

# Wild desert plants face viral surprise

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By analyzing native plants, such as this wild squash, in the Californian desert, a team of researchers from Michigan State University and the University of California, Riverside revealed that non-native viruses from agriculture are invading these habitats. Credit: Tessa Shates

Just as many people battle seasonal colds and flu, native plants face their own viral threats. People have long known that plants can succumb to

viruses just like humans. Now, a new study led by Michigan State University and the University of California, Riverside reveals a previously unknown threat: non-native crop viruses are infecting and jeopardizing the health of wild desert plants.

"For years, the ecological field assumed wild plants were immune to invasive viruses that damage crops," said Carolyn Malmstrom, a professor of [plant biology](#) and ecology, evolution, and behavior at MSU and a co-leader of the study. Kerry Mauck, an associate professor and Alfred M. Boyce Endowed Chair in Entomology, was the team leader at UC Riverside and adviser for the lead author Tessa Shates, who was a graduate student in the Mauck Lab.

"But we've found that we need to be just as concerned about protecting indigenous plants as we are agricultural ones," Malmstrom said.

[Published](#) in the *Phytobiomes Journal*, this discovery holds significant implications for conservation efforts. The research utilizes advanced genetic sequencing and field experiments to demonstrate how insects, acting as unwitting infectors, ferry [harmful pathogens](#) from cultivated fields to native ecosystems.

The study focused on desert regions of Southern California, where the Cucurbita species of wild squash thrived alongside irrigated agriculture. The team meticulously identified, marked, and collected samples from the wild plants.

Then, analyzing the genetic makeup of viruses within these wild plants, the researchers discovered a surprising presence of crop pathogens like cucurbit yellow stunting disorder virus and cucurbit aphid-borne yellows virus, or CABYV.

In fact, they found that infection rates with CABYV—a non-native

pathogen—could reach as high as 88% in some wild Cucurbita populations, with visible impacts on [plant growth](#) and root health, both vital for the plants' survival in the harsh desert environment.

"These wild plants are crucial components of desert ecosystems, providing food and habitat for other species," Malmstrom said. "Their decline from crop [virus](#) infections could have cascading effects on entire ecological communities."

"Our findings should help the greater community recognize that our impact on the landscapes around us is not always obvious or clear to see," Shates said. "It's easy to see the landscape changes of a clear-cut forest, but it is harder to recognize how hitchhiking microbes might change plant community structure over time."

"This project bridges the gap between agriculture and natural systems, reminding us that nature and agriculture are intricately linked," said Malmstrom. "It also underscores the need for a more holistic approach to managing plant health and shows that understanding the complex dynamics of viruses in natural systems is essential for developing sustainable solutions that benefit both agriculture and biodiversity."

**More information:** Tessa M. Shates et al, Non-Native Plant Viruses Prevalent in Remnant Natural Plant Communities Harm Native Perennial Hosts, *Phytobiomes Journal* (2023). [DOI: 10.1094/PBIOMES-05-23-0033-R](https://doi.org/10.1094/PBIOMES-05-23-0033-R)

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