

December 2, 2013

**CA FRUIT TREE, NUT  
TREE AND  
GRAPEVINE  
IMPROVEMENT  
ADVISORY BOARD**



# 2013 IAB NEWSLETTER

## WHAT IAB PROVIDES TO THE INDUSTRY

### Inside this issue:

<i>Annual Assessment</i>	2
<i>2013-14 Research and Services Funding</i>	3
<i>Research on Disease Control and Service Testing</i>	4-7
<i>Board Members Listing</i>	8

The California Fruit Tree, Nut Tree and Grapevine Improvement Advisory Board (IAB) element of the Nursery Program administers an industry-requested assessment (Food and Agricultural Code, Section 6981) on the production of nursery plants such as deciduous pome and stone fruit trees, nut trees and grapevines. The mission of the IAB is to improve the quality of fruit tree, nut tree and grapevine nursery stock offered for sale. The assessment is used to fund research on plant pests, breeding varieties that are resistant to plant pests,

plant pest diagnostics, varietal identification and disease elimination. The University of California, Foundation Plant Services (FPS) provides support and serves as a source of clean planting stock. FPS carries out activities related to the development of planting materials for pome and stone fruit trees, nut trees and grapevines. IAB subvents the costs to carry out Department programs concerning the Registration and Certification (R&C) Program of pome and stone fruit trees, nut trees and grape-



vines. The assessment is collected annually with the nursery license renewal.

### Special points of interest:

- CDFA Nursery Advisory Board (NAB) Meeting in February/March 2014
- Next IAB Board Meetings in April & May 2014
- Meetings Posting Website:  
[www.cdffa.ca.gov/plant/meetings.html](http://www.cdffa.ca.gov/plant/meetings.html)

## 2013 FUNDINGS DISTRIBUTIONS

In 2013, the IAB approved funding for 13 research/service proposals totaling \$380,090, funding for Foundation Plant Services in the amount of \$782,425, and payment to the Nursery Program to subvent Registration and Certifica-

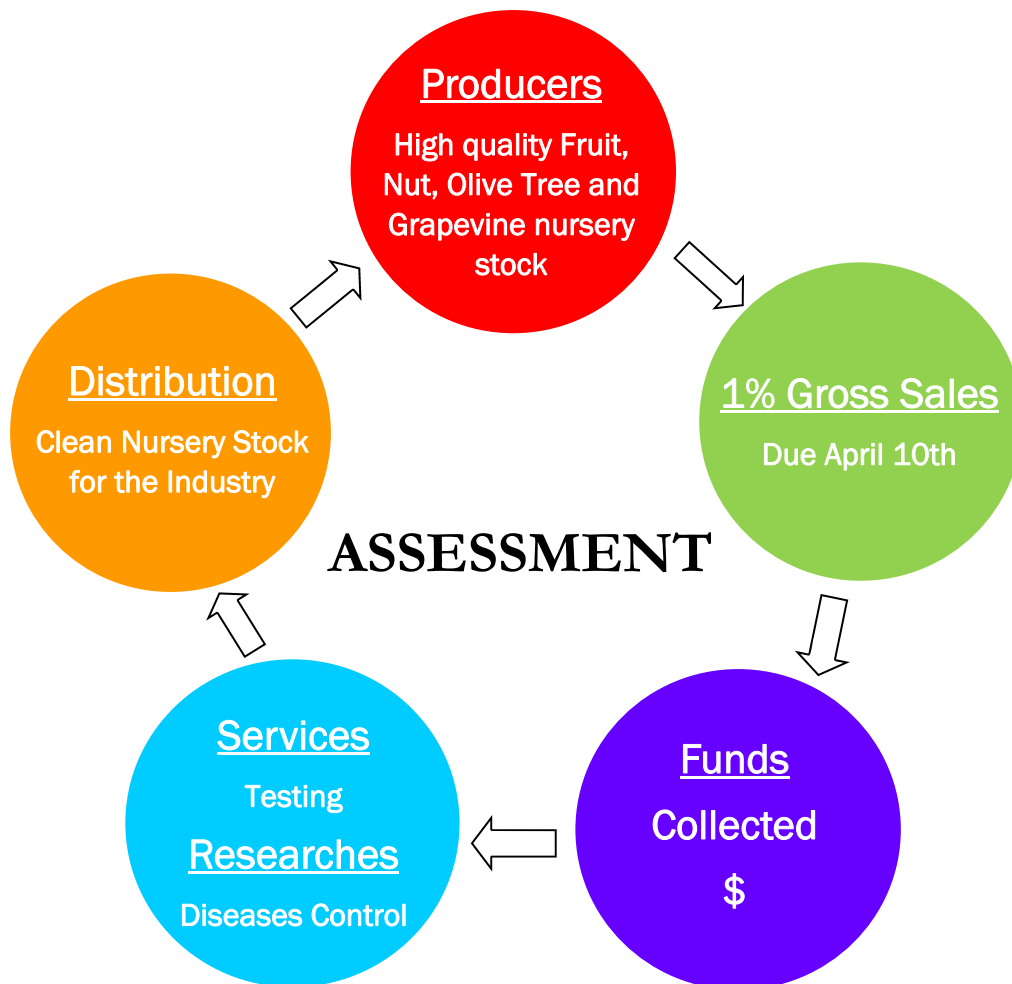
tion (R & C) activities in the amount of \$261,970. The total budget approved was \$1,794,625. As revenues increased for the past two years, the Board has recommended increasing funding for research, FPS and the R & C programs.

