INVERTEBRATE MONITORING OF TROOPERS HILL, BRISTOL

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Cover photograph: *Dasystoma salicella* captured on 11 April.

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1 Summary

- The four days of sampling produced a diversity of 321 species, a good diversity for a small site of this habitat type, more than found on any of the three previous surveys.
- Of these 30 (9.3%) are considered here as Key Species, four of them of RDB quality.
- This is a high quality, better than found in 2000, essentially the same as in 2006 but down on the 2007 result.
- While many key species are well known from Troopers Hill, several additions were recorded, notably *Megalonotus dilatatus*, *Dasystoma salicella* and *Mompha sturnipennella*.
- Overall invertebrate quality remains high, but there is reason to be concerned about the abundance of some Aculeates, with a lower proportion of these recorded than in any of the previous three surveys.
- There is no obvious reason for the decline in some Aculeates, but it will be worth monitoring flower abundance.
- Broom clearance has gone too far and some re-establishment should be considered.
- Clearing more adjacent woodland where scrub can develop can compensate for loss of scrub on grassland areas.
- Further monitoring within six years will be highly desirable.

2 Introduction

Troopers Hill is a small area of flower rich grassland developed on the very poor soils left over after metal mining and smelting and the quarrying of Pennant Sandstone. It has been saved from development by its steep topography and from succession to woodland by the thin and probably toxic nature of the substrate. It was formerly known for its colony of Grayling *Hipparchia semele* (not seen for many years and certainly extinct), which was one of the primary reasons for Troopers Hill gaining its status as a Local Nature Reserve. More recently its great importance for less well-known insects, particularly Aculeate Hymenoptera and the Dotted beefly *Bombylius discolor*, has been recognised. Although there had been some casual recording of these less well-known invertebrates, the first systematic survey was in 2000. This was followed up by a similar surveys in 2006 and 2007. The present survey builds on these three surveys, expanding the taxonomic range of recorded invertebrates and assessing their conservation importance in a national and local context.

3 Survey Methodology

3.1 Sampling Techniques

On all four visits all the areas of open grassy and bushy areas were sampled using a sweep-net. Greatest effort was made in the areas of flower-rich grassland, heathland and especially steep south-facing slopes with exposed substrate. Woodland edge and patches of broom were also samples as these have been shown to be important on previous surveys.

Sweep-netting with a 40 cm diameter white-bag net was the main technique used. The net was swept steadily from side to side as one paces steadily through the grass, herbage or scrub foliage. Specimens were extracted from the net with a pooter or, in the case of larger specimens, individually potted in 30ml soda glass tubes. When sampling was completed or the pooter became too full the contents were killed with ethyl acetate then transferred to 30ml soda glass tubes together with a data label.

Additionally a limited amount of ground searching was done in the open, sparsely vegetated areas, by looking under rocks and other debris.

3.2SAMPLE TIMING

The site was visited on four occasions covering the most important periods for this open, grassy site from early spring to late summer. The first visit on 11 April was early enough to sample the very early flying species that this site is known for, notably *Bombus discolor* and several Aculeate species. The second visit on 31 May was timed to sample late spring and early summer species. On 3 July invertebrate diversity is at its peak with most of the summer hymenoptera and other groups on the wing. The final visit on 15 August was able to sample late summer species such as those associated with flowering heaths.

3.3CONSTRAINTS

Every attempt was made to visit in sunny, dry conditions, and on the four visits the weather was mostly dry and at least partially sunny. However, on the April visit the ambient temperature was lower than ideal even for this early date. In May lack of sun in the morning was less than optimal, but it was warm and sunny in the afternoon. The 3 July visit was in ideal warm, sunny conditions. Again on 15 August conditions were close to ideal, but a strong westerly wind made sampling difficult in exposed areas.

3.4IDENTIFICATION

Where practical, invertebrates were identified in the field but wherever the slightest doubt existed, one or more specimens were collected for more detailed scrutiny. To achieve rigorously accurate identifications, specimens were identified using the author's own library and entomological collection. Where these proved insufficient, specimens were submitted to relevant experts. Selected specimens have been retained in the author's personal collection as vouchers.

3.5TAXONOMIC COVERAGE

It is desirable that as wide a taxonomic range as possible is identified, in order to sample numerous ecological types, i.e. invertebrates with widely differing natural histories. As there was only a limited amount of time available for identification, it was important to name the more readily identified groups which do not require very time consuming techniques or are out with the experience of the worker.

The following orders and families of invertebrates were named to species.

Araneae – Spiders

Odonata - Dragonflies and Damselflies

Orthoptera – Grasshoppers and crickets

Dermaptera – earwigs

Hemiptera, Auchenorrhyncha - Froghoppers, Leafhoppers and Planthoppers (excluding females of difficult genera)

Hemiptera, **Heteroptera - True Bugs** (excluding smaller Miridae)

Lepidoptera – Butterflies and Moths

Coleoptera – **Beetles** (all except small Aleocharine rove beetles and other very small obscure families)

Diptera - True Flies (except, Cecidomyiidae, Chironomidae, Ceratopogonidae, Simulidae, Phoridae, Sphaeroceridae, and females of some groups which are not identifiable).

Hymenoptera – Sawflies, ants, wasps and bees.

3.6 ANALYSIS

The quality of the site for invertebrates has been assessed with reference to the species found which are considered to be nationally scarce or rare by the various Natural England Commissioned Reports published by JNCC (e.g. Falk 1991a; Falk 1991b; Hyman, 1992) and subsequently Natural England. These reviews place all nationally scarce species into categories according to their degree of rarity and their vulnerability to extinction and are accepted as the "official" JNCC/NE designations (see Appendix 1). The more recent ones also assess taxa with reference to IUCN threat categories.

Since the first reviews were published in the 1990's selected families have been updated and this process is ongoing. But this still leaves many groups (e.g. Tipulidae and Sciomyzidae) where statuses have remained unchanged for nearly 30 years while other families (e.g. Larger Brachycera Drake 2017) have been updated very recently. For this reason, in order to facilitate the greatest consistency with earlier surveys, species that were included in earlier reviews, but have lost their status recently, are included in the analysis. These species, no longer considered of conservation concern, are indicated as such in the species accounts. In addition, a number of species that still have official national status but are clearly much more frequent than formerly, and will probably have their status removed when their family is updated, are indicated as such.

Additionally an attempt has been made to gauge the value of the site within a local and regional context. Many of the Nationally Scarce species are also very uncommon in a local or regional context. Also many species which do not merit inclusion in "The reviews of scarce insects" are none-the-less scarce within the region. Biodiversity Action Plan and Amber List species are important here, although the BAP species are heavily skewed towards the Lepidoptera.

As a simple and readily comparable indication of quality, the proportion of Nationally Scarce and RDB species of the total diversity is calculated. The same is done just for the rarest taxa with RDB status. Depending on the habitat type, a proportion of scarce/RDB between 3-5% needs to be exceeded before it can be safely concluded that the site has some conservation significance. Very high quality sites of national importance will have a proportion close to or exceeding 10% Nationally Scarce/RDB species.

4 Results

4.1 OVERALL RESULTS

The survey identified 321 species of invertebrate (Appendix 2), a good diversity for four days of sampling over the season, especially given the small size of the site dominated by habitats that are not normally very diverse. A broad range of invertebrate groups was covered to a greater or lesser extent and the species list includes representatives of the following groups: spiders, dragonflies & damselflies, grasshoppers, crickets & ground hoppers, earwigs, true bugs, froghoppers, planthoppers & leafhoppers, moths, butterflies, beetles, true flies, sawflies, ants, wasps and bees. The main technique of sweep-netting was most efficient at sampling flying insects with Diptera found in the greatest number (98 species, 31%). The second largest group found was Hymenoptera (83 species, 26%), considerably better than found on most surveys highlighting the importance of Troopers Hill for bees wasps and ants. Third most diverse was Coleoptera (55 species 17%), then Lepidoptera (43 species 13%) followed by Hemiptera (25 species 7.8%),

Of the 321 species identified by this survey, 30 (9.3%) are considered here as Key Species (defined in section 3.6). 9.3% is a relatively high proportion of scarce and rare species, but entirely expected from this site and in line with previous surveys. This result is very similar to the 2000 survey when 9.5% scarce species were found, better than the 2006 survey when the result was 8.3%, although not as good as the very high result in 2007 when 11.5% scarce species were recorded. Three of these results are just a little more than 1% point apart so well

within the range of variability expected for this kind of survey. Even the very good result found in 2007 is only about 3% points better, so possibly just a chance results, but a large enough discrepancy to raise some concern. The present survey is a larger sample that taken in any of the previous surveys, 60 more species than recorded in 2007, so likely to be more robust than previous surveys. The number of RDB species found (4 species 1.2%) is a rather disappointing result producing the lowest proportion of any of the four surveys.

Table 1 Comparison between surveys

year	Total	Scarce	RDB	%Scarce	%RDB	days
Troopers Hill 2007	262	30	6	11.5	2.3	4
Troopers Hill 2000	137	13	3	9.5	2.2	3
Troopers Hill 2019	321	30	4	9.3	1.2	4
Troopers Hill 2006	276	23	5	8.3	1.8	4.5

An analysis of the key species found reveals that several are not any longer of great conservation concern. In **Table 2** below 10 species have been highlighted in grey as no longer of national conservation status despite some still having this status officially. These are species that have significantly increased in range and numbers in recent years, possibly due to more favourable climatic conditions, or were much overlooked in the past and have subsequently been shown to be commoner than thought. This proportion of scarce species that are getting commoner is about 30%, which is a very typical finding. Eight species highlighted in yellow in the species column really do merit attention as they are judged still to be of national conservation significance, and often also very rare in the Bristol region. Many of these, such as *Gargara genistae*, *Micropeza lateralis*, *Aporus unicolor* and *Andrena humilis*, are already known from Troopers Hill and very important within a regional context. Others such as *Episinus truncatus*, *Megalonotus dilatatus*, *Dasystoma salicella* and *Mompha sturnipennella* are either very rare or unknown in the region so significant additions to the known importance of Troopers Hill for invertebrate diversity and quality within Bristol.

