

Mellow Croft, Phase 1 Habitat Survey

Target Notes

Please use these notes in conjunction with the submitted habitat map. For more detail on species of conservation interest, please refer to the associated report.

Note that identification of most grass species was not possible during the window of report production for the Phase 1 Habitat Survey (March 2015), and this has limited the precise characterisation of some of the grassland habitats. However, I was commissioned to provide an entomological survey during the summer of 2014, and that work has informed the descriptions presented here.

1. Defunct hedgerows with mature trees **J2.3.1 (defunct)**

Most of the site margin is composed of extensive but largely defunct hedgerows with large mature trees, including Sessile Oak (*Quercus petraea*), Ash (*Fraxinus excelsior*) and Silver Birch (*Betula pendula*). There are also large stretches with mature Hazel (*Corylus avellanae*), Hawthorn (*Crateagus monogyna*) and Sloe (*Prunus spinosa*). The classification of such boundaries is unclear in the guidelines provided; at its most extreme, only separated mature trees remain, although hazels commonly show signs of having once been laid.

The mature trees, especially oaks, host a very diverse insect fauna. Scarce species include:

- the barkfly *Trichopsocus brincki* (18.vii.2014).

1a. Dense area of Sloe (*Prunus spinosa*)

- Sloe Psyllid *Cacopsylla pruni* (18.vii.2014) [uncommon and probably declining]

2. Marshy Grassland **B5**

Dedicated wet habitat resulting from drainage of the smallholding. Dominant vegetation is tussocky Soft Rush (*Juncus effusus*) and Cocksfoot (*Dactylis glomerata*) with other mixed grasses. Area verges into drier, raised habitats with ruderal vegetation.

Diverse insect fauna including:

- *Paraliburnia clypealis* RDBK (05.vi.2014)
- *Magdalis carbonaria* Notable B (05.vi.2014) [see also Target Note 6]

This area is currently planted with numerous very young saplings, which if allowed to grow will change the character of the area and probably result in loss of the populations.

Recommendation: immediate removal of planted saplings within wetland zone.

3. Damp meadow, species-poor **B6 [seasonally B5]**

Neutral to slightly acid, damp, semi-improved grassland with patches of Lousewort (*Pedicularis racemosa*). Some areas are degraded with extensive growth of Soft Rush (*Juncus effusus*), and encroachment of Bramble (*Rubus fruticosus* agg. at 3a) from margins. Insect fauna is abundant but dominated by ubiquitous taxa, with a few local or locally scarce species:

- *Dorytomus dejeani* (05.vi.2014)
- *Cixius simplex* (05.vi.2014)

3a. The brambles adjoining the stream are intended to be removed to maximise field area, but the species is not abundant on the site, and these constitute a rich food source for nectar-feeders.

Recommendation: Consider replanting the extracted brambles along the eastern boundary, where they will help to thicken the hedgerow, and provide further nectaring opportunities for pollinators.

4. Arable **J1.1**

Community allotment scheme with wide range of plant species cultivated in discrete plots surrounded by mown grass; also includes a polytunnel. This is not a natural habitat but provides an important nectar resource for pollinating insects, food for herbivorous insects, and thus also a food supply for resident nesting birds. It is not irreplaceable, but nonetheless supports the overall ecology of the site.

5. Unimproved wet meadow **B5**

Wet, unimproved and partly managed marshy grassland, neutral to somewhat acidic, with areas containing significant (non-dominant) levels of Soft Rush (*Juncus effusus*), and patches of Marsh Bedstraw (*Galium palustre*). Abundant Common Spotted Orchids (*Dactylorhiza fuchsii*).

Insect fauna moderately diverse but only a few local species, including:

- bedstraw-feeding psyllid *Trioza galii* (18.vii.2014).

6. Coniferous woodland **A1.2.2**

Mature, dense plantation of Sitka Spruce (*Picea sitchensis*) with almost no ground-level vegetation.

Low-hanging branches can be sampled at margins, but are otherwise inaccessible. Unusual species include:

- plant bug *Pinalitus rubricatus* (18.vii.2014) [first Welsh record since 1980]
- micromoth *Epinotia nanana* (18.vii.2014) [first Radnorshire record]

7. Deciduous woodland **A1.1.1**

Open, park-like woodland dominated by mature *Betula pendula*. The area was previously more thickly wooded, with an understory of gorse, but this has been removed within the past ten years.

A rich insect fauna of specialist birch-feeding species is present, but no species of conservation significance were recorded here. However, this is the likely population centre for the Notable B weevil *Magdalis carbonaria* (see Target Note 2).

8. Drainage ditches **J2.6**

Episodically wet ditches with banked margins, which carry water after heavy rain. These ditches have been reinstated on the land in order to reduce surface flooding.

No significant insect species have been recorded from the ditches, with most species encountered also being found on adjacent wet grassland areas. Areas of ditch that become permanently wet are more likely to support unusual species.

9. Fish Pond **G1.2**

Substantial pool with mostly clear water and limited growth of aquatic plants. Water lilies (*Nymphaea* sp.) introduced several years ago appear to be surviving well. Koi carp have been introduced.

Contains larger semi-aquatic (epiaquatic) insects including:

- River Skater, *Aquarius najas* (05.vi.2014) [more typical of fast-flowing rivers]
- reed beetle *Plateaumaris sericea* (05.vi.2014)

10. Wildlife Pond **G1.1**

Small, shallow pond from which fish have been deliberately excluded in order to encourage amphibians and invertebrates. Dense growth of aquatic vegetation, dominated by *Ceratophyllum* sp. This pool is classified as Eutrophic based on the dense *Ceratophyllum* growth, but the clear water

and obvious invertebrate life imply no eutrophication, presumably due to rapid grazing and scavenging of dead plant material.

No amphibians were seen during the insect surveys, but this habitat is appropriate to support several species, including Great Crested Newts (*Triturus cristatus*); unconfirmed reports from the landowners suggest that they are present.

No evidence was seen for water voles (including holes in the banks), although the habitat may be suitable.

The insect fauna includes several common species of damselflies and dragonflies, and numerous aquatic Heteroptera and Coleoptera.

Locally significant species include:

- reed beetle *Donacia semicuprea* [scarce in Wales; possibly first Powys record]

11. Stream **G2**

Small, permanent stream, generally around 0.5–1 m wide, connecting the ponds and running through the full length of the site. The banks are generally short and narrow, without a distinctive marginal flora, but where such flora occurs the areas have been noted on the map. No aquatic insect survey was conducted on the stream, but note that a moderately diverse stonefly (Plecoptera) fauna is present, the nymphs of which generally live in flowing water rather than pools.

12. Rough grassland **B2.2**

Unmanaged, semi-improved neutral grassland with diverse herbaceous species such as Common Knapweed (*Centaurea nigra*) and Meadow Buttercup (*Ranunculus acris*).

Large numbers of nectaring insects were recorded, together with diverse beetles and hemipterans. The only locally rare species encountered in this area was a rove beetle:

- *Stenus ochropus* [possible first Welsh record]

13. Amenity space **J2**

Open mown lawns with trees at margins, including recent plantings and young, semi-natural growth of hazel. This is a recreational area, and the only significant ecological value lies in the marginal trees.

14. Ruderal **C3.1**

Rough vegetation on small banks lining the access road, including Bramble (*Rubus fruticosus*), Broom (*Cytisus scoparia*), Rosebay Willowherb (*Chamaenerion angustifolium*) and Nettle (*Urtica dioica*). Patches of sedges (*Carex*) also occur, with a range of other tall grasses.

Insects in this habitat are diverse and abundant, and include a locally rare planthopper:

- *Kelisia pallidula* (23.vii.2014) [feeds on *Carex panicea*; first Radnorshire record].

Kelisia pallidula was found at one location near to the proposed house site, in an area that would be included in a stock grazing field. As this may be a unique population for the county, it is vulnerable to both types of disturbance.

Recommendation: At the end of summer 2015, when adults can no longer be found, relocate a significant portion of the *Carex* growth, including underlying soil, to the wetland zone, where it will be protected from further disturbance.

