

Science for Environment Policy

Wild pollinators in decline, finds 33-year Great Britain study of bees and hoverflies

To estimate the losses of wild pollinators across Great Britain, a study mapped records of 353 wild bee and hoverfly species, collected across the country from 1980 to 2013. It found that a third of species decreased, while a tenth increased. On average, the geographic range of bee and hoverfly species declined by a quarter, which equates to a net loss of 11 species from each 1km grid square (with uncommon species more harshly affected), highlighting a significant risk to biodiversity, pollinators, and their ecosystems.

Pollination is crucial to ecosystem health and global food security. For example, more than 75% of global food crop types — including fruits, vegetables, and some of the most important cash crops such as coffee, cocoa and almonds — rely on animal pollination. Pollinator-dependent crops contribute to 35% of global crop production volume, and up to 88% of flowering plant species¹ worldwide depend upon insect pollinators to some extent^{2,3}. Pollinators face a number of threats, including habitat loss, pesticide use, climate change, and the spread of invasive species; however, there is a lack of robust, large-scale, species-specific trend estimates.

This study aimed to produce such estimates, which are necessary to assess the efficacy of conservation actions and the impacts of environmental change on biodiversity, using over 715 000 biological records collected by the [UK Hoverfly Recording Scheme](#) and the [Bees, Wasps, and Ants Recording Society](#). It used these records to estimate national- and species-level trends for wild pollinators in Great Britain from 1980 to 2013. The researchers constructed an 'occupancy detection model' to combat any bias or incompleteness in the dataset — a model based on detecting and mapping 'species occupancy' across a network of one-kilometre grid squares.

The final dataset comprised 297,536 records on 139 bee species and 417,856 records on 214 hoverfly species, covering roughly 75% of British bee and hoverfly fauna. Bees and hoverflies were split in accordance with their differing species-specific behaviour. Trends for bee species known to be dominant crop pollinators were compared against other wild bee species, and all bee and hoverfly species were divided into four categories based on their distribution pattern — upland, southern, widespread southern and widespread species — and divided by social or solitary behaviour.

Wild pollinators displayed a number of varying trends: a third of wild pollinator species decreased over the study period, a tenth of species increased, and the rest showed no clear trend. Overall, this reflects a loss of 11 pollinator species— 4 bees, 7 hoverflies — per grid cell. When extrapolated to a countrywide level (roughly 240,000 cells), this represents a net loss of over 2.7 million occupied cells.

Virtually all severe declines in bee occupancy occurred after 2007, while hoverflies declined steadily from 1987 to 2012. The researchers suggest that this may be connected to species-specific behaviour: bees' fixed-place foraging versus hoverflies' wide-range roaming, for example, or bees' parental protection in the early stages of life versus hoverflies' flexible juvenile stages and lack of parental dependency.

Continued on next page.

08 August 2019
Issue 529

[Subscribe](#) to free
weekly News Alert

Source: Powney, G. D., Carvell, C., Edwards, M., Morris, R. K. A., Roy, H. E., Woodcock, B. A., and Isaac, N. J. B. (2019). Widespread losses of pollinating insects in Britain. *Nature Communications* vol. 10 Article 1018 (2019).

<https://www.nature.com/articles/s41467-019-08974-9>.

Contact:
gary.powney@ceh.ac.uk

Read more about:
[Agriculture](#),
[Biodiversity](#),
[Emerging risks](#),
[Environment and health](#)

1. Ollerton, J., Winfree, R. & Tarrant, S. (2011). How many flowering plants are pollinated by animals? *Oikos* 120, 321–326.

2. Potts, S. G. et al. (2010). Global pollinator declines: trends, impacts and drivers. *Trends Ecol. Evol.* 25, 345–353.

3. Goulson, D., Nicholls, E., Botías, C. & Rotheray, E. L. (2015). Bee declines driven by combined stress from parasites, pesticides, and lack of flowers. *Science* 347, 1255957.

Science for Environment Policy

Wild pollinators in decline, finds 33-year Great Britain study of bees and hoverflies (continued)

08 August 2019

Issue 529

[Subscribe](#) to free
weekly News Alert

Source: Powney, G. D., Carvell, C., Edwards, M., Morris, R. K. A., Roy, H. E., Woodcock, B. A., and Isaac, N. J. B. (2019) Widespread losses of pollinating insects in Britain. *Nature Communications* vol. 10 Article 1018 (2019).

<https://www.nature.com/articles/s41467-019-08974-9>.

Contact:

gary.powney@ceh.ac.uk

Read more about:

[Agriculture](#),
[Biodiversity](#),
[Emerging risks](#),
[Environment and health](#)

Most bee species declined, although a subset of species identified as key pollinators for a range of economically important crops increased their occupancy by 12%, and social species (including bumblebees) increased their occupancy by 38% (compared to a decline of 32% for solitary species). The researchers suggest this may be due to a rise in the number of widespread initiatives specifically aiming to support bumblebees in farming systems, and in response to the large increases of mass-flowering crops grown during the study period. Additionally, upland species declined by 55% and southern species by 25%, suggesting that particular habitats may be at greater risk of further pollinator loss. When assessing populations for 'evenness', or species diversity within a cell, the study found strong declines in evenness for bees in the late 2000s — a potential issue for wildflowers given that these are best pollinated by diverse bee communities.

The researchers highlight that a lack of standardised monitoring data placed limitations on the study — this issue is prioritised by [the EU Pollinators Initiative](#), which aims to develop a monitoring system to ensure the availability of such standardised data. Additionally, it should be noted that there was a southern bias to the data used in this study — the results thus predominately reflect trends within this region, although do contain northern records and, once scaled, are broadly representative of national trends. Current agri-environmental schemes appear to have successfully promoted pollinator populations on farmland — particularly widespread, common, key pollinator species — but there remains a problem with pollinator diversity, an issue that is important to not only the success of crop yields and ecosystem health, but also crucial to non-crop pollination services and wider biodiversity. The researchers call for more complete and wide-ranging surveys to better characterise the links between species occupancy, local abundance, and pollination rate (or deficit).



The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission. Please note that this article is a summary of only one study. Other studies may come to other conclusions.

To cite this

article/service: "[Science for Environment Policy](#)": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