Table 2 Summary of scarce species.

Species	**National Status**	**current national status**	**Bristol region status**
Episinus truncatus	**Nationally Scarce b**	Very local and confined to south	Rare and confined to S-facing slope of Avon
Metrioptera roeselii	**Nationally Scarce b**	Much increased in range and no longer of conservation concern	Well established across region in suitable habitat.
Forficula lesnei	**Nationally Scarce b**	Increasingly recorded and likely to be overlooked	Well established especially N Somerset
Gargara genistae	**Nationally Scarce b**	Seems to be exceedingly local and rarely recorded	Only known from Troopers Hill in region, at least recently
Megalonotus dilatatus	**Nationally Scarce b**	Widespread in south but very local	All local records appear to be old, and none within Bristol region.
Ectoedemia heringella	**Nationally Scarce b**	Recent colonist now spreading north and west	Still local in region but likely to become frequent.
Dasystoma salicella	**Nationally Scarce b**	Very local, possibly overlooked because of early flight period	Rare, first Bristol record for many years.
Mompha sturnipennella	**Nationally Scarce b**	Very local and rarely recorded	New for Bristol region and vc34
Agrilus sinuatus	**Nationally Scarce a**	Local and elusive but probably frequent where habitat present.	Now well recorded in region.
Anobium inexspectatum	**Nationally Scarce b**	Local but increasingly frequent, perhaps no longer of any conservation concern	Well recorded locally given the difficulty of identification.

Cryptocephalus aureolus	**(Nationally Scarce b) None**	Local but often common in suitable habitat, no longer considered to be of conservation concern.	Numerous colonies locally but Troopers Hill important within city context.
Chorisops nagatomii	**Nationally Scarce**	Increasingly well recorded, possibly no longer of conservation concern.	Frequent locally with many known sites.
Bombylius discolor	**Nationally Scarce**	Although being recorded with increasing frequency, still local and confined to vulnerable sites.	Numerous colonies locally but Troopers Hill most important in city.
Cheilosia soror	**Nationally Scarce**	A woodland species, widespread but local	Not infrequent locally
Volucella zonaria	**Nationally Scarce**	A rapidly spreading species , frequently recorded in S England	Frequent locally especially in city
Eudorylas zermattensis	**(Nationally Scarce) None**	Widespread but local and little recorded, overlooked and misidentified	Relatively few records locally but becoming more frequent.
Micropeza lateralis	**Nationally Scarce**	Widespread but local in S England and S Wales	Troopers Hill seems to be only site for this species in region.
Acanthiophilus helianthi	**Nationally Scarce**	Local but seems to be getting commoner very recently.	Still very few records, nearly all of them recent.
Campiglossa malaris	**RDBK**	Much commoner than formerly and spreading rapidly	A recent arrival in region but spreading rapidly.
Sapromyza quadricincta	**Nationally Scarce**	Local in S Britain, possibly under recorded	Few records locally but a couple of them recently
Blaesoxipha plumicornis	**Nationally Scarce (RDB3)**	Very scarce and apparently declined, but perhaps showing signs of recovery recently	Only second local record and first for city.
Cistogaster globosa	**RDB1 (RDB2)**	Formerly very rare, shown rapid expansion recently. National status should be downgraded	Several local records on favoured habitat.
Phytomyptera nigrina	**(Nationally Scarce)**	Widespread but very local, apparently becoming more frequent	Few records locally but known from Avon Gorge.
Aporus unicolor	**Nationally Scarce a**	Very local in S England and S Wales with evidence of decline	Known from three sites locally of which Troopers Hill one of the most important.
Gorytes laticinctus	**RDB3**	Until recently rare and confined to SE Britain. Rapid increase in range in last few years.	Recorded in Bristol region for first time this year with several examples reported.
Andrena humilis	**Nationally Scarce b**	Widespread but much less frequent than formerly	Several local colonies of which Troopers Hill one of the most important
Lasioglossum malachurum	**Nationally Scarce b**	After a period of rarity much increased in range recently	Still few records in region but likely to be under recorded
Nomada fucata	**Nationally Scarce a**	Very local in S England and S Wales with evidence of decline	Numerous local colonies known with Troopers Hill important within city
Nomada lathburiana	**RDB3**	Very local in S England and S Wales with evidence of decline	Numerous local colonies known with Troopers Hill important within city
Sphecodes crassus	**Nationally Scarce b**	Widespread, possibly overlooked and becoming commoner	Well distributed with numerous records in Somerset but very rare in Gloucestershire

5 Key Species

5.1 RED DATA BOOK

5.1.1 *Campiglossa malaris* RDBK

This attractive fruit-fly with patterned wings was not long ago a great rarity in Britain only known from the far east of Kent having been added to the British list in 1974 (Clemons 1996).

Over the next 8 years it reached the eastern outskirts of London (Clemons 2004), so its arrival this far west in good numbers represents a veritable explosion in range. First occurred in the Bristol region in 2008 and now well established here and west into South Wales (pers. obs.). To date usually found in coastal grassland where its foodplant, Ragwort, is abundant, but now frequently on "brown-field" sites and abandoned pasture. Adults found in July and August. Swept in July.

5.1.2 *Cistogaster globosa* RDB1 (RDB2)

This attractive little Parasitoid fly is known from a few localities in southern England: Wilts; Hants; Surrey; Berks (Falk & Pont in prep.). Just recently it has been found at many more sites including in Wales (Howe & Woodman 2001; pers.obs.) so it seems to be doing well at the moment hence the proposal in a forthcoming review to downgrade its status from RDB1 to RDB2. It seems probable that it will eventually lose its RDB status and be graded at Nationally Scarce. In Gloucestershire it was recorded for the first time in 1999 (Alexander 1999b) and in Somerset in 2001 with several localities now known including Troopers Hill where it was first found in 2006 (pers.obs). Frequents calcareous downland and grassland where it parasitises hemipteran bug *Aelia acuminata* the Bishops Mitre. Adults recorded from June to September. Swept in May and August.

5.1.3 *Gorytes laticinctus* RDB3

This black and yellow solitary wasp is distributed across south-coast counties from east Devon to Kent and in East Anglia and north to Lincolnshire. In the west it is known inland in Wiltshire, and from Somerset in 2016 (pers. obs.) Very recently there has been a remarkable upsurge in records of this wasp including records in Bristol and South Wales. Usually associated with rough vegetation such as brambles in open situations (heathland, scrub, coastal dunes, coastal landslips and soft rock cliffs), quarries and occasionally gardens. Typically observed running over brambles and other low herbage. Nesting occurs in light soils, the cells being stocked with auchenorhynchus bugs such as *Philaenus spumarius*, *Cercopis* spp. and *Aphrophora alni*. Visits umbellifers such as wild parsnip (*Pastinaca sativa*), carrot (*Daucus carota*), hogweed (*Heracleum sphondylium*) and water-dropworts (*Oenanthe* sp.). Adults found from mid-June to mid-August (http://www.bwars.com, Falk 1991a). Swept in August.

5.1.4 *Nomada lathburiana* RDB3

This nomad bee is widely distributed in southern England and Wales north to Yorkshire. It has undergone a considerable decline nationally, especially in lowland sites, but appears to be coming back. Locally there are no old records despite its host being common in a couple of areas in Somerset (Perkins 1924). Recently it has become well established in Gloucestershire and especially north Somerset (Alexander 1999a) and has been well known at Troopers Hill since 2000 (pers. obs.). Favours a variety of habitats including open woodland, chalk grassland, coastal landslips and moorland edge. It is a brood parasite of the mining bee *Andrena cineraria* which is also commoner than formerly. *N. lathburiana* is on the wing from April to June (Falk 1991a). Several noted in April.

5.2 NATIONALLY SCARCE

5.2.1 *Episinus truncatus* Nationally Scarce b

This is very characteristic spider with a truncate tip to the abdomen is usually associated with southern heathlands. It is confined to the south of England where it is known from Cornwall to Sussex and north to Oxfordshire. In the Bristol Region it was found in the Avon Gorge in 2000 and 2003 (pers.obs.) so seems to have an established colony there. Prefers mature heathland but is occasionally found on coastal grassland, and it is this latter habitat type which it seems to be exploiting in the Gorge. This species is a predator on web-spinning spiders which it hunts in low vegetation (Merrett 1990). Like most heathland invertebrates this

species is likely to be very adversely affected by encroaching woodland but an element of scrub is likely to be important. A female swept in July.

5.2.2 *Metrioptera roeselii* Roesel's Bush Cricket Nationally Scarce b

The Roesel's Bush Cricket was formerly a very local species confined to coastal grassland in Kent and the Thames Estuary. However for the last 50 years it has been exhibiting a remarkable westward spread into the Home Counties and then along the M4 corridor to Bristol and beyond. It is probably now too frequent to merit Nb status. In The Bristol region it is well established and frequent although not previously at Troopers Hill (pers.obs.). Usually found in coarse grassland in warm, sunny locations at low levels, Nymphs emerge in late May and June becoming adult in late July surviving into October in favourable years (Haes & Harding 1997). Noted in August.

5.2.3 *Forficula lesnei* Nationally Scarce b

Lesne's Earwig is very similar to its much commoner congener Common Earwig *Forficula auricularia* but lacks functional wings and is a little smaller and paler. In Britain this species is on the northern edge of its range and largely confined to southern counties favouring base-rich soils. In the Bristol region it seems to be well established and frequent, including at Troopers Hill (pers.obs.). Although it is likely to have been under recorded due to its superficial resemblance to the Common Earwig, it appears to be restricted to particularly favourable locations which have not yet been characterised (Haes & Harding 1997). It is frequently found in scrub and amongst common weeds, habitats which are ubiquitous in the country, so its absence from most areas suggests that very subtle habitat and environmental conditions, no doubt readily disturbed, are essential for its survival. Adult insects can be found from May to October. Swept in August.

