



Feed the Future Country Fact Sheet

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Scientific Modeling Helps Defend Tomatoes Against Flying Foe



IPM Innovation Lab

Muni Muniappan inspects tomatoes damaged by *Tuta absoluta* in Puranchaur, Nepal. The pest was first reported in the country in spring of 2016, and it is already promising to be a big problem for the upcoming tomato-growing season.

Tomatoes are so abundant that they can be easy to take for granted. But a pest known as the South American tomato leafminer, or *Tuta absoluta*, has been making this popular ingredient harder to find in countries throughout the world. The tomato leafminer hasn't arrived in the United States yet, but it has made it as far north as Costa Rica. Now, most scientists agree, it's no longer a question of if this pest will arrive, but when.

"People want to know when *Tuta* will be in the United States," said Muni Muniappan, director of the [Feed the Future Innovation Lab for Integrated Pest Management](#), led by Virginia Tech University. "It could be in 1 year or 10 years, but eventually it will be here."

Fresh and processed tomatoes generated \$2 billion dollars in the United States in 2015 and tomato exports totaled \$335 million, making America the seventh largest tomato-producing country in the world. An invasion by the tomato leafminer could put a serious dent in those numbers.

Muniappan and the Integrated Pest Management Innovation Lab have been working to combat the pest since it hitched a ride to Spain in 2006, where it then spread through Europe and the Mediterranean and into Central and South Asia and parts of Africa.

"There is no silver bullet for *Tuta absoluta*," Muniappan said. "We cannot stop it, but we can slow it down."

Under these circumstances, the best way to protect countries that have not been reached by the pest is to delay its arrival and increase awareness about it. Then, if it does arrive, the key is to limit its damage with a quick response.

To keep the pest out of America for as long as possible, the Integrated Pest Management Innovation Lab is helping monitor *Tuta absoluta* and assist states in using pheromone traps for early detection. It is also working with Costa Rica to suppress the pest and prevent its northward spread.

When the pest does inevitably enter the United States, quarantine measures will be necessary. To this end, the Integrated Pest Management Innovation Lab recently gave funding to Virginia Tech's Biocomplexity Institute to model the spread of *Tuta absoluta*, using human movement as a variable. Most models use only temperature and weather patterns as predictors of disease and pest spread, but the model developed through this project will also consider popular trade and travel routes.

"Our model will be an extremely useful tool to develop strategies to combat these pests," said Abhijin Adiga, a research faculty member at the Biocomplexity Institute and project lead. "Further, the methodology will not be limited to studying the tomato leafminer but can be applied to any agricultural invasive species."

Muniappan and the Integrated Pest Management Innovation Lab are raising awareness in America and around the world about the pest. So far, they've held 16 international awareness workshops, reaching scientists from 55 countries. At the International Congress of Entomology in October 2016 in Florida, the Feed the Future Innovation Lab led a symposium, resulting in the group recommending several measures, such as undertaking a concentrated effort to look for natural enemies in *Tuta*'s area of origin in South America and providing information on appropriate insecticide rotations for pest management in the fields.

"With proactive actions," Muniappan said, "we hope to significantly reduce the economic loss caused by this pest in the United States and around the world."