A hoverfly guide

to the Bayer Research Farm in Great Chishill

BAYER

Orchard Farm, Great Chishill

Bayer Crop Science's farm in Great Chishill covers some 20 hectares on a gently undulating clay plateau to the south west of Cambridge, on the Hertfordshire border. It is a working farm set up to help the company research and understand better, new crop protection products and new seed varieties. As its name implies, the farm used to be an orchard and indeed, there remains some apple and pear trees on the site used for testing of novel crop protection products. The majority of the farmland, however has been converted into land suitable for combinable crop trials. The farm is enclosed with mature hedges and trees with a diverse range of habitats, including:

- Reverted plum and apple orchards
- A number of small woodlands and ponds
- A network of grass margins, ditches
- Pollinator and bird seed edges

Biodiversity monitoring at Chishill

First and foremost, this is a working farm which has to pay its way for the company. Nevertheless, non-cropped areas are actively managed, in a way that is entirely consistent with the promotion of biodiversity. We believe that it is important to maximise the resources that the farm has and we regularly measure key biodiversity indices, including:

- Nesting and visiting birds
- Butterflies and moths
- Bees
- Successful fledging of barn owl chicks (as an indicator of small mammal populations)

Hoverflies

Hoverflies are a group of Diptera (flies) comprising the family *Syrphidae* with many being fairly large and colourful. Some of them, such as the Marmalade Hoverfly are generally common and numerous enough to have a common name. Others such as *Eristalinus sepulchris* are declining in numbers, possibly due to a reduction in habitats.

Some members of the family are thought to be pollinators of flowering plants and many are very active and efficient aphid hunters during their larval stages. Most are therefore considered to be beneficial insects with only a few whose larval stages feed on underground bulbs etc. being considered pests, most notably *Eumerus funeralis* which feeds on commercially grown daffodil bulbs.

Hoverflies are mobile over quite large distances and are easily attracted given suitable flowers and environments. They are not social nor nest making insects so need a continuous supply of food during their adult lives. Poor weather may be devastating to an adult population as they cannot survive long without a constant food supply, unlike many bee species that nest and store food as honey.

Encouraging Hoverflies

1. Food Sources

Growing just about any wildflowers will attract at least some hoverflies and a variety of species selected to flower continuously throughout the spring and summer would be preferable. Traditional wildflower meadows are often good places to look for hoverflies, and there are several plants which are favoured. Common bramble is a magnet for various hoverflies and other insects such as bees as are other wild species of the genus *Rosa* such as the various wild roses, blackthorn and hawthorn provided they are allowed to flower. Various members of the *Umbellifera*, in particular species later in the flowering season such as hogweed are good and have the advantage of not being particularly invasive weeds with the exception of ground elder and perhaps Queen Anne's lace. Various *Compositae*, the daisy family, are also attractive to many insects. Creeping thistle is one of the best but is particularly invasive and other *Compositae* may thus be preferred. Ox-eye daisy, common daisy, dandelion, chicory and field scabious for instance, are all good; however the frequently sown hardheads does not seem to be particularly favoured.

Hoverflies do not have suitable mouthparts to feed from pea-flowers such as clover, lucerne or sainfoin that favour bees but will feed from mints, both cornmint and watermint and other Labiates such as thyme, marjoram and so on. Some Crucifers are good such as the spring flowering cuckoo flower and hedge mustard; later on water cress, oil seed rape and other mustards are good. Poppies attract many insects and for later in the year, September onwards, ivy is invaluable for hoverflies and many other late flying insects including bees. It has the added attraction that it produces its rich black berries in the depth of winter and is an invaluable food source at that time for birds.

Eristalis pertinax feeding on bramble, *Rubus fruticosus*

2. Water

Several hoverflies, such as *Eristalis tenax*, breed in water, favouring ponds rich in rotting vegetation. Small neglected ponds, deep permanently wet ditches or old cattle watering ponds with high organic matter levels are favoured. If cleared the organic matter dredged out should be left piled at the pond edge to slowly rot away and will attract hoverflies and beetles to lay eggs. Similarly if cuttings from hedges and woods can be chipped and left in piles they will slowly ferment and rot and also attract insects, acting as a far more productive natural source than simply leaving or burning cuttings, as they may attract grass snakes and slow worms.

3. Nesting sites for bees: Hoverflies as bee mimics

Several hoverflies breed in commensal arrangements with bees, particularly bumble bees and with wasps (particularly hornets) and it follows that encouraging these species will also encourage these particular hoverflies.

Volucella bombylus, for example is a large fly, the size of the bumble bees it mimics. It comes in at least three different colour forms, white-tailed as here mimicking the white and buff-tailed bumble bees, a red-tailed variety mimicking the red-tailed and meadow bumble bees and an all brown sort that mimics the common carder bumble bee.