5.2.4 *Gargara genistae* Nationally Scarce b

This distinctive membracid bug is listed as Nationally Scarce in some places but appears to be omitted (without explanation) from the official review of the group. It is possible that this species does not deserve national status but as this is only the third specimen I have found in Britain and it has never been taken in Britain by a national specialist (M. Wilson pers. comm.) it seems the national status applied here is well deserved. It is confined to south-east England north to Suffolk and west to Hampshire and Bristol, and was found at Troopers Hill in 2006 (pers.obs.). Associated with broom, greenweed and sainfoin (LeQuesne 1965). Swept in August.

5.2.5 *Megalonotus dilatatus* Nationally Scarce b

Although scarce, this all black ground bug is found widely across southern Britain north to Cheshire and Norfolk and in Radnorshire and Glamorganshire in South Wales. It is known from both Somerset and Gloucestershire although none feature on NBN so perhaps all are old records. In Gloucestershire recorded in 1923, 1945 and 1955 (Alexander 1999c), possibly becoming commoner in response to climate change. Found mainly on sandy areas such as heathland and grassland habitats, as well as coastal dunes. Possibly nocturnal and likes crumbly soil into which it can burrow. Adults overwinter, active in May and June with a new generation appearing in August (Kirby 1992). One female found in August.

5.2.6 *Ectoedemia heringella* Nationally Scarce b

This tiny leaf-mining moth is a relatively recent arrival in Britain, first discovered in 1996 Greater London although not confirmed until 2001. Since then it has been found spreading north and west reaching Cambridgeshire and has been noted in Bath and Bristol just in the last 3-5 years. The larvae feed on Holm oak (*Quercus ilex*), creating a contorted gallery mine in the leaves from November through to April that develops slowly through the winter, often with several mines in a single leaf. The adult moths emerge in June or July and like many of the group are rarely encountered, unless they are reared from mines collected in the autumn or

winter (UK moths), but will sometimes come to light in great abundance (pers.obs.). Vacated mines noted in April and adults swept in July.

5.2.7 *Dasystoma salicella* Nationally Scarce b

Although widespread in England and Wales, and just getting into the south of Scotland (NBN) this moth is local and scarce. Possibly overlooked because of its early flight period. In the Bristol region there are no recent records and Barnett et al (2008) treat it as possibly extinct. There are no Somerset or Gloucestershire records at all on NBN, but one was recorded at Crowcombe, Somerset in 1955 (MapMate data) and close to the Severn in vc33 in 1996 (R. Homan pers.comm.). Males fly around noon on sunny April days to find the flightless females. The larva feeds from between leaves spun together on a wide variety of plants including sallows (*Salix*), sloe (*Prunus spinosa*) and bog-myrtle (*Myrica gale*). Growth is slow and extends from May to September, when pupation occurs (UK moths). A single male found in April.

5.2.8 *Mompha sturnipennella* Nationally Scarce b

This slender grey and white micro-moth is similar to the much commoner *M. subbistrigella*, but is noticeably larger and differs subtly in wing markings. First identified in Britain in 1950, with most records from southern England but spreading north. This is the first record for the Bristol region and for vc34 (Barnet et al. 2008; R. Homan pers. comm.), in Somerset there is a record from vc5 in 2003 (MapMate data). The larvae feed on Rosebay willowherb (*Chamerion angustifolium*) the first generation (May-June) forming a gall within the stem and the second generation in July-August feeding in a seed pod or in a stem gall high up on the plant. Adults can be found from July to August, the second generation emerging in September, overwintering and appearing in spring to May, occasionally found around their foodplant flying in sunshine (UK moths). One male found in April.

5.2.9 *Agrilus sinuatus* Nationally Scarce a

This attractive metallic red jewel beetle was, until recently, thought to be very scarce indeed although widespread in England north to Herefordshire (Hyman & Parsons 1992). It has only recently been found in the region but, since it has been discovered how to identify the exit holes, is proving to be widespread in Somerset (pers.obs.) and even more so in Gloucestershire (Alexander et al. 1999). It lives in the dying branches of old hawthorn trees, especially in hedgerows. The adult beetle is exceedingly elusive and appears to have a very short period of activity and it seems that this, rather than real rarity, accounts for the lack of records (Hyman & Parsons op. cit.). Exit holes noted in old hawthorns in April.

5.2.10 *Anobium inexspectatum* Nationally Scarce b

This woodworm beetle is widespread in England and South Wales, a relatively recently noticed species in the country and perhaps now known to be too frequent to merit its national status. Found in woodland and pasture-woodland, neglected orchards and ivy covered quarries and buildings. The larvae bore in the stems of old ivy, very rarely other species. Adults recorded from January and May to August (Hyman & Parsons 1992). Swept in July.

5.2.11 *Cryptocephalus aureolus* (Nationally Scarce b) None

This beautiful brilliant metallic green leaf-beetle is widespread but local in Britain north to Scotland. Locally it is quite common and was found at Troopers Hill in 2000, 2006 and 2007 (pers. obs.); it is probably too frequent to merit the scarcity status given to it nationally and this was recently removed (Hubble 2014). It likes open grassy places preferring light soils especially calcareous areas. Often to be found on yellow composites particularly hawkweeds. The larvae are free-living in a case feeding on leaves. Adults recorded from May to July (Hyman & Parsons 1992). Noted in May.

5.2.12 *Chorisops nagatomii* Nationally Scarce

This small metallic green and yellow soldier fly is widespread but very local in southern England north to Yorkshire and south Wales. It is probably not too uncommon in the region with six records listed by Alexander (1999b) and there are several records from north Somerset (pers. obs.). Within Bristol it is known from several sites including Troopers Hill in 2000 and 2006 (pers obs.). Perhaps now known to be too frequent to justify its national status. Its habitat preferences are far from clear, being taken in broadleaved woodland, parkland, wetlands and riparian habitats. The larval requirements are not known but circumstantial evidence suggests that it develops in damp leaf litter, perhaps close to streams. Adults are recorded from July to September; the male sometimes found in numbers around large trees (Falk 1991b). Swept in August.

5.2.13 *Bombylius discolor* Nationally Scarce

The Dotted beefly is a robust furry insect with conspicuous spots on the wings which has been chosen as a subject for a UK biodiversity action plan. Formerly it was a widespread and frequent fly of the southern half of England and Wales but it has undergone a dramatic decline almost completely disappearing from the eastern part of its range. In the west it has held its own well and there are numerous recent records, these are mostly of singletons but there are several strong colonies known especially in north Somerset (Alexander 1999b; pers.obs.). The colony at Troopers Hill was first found in 1999 and is one of the largest and most consistent in the region (pers.obs,). This fly is a parasitoid of mining bees, the primary host in this region is almost certainly *Andrena flavipes*. The host requires areas of bare ground in which to dig its nests and open areas with numerous flowers especially composites. The fly is on the wing very early from late March to mid-May so requires sheltered sunny areas in adjacent woodland or scrub in which to forage (Stubbs & Drake 2001). Noted in April.

5.2.14 *Cheilosia soror* Nationally Scarce

This all black hoverfly is very similar to several common species and is distinguishable only with microscopic examination. Most historical records are from the chalk of southeast England with unconfirmed records north to Durham; more recently it has been found in limestone districts from Somerset to Morecambe Bay (Stubbs & Falk 2002, NBN). In Gloucestershire early records are few but significant survey effort has shown it to be frequent in the area, mainly in the Cotswolds, and it was recorded at Troopers Hill in 2007 (MapMate data, pers.obs.). Frequents calcareous grassland, scrub and woodland, probably has a requirement for woodland (Falk 1991b). The larvae are thought to develop in truffles which are associated with beech. Swept in August, presumably associated with the woodland at the site or perhaps isolated mature trees.

5.2.15 *Volucella zonaria* Nationally Scarce

This striking black and yellow fly is the largest and most conspicuous of all the British hoverflies; it is predominantly a species of south east England, especially around London. Locally it is a relatively recent colonist, the earliest record in 1954 but it has only become frequent since the 1980's (Levy & Levy 1998). A majority of local records are in or around the city of Bristol where it is now not uncommon. Occurs in scrub, heath, woodland and ruderal sites well into towns and cities, seems to prefer urban areas. The larvae develop as commensals in nests of wasps including *Vespula germanica* and *V. vulgaris*. Thought to feed on organic debris in the bottom of the nest; adults are on the wing June to October and can frequently be seen feeding at flowers. In some years resident populations are supplemented by migrants from the continent, especially the females (Falk 1991b). Noted in August.

5.2.16 *Eudorylas zermattensis* (Nationally Scarce) None

This small black big-headed fly is widespread in England and South Wales north to Nottinghamshire. Seems to have been much overlooked or is spreading and becoming more frequent so its status was recently removed. Known from three sites in Somerset including

Hengrove in Bristol, but this would appear to be the first record for vc34. Frequents chalk grassland, coastal sand dunes and the East Anglian Brecklands and very dry, sunny brownfield sites. A Berkshire site is an area of short grass with sandy and limestone banks, while Devil's Ditch, Cambridgeshire is chalk grassland. It is known from very dry open sites elsewhere in Europe. Its biology is unknown but members of the genus *Eudorylas* are parasitoids of leafhoppers of the family Cicadellidae as larvae. Adults recorded from June to September (Falk & Chandler 2005). Swept in August.

5.2.17 *Micropeza lateralis* Nationally Scarce

This long, slender stilt-legged fly is recorded from southern England north to Norfolk and Scotland. Apart from Troopers Hill, where it was first found in 2000 and then again in 2006, there do not appear to be any other localities for this species in either Somerset or Gloucestershire. Mainly on heathland, usually preferring lush damper areas near trees and bushes or beside streams. Occasionally on chalk or fixed dunes. A number of recent records state a close association with bushes of broom (Falk, Ismay & Chandler 2016). Swept in August.

5.2.18 *Acanthiophilus helianthi* Nationally Scarce

This fruitfly with very limited wing patterning has a decidedly scattered distribution across the southern half of England and a couple of records in Wales. Probably getting more frequent with the only records in the region being recent, and indeed there has been an upsurge of records in 2019 (pers.obs.). Frequents dry grassland, meadows and occasionally gardens where the larvae develop in the flower heads of knapweed. Adults are recorded from July to September (Clemons 1996; Falk 1991b). Swept in August.

