



Fife's Buzzing pollinator survey report- year 1

November 2014

Suzanne Bairner



Saving the small things that run the planet

Summary

Over the three year project, Fife's Buzzing will create wildflower meadows at 16 parks totalling over 12 hectares across Fife. Sites have been selected across the Kingdom of Fife to deliver multiple benefits to both wildlife and people.

Surveys to record invertebrates, focusing on pollinating insects, before and after meadow creation will identify species using the meadow as well as changes over the project lifetime.

During this pollinator survey, a total of eight parks, selected for meadow creation and enhancement in autumn 2014 and spring 2015, were surveyed for invertebrates; parks surveyed included Dunnikier Park, Dunnikier Park Golf Course and Ravenscraig Park in Kirkcaldy, Public Park in Dunfermline, Cotlands Park in Kennoway, Poplar Road in Methil, Riverside Park in Glenrothes and Silver Sands in Aberdour. A higher number of species of invertebrate were recorded within pre-existing areas of meadows at Dunnikier Park and Public Park (30 species) than in areas of amenity grassland at all eight parks (8 species). A total of 33 invertebrate species were recorded during this survey this total includes 18 species of pollinating insect.

The creation and enhancement of meadows through this project will include planting a range of native wildflower species of known origin that will provide vital foraging habitat for pollinating insects and other wildlife.

Contents Page

	Page Number
1. Project introduction	3
2. Pollinator survey method	4
2.1 Sweeping vegetation	5
2.2 Direct observations	5
3. Results	6
4. Discussion	7
5. Conclusion	10
Appendix 1. Complete list of invertebrate species	11

1. Project introduction

A massive 97% (over 3,000,000 hectares) of flower-rich grassland have been lost in the UK since the 1940's through agricultural intensification to produce more home-grown food, and through wider development of housing, transport infrastructure and industry. These flower-rich areas are vital habitats for a range of wildlife species, particularly pollinating insects such as bees, butterflies and hoverflies. The loss of wildflower meadows across the UK has resulted in a massive decline in pollinators as well as other invertebrate species. Over 250 species of pollinating insects in the UK are in danger of extinction and are on the UK Biodiversity Action Plan (UKBAP) priority species list.

Eighty percent of plants need insects for pollination and without these plants we would not have the air we breathe and the food we eat. Pollinators are thought to be responsible for one in every three mouthfuls of the food that we eat and it is estimated that 84% of crops in the European Union (valued at £12.6 billion per annum) rely on insect pollinators. In the UK, pollination of agricultural crops by insects is valued at more than £400 million. National reports in the press stress the importance of honeybees in food production but wild bees and other insects are even more important as they are adapted to pollinate a much wider range of plants. With the recent decline in pollinating insects, there is evidence that insect pollinated plants are also declining and at a faster rate than wind and water pollinated plants.

In Fife, there has been a significant loss of species-rich grassland to urbanisation, industrialisation and agriculture (65% of the land area is cultivated as arable farming and 10% is urban). Acid, neutral and calcareous grassland make up a mere 2.8% of Fife's land area and improved, semi-improved and poor semi-improved grassland that are outwith arable farming make up 3.4% of land area. Many of the remaining grassland areas are managed strictly for amenity use and consequently, support very little wildlife and few plant species. As a result of the above loss in habitat, species-rich grassland is a priority habitat within the current edition of the Fife Local Biodiversity Action Plan (LBAP) (Figure 1).



Figure 1. Wildflower species-rich grasslands like this one at Dunnikier Park in Kirkcaldy are a priority habitat within the Fife Local Biodiversity Action Plan.

Buglife has joined forces with Fife Council to transform mown grassland in urban areas into colourful and wildlife-rich wildflower meadows across Fife. These wildflower meadows will not only provide habitat for invertebrates but will also provide food and nesting areas for a range of other wildlife such as birds, amphibians and small mammals including bats, of which all six species in Fife are a priority in the LBAP.

As well as being important for wildlife, meadows also offer enormous benefits for people. The wildflower meadows will create stunning natural areas that will improve the quality of greenspace for local residents and visitors to enjoy and this in turn will improve people's health and well-being. Additionally, they will also be used as an educational tool by community groups and schools. Across Fife these areas will bring communities together through their creation, management, use and enjoyment.

