

October 2008

U
P
D
A
T
E

San Joaquin Valley Agricultural Sciences Center



Inside this issue:

Research Highlights 2

*Meetings, Conferences,
Workshops & Visitors* 4

Upcoming Events 5

Recent Publications 6

News 7

SJVASC Contact Info 8

Introduction

Science and technology developed by the San Joaquin Valley Agricultural Sciences Center (SJVASC) researchers and cooperators continue to be effectively used through two area-wide pest management projects and Cooperative Research and Development Agreements (CRADA). In the Water Management Research Unit, **Suduan Gao, Jim Gerik, Brad Hanson, and Dong Wang** each leads a separate research project under the Pacific Component of the area-wide pest management project for alternatives to methyl bromide for pre-plant soil fumigation. **Joe Siegel**, in the Commodity Protection and Quality Research Unit, leads an area-wide navel orangeworm management project. **Chuck Burks** and **Bas Kuenen** also participate in this project. **Elaine Backus** partners with consultant William Bennett via a CRADA with Coulbourn Instruments Inc., to design, build, patent, and market all-new versions of Electrical Penetration Graph (EPG) monitors for study of insect feeding. Each of these partnerships involves close communication and collaboration with stakeholders to facilitate and expedite transfer of information and knowledge to the private sector.

Exotic, invasive and emerging pests and diseases pose threats to crop production in the United States. In California, the recent detection of the Asian citrus psyllid (ACP) in San Diego County, is a concern for citrus production. The ACP, in addition to being an exotic pest of citrus in its own right, is also the vector of a bacterium, "*Candidatus Liberibacter*", that is associated with huanglongbing (HLB), a very destructive disease of citrus. In addition, zebra chip (ZC) disease of potato, with which another liberibacter has been associated, has emerged in recent years as a widespread and damaging disease of potato in Mexico, Central America and the southwestern United States, including California. In response to these threats, **Jianchi Chen** and **Hong Lin** are conducting research on the etiological role, molecular characterization, genomics and interrelationships of the prokaryotic pathogens associated with HLB and ZC with cooperators in Florida, Texas, Washington, China, South America and South Africa.

Special points of interest:

- SJVASC Administrative Officer, Denice Chambers is slated to retire on December 3, 2008
- Asian citrus psyllid, citrus huanglongbing, and potato zebra chip research conducted at the SJVASC

Current Research Highlights

Crop Diseases, Pests and Genetics Research Unit

Elaine Backus completed a time course study of *Xylella fastidiosa* colonization of glassy-winged sharpshooter foreguts during acquisition access. Colonization was compared in lab-reared vs. field-collected insects. Confocal and electron microscopy showed that *X. fastidiosa* colonizes the cibarium within 24 hrs feeding initiation. Bacteria then move upstream, gradually filling the precibarium over 3 days. Clean foreguts of lab-reared insects are colonized more fully than those of field-collected insects, which are previously colonized with biofilms of other microbes. Subsequent inoculation occurs as bacteria are swept out of the precibarium during feeding (egestion).

Craig Ledbetter has compiled a listing of new fruit and nut varieties for almond, apple, apricot, blackberry and hybrid berries, blueberry, grape, grape rootstock, nectarine, paw-paw, peach, pecan, plum and plum hybrids, Prunus rootstock, raspberry, strawberry and tropical fruits avocado and kiwifruit. Descriptions include information on origin and pedigree; fruit, bloom, and tree characters; and area of adaptation. Many of the varieties originated in the United States, but some are from other countries. The listing also includes synonyms, patent numbers and selection or test numbers.

Jianchi Chen identified virus-like particles associated with senescent cultures of *Xylella fastidiosa*. The virus-like particles were of several morphological types as observed by electron microscopy, including both filamentous and isometric particle shapes.

Hong Lin has cloned and sequenced 14.7 kilobase pairs of new sequences from three different genomic regions of "*Candidatus Liberibacter asiaticus*". In addition, analysis of available "*Ca. Liberibacter*" species sequences, including the newly cloned rpoB gene from different "*Ca. Liberibacter*" strains, revealed sequence polymorphism. The results confirmed HLB-associated "*Candidatus Liberibacter*" as a new clade in the alpha-proteobacteria subdivision.

David Ramming has evaluated raisin cultivars for dried on the vine (DOV) suitability. It was shown under controlled drying conditions that there are differences in drying rates among raisin cultivars. Summer Muscat and Diamond Muscat, two early ripening USDA raisin cultivars, dried the fastest during the three year study, making them very suitable for dry-on-the-vine raisin production.