The hoverflies lays eggs in the bee nest, and the resultant larvae feed on debris; the obvious “reward” for such housekeeping activities being the relative safety from predators that the nest provides.

Likewise, *Volucella zonaria*, one of the UK’s largest flies, is approximately the same size as an adult worker hornet which they mimic. They are recent invaders into the UK and are spreading rapidly North and Westwards. Their larvae live in hornet’s nests feeding off the debris and discarded bits of food from their hosts. The adult’s resemblance to hornets is uncanny and a good strategy for avoiding being preyed on by other insects and birds.

Bees are of course excellent pollinators and wasps, including hornets, are extremely good natural predators of many injurious pest insects. Wasps in particular as they are busy hunting and killing caterpillars and other pests in their thousands. It is not until the breeding season of their prey finishes at August time that wasps become apparent when their diet changes to sugary sustenance such as windfalls, picnic jams and suchlike.

Leaving long grass field edges will encourage mice and voles, and the presence of owls and kestrels at Great Chishill shows that the habitat generated here is successful. It is in their empty nest burrows that many bumble bees make their nests, and where these hoverflies cohabit.

The presence of owls and kestrels at Great Chishill shows that the habitat generated here is successful

Hoverflies at **Orchard Farm**

This account is of the hoverflies observed on the Bayer's Orchard Farm at Great Chishill in Essex over five visits on the 5th July 2018, 16th August 2018, 8th May 2019, 2nd June 2019 and 3rd July 2019. The dates were chosen because there are variations in emergent species of hoverflies from month to month with few present until May and few remaining after the beginning of September. In fact dates were further chosen because of the weather, most flying insects preferring warm dry days with sunny periods.

Of the United Kingdom's 270 species, 26 species were identified and several more were not identified to species level. Neither were they present in particularly great numbers. This is not unexpected for an agricultural setting such as East Anglia where cultivation is generally arable with little meadow or pasture, as hoverflies are most frequently to be seen attending flower heads of wild flowers of which there were few present during my visits. Suitable habitats were found along field edges, in hedges, the ancient farm pond, the old plum orchard and particularly around the small reservoir with its sown banks which was resultantly the richest source of insects.

It should be noted that although there have been wild flower species plantings in previous years to encourage native insects some of these had been grubbed up in order to be resown but this had not produced effective flower banks at the time of the visits.

It was notable that there was a rich variety of other insects at Great Chishill such as beetles, butterflies, dragonflies, true bugs, bees, various wasps etc.

Many hoverflies are easily identified, however for accurate identification of some there is a need to capture and examine under a dissecting microscope. This was not done and for some species only a genus was ascribed. Generally such flies are members of genii of very similar species usually occupying similar ecological niches and accurate species identification is probably of little importance.

Many of the following photographs were taken at Chishill, many were taken elsewhere but all, with one exception, are of species seen on the farm in 2018 and 2019.

Episyrphus balteatus
The 'Marmalade hoverfly'. Britain and Chishill's commonest hoverfly; a well-known aphid predator. It becomes very common in the later summer months and is easily identified as it is the only British hoverfly with double stripes on its abdomen.

Volucella pellucens
The 'Great pied hoverfly'. Seen in the orchard on three occasions. This hoverfly is quite large—about bee sized—and has the habit of hovering along paths and rides in one spot. It is inquisitive and will suddenly dart to investigate other insects and even humans before darting back to its favoured spot.

These first two hoverflies are the only ones in the UK that have common names in widespread use.

Cheliosa pagana
Cheliosa ssp are very common hoverflies. Most are difficult to identify 'little black jobs'. There were several species seen during most visits to Chishill although in small numbers. *C. pagana* is one of few that can be easily identified because it alone in this genus has orange antennae. The only other one firmly identified was *Cheliosa variabilis.*

Eristalinus sepulchris
A strange shaped fly with obvious spots on its eyes. A declining UK species often associated with agricultural ponds rich in organic matter such as old-fashioned cattle ponds or ponds where there has been high levels of fertilizer runoff. A small number were seen around the pond at Chishill feeding on water cress flowers.

Epistrophe eligans
A widespread and fairly common medium sized spring hoverfly. Two were seen at Chishill in May 2019. Its larvae feed on aphids in trees.

Eristalis pertinax
Seen on all visits in small numbers. A common UK hoverfly. Two other *Eristalis ssp* were seen, *E. arbustorum* and *E. tenax*. *E. pertinax* is very similar to *E. tenax* but differs in having yellow/orange front 'feet' and so is easy to separate from other *Eristalis ssp.* Both *E. pertinax* and *E. tenax* are honey bee mimics, indeed *E. tenax* is sometimes known as the 'drone fly'. Their larvae feed on rotting vegetation, usually underwater and possess a long breathing tube extending from the end of their abdomen and so are known as 'rat-tailed larvae'.

