

# UK Biodiversity Indicators 2019

This documents supports  
D1c. Status of pollinating Insects

## **Technical background document:**

Gary D. Powney, Colin A. Harrower, Charlotte Outhwaite, Nick J.B. Isaac

For further information on D1c. Status of pollinating insects visit <http://www.jncc.gov.uk/ukbi-D1c>

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## D1c - Biodiversity and Ecosystem Services – status of pollinating insects – technical background document

Gary D. Powney, Colin A. Harrower, Charlotte Outhwaite, Nick J. B. Isaac

### Introduction

Pollination is a vital ecosystem service that benefits agricultural and horticultural production, and is essential for maintaining wild flower biodiversity. By improving the yield, quality and resilience of crops, insect pollination has been valued at £400 million per year to the UK economy (POST, 2010). 35% of the world's agricultural output, by volume, consists of 87 crop types that benefit from pollination by animals (insects, birds and mammals), but because most of these crops are not entirely dependent on animal pollination, the amount of production directly attributable to animals is lower than this value (Klein *et al.*, 2007). There is growing concern regarding the population status of insect pollinators, and in turn the pollination service they provide (Potts *et al.*, 2010; Garratt *et al.*, 2014). As with most other areas of biodiversity, the main threats to pollinators include habitat loss, environmental pollution, climate change and the spread of alien species (Klein *et al.*, 2007; Potts *et al.*, 2010; Vanbergen & The Insect Pollinators Initiative 2013). The widespread application of pesticides is also perceived as a major threat to pollinator diversity (Brittain *et al.*, 2010). In order for governments to act upon these threats they need robust metrics on the national-scale status of pollinators and pollination. Deriving such a metric has previously been limited by the availability of suitable data and analytical techniques. With the increase in citizen science, the availability of large-scale biological record data has increased (Silvertown, 2009). Such data are collected without a standardized survey protocol and therefore extracting reliable trends from them can be difficult. However, with recent analytical advances it is now possible to estimate reliable trends from such data (van Strien *et al.*, 2013; Isaac *et al.*, 2014).

### Methods

#### *Data sources*

Occurrence records of bee and hoverfly species within 1km grid cells in the UK were extracted from the Bees, Wasps and Ants Recording Society (BWARS) and the Hoverfly Recording Scheme biological records databases. The time-period used for the indicator was 1980 to 2016, as this represents a core period of recording for these taxa in the UK. Bee species were filtered (following expert guidance from BWARS) so that only species considered to be wild pollinators were included. Species that had undergone taxonomic changes or had taxonomic issues during the time frame of the indicator were excluded from the analysis. Furthermore, models based on species with less than 50 records tend to be unreliable (Powney *et al.*, 2019), and were therefore excluded from the analysis. The final composite indicator was based on 365 species of wild pollinator, see Appendix 1 for a list of species covered.

#### *Generating species' trends and the composite indicator*

The data used to produce the indicator were not collected using a standardised protocol, but instead are a collation of unstructured biological observations collected by a large network of volunteer recorders. Such data tend to contain many forms of sampling bias and noise, making it hard to detect genuine signals of change (Tingley & Beissinger, 2009; Hassall & Thompson, 2010; Isaac *et al.*, 2014). Recent studies have highlighted the value of Bayesian occupancy models for estimating species occurrence in the presence of imperfect detection (van Strien *et al.*, 2013; Isaac *et al.*, 2014). This approach uses two hierarchically coupled sub-models: an occupancy sub-model (i.e. presence versus absence), and a detection sub-model (i.e. detection versus non-detection). Together these sub-models estimate the conditional probability that a species is detected when present. A Bayesian occupancy model was applied to the data for each species, following van

Strien *et al.* (2013) and Isaac *et al.* (2014), with improvements based on Outhwaite *et al.* (2018). For each site-year combination the model estimates presence or absence for the species in question given variation in detection probability: from this the proportion of occupied sites ('occupancy') was estimated for each year. To estimate the composite indicator trend with uncertainty, the posterior distribution of the annual occupancy estimates for each species was utilised. For 1,000 iterations, the arithmetic mean occupancy estimate (on the unbounded log-odds scale) each year across all species were estimated. These estimates were converted back to the odds scale, then scaled so the mean estimate in the first year (1980) was set to 100, and summarized each year using the mean and 90% credible intervals. The summarized mean estimates are referred to as the composite index, and form the indicator when plotted alongside the 90% credible intervals. A detailed description of the occupancy model underlying this indicator, can be found in the [technical document on the Bayesian indicator development](#). For each iteration, the proportional difference between the 1980 and 2016 was calculated (giving 1,000 proportional differences), these differences were then summarized using the mean and 90% credible intervals. A proportional difference of 0 indicates no change, consequently the trend was assessed as increasing if the lower 90% credible intervals was above 0 and decreasing if the upper 90% credible intervals was below 0. The trend was assessed as stable if the 90% credible intervals spanned 0. The same process was used to assess the short-term trend, but with the first year as 2011 rather than 1980.

