

When plants attract bugs, it may be their own fault

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If you're debating about what impatiens to plant in your yard, a recent study at the University of Illinois suggests that you go with Cajun Carmine, that is if you want fewer insects in your garden. Why some varieties of the popular bedding plant impatiens attract more thrips than others was one of the questions graduate student Katie Yu investigated.

"The fragrances given off by flowers are actually complex compounds known as plant volatiles, some of which cannot be detected by humans," Yu said. "Volatile compounds act as a language that they use to communicate and interact with the surrounding environment. It's a defense mechanism against herbivores and it's a means to attract pollinators. As of today, there have been over 1,000 plant volatiles reported. But, none have yet to be reported in impatiens."

Impatiens, one of the top-selling bedding plants in America, is very durable, relatively easy to grow and has wholesale sales exceeding over \$170 million per year. Yu chose two the popular varieties Dazzler White and Cajun Carmine to study their resistance to the Western flower thrips.

Yu's initial research in greenhouses showed that Cajun Carmine had significantly less damage from thrips than Dazzler White. So she set out to prove the reason why, suspecting that impatiens may emit volatiles that attract the thrips.

Thrips are very tiny, sliver-like insects that are native to northwestern

North America. They are a worldwide pest, causing problems in field crops and greenhouses. They are attracted to a wide range of host plants including impatiens, fuchsia, hibiscus, chrysanthemum, begonias, ivy, petunias, and major [food crops](#). They feed on the plants' leaves and petals and transmit devastating plant viruses.

For her research, Yu used a tiny glass apparatus shaped like the letter "Y." The thrips are inserted one at a time into the base of the Y. When the thrip reaches the junction in the Y, it has the opportunity to choose to continue one way or the other. In this experiment, one of the choices was toward purified air, while the other was toward volatiles from an impatiens plant.

"Because we want to know if the thrips are choosing based on a non-visual cue, the apparatus is contained in a black box so the thrips cannot see if they're going toward the plant or not," Yu said.

In the experiment, thrips chose Dazzler White over the purified air 64 percent of the time. The thrips chose Cajun Carmine only 53 percent of the time. "Because the thrips are blinded to the [plants](#), it's easy to infer that they are responding to the volatile compounds," Yu said. "Thrips did not choose the Cajun Carmine preferentially over the purified air. What this implies is that Cajun Carmine does not produce a volatile attractive to thrips."

Although the percentages don't appear significantly different, Yu said that it is conclusive. "As a control, we also did the Y test with purified air only, and the thrips were choosing one side over the other 50-50. Because the thrips were choosing Cajun Carmine basically 50-50, choosing Dazzler White 64 percent of the time shows they were definitely choosing the plant [Dazzler White] over the purified air."

While preliminary, these findings are exciting to researchers seeking to

minimize damage to impatiens in commercial greenhouses.

When specific plant volatiles are identified as attractant or repellents to specific insect pests, these volatiles can then be used as selection factors in plant breeding programs or by producers seeking to limit insect damage," said Yu's U of I advisor Daniel Warnock. "The development of commercially acceptable cultivars of impatiens that are not attractive to or recognized as a food source by western flower thrips will reduce insecticide usage in greenhouses as the thrips will choose to feed elsewhere. Attractant volatiles may also be used as lures to trap insects as a control method. Repellents may be used as a deterrent to feeding if formulated for application on other crops."

Future research to be conducted at the University of Illinois will focus on identifying the presence of [volatile compounds](#) in impatiens germplasm lines which show higher levels of resistance to western flower thrips feeding than Cajun Carmine. Once the presence or absence of volatiles are confirmed, researchers plan to begin fractioning the mass volatiles into specific compounds that are candidates for use in reducing insect attractiveness to greenhouse crops.

Provided by University of Illinois at Urbana-Champaign

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