



JOHN PALUMBO

Fighting a Melon Virus in Yuma County

A cooperative program with growers

By Susan McGinley

Yellow sticky trap catches whiteflies for monitoring effort in Dome Valley, Arizona

Yuma County melon producers suffered crop losses of 60 percent or more to the whitefly-transmitted *Cucurbit yellow stunting disorder virus* (CYSDV) when it first appeared in 2006. Three years later, through a partnership between the University of Arizona's Yuma Agricultural Center (YAC), Yuma County Cooperative Extension and local growers, a county-scale whitefly/virus monitoring program is in place in Yuma County, along with a voluntary host-free period during the summer to reduce whitefly infestations, and other strategies.

So far, the program has allowed local growers to continue bringing spring and fall melons to market, despite the ongoing threat of the virus in the region. Yuma County produces about 75 percent of Arizona's melon crop, including cantaloupe, honeydew, watermelon and mixed melons. Damages in 2006 amounted to \$14 million.

"All I knew about this virus before 2006 was what I read in the literature, and most of it was about infected lab or greenhouse or monoculture crops grown in Spain, Portugal and the Middle East," says John Palumbo, a research scientist and extension specialist in entomology at the YAC. "Arizona has a different cropping system from where CYSDV originated, in an entirely different environment. It's a desert 'multiculture' of mixed vegetable, field, grain and fruit crops, and we had to start from scratch on how it works here."

The first year, Palumbo and Kurt Nolte, Yuma County Cooperative Extension director and area associate agent in agriculture—walked 20 commercial melon fields in the Yuma Valley and Dome Valley/Roll area at 7-10-day intervals. They noted the progression of CYSDV symptoms over time in relation to weather patterns, plant stress and the presence of the whitefly *Bemisia tabaci* that carries the virus.

They also experimented with fabric row covers at the YAC, placing them over young melon seedlings and removing them at first bloom because it only takes one or two adult whiteflies to

infect a plant. Although the procedure was expensive and labor-intensive, Palumbo says the virus did show up much later, at a lower incidence of infection.

"We wanted to show that the longer you delay the whitefly infestation, the less severe the virus is," he says. Palumbo also began testing various insecticides to control the whitefly.

Meanwhile, Cooperative Extension and YAC specialists began to develop an area-wide—and unprecedented—whitefly and virus monitoring program first implemented on a smaller scale in 2007, based on geospatial technology.

"We set out yellow sticky traps in spring 2007 for 75,000 acres, and expanded to all regions of melon production in the Yuma area by 2008," Nolte says.

By spring 2008, extension technicians had distributed 105 traps in a uniform grid across 200,000 acres in the Yuma, Gila, Dome



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Close-up of adult whiteflies feeding on underside of melon leaf. Adult whiteflies are about 1/16th inch long.

and Wellton-Mohawk valleys, Yuma Mesa and the City of Yuma. Each trap was checked and swapped weekly, with the location, date, and number of adult whiteflies logged. Funded by Arizona Cooperative Extension, the program is now gearing up for the 2009 growing season.

“As the traps are georeferenced, GIS software is used to produce maps which show the weekly dispersal of adult whitefly populations, with red indicating up to 5 times more adults per trap compared to the blue zones,” Nolte says. The system can also pinpoint areas where virus symptoms have appeared. Field samples are analyzed and confirmed in the laboratory of UA virologist and vector biologist Judith K. Brown and entered into the database.

“We’re trying to predict the relationship between whitefly migration and the progression and incidence of this disease,” Nolte says. “We’re also working on tracking whiteflies in cotton, lettuce, broccoli and cauliflower.”

Knowing which fields have tested positive for CYSDV and where the whitefly is heaviest helps producers coordinate and time their field operations to divert whiteflies and delay or halt the progression of the virus. The Yuma County grower task force has expanded to include producers in Pinal and Maricopa counties as well, according to Nolte. He sends weekly updates based on the GIS maps to melon growers during the growing season, and works with Palumbo and other UA faculty in presenting research information through newsletters, listservs, workshops and other means.