### *Species-specific trends*

For each species, the long- and short-term trend in occupancy was estimated as the mean annual percent change (over the time-period in question) across 1,000 estimates from the posterior distribution. Species were grouped into one of 5 categories based on both their short-term and long-term occupancy trend (Table 1). The threshold values for each category were based on those of the wild bird indicator; whether an individual species is increasing or decreasing has been decided by its rate of annual change over the time period (long or short) of interest. If the rate of annual change would lead to an occupancy increase or decrease of between 25% and 49% over 25 years, the species is said to have shown a 'weak increase' or a 'weak decline' respectively. If the rate of annual change would lead to a population increase or decrease of 50% or more over 25 years, the species is said to have shown a 'strong increase' or a 'strong decline' respectively. These thresholds are used in the [Birds of Conservation Concern](#) status assessment for birds in the UK.

**Table 1: Thresholds used to define individual species trends**

Category	Thresholds	Threshold – equivalent
Strong increase	Above +2.81% per annum	+100% over 25 years
Weak increase	Between +1.16% and +2.81% p.a.	+33% to +100% over 25 years
Stable	Between -1.14 % and +1.16% p.a.	-25% to +33% over 25 years
Weak decrease	Between -2.73% and -1.14% p.a.	-50% to -25% over 25 years
Strong decrease	Below -2.73% p.a.	-50% over 25 years

Asymmetric percentage change thresholds are used to define these classes as they refer to proportional change, where a doubling of a species index (an increase of 100%) is counterbalanced by a halving (a decrease of 50%).

## Results

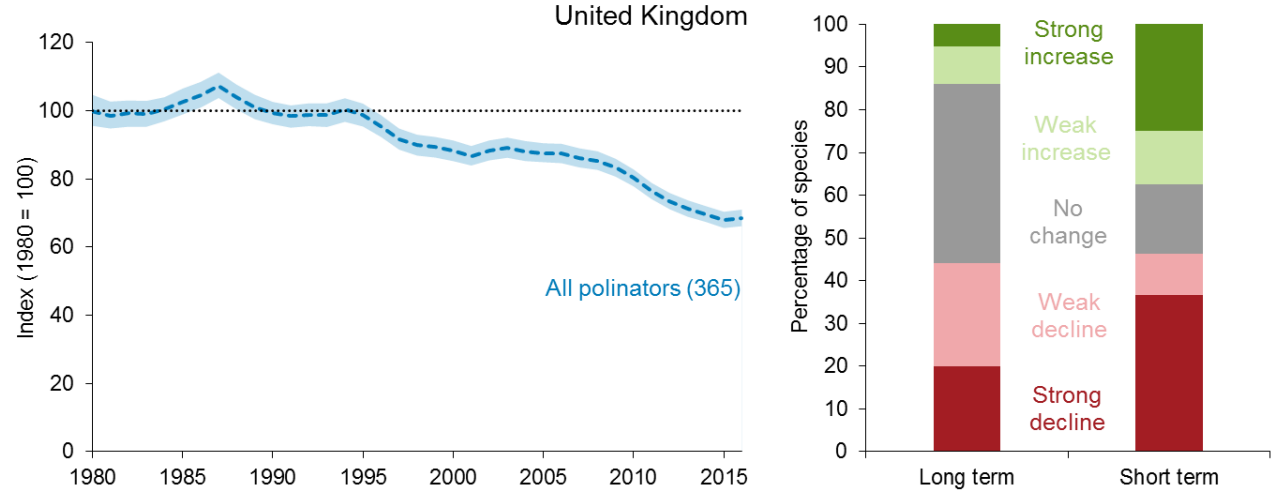
- The indicator (Figure 1) shows the average relative change in the area over which each of 365 species of pollinator was found, as measured by the number of 1km grid squares across the UK in which they were recorded – this is referred to as the ‘occupancy index’.
- Over the long term (1980 to 2016), the pollinator indicator showed 31% decline (90% CIs: 35% to 28% decline), and was therefore assessed as a declining.
- Temporal patterns of change in the pollinator indicator showed a steady decline from 1987 onwards.
- Between 2011 and 2016 the indicator decreased by 10% (90% CIs: 13% to 7% decrease), therefore the short-term trend was assessed as a decline.
- Over the long term, 14% of pollinator species became more widespread (5% showed a strong increase), and 44% became less widespread (20% showed a strong decrease).
- A greater proportion of species were decreasing than increasing over the short term, with 46% of species decreasing and 38% increasing.
- As individual pollinator species become more or less widespread, the communities in any given area become more or less diverse, and this may have implications for pollination as more diverse communities are, in broad terms, more effective in pollinating a wide range of crops and wild flowers.