15. Buildings **J3.6**

All structures on the land currently are small temporary buildings without foundations, mainly of wooden construction. These are newly-built structures that provide habitats for synanthropic invertebrates, but none of any conservation significance were recorded during the survey. None appear suitable for bat roost or nest sites.

16. Sycamore

Mature Sycamore (*Acer pseudoplatanus*) beside stream.

Diverse insect community including an unusually wide range of elaterid beetles, and a very local leafhopper:

- *Ossiannilssonola callosa*.

17. Sycamore

Mature Sycamore (*Acer pseudoplatanus*) beside pools, with visible holes in upper trunk. Tawny owls noted to roost here (possibly nesting).

Possible bat roost.

18. Scots Pine (*Pinus sylvestris*)

Mature Scots Pine with crevices at height.

Possible bat roost.

19. Field Maple (*Acer campestre*)

Mature Field Maple with grooved branches offering some shelter.

Possible bat roost.

20. Ash (*Fraxinus excelsior*)

Senescent Ash with hollows and holes from woodpecker activity.

Possible bat roost.

21. Semi-natural birch woodland **A.1.1.1**

Small area of natural Silver Birch (*Betula pendula*) colonisation at the margin of a Sitka Spruce plantation. The trees are generally young compared with the area in Target Note 7, and no significant species were recorded.

22. Proposed site of septic tank. This area consists of poor semi-improved grassland that is currently of no conservation interest.

23. Proposed site of reedbeds. This is currently a weakly channelised marshy grassland and is appropriate to support reedbeds.

24. Area of branches and brush piled up by landowners as habitat for small mammals, approximately 10 x 8 m in size.

25. Recent deposit of loose large rocks for use on site; a small area is temporarily covered. No reptiles or other associated species seen.

26. Marginal **F2.1**

Semi-inundated, muddy sunstrate with Yellow Flag (*Iris pseudacorus*). No significant insect species seen.

27. Orchard **A1.1.2**

Small, neglected orchard area with apple and plum trees. No significant insect species seen.

28. Oak (*Quercus* sp.)

Mature oak.

Possible bat roost.

Report

Phase 1 Habitat Survey including entomological survey

Mellow Croft (Llandegley, Powys)

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1. Summary

A Phase 1 Habitat Survey has been conducted in accordance with published guidelines, and is combined with an entomological survey conducted in 2014. A botanical survey has not been performed, and this has made some categorisation of grassland types difficult due to the timing of this survey request, in March 2015, together with the short deadline (three weeks). The important considerations relating to a Phase 1 survey have nonetheless been covered satisfactorily, and serve to illustrate the local and regional importance of the site for wildlife. I have provided recommendations for avoiding the few risks to particular species that are apparent, and these recommendations have been accepted by the landowners.

The importance of the site appears to rest on the long-term existence of a smallholding on the site, which has never entirely lost the traditional structure; some species are typical of ancient sites (*Paraliburnia clypealis*), while others are likely to have been formerly widespread in Mid Wales but have since declined dramatically (e.g. *Pinalitus rubricatus*). A number of species, particularly of beetles, are widespread in the lowlands of England but very scarce in Mid Wales (e.g. *Donacia semicuprea*, *Dorytomus dejeani*, *Stenus ochropus*). Almost all of the species of interest are in habitats that are protected by the proposed plans, or actively encouraged. Some are living in habitats created or emphasised by the present owners, and most species of interest would be severely impacted by a return to high-intensity grazing and/or removal of boundaries that maintain habitat diversity.

Overall, the insect fauna is of considerable local and regional significance, including several records of species that are new to the county, or have not been recorded locally for decades. In one case, *Paraliburnia clypealis*, the species is listed in the Red Data Book list for the UK, and until 2013 was unknown from Wales. Several other species appear to be new to Radnorshire, Powys, or Wales. These are also noted in the target notes relating to the map.

2. Survey methodology

An entomological survey was conducted at the site by independent consultant Joe Botting (JPB) on three dates in 2014: June 6th, July 18th and July 23rd. The third date was primarily focussed on surrounding areas of moorland, in order to provide comparative data for adjacent habitats, and the difference between the entomofauna of the site and with typical local high-intensity grazing land.

JPB is an authority on UK Hemiptera, particularly the Psylloidea (national recording scheme organiser), with a wider interest in many lesser-known groups such as the Psocoptera, Coleoptera and Collembola. Many further groups of insects and other invertebrates were noted, but not covered in significant detail.

Surveys were conducted with a combination of sweep netting, box-beating and targeted direct inspection. No forms of trapping were used, due to the limited time and resources of the survey, but a total of 226 species were recorded, including 103 species of Hemiptera. Many of these were photographed in the field as an aid to identification, and as confirmable records. The survey was not exhaustive, but provides a baseline for future work, and was sufficient to indicate the character of the insect fauna present.

Mapping of habitats for this report was conducted by JPB, together with site owners and staff, on March 3rd, 2015. Habitats were assessed based on vegetation (combined with knowledge obtained from the 2014 insect surveys), water clarity, and knowledge of historical land use. European Protected Species were considered based on their known ranges, habitat preferences and requirements, and by searching for direct evidence where such searches were appropriate and could be conducted without risk of disturbance.

3. Notes on European Protected Species (EPS)

Particular vertebrate species protected under European law are considered below. Professional surveys for these species have not been conducted, but most can be excluded from occurring at the site. Suitable habitats exist for others, but their presence has not been confirmed.

Otter (*Lutra lutra*). No suitable habitat exists on the site.

Badgers (*Meles meles*). No setts are present on the site, although parts of the site are probably used for foraging. The proposed work presents no threat to the foraging activity.

Water Vole (*Arvicola amphibius*). Little suitable habitat exists on the site (Target Note 10), and no evidence was seen for their presence (i.e. no holes seen in pool or stream banks, and no anecdotal reports).

Hazel Dormouse (*Muscardinus avellanarius*). The extensive hedgerows offer suitable habitats for dormice, but no evidence for them has been seen, and they are very rare in Mid Wales. The proposed work seeks to maintain and protect these habitats, with no trees being felled; in the unlikely event that a population is present, the proposed work presents no potential threat to it.

Bats. The lack of old buildings or hollow trees on the site limits the suitable habitat for bat roosting. There are sufficient mature trees, however, that roosting on site cannot be ruled out, and the site is certainly used for foraging by at least pipistrelles. Likely candidate roosting sites are noted in Target Notes 17-20 and 28.

Recommendation: None of the mature trees highlighted should be felled during this work. I understand that no trees are planned to be felled, except for some sapling obstructing the junction of the access road with the A470. The alterations proposed should have little or no effect on the activities of local bat populations, and individual bats will not be harmed by the proposed work.

Great Crested Newts (*Triturus cristatus*). Although none were seen during the survey, the wildlife pond is maintained as a suitable habitat for this species, and anecdotal reports strongly suggest that they are present. This pool was constructed specifically for the purpose of encouraging wildlife, and is a recent addition to the site. The likely population should be supported by actively maintaining the current condition of the pond, and preventing stock from entering. A fence surrounding the pond is planned, and this, together with monitoring for clogging by weed or eutrophication, should be sufficient to maintain the population.

Reptiles. None were observed during the survey, although many of the habitats on site are appropriate for Common Lizard (*Zootoca vivipara*) and Slow Worm (*Anguis fragilis*). These habitats (e.g. Target Notes 12, 24) are not at threat from the proposed developments, and are encouraged by the present land use.

4. Entomology Survey

The entomological survey has revealed a substantial number of significant species, amongst a total of 226 recorded. The most important are mentioned in the target notes associated with the survey map, and the full list is provided in the appended table. This is not an exhaustive list, and the survey covered only the period July-September, but is sufficient to demonstrate the general character of the fauna and provide guidance on habitat conservation.

Overall character of the fauna

Hemiptera and Coleoptera are very well represented at the site, and these two groups contain most of the significant species found. Both are very diverse, including over 100 species of Heteroptera + Auchenorrhyncha, which is around 9% of the national diversity. The other most diverse groups appear to be Diptera and Lepidoptera (particularly moths), with significant numbers of species of Psocoptera.