5.2.19 *Sapromyza quadricincta* Nationally Scarce

This yellow Lauxanid fly has a scattered distribution in southern England north to Warwickshire and one locality in Wales. The only historical record in the region is Clevedon 1945 (Audcent 1950) but also known from Hengrove and the Avon Gorge in Bristol (pers.obs.). Frequents woodland, woodland edge, scrub and occasionally gardens, one record from saltmarsh. Its biology is unknown but the larvae of this family are generally believed to develop in decaying vegetable matter including fallen leaves. Adults are recorded from June to October (Falk, Ismay & Chandler 2016). Swept in August.

5.2.20 *Blaesoxipha plumicornis* Nationally Scarce (RDB3)

This flesh fly is a very scarce species mainly recorded from Dorset, Hampshire and Surrey, but also known from Cornwall, Devon, Sussex, Middlesex and Berkshire. Only three post 1960 records so it is proposed to increase its national status. This would appear to be the first record for Bristol and Gloucestershire, although recorded at Radstock in 2012 (pers.obs.), so perhaps this species is recovering from a period of great scarcity. Usually found in heathland and grassland, the larvae developing as parasitoids of Grasshoppers including *Chorthippus parallelus*, *C. brunneus* and *Omocestus viridulus* (Orthoptera, Acrididae). Adults from June to September (Falk & Pont in prep.). Swept in May.

5.2.21 *Phytomyptera nigrina* (Nationally Scarce)

This parasitoid fly is widespread in England and Wales north to Staffordshire and with records from northern Scotland but very local, perhaps getting commoner in recent years. Locally records are few but it was recorded in the Avon Gorge in 2011 (pers.obs.). Frequents broadleaved woodland and adjacent marshy ground; fens, heaths and scrubby dunes. The larvae are parasitoids of stem-boring and concealed lepidopterous caterpillars of the families Pterophoridae and Tortricidae. Adults recorded from May to August (Falk & Pont in prep.). Swept in April.

5.2.22 *Aporus unicolor* Nationally Scarce a

This largely black spider-hunter wasp is very local in southern England north to Cambridgeshire and with recent records from South Wales. Known from about 15 post 1970 localities suggesting a general decline. Locally known from three sites, Tucking Mill, Avon Gorge and especially Troopers Hill where recorded in 2006 and 2007 (pers.obs.; BWARS). Frequents sparsely vegetated light soils in sunny localities, particularly chalky and sandy areas, such as south facing cliffs, heathland and well grazed downland. It is known to be a parasitoid of the purse-web spider *Atypus affinis*, itself very scarce in the region recorded at Troopers Hill for the first time in 2018 (NBN). Adults found from June to September (Falk1991a). Swept in July.

5.2.23 *Andrena humilis* Nationally Scarce b

A medium-sized brown mining bee lacking conspicuous features in the field. Historically it was widespread in England north to Yorkshire but has declined considerably. In Somerset it is only recorded from Kewstoke Wood (Perkins 1924) Radstock, Bleadon Quarry and Dolebury Warren (pers. obs.), in Gloucestershire apart from Troopers Hill, there are only three localities all very old (Alexander 1999a). At Troopers Hill this species has been consistently recorded since 1998 (pers.obs.). Favours a variety of habitats particularly coastal landslips but also heathland and grassland. Nests in hard sand or stiff soil in sunny situations, including vertical banks. Can form large colonies but aggregations are usually small. It is single brooded flying from May to July the females gathering pollen exclusively from yellow composites (Falk 1991a). Noted in May.

5.2.24 *Lasioglossum malachurum* Nationally Scarce b

This mining bee is confined to southern England from Dorset to Kent and north to Oxfordshire, not so long ago it was largely confined to the coast of Kent and Isle of Wight, however, in recent years it seems to have started moving north again. In the Bristol region records are relatively few but recorded in Radstock in 2005and near Dyrham in 2002 (pers.obs.). It is mainly coastal, especially where there are landslips, soft rock cliffs or other areas where the clay substrate is exposed. Nests on level or gently sloping bare and sparsely vegetated ground exposed to the sun. Adult females hibernate through the winter emerging as early as mid-February and rearing three broods of workers through to October; males can be found from July to October (Falk 1991a). Swept in August.

5.2.25 *Nomada fucata* Nationally Scarce a

This nomad bee was historically widespread in southern England but declined considerably, however, recently it has shown a remarkable recovery and is now one of the more frequently met with *Nomadas*. Its status as Na may need reviewing, however, since 2003 this bee seems to have returned to its earlier abundance and is much less often seen than it was in the first few years of the 21st century. In the Bristol region there are numerous recent sites, nearly all in Somerset, with Troopers Hill being the most important site in Bristol itself (pers.obs.). Favours a wide variety of open sandy and grassy situations which offer a rich flora and bare, sunny cliffs and slopes. It is a cleptoparasite of the mining bee *Andrena flavipes* which forms dispersed or concentrated colonies in bare sandy or clayey soils. *N. fucata* is, like its host, double brooded flying from April to May and July to August (Falk 1991a.). Swept in July, much less frequent than on previous surveys.

5.2.26 *Sphecodes crassus* Nationally Scarce b

This small black and red cuckoo-bee is very widely distributed in England and Wales as far north as Yorkshire. It is a very difficult species to identify so its true status is not easy to assess but it is certainly very local. In the Bristol region it is well recorded in north Somerset, but Troopers Hill is possibly the only colony in South Gloucestershire (pers.obs.). Lives in a variety of habitats including heathland, calcareous grassland, soft rock cliffs, landslips and abandoned quarries. It is a cleptoparasite of the mining bee genus *Lasioglossum*. Suspected

hosts include *L. nitidiusculum, L. parvulum, L. morio, L. pauxillum* and *L. fulvicorne*, two of which were recorded during this survey. Whatever the host is, it will almost certainly have a requirement for areas of bare soil or sparse vegetation in sunny spots where they can dig their nests. Adult females are on the wing from May to August, males from July to September; frequenting flowers such as *Calluna, Heracleum, Jasione, Achillea, Tripleurospermum, Angelica* and *Cirsium* (Falk 1991a). Swept in July.

5.3BAP/S41, LOCALLY SIGNIFICANT

5.3.1 *Coenonympha pamphilus* Small Heath BAP

This is a widespread butterfly and can be found over most of the British Isles with the exception of the Shetlands and Orkneys and mountainous regions (NBN). It lives in discrete colonies and adults rarely venture far from the colony. Not confined to heathland and can be found in a wide variety of habitats. Populations found in the north have one generation each year, while populations in the south have two generations each year and possibly three in exceptional years. Both population and range shown to be declining, hence its addition to the Priority List of UK Biodiversity Action Plan Species. Adults can be found continuously from late May until mid-September as a result (UK Butterflies). Noted in May and July.

5.3.2 *Tyria jacobaeae* Cinnabar BAP

This very attractive and well known day-flying moth has recently been added to the Priority List of UK Biodiversity Action Plan Species. In the Bristol region it is still quite common and well recorded (NBN). Its addition is due to concern that the species is suffering a significant decline and probably that its food plant is in jeopardy due to potential new legislation. The larvae feed on Ragwort, a plant much persecuted by many landowners. Ragwort supports many insect species other than Cinnabar so this moth acts as a flagship for the whole Ragwort dependant fauna. Adults noted in May.

6 Site Evaluation

As has been established by three previous surveys and much casual recording, Troopers Hill is exceptionally rich for invertebrates found in few other local sites, especially Aculeate Hymenoptera. After the first survey in 2000 there was a gap of six years before the 2006 survey closely followed by another in 2007. So this survey comes 12 years after the last, plenty of time to show any changes if these have occurred. The first survey in 2000 was much less taxonomically extensive with a definite focus on Hymenoptera. The total species list was less than half that found in 2019 with more Hymenoptera recorded than Diptera. However, the results from the 2006 survey, with a much higher diversity recorded, were very similar in quality both overall and with regard to the Hymenoptera. In 2007 a very good result was returned, at least as far a quality was concerned although diversity was down on 2006. This year's result, while an improvement on 2000, and essentially the same as the 2006 result is worryingly poorer than the 2007 result. Whether this is due to an anomalously good result in 2007, or is indicative of some loss of quality needs further investigation. Because of the very significant contribution of the Aculeate Hymenoptera to the quality of this site, Table 3 below compares this group from the four surveys.

Table 3 Comparison of Aculeate Hymenoptera 2000 to 2019.

2000	2006	2007	2019	status
	Aporus unicolor	*Aporus unicolor*	*Aporus unicolor*	Nationally Scarce a
	Arachnospila minutula			Nationally Scarce b
		Microdynerus exilis		Nationally Scarce b
			Gorytes laticinctus	RDB3
		Crossocerus distinguendus		Nationally Scarce a
Philanthus triangulum	*Philanthus triangulum*	*Philanthus triangulum*		RDB3

		Psenulus schencki		Nationally Scarce a
		Andrena fulvago		Nationally Scarce a
Andrena humilis	*Andrena humilis*	*Andrena humilis*	*Andrena humilis*	Nationally Scarce b
	Andrena trimmerana			Nationally Scarce b
Andrena labiata				Nationally Scarce a
			Lasioglossum malachurum	Nationally Scarce b
		Hylaeus cornutus		Nationally Scarce a
Sphecodes crassus		*Sphecodes crassus*	*Sphecodes crassus*	Nationally Scarce b
Sphecodes reticulatus	*Sphecodes reticulatus*			Nationally Scarce a
Nomada fucata	*Nomada fucata*	*Nomada fucata*	*Nomada fucata*	Nationally Scarce a
Nomada guttulata				RDB1
Nomada integra	*Nomada integra*	*Nomada integra*		Nationally Scarce a
Nomada lathburiana	*Nomada lathburiana*		*Nomada lathburiana*	RDB3
9	9	11	7	
16%	13%	17%	10%	

Of the 19 Aculeates of conservation concern found at Troopers Hill over the last 20 years just two have been found consistently each survey *Andrena humilis* and *Nomada fucata*. This is not too surprising, even species that are relatively common on site can easily be missed in any one year. Five species were found in three out of the four surveys, one species found twice and the remainder in a just single year. The decline in the number and proportion of scarce aculeates is concerning and is not so small that is can be dismissed as chance (although this could be the explanation). Of particular concern was the relative rarity of *Andrena humilis* this season, this species was often to be seen in good numbers at Troopers Hill, but just a single female was found in May in 2019. Its cleptoparasite, *Nomada integra*, was recorded in all three previous surveys but not in 2019. On the positive side both *Nomada lathburiana* and *Aporus unicolor* seem to be maintaining good populations. Two additional aculeates were recorded this year, *Gorytes laticinctus* and *Lasioglossum malachurum*, both expanding species that do not make up for the possible loss of *Nomada integra*.

