

## Penn State and Partners Bring New Disease-Management Tool to Nepal

Penn State's College of Agricultural Sciences, as part of a consortium that includes Virginia Tech and Ohio State universities, is collaborating with researchers from Nepal Agricultural Research Council and Winrock International to develop a new grafting technology to combat diseases and pests in tomatoes and eggplants.

Tomatoes and eggplants are some of the most popular vegetables in the world. Because of their high demand, they also are popular among growers wanting to increase their income. New technologies such as plastic tunnels are helping promote the off-season cultivation of tomatoes in countries across the globe. But various pests, such as

bacterial wilt, root knot nematodes, tomato fruit worm, and shoot and fruit borer of eggplant, decrease yields and have been known to destroy entire crops.

Ed Rajotte, professor of entomology, is collaborating with researchers in other countries to find solutions through the Integrated Pest Management (IPM) Collaborative Research Support Program. The fifteen-year-old program, managed by Virginia Tech, is part of the United States Agency for International Development, which supports research, education/training, and information exchange among U.S. and developing-country institutions. "The program focuses on participatory and collaborative IPM research and education programs for horticultural crops and other food-production systems," Rajotte explains. "Integrated pest management provides economical methods for managing pests such as insects, diseases, weeds, and rodents using tactics that are eco-

nomical, safe for people, and non-threatening to the environment."

In Nepal, bacterial wilt in tomato and eggplant is prevalent in the foothills and valleys where the environment is warm and humid. In the absence of proper pest-management methods, yield losses could approach 100 percent. Root knot nematode is another severe pest of tomatoes and eggplants. Many farmers in Nepal report related losses of about 40 percent.

According to Rajotte, management of these pests is very difficult due to wide host range, location, and variability among the pathogens. In addition, there are

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no commercial pesticides available for sustainable control, and disease-resistant plants are not readily available.

"Grafting eggplant and tomato varieties onto resistant wild *Solanum* rootstocks has proved to be effective for controlling bacterial wilt and root knot nematode in Bangladesh, one of the program's collaborating countries," Rajotte says. "One rootstock species, *S. silymbriifolium*, was chosen because it adapts to local growing conditions, is resistant to soilborne diseases, and grows quickly to provide rootstock seedlings faster. In addition, these grafting techniques can be done cheaply so that grafted plants can be produced locally at the village level. In Bangladesh, grafted plants yielded significantly higher than nongrafted plants in farmers' fields."

The grafting technique developed in Bangladesh has been transferred and is being evaluated in Nepal. Local testing of any new technology is important because different ecological factors may necessitate adjustments in the technique. Grafting is especially important to Nepal because its higher altitudes allow tomato production when it is too hot in India.

A thriving tomato export industry has developed in Nepal, but it has been plagued by soilborne diseases. So far, the grafting technique is working well and the farmers are getting better yields. "Fifteen farmers from six different districts of Nepal have been trained and are acting as nursery growers to supply local farmers with grafted plants," says B. K. Gyawali, the program's Nepal site coordinator. "The availability of grafted plants will reduce pest-control costs, improve yields, and strengthen the supply chain for vegetables."

More information about the project and the Integrated Pest Management Collaborative Research Support Program is available online at [www.oired.vt.edu/ipmcrsp](http://www.oired.vt.edu/ipmcrsp).

—Kristie Auman-Bauer



PHOTO: PROVIDED BY ED RAJOTTE

**These Nepalese women are part of a cooperative that was formed to grow tomatoes in the off-season and sell them to consumers in India, where it is too hot to grow tomatoes in summer. New grafting techniques are helping growers in Nepal increase yields by avoiding disease-related crop losses.**