University of California
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Kearney Agricultural Research and Extension Center

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It has been an interesting 25 years (1990-2015). My role has been to study insect pests of citrus and develop the San Joaquin Valley integrated pest management (IPM) program. I have worked out of two Research and Extension Centers during this time, employing staff at both centers. Kearney REC is the site of my laboratory and Lindcove REC is the site of my citrus trees and my primary location since I became director of that center in 2006.

When I first started, the primary treatments that were registered for citrus pests were organophosphate (OP) and carbamate insecticides. The key pests at that time were California red scale and citrus thrips. Resistance to the OPs and carbamate insecticides was developing in many populations of these pests, causing growers to spray more and more frequently. Growers interested in depending on biological control had to work very hard to use weakly effective insecticides and wrestled with secondary pest outbreaks of citricola scale. My laboratory group at Kearney used a colorimetric test to document OP resistance in hundreds of populations of California red scale and helped obtain registrations of new insecticides that were safer for natural enemies. The use of OPs and carbamate insecticides in citrus dropped dramatically.

Since that time, my team and I have helped with the registration of dozens of insecticides and determined how best to use them in citrus. We have also developed pheromone traps, sampling methods, and economic thresholds of damage for citrus pests. Our research has helped SJV citrus growers limit their pesticide use and maintain natural enemies to assist with control.

In recent years, export issues have strongly impacted the IPM program. If an import country decides that a pest from California is a risk to their industry and demands a treatment for that pest (bean thrips, Fuller rose beetle, mites), then growers must apply the treatment or lose the export market. The treatment may be a broad spectrum pesticide and impact the balance of IPM. Our laboratory has worked extensively with the USDA ARS SJV Parlier Center to develop post-harvest fumigants for these pests.

The biggest disruption of the IPM program has been the continual arrival of invasive pests (glassy-winged sharpshooter, citrus peelminer, citrus leafminer, and Asian citrus psyllid) creating varying levels of problems. Some of these pests just need time for their natural enemies to kick in, or an adjustment in the pesticide regime to manage them. Asian citrus psyllid, however, vectors the most deadly bacterial disease of citrus known worldwide – huanglongbing. The psyllid is a very efficient vector of the bacterium and trees don't show symptoms for many months, making disease management difficult. Insecticide treatments in response to this pest will increase dramatically, disrupting the IPM program that it has taken decades to develop. We expect to see devastation of the 300,000+ acres of commercial and landscape citrus in California in the next 10 years. Growers and researchers are scrambling for solutions including resistant rootstocks, genetically engineered trees, viruses or psyllids, and heat treatments for trees. I will continue to be an integral part of participating in those efforts and communicating the results to the grower community.

It will be interesting to see how the citrus industry adapts to the situation. Growers are very creative people and I believe they will find a way.

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