In general aculeates do not appear to be as abundant as formerly, while a few *Panurgus banksianus* were recorded, in former years this conspicuous species has been visible in abundance on yellow composites. Even the large and important colonies of *Andrena flavipes* and *A. cineraria*, while still in good numbers, were not as evident as in the past.

It is very difficult to explain this apparent decline in diversity and abundance without pointing to the general decline in invertebrates being seen across Europe. No obvious management problem presents itself, if anything the habitat looks more open and suitable for heliophilous invertebrates that is ever was. Most of the important aculeate nesting areas are still open and with plenty of exposed substrate, and more areas have been cleared which should have provided more nesting and foraging space.

A possible problem that I am unable to access is the availability of pollen sources. Although many species will forage in adjacent gardens and woodland, especially on blackthorn, hawthorn and sallow, the abundance of perennial flowers, especially yellow composites, is of considerable importance to many species. If there is any evidence of a decline in the abundance of such flowers then this could be a real problem.

Hopefully this apparent decline in the quality of aculeates is just a combination of chance and a relatively cool spring, but it needs to be focused on in any future monitoring.

7 Recommendations

Many recommendations for habitat management were discussed in detail in the 2006 and 2007 reports and those of a general nature still stand. Here I shall confine myself to specific recommendations that data from the current survey suggest.

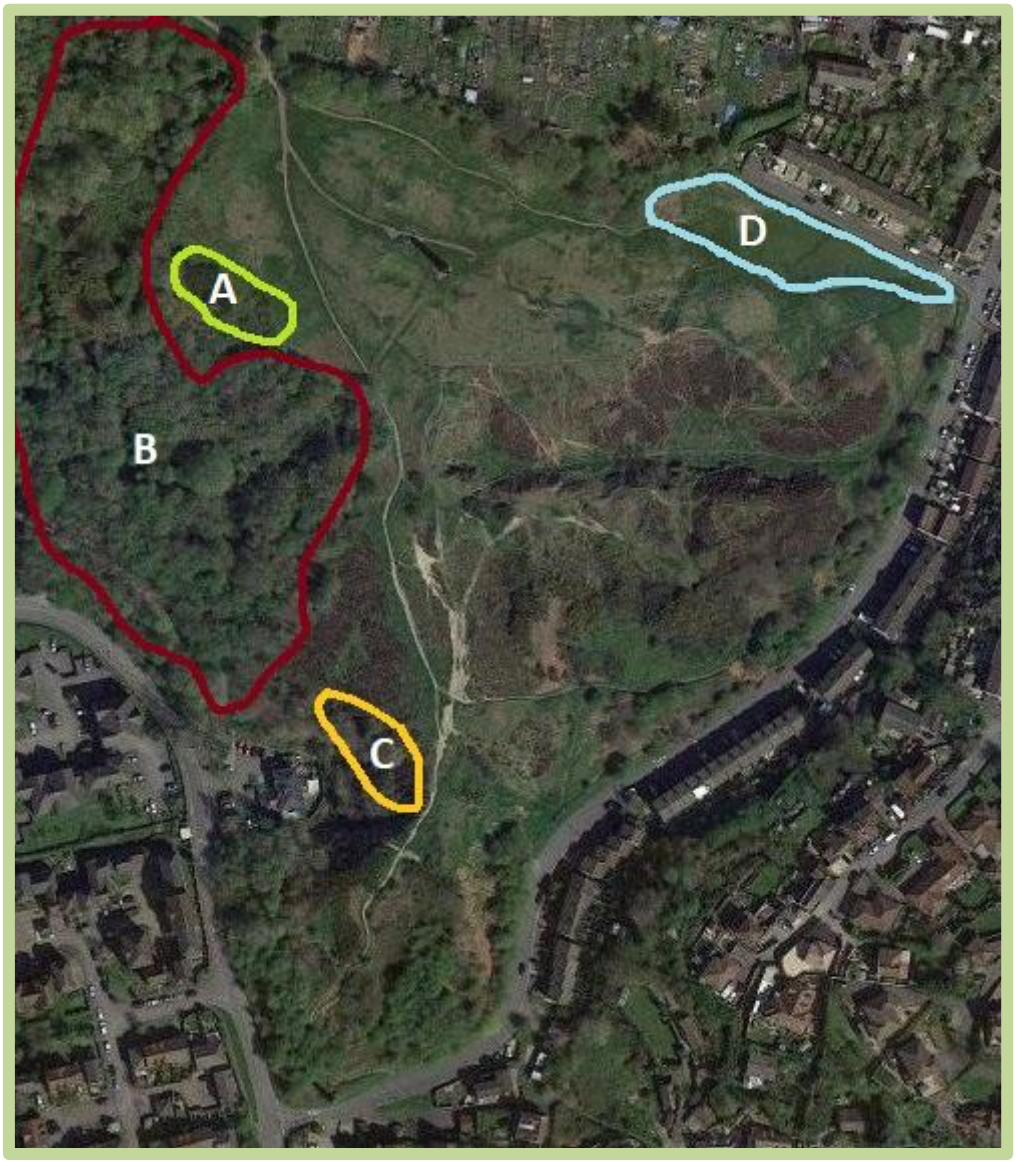
While scrub encroachment is certainly the most useful management action required to maintain the open and sunny nature of Troopers Hill, it needs be remembered that scrub is also an important component of most habitats with many associated invertebrates. There is a great temptation when clearing scrub to remove small patches within the site rather than tackle the taller and more difficult thicket around the margins of the site. At Troopers Hill this appears to have happened with regard to the patch of broom (at point A on map Fig 1) which has been completely removed so significantly reducing the amount of this plant on site. In earlier reports I did suggest some limited management here, cutting fire-breaks, thinning and preventing encroachment on to open areas, but recommended that all Broom parches be retained at least in part. This isolated patch of Broom was particularly important because, being separate from the Broom and Gorse patches in the east of the site it would be safe from fire in those more or less contiguous areas. This patch also produced several important Broom dependent invertebrates not noted elsewhere on the site. If any of the plants have survived in this Broom patch, it should be allowed to re-establish, at least in part.

Pushing back the surrounding woodland in order to create an open thicket where scrub can develop without sacrificing any of the grassland could be useful (e.g. B on map Fig 1). If this can be done then retain scrub important as nectar and pollen sources for Aculeates, especially Sallow, Blackthorn and Hawthorn. It might be worth planting male Sallows around any larger areas that can be cleared within the woodland close to the grassland.

One area that has in the past been important for nesting Aculeates, but which is in danger of becoming over shaded, is at the southern end of the site (area C, map Fig 1). It is steep so tree and scrub clearance will be difficult but needs to be done. There are several scrub oaks here that at least need to be reduced, if not coppiced right down.

In the northeast of the site is a fairly large area of coarse grassland that does not contribute much to the quality of the reserve. One area includes many Hogweed plants that provide an important nectar source later in summer, and this can be retained as it is. However, area D (Fig 1) could be improved by mowing annually and removal of the cuttings. There is still some remnant of a more flower-rich sward here, with scattered Knapweed plants, but otherwise it is relatively uniform coarse grasses. The western part of this area also needs some bramble control.

Figure 1 Suggested management zones.



7.1 Further Survey

A 12 year gap between surveys is really too long, five to six years would be better and allow a more useful level of monitoring. Further survey within this time frame will be important to understand the apparent decline in diversity and abundance of Aculeates. While this concerning development might just be chance, this needs to be monitored.

8 References

Alexander, K.N.A. 1999a. *The Sawflies, Ants, Bees and Wasps (Hymenoptera) of Gloucestershire*. Unpublished.

Alexander, K.N.A. 1999b. *An annotated checklist of Gloucestershire Diptera other than Syrphidae*. Unpublished.

Alexander, K.N.A. 1999c. *The land and freshwater bugs (Hemiptera) of Gloucestershire*. Unpublished.

Alexander, K.N.A., D.B.Atty & I.S.Carter 1999. *Some additions and corrections to the Gloucestershire county list* [Coleoptera]. Unpublished.

Audcent, H.L.F. 1950. Bristol Insect Fauna, Diptera (continued). *Proceedings of the Bristol Naturalists Society* **28**(1) 45-132.

Barnett, R.J., Andrews, R.M., Bailey, M.A., Corner, T., Higgins, R.J. & Martin, J.P. 2008 *Moths of the Bristol region*. BRERC.

Clemons, L. 1996. *A provisional atlas of the Tephritidae (Diptera) of Britain and Ireland*. Dipterists Forum.

Clemons, L. 2004. A provisional atlas of the Tephritidae (Diptera) of Britain and Ireland. Dipterists Forum.

Falk, S. 1991a. A review of the scarce and threatened bees, wasps and ants of Great Britain. No 35. NCC.

Falk, S. 1991b. A review of the scarce and threatened flies of Great Britain Part 1. No 39. NCC.

Falk, S. & P. Chandler 2005. *A review of the scarce and threatened flies of Great Britain; Nematocera and Aschiza not dealt with by Falk* (1991). Species Status 2: 1-191. JNCC.

Falk, S.J., J.W. Ismay & P.J. Chandler 2016. *A review of the scarce and threatened flies of Great Britain; Acalypterates*. JNCC.

Falk, S.J. & A.C. Pont in prep. A review of the scarce and threatened flies of Great Britain Part X: Calyptratae. No. XX JNCC.

Haes, E.C.M. & P.T. Harding 1997 *Atlas of grasshoppers, crickets and allied insects in Britain and Ireland.* Biological Records Centre, Huntingdon.

