera	Common	tall sward & scrub
<i>Pararge aegeria</i>	Nymphalidae	Lepidoptera	Common	tall sward & scrub
<i>Vanessa atalanta</i>	Nymphalidae	Lepidoptera	Common	

<i>Vanessa cardui</i>	Nymphalidae	Lepidoptera	Common	
<i>Pieris brassicae</i>	Pieridae	Lepidoptera	Common	
<i>Pieris napi</i>	Pieridae	Lepidoptera	Common	
<i>Pieris rapae</i>	Pieridae	Lepidoptera	Common	
<i>Stenoptilia bipunctidactyla</i>	Pterophoridae	Lepidoptera	Common	tall sward & scrub
<i>Smerinthus ocellata</i>	Sphingidae	Lepidoptera	LC (Global)	arboreal
<i>Lamyctes emarginatus</i>	Henicopidae	Lithobiomorpha	Common	tall sward & scrub
<i>Lithobius (Lithobius) forficatus</i>	Lithobiidae	Lithobiomorpha	Common	
<i>Micromus variegatus</i>	Hemerobiidae	Neuroptera	Common	tall sward & scrub
<i>Sympetrum striolatum</i>	Libellulidae	Odonata	Common	marshland
<i>Dicranopalpus ramosus</i>	Phalangiidae	Opiliones	Common	
<i>Lacinius ephippiatus</i>	Phalangiidae	Opiliones	Frequent	tall sward & scrub
<i>Leiobunum blackwalli</i>	Phalangiidae	Opiliones	Common	arboreal
<i>Phalangium opilio</i>	Phalangiidae	Opiliones	Common	
<i>Chorthippus brunneus</i>	Acrididae	Orthoptera	Common	tall sward & scrub
<i>Chorthippus parallelus</i>	Acrididae	Orthoptera	Common	tall sward & scrub
<i>Omocestus viridulus</i>	Acrididae	Orthoptera	Common	tall sward & scrub
<i>Conocephalus dorsalis</i>	Conocephalidae	Orthoptera	Frequent	tall sward & scrub
<i>Conocephalus fuscus</i>	Conocephalidae	Orthoptera	Common	tall sward & scrub
<i>Polydesmus angustus</i>	Polydesmidae	Polydesmida	Common	
<i>Deroceras invadens</i>	Agriolimacidae	Pulmonata	Common	

<i>Deroceras reticulatum</i>	Agriolimacidae	Pulmonata	Common	tall sward & scrub
<i>Arion flagellus</i>	Arionidae	Pulmonata	Common	tall sward & scrub
<i>Arion rufus</i>	Arionidae	Pulmonata	Common	
<i>Arion intermedius</i>	Arionidae	Pulmonata	Common	tall sward & scrub
<i>Cochlicopa cf. lubrica sensu Anderson 2008</i>	Cochlicopidae	Pulmonata	Common	tall sward & scrub
<i>Aegopinella nitidula</i>	Oxychilidae	Pulmonata	Common	tall sward & scrub
<i>Sminthurinus elegans</i>	Katiannidae	Symphyleona	DD, very few record in Wales	
<i>Sminthurus viridis</i>	Sminthuridae	Symphyleona	Common	