Butterflies, hoverflies and pollinating Hymenoptera were not particularly abundant or diverse during the survey dates, perhaps due to the intensive grazing experienced by the surrounding area, which had also been applied to the site in recent history. Springtails (Collembola) were not found to be diverse or abundant, although many small soil-dwelling species will certainly be present. The semi-aquatic insects such as Odonata, Ephemeroptera and Plecoptera are abundant near to the new ponds and the upper parts of the stream, but all appear to be widespread and common species; this is entirely expected for a new habitat that has been recently colonised.

The most important elements of the insect fauna fall into two groups:

- (i) species typical of ancient sites that need specific microhabitats (particularly wetland);
- (ii) species that are widely distributed in England, but are generally rare or absent in Powys, probably due partly to climatic reasons and partly because suitable habitats have been lost through overgrazing.

The former category includes the Red Data Book planthopper *Paraliburnia clypealis*, which was historically known from Wicken Fen, Cambridgeshire, and which has since been found at a few other, similar sites. I recorded the first Welsh examples in 2013, from Abercamlo Bog: another ancient (glacial pingo) site. The presence of *P. clypealis* at Mellow Croft is remarkable, and suggests survival of a small population since much earlier times, perhaps because drainage was never completed on some parts of the smallholding. Most adults are short-winged, which reduces their potential for rapid dispersal and colonisation of new sites.

Category (ii) includes many more species, including the beetles *Dorytomus dejeani*, *Stenus ochropus*, *Magdalis carbonaria* and *Donacia semicuprea*, and the plant bug *Pinalitus rubricatus*. These species are in many cases widespread in England (although sometimes scarce), and are also able to disperse large distances. It is therefore unclear whether most of these represent relict populations that have survived at Mellow Croft, or indicate recolonisation from English populations, made possible by suitable site maintainence. Given the presence of at least some species that are more easily explained as relict populations, it is likely that a combination of factors applies here.

In addition to these, there are also a surprising number of arboreal Hemiptera species that are rarely encountered at other sites in Powys, despite the presence of the host plant. This includes the leafhoppers *Ossiannilssonola callosa* (on Sycamore) and *Zonocyba bifasciata* (on Hornbeam), and the psyllid *Cacopsylla pruni* (on Sloe), the first and last of these being rarely encountered anywhere in the UK. The presence of all three of these species at the site is unique in my experience, and supports the appearance of an unusually rich community. It is likely that these species have been present at the site for a long time, and that the population has relied on a continuous presence of the host plants for many decades, or centuries. At other sites without such continuity, the species appear to have been lost, and recolonisation through dispersal appears to be slow.



Fig. 1. Insects of conservation or distributional significance. Please see section 4 of the report for further detail. A, *Donacia semicuprea*, a reed beetle new to Radnorshire (showing feeding damage on *Potamogeton* leaves); B, *Pinalitus rubricatus*, a plant bug on Spruce, new to Radnorshire and not recorded in Wales since 1980; C, *Zonocyba bifasciata*, a local leafhopper feeding on Hornbeam, and new to Radnorshire; D, *Epinotia nanana*, a Notable B, Spruce-feeding micromoth new to Radnorshire; E, *Magdalis carbonaria*, a Notable B weevil; F, *Paraliburnia clypealis*, a nationally rare (RDBK) delphacid planthopper.

Species of particular significance

The following species have particular conservation interest and may influence future activities in terms of habitat protection. Although they do not have legal protected status, the protection of these species and their habitats should be a priority for landowners and site managers with an interest in conservation. Status within Radnorshire is based on LRC Wales data access tool, published information, and discussions with other local recorders.

Status definitions:

RDBK: nationally rare (fewer than 15 hectads across UK), but insufficiently known to assess exact

status.

Notable B: found in 31-100 hectads across the UK.

Scarce: probably equivalent to Notable, but with insufficient information to assess precisely.

Local: usually found in 101-300 hectads, but often with a scattered distribution.

RDBK

Paraliburnia clypealis (Fig. 1F)

A rare delphacid planthopper characteristic of ancient wetland sites, and only recently discovered in Wales (*personal observation*, 2013). The primary host plant is Purple Small-Reed (*Calamagrostis canescens*), although there are also reports of populations living on *Eriophorum* and *Rhynchospora* (Nickel, 2003). The species was found only in the small area of marshy grassland described in Target Note 2. This is a nationally important population that should be maintained in approximately its current form.

Notable B

Magdalis carbonaria (Fig. 1E)

A large black weevil with a scattered distributed across England, and a few localised records in the uplands of Scotland and Wales. The host plant is Birch (*Betula* spp.), which occurs abundantly on some parts of the site, although the specimen was found in marshy grassland (Target Note 2) rather than on the host. A very scarce species in Wales, although there are a few records from the Elan Valley area. Further investigation of the mature birchwood (Target Note 7) during summer should establish how well established the species is at Mellow Croft.

Small Spruce Bell, *Epinotia nanana* (Fig. 1D)

A local micromoth that can occur abundantly on Spruce (*Picea* spp.) but has a scattered distribution largely confined to England. The mature Sitka Spruce plantation at Mellow Croft provides an ideal habitat for this species, and the population here is locally important. First Radnorshire record.

NB: This species is difficult to identify, and further specimens would be ideal before a formal record is made.

Scarce

Cacopsylla pruni

A psyllid found on *Prunus* species (primarily Sloe, *Prunus spinosa*) across the UK. Hodkinson & White (1979) noted that it was uncommon, and it seems to have declined since then; I have no other recent records in the national database, except for a single overwintering specimen taken in Llandrindod in 2013. The species was found only in one area of dense hedgerow (Target Note 1a). The species is vulnerable to summer pruning, as eggs are laid on leaves, and these hedgerow areas should be left as unmanaged as possible.

Trichopsocus brincki

An interesting species first discovered in the UK in 2003, which was until then known only from Madeira. It remains unclear whether it has been introduced from there, or has been native to the UK and overlooked until recently (New, 2005). Although still regarded as scarce, it appears to be increasing in numbers, perhaps particularly in Shropshire and Mid Wales, suggesting a recent introduction to the UK. The species was found several times in different areas of the site, particularly on dead branches in mature hedgerows, and is not of conservation concern.

Local (selected species)

Cixius simplex

A single specimen of this lacehopper was collected from the wet meadow area (Target Note 3). This species is generally scarce, with a scattered distribution, and few Welsh records. First Radnorshire record.

Dorytomus dejeani

A local weevil with a widespread distribution through lowland England, but a very limited, coastal distribution in Wales. First Radnorshire record?

NB: This species is difficult to separate from the more common *D. taeniatus*, and additional specimens would help to confirm the identification.

Dorytomus tortrix

A local species found widely in the West Midlands, but only a rare, coastal distribution in Wales. First Radnorshire record.

Kelisia pallidula

A local and generally scarce species found mainly in southeast England, but with a scattering of wider records including Herefordshire. The species feeds exclusively on Carnation Sedge (*Carex panicea*) (Nickel, 2003), and was found at one location with ruderal vegetation, adjacent to the proposed building site (Target Note 14). There are few Welsh records (perhaps only on Anglesey), and this appears to be the first from Radnorshire.

The site is vulnerable to severe disturbance under the proposed plans, but the sedge could reasonably be transplanted to the wetland area; see recommendations below.

Loricula pselaphiformis

A local microphysid bug found on lichen-covered tree branches, where it feeds largely on springtails and mites. The species is short-winged and disperses poorly, and although not threatened either nationally or locally, it remains a good indicator of long-established mature woodland.

Ossiannilssonola callosa

A local and perhaps declining leafhopper that feeds on Sycamore (*Acer pseudoplatanus*). Although not formally listed as Notable, it is now genuinely scarce in my experience, and that of my colleagues. I have previously recorded it only at Dundreggan, in the Scottish Highlands. Extensive sampling of Sycamore in the local area (around Llandrindod) has failed to locate it, and the only Welsh records I am aware of are in the extreme south. First Radnorshire record.