Mark Sisterson has investigated the role of alfalfa in epidemics of almond leaf scorch disease. The green sharpshooter vector is often found in large numbers in cultivated alfalfa fields and alfalfa is a known host of *X. fastidiosa*. The potential for alfalfa to serve as a source of *X. fastidiosa* inoculum or as a source of vectors was assessed. Analysis of Geographic Information Systems maps indicates high overlap in the distribution of grape and almond with alfalfa in Fresno, Kern, and Tulare counties. Within these counties, monitoring of green sharpshooter populations in alfalfa fields determined that green sharpshooter abundance is typically highest on weedy-field margins. In addition, screening of field collected alfalfa using standard PCR methods, determined that incidence of *X. fastidiosa* in alfalfa is typically low. The results suggest that alfalfa fields may be a minor source of inoculum.

Ray Yokomi has analyzed genetic diversity resident in strains of *Sprionoplasma citri*, the causal agent of citrus stubborn disease (CSD). Incidence of CSD appears to be increasing in some citrus groves in central California. A molecular analysis of representative *S. citri* strains collected recently was compared with strains maintained in a culture collection from the last 20 years. Using a method called randomly amplified polymorphic DNA (RAPD)-polymerase chain reaction (PCR) and 20 different primer pairs, no evidence was found for the emergence or development of a new strain.

Current Research Highlights (continued)

Crop Diseases, Pests and Genetics Research Unit continued—

Therefore, one conclusion was that the increasing CSD incidence was not attributed to a new strain. However, consistent genetic differences were discernable in *S. citri* isolated from carrots and daikon. This evidence suggested that certain host plants other than citrus may more readily lead to development of new strains.

Water Management Research Unit

Methyl bromide (MB) has been used extensively as a soil fumigant to control nematodes, fungi, insects and weeds on more than 100 crops worldwide. It is considered essential for production of many high-value annual and perennial food, nursery, and ornamental crops. Its use as a soil fumigant has been phased out since 2005 except for Critical Use Exemptions (CUEs) approved by Parties of the United Nations Montreal Protocol. In 2006, a five year area-wide pest management project for methyl bromide alternatives was initiated to foster effective transitions to MB alternatives in key southeastern and western US crop systems. Support is divided approximately equally between the South Atlantic and Pacific Components. The Pacific Component solicits commodity-focused team proposals for control of soilborne pests and pathogens yearly. For each cluster of western US commodities granted a CUE for MB, a project leader was designated and invited to develop an interdisciplinary team of scientists from UC/UCCE, USDA-ARS, or other appropriate public research/education institution. The team develops a composite proposal that meets the goals of the Pacific Component of the MB alternatives area-wide pest management project. **Suduan Gao**, a soil scientist, leads a project that is testing and calibrating new designs for a dynamic flux chamber system used to measure soil fumigant emissions. **James Gerik**, a plant pathologist, has the lead for a project that deals with technology transfer methods for adoption of MB alternatives in California cut flower and ornamental crops. **Brad Hanson**, a weed scientist, is leading a project in perennial crop nurseries to determine the impact of a modified application shank and several surface seal techniques on pest control efficacy and 1, 3-D emissions compared to standard soil fumigation procedures. **Dong Wang**, a soil scientist, leads a project to investigate MB alternatives for vineyard replant including assessment of control efficacy, fumigant movement, and crop response. All these projects include a strong research component with plot experiments conducted at the USDA-ARS-SJVASC field facility and demonstration components conducted at commercial growers' fields. These projects have close collaboration with researchers from UC/UCCE and other USDA-ARS locations (e.g. ARS Davis and ARS Riverside), and have strong support by industry (e.g. TriCal and Dow AgroSciences).

Commodity Protection and Quality Research Unit

Victoria Yokoyama began conducting tests in collaboration with the National Hay Association to develop quarantine strategies to control pests of regulatory concern in western US hay exports to new markets in China, Vietnam, and Korea.

The biological control program funded by the California Olive Committee to control olive fruit fly was initiated in California with field releases of a parasitoid imported from USDA-APHIS-PPQ, Guatemala. Olive Growers signed-up to receive parasitoid releases during the UC Coop. Ext., Central California Olive Day, at Lindcove Field Station, CA, on August 15, 2008.

