

UK Biodiversity Indicators 2018

This documents supports
D1c. Status of pollinating Insects

Technical background document:

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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 (Outhwaite *et al.*, in press), and were therefore excluded from the analysis. The final composite indicator was based on 351 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.* (in press). 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, we utilized the posterior distribution of the annual occupancy estimates for each species. For 1,000 iterations, we estimated the arithmetic mean occupancy estimate (on the unbounded log-odds scale) each year across all species. 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 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. In order to reduce the influence of species with highly uncertain annual occupancy estimates, species with fewer than 50 total records were excluded from the indicator. A lag in submission and collation of hoverfly records means that post 2013 records per year tended to drop off. Therefore, for the composite indicator and assessment, hoverfly occupancy estimates post 2013 were held at their value in 2013.

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 five 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 per cent and 49 per cent 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 per cent 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

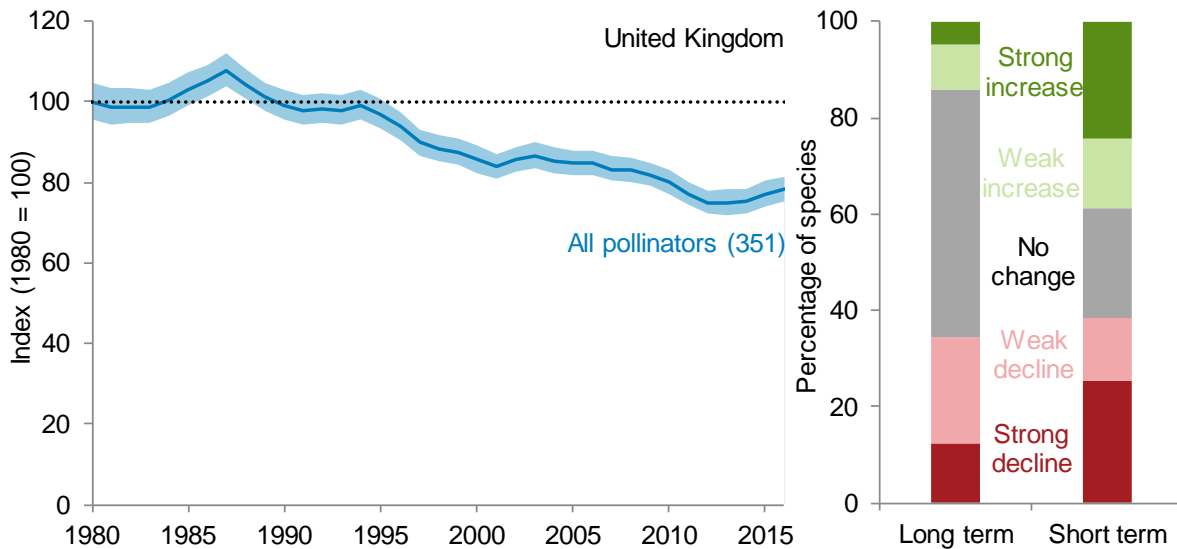
- The indicator (Figure 1) shows the average relative change in the area over which each of 351 species of pollinator was found, as measured by the number of 1km grid squares across the UK in which they were recorded – this is referred to as the ‘occupancy index’.
- Over the long-term (1980 to 2016) the pollinator indicator showed 22% decline (90% CIs: 25% to 18% decline), and was therefore assessed as a declining.
- Temporal patterns of change in the pollinator indicator showed a steady decline from 1987 onwards, with potential signs of stabilisation from 2012 onwards.
- Between 2011 and 2016 the indicator increased by 2% (90% CIs: 1% decrease to a 5% increase), however, given the uncertainty spans zero, the short-term trend is assessed as stable.
- Over the long-term, 14% of pollinator species became more widespread (5% showed a strong increase), and 34% became less widespread (13% showed a strong decrease).
- In contrast, the balance of increasing and decreasing species was similar in the short-term, with 39% and 38% of species increasing and decreasing respectively.
- 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 2001, reaching a low of 78% of the value in 1980 in 2001. The trend was then relatively stable up to 2013, ending 24% (90% CIs: 29% to 19% decline) lower than the value in 1980. A greater proportion of hoverflies have declined in occupancy over the long-term than have increased (33% and 10%, respectively). The balance of increasing and decreasing species was more even in the short-term, with 42% and 34% of species decreasing and increasing, respectively.

