2013 HUANGLONGBING (CITRUS GREENING) PROFICIENCY TEST FOR CERTIFICATION

Patrick J. Shiel, NPPLAP Coordinator and Vessela Mavrodieva, NPPLAP Proficiency Testing Manager, USDA-APHIS-PPQ-CPHST-NPPLAP

The 2013 Proficiency Test (PT) panel for certification of diagnosticians/labs conducting molecular identification of the pathogen causing Huanglongbing (HLB), also known as Citrus Greening, in regulatory samples is being prepared. There are two differences to note concerning 2013 PT and testing: 1) The current Work Instruction for screening testing of HLB (WI-B-T-D-2) has been revised to combine *Candidatus* Liberibacter asiaticus and L. americanus tests into a single multiplex reaction. This WI can be accessed by registration to the CPHST-Beltsville Work Instruction document website (www.nahln.org). A separate WI for processing and testing of the PT panel samples will be provided to all participants during PT distribution. The associated WIs for DNA extraction of plant tissue samples for the PT and for USDA regulatory samples are currently unchanged. 2) HLB 2013 PT distribution will occur from mid-November 2013 through February 2014.

The USDA HLB PT program began in 2007 in support of PPQ Citrus Health Response Program. Like the earlier years, the 2013 HLB PT panel consists of DNA samples requiring PCR analysis and lyophilized tissue samples requiring DNA extraction and PCR analysis. Participating laboratories should possess a valid USDA permit for interstate diagnostic samples to receive the PT panel. Information and applications for permits can be viewed at the following USDA-APHIS-PPQ website: www. aphis.usda.gov/plant_health/ permits/organism/index.shtml. When sent, HLB positive and healthy DNA controls for PCR will be provided for use with each panel.

Brown, necrotic or aborted seeds in HLB infected mandarin.

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To ensure the PT panels are of sufficient quality prior to shipment, the panel samples have been extensively tested according to USDA-approved diagnostic protocols. Individual, randomly selected aliquots of each DNA panel sample are tested periodically to ensure DNA stability. DNA is also extracted from randomly selected lyophilized tissue samples at regular time intervals and tested by PCR to ensure tissue stability and uniformity.

It is suggested that primers/probes/reagents are ordered in advance so that all required reagents are on hand before panel receipt. Please be aware that fluorescent probes can take up to 14 days to receive. For those who have been previously HLB certified, it is strongly suggested that a new set of primers and probes is ordered, since degradation is one of the

Issue Highlights

- 2014 NPDN/USDA-APHIS advanced diagnostic workshops
- Lucid mobile apps released for Android
- National Repository tip: confidence levels
- GPDN webinar schedule
- USDA announces opening of new plant inspection station
- IPM advisor job opportunity in CA

NPDN

National Plant Diagnostic Network

major reasons for failure or low efficiency of PCR. Purchase of a new DNeasy® Plant Mini Kit (Qiagen® cat. # 69104) is strongly recommended since using expired kit components contributes to low DNA extraction efficiencies, often resulting in out-of-range real-time PCR values and faint or missing conventional PCR product bands.

Please Note: PT Work Instructions will be provided with the panel. While these PT Work Instructions use the same probes/primers and reagents as the Work Instructions for regulatory samples, the PT Work Huanglongbing (Citrus Greening) Proficiency Test 2013 National Plant Protection Laboratory Accreditation Program Page 2 of 5 Instructions include additional guidelines for handling and information specific to the processing of PT panel samples only. Likewise the PT work instructions should not be used for testing field samples.

In addition to the PT Work Instructions, results reporting forms will be provided electronically for PT results submission. Panel results submitted in an unacceptable format (other than the reporting forms provided) will be returned for reformatting and resubmission, thereby delaying the results evaluation. Upon receiving properly submitted results, panel results evaluation and prompt feedback will be provided by NPPLAP within one month.

Please, visit the NPPLAP website to download the official announcement at www.aphis.usda.gov/plant_health/cphst/npplap.shtml. The form to request a panel(s) can be found at the end of the 2013 Proficiency Test Letter for Huanglongbing. Each individual participant should choose a preferred month (mid-November through February) to receive a panel(s), fill out the application form and promptly return the completed form by e-mail to Vessela.A.Mavrodieva@aphis.usda.gov.