Pinalitus rubricatus (Fig. 1B)

A local plant bug that feeds on various species of spruce (*Picea*). The species is listed by Howe (2004) as not having been recorded in Wales since 1980, and is clearly regionally scarce. As with *Epinotia nanana* (above), the mature Sitka Spruce plantation provides an ideal habitat, and this location is locally and regionally important. First Radnorshire record.

Rathke's Woodlouse (*Trachelipus rathkei*)

A local woodlouse species with a traditional distribution scattered through southeast England, but which was recently discovered near Llandrindod (*personal observation*, 2013). The species appears to have been overlooked in some areas, and may be expanding its range along major river valleys (Steve Gregory, *pers. comm.* 2013). The Mellow Croft record suggests that it is not restricted to river valleys, and has already spread widely across parts of Radnorshire.

Stenus ochropus

A small rove beetle with a very scattered, localised distribution in southern England. The normal habitat is among relatively warm, dry moss or leaf litter, usually on sandy or chalky soils (Lott &

Anderson, 2011), making the Mellow Croft record extremely unusual. A single specimen was collected from a relatively dry, flower-rich meadow (Target Note 12). First Radnorshire record; only one other listed for Wales, from near Mold.

Zonocyba bifasciata (Fig. 1C)

A local leafhopper feeding exclusively on Hornbeam (*Carpinus betulae*). The main distribution is in central England, including scattered records from the rest of England, and south Wales. Although the leafhopper was recorded within the site, along the access road, they were on branches of trees planted outside the boundaries. Planting hornbeam saplings within the site will provide a more secure status for the species at Mellowcroft, as they are likely to colonise new plantings rapidly. First Radnorshire record.

Other species of local interest

Donacia semicuprea (Fig. 1A)

A reed beetle that is frequent and widely-distributed throughout lowland parts of England but is virtually absent from northern and western uplands, including Powys. The species was found in some abundance on the surface of the wildlife pond (Target Note 10). First Radnorshire record?

5. Comparison with adjacent habitats

On 23rd July, 2014, a survey was conducted of the adjacent common and improved pasture for comparison with the results obtained at Mellow Croft itself.

Llandegley Rhos common

Exposed open moorland with acidic, peat-based soil and low-diversity of grasses except along drainage channels and streams; large areas are dominated by Soft Rush (*Juncus effusus*). Gorse (*Ulex europeus*) bushes are common, and are regularly cleared by burning. Heathers and *Potentilla* form low ground cover.

Insect fauna is markedly different from that seen on the Mellow Croft site. There is a typical but generally depauperate community for mixed dry and wet grassland sites, including the leafhoppers *Arocephalus punctum*, *Forcipata citrinella* and *Aphrodes makarovi*. Dense populations of the planthopper *Conomelus anceps* were encountered on Soft Rush, at much higher levels than observed on the Mellow Croft site. Some specialists of disturbed ground were noted, including the plant bug *Trigonotylus ruficornis*. The presence of abundant Gorse introduces an additional host-specific element that is not seen at Mellow Croft, such as *Dictyonota strichnocera*.

An enclosed area of the common with more intensive grazing by sheep but also abundant thistles (various species) was found to be richer in pollinator species than Mellow Croft, with noticeably more butterflies and hoverflies seen, although of the same species. The area included a wet flush that also yielded further hemipteran species associated with wetlands (e.g. *Teratocoris viridis*).

A small mature Larch (*Larix*) plantation with abundant nettle growth at the margins yielded very few different species, but these did include the conifer-feeding plant bug *Atractotomus magnicornis*, which was not found in the Spruce plantation at Mellow Croft.

Improved grazing meadow

An enclosed meadow adjacent (on the south-east side) to Mellow Croft is dominated by a few species of fast-growing grasses (probably *Lolium perenne* and *Alopecurus* sp.). Diversity of insect species was very low, with specialists of improved habitats (e.g. the leafhopper *Macrosteles sexnotatus*) dominating the fauna. Almost all species seen are extremely widespread and abundant,

with the exception of the planthopper *Javesella obscurella*, which is localised.

At the field margin there is a drainage ditch that connects directly to one running along the edge of Mellow Croft. This ditch yielded a more diverse range of common and widespread species that are typical of ruderal vegetation.

Summary of comparative survey

This survey has demonstrated the major difference in insect biodiversity between Mellow Croft and the surrounding land. The improved meadow was, comparatively, of virtually no conservation value, with only common and widespread species present. The common land of Llandegley Rhos hosts interesting species different from those seen in Mellow Croft, but these species are almost certainly widespread over large areas of the rough upland grazing that typifies much of Radnorshire.

The species of conservation interest at Mellow Croft were not encountered on the surrounding land. This supports the interpretation of the site as being of regional significance for the insect fauna, due to a combination of the long-term stability of certain habitats (old hedgerows and wetlands) and to the habitats being suitable for more recent colonisation.

6. Conservation recommendations

The following specific recommendations are presented with regard to conservation of habitats and species on site.

1. Avoid disturbance to the old trees noted as potential bat roosts on the habitat map (Target Notes 17-20, 28).
2. Maintain and avoid disturbance to the wildlife pond (Target Note 8)
3. Maintain or enhance the current drainage patterns into the wetland area (Target Note 2).
4. Remove recently-planted saplings from the main area of this wetland, as this will change the habitat dramatically if they become established.
5. Monitor water quality of output from reedbeds, after construction. If increased nutrients begin to leach into the downstream wetland then this may change the ecology dramatically, and modifications to the system (e.g. planting of additional reeds) may be required.
6. Transplant clumps of *Carex panicea* (Target Note 14) to similar microhabitat within the wetland area, to ensure survival of the population of *Kelisia pallidula*. This should be done in autumn, after adults have died off, and include soil and root mass, as these will host the eggs that will hatch the following year.
7. Do not prune or manage hedgerows (especially at Target Note 1a) more than necessary, or do so only in winter; this will protect species such as *Cacopsylla pruni*, which lay eggs on the leaves but overwinter on conifers.
8. When removing brambles from encroaching onto fields, consider transplanting them to site boundaries in order to thicken hedgerows and encourage pollinators.
9. Encourage a diverse range of wildflowers, especially at Target Note 12, which should not be mowed or grazed if this can be avoided. I understand that some of the meadow areas have already been extensively seeded with a local native wildflower mix.

7. Final comment on ecological impact of proposed plans

The work already conducted at Mellow Croft, aimed at recreating the structure of a traditional smallholding, has enormously increased the biodiversity potential of the site, and helped to preserve its distinctive ecological features. Adding the wildlife pond, and recreating drainage channels to enable the wetland to be more permanent, are highly beneficial. The planting of thousands of trees

and seeding with native wildflower mix can only enhance the local ecology, provided that these are done sensitively, and that where the results would be counter-productive (see recommendation 4, above) then the plans are modified accordingly. I am willing to continue to advise on these matters in future. In the very few cases where the proposed work would have a detrimental affect, this can be easily resolved by transplantation of plants (recommendations 6, 8).

The contrast with adjacent, intensely grazed land is extreme. The smallholding model, applied with sensitivity and knowledge of the local ecology, will encourage the existing biodiversity, and could act as a model for similar land use. I hope to see these plans develop, and would like to continue to monitor the future health of the unique community at Mellow Croft.

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Appendix: records of entomology survey

The table below provides data for all records obtained during the survey, within the Mellow Croft site. Records from the surrounding areas (on 23.vii.2014; see discussion in section 5, above) can be provided on request, but should not be relevant to the planning application. Where species are not identified to species level, this is due to technical difficulty such as early growth stages or difficult groups beyond my knowledge; any such species listed are distinct from all others listed. Locations are given in broad terms, and also with respect to the closest Target Note.