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 pollinators 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 (1980-2016) and b) the short-term (2011-2016)*.



*1980-2013 and 2008-2013 for hoverflies.

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 (1980-2016) and b) the short-term (2011-2016).

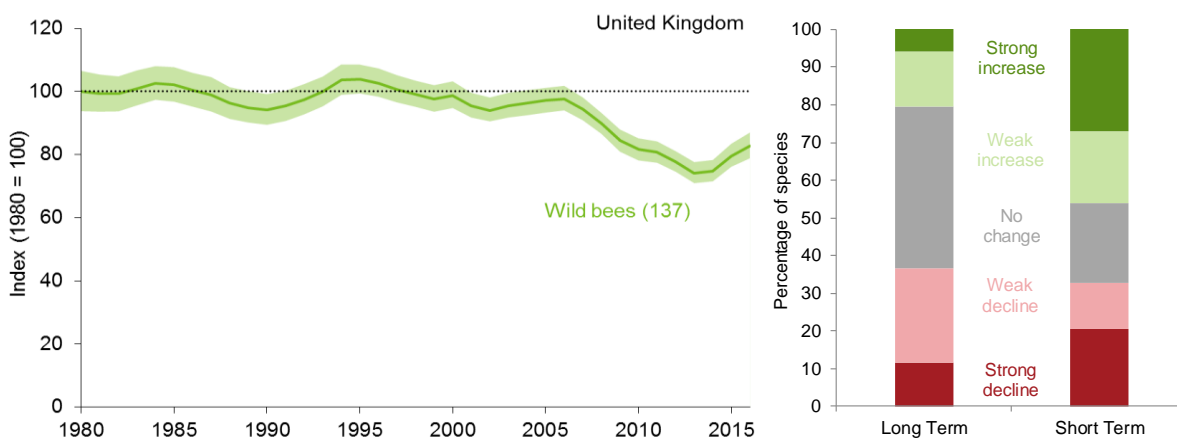
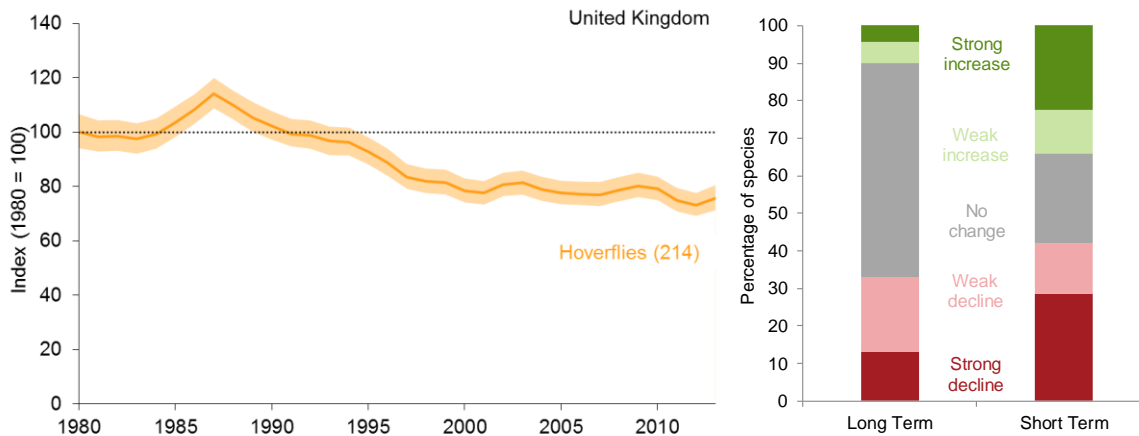


Figure 3: Change in the distribution of hoverfly species (n = 214) in the UK between 1980 and 2013. The shaded region is the 90% credible intervals of the annual occupancy estimates and represents the uncertainty surrounding the annual estimates. The solid line illustrates the rescaled indicator value. The proportion of hoverfly species in each trend category is based on the mean annual change in occupancy over both a) the long-term (1980-2013) and b) the short-term (2008-2013).