Diagnosticians or laboratories new to the PT program, should contact NPPLAP as soon as possible in order to complete the required documentation before receiving a 2013 PT panel.

Irrigation Pathogens and Water Quality

USDA | ars | NIFA

Upcoming Webinar

What plant pathogens could be in my water?

Presenter: Dr. Gary W. Moorman, Professor of Plant Pathology, Pennsylvania State University

Tuesday, December 3, 2013, Noon to 1:00 pm (Eastern)
To participate in this webinar, please go to
http://connect.extension.iastate.edu/irrigation-water/
and dial 1-888-619-1583 then enter pass code: 491981

Visit the project site at www.irrigation-pathogens.info for recordings of past webinars and for other ongoing educational programs and exciting research activities. For more information about the webinar, or questions, contact Chuan Hong at chhong2@vt.edu

Quality Corner

Using the Get Started Implementation Booklet to Establish the STAR-D Laboratory Accreditation System in your Laboratory; Step 3

Karen Snover-Clift and Dawn Dailey O'Brien, Department of Plant Pathology and Plant-Microbe Biology, Cornell University

So far we have review steps 1 and 2 of the "STAR-D: How to Get Started in Your Laboratory" booklet. Hopefully those articles were helpful and have given you a few ideas about planning for the implementation of the STAR-D laboratory accreditation quality management system in your laboratory. We understand that the idea of implementing such a complex system can be daunting. It is much easier to implement if it is broken down into manageable segments, therefore, we are continuing the review of each page within the booklet by providing this information in the *NPDN News*, under the STAR-D quality corner section.

3 How to Get Started — Documents

Step Three builds on Step One and Two by continuing the process of preparation, assigning duties to lab members and reviewing the webpage, document templates and auditor checklists. Remember to begin this process you should set a goal for each activity in this section. When completed, post the date. Checking off each item provides a great sense of accomplishment!

Activities:

★ Look at example Quality Manuals to see how others interpreted the NPDN Requirements and Standards, and how they modified the Quality Manual template to suit their laboratory. We have four examples now available on-line!

★ Select which laboratory member will approve your document system and document changes.

★ Decide where you will store electronic versions of your documents. Be sure to choose a place easily accessible by laboratory staff.

★ Write your Quality Manual. (This is a big step into implementing your STAR-D program!) Look over

QP, WI and Form templates, that pertain to section 4.3 Documents, decide which you will use.

★ Create any needed document related QPs, WIs and Forms.

Step Three includes a Helpful Hints section. The hints are a collection of items gathered from a few of the diagnosticians that have started this process. They provided their most helpful messages for you. All you need to do here is review the hints, think about if any of the hints pertain to you or your laboratory and if you like one of the provided hints, discuss it with your laboratory members.

Helpful Hints:

★ If you currently have tools that work effectively, keep them. If you already have documents that are effective, add a unique identifier.

★ Not every procedure needs to be written down.

★ When writing your documents, give yourself lots of flexibility. Do not say "Use a No. 2 pencil" when a pen will not change the results of the test.

★ You will not always need all levels of documentation for every section. Some sections will be completely covered in your Quality Manual (QM), others may be introduced in the QM and specifics given in a QP, and others will need the QM, QP, WI and Forms.

★ Include version numbers on each document. Small changes should increase by tenths; big changes may warrant a whole number increase.

Please contact us with any questions! Next month we will proceed to Step 4…How to Get Started-Personnel/ Training!

2014 NPDN/USDA-APHIS Advanced Diagnostic Workshops

Karen L. Snover-Clift, Cornell University and Mark Nakhla, USDA-APHIS-PPQ-CHPST-NPGBL

The NPDN Diagnostics Program Area Committee and members of USDA-APHIS-PPQ-CHPST-National Plant Germplasm and Biotechnology Laboratory (NPGBL) are pleased to announce the 2014 advanced diagnostic workshops. The workshops will begin on March 4, 2014 and a number of topics will be covered. We have planned the workshops in consecutive weeks again this year so that the Beltsville staff can focus on these sessions during this four week period and then devote the rest of the year to other activities. This format seemed to work well for all those involved last year. During the spring of 2014, we will again offer advanced trainings on a number of topics.

