

# Wildflower Turf Entomology Report

June 21

# 2010

On 21st June and 26th July 2010 a selection of pitfall and frisbee traps were set on selected turf beds across Ashe Warren Farm to ascertain the range of invertebrates that inhabit the various types of turf grown for commercial purposes. Visual surveys also took place at each survey. The objective of the surveys was to establish whether different types of turf proved to be more favourable habitats to a range of species than others. What range species of invertebrates would inhabit sedum laid on a roof and would a similar variety of species be found on a wildflower turf roof? What range of species would inhabit a wildflower meadow during its first year and would this be maintained or would it increase with successive years? What would be the likelihood of a wildflower meadow in whatever situation attracting the somewhat rarer species that had previously frequented Britain's Wildflower meadows of a century ago?

First  
Entomology  
report to  
establish  
biodiversity  
of wildflower  
turf at Ashe  
Warren Farm

**First 2010 Entomology Survey of Various Types of Turf  
grown at  
Ashe Warren Farm,  
Ashe Warren,  
Overton,  
Basingstoke**

**Report prepared for James Hewetson-Brown**

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## Table of Contents

ABSTRACT .....	5
INTRODUCTION.....	6
PHASE ONE: .....	8
Area 1 - Courtyard .....	8
a. Wildflower Meadow .....	8
Background .....	8
Trap Survey - Method .....	8
Visual Survey.....	8
Results .....	9
b. Sedum Trial Bed (TLP) .....	11
Background .....	11
Trap Survey – Method .....	11
Visual Survey.....	11
Results .....	12
c. Chalk adjacent to areas a & b in enclosed courtyard .....	13
Background .....	13
Trap Survey – method.....	13
Visual Survey.....	13
Results .....	13
Conclusions for Area 1 .....	15
Area 2 – Grass Lawn.....	16
Background .....	16
Trap Survey - Method .....	16
Visual Survey.....	17
Results .....	17
Area 3 – Wildflower Meadow .....	19
Background .....	19
Trap Survey – Method .....	19
Visual Survey.....	20
Results .....	20
Area 4 – Stable Roof .....	22
Background .....	22
Trap Survey – Method .....	22

Visual Survey.....	23
Results .....	23
PHASE 2 Green Roofs - July .....	25
Area 6 – Sedum Roof .....	25
Background .....	25
Trap Survey – Method .....	25
Visual Survey.....	25
Results .....	26
Area 7 .....	27
Stable Roof.....	27
Background .....	27
Trap Survey – Method .....	27
Visual Survey.....	27
Results .....	28
Analysis.....	29
PHASE 1 WILDFLOWER MEADOWS Vs. LAWN GRASS.....	29
PHASE 2 – GREEN ROOFS.....	30
Sedum Roof - July.....	30
Stable Block - July.....	31
Stable Block Analysis – June & July .....	32
Conclusions.....	33
Appendix 1.....	34

## **ABSTRACT**

On 21st June and 26th July 2010 a selection of pitfall and frisbee traps were set on selected turf beds across Ashe Warren Farm to ascertain the range of invertebrates that inhabit the various types of turf grown for commercial purposes. Visual surveys also took place at each survey. The objective of the surveys was to establish whether different types of turf proved to be more favourable habitats to a range of species than others. What range species of invertebrates would inhabit sedum laid on a roof and would a similar variety of species be found on a wildflower turf roof? What range of species would inhabit a wildflower meadow during its first year and would this be maintained or would it increase with successive years? What would be the likelihood of a wildflower meadow in whatever situation attracting somewhat rarer species that had previously frequented Britain's Wildflower meadows of a century ago?

## INTRODUCTION

The purpose of a bug survey, carried out over two phases, Phase One over 21<sup>st</sup>/22<sup>nd</sup> June 2010 – Trial Meadows, Wildflower Meadow Adjacent to the Lake and the Lawn - and Phase Two carried out over 25<sup>th</sup>/26<sup>th</sup> July – diesel roof covered with Sedum and Stable roof covered with native wildflowers; at Ashe Warren Farm, Ashe Warren, Overton, (see location map in Appendix 1), was to begin to establish the level of biodiversity in wildflower meadows. The survey also endeavoured to identify and analyse the following comparisons:

- Would there be a significant increase in wildlife between wildflower meadows, of whatever size or location, and those of ordinary lawn grass?
- Would there be a significant difference in wildlife on a sedum roof to that found on a roof covered in native wildflowers?
- What level of biodiversity would be found in a newly established wildflower meadow? Would it attract a similar range of invertebrates as a more established meadow or would a meadow of several years duration attract a wider variety of invertebrates?
- Would the diversity of wildlife on a roof covered with native wildflowers change over the space of a single month?

By surveying contrasting areas across the farm it is hoped that these questions will at least be partly answered. Subsequent reports should supply statistics that will create trends to determine fluctuations in invertebrate populations across the various types of turf grown on the farm.

By way of background; all areas being grown for commercial purposes are equally irrigated on a regular basis from the moment they are sown until they are cut and transported to their final destination. However; once the turf is established, the wildflower meadow is no longer irrigated.

This initial report is expected to be one of several which are forecasted to take place over a period of time yet to be determined. The overall picture that will emerge is envisaged to be used for commercial purposes to answer the popular leaning towards a more biodiverse aware public in the United Kingdom.

The stable roof, alongside some of the newer beds is exposed on its northern side and is in its second year, how many invertebrates would this attract after a dry spell of three weeks? What type of invertebrates would be found if there had then been a spell of wet weather?

Would there be a change in the wildlife found once the flowers had mostly died and were going to seed? Comparing the stable roof at this stage, when there is little to eat for nectar feeding insects, with the sedum roof which had also ceased flowering in July should provide realistic data as to sustainability and biodiversity.

These are all questions that this initial survey report will try to answer. All the results, having been analysed will be gauged against subsequent surveys to establish biodiversity over a single year.

This initial survey consisted of frisbee traps, pitfall traps, both containing washing up liquid to break the surface of the water, and timed observation in specific areas as close to the centre of each location as was possible.

The third method of simple observation was utilised to observe what else might be frequenting the selected areas, during the most favourable part of the day for flying insects, between 10:00 and 15:00 hrs.

## PHASE ONE:

### Area 1 - Courtyard

#### a. Wildflower Meadow

##### Background

Earlier this year a trial meadow using wildflower meadow turf<sup>1</sup> was set up for a time-lapse photography project. The area is a small courtyard and therefore more sheltered than other areas of wildflower turf, being almost totally enclosed by buildings away from the main growing beds and benefiting from shade from the surrounding buildings at various times of the day. It was irrigated regularly after it was first laid but this has now ceased. The soil surrounding it is mostly chalk with a very small amount of poor soil, barren of plants with only one narrow passage between buildings by way of access. These buildings are a mix of single story offices and taller barns.

Would this isolation affect the number and variety of species discovered using the two traps employed? Would this apparent isolation prevent bees, butterflies and other winged insects from finding the wildflowers?

##### Trap Survey - Method

The main part of the survey was carried out using two types of trap;

- yellow frisbee to attract as many invertebrates as possible with a little water with washing up added to break the water surface
- pitfall trap - small shallow clear plastic tub sunk into the turf so upper lip is at ground level, also containing a water/washing up liquid mix.

DATE/TIME SET	WEATHER CONDITIONS	WIND	DATE/TIME RETRIEVED	WEATHER CONDITIONS	WIND
21.06.2010 10:00 – 10:20	DRY, SUNNY AND WARM	LIGHT BREEZE	22.06.2010 09:45 – 10:15	DRY, SUNNY, HOT	LIGHT BREEZE

The survey took place during ideal conditions, with similar conditions prevailing over night. The traps were in place for a little under twenty four hours, and were expected to attract/trap a reasonable number of invertebrates over the period chosen.

##### Visual Survey

An additional visual survey took place over two twenty minute periods both at the time of the traps being set and at retrieval. This consisted of simply observing the larger insects that were in evidence at those moments in time.

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<sup>1</sup> Time-lapse photography footage can be seen at [www.wildflowerturf.co.uk/meadowvideo.html](http://www.wildflowerturf.co.uk/meadowvideo.html)

## Results

On analysing the results of the survey it was interesting to note the variety of invertebrates that were found in this small area of wildflower meadow. It has to be acknowledged that some of these species would have been imported when the turf was laid having established themselves during the initial growing period, thus providing it with “starter” boost of wildlife. However, this wouldn’t account for all the varieties found. Some will simply have flown into the area on whatever breeze was prevailing, others such as the bees observed (below) would have found the flowers as they carried out their usual search for nectar and then, once found would repeatedly return.