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Appendices

Appendix 1: The list of 351 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 chrysoseles</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 soroeensis</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 florissomne</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	Species	Group
<i>Hoplitis claviventris</i>	Bee	<i>Osmia spinulosa</i>	Bee
<i>Lasioglossum albipes</i>	Bee	<i>Osmia xanthomelana</i>	Bee
<i>Lasioglossum brevicorne</i>	Bee	<i>Panurgus banksianus</i>	Bee
<i>Lasioglossum calceatum</i>	Bee	<i>Panurgus calcaratus</i>	Bee
<i>Lasioglossum cupromicans</i>	Bee	<i>Anasimyia contracta</i>	Hoverfly
<i>Lasioglossum fratellum</i>	Bee	<i>Anasimyia interpuncta</i>	Hoverfly
<i>Lasioglossum fulvicorne</i>	Bee	<i>Anasimyia lineata</i>	Hoverfly
<i>Lasioglossum laevigatum</i>	Bee	<i>Anasimyia lunulata</i>	Hoverfly
<i>Lasioglossum lativentre</i>	Bee	<i>Anasimyia transfuga</i>	Hoverfly
<i>Lasioglossum leucopus</i>	Bee	<i>Arctophila superbiens</i>	Hoverfly
<i>Lasioglossum leucozonium</i>	Bee	<i>Baccha elongata</i>	Hoverfly
<i>Lasioglossum malachurum</i>	Bee	<i>Brachyopa bicolor</i>	Hoverfly
<i>Lasioglossum minutissimum</i>	Bee	<i>Brachyopa insensilis</i>	Hoverfly
<i>Lasioglossum morio</i>	Bee	<i>Brachyopa pilosa</i>	Hoverfly
<i>Lasioglossum nitidiusculum</i>	Bee	<i>Brachyopa scutellaris</i>	Hoverfly
<i>Lasioglossum parvulum</i>	Bee	<i>Brachypalpoides lentus</i>	Hoverfly
<i>Lasioglossum pauperatum</i>	Bee	<i>Brachypalpus laphriformis</i>	Hoverfly
<i>Lasioglossum pauxillum</i>	Bee	<i>Caliprobola speciosa</i>	Hoverfly
<i>Lasioglossum prasinum</i>	Bee	<i>Callicera aurata</i>	Hoverfly
<i>Lasioglossum punctatissimum</i>	Bee	<i>Callicera rufa</i>	Hoverfly
<i>Lasioglossum puncticolle</i>	Bee	<i>Chalcosyrphus eunotus</i>	Hoverfly
<i>Lasioglossum quadrinotatum</i>	Bee	<i>Chalcosyrphus nemorum</i>	Hoverfly
<i>Lasioglossum rufitarse</i>	Bee	<i>Chamaesyrphus scaevoides</i>	Hoverfly
<i>Lasioglossum semilucens</i>	Bee	<i>Cheilosia albipila</i>	Hoverfly
<i>Lasioglossum smeathmanellum</i>	Bee	<i>Cheilosia antiqua</i>	Hoverfly
<i>Lasioglossum villosulum</i>	Bee	<i>Cheilosia barbata</i>	Hoverfly
<i>Lasioglossum xanthopus</i>	Bee	<i>Cheilosia bergenstammi</i>	Hoverfly
<i>Lasioglossum zonulum</i>	Bee	<i>Cheilosia carbonaria</i>	Hoverfly
<i>Macropis europaea</i>	Bee	<i>Cheilosia chrysocoma</i>	Hoverfly
<i>Megachile centuncularis</i>	Bee	<i>Cheilosia cynocephala</i>	Hoverfly
<i>Megachile circumcincta</i>	Bee	<i>Cheilosia fraterna</i>	Hoverfly
<i>Megachile leachella</i>	Bee	<i>Cheilosia griseiventris</i>	Hoverfly
<i>Megachile ligniseca</i>	Bee	<i>Cheilosia grossa</i>	Hoverfly
<i>Megachile maritima</i>	Bee	<i>Cheilosia illustrata</i>	Hoverfly
<i>Megachile versicolor</i>	Bee	<i>Cheilosia impressa</i>	Hoverfly
<i>Megachile willughbiella</i>	Bee	<i>Cheilosia lasiopa</i>	Hoverfly
<i>Melitta dimidiata</i>	Bee	<i>Cheilosia latifrons</i>	Hoverfly
<i>Melitta haemorrhoidalis</i>	Bee	<i>Cheilosia longula</i>	Hoverfly
<i>Melitta leporina</i>	Bee	<i>Cheilosia mutabilis</i>	Hoverfly
<i>Melitta tricincta</i>	Bee	<i>Cheilosia nebulosa</i>	Hoverfly
<i>Osmia aurulenta</i>	Bee	<i>Cheilosia pagana</i>	Hoverfly
<i>Osmia bicolor</i>	Bee	<i>Cheilosia proxima</i>	Hoverfly
<i>Osmia bicornis</i>	Bee	<i>Cheilosia pubera</i>	Hoverfly
<i>Osmia caerulescens</i>	Bee	<i>Cheilosia scutellata</i>	Hoverfly
<i>Osmia leaiana</i>	Bee	<i>Cheilosia soror</i>	Hoverfly
<i>Osmia parietina</i>	Bee	<i>Cheilosia urbana</i>	Hoverfly
<i>Osmia pilicornis</i>	Bee	<i>Cheilosia variabilis</i>	Hoverfly