## WHO PAYS THE NURSERY STOCK ASSESSMENT AND HOW IT IS USED?

The California Fruit Tree, Nut Tree and Grapevine Improvement Advisory Board (IAB) was established in 1988 to promote production of high quality tree and grapevine nursery stock, and to help develop and promote consumer education. The IAB is funded through a 1% annual assessment on gross sales paid by producers of deciduous pome and stone fruit

tree, nut tree, olive tree and grapevine nursery stock. Section 44 of the Food and Agricultural Code defines sell to include, “offer for sale, expose for sale, possess for sale, exchange, barter, or trade.” Therefore you are required to pay the assessment on any qualifying nursery stock disposed of by any of these means. The IAB uses these funds to support Foundation Plant Services (FPS), to sub-

sidize Prunus Necrotic Ringspot and Prunus Dwarf Virus testing in registered trees, to subsidize virus testing and clean-up of new fruit and nut tree varieties, to subsidize fanleaf and leafroll sampling and vine mealybug trapping in grapevines, and to support research into disease and pest-resistant varieties and alternatives to fumigants currently in use.



## RESEARCH AND SERVICE PROJECTS FUNDED IN FY 2013-14

- \* Adapting New Technology to Facilitate Virus Testing of Fruit Tree
- \* Study the Lethal Effect of the Mixed Infection of Vitiviruses and Leafroll Associated Viruses ....
- \* Molecular Characterization and Detection of a Novel Vitivirus Isolated from Grapevine .....
- \* Symptomatology and Distribution of Grapevine Red Blotch Disease on Different Grapevine ....
- \* Development and Application of Next Generation Sequencing .....
- \* Etiology and Management of Cryptic Canker Pathogens in Cold-stored Bare Root and Container's ....
- \* DNA Methylation as a Diagnostic Marker for Clonal Ageing and Non-infectious Bud-failure ....
- \* Mealybug Transmission of Grapevine Leafroll-Associated Virus 3
- \* Study of the Effects of Red Blotch Disease on Different Grapevine Rootstocks ....
- \* Search for, and Development of Nematode Resistance in Grapevine Rootstock
- \* Development of Next Generation Rootstocks for California Vineyards
- \* Support to Foundation Plant Services
- \* Support to R&C Programs at CDFA
- \* Heat Therapy and Indexing of Stone and Pome Fruit Cultivars
- \* Methyl Bromide CUE

**Total Research & Service Projects Funded: \$1,794,625.00**



## Mealybug Transmission of Grapevine Leafroll Associated Virus-3

R. Almeida, UC Berkeley

The overarching goal of this research is to obtain information about transmission of *Grapevine leafroll-associated virus 3* (GLRaV-3), the primary virus species associated with spread of the economically damaging Grapevine Leafroll Disease (GLD) in Napa Valley. Such information is necessary to inform control strategies, it is clear that knowledge-based management of vector-borne diseases requires a robust understanding of how the pathogen spreads in vineyards. Mealybugs are the vectors associated with spread of GLD, but nothing is known about differences in transmission efficiency among mealybug species inhabiting vines in California. Furthermore, genetically distinct variants of GLRaV-3 exist but nothing is known about differences among these variants in terms of their ability to spread, or what the relevance of that variation is to GLD epidemiology. Lastly, all previous GLRaV-3 transmission studies were done under greenhouse conditions, and it is not known how well the results of such studies predict transmission in vineyards. This research addresses these significant gaps in knowledge.



