

Agriculture and climate change are reshaping insect biodiversity worldwide

- [Published: 20 April 2022](#)
- [Charlotte L. Outhwaite](#),
- [Peter McCann](#) &
- [Tim Newbold](#)

Nature volume 605, pages97–102 (2022)[Cite this article](#)

Abstract

Several previous studies have investigated changes in insect biodiversity, with some highlighting declines and others showing turnover in species composition without net declines^{1,2,3,4,5}. Although research has shown that biodiversity changes are driven primarily by land-use change and increasingly by climate change^{6,7}, the potential for interaction between these drivers and insect biodiversity on the global scale remains unclear. Here we show that the interaction between indices of historical climate warming and intensive agricultural land use is associated with reductions of almost 50% in the abundance and 27% in the number of species within insect assemblages relative to those in less-disturbed habitats with lower rates of historical climate warming. These patterns are particularly evident in the tropical realm, whereas some positive responses of biodiversity to climate change occur in non-tropical regions in natural habitats. A high availability of nearby natural habitat often mitigates reductions in insect abundance and richness associated with agricultural land use and substantial climate warming but only in low-intensity agricultural systems. In such systems, in which high levels (75% cover) of natural habitat are available, abundance and richness were reduced by 7% and 5%, respectively, compared with reductions of 63% and 61% in places where less natural habitat is present (25% cover). Our results show that insect biodiversity will probably benefit from mitigating climate change, preserving natural habitat within landscapes and reducing the intensity of agriculture.