Eupeodes corolla and Eupeodes luniger

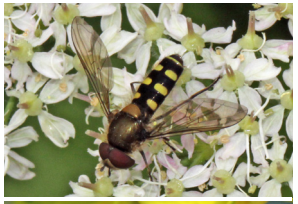
These two *Eupeopes* species are both common in the UK and were both seen frequently at Chishill. In *E. corolla* the yellow spots on the abdomen join up almost creating stripes whereas in *E. luniger* they remain separate and look like forward facing 'commas'. Their larvae feed on a wide range of aphids.

Myathropa florea

A common and widespread hoverfly during most of the year but usually only seen singly. Present at Chishill on all visits, frequently around the orchard. Their larvae are found in water feeding on rotting vegetation.

Melangyna umbellatarum, Meliscaeva auricollis and Melanostoma scalare

These hoverflies are three very similar, common, small and slim summer hoverflies, seen in fair numbers around the reservoir and elsewhere and shown here as representative of the group. Although not closely related they are difficult to accurately identify. All their larvae feed on aphids whereas the adults feed on pollen and so are often seen in large numbers on wildflowers such as hogweed, cow parsley or ox-eye daisies.



Heliophilus pendulus

There are two common species of *Heliophilus* and they can be very hard to distinguish. They are larger, bee sized, handsome flies with vertical stripes on their thorax resembling those of American Football referees. The male *H. hybridus* is easy to identify however the females are very similar to *H. pendulus* but can be separated as their hind tibia is mostly orange/yellow—not easy!

Leucozona lucorum

A widespread and common UK hoverfly seen mostly in spring and early summer. A few were seen in May 2019 at Chishill. Another aphid predator.

Spherophoria scripta & Spherophoria ssp

S. scripta is one of the commonest UK hoverflies and was also so at Chishill; it is the only *Spherophoria* that can reliably be identified, it has an abdomen that is longer than its wings and thus is easily identified. Other ssp were probably also present. They are perhaps the most difficult of hoverflies to identify. Even experts using microscopes cannot separate the females of some of these species. Their larvae are aphid eaters.

Syritta pipens

A smaller, relatively common and widespread hoverfly seen at Chishill on several occasions, usually in higher numbers in the later months. Their larvae feed on wet, decaying vegetation.

Platycheirus albimanus

A few *Platycherius ssp* were seen. They are all small hoverflies that have the habit of closing their wings as soon as they land and are thus impossible to identify without capture. This shot of *P. albimanus* in flight shows the distinctive grey marks on its abdomen. It is a very common representative of this large genus in which the larvae feed on aphids and the adults on pollen.

Xylotta segnis

One was seen in the orchard. *Xylota ssp* are woodlands hoverflies found where there is a lot of damp rotting wood.

Pipiza austrica

Pipiza ssp were seen occasionally. They are medium sized hoverflies, usually all black and difficult to accurately identify. *P. austrica* has a dark cloud on its wings but others of the genus have few identifying features. There were probably more present than *P. austrica* which is the easiest to identify without capturing specimens. Another group whose larvae feed on aphids.

Scaeva pyrastri

Larger and boldly marked hoverflies. This is a migratory species visiting from the Continent and not resident in the UK but seen in variable numbers most years. Two were seen in the orchard in July 2019, one a female laying eggs —these might hatch but will probably not survive winter. Their larvae are once again aphid eaters.

Volucella zonaria
This is one of the UK's largest flies, approximately the same size as an adult worker hornet which they mimic. They are recent invaders into the UK and are spreading rapidly North and Westwards. Their larvae live in hornet's nests feeding off the debris and discarded bits of food from their hosts. The resemblance to hornets is uncanny and a good strategy for avoiding being preyed on by other insects and birds.

Vespa crabro
A hornet for comparison.

Syrphus ribesii and Syrphus vitripennis
There are three common UK species of *Syrphus*. Along with *E. balteatus* and *Spherophoria ssp* they are the commonest UK hoverflies and are the familiar common hoverflies on garden and meadow flowers. *Syrphus ssp* were seen on all visits to Chishill in good numbers. They closely resemble each other and are difficult to identify in the field although in the females, whose eyes do not meet at the top of their head, this can be done as in *S. ribesii* the hind femur is all yellow and in *S. vitripennis* the femur is mostly black.

Volucella bombylus
A large fly, the size of the bumble bees it mimics. It comes in at least three different colour forms, white-tailed as here mimicking the white and buff-tailed bumble bees, a red-tailed variety mimicking the red-tailed and meadow bumble bees and an all brown sort that mimics the common carder bumble bee. This one was seen in the orchard. They breed in the nests of the bumble bee they mimic and are rather variable in occurrence. Common but never in large numbers.

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The survey of hoverflies at Orchard Farm was undertaken by Geoff Vowles,a retired pathologist, now an amateur naturalist with a particular interest in how insects, wild plants, birds and animals interact together.

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