This project is generating much needed information on how GLRaV-3 is transmitted by mealybug vectors. It provides general information on the transmission



### Objectives:

- i) compare the transmission efficiency of GLRaV-3 variants by the obscure and vine mealybug*
- ii) determine the outcome of mixed inoculations of GLRaV-3 variants*
- iii) determine GLD incubation period in the field after transmission by grape and vine mealybugs.*

efficiency of different virus variants by mealybug vector species, showing that one variant may spread faster. The immediate relevance and impact of this work is self-evident in the results of our field experiments (2011 experiment), where we showed the impact of vector-inoculated GLRaV-3 on commercial grapevines in the field one year after infection. Our current and pending results will inform ecological studies aimed at developing sustainable management practices (led by Daane), and provide support to epidemiological work on rogueing and economic studies by others.



# Grapevine Red Blotch Disease Effects on Fruit Maturity - M. Sudarshana, USDA ARS



During the last two decades, at UC Davis, collaborative efforts between USDA-ARS and UC D virologists have focused on the discovery of etiological agents, developing detection and diagnostics protocols for viruses of importance to California vineyards and orchards. These efforts have benefitted the nurseries by ensuring clean plant stocks to their clients for the establishment of productive or-

chards and vineyards. The recent reporting of red blotch disease and an associated virus has made some of those involved in procuring rootstock and scion material for planting in vineyards concerned. The primers we have developed for a PCR-based detection of GRBaV have SYBRR Green based qPCR method of detection. However, to prove that the GRBaV is the causal agent of red blotch disease, we need to meet Koch's postulates which is not

- Objectives:**
- i) Conduct surveys for the incidence of Grapevine red blotch-associated virus in red and white grape varieties in a commercial vineyard and determine severity of the disease symptoms.
  - ii) Determine the impact of GRBaV infection on fruit maturity in red and white wine grape varieties.

easily accomplished in the case of plant viruses, particularly those infecting woody perennials. This study is a further step in satisfying Koch's postulates where a relationship between virus titer and symptom severity needs to be established in several red and white grape varieties. At this time, GRBaV has been de-



tected in white varieties such as chardonnay and Riesling, but symptoms in white varieties and associated effects on fruit maturity in virus-infected and healthy grapevines are not known. This study will attempt to provide this information. Also, we may be able to gather preliminary information on varietal differences in disease impact.

## Clonal Ageing and Non-infectious Bud-failure in Almond - T. Gradziel, UC Davis



Current research indicates that bud-failure (BF) does not follow the standard genetic model but rather is due to the failed expression of a gene/gene complex required for normal growth and development. In BF, the DNA sequence (gene) appears to be identical in both the normal and BF condition, obviating the value of traditional molecular markers as predictors of this disorder. The aberrant nature of such 'epigenetic' conditions have discouraged

their research in mainstream genetics with early studies limited to genetic disorders with dramatic economic consequences, such as almond BF and cherry crinkle. Recent advances in our understanding of whole plant genomics have shown that development (including developmental disorders and cellular ageing) are controlled by a diversity of epigenetic mechanisms often mediated by DNA methylation. If differences in DNA-methylation profiles are exhibited among various almond source-clones, the association between a specific DNA-

methylation patterns and either aging and/or BF and may allow prediction of these conditions. Because the almond BF model is currently one of the most highly developed predictors of source-clone degeneration with aging, it provides the best test platform for evaluating associations with DNA methylation patterns. Since the model is also fairly comprehensive in its attention to both basic and applied aspects of source-clone aging, results could quickly be applied to other clonally propagated crops.