Species	Number Recorded
Very Small Black Flies - assorted species	22
Common Black Flies	13
Soldier Fly ( <i>Chloromyia formosa</i> )	5
Garden Bumblebee ( <i>Bombus hortorum</i> )	3
Small Mosquito	2
Small Tortoiseshell Butterfly ( <i>Aglais urticae</i> )	2
Soldier Fly ( <i>Beris clavipes</i> )	1
<i>Orsodacne cerasi</i>	1
Scorpion Fly ( <i>Panorpa communis</i> )	1
Common Pollen Beetle ( <i>Meligethes aenus</i> )	1
Discarded case of Meadow Grasshopper ( <i>Chorthippus parallelus</i> )	1

Table 1 Survey Results for Wildflower Meadow in Enclosed Courtyard 1st Year

As was expected the most prolific species are flies as noted in the table above. The abundance of flies, 35, came as no surprise as most female flies feed on nectar. Ranging from the common black flies of which there are several hundred species, to smaller black flies with longer bodies.

Soldier flies, *Chloromyia formosa* and *Beris clavipes* are a little more glamorous and certainly more attractive to look at. Both will visit wildflowers for their nectar although whilst *Chloromyia formosa* also likes to sunbathe on the ground amongst short vegetation, *Beris clavipes* simply likes damp areas of lush vegetation, both of which are in abundance in wildflower meadows.

It is fair to say that even though small numbers of some insects were recorded in the traps these would almost certainly be in quiet abundance throughout the meadow. Species such as Common Pollen Beetles (*Meligethes aenus*) and Scorpion flies (*Panorpa communis*) are more likely to be found on the flower heads themselves as opposed to near the ground.

It was also interesting to find a discarded case of a Meadow Grasshopper (*Chorthippus parallelus*) 3mm long, indicating the abundance of food available.

During the observation period it was evident that this small meadow had been located by the Garden Bumblebee (*Bombus hortorum*) and that it was quite a popular location for two or three at a time, visiting the various Campions, Red (*Silene dioica*), White (*Silene latifolia*), Bladder (*Silene vulgaris*) and Ragged Robin (*Lychnis flos-cuculi*) for the nectar these abundant wildflowers provides.

Full survey results can be also be viewed in graphical format overleaf

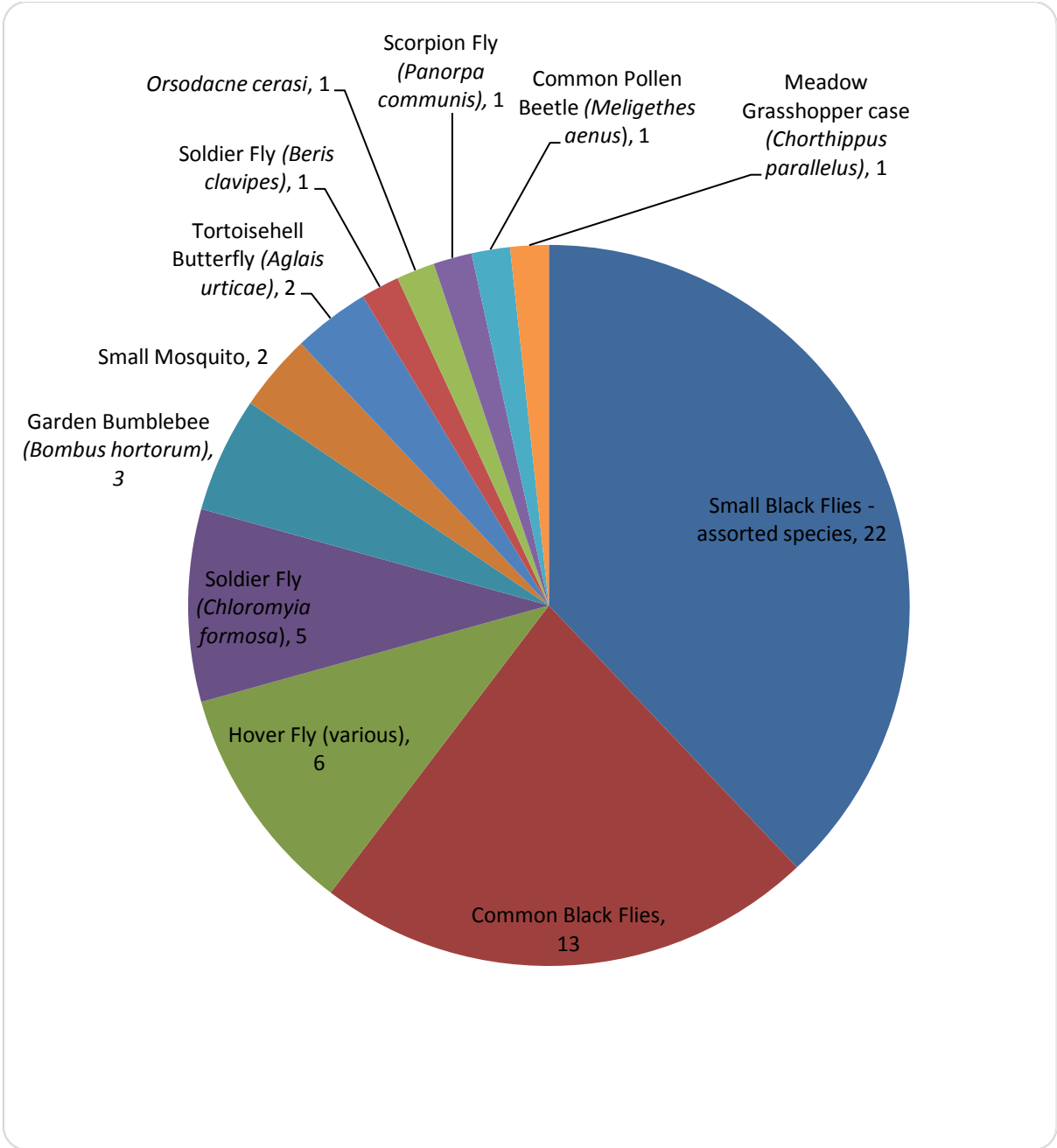


Table 2 Species found in Wildflower Meadow, Courtyard, Yr 1

## b. Sedum Trial Bed (TLP)

### Background

As with the Wildflower Meadow this was laid to see what would be attracted to sedum. As a rule this is laid on rooftops to create green roofs, a far more biodiverse roof covering than traditional tiles or even thatch. Sedum, being a succulent, stores water in its leaves which it will then use in times of drought.

The area is the small courtyard as previously discussed. Would this effect the level of wildlife found in this small area? Furthermore what would be the effect of having a sedum bed next to a wildflower meadow? Would this increase the level of invertebrates present in the sedum?

### Trap Survey – Method

As the area surveyed was so small - less than a meter wide and only a few meters long, the main part of the survey was carried out using one type of trap;

- pitfall trap - small shallow clear plastic tub sunk into the turf so upper lip is at ground level, containing a water/washing up liquid mix.

DATE/TIME SET	WEATHER CONDITIONS	WIND	DATE/TIME RETRIEVED	WEATHER CONDITIONS	WIND
21.06.2010 10:00 – 10:20	DRY, SUNNY AND WARM	LIGHT BREEZE	22.06.2010 10:15 – 10:25	DRY, SUNNY, HOT	LIGHT BREEZE

The survey took place during ideal conditions, with similar conditions prevailing over night. The trap was in place for a little over twenty four hours, and was expected to attract/trap a reasonable number of invertebrates over the period chosen.

### Visual Survey

No separate visual survey took place as this was combined with that for Area 1a - Wildflower Meadow (TLP)

## Results

It was interesting to note the very small number of invertebrates present in this newly established bed. This could of course be due to its location next to the wildflower meadow in the courtyard, which was certainly attracting the bulk of the insects present. It could also simply mean that few insects were attracted to it as the sedum had yet to flower in this area. A subsequent survey should help to establish answers to these questions. However, by comparing this trial bed with Sedum bed on the diesel tank roof, it will be possible to see what the potential is for attracting invertebrates.

Species	Number Recorded
Maggots	3
Slugs	2
Black Spider	1
Black Flies	1
Young Common Ground Hopper (4mm) ( <i>Tetrix undulata</i> )	1

Table 3 Species collected from Sedum bed in courtyard 1<sup>st</sup> Year

The table above shows only a small number of species present in this small area of sedum. However, this cannot really be considered indicative of the invertebrates that a green roof would attract in its first year as this bed is located on the ground, adjacent to a wildflower meadow as opposed to being located on a roof.

