

## Testing for virus-resistant tomato plants



Sheeka Tareyama meets with local tomato farmers in their fields to evaluate plants infected with a tomato virus.

In 2007 a mysterious disease was reducing the yield of tomatoes by 10% in northern Guam. Farmers noticed their tomato plants exhibiting symptoms of leaf curl, yellowing, and stunted growth. By spring of 2011 some farmers were experiencing a total loss of their tomato crops, apparently to the same problem. This prompted samples to be sent off-island for genetic sequencing. Forward and reverse sequences of the samples had a 93% identity to Ageratum yellow vein virus (AYVV).

In an effort to identify the virus species with greater precision, additional samples were collected and sent to Dr. Kai-Shu Ling at the U.S. Vegetable Laboratory in South Carolina. Using an enzyme linked immunosorbent assay (ELISA), samples were found to be negative to most common tomato viruses but positive for Begomovirus using PCR. Dr. Ling reported, "Due to the high level of sequence diversity found, it is likely that Guam has a unique strain of AYVV."

"We conducted farm trials in August 2014 to compare 17 commercial tomato varieties for virus resistance and production suitability against the control variety Season Red," explained Extension Associate Sheeka Tareyama. "We created a tomato virus severity scale to visually evaluate the tomato varieties for AYVV. We then compared tomato varieties against the control and Karl Schlub, project statistician, analyzed this and other



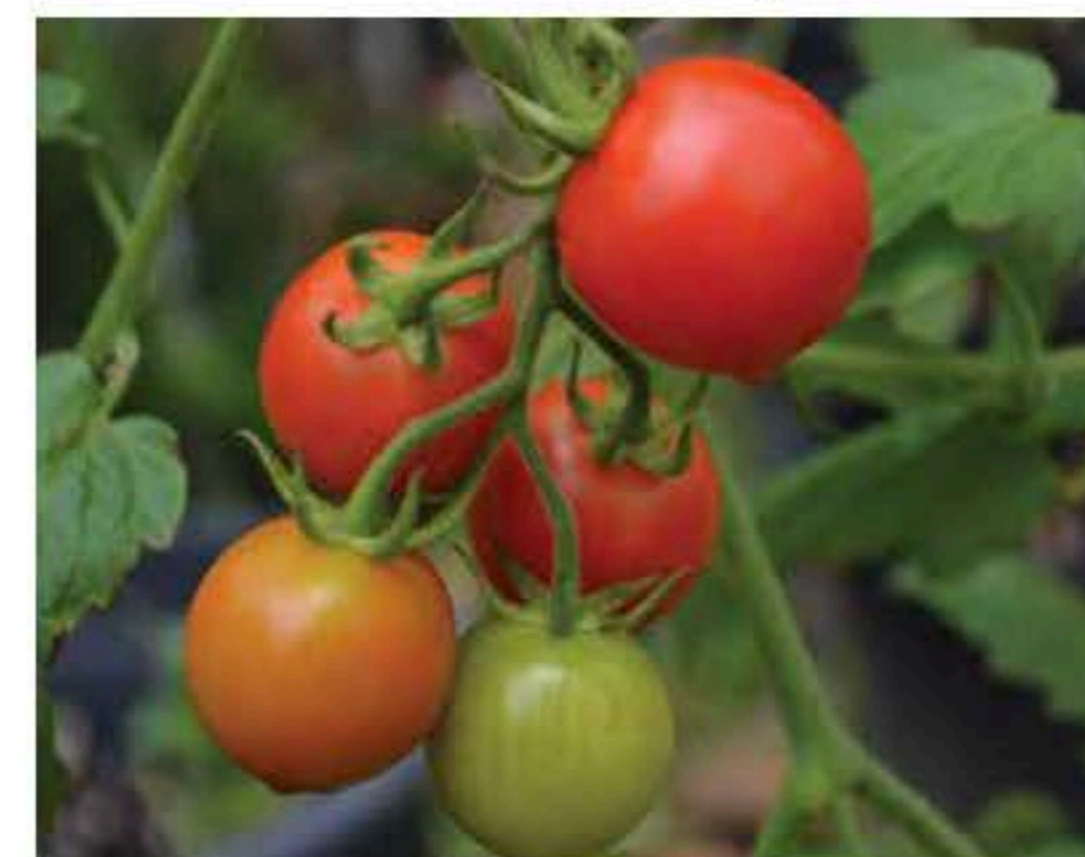
data using a cumulative logic model." Partial analysis identified 12 varieties with virus resistance superior to Season Red and five with inferior resistance. Using real-time PCR protocol developed in Dr. Ling's laboratory, AYVV was detected in one superior variety and four inferior ones. When symptomless tomatoes were tested, only one of the 18 varieties were positive for AYVV.

Top varieties selected by producers include: Olivia, Carmine, Affinity, Ornela, and Felicity. Due to Olivia's fruit characteristics and growth habits, it is only recommended for production in Guam's dry season or in a hoop house. The other varieties are recommended for

year round production on Guam based on field data showing strong virus resistance, high yield, and low levels of cracked and unmarketable fruits.

Through this collaborative research, WPTRC helps all Guam tomato farmers maximize their profits and gives consumers better choices for fresh, locally-grown produce.

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