Fife's Buzzing will create 16 meadows (c. 12.6 hectares) across Fife. Sites have been selected in order to deliver multiple benefits to wildlife and people. This project started in August 2014, is funded by the Heritage Lottery Fund and Fife Environment Trust.

2. Pollinator survey method

As part of this project, Buglife will undertake surveys to record invertebrates, focusing on pollinating insects, as well as wildflowers, before and after meadow creation to highlight the benefit to local wildlife and change in species within the meadows; this report will focus on the invertebrates recorded during the surveys.

During year one of the project, Buglife surveyed areas of amenity grassland in eight parks selected for meadow creation and enhancement during autumn 2014 and spring 2015 (Dunnikier Park, Dunnikier Park Golf Course and Ravenscraig Park in Kirkcaldy; Public Park in Glenrothes; Cotlands Park in Kennoway; Poplar Road in Methil; Riverside Park in Glenrothes; Silver Sands in Aberdour) (Table 1); pre-existing meadow areas within Dunnikier Park and Public Park were also surveyed (Table 1).

Table 1. Date, grid reference and proposed timing of habitat creation of selected amenity and meadow area surveyed at each of the eight parks.

Park Name	Area	Grid Reference	Date Surveyed	Habitat Creation
Dunnikier Park	Kirkcaldy	NT281939 (amenity), NT280940 (meadow),	27/08/2014	Autumn 2014
Dunnikier Park Golf Course	Kirkcaldy	NT278946	27/08/2014	Autumn 2014, Spring 2015
Ravenscraig Park	Kirkcaldy	NT296925	27/08/2014	Autumn 2014
Cotlands Park	Kennoway	NO353027	03/09/2014	Spring 2015
Poplar Road	Methil	NO356004	03/09/2014	Spring 2015
Public Park	Dunfermline	NT098873 (amenity), NT099872 (meadow)	05/09/2014	Spring 2015
Riverside Park	Glenrothes	NO262016	05/09/2014	Spring 2015
Silver Sands	Aberdour	NT197852	05/09/2014	Spring 2015

Invertebrates were surveyed during a single visit to each park during dry and warm days in August/September 2014 (Table 1). The surveyor walked a transect across the park using direct observations and a sweep net to survey for invertebrates concentrating on pollinating insects such as bees and wasps (Order Hymenoptera), hoverflies (Family Syrphidae, Order Diptera) and butterflies and moths (Order Lepidoptera). Other invertebrate species found during the survey were also recorded. A complete list of invertebrate species recorded during this survey can be found in Appendix 1.

2.1 Sweeping vegetation

Sweep nets were used to collect invertebrates from vegetation, particularly from flower heads (Figure 2). A canvas net was swept over vegetation in a figure of eight for one minute in a transect across a site and specimens were then collected from the net. Specimens collected in this way were either put into a pot with 70% ethanol to be identified later or if they could be identified by the surveyor at the park the specimen was released.



Figure 2. A sweep net was used to collect invertebrates on vegetation, especially pollinating insects on flowers.

2.2 Direct observations

Identification of several species of bees, wasps, butterflies, moths and hoverflies were made through direct observation of specimens visiting flowers or in flight during a site survey. Sweep nets were sometimes used to aid in identification of a species which could then be released. Other species identified through direct observations included true bugs (Order Hemiptera), and some beetles (Order Coleoptera).

3. Results

A total of 33 invertebrate species were recorded in pollinator surveys across the eight parks in Fife; parasitoid wasps (Hymenoptera), sawfly (Hymenoptera), crane fly (Diptera), money spider (Aranea) and weevil (Coleoptera) recorded within the meadows at Public Park and Dunnikier Park have not been included within this total as several individuals were seen of an unknown number of species. Hoverflies made up the greatest number of pollinator species recorded with a total of eight across all parks (Figure 3). Four species of butterfly and moth and three species of bee and wasp were recorded across the eight parks (Figure 3). A total of 18 other species of invertebrate were recorded and includes seven species of beetle and nine species of true bug (Figure 3).