Current Research Highlights (continued)

Commodity Protection and Quality Research Unit continued—

The second annual stakeholder meeting for the Area-wide Program to Control Navel Orangeworm in Almonds, Pistachios and Walnuts was held on September 8, 2008 at the San Joaquin Valley Agricultural Sciences Center. Attendees included representatives of USDA/ARS, the Almond Board of California, The California Walnut Commission, University of California, University of California Cooperative Extension, Paramount Farming Company, Pest Control Advisors and Suterra. ARS and Paramount Farming Company researchers presented an update on the status of mating disruption in Kern and Fresno counties, progress on developing a complete pheromone mixture for attracting male navel orangeworm to traps as well as the population dynamics of navel orangeworm in pistachios, and progress in evaluating the new insecticides that will soon be available for use in almonds and pistachios. The UC and UCCE researchers presented proposals for assessing the success of mating disruption and quantifying the population dynamics of navel orangeworm in almonds and walnuts in the Sacramento Valley, and assessing sanitation efficacy. Research results will be reported through peer reviewed publications, industry publications and websites, and will also be posted on the websites of the Farm Advisors.

Meetings, Conferences, Workshops & Visitors

Victoria Yokoyama presented a paper concerning olive fruit fly control in the program of the Entomological Society of America Pacific Branch Meeting, Napa, CA, March 30-April 2, 2008.

Craig Ledbetter attended the XIV GREMPA meeting on pistachios and almonds in Athens, Greece, April, 2008 and presented research results on the development of seed-propagated peach-almond hybrids for use as almond rootstocks.

Brad Hanson attended National Program 304 Customer Workshop, Miami, FL May 19-23, 2008. He served on a writing team for four sub-components. He also attended California Strawberry Commission - Farming Without Fumigants meeting, April 15, 2008.

Victoria Yokoyama presented a seminar, "Medfly Terminator in California: El Pino, Petapa, and What's Olive Fly Got to Do with It?" at the UC Kearney Agric. Center, Parlier, CA, June 26, 2008.

Dave Obenland gave a presentation titled "The ratio of soluble solids to titratable acidity and its relationship to the acceptability of navel oranges" at the Institute of Food Technologists Annual Meeting in New Orleans on June 29, 2008.

Smilanick, J. L. presented the results of his research on preharvest fungicides to control postharvest decay of table grapes in California's San Joaquin Valley, at the National Viticulture Research Conference, Mondavi Center, Davis CA, July 9, 2008.

Victoria Yokoyama presented a paper concerning olive fruit fly control in the Symposium, "IPM on Perennial Crops," at the International Congress of Entomology, Durban, South Africa, July 6-12, 2008.

Elaine Backus attended the International Conference of Entomology, Durbin, South Africa, July, 2008, where she presented several research papers describing glassy-winged feeding behavior and transmission of *Xylella fastidiosa*.

Jianchi Chen, Hong Lin, Mark Sisterson, and Drake Stenger attended the American Phytopathological Society Annual Meeting, Minneapolis, MN, July, 2008, and presented research results concerning glassy-winged sharpshooter and *Xylella fastidiosa*.

Meetings, Conferences, Workshops & Visitors (continued)

Brad Hanson gave a presentation to the CDFA Fruit Tree, Nut Tree, and Grapevine Improvement Advisory Board, April 16, 2008; and made a presentation on the distribution of glyphosate-resistant horseweed in the Central Valley at the 2008 University of California Weed Day, Davis, CA, July 17, 2008.

On July 23, 2008, **Judy Johnson and Jim Leesch** were invited to speak on stored product insects at a seminar hosted by Cardinal Professional Products; "Pest Management in Food Processing 2008" in Sacramento, CA.

Ray Yokomi attended the International Congress of Plant Pathology, Torino, Italy, Aug, 2008 and presented research results concerning *Spiroplasma citri* detection and genetic diversity.

Joe Smilanick was an invited keynote speaker at the second National Citrus Research Conference, KwaZulu Natal, South Africa August 5, 2008, and made a presentation on methods to minimize postharvest fungicide use in California.

James E. Ayars traveled to Jordan from August 17-23 to attend a workshop at the Dead Sea sponsored by the Middle East Regional Irrigation Management Information System (MERIMIS) project. This project is funded by the Middle East Peace Process and is designed to develop crop water requirements and crop coefficients for crops grown in Israel, Jordan, and the Palestinian Authority. The project includes scientists from each of the participating entities and the workshop was held to provide progress reports and develop plans for each entity. **Dr. Ayars** has been one of the US cooperators on the project for the past 5 years. He participated in the construction of a weighing lysimeter facility at the Dyar Alla research center of the National Center of Agricultural Research and Extension (NCARE) of Jordan. During this visit he gave a lecture to the staff NCARE and met with colleagues to discuss the operation of the weighing lysimeter.

Jim Leesch was an invited session moderator and gave a paper titled "The Use of Gaseous Ozone to Control Pests in Export Commodities" at the 8th International Conference on Controlled Atmosphere and fumigation in Stored Products. The conference was held in Chengdu, China on September 21-26.