Full survey results can be also be viewed in graphical format below:

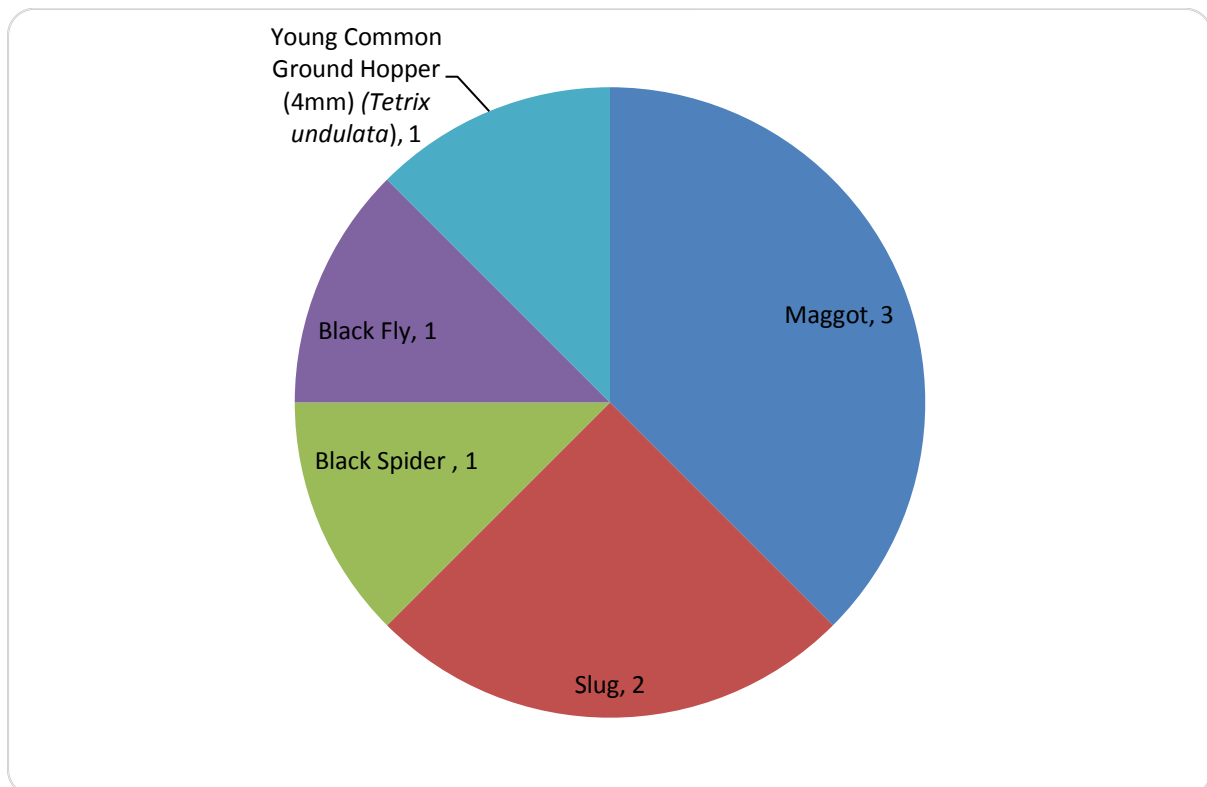


Table 4 Species Found on Sedum, Courtyard Yr 1

## c. Chalk adjacent to areas a & b in enclosed courtyard

### Background

The area adjacent to the wildflower meadow and the sedum bed was added to the survey by way of comparison. This area has very little soil and is predominantly chalk which provides the composition for the overall area. At the time of the survey, it was completely void of plants of any sort possibly due to the prolonged dry spell but also due to the time of season when very little if anything had run to seed.

The area in the courtyard, as has already been discussed is surrounded by single story barns and has only one narrow passage leading to it.

### Trap Survey – method

As the area surveyed was being used for comparison purposes only, one type of trap was used;

- yellow frisbee to attract as many invertebrates as possible with a little water with washing up added to break the water surface

DATE/TIME SET	WEATHER CONDITIONS	WIND	DATE/TIME RETRIEVED	WEATHER CONDITIONS	WIND
21.06.2010 10:25 – 10:30	DRY, SUNNY AND WARM	LIGHT BREEZE	22.06.2010 10:25 – 10:30	DRY, SUNNY, HOT	LIGHT BREEZE

### Visual Survey

No separate visual survey took place as this was combined with that for Area 1- Wildflower Meadow (TLP) and Area 2 - Sedum Bed.

### Results

As expected there was very little wildlife on the chalk. However, there was an abundance of common black flies, which was expected, plus a few other flies which had also been discovered in areas a & b.

Species	Number Recorded
Common Black Flies small	11
Spider	1
Snipe fly 6mm ( <i>Atherix ibis</i> )	1
Soldier Fly ( <i>Chloromyia formosa</i> )	1
Dance Fly ( <i>Empis trigramma</i> ) 3mm	1

Full survey results can be also be viewed in graphical format overleaf

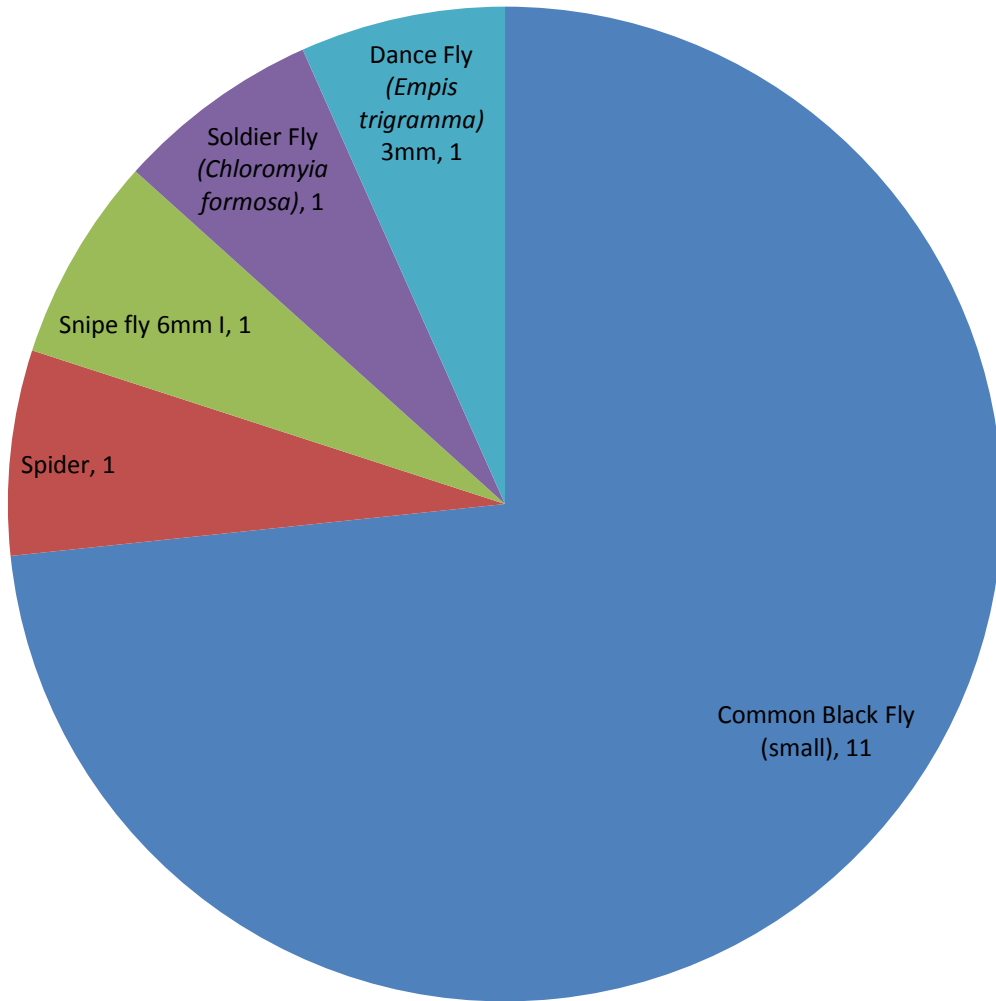


Table 5 Species Found on Chalk in Courtyard

## Conclusions for Area 1

The presence of such a variety of wildlife in an enclosed courtyard indicates that even though the initial area chosen for either a small wildflower meadow or a sedum roof appears barren of wildlife, within a few months the diversity of creatures that find it and utilise that habitat for food and procreation is greatly increased. This was evidenced by the abundance of invertebrates both on the ground and air-born especially in the wildflower meadow.



Soldier Fly *Chloromya formosa* - trap method has caused genitalia to become exposed



Soldier Fly taken by A Dale

## Area 2 – Grass Lawn

### Background

The lawn turf surveyed has been established for the past seven years. It lies in the south west corner of the main turf beds and is within 20 meters of the fresh water lake which lies to the south. In its north west corner lies a boggy area with yellow Iris and tall grasses, with farm buildings and barns both north and west from 30m and beyond. Over time white clover has become established in the lawn turf.

### Trap Survey - Method

- yellow frisbee to attract as many invertebrates as possible with a little water with washing up added to break the water surface

DATE/TIME SET	WEATHER CONDITIONS	WIND	DATE/TIME RETRIEVED	WEATHER CONDITIONS	WIND
21.06.2010 11:00 – 11:20	DRY, SUNNY AND WARM	LIGHT BREEZE	22.06.2010 11:15 – 11:40	DRY, SUNNY, HOT	LIGHT BREEZE

The survey took place during ideal conditions, with similar conditions prevailing over night. The trap was in place in a hollow in the lawn, for a little over twenty four hours, and was expected to attract/trap any invertebrates walking across the turf over the period chosen.