Howe, M.A. & J.Woodman 2001. *Cistogaster globosa* (Fabricius) (Diptera, Tachinidae) new to Wales. *Dipterists Digest* 8,66.

Hubble, D.S. 2014. *Chrysomelidae, Megalopodidae and Orsodacnidae Species Status No.19*. Natural England Commissioned Reports, NECR161.

Hyman, P.S. (revised Parsons, M.S.) (1992). A review of the scarce and threatened Coleoptera of Great Britain. Part 1. U.K. Nature Conservation: 3. Peterborough: Joint Nature Conservation Committee.

Kirby, P. 1992. *A review of the scarce and threatened Hemiptera of Great Britain* Part 1. JNCC.

LeQuesne, W.J. 1965. Hemiptera: Cicadomorpha (excluding Deltocephalinae & Typhlocybinae). HIBI, 2(2a), 1-64.

Levy, E.T. & D.A. Levy 1998. *Somerset hoverflies*. (self-published).

Merrett, P. 1990. *A review of the nationally notable spiders of Great Britain*. No 127. NCC.

Perkins, R.C.L. 1924. The aculeate Hymenoptera of Gloucestershire and Somerset. *Proc. Bristol, Nat. Soc*. V. 6; Pt. 2. 133-160.

Stubbs, A. & M. Drake 2001. *British Soldierflies and their allies*. BENHS

Stubbs, A.E.& S.J. Falk 2002. *British hoverflies; an illustrated identification guide*. BENHS.

9 Appendix 1: British conservation status categories – definitions.

The following definitions are those used by the JNCC review of the status's of scarce invertebrates of Great Britain.

Red Data Book Category 1. **RDB1-ENDANGERED**

- Taxa in danger of extinction if causal factors continue unabated. Includes species occurring as a single colony or only in habitats which are much reduced and highly threatened or which have shown a rapid and continuous decline.

Red Data Book Category 2. **RDB2-VULNERABLE**

- Taxa believed likely to move into the endangered category in the near future if the causal factors continue operating. Includes species of which most or all populations are decreasing and those which are confined to vulnerable habitats.

Red Data Book Category 3. **RDB3-RARE**

- Taxa with small populations that are not at present endangered or vulnerable, but are at risk; usually localised within restricted geographical areas or habitats or are thinly scattered over a wider range. Includes species estimated to exist in only fifteen or less post 1970 10km squares or, if more, then in vulnerable habitat.

Red Data Book Category 4. **RDBK – Data deficient**

- Taxa that are suspected, but not definitely known, to belong to any of the above categories, because of lack of information. Includes taxa recently discovered or recognised in Great Britain which may prove to be more widespread in the future; taxa with very few or perhaps only a single known locality but which belong to poorly recorded or taxonomically difficult groups; species known from very few localities but which occur in inaccessible habitats or habitats which are seldom sampled; species with very few or perhaps only a single known locality and of questionable native status, but not clearly falling into the category of recent colonist, vagrant or introduction.

Nationally Scarce Category a. **Na**

- Taxa which do not fall within the RDB categories but which are uncommon in Great Britain and are known to occur in 30 or fewer 10km squares or, in less well recorded groups, within seven or fewer vice-counties.

Nationally Scarce Category b. **Nb**

- Taxa which do not fall within the RDB categories but which are uncommon in Great Britain and are known to occur in between 31 and 100 10km squares or, in less well recorded groups, between eight and twenty vice-counties.

10 Appendix 2: Species list.

Order: Family	Species	Vernacular	National Status
Araneae: Theridiidae	*Episinus truncatus*		**Nationally Scarce b**
Araneae: Pisauridae	*Pisaura mirabilis*		
Araneae: Thomisidae	*Misumena vatia*		
Araneae: Thomisidae	*Xysticus kochi*		
Araneae: Salticidae	*Talavera aequipes*		
Odonata: Platycnemididae	*Platycnemis pennipes*	White-legged Damselfly	
Odonata: Coenagriidae	*Enallagma cyathigerum*	Common Blue Damselfly	
Orthoptera: Meconematidae	*Meconema thalassinum*	Oak Bush Cricket	
Orthoptera: Tettigoniidae	*Pholidoptera griseoaptera*	Dark Bush Cricket	
Orthoptera: Tettigoniidae	*Metrioptera roeselii*	Roesel's Bush Cricket	**Nationally Scarce b**
Orthoptera: Acrididae	*Stenobothrus lineatus*	Stripe-Winged Grasshopper	
Orthoptera: Acrididae	*Omocestus viridulus*	Common Green Grasshopper	
Orthoptera: Acrididae	*Chorthippus brunneus*	Common Field Grasshopper	
Orthoptera: Acrididae	*Chorthippus parallelus*	Meadow Grasshopper	
Orthoptera: Acrididae	*Myrmeleotettix maculatus*	Mottled Grasshopper	
Dermaptera: Forficulidae	*Forficula auricularia*	Common Earwig	
Dermaptera: Forficulidae	*Forficula lesnei*		**Nationally Scarce b**
Hemiptera: Aphrophoridae	*Aphrophora alni*		
Hemiptera: Aphrophoridae	*Philaenus spumarius*		
Hemiptera: Aphrophoridae	*Neophilaenus campestris*		
Hemiptera: Aphrophoridae	*Neophilaenus lineatus*		
Hemiptera: Membracidae	*Gargara genistae*		**Nationally Scarce b**
Hemiptera: Cicadellidae	*Iassus lanio*		
Hemiptera: Cicadellidae	*Allygus mixtus*		
Hemiptera: Cicadellidae	*Thamnotettix dilutior*		
Hemiptera: Anthocoridae	*Anthocoris nemoralis*		
Hemiptera: Anthocoridae	*Anthocoris sarothamni*		
Hemiptera: Lygaeidae	*Macrodema micropterum*		
Hemiptera: Lygaeidae	*Megalonotus dilatatus*		**Nationally Scarce b**

Order: Family	Species	Vernacular	National Status
Hemiptera: Miridae	*Cyllecoris histrionius*		
Hemiptera: Miridae	*Megacoelum infusum*		
Hemiptera: Miridae	*Phytocoris tiliae*		
Hemiptera: Miridae	*Stenodema laevigata*		
Hemiptera: Acanthosomatidae	*Acanthosoma haemorrhoidale*	Hawthorn Shieldbug	
Hemiptera: Acanthosomatidae	*Elasmostethus interstinctus*	Birch Shieldbug	
Hemiptera: Coreidae	*Coreus marginatus*	Dock Bug	
Hemiptera: Pentatomidae	*Aelia acuminata*	Bishop's Mitre Shieldbug	
Hemiptera: Pentatomidae	*Dolycoris baccarum*	Hairy Shieldbug	
Hemiptera: Pentatomidae	*Palomena prasina*	Common Green Shieldbug	
Hemiptera: Pentatomidae	*Pentatoma rufipes*	Red-legged Shieldbug	
Hemiptera: Pentatomidae	*Piezodorus lituratus*	Gorse Shieldbug	
Hemiptera: Rhopalidae	*Corizus hyoscyami*		
Lepidoptera: Nepticulidae	*Ectoedemia heringella*	a moth	**Nationally Scarce b**
Lepidoptera: Nepticulidae	*Ectoedemia heringi*	a moth	
Lepidoptera: Heliozelidae	*Heliozela hammoniella*	a moth	
Lepidoptera: Adelidae	*Nemophora degeerella*	a moth	
Lepidoptera: Psychidae	*Luffia ferchaultella*	a moth	
Lepidoptera: Gracillariidae	*Phyllonorycter messaniella*	a moth	
Lepidoptera: Plutellidae	*Plutella xylostella*	Diamond-back Moth	
Lepidoptera: Chimabachidae	*Dasystoma salicella*	a moth	**Nationally Scarce b**
Lepidoptera: Depressariidae	*Agonopterix scopariella*	a moth	
Lepidoptera: Gelechiidae	*Aristotelia ericinella*	a moth	
Lepidoptera: Gelechiidae	*Monochroa tenebrella*	a moth	
Lepidoptera: Gelechiidae	*Teleiopsis diffinis*	a moth	
Lepidoptera: Momphidae	*Mompha sturnipennella*	a moth	**Nationally Scarce b**
Lepidoptera: Momphidae	*Mompha raschkiella*	a moth	
Lepidoptera: Tortricidae	*Cnephasia stephensiana*	Grey Tortrix	
Lepidoptera: Tortricidae	*Eulia ministrana*	a moth	
Lepidoptera: Tortricidae	*Dichrorampha plumbana*	a moth	
Lepidoptera: Tortricidae	*Dichrorampha sequana*	a moth	
Lepidoptera: Zygaenidae	*Zygaena filipendulae*	Six-spot Burnet	

Order: Family	**Species**	**Vernacular**	**National Status**
Lepidoptera: Hesperiidae	*Thymelicus sylvestris*	Small Skipper	
Lepidoptera: Hesperiidae	*Ochlodes sylvanus*	Large Skipper	
Lepidoptera: Pieridae	*Anthocharis cardamines*	Orange-tip	
Lepidoptera: Nymphalidae	*Pararge aegeria*	Speckled Wood	
Lepidoptera: Nymphalidae	*Coenonympha pamphilus*	Small Heath	**BAP**
Lepidoptera: Nymphalidae	*Aphantopus hyperantus*	Ringlet	
Lepidoptera: Nymphalidae	*Maniola jurtina*	Meadow Brown	
Lepidoptera: Nymphalidae	*Pyronia tithonus*	Gatekeeper	
Lepidoptera: Nymphalidae	*Melanargia galathea*	Marbled White	
Lepidoptera: Nymphalidae	*Vanessa cardui*	Painted Lady	
Lepidoptera: Nymphalidae	*Aglais io*	Peacock	
Lepidoptera: Nymphalidae	*Aglais urticae*	Small Tortoiseshell	
Lepidoptera: Lycaenidae	*Lycaena phlaeas*	Small Copper	
Lepidoptera: Lycaenidae	*Celastrina argiolus*	Holly Blue	
Lepidoptera: Lycaenidae	*Aricia agestis*	Brown Argus	
Lepidoptera: Lycaenidae	*Polyommatus icarus*	Common Blue	
Lepidoptera: Pyralidae	*Myelois circumvoluta*	Thistle Ermine	
Lepidoptera: Pyralidae	*Homoeosoma sinuella*	a moth	
Lepidoptera: Crambidae	*Patania ruralis*	Mother of Pearl	
Lepidoptera: Crambidae	*Chrysoteuchia culmella*	Garden Grass-veneer	
Lepidoptera: Crambidae	*Agriphila inquinatella*	a moth	
Lepidoptera: Erebidae	*Tyria jacobaeae*	Cinnabar	**BAP**
Lepidoptera: Erebidae	*Euclidia glyphica*	Burnet Companion	
Lepidoptera: Noctuidae	*Autographa gamma*	Silver Y	
Coleoptera: Carabidae	*Amara aenea*		
Coleoptera: Carabidae	*Ophonus puncticeps*		
Coleoptera: Carabidae	*Paradromius linearis*		
Coleoptera: Staphylinidae	*Aleochara intricata*		
Coleoptera: Scarabaeidae	*Cetonia aurata*	Rose Beetle	
Coleoptera: Buprestidae	*Agrilus sinuatus*	Hawthorn Jewel Beetle	**Nationally Scarce a**
Coleoptera: Elateridae	*Prosternon tessellatum*	Chequered Click Beetle	
Coleoptera: Elateridae	*Limonius poneli*		