Gary Banuelos was a moderator, keynote speaker, and participant of biofuel and alternative crop workshops at both the IBIO Conference in Beijing, China and the European Geoscience Union General Assembly in Vienna, Austria; a guest speaker at University of Zurich and Agricultural University in China.

The **California Table Grape Commission Research Committee** met at the San Joaquin Valley Agricultural Sciences Center (SJVASC) in July, August and September of this year.

On August 11, 2008 the **National Grape and Wine Initiative Board** summer meeting was held in the Large Conference Room at the SJVASC.

The **California Specialty Crops Tour**, led by **Lori Berger**, arrived at the SJVASC in July. The Center Director, **Ed Civerolo**, presented an overview of the SJVASC.

Jianchi Chen and **Ray Yokomi** participated in a Pysillid Yellows Workshop in Riverside, CA in October, 2008.

Upcoming Events

2008 Joint Annual Meeting of GSA-SSSA-ASA-CSSA-GCAGS-HGS in Houston, TX October 6-9, 2008.

Water Reuse in Agriculture Conference in Monterey, CA October 26-28, 2008.

International Biofuels meeting in Beijing, China, October 15-25, 2008.

Upcoming Events (continued)

- 7th Meeting of the Working Group on Fruit Flies of the Western Hemisphere, Mazatlan, Sinaloa, Mexico, November 2-7, 2008.
- Walnut Entomology Group/PRAC meeting, Modesto, California, November 3, 2008.
- 2008 Annual International Research Conference on Methyl Bromide Alternatives and Emissions reductions, Orlando Florida, November 11-14, 2008.
- Citrus Nursery Society Meeting in Rocklin, CA, November 12, 2008.
- 2008 Annual Meeting of the ESA, Reno, Nevada, November 16-19, 2008.
- 8th International Symposium on Grapevine Physiology and Biotechnology, Adelaide, Australia, November 23-28, 2008.
- International Research Conference on Huanglongbing, Orlando, FL, December 1-5, 2008.
- California Alfalfa Symposium, San Diego, CA, December 2-4, 2008.
- 2008 Annual Potato Zebra Chip Disease Conference, Dallas, TX, December 2-5, 2008.
- Almond Industry Conference, Modesto, CA, December 10-11, 2008.
- Annual Almond Farm Advisor Meeting, Modesto, California, December 12, 2008.
- 2008 Pierce's Disease—Glassy-winged Sharpshooter Research Symposium, San Diego, CA, December 15-17, 2008.
- National Research Council of the National Academies Review Panels for the Florida Citrus Advanced Technology Program in October and November, 2008, in Washington, DC.

Recent Publications

- Chen, J.**, Civerolo, E.L. 2008. Morphological evidence for phages of *Xylella fastidiosa*. *Virology Journal*. 5:75.
- Chen, J.**, Civerolo, E.L., Tubajika, K.M., Livingston, S., Higbee, B. 2008. Hyper-variation of Tandem Repeats at the PD0218 (pspB) locus of *Xylella fastidiosa* Almond Leaf Scorch and Grape Pierce's Disease Strains. *Applied and Environmental Microbiology*. 74:3652-3657.
- Chen, J.**, Livingston, S., Groves, R.L., Civerolo, E.L. 2008. High throughput PCR detection of *Xylella fastidiosa* directly from almond tissues. *Journal of Microbiological Methods*. 73:57-61.
- Doddapaneni, H.**, Liao, H., **Lin, H.**, Bai, X., Zhao, X., Civerolo, E.L., Irely, M., Coletta-Filho, H., Pietersen, G. 2008. Comparative phylogenomics and multi-gene cluster analyses of the CitrusHuanglongbing (HLB)-associated bacterium "*Candidatus Liberibacter*". *BMC Research Notes*, 1:72.
- Fidelibus, M.W., L. P. Christensen, D. G. Katayama, and **D. W. Ramming**. 2008. Early-ripening Grapevine Cultivars for Dry-on-vine Raisins on an Open-gable Trellis. *Horttechnology* 18:740-745.
- Ledbetter, C.A.** 2008. Register of New Fruit and Nut Varieties List 44. *HortScience* 43(5):1321-1343.
- Mello, A.F., **Yokomi, R.K.**, Mulcher, U., Chen, J., Wayadande, A., Fletcher, J. 2008. Genetic Diversity of *Spiroplasma citri* strains from Different Regions, Hosts, and Isolation Dates. *Phytopathology*. 98:960-968.