Group	Species	Common Name	Date	nearest Target Note	location
Chilopoda	<i>Lithobius forficatus</i>	Brown Centipede	18/07/2014	12	Top Field
Coleoptera	<i>Agonum thoreyi</i>	a ground beetle	05/06/2014	12	Top Field
Coleoptera	<i>Agriotes obscurus</i>	a click beetle	05/06/2014	15	Treehouse
Coleoptera	<i>Agriotes pallidulus</i>	a click beetle	05/06/2014	12	Top Field
Coleoptera	<i>Altica</i> sp.	a leaf beetle	05/06/2014	2	Wetland
Coleoptera	<i>Altica</i> sp.	a leaf beetle	18/07/2014	25	entrance drive
Coleoptera	<i>Aphidecta oblitterata</i>	Larch Ladybird	18/07/2014	12	Top Field
Coleoptera	Apionidae indet.	a weevil	05/06/2014	14	Treehouse
Coleoptera	<i>Athous haemorrhoidale</i>	a click beetle	05/06/2014	3	Wet meadow
Coleoptera	<i>Cantharis rustica</i>	a soldier beetle	05/06/2014	3	Wet meadow
Coleoptera	<i>Cartodere nodifer</i>	a latrunculid beetle	05/06/2014	14	Treehouse
Coleoptera	<i>Cartodere nodifer</i>	a beetle	18/07/2014	12	Top Field
Coleoptera	<i>Ceutorhynchus pallidactylus</i>	Cabbage Stem Weevil	05/06/2014	3	Wet meadow
Coleoptera	<i>Crepidodera aurata</i>	a flea beetle	18/07/2014	12	Top Field
Coleoptera	<i>Cyphon</i> cf. <i>coarctatus</i>	a beetle	05/06/2014	15	Treehouse
Coleoptera	<i>Cyphon</i> cf. <i>coarctatus</i>	a beetle	18/07/2014	12	Top Field
Coleoptera	<i>Demetrias atricapillus</i>	a ground beetle	18/07/2014	12	Top Field
Coleoptera	<i>Donacia semicuprea</i>	a reed beetle	18/07/2014	10	Wildlife Pond
Coleoptera	<i>Dorytomus dejeani</i>	a weevil	05/06/2014	3	Wet meadow
Coleoptera	<i>Dorytomus tortix</i>	a weevil	05/06/2014	3	Wet meadow
Coleoptera	<i>Epuraea</i> sp.	a flower beetle	18/07/2014	12	Top Field
Coleoptera	<i>Galerucella lineola</i>	a leaf beetle	05/06/2014	5	bottom of Orchid Field
Coleoptera	<i>Gastrophysa viridula</i>	Dock Beetle	05/06/2014	2	Wetland
Coleoptera	<i>Hydrothassa glabra</i>	a leaf beetle	05/06/2014	12	Top Field
Coleoptera	<i>Hydrothassa marginella</i>	a leaf beetle	05/06/2014	3	Wet meadow
Coleoptera	<i>Hydrothassa marginella</i>	a leaf beetle	05/06/2014	2	Wetland
Coleoptera	<i>Hypera plantaginis</i>	a weevil	05/06/2014	12	Top Field
Coleoptera	<i>Hypera plantaginis</i>	a weevil	05/06/2014	2	Wetland
Coleoptera	<i>Hypera plantaginis</i>	a weevil	18/07/2014	12	Top Field
Coleoptera	<i>Leiosoma deflexum</i>	weevil	05/06/2014	14	Treehouse
Coleoptera	<i>Longitarus</i> sp.	a flea beetle	05/06/2014	3	Wet meadow
Coleoptera	<i>Magdalis carbonaria</i>	a weevil	05/06/2014	2	Wetland
Coleoptera	<i>Malthinus flaveolus</i>	a beetle	05/06/2014	5	bottom of Orchid Field
Coleoptera	<i>Meligethes</i> sp.	a pollen beetle	18/07/2014	25	entrance drive
Coleoptera	<i>Mordellus</i> sp.	a tumbling flower beetle	05/06/2014	3	Wet meadow
Coleoptera	<i>Nedus quadrimaculatus</i>	Small Nettle Weevil	05/06/2014	14	Treehouse
Coleoptera	<i>Neocrepidodera transversa</i>	a leaf beetle	18/07/2014	12	Top Field
Coleoptera	<i>Otiorhynchus singulatus</i>	a weevil	05/06/2014	14	Treehouse
Coleoptera	<i>Otiorhynchus singulatus</i>	a weevil	18/07/2014	12	Top Field
Coleoptera	<i>Otiorhynchus sulcatus</i>	Vine Weevil	05/06/2014	9	Fish Pond
Coleoptera	<i>Pelenomus quadrituberculatus</i>	a weevil	18/07/2014	25	entrance drive
Coleoptera	<i>Phratora laticollis</i>	a leaf beetle	18/07/2014	7	Birch woodland

Coleoptera	<i>Phratora vitellinae</i>	a leaf beetle	05/06/2014	3	Wet meadow
Coleoptera	<i>Phyllobius argentatus</i>	a weevil	18/07/2014	7	Birch woodland
Coleoptera	<i>Plateumaris sericea</i>	a reed beetle	05/06/2014	9	Fish Pond
Coleoptera	<i>Polydrusus cervinus</i>	a weevil	05/06/2014	3	Wet meadow
Coleoptera	<i>Propylea quattordecempunctata</i>	Fourteen-Spot Ladybird	05/06/2014	5	bottom of Orchid Field
Coleoptera	<i>Propylea quattordecempunctata</i>	14-spot Ladybird	18/07/2014	12	Top Field
Coleoptera	<i>Pterostichus madidus</i>	a ground beetle	18/07/2014	25	entrance drive
Coleoptera	<i>Rhagonycha fulva</i>	Common Soldier Beetle	05/06/2014	14	Treehouse
Coleoptera	<i>Rhagonycha fulva</i>	Common Soldier Beetle	18/07/2014	12	Top Field
Coleoptera	<i>Rhagonycha fulva</i>	Common Soldier Beetle	18/07/2014	10	Wildlife Pond
Coleoptera	<i>Rhagonycha limbata</i>	a soldier beetle	05/06/2014	14	Treehouse
Coleoptera	<i>Silpha atrata</i>	a burying beetle	18/07/2014	5	bottom of Orchid Field
Coleoptera	<i>Sitona?</i> sp.	a weevil	05/06/2014	5	bottom of Orchid Field
Coleoptera	<i>Stenus bifoveolatus</i>	a rove beetle	05/06/2014	14	Treehouse
Coleoptera	<i>Stenus bimaculatus</i>	a rove beetle	05/06/2014	5	Wetland
Coleoptera	<i>Stenus fulvicornis</i>	a rove beetle	05/06/2014	3	Wet meadow
Coleoptera	<i>Stenus ochropus</i>	a rove beetle	05/06/2014	12	Top Field
Coleoptera	<i>Strophosoma melanogrammum</i>	a weevil	18/07/2014	12	Top Field
Coleoptera	<i>Tachyporus dispar</i> agg.	a rove beetle	05/06/2014	14	Treehouse
Coleoptera	<i>Tachyporus dispar</i> agg.	a rove beetle	18/07/2014	12	Top Field
Coleoptera	chrysomelid indet.	a leaf beetle	05/06/2014	3	Wet meadow
Coleoptera	chrysomelid indet.	a click beetle	05/06/2014	12	Top Field
Collembola	<i>Entomobrya nivalis</i>	a springtail	05/06/2014	3	Wet meadow
Collembola	<i>Entomobrya nivalis</i>	a springtail	18/07/2014	12	Top Field
Collembola	<i>Orchesella cincta</i>	a springtail	05/06/2014	12	Top Field
Collembola	<i>Orchesella cincta</i>	a springtail	18/07/2014	12	Top Field
Collembola	<i>Pogonognathellus longicornis</i>	a springtail	05/06/2014	14	Treehouse
Collembola	<i>Sminthurus viridis</i>	Lucerne Flea	05/06/2014	3	Wet meadow
Collembola	<i>Sminthurus viridis</i>	Lucerne Flea	18/07/2014	12	Top Field
Collembola	<i>Tomocerus minor</i>	a springtail	18/07/2014	12	Top Field
Dermaptera	<i>Forficula auricularia</i>	Common Earwig	05/06/2014	14	Treehouse
Dermaptera	<i>Forficula auricularia</i>	Common Earwig	18/07/2014	12	Top Field
Diptera	<i>Beris vallata</i>	Common Legionnaire Fly	05/06/2014	14	Treehouse
Diptera	<i>Empis trigramma</i>	A dagger-fly	05/06/2014	14	Treehouse
Diptera	<i>Episyrphus balteatus</i>	Marmalade Fly	18/07/2014	12	Top Field
Diptera	<i>Fannia canicularis</i>	Lesser House Fly	05/06/2014	3	Wet meadow
Diptera	<i>Geomyza tripunctata</i>	a fly	18/07/2014	5	bottom of Orchid Field
Diptera	<i>Helophilus pendulus</i>	a hoverfly	05/06/2014	3	Wet meadow
Diptera	<i>Leucozona lucorum</i>	a hoverfly	05/06/2014	3	Wet meadow
Diptera	<i>Limonia phragmitidis</i>	a crane fly	05/06/2014	14	Treehouse
Diptera	<i>Melanostoma scalare</i>	a hoverfly	18/07/2014	12	Top Field
Diptera	<i>Psychoda</i> sp.	a moth-fly	05/06/2014	14	Treehouse
Diptera	<i>Rhingia campestris</i>	a hoverfly	05/06/2014	12	Top Field
Diptera	<i>Sarcophaga</i> sp.	a flesh fly	05/06/2014	3	Wet meadow
Diptera	<i>Scathophaga stercoraria</i>	Yellow Dung Fly	05/06/2014	3	Wet meadow
Diptera	<i>Xylota segnis</i>	a hoverfly	05/06/2014	3	Wet meadow
Diptera	dipteran indet.	a fly	05/06/2014	14	Treehouse
Hemiptera	<i>Agallia consobrina</i>	a leafhopper	18/07/2014	25	entrance drive
Hemiptera	<i>Alebra viridis</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	<i>Alnetoidea alneti</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	<i>Anoscopus albifrons</i>	a leafhopper	18/07/2014	12	Top Field