The indicator plot was also produced for the bee (Figure 2) and hoverfly (Figure 3) species separately. The bee index was relatively stable up to 2006, before undergoing several years of declines. From 2013 onwards there was evidence of a recovery, however, the bee index in 2016 was estimated 17% (90% CIs: 21% to 13% decline) lower than in 1980. The occupancy index was declining for a greater number of bee species than were increasing over the long term. However, a greater number of species were increasing than decreasing over the short term.

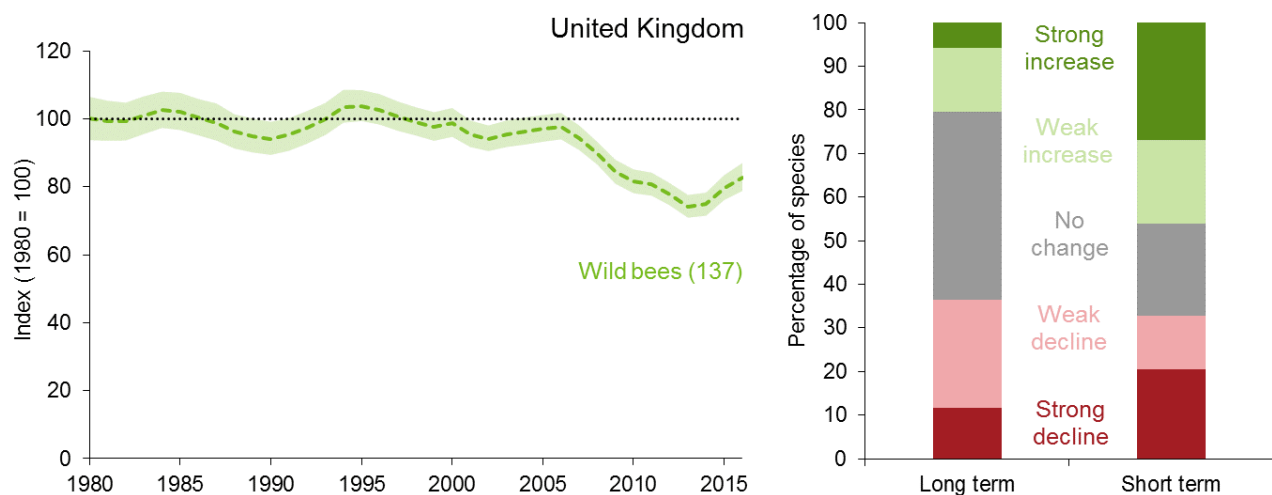
In contrast to the bees, the hoverfly index (Figure 3) shows a gradual decline from 1987 to 2000, reaching a low of 82% of the value in 1980 in 2000. The trend was then relatively stable up to 2009, before declining again, ending 39% (90% CIs: 43% to 35% decline) lower than the value in 1980. A greater proportion of hoverflies have declined than increased in occupancy over the long- and short term (1980 to 2016: 49% decreased and 10% increased; 2011 to 2016: 54% decreased and 32% increased).

The recent decline in bees is striking. A run of wet summers and agricultural practices, including pesticide use, have both been implicated in the recent decline in bees (Stanley *et al.*, 2015). However, further research is needed to better understand the relative importance of these potential drivers of change.

