October 2007

UPDATE

San Joaquin Valley Agricultural Sciences Center

Inside this issue:

Special points of interest:

- Area-wide Pest Management Project coordinated by Dr. Joel P. Siegel
- Dr. Rodrigo Krugner joins the Crop Diseases, Pests and Genetics Research Unit

Introduction

The USDA Agricultural Research Service has been awarded funding for a five year Area-wide Pest Management Project for control of navel orangeworm in almonds, pistachios and walnuts. These three crops cover more than 1.1 million acres and in 2005 their total farm gate value was $3.46 billion. All of these crops contribute substantially to the US export balance of trade and the percent exported in 2005 was 77% almonds, 59% pistachios, and 43% walnuts. This project is a cooperative effort between researchers at the USDA-ARS San Joaquin Valley Agricultural Sciences Center, UC Berkeley, UC Davis, UCCE and Paramount Farming Company. The Almond Board of California, Administrative Committee for Pistachios, and Walnut Marketing Board are active participants and will assist in planning, provide technical oversight, and support subsidiary research targeting navel orangeworm.

This area-wide effort will implement an integrated pest management program in the Central Valley and the technologies demonstrated include enhanced sanitation in almonds, mating disruption in almonds and walnuts, enhanced sanitation in pistachios and the integration of selective chemistries and/or biological agents into control programs for these commodities. The impact of these strategies on beneficial insects, secondary pests, and nut quality will be determined. Emphasis will be placed on predicting insect damage using grower data and new methods will be evaluated to estimate pest density.

Researchers in the Water Management Research Unit also participate in an area-wide pest management project that addresses methyl bromide alternatives for pre-plant soil fumigation.

Current Research Highlights

Commodity Protection and Quality Research Unit

In collaboration with researchers from Washington State University and the University of California, Davis, Research Entomologist **Judy Johnson** from the Commodity Protection and Quality Research Unit demonstrated the potential of radio frequency heating to disinfest inshell walnuts of insect pests. This method is proposed as a

Current Research Highlights (continued)

Commodity Protection and Quality continued—

non-chemical alternative to methyl bromide, and uses a process similar to microwaves to rapidly heat and disinfest commodities while maintaining product quality.

Judy Johnson, in collaboration with ARS researchers from Wapato, Washington, provided further proof that cherries are not a preferred host for codling moth. The presence of codling moths in commercial cherry orchards was first determined through trapping studies. Researchers then examined more than 40,000 cherries from these orchards without finding a single infested fruit, thus demonstrating the non-host status of cherries. This information will be used to obtain acceptance of a Systems Approach for quarantine issues for U.S. sweet cherries destined for the Japanese market, eliminating the need for methyl bromide fumigation.

Victoria Yokoyama, Research Entomologist, invited research presentations by visiting scientists **Dr. Carlos Cáceres**, International Atomic Energy Agency, Seibersdorf, Austria, and **Dr. Patrizia Sacchetti**, Department of Agricultural Biotechnologies, University of Florence, Italy in a co-organized session titled. "Status of Olive Fruit Fly Management in California," in the 9th Exotic Fruit Fly Symposium, Fresno, California, 25-26 April 2007. **Dr. Yokoyama** also visited the laboratory of **Dr. Pedro Rendón**, USDA-APHIS-PPQ, CPHST, Guatemala Plant Protection Laboratory, Petapa, Guatemala in August 2007, to plan future research for biological control of olive fruit fly in California using imported parasitoids.

The USDA-ARS is the lead agency for the Area-wide Pest Management Project on navel orangeworm with **Joel P. Siegel**, San Joaquin Valley Agricultural Sciences Center, Commodity Protection and Quality Unit, coordinating the project. Two other scientists from this unit, **Chuck Burks** and **L.P.S. "Bas" Kuenen** will participate. Participants from the University of California are **Kent Daane** (UC Berkeley and Kearney Agricultural Center) **Steve Welter** (UC Berkeley), **Themis Michailides** (UC Davis and Kearney Agricultural Center) and **Frank Zalom** (UC Davis). Participants from the University of California Cooperative Extension service are **Bob Beede**, **Karen Klonsky**, and **Carolyn Pickel**. **Bradley Higbee**, Paramount Farming Company, will oversee the navel orangeworm projects in Kern County.

Crop Diseases, Pests and Genetics Research Unit

Jianchi Chen and co-workers describe variation in colony morphology of *Xylella fastidiosa* isolated from almond leaf scorch disease-affected almond trees. The results demonstrate that G-type strains from almond consistently produced colonies with smooth edges whereas A-type strains yielded colonies with distinctive rough edges. As G-type and A-type strains both infect almond but differentially infect grapes, easily discernable differences in colony appearance provide a new and simple means to differentiate pathotypes of *X. fastidiosa*. This work has been published in the Canadian Journal of Plant Pathology (2007) volume 29.