Yellow frisbee trap set in hollow

## Visual Survey

An additional visual survey took place over two twenty minute periods both at the time of the traps being set and at retrieval. This consisted of simply observing the larger insects that were in evidence at those moments in time.

Unfortunately the only insects in evidence were small Red Tailed Bees (*Bombus ruderarius*) pictured previously, and various black flies, despite the proximity to the lake and the open aspect of the site.

## Results

Upon examining the results it came as no real surprise that the frisbee trap contained an abundance of black flies. The presence of White Clover (*Trifolium repens*) accounted for the presence of Red Tailed Bees (*Bombus ruderarius*), note the red hairs on the pollen basket in the photograph below, which separates it from the more common *Bombus lapidarius*.

Species	Number Recorded
Common black Flies	63
Red Tailed Bee ( <i>Bombus ruderarius</i> ) - worker 13mm	4
Dolichopids ( <i>Poecilobothrus nobilitatus</i> ) - ( 10mm in total)	2
Dance Fly ( <i>Hilara maura</i> )	1
Louse	1
Leaf Beetle ( <i>Pyrrhalta viburni</i> )	1

Table 6 Species Recorded on Lawn Turf

Table 2 above highlights the quite distinct proliferation of Common Black Flies, most of which are most likely to have been females attracted to the White Clover.



Leaf Beetle (*Pyrrhalta viburni*)



*Bombus ruderarius* – note the red hairs bordering the pollen baskets

However, it was also interesting to find that a large Leaf Beetle (*Pyrrhalta viburni*) had wondered into the trap as photographed below, something that wasn't recorded in any of the other samples.

Full survey results can be also be viewed in graphical format overleaf

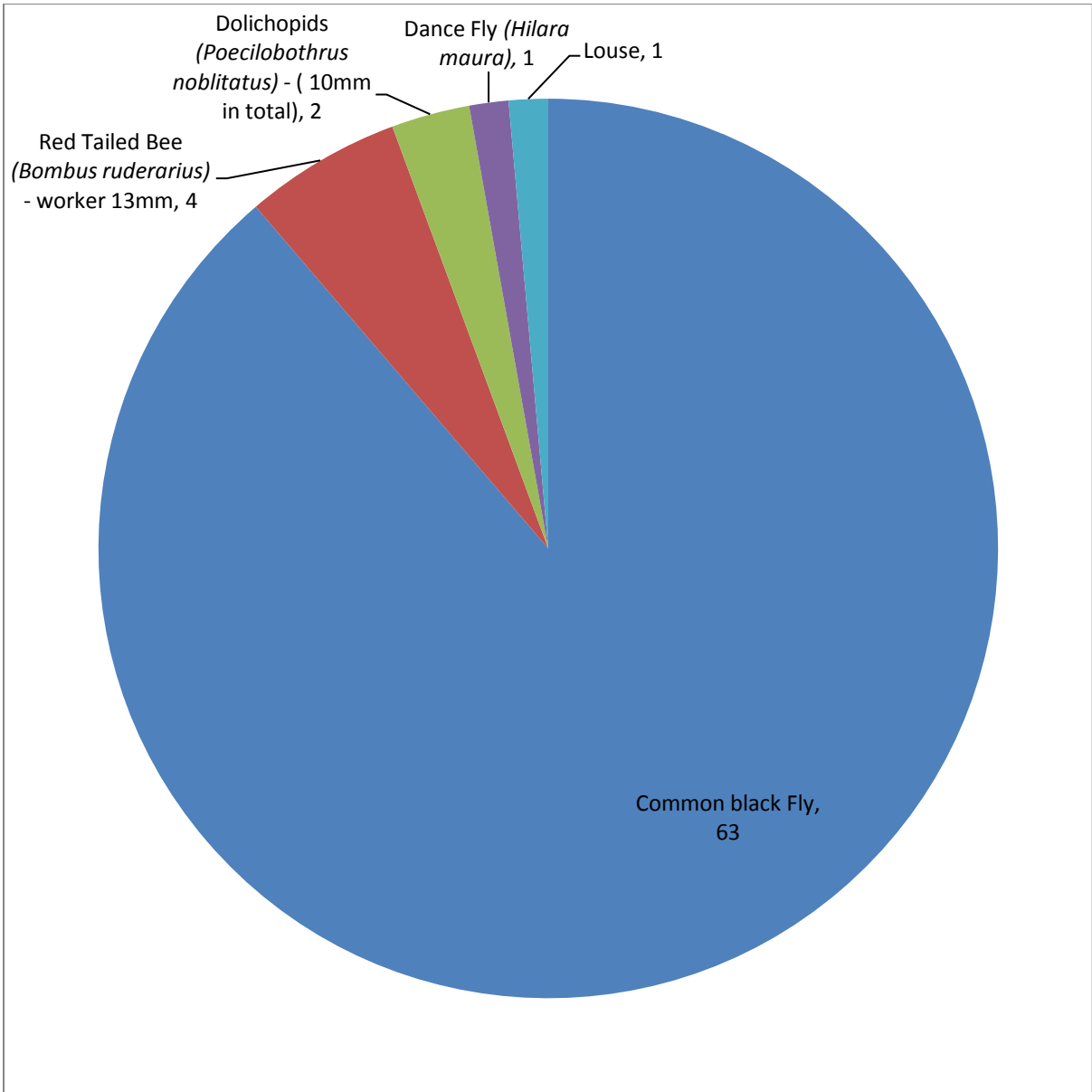


Table 7 Species found in Grass Lawn

## Area 3 – Wildflower Meadow

### Background

This wildflower meadow is on a slope adjacent to the lake and was established seven years ago. Over time the balance between flower species has changed as expected. At the time of the survey, the vast majority of flowers were Oxeye Daisies.



Due to the meadows proximity to the lake, species that would *not* normally be present in a wildflower meadow were in evidence, such as young frogs that had newly emerged from the lake, plus a number of damselflies. A beehive has also been installed in the centre of the meadow which accounts for the high number of honey bees seen during the visual survey.

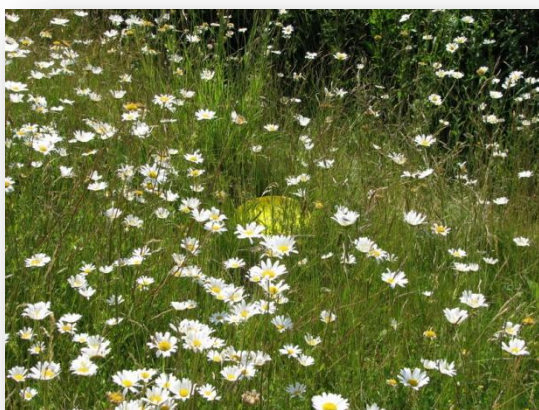
The meadow is shielded on its west and north sides by mixed broadleaved hedge rows and on the east by a small broadleaved copse

### Trap Survey – Method

The main part of the survey was carried out using two types of trap;

- yellow frisbee to attract as many invertebrates as possible with a little water with washing up added to break the water surface
- pitfall trap - small shallow clear plastic tub sunk into the turf so upper lip is at ground level, also containing a water/washing up liquid mix.

DATE/TIME SET	WEATHER CONDITIONS	WIND	DATE/TIME RETRIEVED	WEATHER CONDITIONS	WIND
21.06.2010 11:25 – 11:40	DRY, SUNNY AND WARM	LIGHT BREEZE	22.06.2010 11:45 – 12:00	DRY, SUNNY, HOT	LIGHT BREEZE



The survey took place during ideal conditions, with similar conditions prevailing over night. The traps were in place half way down the meadow about 30 yards east of the beehive with the pitfall trap slightly higher up the bank and 10 yards further east. They were in place for a little over twenty four hours, and were expected to attract/trap any invertebrates walking across the meadow over the period chosen.

## Visual Survey



The visual survey was carried out by observing air-born insects around the specific area that the traps were set. This survey by no means enumerates all those present over the meadow.

## Results

The results really speak for themselves. After seven years this wildflower meadow is well established and provides a stable habitat for a large variety of invertebrates indigenous with wildflower meadows as well as those that frequent lakeside margins.

As expected there was a surfeit of air-born invertebrates, from Damselflies to Butterflies. One especially nice specimen of Tortoiseshell Butterfly, as photographed, particularly enjoyed the abundance of nectar on offer.

Due to the proximity of the beehive there were an abundance of honey bees as well as some bumblebees, namely *Bombus ruderarius*. There were also a significant number of crickets and grasshoppers both seen and heard.

Species	Number Recorded
Honey Bees ( <i>Apis mellifera</i> )	35
Common Blue Damselfly ( <i>Enallagma cyathigerum</i> )	20
Hoverfly ( <i>Helophilus pendulus</i> )	10
Blue Tailed Damselfly ( <i>Ischnura elegans</i> )	8
Crickets	8
Black Ants	6
Spiders	3
Soldier Fly ( <i>Chloromyia formosa</i> )	3
Lesser Marsh Grasshopper ( <i>Chorthippus albomarginatus</i> )	1
Meadow Brown Butterfly	1
Small Tortoiseshell Butterfly	1
Green Veined White Butterfly	1

Surprisingly there weren't any common black flies caught in the traps, however at the time the survey was carried out, the House Martins that nest in the various barns were very much in evidence, swooping to the lake and collecting mud for their nests. The area is also populated by an abundance of insect loving birds such as Blackbirds, Finches and Swifts which could account for this lack of flies.