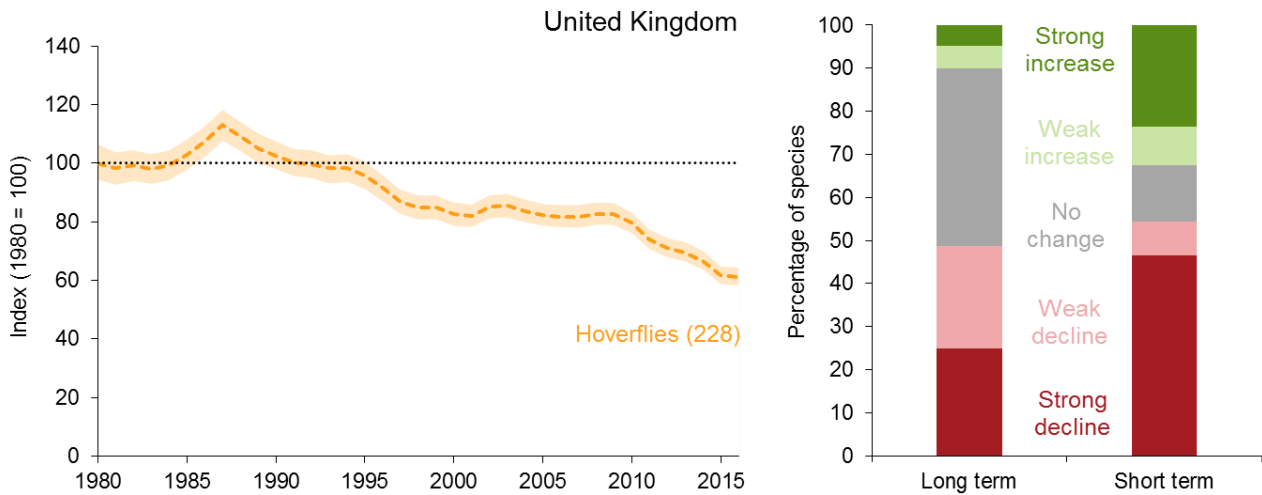
**Figure 1:** Change in the distribution of wild pollinators (n = 365) in the UK between 1980 and 2016. The shaded region is the 90% credible intervals of the annual occupancy estimates and represents the uncertainty surrounding the annual estimates. The solid line illustrates the rescaled indicator value. The proportion of pollinator species in each trend category is based on the mean annual change in occupancy over both a) the long term (1980 to 2016) and b) the short term (2011 to 2016).



**Figure 2:** Change in the distribution of pollinating wild bee species (n = 137) in the UK between 1980 and 2016. The shaded region is the 90% credible intervals of the annual occupancy estimates and represents the uncertainty surrounding the annual estimates. The solid line illustrates the rescaled indicator value. The proportion of pollinating wild bee species in each trend category is based on the mean annual change in occupancy over both a) the long term (1980 to 2016) and b) the short term (2011 to 2016).



**Figure 3:** Change in the distribution of hoverfly species (n = 228) in the UK between 1980 and 2016. The shaded region is the 90% credible intervals of the annual occupancy estimates and represents the uncertainty surrounding the annual estimates. The solid line illustrates the rescaled indicator value. The proportion of hoverfly species in each trend category is based on the mean annual change in occupancy over both a) the long term (1980 to 2016) and b) the short term (2011 to 2016).



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## Appendices

**Appendix 1:** The list of the 365 species included in the pollinator indicator.

Species	Group	Species	Group
<i>Andrena alfkenella</i>	Bee	<i>Andrena subopaca</i>	Bee
<i>Andrena angustior</i>	Bee	<i>Andrena synadelpha</i>	Bee
<i>Andrena apicata</i>	Bee	<i>Andrena tarsata</i>	Bee
<i>Andrena argentata</i>	Bee	<i>Andrena thoracica</i>	Bee
<i>Andrena barbilabris</i>	Bee	<i>Andrena tibialis</i>	Bee
<i>Andrena bicolor</i>	Bee	<i>Andrena trimmerana</i>	Bee
<i>Andrena bimaculata</i>	Bee	<i>Andrena varians</i>	Bee
<i>Andrena bucephala</i>	Bee	<i>Andrena wilkella</i>	Bee
<i>Andrena chrysosceles</i>	Bee	<i>Anthidium manicatum</i>	Bee
<i>Andrena cineraria</i>	Bee	<i>Anthophora bimaculata</i>	Bee
<i>Andrena clarkella</i>	Bee	<i>Anthophora furcata</i>	Bee
<i>Andrena coitana</i>	Bee	<i>Anthophora plumipes</i>	Bee
<i>Andrena congruens</i>	Bee	<i>Anthophora quadrimaculata</i>	Bee
<i>Andrena denticulata</i>	Bee	<i>Bombus distinguendus</i>	Bee
<i>Andrena dorsata</i>	Bee	<i>Bombus hortorum</i>	Bee
<i>Andrena ferox</i>	Bee	<i>Bombus humilis</i>	Bee
<i>Andrena flavipes</i>	Bee	<i>Bombus jonellus</i>	Bee
<i>Andrena florea</i>	Bee	<i>Bombus lapidarius</i>	Bee
<i>Andrena fucata</i>	Bee	<i>Bombus muscorum</i>	Bee
<i>Andrena fulva</i>	Bee	<i>Bombus pascuorum</i>	Bee
<i>Andrena fulvago</i>	Bee	<i>Bombus pratorum</i>	Bee
<i>Andrena fuscipes</i>	Bee	<i>Bombus ruderarius</i>	Bee
<i>Andrena haemorrhoea</i>	Bee	<i>Bombus ruderatus</i>	Bee
<i>Andrena hattorfiana</i>	Bee	<i>Bombus soroensis</i>	Bee
<i>Andrena helvola</i>	Bee	<i>Bombus sylvarum</i>	Bee
<i>Andrena humilis</i>	Bee	<i>Bombus terrestris</i>	Bee
<i>Andrena labialis</i>	Bee	<i>Ceratina cyanea</i>	Bee
<i>Andrena labiata</i>	Bee	<i>Chelostoma campanularum</i>	Bee
<i>Andrena lapponica</i>	Bee	<i>Chelostoma florisomne</i>	Bee
<i>Andrena marginata</i>	Bee	<i>Colletes cunicularius</i>	Bee
<i>Andrena minutula</i>	Bee	<i>Colletes daviesanus</i>	Bee
<i>Andrena minutuloides</i>	Bee	<i>Colletes floralis</i>	Bee
<i>Andrena nigriceps</i>	Bee	<i>Colletes fodiens</i>	Bee
<i>Andrena nigroaenea</i>	Bee	<i>Colletes halophilus</i>	Bee
<i>Andrena nitida</i>	Bee	<i>Colletes marginatus</i>	Bee
<i>Andrena nitidiuscula</i>	Bee	<i>Colletes similis</i>	Bee
<i>Andrena ovatula</i>	Bee	<i>Colletes succinctus</i>	Bee
<i>Andrena praecox</i>	Bee	<i>Dasypoda hirtipes</i>	Bee
<i>Andrena proxima</i>	Bee	<i>Eucera longicornis</i>	Bee
<i>Andrena ruficrus</i>	Bee	<i>Halictus confusus</i>	Bee
<i>Andrena scotica</i>	Bee	<i>Halictus rubicundus</i>	Bee
<i>Andrena semilaevis</i>	Bee	<i>Halictus tumulorum</i>	Bee
<i>Andrena similis</i>	Bee	<i>Heriades truncorum</i>	Bee