## Search for, and Development of Nematode Resistance Grape Rootstocks - H. Ferris and A. Walker, UC Davis



This year Howard Ferris and Andrew Walker have focused their attention on obtaining a broader genetic base for resistance to virulent pathotypes of root-knot (*Meloidogyne* sp.) and dagger nematodes (*Xiphinema index*), broadening their search for resistance to ring nematode (*Mesocriconema xenoplax*) and to sources of resistance to pin nematode (*Paratylenchus* sp.). They have invested considerable effort into developing sterile dual-culture techniques which will allow to understand the mechanisms of resistance provided by various genetic

sources. They continue with their efforts to develop culture techniques for *Xiphinema americanum* and in monitoring the perfor-

mance of resistant rootstocks in field trials. They continue to expand and to improve accessibility to the database for plant resistance to nematodes and for selection of rotation and cover crops. Further they have disseminated results of their research to end users and in scientific media.



## *Next Generation Sequencing to Facilitate the Release of New Grapevine Accessions*

*A. Rowhani, UC Davis*

This project aims to improve the process of routine grapevine disease screening and certification through the application of Next Generation Sequencing (NGS) technology. Our aim is to speed up the process by fifty fold over the current biological screening, which is now the industry standard for pathogen detection in grapevines. Adib Rowhani has demonstrated on a small scale that NGS analysis is easier and faster, and more sensitive, cost effective, and comprehensive than the industry standard of bioassay screening for microbial

pathogens in viticultural applications. Rowhani proposes to document that finding in this proposal, with the intent of demonstrating the advantages of NGS as a diagnostic tool for multiple pathogen control application in California and across the U.S. The time saving of NGS analysis over bioassay screening in perennial crops is particularly important. In a demonstration project to be proposed here, we will run bioassays in indicator plants in parallel with NGS analysis for the same pathogens. We expect that the data from these com-

parative assessments will confirm the advantage in speed, as well as range and accuracy of the automated NGS procedure over the current standard bioassay approach. The time saving is crucial to grower's success in moving new accessions out of the quarantine and certification pipeline and into the field. The rapid diagnostic capability of NGS screening will shorten the release time by years over bioassay protocols, allowing more timely initiation of virus elimination, indexing and propagative increase of productive plants.

## *Heat Therapy and Indexing of Stone and Pome Fruit Cultivars - K.C. Eastwell, WSU*

Ken Eastwell, a professor in the Washington State University Department of Plant Pathology based at WSU's Irrigated Agriculture Research and Extension Center in Prosser, has been appointed director of the Clean Plant Center of the Northwest. As director of CPCNW, Eastwell provides leadership for the development and distribution of deciduous fruit trees, grapevines and hops that are free of viruses and virus-like agents. Eastwell's re-

search and outreach programs focus on reducing the economic impact of virus diseases of vegetatively propagated perennial crops, including fruit trees, grapevines, hops and flower crops. Preventing the spread of diseases is done by identifying pathogenic agents associated with graft-transmissible diseases, and developing disease diagnoses and advancing disease-management strategies.





**Board Members:**

1. Jack Poukish - Chair - Sierra Gold Nurseries
2. Dan Martinez - Vice Chair - Martinez Orchard
3. Alex Brody - Burchell Nursery
4. Chuck Fleck - Fowler Nursery
5. Phillip Cox - L.E. Cooke
6. Merlin Fagan - Public
7. Eckhard Kasekamp - Guilluame Grapevine
8. Tom Burchell - Burchell Nursery
9. Andrew Jones - Sunridge Nursery
10. Nicholas Podsakoff - Vintage Nurseries
11. Mike Farris - Dave Wilson

Sean Dayyani - IAB Manager



**Membership on the Board consists of 11 representatives:**

- \* Two each from stone fruit and nut tree industries;
- \* Four from grapevine industry
- \* One each from pome fruit and olive tree industries
- \* One Public Member

**2014 Nominations:**

- Nicholas Podsakoff - Chair  
Chuck Fleck - Vice Chair  
David Cox - L.E. Cooke  
Benjamin Kasekamp  
Ray Tonella—Public Member

**Mission Statement:**

Enable production of the highest possible quality grapevine and deciduous fruit and ornamental nursery stock and to help develop and promote consumer education.



*Protects your Environment*  
*Protects your Plants*  
*Protects your Food Supply*



California Department of Food and Agriculture  
Nursery, Seed and Cotton Program  
1220 N Street, Room 344  
Sacramento, CA 95814  
If you have any questions, please contact us at  
(916) 654-0435, or via  
Email: [sean.dayyani@cdfa.ca.gov](mailto:sean.dayyani@cdfa.ca.gov)