The GIS maps have confirmed the benefits of a county-wide, host-free melon period first implemented in 2007. The growers disk their spring melon crop in July—and any subsequent volunteer melons or other hosts—and wait 30 days before

planting the fall crop in August. The virus can’t live without a host for more than 7-10 days and the hungry whiteflies disperse to other fields. Although most of the producers participated in 2007 and 2008, Palumbo admits there were a few who didn’t, with unfortunate results.

“Fall melons planted adjacent to fields where spring melons had not been harvested or disked had higher rates of infection,” he says. The GIS maps showed higher populations of whiteflies in the fields that were not turned under and in general have revealed that CYSDV outbreaks coincide with whitefly numbers.

Yet overall, the incidence of CYSDV was less severe in 2008, according to Palumbo.

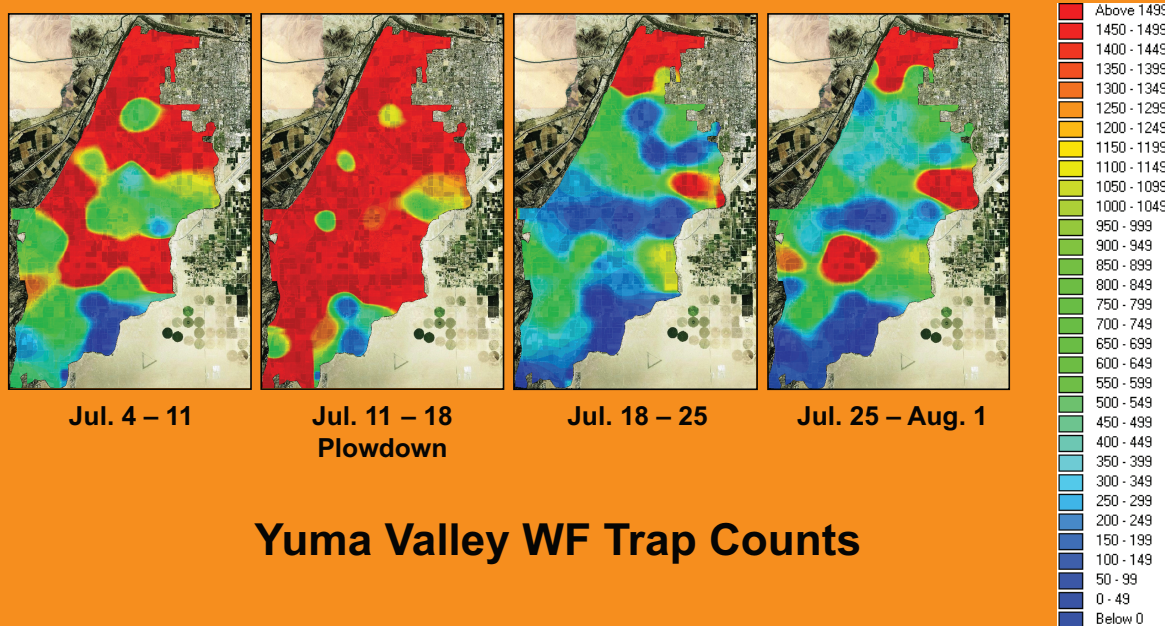
“There was a big difference with growers moving more aggressively to keep the whitefly adults suppressed through cultural practices, chemical management based on whitefly densities, and adhering to the host-free period,” he says.

“The first and foremost thing is that it has to be a unified approach area-wide,” Nolte adds. “We have a partnership between research, extension and growers. It’s a team effort to identify and track the disease, and to determine new means of management and control. We’ve worked side by side with the local grower community to help, from the beginning.” 🌟

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A series of GIS maps for Yuma County, Arizona shows fluctuations in whitefly populations caught in sticky traps between July 4-August 1, 2008. Red areas have the greatest whitefly concentrations, blue the least. The large decrease in whitefly numbers on the July 18-25 map was the result of a voluntary plowdown by melon growers after harvest. The plowdown cleared out much of the whitefly—and subsequent infection—that would have continued into the fall crop.