Species	Group
<i>Hoplitis claviventris</i>	Bee
<i>Lasioglossum albipes</i>	Bee
<i>Lasioglossum brevicorne</i>	Bee
<i>Lasioglossum calceatum</i>	Bee
<i>Lasioglossum cupromicans</i>	Bee
<i>Lasioglossum fratellum</i>	Bee
<i>Lasioglossum fulvicorne</i>	Bee
<i>Lasioglossum laevigatum</i>	Bee
<i>Lasioglossum lativentre</i>	Bee
<i>Lasioglossum leucopus</i>	Bee
<i>Lasioglossum leucozonium</i>	Bee
<i>Lasioglossum malachurum</i>	Bee
<i>Lasioglossum minutissimum</i>	Bee
<i>Lasioglossum morio</i>	Bee
<i>Lasioglossum nitidiusculum</i>	Bee
<i>Lasioglossum parvulum</i>	Bee
<i>Lasioglossum pauperatum</i>	Bee
<i>Lasioglossum pauxillum</i>	Bee
<i>Lasioglossum prasinum</i>	Bee
<i>Lasioglossum punctatissimum</i>	Bee
<i>Lasioglossum puncticolle</i>	Bee
<i>Lasioglossum quadrinotatum</i>	Bee
<i>Lasioglossum rufitarse</i>	Bee
<i>Lasioglossum semilucens</i>	Bee
<i>Lasioglossum smeathmanellum</i>	Bee
<i>Lasioglossum villosulum</i>	Bee
<i>Lasioglossum xanthopus</i>	Bee
<i>Lasioglossum zonulum</i>	Bee
<i>Macropis europaea</i>	Bee
<i>Megachile centuncularis</i>	Bee
<i>Megachile circumcincta</i>	Bee
<i>Megachile leachella</i>	Bee
<i>Megachile ligniseca</i>	Bee
<i>Megachile maritima</i>	Bee
<i>Megachile versicolor</i>	Bee
<i>Megachile willughbiella</i>	Bee
<i>Melitta dimidiata</i>	Bee
<i>Melitta haemorrhoidalis</i>	Bee
<i>Melitta leporina</i>	Bee
<i>Melitta tricincta</i>	Bee
<i>Osmia aurulenta</i>	Bee
<i>Osmia bicolor</i>	Bee
<i>Osmia bicornis</i>	Bee
<i>Osmia caerulea</i>	Bee
<i>Osmia leaiana</i>	Bee
<i>Osmia parietina</i>	Bee
<i>Osmia pilicornis</i>	Bee