Recent Publications (continued)

- Nadel, H., Seligmann, R., Johnson, M.W., Hagler, J.R., **Stenger, D.C.**, Groves, R.L. 2008. Effects of citrus and avocado irrigation and nitrogen-form soil amendment on host selection by adult *Homalodisca vitripennis*. *Environmental Entomology*. 37(3):787-795.
- Ramming, D.W.** 2008. Plum and Plum hybrids. *HortScience* 45:(5):1335-1336.
- Ramming, D.W.** 2008. `Thomcord' grape. *HortScience* 43(3):945-946.
- Stenger, D.C.**, French, R. 2008. Complete nucleotide sequence of a maize chlorotic mottle virus isolate from Nebraska. *Archives of Virology* 153:995-997.
- Sisterson, M.S.**, Yacoub, R., Montez, G., Grafton-Cardwell, E., Groves, R.L. 2008. Distribution and Management of Citrus in California: Implications for Management of Glassy-winged Sharpshooter. *Journal of Economic Entomology*. 101:1041-1050.
- Shrestha, A., **B.D. Hanson**, K.J. Hembree. 2008. Glyphosate-resistant hairy fleabane (*Conyza bonariensis*) documented in the central valley. *Calif. Agric.* 62:116-119.
- Hanson, B.D.** and S.A. Schneider. 2008 Evaluation of weed control and crop safety with herbicides in open field tree nurseries. *Weed Technol.* 22:493-498.
- Johnson, J. A.** and J. D. Hansen, 2008. Evidence for the non-pest status of codling moth on commercial fresh sweet cherries intended for export. *Crop Protection* (in press) available at: <http://dx.doi.org/10.1016/j.cropro.2008.06.002>
- Burks, C. S.**, B. S. Higbee, **D. G. Brandl**, and B. E. Mackey. 2008. Sampling and pheromone trapping for comparison of abundance of *Amyelois transitella* in almonds and pistachios. *Entomologia Experimentalis et Applicata* 129: 66-76. Available <http://dx.doi.org/10.1111/j.1570-7458.2008.00754.x>
- Yokoyama, V. Y.**, P. Rendón, and J. Sivinski. 2008. *Psytalia ef. Concolor* (Hymenoptera: Braconidae) for biological control of olive fruit fly (Diptera: Tephritidae) in California. *Environ. Entomol.* 37:764-773.

News

Management of the National Arid Land Plant Genetic Resources (NALPGRU) work site in Parlier has been reassigned from Pullman, WA to the Crops Pathology and Genetics Research Unit in Davis, CA. Acting Curator, **Allan Brown**, accepted a position with private industry and departed September 2008. **Dan Kluepfel** will be the Acting Research Leader for the work site, and **Craig Ledbetter** (CDPGRU) will be the Acting Curator until the NALPGRU Research Leader position at Davis is filled.

News

Denice Chambers, Administrative Officer for the USDA-ARS, Parlier has announced her retirement effective December 3, 2008 after 35 years of Federal service. Denice began her career with the Agricultural Research Service (ARS) in 1989 as an Administrative Technician for the Conservation Biology of Rangelands Research Unit in Reno, Nevada (now the Exotic and Invasive Weeds Research Unit). In 1993 she transferred to the ARS in Fresno, California. While in Fresno, Denice was instrumental in the day-to-day oversight of the construction of the new ARS San Joaquin Agricultural Sciences Center and the subsequent move of the Fresno location to Parlier in 2001. During her tenure Denice received the Administrative Support Award of Excellence, completed the USDA Graduate School "Women's Executive Leadership Program," and was a member of the USDA-ARS Consolidated Assistance Review and Evaluation (CARE) Team. She has mentored Administrative Officers new to the Pacific West Area and has received numerous awards and recognition. As Administrative Officer, Denice has been responsible for the appropriated operating budget, the maintenance of the facility and the well-being of the employees. Her dedication has provided for many successful years of research conducted at Parlier. It is not an exaggeration to say "the place won't be the same without her!" We wish her all the very best in her retirement.



Austin, Denice and Garrett

Research Units and Contact Information

Water Management
Research Unit

Commodity Protection &
Quality Research Unit

Crop Diseases,
Pests & Genetics
Research Unit

National Arid Land Plant
Genetics
Resources Unit

USDA United States Department of Agriculture
ARS **Agricultural Research Service**
the in-house research arm of the U.S. Department of Agriculture

San Joaquin Valley Agricultural Sciences Center
9611 S. Riverbend Avenue
Parlier, California 93648-9757
(559) 596-2999

www.ars.usda.gov/pwa/sjvasc