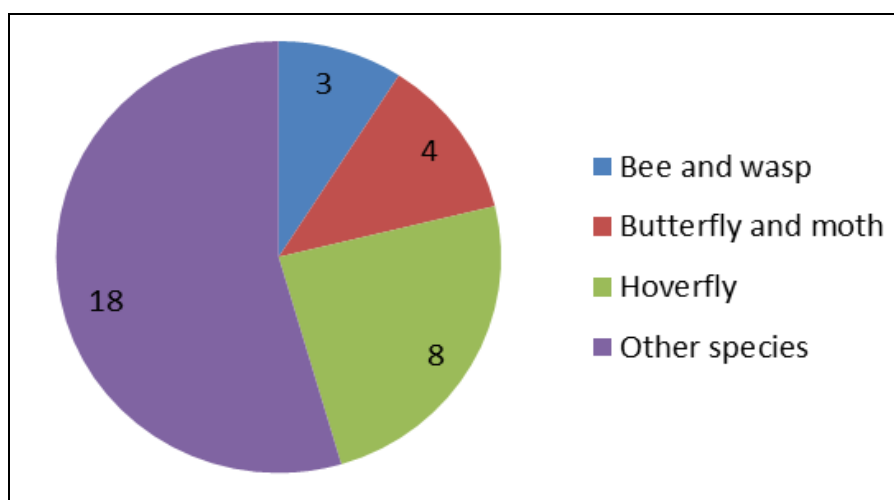


Figure 3. Total number of pollinator species recorded across the eight parks in Fife including 'bee and wasp', 'butterfly and moth' and 'hoverfly'; the category 'other species' includes all other invertebrates and flies that are not hoverflies.

A total of 30 species of invertebrate were recorded within pre-existing meadows at Dunnikier Park and Public Park (Figure 4). Only eight species of invertebrate were recorded within amenity grassland at all eight parks surveyed (Figure 4).

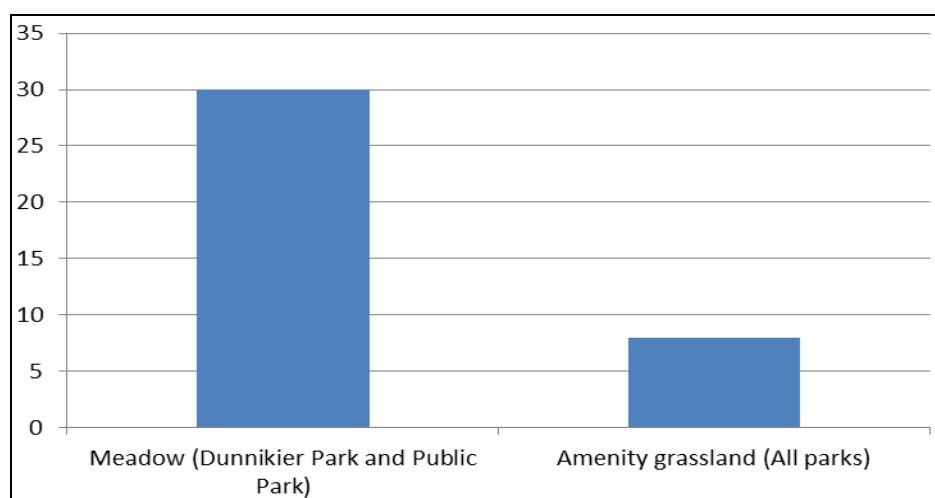


Figure 4. Total number of invertebrate species recorded from within meadow areas at Dunnikier Park and Public Park and amenity grassland at all eight parks surveyed.

Within areas of amenity grassland surveyed, Dunnikier Park and Public Park had the greatest number of invertebrates recorded with a total of three species at each park (Figure 5). Only two species of invertebrates were recorded within amenity grassland at Cotlands Park and Ravenscraig Park and only a single species was recorded at Riverside Park (Figure 5). No invertebrates were recorded at Dunnikier Park Golf Course, Poplar Road or at Silver Sands (Figure 5). Within pre-existing meadow areas, 24 species of invertebrate were recorded from Dunnikier Park and 12 from Public Park (Figure 5).

