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Role of Pesticides in Bee Decline: Scientists Call for Debate

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An international panel of scientists, including a University of Guelph professor, is calling for an evidence-based debate over whether controversial and widely used neonicotinoid insecticides are causing population declines in bees and other insect pollinators.

A paper on the scientific evidence about neonicotinoids was published May 21 in [*Proceedings of the Royal Society B*](http://rspb.royalsocietypublishing.org/content/281/1786/20140558) (<http://rspb.royalsocietypublishing.org/content/281/1786/20140558>) by nine scientists at leading European universities and Guelph professor Nigel Raine, the newly installed Rebanks Family Chair in Pollinator Conservation.

The paper aims to clarify what is known about these insecticides to support coherent policy and practice recommendations.

This past December, the European Union placed a moratorium on using three neonicotinoid insecticides on crops favoured by bees over fears that the substances harm pollinating insects. Pollination is critical for many crops and wild plants, but neonicotinoids are among the most effective insecticides used by farmers. Neonicotinoids make up 30 per cent of the global insecticide market.

The agricultural and environmental effects of neonicotinoid use have sparked controversy among scientists and policy-makers.

"This paper provides a balanced and accessible summary of both the strengths and weaknesses of research in this area to facilitate evidence-based discussion and policy-making," said Raine.

"The causes of global bee and other key pollinator declines are likely the result of multiple factors including loss of suitable habitat, parasites and diseases, invasive species, adverse weather conditions and agricultural intensification, including the use of agrochemicals such as pesticides."

The paper discusses insecticide amounts in treated plants and in pollinators, how neonicotinoids affect individual bees and other pollinators, and the insecticide's impact on colonies and populations.

Scientists need to figure out how to stop pollinator decline, said Raine. His research chair at Guelph is the first in Canada in pollinator conservation.

“Roughly one in three mouthfuls of food we eat are reliant on insect, and primarily bee, pollination. This includes the majority of fruits and vegetables, coffee and others, so losing pollinators will increase the price of these goods or make it harder to grow them in some parts of the world. Ultimately, if pollinator populations continue to decline, we may lose the ability to grow these crops altogether.”

The paper says banning neonicotinoids would likely not immediately reverse declines, as pollinator numbers were falling before these pesticides were introduced in the 1990s. Noting that a ban could discourage farmers from growing crops needed by pollinators, the authors call for more research on the impacts of these pesticides.

“There are likely many reasons for global bee declines,” said Raine.

“While pesticide exposure may be a factor, it is essential to remember that other drivers, including habitat loss, bee diseases and climate change, could be at least as important. This restatement will be a useful tool for policy-makers and regulators to help them assess the scientific evidence on this potentially confusing issue.”

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