Craig Ledbetter and **Mark Sisterson** described first-year growth characteristics of advanced generation peach-almond hybrids with potential to serve as seedling rootstocks for almond. The results demonstrate that specific peach-almond hybrids have similar emergence rates in the nursery row and increased first-year growth characteristics relative to the rootstock Nemaguard. Increased first-year rootstock growth allows an earlier propagation date, leading to healthier nursery stock. Additional research with these hybrid rootstocks is ongoing. This work will be soon be published in Euphytica.

Meetings, Conferences, Workshops & Visitors

David Ramming attended the Applied Grape Genomics Conference, Davis, CA, July 16-17, 2007. He gave a presentation titled "Marker Assisted Selection for Powdery Mildew Resistance," and participated in discussions to determine the highest priority needs for applying genomics in grape research.

David Ramming presented a discussion on the "USDA/ARS Grape Breeding Program in Parlier, CA" at the National Viticulture Research Conference, Davis, CA, July 18-20, 2007. The talk included a description of table grape, raisin grape, powdery mildew resistance and Pierce's disease resistance breeding research.

Ed Civerolo, David Ramming, Hong Lin and Drake Stenger participated in the USDA-ARS and Industry Wine/Grape Workshop, Kennewick, Washington, July 24-25, 2007.

Hong Lin and **Ed Civerolo** participated in a *Xylella fastidiosa* workshop in Campinas, Brazil on August 20-22, 2007. The workshop focused on current research related to the functional genomics of *X. fastidiosa*, and the application of genomic approaches to disease management. After the workshop, **Hong Lin** visited citrus groves affected with Huanglongbing (greening) disease. He also visited with cooperators **Dr. Marco Machado**, Sylvio Moreira Citriculture Center in Cordeirópolis and **Dr. Eliana Lemos**, Department of Technology, Facility of Agricultural and Veterinary Science in Jaboticabal.

Dong Wang, **Ed Civerolo** and **Patricia Martinez** participated in the 2007 California Specialty Crop Tour on July 16-19, 2007.

Ed Civerolo participated in a USDA-APHIS-PPQ Working Group in Gainesville, Florida on September 18-21, 2007, that drafted recommendations for the safe movement of citrus nursery stock, primarily from Florida, to non-citrus producing states with minimal risk to U.S. agriculture and the citrus industry.

Craig Ledbetter participated in the 12th EUCARPIA symposium on fruit breeding & genetics at Zaragoza, Spain 16 - 20 September 2007. The symposium was organized by the Centro de Investigación y Tecnología Agroalimentaria de Aragón, just outside of Zaragoza. **Dr. Ledbetter** presented a talk (Apricot variety development in California's San Joaquin Valley) and displayed a poster that highlighted the use of Central Asian apricot germplasm to improve fruit quality in California adapted apricots.

James Ayars hosted **Dr. Evan Christen** from CSIRO Land and Water, Griffith, Australia for the week of September 24-28, 2007. **Dr. Christen** was interested in the status of disposal of food processing wastes in California and winery wastes in particular. This is a significant problem in New South Wales where he is working. In response to his request, they visited the Del Monte processing plant in Modesto, the Gallo winery in Livingston and two wineries in Lodi where they saw constructed wetlands being used to process winery waste water. The use of constructed wetlands by the wineries in Lodi was of particular interest. Disposal of food processing wastes (solids and water) is a problem in California and this represented a good opportunity to review the problems facing food processors and to see what is being done.

James Ayars attended the 58th meeting of the International Executive Council (IEC) of the International Commission on Irrigation and Drainage (ICID) in Sacramento from September 28 to October 6. He is the US representative to the ICID working group on drainage and was selected to be the US representative on the ICID permanent finance committee, as well as the committee secretary. The IEC meetings are held annually at a different member country to conduct the business of the Commission. In conjunction with the IEC meeting, the US Committee on Irrigation and Drainage (USCID) sponsored the 4th International Conference on Irrigation and Drainage titled "The Role of Irrigation and Drainage in a Sustainable Future." **Dr. Ayars** presented a paper at this symposium and moderated two sessions. There were approximately 450 participants at the meeting representing many countries.

Meetings, Conferences, Workshops & Visitors (continued)

Dong Wang was an invited speaker at the 3rd International Symposium on Pesticide and Environmental Safety and 7th International Workshop on Crop Protection Chemistry and Regulatory Harmonization co-organized by the International Union of Pure and Applied Chemistry (IUPAC). His presentation was titled "Measurement and reduction techniques of atmospheric emission of methyl bromide and alternative chemicals in soil fumigation."

David Ramming co-hosted the North American Grape Breeders meeting, August 20-23, 2007. Meeting included a visit to the USDA/ARS grape breeding research program at the San Joaquin Valley Agricultural Sciences Center in Parlier, California.