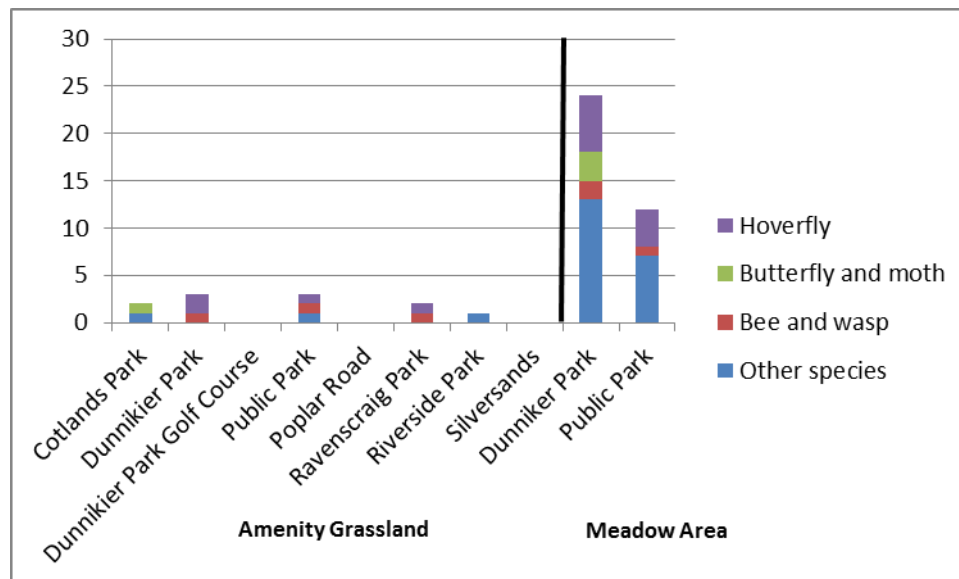


Figure 5. Total number of 'hoverfly', 'butterfly and moth', 'bee and wasp' and all 'other species' of invertebrate (including flies that are not hoverflies) recorded from amenity grassland at all eight parks and from within pre-existing meadow areas within Dunnikier Park and Public Park.

4. Discussion

Summers in Scotland have a mixture of dry and wet weather which varies from year to year across the country. Generally speaking the east coast is cool and dry whereas the west coast is warm and wet. This changeable weather is being further influenced by climate change which is causing summer droughts, flooding and other local extreme weather events. The weather this year in Scotland may have influenced many invertebrate species due to the long dry and warm spring and summer (Figure 6).



Figure 6. Bumblebees including these Buff tailed bumblebees (*Bombus terrestris*) have benefitted with the long dry and warm summer of 2014.

During this survey a total of eight species of invertebrate were recorded from amenity grassland across all eight parks surveyed before meadow creation and enhancement in autumn 2014 and spring 2015; this includes seven species of pollinating insect comprising three species of hoverfly (*Eupeodes corollae*, Marmalade hoverfly (*Episyrphus balteatus*) and Common banded hoverfly (*Syrphus ribesii*)), two species of Hymenoptera (White tailed bumblebee (*Bombus lucorum*) and Common wasp (*Vespula vulgaris*)), and a single species of moth (Nettle tap moth (*Anthophila fabriciana*)) and beetle (Seven-spot ladybird (*Coccinella septempunctata*)).

Of the eight species of invertebrate recorded within amenity grassland, three species were recorded at Dunnikier Park and Public Park that were also recorded from within the pre-existing meadow areas at these two parks; Dunnikier Park: Common banded hoverfly, Marmalade hoverfly and White tailed bumblebee; Public Park: Seven-spot ladybird, Common wasp and Common banded hoverfly.

Very few species of invertebrate were recorded at the remaining six parks; two species were recorded at Cotlands Park in Kennoway (Nettle tap moth and Seven-spot ladybird) and Ravenscraig Park in Kirkcaldy (the hoverfly *Eupeodes corollae* and Common wasp) and only a single species was recorded at Riverside Park in Glenrothes (Black slug *Arion ater*); of these species only the Nettle tap moth, *Eupeodes corollae* and Black slug were not recorded within the pre-existing meadow areas at Dunnikier Park and Public Park (Figure 7).



Figure 7. This Nettle tap moth (*Anthophila fabriciana*) was observed foraging on Daisy (*Bellis perennis*) at Cotlands Park in Kennoway.

No invertebrates were recorded at Dunnikier Park Golf Course in Kirkcaldy, Poplar Road in Methil and Silver Sands in Aberdour. It was expected that low numbers of invertebrates would be recorded within amenity grassland as very few plant species are present and almost no flowers are available for foraging pollinators. A couple of the parks had also just had their grass cut before the surveys took place.