Hemiptera	<i>Anthocoris confusus</i>	a flower bug	05/06/2014	12	Top Field
Hemiptera	<i>Anthocoris confusus</i>	a flower bug	18/07/2014	12	Top Field
Hemiptera	<i>Anthocoris nemoralis</i>	a flower bug	05/06/2014	28	bottom of Orchid Field
Hemiptera	<i>Anthocoris nemoralis</i>	a flower bug	18/07/2014	12	Top Field
Hemiptera	<i>Anthocoris nemorum</i>	Common Flower Bug	05/06/2014	12	Top Field
Hemiptera	<i>Anthocoris nemorum</i>	Common Flower Bug	18/07/2014	12	Top Field
Hemiptera	<i>Anthocoris nemorum</i>	Common Flower Bug	18/07/2014	28	bottom of Orchid Field
Hemiptera	<i>Aphrophora alni</i>	Alder Spittlebug	18/07/2014	12	Top Field
Hemiptera	<i>Aphrophora alni</i>	Alder Spittlebug	18/07/2014	5	bottom of Orchid Field
Hemiptera	<i>Apolygus spinolai</i>	a plant bug	18/07/2014	25	entrance drive
Hemiptera	<i>Aquarius najas</i>	River Skater	05/06/2014	9	Fish Pond
Hemiptera	<i>Arthaldeus pascuellus</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	<i>Asciodema obsoleta</i>	a plant bug	18/07/2014	12	Top Field
Hemiptera	<i>Baeopelma foersteri</i>	a psyllid	18/07/2014	12	Top Field
Hemiptera	<i>Baeopelma foersteri</i>	a psyllid	18/07/2014	28	bottom of Orchid Field
Hemiptera	<i>Blepharidopterus angulatus</i>	Black-Kneed Capsid	18/07/2014	12	Top Field
Hemiptera	<i>Bryocoris pteridis</i>	Fern Bug	18/07/2014	12	Top Field
Hemiptera	<i>Cacopsylla brunneipennis</i>	a psyllid	05/06/2014	3	Wet meadow
Hemiptera	<i>Cacopsylla melanoneura</i>	a psyllid	05/06/2014	14	Treehouse
Hemiptera	<i>Cacopsylla melanoneura</i>	a psyllid	05/06/2014	2	Wetland
Hemiptera	<i>Cacopsylla melanoneura</i>	a psyllid	18/07/2014	12	Top Field
Hemiptera	<i>Cacopsylla peregrina</i>	a psyllid	05/06/2014	3	Wet meadow
Hemiptera	<i>Cacopsylla peregrina</i>	a psyllid	18/07/2014	12	Top Field
Hemiptera	<i>Cacopsylla pruni</i>	a psyllid	18/07/2014	1a	bottom of Orchid Field
Hemiptera	<i>Cacopsylla pulchra</i>	a psyllid	05/06/2014	12	Top Field
Hemiptera	<i>Cacopsylla</i> sp.	a psyllid	05/06/2014	3	Wet meadow
Hemiptera	<i>Campyloneura virgula</i>	a plant bug	18/07/2014	12	Top Field
Hemiptera	<i>Campyloneura virgula</i>	a plant bug	18/07/2014	7	Birch woodland
Hemiptera	<i>Capsus ater</i>	a plant bug	05/06/2014	3	Wet meadow
Hemiptera	<i>Capsus ater</i>	a plant bug	05/06/2014	12	Top Field
Hemiptera	<i>Cicadella viridis</i>	a leafhopper	05/06/2014	12	Top Field
Hemiptera	<i>Cicadella viridis</i>	a leafhopper Common Green	18/07/2014	12	Top Field
Hemiptera	<i>Cicadella viridis</i>	Leafhopper	18/07/2014	5	bottom of Orchid Field
Hemiptera	<i>Cixius nervosus</i>	a lacehopper	18/07/2014	12	Top Field
Hemiptera	<i>Cixius simplex</i>	a lacehopper	05/06/2014	3	Wet meadow
Hemiptera	<i>Conomelus anceps</i>	a planthopper	18/07/2014	12	Top Field
Hemiptera	<i>Criomorpha albomarginatus</i>	a planthopper	05/06/2014	14	Treehouse
Hemiptera	<i>Criomorpha albomarginatus</i>	a planthopper	18/07/2014	12	Top Field
Hemiptera	<i>Criomorpha albomarginatus</i>	a planthopper	18/07/2014	1a	bottom of Orchid Field
Hemiptera	<i>Dicranotropis hamata</i>	a planthopper	05/06/2014	3	Wet meadow
Hemiptera	<i>Dicranotropis hamata</i>	a planthopper	05/06/2014	9	Fish Pond
Hemiptera	<i>Dicranotropis hamata</i>	a planthopper	05/06/2014	12	Top Field
Hemiptera	<i>Dicranotropis hamata</i>	a planthopper	05/06/2014	1a	bottom of Orchid Field
Hemiptera	<i>Dicranotropis hamata</i>	a planthopper	18/07/2014	12	Top Field
Hemiptera	<i>Drymus</i> sp.	a groundbug	05/06/2014	14	Treehouse
Hemiptera	<i>Drymus sylvaticus</i>	a ground bug	18/07/2014	12	Top Field
Hemiptera	<i>Dryophilocoris flavoquadrimaculatus</i>	a plant bug	05/06/2014	28	bottom of Orchid Field
Hemiptera	<i>Edwardsiana crateagi</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	<i>Edwardsiana flavescens</i>	a leafhopper	18/07/2014	1a	bottom of Orchid Field
Hemiptera	<i>Edwardsiana geometrica</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	<i>Elasmotethus interstinctus</i>	Birch Shieldbug	05/06/2014	3	Wet meadow