Order: Family	**Species**	**Vernacular**	**National Status**
Coleoptera: Cantharidae	*Rhagonycha fulva*		
Coleoptera: Cantharidae	*Malthinus seriepunctatus*		
Coleoptera: Cantharidae	*Malthinus seriepunctatus*		
Coleoptera: Anobiidae	*Ochina ptinoides*	Ivy Boring Beetle	
Coleoptera: Anobiidae	*Anobium inexspectatum*		**Nationally Scarce b**
Coleoptera: Anobiidae	*Anobium fulvicorne*		
Coleoptera: Malachiidae	*Malachius bipustulatus*	Malachite Beetle	
Coleoptera: Phalacridae	*Olibrus affinis*		
Coleoptera: Phalacridae	*Olibrus affinis*		
Coleoptera: Coccinellidae	*Rhyzobius chrysomeloides*		
Coleoptera: Coccinellidae	*Rhyzobius litura*		
Coleoptera: Coccinellidae	*Scymnus auritus*		
Coleoptera: Coccinellidae	*Psyllobora vigintiduopunctata*	22-spot Ladybird	
Coleoptera: Coccinellidae	*Calvia quattuordecimguttata*	Cream-spot Ladybird	
Coleoptera: Coccinellidae	*Harmonia axyridis*	Harlequin Ladybird	
Coleoptera: Coccinellidae	*Adalia decempunctata*	10-spot Ladybird	
Coleoptera: Coccinellidae	*Coccinella septempunctata*	7-spot Ladybird	
Coleoptera: Coccinellidae	*Tytthaspis sedecimpunctata*	16-spot Ladybird	
Coleoptera: Coccinellidae	*Subcoccinella vigintiquattuorpunctata*	24-spot Ladybird	
Coleoptera: Tenebrionidae	*Lagria hirta*		
Coleoptera: Tenebrionidae	*Isomira murina*		
Coleoptera: Oedemeridae	*Oedemera nobilis*	Swollen-thighed Beetle	
Coleoptera: Oedemeridae	*Oedemera lurida*		
Coleoptera: Cerambycidae	*Grammoptera ruficornis*		
Coleoptera: Cerambycidae	*Rutpela maculata*		
Coleoptera: Cerambycidae	*Tetrops praeustus*		
Coleoptera: Chrysomelidae	*Cryptocephalus aureolus*		**(Nationally Scarce b) None**
Coleoptera: Chrysomelidae	*Cryptocephalus fulvus*		
Coleoptera: Chrysomelidae	*Cryptocephalus labiatus*		
Coleoptera: Chrysomelidae	*Cryptocephalus pusillus*		

Order: Family	**Species**	**Vernacular**	**National Status**
Coleoptera: Apionidae	*Ceratapion carduorum*		
Coleoptera: Apionidae	*Exapion fuscirostre*		
Coleoptera: Apionidae	*Perapion marchicum*		
Coleoptera: Apionidae	*Perapion violaceum*		
Coleoptera: Apionidae	*Apion haematodes*		
Coleoptera: Apionidae	*Ischnopterapion virens*		
Coleoptera: Apionidae	*Oxystoma subulatum*		
Coleoptera: Curculionidae	*Polydrusus cervinus*		
Coleoptera: Curculionidae	*Neliocarus nebulosus*		
Coleoptera: Curculionidae	*Andrion regensteinense*		
Coleoptera: Curculionidae	*Trichosirocalus troglodytes*		
Coleoptera: Curculionidae	*Anthonomus rubi*	Strawberry Blossom Weevil	
Coleoptera: Curculionidae	*Curculio glandium*	Acorn Weevil	
Coleoptera: Curculionidae	*Archarius pyrrhoceras*		
Coleoptera: Curculionidae	*Mecinus pyraster*		
Coleoptera: Curculionidae	*Mecinus pascuorum*		
Coleoptera: Curculionidae	*Orchestes pilosus*		
Diptera: Limoniidae	*Dicranomyia chorea*		
Diptera: Limoniidae	*Dicranomyia mitis*		
Diptera: Bibionidae	*Bibio lanigerus*		
Diptera: Mycetophilidae	*Docosia sciarina*		
Diptera: Anisopodidae	*Sylvicola cinctus*		
Diptera: Stratiomyidae	*Beris morrisii*		
Diptera: Stratiomyidae	*Chorisops nagatomii*		**Nationally Scarce**
Diptera: Stratiomyidae	*Pachygaster atra*		
Diptera: Stratiomyidae	*Chloromyia formosa*		
Diptera: Stratiomyidae	*Microchrysa polita*		
Diptera: Bombyliidae	*Bombylius discolor*		**Nationally Scarce**
Diptera: Bombyliidae	*Bombylius major*		
Diptera: Therevidae	*Thereva nobilitata*		

Order: Family	**Species**	**Vernacular**	**National Status**
Diptera: Asilidae	*Dysmachus trigonus*		
Diptera: Asilidae	*Machimus cingulatus*		
Diptera: Asilidae	*Leptogaster cylindrica*		
Diptera: Asilidae	*Dioctria atricapilla*		
Diptera: Asilidae	*Dioctria baumhaueri*		
Diptera: Asilidae	*Dioctria rufipes*		
Diptera: Hybotidae	*Platypalpus optivus*		
Diptera: Empididae	*Hilara brevistyla*		
Diptera: Dolichopodidae	*Dolichopus griseipennis*		
Diptera: Dolichopodidae	*Dolichopus ungulatus*		
Diptera: Lonchopteridae	*Lonchoptera lutea*		
Diptera: Syrphidae	*Melanostoma mellinum*	a hoverfly	
Diptera: Syrphidae	*Platycheirus angustatus*	a hoverfly	
Diptera: Syrphidae	*Platycheirus scutatus*	a hoverfly	
Diptera: Syrphidae	*Paragus haemorrhous*	a hoverfly	
Diptera: Syrphidae	*Chrysotoxum cautum*	a hoverfly	
Diptera: Syrphidae	*Chrysotoxum festivum*	a hoverfly	
Diptera: Syrphidae	*Epistrophe eligans*	a hoverfly	
Diptera: Syrphidae	*Episyrphus balteatus*	a hoverfly	
Diptera: Syrphidae	*Eupeodes luniger*	a hoverfly	
Diptera: Syrphidae	*Parasyrphus punctulatus*	a hoverfly	
Diptera: Syrphidae	*Sphaerophoria scripta*	a hoverfly	
Diptera: Syrphidae	*Cheilosia soror*	a hoverfly	**Nationally Scarce**
Diptera: Syrphidae	*Helophilus pendulus*	a hoverfly	
Diptera: Syrphidae	*Myathropa florea*	a hoverfly	
Diptera: Syrphidae	*Merodon equestris*	a hoverfly	
Diptera: Syrphidae	*Pipizella viduata*	a hoverfly	
Diptera: Syrphidae	*Volucella zonaria*	a hoverfly	**Nationally Scarce**
Diptera: Pipunculidae	*Cephalops ultimus*		
Diptera: Pipunculidae	*Eudorylas obliquus*		
Diptera: Pipunculidae	*Eudorylas zermattensis*		**(Nationally Scarce) None**
Diptera: Pipunculidae	*Tomosvaryella kuthyi*		

Order: Family	Species	Vernacular	National Status
Diptera: Pipunculidae	*Tomosvaryella sylvatica*		
Diptera: Micropezidae	*Micropeza lateralis*		**Nationally Scarce**
Diptera: Conopidae	*Sicus ferrugineus*		
Diptera: Lonchaeidae	*Protearomyia nigra*		
Diptera: Tephritidae	*Acanthiophilus helianthi*		**Nationally Scarce**
Diptera: Tephritidae	*Campiglossa malaris*		**RDB1 (RDBK)**
Diptera: Tephritidae	*Tephritis formosa*		
Diptera: Tephritidae	*Tephritis neesii*		
Diptera: Tephritidae	*Tephritis vespertina*		
Diptera: Tephritidae	*Anomoia purmunda*		
Diptera: Lauxaniidae	*Calliopum aeneum*		
Diptera: Lauxaniidae	*Calliopum geniculatum*		
Diptera: Lauxaniidae	*Minettia fasciata*		
Diptera: Lauxaniidae	*Sapromyza quadricincta*		**Nationally Scarce**
Diptera: Lauxaniidae	*Sapromyza quadripunctata*		
Diptera: Chamaemyiidae	*Chamaemyia aridella*		
Diptera: Sciomyzidae	*Limnia unguicornis*		
Diptera: Sciomyzidae	*Sepedon sphegea*		
Diptera: Agromyzidae	*Agromyza johannae*	a leaf-miner fly	
Diptera: Agromyzidae	*Agromyza nigrescens*	a leaf-miner fly	
Diptera: Agromyzidae	*Melanagromyza cunctans*	a leaf-miner fly	
Diptera: Agromyzidae	*Ophiomyia beckeri*	a leaf-miner fly	
Diptera: Agromyzidae	*Cerodontha denticornis*	a leaf-miner fly	
Diptera: Agromyzidae	*Liriomyza richteri*	a leaf-miner fly	
Diptera: Agromyzidae	*Chromatomyia farfarella*	a leaf-miner fly	
Diptera: Opomyzidae	*Geomyza tripunctata*		
Diptera: Chloropidae	*Meromyza femorata*		
Diptera: Chloropidae	*Thaumatomyia notata*		
Diptera: Chloropidae	*Oscinella frit*		
Diptera: Scathophagidae	*Scathophaga stercoraria*		