From within pre-existing meadow areas within Dunnikier Park in Kirkcaldy and Public Park in Dunfermline a total of 30 species of invertebrate were recorded and this includes 15 species of pollinating insect comprising hoverflies (seven species), Hymenoptera (three species), butterflies (three species) and beetles (two species).

Within pre-existing meadow areas surveyed a total of 24 species of invertebrate were recorded at Dunnikier Park and 12 species at Public Park. A diverse range of wildflowers are already present at these two meadows that provide important foraging habitat for pollinating insects and other invertebrates, including Rough hawbit (*Leontodon hispidus*), Germander speedwell (*Veronica chamaedrys*) and Cuckooflower (*Cardamine pratensis*) at the Public Park and Self heal (*Prunella vulgaris*) and Lesser Stitchwort (*Stellaria graminea*) at Dunnikier Park. These meadow areas will be further enhanced through this project and new meadows will be created alongside these to provide further foraging habitat for pollinating insects as well as other wildlife.

A range of species were recorded within the meadow at Dunnikier Park including several species of pollinating insect. A total of six species of hoverfly were recorded during the survey all of which are common and widespread across the UK such as the Chequered hoverfly (*Melanostoma scalare*) and the Drone fly (*Eristalis tenax*). Three species of butterfly were recorded through direct observations and included Green veined white (*Pieris napi*), Peacock (*Inachis io*) and Small copper (*Lycaena phlaeas*); since the survey, Red admiral (*Vanessa atalanta*) have also been recorded but have not been included within the species total. Only two species of bumblebee the Common carder (*Bombus pascuorum*) and White tailed bee (*Bombus lucorum*) were recorded within the meadow. Other species of invertebrate recorded during the survey include six species of true bug such as the grass bug

Stenodema calcarata and the leafhopper *Balclutha punctata* and four species of beetle including the rove beetles *Stenus similis* and *Tachyporus chrysomelinus*.

Within the Public Park, four species of hoverfly were recorded including the Pale-footed hoverfly (*Platycheirus albimanus*). No butterflies were recorded and only one species of Hymenoptera was recorded at the park, the Common wasp. Of the other invertebrate species recorded within the Public Park this included three species of true bug such as the Tarnished plant bug (*Lygus rugulipennis*) and four species of beetle including the flea beetle *Longitarsus luridus* and Pea weevil (*Sitona* species).

In total, 33 species of invertebrate were recorded from amenity grassland and pre-existing meadows across the eight parks and this includes 18 species of pollinating insect comprising hoverflies (nine species), butterflies (three species), beetles (two species), bees (two species), wasp (one species) and moth (one species). Several invertebrates observed during the survey have not been included within total species results as they could not be identified beyond family or order and it is unclear how many species there was from each park; includes money spider (Family Linyphiidae, Order Araneae), crane fly (Order Diptera), caterpillars of sawfly (Order Hymenoptera), various parasitoid wasps (Order Hymenoptera) and a weevil (Family Curculionidae, Order Coleoptera), these records have been left in Appendix 1 to show the parks that they were recorded in.

5. Conclusion

A total of eight species of invertebrate were recorded from amenity grassland across all eight parks surveyed before meadow creation and enhancement through the Fife's Buzzing project in autumn 2014 and spring 2015. From pre-existing meadow areas surveyed at Dunnikier Park and Public Park a total of 30 species of invertebrate were identified.

Overall, 33 species of invertebrate were identified during this survey and this includes 18 species of pollinating insect.

The creation of wildflower meadows through the Fife's Buzzing project will use native wildflower species of known origin by sowing seed and planting plug plants of a diverse range of species. This will enhance wildflower meadows already present as well as create new areas that will significantly benefit wildlife, particularly pollinating insects such as bees, hoverflies and butterflies that feed on flowers of a variety of species. The use of native species is important as our pollinators are more easily able to forage at them. Seed mixes will be chosen so that species will flower at different times of the year and there will be a variety of flower colours and shapes.

Appendix 1. Complete list of invertebrate species recorded from amenity grassland at all eight parks and pre-existing meadow areas at Dunnikier park and Public Park.