Hemiptera	<i>Elasmotherus interstinctus</i>	Birch Shieldbug	18/07/2014	7	Birch woodland
Hemiptera	<i>Euceraphis betulae</i>	Silver Birch Aphid	18/07/2014	7	Birch woodland
Hemiptera	<i>Eupteryx aurata</i>	Potato Leafhopper	18/07/2014	25	entrance drive
Hemiptera	<i>Eupteryx urticae</i>	Nettle Leafhopper	05/06/2014	2	Wetland
Hemiptera	<i>Eupteryx urticae</i>	Nettle Leafhopper	18/07/2014	25	entrance drive
Hemiptera	<i>Eurhadina concinna</i>	a leafhopper	18/07/2014	28	bottom of Orchid Field
Hemiptera	<i>Eurhadina loewii</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	<i>Euscelis incisus</i>	a leafhopper	05/06/2014	3	Wet meadow
Hemiptera	<i>Euscelis incisus</i>	a leafhopper	05/06/2014	5	bottom of Orchid Field
Hemiptera	<i>Euscelis incisus</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	<i>Florodelphax leptosoma</i>	a planthopper	05/06/2014	5	bottom of Orchid Field
Hemiptera	<i>Gerris lacustris</i>	a pond skater	05/06/2014	9	Fish Pond
Hemiptera	<i>Hyledelphax elegantulus</i>	a planthopper	05/06/2014	1a	bottom of Orchid Field
Hemiptera	<i>Iassus lanio</i>	a leafhopper	18/07/2014	28	bottom of Orchid Field
Hemiptera	<i>Idiocerus confusus</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	<i>Javesella discolor</i>	a planthopper	05/06/2014	3	Wet meadow
Hemiptera	<i>Javesella dubia</i>	a planthopper	05/06/2014	14	Treehouse
Hemiptera	<i>Javesella dubia</i>	a planthopper	18/07/2014	12	Top Field
Hemiptera	<i>Javesella dubia</i>	a planthopper	18/07/2014	7	Birch woodland
Hemiptera	<i>Javesella pellucida</i>	a planthopper	05/06/2014	14	Treehouse
Hemiptera	<i>Javesella pellucida</i>	a planthopper	05/06/2014	3	Wet meadow
Hemiptera	<i>Javesella pellucida</i>	a planthopper	18/07/2014	12	Top Field
Hemiptera	<i>Kosswigianella exigua</i>	a planthopper	05/06/2014	12	Top Field
Hemiptera	<i>Kosswigianella exigua</i>	a planthopper	05/06/2014	1a	bottom of Orchid Field
Hemiptera	<i>Kybos</i> sp.	a leafhopper	18/07/2014	28	bottom of Orchid Field
Hemiptera	<i>Kybos</i> sp.	a leafhopper	18/07/2014	7	Birch woodland
Hemiptera	<i>Leptopterna dolabrata</i>	Meadow Plant Bug	05/06/2014	14	Treehouse
Hemiptera	<i>Loricula elegantula</i>	a microphysid bug	18/07/2014	7	Birch woodland
Hemiptera	<i>Loricula pselaphiformis</i>	a microphysid bug	18/07/2014	1a	bottom of Orchid Field
Hemiptera	<i>Lygocoris pabulinus</i>	Common Green Capsid	18/07/2014	12	Top Field
Hemiptera	<i>Macrosteles laevis</i>	a leafhopper	05/06/2014	3	Wet meadow
Hemiptera	<i>Macrosteles sexnotatus</i>	a leafhopper	05/06/2014	3	Wet meadow
Hemiptera	<i>Macrosteles sexnotatus</i>	a leafhopper	05/06/2014	5	bottom of Orchid Field
Hemiptera	<i>Macrosteles sexnotatus</i>	a leafhopper	05/06/2014	2	Wetland
Hemiptera	<i>Macrosteles sexnotatus</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	<i>Macustus grisescens</i>	a leafhopper	05/06/2014	3	Wet meadow
Hemiptera	<i>Macustus grisescens</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	Miridae indet.	a plant bug	05/06/2014	14	Treehouse
Hemiptera	<i>Muellerianella</i> sp	a planthopper	18/07/2014	12	Top Field
Hemiptera	<i>Nabis flavomarginatus</i>	Broad Damselbug	18/07/2014	5	bottom of Orchid Field
Hemiptera	<i>Nabis limbatus</i>	Marsh Damselbug	18/07/2014	12	Top Field
Hemiptera	<i>Nabis limbatus</i>	Marsh Damselbug	18/07/2014	5	bottom of Orchid Field
Hemiptera	<i>Nabis rugosus</i>	Common Damselbug	05/06/2014	14	Treehouse
Hemiptera	<i>Nabis rugosus</i>	Common Damselbug	05/06/2014	12	Top Field
Hemiptera	<i>Neolygus contaminatus</i>	a plant bug	18/07/2014	12	Top Field
Hemiptera	<i>Neolygus viridis</i>	a plant bug	18/07/2014	12	Top Field
Hemiptera	<i>Neophilaenus lineatus</i>	a froghopper	18/07/2014	12	Top Field
Hemiptera	<i>Oncopsis flavicollis</i>	a leafhopper	05/06/2014	28	bottom of Orchid Field
Hemiptera	<i>Oncopsis flavicollis</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	<i>Oncopsis flavicollis</i>	a leafhopper	18/07/2014	7	Birch woodland
Hemiptera	<i>Oncopsis tristis</i>	a leafhopper	05/06/2014	3	Wet meadow
Hemiptera	<i>Oncopsis tristis</i>	a leafhopper	18/07/2014	12	Top Field

Hemiptera	<i>Oncopsis tristis</i>	a leafhopper	18/07/2014	7	Birch woodland
Hemiptera	<i>Orthotylus flavinervis</i>	a plant bug	18/07/2014	28	bottom of Orchid Field
Hemiptera	<i>Ossiannilssonola callosa</i>	a leafhopper	18/07/2014	16	Top Field
Hemiptera	<i>Paraliburnia clypealis</i>	a planthopper	05/06/2014	2	Wetland
Hemiptera	<i>Pentatoma rufipes</i>	Forest Bug	18/07/2014	16	Top Field
Hemiptera	<i>Pentatoma rufipes</i>	Forest Bug	18/07/2014	28	bottom of Orchid Field
Hemiptera	<i>Philaenus spumarius</i>	Common Froghopper	05/06/2014	14	Treehouse
Hemiptera	<i>Philaenus spumarius</i>	Common Froghopper	18/07/2014	12	Top Field
Hemiptera	<i>Phytocoris populi</i>	a plant bug	18/07/2014	7	Birch woodland
Hemiptera	<i>Phytocoris ulmi</i>	a plant bug	18/07/2014	5	bottom of Orchid Field
Hemiptera	<i>Pinalitus cervinus</i>	a plant bug	05/06/2014	2	Wetland
Hemiptera	<i>Pinalitus rubricatus</i>	a plant bug	18/07/2014	6	Top Field
Hemiptera	<i>Pithanus maerkeli</i>	a plant bug	05/06/2014	12	Top Field
Hemiptera	<i>Pithanus maerkeli</i>	a plant bug	18/07/2014	12	Top Field
Hemiptera	<i>Plagiognathus arbustorum</i>	a plant bug	18/07/2014	12	Top Field
Hemiptera	<i>Plagiognathus arbustorum</i>	a plant bug	18/07/2014	28	bottom of Orchid Field
Hemiptera	<i>Plagiognathus arbustorum</i>	a plant bug	18/07/2014	25	entrance drive
Hemiptera	<i>Populicerus nitidissimus</i>	a leafhopper	18/07/2014	28	bottom of Orchid Field
Hemiptera	<i>Populicerus populi</i>	a leafhopper	18/07/2014	7	Birch woodland
Hemiptera	<i>Psallus lepidus</i>	a plant bug	18/07/2014	12	Top Field
Hemiptera	<i>Psylla alni</i>	a psyllid	18/07/2014	28	bottom of Orchid Field
Hemiptera	<i>Psyllopsis fraxinicola</i>	a psyllid	18/07/2014	12	Top Field
Hemiptera	<i>Rhabdomiris striatellus</i>	a plant bug	05/06/2014	28	bottom of Orchid Field
Hemiptera	<i>Rhinocola aceris</i>	a psyllid	05/06/2014	19	Top Field
Hemiptera	<i>Speudotettix subfuscus</i>	a leafhopper	18/07/2014	7	Birch woodland
Hemiptera	<i>Stenodema calcarata</i>	a grass bug	05/06/2014	9	Fish Pond
Hemiptera	<i>Stenodema holsata</i>	a grass bug	05/06/2014	14	Treehouse
Hemiptera	<i>Stenodema holsata</i>	a grass bug	05/06/2014	3	Wet meadow
Hemiptera	<i>Stenodema holsata</i>	a grass bug	18/07/2014	12	Top Field
Hemiptera	<i>Stenodema holsata</i>	a grass bug	18/07/2014	5	bottom of Orchid Field
Hemiptera	<i>Stenodema laevigata</i>	a grass bug	05/06/2014	3	Wet meadow
Hemiptera	<i>Stenotus binotatus</i>	a plant bug	18/07/2014	12	Top Field
Hemiptera	<i>Stenotus binotatus</i>	a plant bug	18/07/2014	5	bottom of Orchid Field
Hemiptera	<i>Streptanus marginatus</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	<i>Tachycixius pilosus</i>	a lacehopper	05/06/2014	3	Wet meadow
Hemiptera	<i>Temnostethus gracilis</i>	a flower bug	05/06/2014	19	Top Field
Hemiptera	<i>Temnostethus gracilis</i>	a flower bug	18/07/2014	19	Top Field
Hemiptera	<i>Thamnotettix confinis</i>	a leafhopper	18/07/2014	12	Top Field
Hemiptera	<i>Trioxa galii</i>	a psyllid	18/07/2014	12	Top Field
Hemiptera	<i>Trioxa galii</i>	a psyllid	18/07/2014	5	bottom of Orchid Field
Hemiptera	<i>Trioxa remota</i>	a psyllid	05/06/2014	14	Treehouse
Hemiptera	<i>Trioxa urtica</i>	a psyllid	05/06/2014	2	Wetland
Hemiptera	<i>Trioxa urticae</i>	Nettle Psyllid	18/07/2014	12	Top Field
Hemiptera	<i>Trioxa urticae</i>	Nettle Psyllid	18/07/2014	1a	bottom of Orchid Field
Hemiptera	<i>Trioxa urticae</i>	Nettle Psyllid	18/07/2014	25	entrance drive
Hemiptera	<i>Typhlocyba quercus</i>	a leafhopper	18/07/2014	28	bottom of Orchid Field
Hemiptera	<i>Zonocyba bifasciata</i>	a leafhopper	18/07/2014	25	entrance drive
Hymenoptera	<i>Bombus hypnorum</i>	Tree Bumblebee	05/06/2014	3	Wet meadow
Hymenoptera	<i>Bombus hypnorum</i>	Tree Bumblebee	05/06/2014	12	Top Field
Hymenoptera	<i>Bombus lucorum</i>	White-Tailed Bumblebee	05/06/2014	3	Wet meadow
Hymenoptera	<i>Bombus pascuorum</i>	Common Carder Bee	05/06/2014	3	Wet meadow
Hymenoptera	<i>Dolerus</i> sp.	a sawfly	05/06/2014	14	Treehouse