Species	Group
<i>Osmia spinulosa</i>	Bee
<i>Osmia xanthomelana</i>	Bee
<i>Panurgus banksianus</i>	Bee
<i>Panurgus calcaratus</i>	Bee
<i>Anasimyia contracta</i>	Hoverfly
<i>Anasimyia interpuncta</i>	Hoverfly
<i>Anasimyia lineata</i>	Hoverfly
<i>Anasimyia lunulata</i>	Hoverfly
<i>Anasimyia transfuga</i>	Hoverfly
<i>Arctophila superbiens</i>	Hoverfly
<i>Baccha elongata</i>	Hoverfly
<i>Brachyopa bicolor</i>	Hoverfly
<i>Brachyopa insensilis</i>	Hoverfly
<i>Brachyopa pilosa</i>	Hoverfly
<i>Brachyopa scutellaris</i>	Hoverfly
<i>Brachypalpus lentus</i>	Hoverfly
<i>Brachypalpus laphriformis</i>	Hoverfly
<i>Caliprobola speciosa</i>	Hoverfly
<i>Callicera aurata</i>	Hoverfly
<i>Callicera rufa</i>	Hoverfly
<i>Chalcosyrphus eunotus</i>	Hoverfly
<i>Chalcosyrphus nemorum</i>	Hoverfly
<i>Chamaesyrphus scaevoides</i>	Hoverfly
<i>Cheilosia albipila</i>	Hoverfly
<i>Cheilosia albitarsis</i>	Hoverfly
<i>Cheilosia antiqua</i>	Hoverfly
<i>Cheilosia barbata</i>	Hoverfly
<i>Cheilosia bergenstammi</i>	Hoverfly
<i>Cheilosia caerulea</i>	Hoverfly
<i>Cheilosia carbonaria</i>	Hoverfly
<i>Cheilosia chrysocoma</i>	Hoverfly
<i>Cheilosia cynocephala</i>	Hoverfly
<i>Cheilosia fraterna</i>	Hoverfly
<i>Cheilosia griseiventris</i>	Hoverfly
<i>Cheilosia grossa</i>	Hoverfly
<i>Cheilosia illustrata</i>	Hoverfly
<i>Cheilosia impressa</i>	Hoverfly
<i>Cheilosia lasiopa</i>	Hoverfly
<i>Cheilosia latifrons</i>	Hoverfly
<i>Cheilosia longula</i>	Hoverfly
<i>Cheilosia mutabilis</i>	Hoverfly
<i>Cheilosia nebulosa</i>	Hoverfly
<i>Cheilosia nigripes</i>	Hoverfly
<i>Cheilosia pagana</i>	Hoverfly
<i>Cheilosia proxima</i>	Hoverfly
<i>Cheilosia pubera</i>	Hoverfly
<i>Cheilosia ranunculi</i>	Hoverfly