Order	Scientific name	Common name	Cotlands Park	Dunnikier Park	Dunnikier Park Golf Course	Poplar Road	Public Park	Ravenscraig Park	Riverside Park	Silver Sands
Aranaea	Family Linyphiidae	Money spider		●			●			
Coleoptera	Apionidae spp.	Weevil					●			
Coleoptera	<i>Coccinella septempunctata</i>	Seven-spot ladybird	●	●			●			
Coleoptera	<i>Cuccidula rufa</i>	Ladybird		●						
Coleoptera	<i>Longitarsus luridus</i>	Flea beetle					●			
Coleoptera	<i>Sitona</i> spp.	Pea weevil					●			
Coleoptera	<i>Stenus similis</i>	Rove beetle		●						
Coleoptera	<i>Tachyporus chrysomelinus</i>	Rove beetle		●						
Coleoptera	Family Curculionidae	Weevil spp.		●						
Diptera	<i>Episyrphus balteatus</i>	Marmalade hoverfly		●			●			
Diptera	<i>Eristalis tenax</i>	Hoverfly		●						
Diptera	<i>Eupeodes corollae</i>	Hoverfly						●		
Diptera	<i>Helophilus pendulus</i>	Hoverfly		●						
Diptera	<i>Melanostoma scalare</i>	Chequered hoverfly		●			●			
Diptera	<i>Platycheirus albimanus</i>	Pale footed hoverfly					●			
Diptera	<i>Platycheirus</i> species	Hoverfly		●						
Diptera	<i>Scathophaga</i> species	Yellow dung fly		●						
Diptera	<i>Syrphus ribesii</i>	Common banded hoverfly		●			●			

Order	Scientific name	Common name	Cotlands Park	Dunnikier Park	Dunnikier Park Golf Course	Poplar Road	Public Park	Ravenscraig Park	Riverside Park	Silver Sands
Diptera		Crane fly					●			
Gastropoda	<i>Arion ater</i>	Black slug							●	
Hemiptera	<i>Anthocoris nemorum</i>	Flower bug		●			●			
Hemiptera	<i>Balclutha punctata</i>	Leafhopper		●						
Hemiptera	<i>Lygus rugulipennis</i>	Tarnished plant bug		●			●			
Hemiptera	<i>Macrostelus laevis</i>	Leafhopper					●			
Hemiptera	<i>Nabis flavomarginatus</i>	Broad damsel bug		●						
Hemiptera	<i>Pentatoma rufipes</i>	Forest bug		●						
Hemiptera	<i>Philaenus spumarius</i>	Common froghopper		●						
Hemiptera	<i>Stenodema calcarata</i>	Grass bug		●						
Hemiptera	<i>Stenodema laevigata</i>	Grass bug		●						
Hymenoptera	<i>Bombus lucorum</i>	White tailed bumblebee		●						
Hymenoptera	<i>Bombus pascuorum</i>	Common carder bumblebee		●						
Hymenoptera	<i>Vespula vulgaris</i>	Common wasp					●	●		
Hymenoptera		Parasitoid wasp		●			●			
Hymenoptera		Sawfly (larvae)		●			●			
Lepidoptera	<i>Anthophila fabriciana</i>	Nettle tap moth	●							
Lepidoptera	<i>Inachis io</i>	Peacock butterfly		●						
Lepidoptera	<i>Lycaena phlaeas</i>	Small copper butterfly		●						
Lepidoptera	<i>Pieris napi</i>	Green-veined white		●						

Contact us: Buglife, Balallan House, 24 Allan Park,
Stirling, FK8 2QG

www.buglife.org.uk

Tel: 01786 447504

Email: info@buglife.org.uk

[@buzz_dont_tweet](https://twitter.com/buzz_dont_tweet)

Buglife would like to thank Fife Council for their support
with the pollinator surveys and this report

Photo credits L-R; Ladybird spider (*Eresus sandaliatus*) © S. Dalton, Jellyfish © D. Huffman, Tansy
beetle (*Chrysolina graminis*) © S. Falk and Large garden bumblebee (*Bombus ruderatus*) © S. Falk



Saving the small things that run the planet

Buglife - The Invertebrate Conservation Trust is a registered charity at Bug House, Ham Lane, Orton Waterville,
Peterborough, PE2 5UU

Company no. 4132695, Registered charity no. 1092293, Scottish charity no. SC04004