SJVASC and **David Ramming** hosted four California Table Grape Commission Research committee meetings to evaluate the advanced table grape selections from the ARS Parlier grape breeding program. The meetings were held in Coachella Valley on May 4, and Parlier on August 7, September 11, November 17, 2007. An average of 45 people attended the Parlier meetings. A total of 18 selections were evaluated this year when they were first picked and after storage to determine if the selections have commercial potential.

News

Rodrigo Krugner joined the Crop Diseases, Pests and Genetics Research Unit as a Research Entomologist on September 17, 2007. His research will focus on ecological aspects of GWSS biology and control.

The Crop Diseases, Pests and Genetics Research Unit is proud to announce that **Elizabeth Rogers** has accepted a Research Plant Molecular biologist position to investigate molecular interactions of Xylella fastidiosa with host plants. **Dr. Rogers** will come on board in January 2008.

Nishanth Tharayil joined the Water Management Research Unit as a postdoctoral researcher (hired through an UC cooperative agreement). He recently received his Ph.D. at the University of Massachusetts and will be working with **Brad Hanson**, **Suduan Gao**, and **Dong Wang** on the Pacific Area Wide Methyl Bromide Alternatives Projects.

Upcoming Events

Brad Hanson, Jim Gerk, Suduan Gao, Dong Wang and their post-docs will attend and present papers at the 2007 Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions in San Diego, CA.

Jim Ayars, Suduan Gao, Dong Wang and **Peter Vaughan** will attend and make presentations at the 2007 International Annual Meeting of American Society of Agronomy-Crop Science Society of America-Soil Science Society of America in New Orleans, LA.

Recent Publications

Book Chapters:

Hansen, J. D. and J. A. Johnson. 2007. Introduction. In: Tang, J., Micham, E., Wang, S., and Lurie, S. (ed.) Heat Treatments for Postharvest Pest Control: Theory and Practice. CABI Publishing, Wallingford, Oxforshire, UK; Cambridge MA. pp. 1-26.

Tang, J., S. Wang, and J. A. Johnson. 2007. Biology and thermal death kinetics of selected insects. In: Tang, J., Micham, E., Wang, S., and Lurie, S. (ed.) Heat Treatments for Postharvest Pest Control: Theory and Practice. CABI Publishing, Wallingford, Oxforshire, UK; Cambridge MA. pp. 133-161.

Ayars, J., E. Christen, and J. Hornbuckle. 2007. Managing irrigation and drainage in saline environments. In: CAB Review: Perspectives in Agriculture, Veterinary Science, Nutrition, and Natural Resources, No. 040. CABI Publishing.

Recent Publications (continued)

Journal Articles:

Qin, R., S. Gao, B. Hanson, J. McDonald, T. Trout, and H. Ajwa. 2007. Effect of drip application of ammonium thiosulfate on fumigant degradation in soil columns. J. Ag Food Chem. 55, 8193-8199.

Banuelos, G., D. Leduc, E. Pilon-Smits, and N. Terry. 2007. Transgenic Indian mustard overexpressing selenocysteine lyase or selenocysteine methyltransferase exhibit enhanced potential for selenium phytoremediation under field conditions. Environ. Sci. Technol. 41, 599-605.

Gao, S., K. Tanji, R. Dahlgren, J. Ryu, M. Herbel, and R. Gigashi. 2007. Chemical status of selenium in evaporation basins for disposal of agricultural drainage. Chemosphere 69, 585-594.

Chen, J., Groves, R., Zheng, Y., Civerolo, E.L., Viveros, M. and Freeman, M. 2007. Colony Morphology of *Xylella fastidiosa* almond leaf scorch strains. Can. J. Plant Pathol. 29:1-7.

Wang, S., M. Monzon, J. A. Johnson, E. J. Mitcham, and J. Tang. 2007. Industrial-scale radio frequency treatments for insect control in walnuts II: heating uniformity and energy efficiency. Postharvest Biol. Technol. 45: 240-246.

Wang, S., M. Monzon, J. A. Johnson, E. J. Mitcham, and J. Tang. 2007. Industrial-scale radio frequency treatments for insect control in walnuts II: insect mortality and product quality. Postharvest Biol. Technol. 45: 247-253.

Johnson, J. A. 2007. Survival of Indianmeal moth and navel orangeworm (Lepidoptera: Pyralidae) at low temperatures. J. Econ. Entomol. 100: 1482-1488.

Brown, AF, Jeffery, EH, and Juvik, JA 2007. A Polymerase Chain Reaction-based Linkage Map of Broccoli and Identification of Quantitative Trait Loci Associated with Harvest Date and Head Weight J. Amer. Soc. Hort. Sci. 132 (4):507–513. 2007.

Miscellaneous

On June 11-13, 2007, **David Ramming** participated in a grape germplasm collecting trip with **Berine Prins** (USDA/ARS, Repository, Davis, CA) to Mr. Zehnder's (recently deceased), near Charleston, South Carolina. Over 50 items were collected from Mr. Zehnder's work and collection for disease resistant grapes. The material collected was donated to the National Germplasm Repository, Davis, CA.