

Avoiding virus dangers in “domesticating” wild plants for biofuel use



In our ongoing quest for alternative energy sources, researchers are looking more to plants that grow in the wild for use in biofuels, plants such as switchgrass.

However, attempts to “domesticate” wild-growing plants have a downside, as it could make the plants more susceptible to any number of plant viruses.

In a presentation at this year’s meeting of the American Association for the Advancement of Science, Michigan State University plant biologist Carolyn Malmstrom said that when we start combining the qualities of different types of plants into one, there can be unanticipated results.

“Most wild plants are perennials, while most of our agriculture crops are annuals,” Malmstrom said. “Sometimes when you mix the properties of the two, unexpected things can happen.”

For example, annual domestic plants are made to grow quickly. “In agriculture we select more for growth,” she said. “There is a reduced need for the plants to defend themselves because we have taken care of that.”

If pest control measures aren't taken, these annual plants can serve as "amplifiers," producing lots of viruses and insects to move the viruses around.

In contrast, perennial plants in nature grow slower, but are usually better equipped to fight off invading viruses. When wild-growing perennials do get infected they can serve as reservoirs for viruses, Malmstrom said, “a place where viruses can hang out a long time.”

In the domestication of wild plants for bioenergy, long-lived plants are being selected for fast growth like annuals. “Now you have a plant that could be a long-term reservoir, but it also happens to be faster growing and can serve as an amplifier for viruses. This all-in-one combination could increase virus pressure in

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Published on Research & Development (<http://www.rdmag.com>)

crop areas unless mitigated.”

Malmstrom said that plant virus ecology and the study of viral interactions between wild-growing plants and agricultural crops is an expanding field. In the last 15 years, disease ecology has really come to the fore as a basic science.

Most of what is known about plant viruses comes from studies of crops. To understand the complete ecology of viruses, researchers are now studying these tiny organisms in nature, too. “The mysteries of how plant viruses can play a role in ecosystem properties and processes in natural ecosystems are emerging more slowly,” Malmstrom said.

Malmstrom said it's important to catch-up in our understanding of viral ecology, as there are any number of societal issues that need to be addressed in this area.

“Society wants us to be able to answer questions such as whether viruses can be used in agricultural terrorism, how to recognize a novel virus, and what happens if a virus is genetically modified and then let loose?”

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