Full survey results can be also be viewed in graphical format overleaf

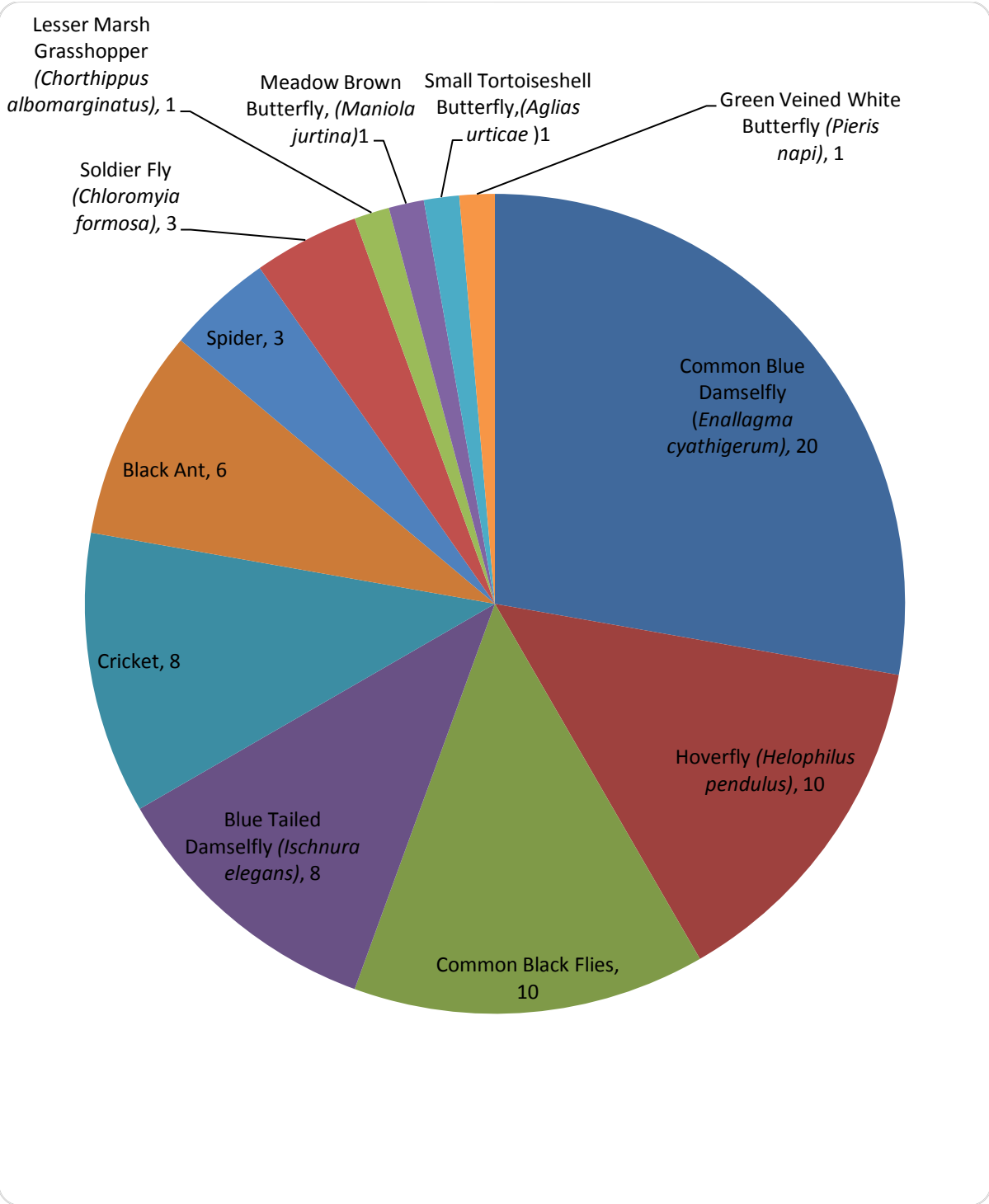


Table 8 Species found in Wildflower Meadow Adjacent to Lake

## Area 4 – Stable Roof

### Background

The stable block has been established for the past two years. The roof is laid with wildflower turf and is exposed on the north side especially, whereas the south, east and west sides are sheltered by the woods, barn and farmhouse respectively.

The wildflower turf was very dry at the time of the survey having been exposed to sun and wind for the past weeks during the dry weather.



Stable roof from the East looking West

### Trap Survey – Method

The area surveyed was the roof of an L shaped stable block. One type of trap was used on the east facing Apex;

- two yellow frisbees were placed approximately three meters apart to attract as many invertebrates as possible with a little water with washing up added to break the water surface

DATE/TIME SET	WEATHER CONDITIONS	WIND	DATE/TIME RETRIEVED	WEATHER CONDITIONS	WIND
21.06.2010 12:00 – 12:20	DRY, SUNNY AND WARM	LIGHT BREEZE	22.06.2010 12:15 – 12:30	DRY, SUNNY, HOT	STIFF BREEZE

The survey took place during ideal conditions, with similar conditions prevailing over night. The traps were deliberately placed in amongst wildflowers at different stages, i.e. the Yellow Rattle (*Rhinanthus minor*) had finished flowering whereas the tufted vetch was in full flower. This was to see whether different species of invertebrates would be in evidence if the plants were flowering as opposed to laying seed. The yellow frisbees were in place for a little over twenty four hours, and were expected to attract/trap any invertebrates walking across the wildflowers over the period chosen.

## Visual Survey

A brief visual survey carried out whilst the trap were being laid and then again when they were being collected, revealed only bumbles bees, and flies. However at this elevation, a little over 2m, the breeze that had been light the previous day was increased, mostly by the stable blocks position on the farm, being open to the north and west, so no butterflies were in evidence, which was not surprising.

## Results

The range of species found on this single apex of the stable roof indicates that this has become a substantial habitat for wildlife over the past two years.

The variety of species was greater than the wildflower meadow adjacent to the lake and as expected was broader than the wildflower meadow in the courtyard. However, the variety and number of species was similar in both frisbees.

<b>Species</b>	<b>Number Recorded</b>
Hover flies (2mm)	17
Insect Casings - various	6
Midges 1mm	3
Soldier Fly ( <i>Beris clavipes</i> )	3
Garden Bumblebee ( <i>Bombus hortorum</i> )	3
Black Flies small	2
Rose Aphids ( <i>macrosiphum rosea</i> )	2
Soldier Fly ( <i>Chloromyia formosa</i> )	2
Red Spider Mite ( <i>Panonchus ulmi</i> )	1
Caterpillar (moth)	1
Sawfly ( <i>Megalodontes klugii</i> )	1
Fruit Fly	1
Spider - small	1
Parasitic Hymenoptera ( <i>Aulacus striatus</i> )	1

Full survey results can be also be viewed in graphical format overleaf.