Species	Group	Species	Group
<i>Cheilosia scutellata</i>	Hoverfly	<i>Eumerus ornatus</i>	Hoverfly
<i>Cheilosia semifasciata</i>	Hoverfly	<i>Eumerus sabulonum</i>	Hoverfly
<i>Cheilosia soror</i>	Hoverfly	<i>Eumerus strigatus</i>	Hoverfly
<i>Cheilosia urbana</i>	Hoverfly	<i>Eupeodes corollae</i>	Hoverfly
<i>Cheilosia variabilis</i>	Hoverfly	<i>Eupeodes latifasciatus</i>	Hoverfly
<i>Cheilosia velutina</i>	Hoverfly	<i>Eupeodes luniger</i>	Hoverfly
<i>Cheilosia vernalis</i>	Hoverfly	<i>Eupeodes nielseni</i>	Hoverfly
<i>Cheilosia vicina</i>	Hoverfly	<i>Eupeodes nitens</i>	Hoverfly
<i>Cheilosia vulpina</i>	Hoverfly	<i>Ferdinandea cuprea</i>	Hoverfly
<i>Chrysogaster cemiteriorum</i>	Hoverfly	<i>Ferdinandea ruficornis</i>	Hoverfly
<i>Chrysogaster solstitialis</i>	Hoverfly	<i>Helophilus hybridus</i>	Hoverfly
<i>Chrysogaster virescens</i>	Hoverfly	<i>Helophilus pendulus</i>	Hoverfly
<i>Chrysotoxum arcuatum</i>	Hoverfly	<i>Helophilus trivittatus</i>	Hoverfly
<i>Chrysotoxum bicinctum</i>	Hoverfly	<i>Heringia heringi</i>	Hoverfly
<i>Chrysotoxum cautum</i>	Hoverfly	<i>Heringia latitarsis</i>	Hoverfly
<i>Chrysotoxum elegans</i>	Hoverfly	<i>Heringia pubescens</i>	Hoverfly
<i>Chrysotoxum festivum</i>	Hoverfly	<i>Heringia vitripennis</i>	Hoverfly
<i>Chrysotoxum verralli</i>	Hoverfly	<i>Lejogaster metallina</i>	Hoverfly
<i>Criorhina asilica</i>	Hoverfly	<i>Lejogaster tarsata</i>	Hoverfly
<i>Criorhina berberina</i>	Hoverfly	<i>Leucozona glaucia</i>	Hoverfly
<i>Criorhina floccosa</i>	Hoverfly	<i>Leucozona laternaria</i>	Hoverfly
<i>Criorhina ranunculi</i>	Hoverfly	<i>Leucozona lucorum</i>	Hoverfly
<i>Dasysyrphus albostrigatus</i>	Hoverfly	<i>Mallota cimbiciformis</i>	Hoverfly
<i>Dasysyrphus pinastri</i>	Hoverfly	<i>Melangyna arctica</i>	Hoverfly
<i>Dasysyrphus tricinctus</i>	Hoverfly	<i>Melangyna cincta</i>	Hoverfly
<i>Dasysyrphus venustus</i>	Hoverfly	<i>Melangyna compositarum</i>	Hoverfly
<i>Didea fasciata</i>	Hoverfly	<i>Melangyna labiatarum</i>	Hoverfly
<i>Didea intermedia</i>	Hoverfly	<i>Melangyna lasiophthalma</i>	Hoverfly
<i>Epistrophe diaphana</i>	Hoverfly	<i>Melangyna quadrimaculata</i>	Hoverfly
<i>Epistrophe eligans</i>	Hoverfly	<i>Melangyna umbellatarum</i>	Hoverfly
<i>Epistrophe grossulariae</i>	Hoverfly	<i>Melanogaster aerea</i>	Hoverfly
<i>Epistrophe melanostoma</i>	Hoverfly	<i>Melanogaster hirtella</i>	Hoverfly
<i>Epistrophe nitidicollis</i>	Hoverfly	<i>Melanostoma mellinum</i>	Hoverfly
<i>Episyrphus balteatus</i>	Hoverfly	<i>Melanostoma scalare</i>	Hoverfly
<i>Eriozona erratica</i>	Hoverfly	<i>Meligramma euchromum</i>	Hoverfly
<i>Eriozona syrphoides</i>	Hoverfly	<i>Meligramma guttatum</i>	Hoverfly
<i>Eristalinus aeneus</i>	Hoverfly	<i>Meligramma trianguliferum</i>	Hoverfly
<i>Eristalinus sepulchralis</i>	Hoverfly	<i>Meliscaeva auricollis</i>	Hoverfly
<i>Eristalis abusivus</i>	Hoverfly	<i>Meliscaeva cinctella</i>	Hoverfly
<i>Eristalis arbustorum</i>	Hoverfly	<i>Merodon equestris</i>	Hoverfly
<i>Eristalis horticola</i>	Hoverfly	<i>Microdon analis</i>	Hoverfly
<i>Eristalis intricarius</i>	Hoverfly	<i>Microdon devius</i>	Hoverfly
<i>Eristalis nemorum</i>	Hoverfly	<i>Microdon myrmicae</i>	Hoverfly
<i>Eristalis pertinax</i>	Hoverfly	<i>Myathropa florea</i>	Hoverfly
<i>Eristalis rupium</i>	Hoverfly	<i>Myolepta dubia</i>	Hoverfly
<i>Eristalis tenax</i>	Hoverfly	<i>Neoascia geniculata</i>	Hoverfly
<i>Eumerus funeralis</i>	Hoverfly	<i>Neoascia interrupta</i>	Hoverfly

