

Science for Environment Policy

Bee and wasp extinctions in UK driven by historical agricultural changes

Changes in agricultural policy and practice, such as increased intensification and fertiliser use, are responsible for many historical extinctions of pollinator populations in the UK, suggests new research. The study looked at bee and wasp extinction rates in relation to agricultural practices since the mid-19th century.

The pollination services provided by insects, such as bees and flower-visiting wasps, are fundamental to maintaining both [biodiversity](#) and [agricultural](#) productivity. However, despite their importance, human activities are causing the number and diversity of these species to decline.

Many studies have focused on understanding how habitat destruction, loss of the flowers these species rely on for survival and increased use of pesticides have contributed to the decline in these species. However, much of this research has been relatively limited in terms of the time periods and geographical ranges considered.

In this research, almost 500 000 records of sightings held by the Bees, Wasps and Ants Recording Society ([BWARS](#)) were used to assess the extinction of bee and flower-visiting wasp species throughout Britain from the mid-19th century to the modern day. The researchers examined the rate of extinctions and how it varied over time, looking for patterns to help explain changes.

Species were considered as extinct in the UK if there had been no record of them for 20 or more years. Many of the species examined still exist in continental Europe; as such, these are species which have only become locally extinct in Britain.

A total of 23 species were identified as extinct. The years that these species were last observed ranged from as long ago as 1853, to as recently as 1990. The rate of extinctions varied over time, with four periods of extinction rate change identified. These were from 1874 to 1928, 1928 to 1958, 1958 to 1986 and 1986 onwards.

The researchers linked these periods of increased extinction to phases of large-scale changes in agricultural policy and practice. The 1874 period of species loss, when 0.96 species were lost per decade (compared with 0.21 before that) coincided with changes in fertiliser use. These reduced the need for 'fallow' years to maintain soil quality, when the wild plants some species relied on would normally flourish.

A major period of species loss — 3.46 species per decade — occurred from around 1928 to 1958, following changes to agricultural policy and practice after the First World War. During this period, agriculture was intensified due to food security concerns, which continued through to the Second World War and beyond.

Between 1958 and 1986, the extinction rate slowed to around 0.98 species per decade. This is not easily explained, the study's authors say, since agriculture became even more intensive during this period. However, it may be that the species most sensitive to change had already been lost, while less sensitive species survived.

The final period, from 1986 to 1994, saw an extinction rate of 5.48 species per decade. The authors note the high uncertainty associated with this particular figure and acknowledge that this result may appear to contradict recent reports of reduced species loss. They suggest this high rate may be due to four extinctions between 1988 and 1990 which skew the data and exaggerate the estimate. Between 1971 and 1994 there were otherwise no extinctions.

Overall, the study shows that, while the drivers behind the extinctions are complex, they are strongly linked with changes in agricultural policy and practice.



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