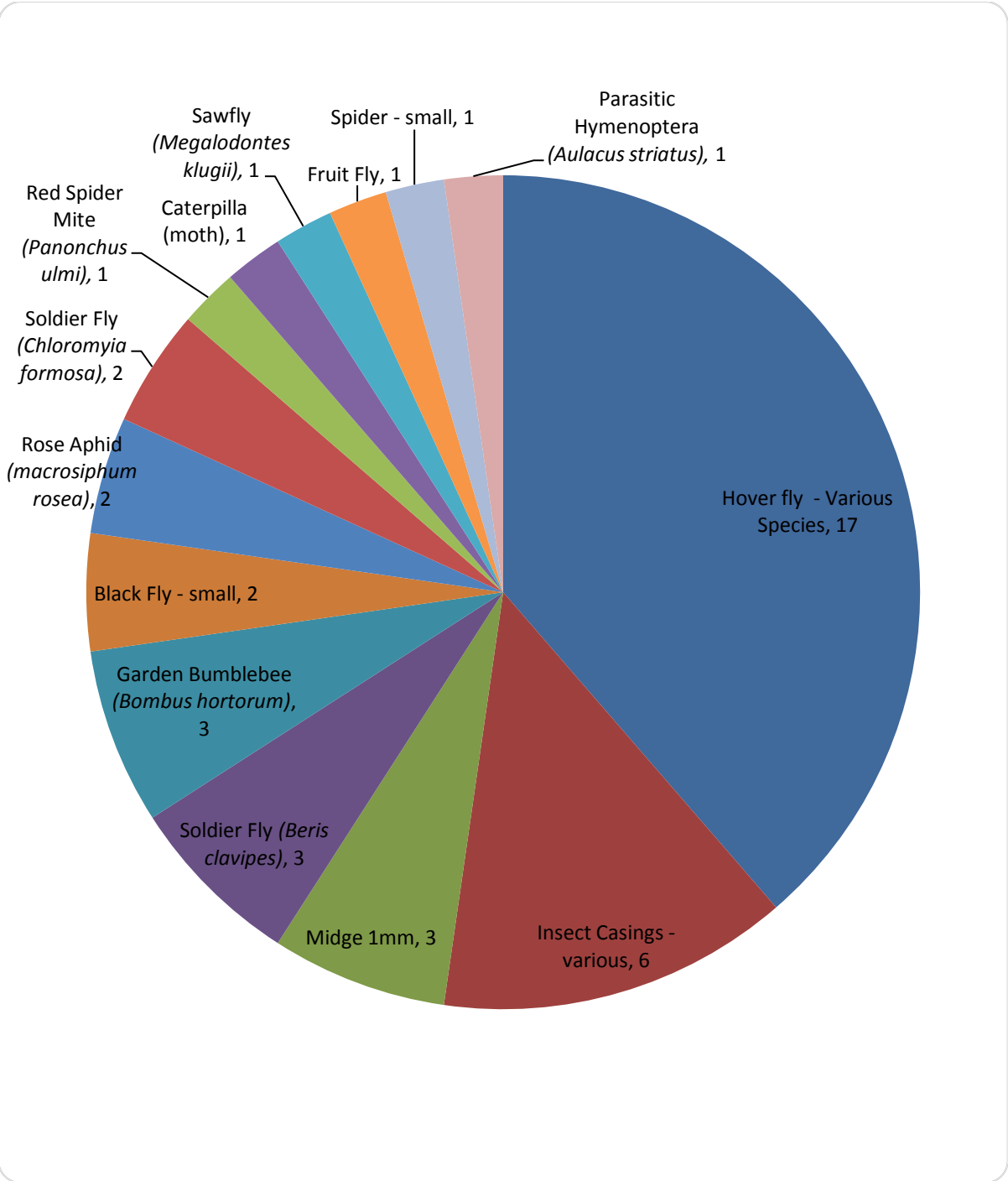


Table 9 Species found on Stable Roof June

## PHASE 2 Green Roofs - July

### Area 6 – Sedum Roof

#### Background

At the top of the slope leading to the wildflower turf beds there is a diesel tank upon which a sedum roof has been established for the past three years. The tank is fairly exposed on all sides and especially on the East. The roof is approximately 6m<sup>2</sup>.

At the time the survey was instigated the weather had been inclement for at least a couple of weeks although quite warm.

Most of the sedum had finished flowering as there had been a prolonged dry spell during the months of May through to July which instigated a fast flowering season.

#### Trap Survey – Method

The area surveyed was the flat roof of a diesel tank. Only one type of trap was used, placed as close to the centre as possible.

- yellow frisbees with a little water with washing up added to break the water surface

DATE/TIME SET	WEATHER CONDITIONS	WIND	DATE/TIME RETRIEVED	WEATHER CONDITIONS	WIND
25.07.2010 10:30 – 10:40	DRY, WARM, SCATTERED CLOUDS, SUNNY	LIGHT BREEZE	26.07.2010 11:30 – 11:40	DRY, WARM SCATTERED CLOUDS, SUNNY	LIGHT BREEZE

When the trap was set the weather was dry and sunny, however there was light drizzle overnight and into the early hours of the morning, finally ceasing around 08:30. This was not heavy enough to affect the liquid levels of the trap.

The yellow frisbee was in place for a little over twenty four hours, and was expected to attract/trap any invertebrates walking across the roof over the period chosen.

#### Visual Survey

Short visual surveys took place whilst the traps were being set and later retrieved. At the time of setting the weather was warm, dry and sunny. Hoverflies were observed but no bees or butterflies. However, this was expected as the Sedum has now ceased flowering.

At the time of retrieval, there were only flies observed around the sedum.

There is an abundance of House Martins flying around so the low numbers of common flies in close vicinity was anticipated.

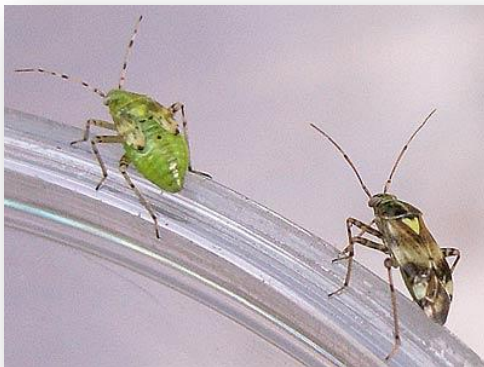
## Results

In view of the changes in weather between the traps being set, the subsequent overnight drizzle and the large flocks of House Martins hunting around the farm, there were still a large number of flies in the trap. However, the vast majority of these were small, winged aphids.

Pollen beetles were expected as were Hoverflies as there is still some nectar available. Female parasitic Hymenoptera insert their eggs into the larvae of other insects and were also present in wildflower meadows and would also be expected wherever there was a variety of insects and their larva to prey upon.

It was interesting however, to find a Mirid bug (*Liocoris tripustulatus*). Unusual though to find it on sedum as this particular bug prefers nettles which provide the food source throughout its life stages. The one found is believed to be a new generation adult as the markings darken considerably as it matures.

Species	Number Recorded
Air-born Aphid (green fly, black fly)	100
Pollen Beetle	20
Common Black Fly	14
Hoverfly (various)	5
Parasitic Hymenoptera	2
Green Bottle Fly	1
Large House Fly ( <i>Phaonia sp.</i> )	1
Mirid Bug ( <i>Liocoris tripustulatus</i> )	1



Mirid Bug by Ashley Wood (June 2007, Surrey)



Mirid Bug (*Liocoris tripustulatus*)

## Area 7

### Stable Roof

#### Background

Having surveyed the stable roof in June when the flowers were in full bloom, it was decided to survey this area again when most of the wildflowers had gone to seed and the grasses were also seeding. However, as this was the only other roof available to survey, it was surveyed a second time in order to draw comparisons between two criteria:

- The possible differences in wildlife between the flowering stages
- The wildlife present on a roof of native wildflowers & grasses and that planted with sedum

#### Trap Survey – Method

The area surveyed was the east apex of the stable block. Only one type of trap was used, placed as close to the centre as possible.

- yellow frisbees with a little water with washing up added to break the water surface

DATE/TIME SET	WEATHER CONDITIONS	WIND	DATE/TIME RETRIEVED	WEATHER CONDITIONS	WIND
25.07.2010 10:50 – 11:00	DRY, WARM, SCATTERED CLOUDS, SUNNY	LIGHT BREEZE	26.07.2010 11:40 – 11:50	DRY, WARM SCATTERED CLOUDS, SUNNY	LIGHT BREEZE

When the trap was set the weather was dry and sunny, however there was light drizzle overnight and into the early hours of the morning, finally ceasing around 08:30. This was not heavy enough to affect the liquid levels of the trap.

The yellow frisbee was in place for a little over twenty four hours, and was expected to attract/trap any invertebrates walking across the roof over the period chosen.

#### Visual Survey

The weather conditions when the trap was set were favourable having been dry for a few days. Several insects were present in flight over the stable roof, namely butterflies (Tortoiseshell, Large White and a very nice Small Skipper *Thymelicus sylvestris*), several species of hoverfly and a day flying white micro-moth. Several wasps were also observed due to the location of a nest at the other end of the stable block roof.

The following day when the traps were retrieved, saw a downturn in the number of air-born insects. However, it had been raining during the night and had only ceased around 08:30. The only insects observed were several varieties of hoverflies and one wasp. The clouds had only just dispersed so the lack of butterflies was unsurprising around the tall wet grasses and wildflowers.

## Results

It was interesting to note the considerable number of invertebrates present on the roof even though most of the flowers had finished blooming. Grasses were however in flower and attracted many of the hoverflies, and smaller insects.

According to the Butterfly Conservation website<sup>2</sup> one of several grasses Small Skippers feed on is Timothy (Phleum sp.), which is one of the grasses grown in the wildflower meadow seed mix.



Leafhopper (*Arboridia sp.*)



Small Skipper (*Thymelicus sylvestris*)

Leafhoppers, pictured above, are wholly vegetarian, producing honeydew as a waste product which is eagerly consumed by bees and many other insects

Species	Number Recorded
Hoverfly (various species)	10
Common Black Fly	10
Common Pollen Beetle ( <i>Meligethes aenus</i> )	6
Sweat Bee ( <i>Halictus rubicandus</i> )	3
Small yellow & black fly	2
Common Wasp	2
Blow Fly	1
Bumble Bee	1
<i>Ichneuman suspiciosus</i> ♀	1
Ladybird Larva	1
Large White Butterfly	1
Leafhopper ( <i>Arboridia sp.</i> ) 3mm	1
Louse Fly ( <i>Gonia sp.</i> )	1
Parasitic hymenoptera	1
Small Skipper ( <i>Thymelicus sylvestris</i> )	1
Tortoiseshell Butterfly	1
White day flying micro moth	1

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<sup>2</sup> [Butterfly Conservation](#)

## Analysis

### PHASE 1 WILDFLOWER MEADOWS Vs. LAWN GRASS

On analysis when comparing the data from the selected wildflower meadows (both on the ground and the roof), it can be concluded that wildflower meadows sustain a greater variety of species than standard grass lawns or meadows as can be seen from the chart below.