Species	Group	Species	Group
<i>Neoscia meticulosa</i>	Hoverfly	<i>Pocota personata</i>	Hoverfly
<i>Neoscia obliqua</i>	Hoverfly	<i>Portevinia maculata</i>	Hoverfly
<i>Neoscia podagrica</i>	Hoverfly	<i>Psilota anthracina</i>	Hoverfly
<i>Neoscia tenur</i>	Hoverfly	<i>Rhingia campestris</i>	Hoverfly
<i>Orthonevra brevicornis</i>	Hoverfly	<i>Rhingia rostrata</i>	Hoverfly
<i>Orthonevra geniculata</i>	Hoverfly	<i>Riponnensia splendens</i>	Hoverfly
<i>Orthonevra nobilis</i>	Hoverfly	<i>Scaeva pyrastri</i>	Hoverfly
<i>Paragus haemorrhous</i>	Hoverfly	<i>Scaeva selenitica</i>	Hoverfly
<i>Parasyrphus annulatus</i>	Hoverfly	<i>Sericomyia lappona</i>	Hoverfly
<i>Parasyrphus lineola</i>	Hoverfly	<i>Sericomyia silentis</i>	Hoverfly
<i>Parasyrphus malinellus</i>	Hoverfly	<i>Sphaerophoria batava</i>	Hoverfly
<i>Parasyrphus nigritarsis</i>	Hoverfly	<i>Sphaerophoria fatarum</i>	Hoverfly
<i>Parasyrphus punctulatus</i>	Hoverfly	<i>Sphaerophoria interrupta</i>	Hoverfly
<i>Parasyrphus vittiger</i>	Hoverfly	<i>Sphaerophoria philanthus</i>	Hoverfly
<i>Parhelophilus consimilis</i>	Hoverfly	<i>Sphaerophoria rueppellii</i>	Hoverfly
<i>Parhelophilus frutetorum</i>	Hoverfly	<i>Sphaerophoria scripta</i>	Hoverfly
<i>Parhelophilus versicolor</i>	Hoverfly	<i>Sphaerophoria taeniata</i>	Hoverfly
<i>Pelecocera tricincta</i>	Hoverfly	<i>Sphaerophoria virgata</i>	Hoverfly
<i>Pipiza austriaca</i>	Hoverfly	<i>Sphegina clunipes</i>	Hoverfly
<i>Pipiza bimaculata</i>	Hoverfly	<i>Sphegina elegans</i>	Hoverfly
<i>Pipiza fenestrata</i>	Hoverfly	<i>Sphegina sibirica</i>	Hoverfly
<i>Pipiza lugubris</i>	Hoverfly	<i>Sphegina verecunda</i>	Hoverfly
<i>Pipiza luteitarsis</i>	Hoverfly	<i>Syrirta pipiens</i>	Hoverfly
<i>Pipiza noctiluca</i>	Hoverfly	<i>Syrphus ribesii</i>	Hoverfly
<i>Pipizella viduata</i>	Hoverfly	<i>Syrphus torvus</i>	Hoverfly
<i>Pipizella virens</i>	Hoverfly	<i>Syrphus vitripennis</i>	Hoverfly
<i>Platycheirus albimanus</i>	Hoverfly	<i>Trichopsomyia flavitarsis</i>	Hoverfly
<i>Platycheirus ambiguus</i>	Hoverfly	<i>Triglyphus primus</i>	Hoverfly
<i>Platycheirus angustatus</i>	Hoverfly	<i>Tropidia scita</i>	Hoverfly
<i>Platycheirus clypeatus</i>	Hoverfly	<i>Volucella bombylans</i>	Hoverfly
<i>Platycheirus discimanus</i>	Hoverfly	<i>Volucella inanis</i>	Hoverfly
<i>Platycheirus europaeus</i>	Hoverfly	<i>Volucella inflata</i>	Hoverfly
<i>Platycheirus fulviventris</i>	Hoverfly	<i>Volucella pellucens</i>	Hoverfly
<i>Platycheirus granditarsus</i>	Hoverfly	<i>Volucella zonaria</i>	Hoverfly
<i>Platycheirus immarginatus</i>	Hoverfly	<i>Xanthandrus comtus</i>	Hoverfly
<i>Platycheirus manicatus</i>	Hoverfly	<i>Xanthogramma citrofasciatum</i>	Hoverfly
<i>Platycheirus nielsenii</i>	Hoverfly	<i>Xanthogramma pedissequum</i>	Hoverfly
<i>Platycheirus occultus</i>	Hoverfly	<i>Xylota abiens</i>	Hoverfly
<i>Platycheirus peltatus</i>	Hoverfly	<i>Xylota florum</i>	Hoverfly
<i>Platycheirus perpallidus</i>	Hoverfly	<i>Xylota jakutorum</i>	Hoverfly
<i>Platycheirus podagratus</i>	Hoverfly	<i>Xylota segnis</i>	Hoverfly
<i>Platycheirus ramsarensis</i>	Hoverfly	<i>Xylota sylvarum</i>	Hoverfly
<i>Platycheirus rosarum</i>	Hoverfly	<i>Xylota tarda</i>	Hoverfly
<i>Platycheirus scambus</i>	Hoverfly	<i>Xylota xanthocnema</i>	Hoverfly
<i>Platycheirus scutatus</i>	Hoverfly		
<i>Platycheirus splendidus</i>	Hoverfly		
<i>Platycheirus tarsalis</i>	Hoverfly		