Order: Family	**Species**	**Vernacular**	**National Status**
Diptera: Anthomyiidae	*Anthomyia liturata*		
Diptera: Anthomyiidae	*Delia platura*		
Diptera: Anthomyiidae	*Leucophora obtusa*		
Diptera: Muscidae	*Schoenomyza litorella*		
Diptera: Muscidae	*Hydrotaea cyrtoneurina*		
Diptera: Muscidae	*Helina reversio*		
Diptera: Calliphoridae	*Melanomya nana*		
Diptera: Sarcophagidae	*Miltogramma punctata*		
Diptera: Sarcophagidae	*Brachicoma devia*		
Diptera: Sarcophagidae	*Nyctia halterata*		
Diptera: Sarcophagidae	*Blaesoxipha plumicornis*		**Nationally Scarce (RDB3)**
Diptera: Sarcophagidae	*Sarcophaga pumila*		
Diptera: Tachinidae	*Eriothrix rufomaculata*		
Diptera: Tachinidae	*Ramonda spathulata*		
Diptera: Tachinidae	*Lydella grisescens*		
Diptera: Tachinidae	*Exorista rustica*		
Diptera: Tachinidae	*Ocytata pallipes*		
Diptera: Tachinidae	*Phania funesta*		
Diptera: Tachinidae	*Cistogaster globosa*		**RDB1 (RDB2)**
Diptera: Tachinidae	*Phasia pusilla*		
Diptera: Tachinidae	*Phasia obesa*		
Diptera: Tachinidae	*Phytomyptera nigrina*		**(Nationally Scarce)**
Diptera: Tachinidae	*Tachina fera*		
Hymenoptera: Argidae	*Arge cyanocrocea*	a sawfly	
Hymenoptera: Tenthredinidae	*Athalia rosae*	a sawfly	
Hymenoptera: Tenthredinidae	*Monophadnoides ruficruris*	a sawfly	
Hymenoptera:Tenthredinidae	*Pachyprotasis simulans*	a sawfly	
Hymenoptera:Tenthredinidae	*Nematus lucidus*	a sawfly	
Hymenoptera: Ichneumonidae	*Habronyx nigricornis*	an ichneumon	
Hymenoptera: Ichneumonidae	*Exetastes laevigator*	an ichneumon	
Hymenoptera: Ichneumonidae	*Collyria trichophthalma*	an ichneumon	
Hymenoptera: Ichneumonidae	*Pristomerus vulnerator*	an ichneumon	

Order: Family	Species	Vernacular	National Status
Hymenoptera: Ichneumonidae	*Cryptus viduatorius*	an ichneumon	
Hymenoptera: Ichneumonidae	*Amblyteles armatorius*	an ichneumon	
Hymenoptera: Ichneumonidae	*Barichneumon chionomus*	an ichneumon	
Hymenoptera: Ichneumonidae	*Ichneumon sarcitorius*	an ichneumon	
Hymenoptera: Ichneumonidae	*Platylabus iridipennis*	an ichneumon	
Hymenoptera: Ichneumonidae	*Polysphincta tuberosa*	an ichneumon	
Hymenoptera: Ichneumonidae	*Zatypota percontatoria*	an ichneumon	
Hymenoptera: Chrysididae	*Pseudomalus auratus*	a cuckoo wasp	
Hymenoptera: Tiphiidae	*Tiphia femorata*	a solitary wasp	
Hymenoptera: Formicidae	*Lasius alienus sens. lat.*	an ant	
Hymenoptera: Formicidae	*Lasius fuliginosus*	an ant	
Hymenoptera: Formicidae	*Lasius niger sens. lat.*	an ant	
Hymenoptera: Pompilidae	*Anoplius nigerrimus*	a spider-hunter wasp	
Hymenoptera: Pompilidae	*Aporus unicolor*	a spider-hunter wasp	**Nationally Scarce a**
Hymenoptera: Pompilidae	*Arachnospila anceps*	a spider-hunter wasp	
Hymenoptera: Pompilidae	*Dipogon variegatus*	a spider-hunter wasp	
Hymenoptera: Pompilidae	*Evagetes crassicornis*	a spider-hunter wasp	
Hymenoptera: Ormyridae	*Ormyrus nitidulus*	a chalcid	
Hymenoptera: Crabronidae	*Astata boops*	a digger wasp	
Hymenoptera: Crabronidae	*Cerceris arenaria*	Sand Tailed Digger Wasp	
Hymenoptera: Crabronidae	*Cerceris rybyensis*	Ornate Tailed Digger Wasp	
Hymenoptera: Crabronidae	*Crossocerus annulipes*	a digger wasp	
Hymenoptera: Crabronidae	*Ectemnius continuus*	a digger wasp	
Hymenoptera: Crabronidae	*Ectemnius dives*	a digger wasp	
Hymenoptera: Crabronidae	*Gorytes laticinctus*	a digger wasp	**RDB3**
Hymenoptera: Crabronidae	*Lindenius albilabris*	a digger wasp	
Hymenoptera: Crabronidae	*Oxybelus uniglumis*	Common Spiny Digger Wasp	
Hymenoptera: Crabronidae	*Pemphredon lethifera*	a digger wasp	
Hymenoptera: Crabronidae	*Psenulus pallipes*	Pale Footed Black Wasp	
Hymenoptera: Crabronidae	*Rhopalum coarctatum*	a digger wasp	

Order: Family	**Species**	**Vernacular**	**National Status**
Hymenoptera: Apidae	*Andrena cineraria*	Grey Mining Bee	
Hymenoptera: Apidae	*Andrena flavipes*	Yellow Legged Mining Bee	
Hymenoptera: Apidae	*Andrena fulva*	a mining bee	
Hymenoptera: Apidae	*Andrena fuscipes*	a mining bee	
Hymenoptera: Apidae	*Andrena haemorrhoa*	Early Mining Bee	
Hymenoptera: Apidae	*Andrena humilis*	a mining bee	**Nationally Scarce b**
Hymenoptera: Apidae	*Andrena minutula*	a mining bee	
Hymenoptera: Apidae	*Andrena nigroaenea*	a mining bee	
Hymenoptera: Apidae	*Andrena nitida*	a mining bee	
Hymenoptera: Apidae	*Andrena scotica*	a mining bee	
Hymenoptera: Apidae	*Andrena subopaca*	a mining bee	
Hymenoptera: Apidae	*Anthophora bimaculata*	a solitary bee	
Hymenoptera: Apidae	*Apis mellifera*	Honey Bee	
Hymenoptera: Apidae	*Bombus hortorum*	Small Garden Bumble Bee	
Hymenoptera: Apidae	*Bombus hypnorum*	a bumblebee	
Hymenoptera: Apidae	*Bombus lapidarius*	Large Red Tailed Bumble Bee	
Hymenoptera: Apidae	*Bombus lucorum sens. lat.*	White-tailed Bumble Bee	
Hymenoptera: Apidae	*Bombus pascuorum*	Common Carder Bee	
Hymenoptera: Apidae	*Bombus terrestris*	Buff-tailed Bumble Bee	
Hymenoptera: Apidae	*Bombus vestalis*	a bumblebee	
Hymenoptera: Apidae	*Colletes similis*	a mining bee	
Hymenoptera: Apidae	*Colletes succinctus*	a mining bee	
Hymenoptera: Apidae	*Halictus rubicundus*	a mining bee	
Hymenoptera: Apidae	*Halictus tumulorum*	a mining bee	
Hymenoptera: Apidae	*Hylaeus dilatatus*	a solitary bee	
Hymenoptera: Apidae	*Lasioglossum calceatum*	Slender Mining Bee	
Hymenoptera: Apidae	*Lasioglossum leucozonium*	a mining bee	
Hymenoptera: Apidae	*Lasioglossum malachurum*	a mining bee	**Nationally Scarce b**
Hymenoptera: Apidae	*Lasioglossum minutissimum*	Least Mining Bee	
Hymenoptera: Apidae	*Lasioglossum morio*	Brassy Mining Bee	
Hymenoptera: Apidae	*Lasioglossum parvulum*	a mining bee	
Hymenoptera: Apidae	*Lasioglossum villosulum*	Shaggy Mining Bee	

Order: Family	**Species**	**Vernacular**	**National Status**
Hymenoptera: Apidae	*Nomada fabriciana*	a cuckoo bee	
Hymenoptera: Apidae	*Nomada flavoguttata*	a cuckoo bee	
Hymenoptera: Apidae	*Nomada fucata*	a cuckoo bee	**Nationally Scarce a**
Hymenoptera: Apidae	*Nomada goodeniana*	a cuckoo bee	
Hymenoptera: Apidae	*Nomada lathburiana*	a cuckoo bee	**RDB3**
Hymenoptera: Apidae	*Nomada marshamella*	a cuckoo bee	
Hymenoptera: Apidae	*Nomada rufipes*	a cuckoo bee	
Hymenoptera: Apidae	*Panurgus banksianus*	a mining bee	
Hymenoptera: Apidae	*Sphecodes crassus*	a cuckoo bee	**Nationally Scarce b**
Hymenoptera: Apidae	*Sphecodes ephippius*	a cuckoo bee	
Hymenoptera: Apidae	*Sphecodes gibbus*	a cuckoo bee	
Hymenoptera: Apidae	*Sphecodes monilicornis*	a cuckoo bee	
		total diversity	321
		all scarce/RDB	30
		% scarce/RDB	9.3
		no RDB	4
		% RDB	1.2