After 7 years the lawn grass is still mostly attracting common black flies and bumble bees, which can mostly be attributed to the large patches of clover present which were in full flower at the time of the survey. It can only be assumed that if the clover was absent, that even this low level of biodiversity would decrease.

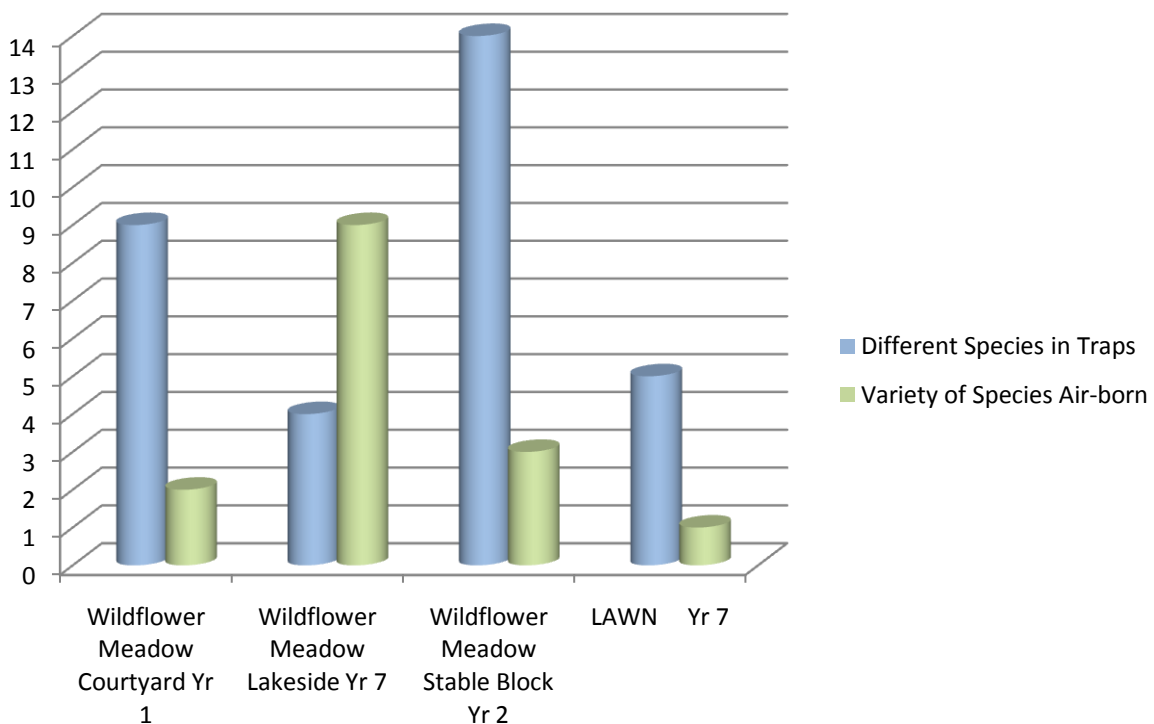


Table 10 Wildflower Meadow vs. Lawn Grass

The Wildflower Meadow in the courtyard (Area 1a), in less than three months old and in such an enclosed location, still attracted a wider variety of invertebrates than the grass lawn which was located in an open area only approximately 20 yards from the lake and the adjacent wildflower meadow and had been established for seven years (Area 2). Moreover, the speed at which Area 1a established itself was considerable, being only a relatively short time before the plants ceased to require any irrigation and had begun to grow and produce flower buds. Evidence of this can be seen on the [Company's website](#) where time-lapse photography footage shows this area from the time it was laid to when it was established and free flowering.

## PHASE 2 – GREEN ROOFS

The final analysis for this survey concerned the two types of green roof being cultivated at Ashe Warren Farm, sedum and native wildflower. This survey was carried out in mid July.

Sedum is a recognised roof covering designed to provide environmental benefits such as absorption of carbon dioxide, food sources for bees and butterflies and safe refuges for over wintering bugs.

Native wildflowers are also recognised as a roof covering, certainly in Norway where they have been used for several decades, but are they more effective and longer lasting than sedum?

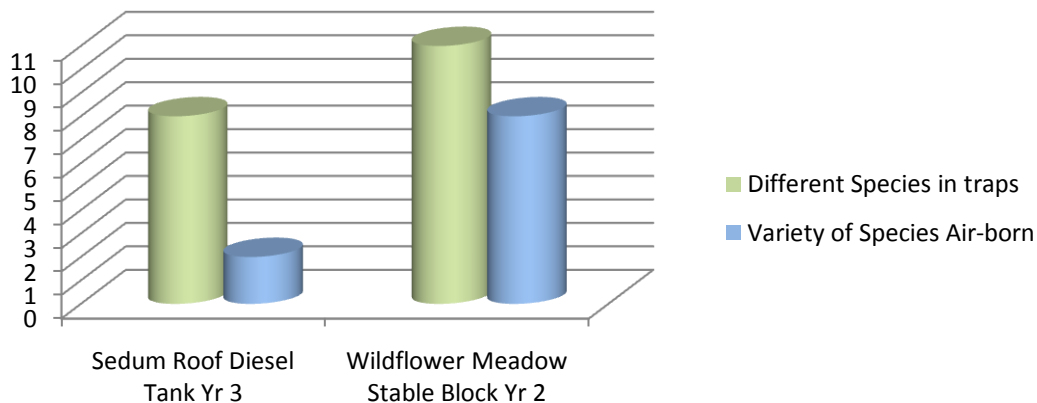


Table 11 Sedum Roof vs. Wildflower Meadow Roof

### Sedum Roof - July

Whilst there was a range of insects present in the sedum, it consisted mainly of common species such as Aphids, Black Flies, Pollen Beetles and Hover Flies. The sedum had finished flowering at the time of the survey which was due to the extended dry period over May-July. Whilst this type of green roof is drought tolerant it does die off if the period of drought is extended at which time insect activity is greatly reduced as seen in the second survey.

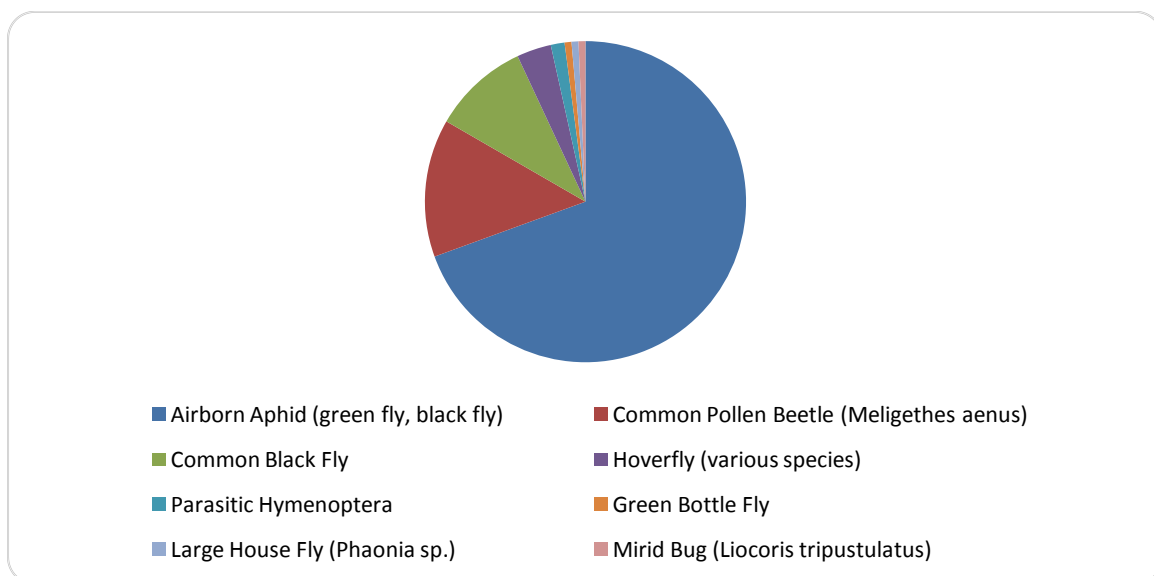


Table 12 Species Recorded on Sedum Roof July

## Stable Block - July

The stable block in contrast provided a wealth of species with insects that feed on both grasses and wildflowers, some of which are becoming increasingly less frequent today. Whilst most are not endangered at present the reduction in their habitat throughout the British Isles can only result in their becoming scarce.