Hymenoptera	<i>Myrmica rubra</i>	Common Red Ant	05/06/2014	14	Treehouse
Hymenoptera	<i>Tenthredopsis nassata</i>	a sawfly	05/06/2014	3	Wet meadow
Isopoda	<i>Oniscus asellus</i>	Common Shiny Woodlouse	18/07/2014	12	Top Field
Isopoda	<i>Philoscia muscorum</i>	Common Striped Woodlouse	05/06/2014	14	Treehouse
Isopoda	<i>Philoscia muscorum</i>	Common Striped Woodlouse	18/07/2014	12	Top Field
Isopoda	<i>Porcellio scaber</i>	Common Rough Woodlouse	05/06/2014	3b	Wet meadow
Isopoda	<i>Trachelipus rathkei</i>	a woodlouse	18/07/2014	5	bottom of Orchid Field
Isopoda	<i>Trachelipus rathkei</i>	a woodlouse	18/07/2014	12	Top Field
Isopoda	<i>Trichoniscus pusillus</i> agg.	Common Pygmy Woodlouse	05/06/2014	12	Top Field
Lepidoptera	<i>Anthophila fabriciana</i>	Nettle-tap	05/06/2014	3b	Wet meadow
Lepidoptera	<i>Aphantopus hyperantus</i>	Ringlet	18/07/2014	12	Top Field
Lepidoptera	<i>Argyresthia brockeella</i>	a micromoth	18/07/2014	12	Top Field
Lepidoptera	<i>Celypha lacunana</i>	a micromoth	05/06/2014	12	Top Field
Lepidoptera	<i>Epinotia nanana</i>	a micromoth	18/07/2014	19	Top Field
Lepidoptera	<i>Glyphipterix thrasonella</i>	a micromoth	05/06/2014	14	Treehouse
Lepidoptera	<i>Maniola jurtina</i>	Meadow Brown	18/07/2014	12	Top Field
Lepidoptera	<i>Micropterix aureatella</i>	a micromoth	05/06/2014	3b	Wet meadow
Lepidoptera	<i>Nepticulidae</i> indet.	a micromoth	05/06/2014	5	bottom of Orchid Field
Lepidoptera	<i>Pandemis cerasana</i>	Barred Fruit Tree Tortix	18/07/2014	7	Birch woodland
Lepidoptera	<i>Pieris napi</i>	Green-Veined White	05/06/2014	3	Wet meadow
Lepidoptera	<i>Thymelicus sylvestris</i>	Small Skipper	18/07/2014	12	Top Field
Lepidoptera	<i>Thymelicus sylvestris</i>	Small Skipper	18/07/2014	5	bottom of Orchid Field
Lepidoptera	<i>Xanthorhoe montanata</i>	Silver-Ground Carpet	05/06/2014	3	Wet meadow
Lepidoptera	<i>Zygaena filipendulae</i>	Six-Spot Burnet	05/06/2014	12	Top Field
Mecoptera	<i>Panorpa</i> sp.	a scorpionfly	05/06/2014	3b	Wet meadow
Mecoptera	<i>Panorpa</i> sp.	a scorpionfly	05/06/2014	28	bottom of Orchid Field
Neuroptera	Coniopterygidae indet.	a dustywing	18/07/2014	25	entrance drive
odonata	<i>Enallagma cyathigerum</i>	Common Blue Damselfly	05/06/2014	3b	Wet meadow
Odonata	<i>Enallagma cyathigerum</i>	Common Blue Damselfly	18/07/2014	10	Wildlife Pond
odonata	<i>Lestes sponsa</i>	Emerald Damselfly	18/07/2014	10	Wildlife Pond
odonata	<i>Pyrrhosoma nympha</i>	Large Red Damselfly	05/06/2014	10	Wet meadow
Odonata	<i>Pyrrhosoma nympha</i>	Large Red Damselfly	18/07/2014	10	Wildlife Pond
Opiliones	<i>Dicranopalpis ramosus</i>	a harvestman	18/07/2014	7	Birch woodland
Opiliones	<i>Mitopus morio</i>	a harvestman	18/07/2014	12	Top Field
Plecoptera	<i>Siphonoperla torrentium</i>	a stonefly	05/06/2014	14	Treehouse
Psocoptera	<i>Ectopsocus briggsi</i>	a barkfly	18/07/2014	7	Birch woodland
Psocoptera	<i>Ectopsocus petersi</i>	a barkfly	05/06/2014	3b	Wet meadow
Psocoptera	<i>Ectopsocus petersi</i>	a barkfly	18/07/2014	12	Top Field
Psocoptera	<i>Ectopsocus petersi</i>	a barkfly	18/07/2014	7	Birch woodland
Psocoptera	<i>Enderleinella obsoleta</i>	a barkfly	18/07/2014	19	Top Field
Psocoptera	<i>Mesopsocus immunis</i>	a barkfly	05/06/2014	14	Treehouse
Psocoptera	<i>Mesopsocus immunis</i>	a barkfly	05/06/2014	2	Wetland
Psocoptera	<i>Peripsocus phaeopterus</i>	a barkfly	18/07/2014	19	Top Field
Psocoptera	<i>Peripsocus subfasciatus</i>	a barkfly	18/07/2014	19	Top Field
Psocoptera	<i>Trichopsocus brincki</i>	a barkfly	18/07/2014	19	Top Field
Trichoptera	<i>Agrypnia varia</i>	a caddisfly	05/06/2014	14	Treehouse

