

Plant diversity could provide natural repellent for crop pests

October 12 2016



Fields with a variety of plants seems to attract fewer plant-eating insects, such as three-lined potato beetles, than farm land with just one type of crop. Credit: William Wetzel, Michigan State University

A new study has unveiled why a field with a variety of plants seems to

attract fewer plant-eating insects than farm land with just one type of crop.

Scientists and farmers have puzzled over this pattern that makes protecting crops from pests a challenge.

Research published in the current issue of *Nature* and led by William Wetzel, a new Michigan State University entomologist and the study's lead author, is shedding light on this interaction. Plants suppress their insect enemies by being variable, not just by being low quality on average as is typically thought.

After studying 53 species of insects, the researchers found that bugs have narrow ranges of nutrient levels where they flourish. If the [plants](#) being fed on are too nutrient rich or poor, the insects are less likely to thrive. Bugs surrounded by diverse plants are harmed much more by low-quality plants with the wrong nutrient levels than they are benefited by high-quality plants with high nutrient levels.

"Farm fields can create monocultures where pests may find the perfect nutrition to be healthy and reproduce," said Wetzel, who conducted the research during his doctoral work at the University of California, Davis. "Planting fields with higher plant nutrient variability could contribute to sustainable pest control."

Many large farm fields are monocultures because plants are bred to be as identical as possible. What are the solutions for larger growers to add diversity into their farming to discourage pests, while maintaining the same level of productivity?

Crop varieties could be bred with variable nutrient levels in the parts eaten by insects, for example the leaves or roots, while the parts ate by consumers could be consistent. Or farmers could plant new mixtures of

[crop varieties](#) or genotypes that differ in [nutrient levels](#).



A Japanese beetle munches on a leaf. Credit: Bill Ravlin/Michigan State University

With Wetzel's move to MSU, he intends to take this research to the next level. His program is using modern genetic resources to develop a model system for manipulating plant trait diversity in field populations and measuring the effects on insect populations and plant damage.

"The community of stellar agricultural and ecological scientists here and

core facilities for chemistry, along with greenhouses and field research centers, is helping me test new hypotheses for how plant diversity influences insect ecology at large scales and in the field where it matters," said Wetzel, who's with the College of Agriculture and Natural Resources. "I'm excited about bringing the work to MSU because of the potential to collaborate with an exciting array of molecular biologists, physiologists and landscape ecologists, as well as Extension specialists who bring new knowledge where it is most needed."

More information: Variability in plant nutrients reduces insect herbivore performance, *Nature*,
[nature.com/articles/doi:10.1038/nature20140](https://doi.org/10.1038/nature20140)

Provided by Michigan State University

Citation: Plant diversity could provide natural repellent for crop pests (2016, October 12)
retrieved 25 April 2024 from
<https://phys.org/news/2016-10-diversity-natural-repellent-crop-pests.html>

| |
|--|
| <p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p> |
|--|