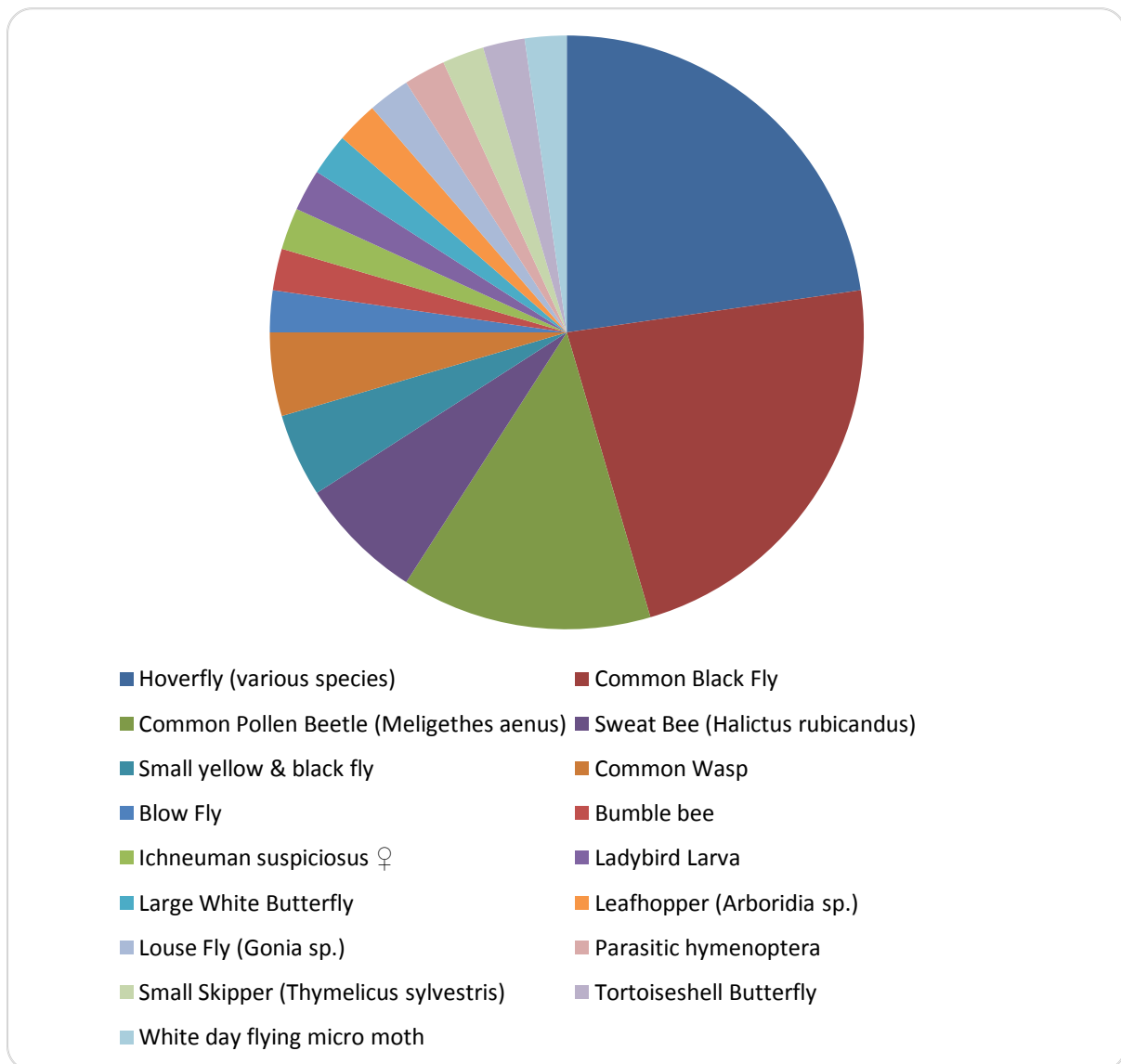


Table 13 Species Recorded on Stable Block July

Wildflower roofs are less drought tolerant than sedum, however over an extended dry period the flowers run to seed and therefore this type of roof becomes more self-sustaining.

The variety of insects, 17 different species – although common black flies have not been individually identified – appears to indicate that the creation of a wildflower meadow as a green roof is a guaranteed way to create a biodiverse habitat even though space may be at a premium

## Stable Block Analysis – June & July

The stable block was most interesting. This area was surveyed twice, first in June when the majority of flowers were in full bloom and then subsequently in July when much of the wildflowers had gone to seed and the grasses had begun to flower. As a result clear evidence of the biodiversity of this “meadow” has begun to appear as can be seen in Table 8 below.

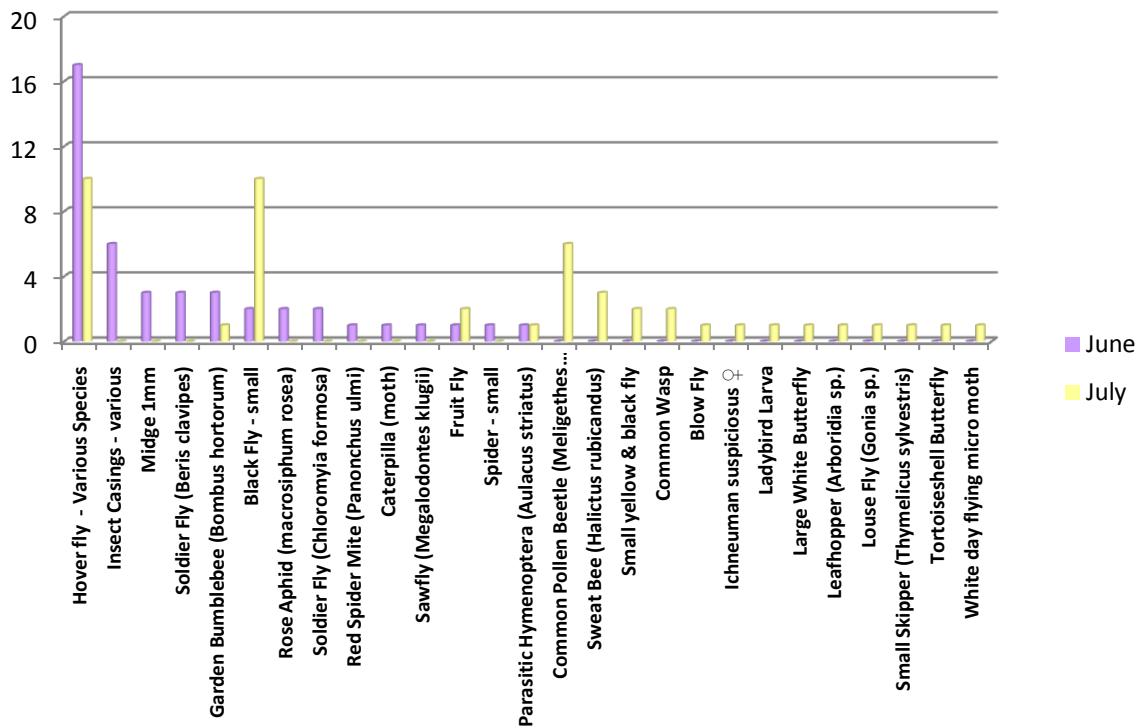


Table 14 WFM Stable Roof June & July 2010

The continuously changing varieties of insects appears to indicate that wildflower roof turf doesn’t just provide habitat for a selected number of insects, but rather that selection changes as the season progresses. It will be interesting to see if a similar metamorphosis occurs in another month’s time.

It is recommended that successive surveys are carried out over a number of months/seasons to establish whether the apparent trend demonstrated by the stable roof, can be sustained, and whether wildflower meadow turf can be seen as a long term method of sustaining a green roof.

It is also envisaged that sweep nets will be used to capture air-born insects as opposed to a visual survey for subsequent surveys.

## Conclusions

The evidence above appears to indicate that wildflower meadows attract and provide habitats for a wider range of insects than ordinary grass lawns or meadows. Similarly when creating a green roof the data appears to indicate that even though sedum provides recognised environmental benefits such as absorption of carbon dioxide and a food source for bees and butterflies while it is flowering, the variety of insects frequenting sedum is much less diverse than native wildflower roofs.

Wildflower meadows can evidently attract many invertebrates even in the first few months after becoming established. In successive years this diversity is likely to increase if results from the other wildflower meadows can be used in comparison.

With reference to providing safe refuge for over wintering insects, wildflower meadows thicken with age thus providing a more consistent safe refuge than sedum or lawn grass.

The results of Phase One and Phase two surveys appear to indicate that wildflower meadows are a more biodiverse solution to environmental changes and should therefore be considered an ecological option for landscapes and roofs.

This survey has concentrated on a small range of options that will encourage native flora and fauna. However, it can be said that the creation of the habitats surveyed is easy to achieve using wildflower turf and the potential to improve biodiversity can be seen in the results of this report.

By establishing these types of biodiverse ecosystems, even for small areas, such as gardens and roofs, the results would indicate significant benefits to the environment and its diversity.

# Appendix 1