Species	Group	Species	Group
<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 albostriatus</i>	Hoverfly	<i>Melangyna arctica</i>	Hoverfly
<i>Dasysyrphus pinastri</i>	Hoverfly	<i>Melangyna cincta</i>	Hoverfly
<i>Dasysyrphus tricinctus</i>	Hoverfly	<i>Melangyna compositarum</i>	Hoverfly
<i>Dasysyrphus venustus</i>	Hoverfly	<i>Melangyna labiatarum</i>	Hoverfly
<i>Didea fasciata</i>	Hoverfly	<i>Melangyna lasiophthalma</i>	Hoverfly
<i>Didea intermedia</i>	Hoverfly	<i>Melangyna quadrimaculata</i>	Hoverfly
<i>Epistrophe diaphana</i>	Hoverfly	<i>Melangyna umbellatarum</i>	Hoverfly
<i>Epistrophe eligans</i>	Hoverfly	<i>Melanogaster aerea</i>	Hoverfly
<i>Epistrophe grossulariae</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 interruptus</i>	Hoverfly	<i>Microdon devius</i>	Hoverfly
<i>Eristalis intricarius</i>	Hoverfly	<i>Myathropa florea</i>	Hoverfly
<i>Eristalis pertinax</i>	Hoverfly	<i>Myolepta dubia</i>	Hoverfly
<i>Eristalis rupium</i>	Hoverfly	<i>Neoascia geniculata</i>	Hoverfly
<i>Eristalis tenax</i>	Hoverfly	<i>Neoascia interrupta</i>	Hoverfly
<i>Eumerus funeralis</i>	Hoverfly	<i>Neoascia meticulosa</i>	Hoverfly
<i>Eumerus ornatus</i>	Hoverfly	<i>Neoascia obliqua</i>	Hoverfly
<i>Eumerus sabulonum</i>	Hoverfly	<i>Neoascia podagrica</i>	Hoverfly
<i>Eumerus strigatus</i>	Hoverfly	<i>Neoascia tenur</i>	Hoverfly
<i>Eupeodes bucculatus</i>	Hoverfly	<i>Orthonevra brevicornis</i>	Hoverfly
<i>Eupeodes corollae</i>	Hoverfly	<i>Orthonevra geniculata</i>	Hoverfly
<i>Eupeodes latifasciatus</i>	Hoverfly	<i>Orthonevra nobilis</i>	Hoverfly

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