Week 1: Bioinformatics, March 4–6, 2014

In previous years we have offered this session in two parts. Beginning last year, the two parts were combined which made this a 3 day workshop that included detailed guidance on sequencing PCR amplified fragments either directly or after cloning. The rest of the session will cover analysis of obtained sequences from both plus and minus strands, editing sequences, blasting sequences, understanding blast results based on size and gene target, when to directly sequence PCR products or clones, which genes are used for sequence analysis for fungi, bacteria, and viruses, what sequence analysis programs are available commercially or as freeware, and hands-on use of sequence analysis programs using sequences from case studies for different pathogen types, and allowing the participants to work with their own sequences.

Week 2: Phytophthora, March 11–14

Due to continued interest, we have scheduled a Phytophthora training session. The session is 3 ½ days long and covers ELISA, DNA extraction, conventional PCR (nested and multiplex), real-time PCR (ITS and Elicitin), and interpretation of results.

Week 3 (first pt of wk): Potato Wart, March 17–18

Again due to continued interest, we have scheduled a Potato Wart session. The session is 2 days long and will be held the first part of the week with Citrus Greening-HLB at the end of the same week. Those interested in both topics may want to choose this option to complete both sessions with one trip.

Week 3 (second pt of wk): Citrus Greening-HLB, March 19–21

Due to the continued presence and spread, there continues to be a need for Citrus Greening-HLB training. This session will be done over a 3 day period.

2014 Advanced Diagnostic Workshops

Week 1: Bioinformatics, March 4–6, *3 days*

Week 2: Phytophthora, March 11–14, *3.5 days*

Week 3 (1st pt of wk): Potato Wart, March 17–18, *2 days*

Week 3 (2nd pt of wk): Citrus Greening-HLB, March 19–21, *3 days*

Week 4: Citrus pathogens, March 25–28, *4 days*

Week 4: Citrus pathogens, March 19–22

This topic was very popular over the past two years that it has been offered. The 4 day session will cover citrus leprosis, sweet orange scab and citrus black spot in a 4½ day session. The training will cover disease symptoms and methods of detection and identification of CiLV, CBS and SOS. The molecular diagnostics will include PCR, real-time PCR, RT-PCR and RT-real-time PCR. This workshop completes the schedule of advanced diagnostic workshops at Beltsville for 2014.

Week 5: Citrus Greening-HLB, March 26–28

Due to the continued presence and spread, there to continues to be a need for HLB training. This session will be done over a 3 day period and will conclude our training for the year.

More specifics about travel and lodging will be sent directly to participants before the end of December so that they can make their travel plans. Expenses for travel, lodging and meals will be covered from a supplemental grant for diagnostician training so you will not need to use your funds from this year's NPDN allocation. All expenses will be processed through Cornell University. There is no registration charge for the workshops or for meeting materials. These expenses are covered by our colleagues at the CPHST Beltsville Laboratory. Funds for reimbursement of travel expenses are limited. Priority will be given on a first come, first served basis in order by requests received until funds are exhausted. Please sign-up as soon as possible to ensure your spot in the workshop and your expense coverage! If you are interested in participating in any of these workshops please contact Karen Snover-Clift at kls13@cornell.edu. Thank you!

## ITP and QBIT Release Lucid Mobile Apps for Android

Terrence Walters, USDA-APHIS-PPQ-S&T-FCL-ITP

The internationally recognized Lucid software for developing matrix-based identification keys to biological organisms has recently added support for Lucid keys on mobile devices. You can now carry Lucid keys with you into the field on your mobile devices without requiring internet access. Lucid Mobile takes full advantage of all the conventions and functionalities you have grown accustomed to on your mobile device, while supporting the features you value in desktop Lucid keys.

The Identification Technology Program (USDA-APHIS-ITP) announces the first release of Lucid Mobile apps to support plant pest identification for Android smartphones and tablets. Developed in cooperation with The University of Queensland's QAAFI Biological Information Technology team (QBIT), the 10 apps are now available for download, at no cost, from Google Play USDA APHIS ITP. The 10 Lucid Mobile apps will be available, via the Apple iTunes website, in early 2014.

For the first suite of Lucid Mobile apps, ITP and QBIT selected desktop Lucid keys from ITP's existing tools (http://idtools.org), that had potential value, if converted into Lucid Mobile, to support field pest screening and identification.

For technical questions concerning Lucid Mobile, contact Mathew Taylor (m.taylor@cbit.uq.edu.au). For questions or comments about ITP's Lucid Mobile apps contact Terrence Walters (itp@aphis.usda.gov).
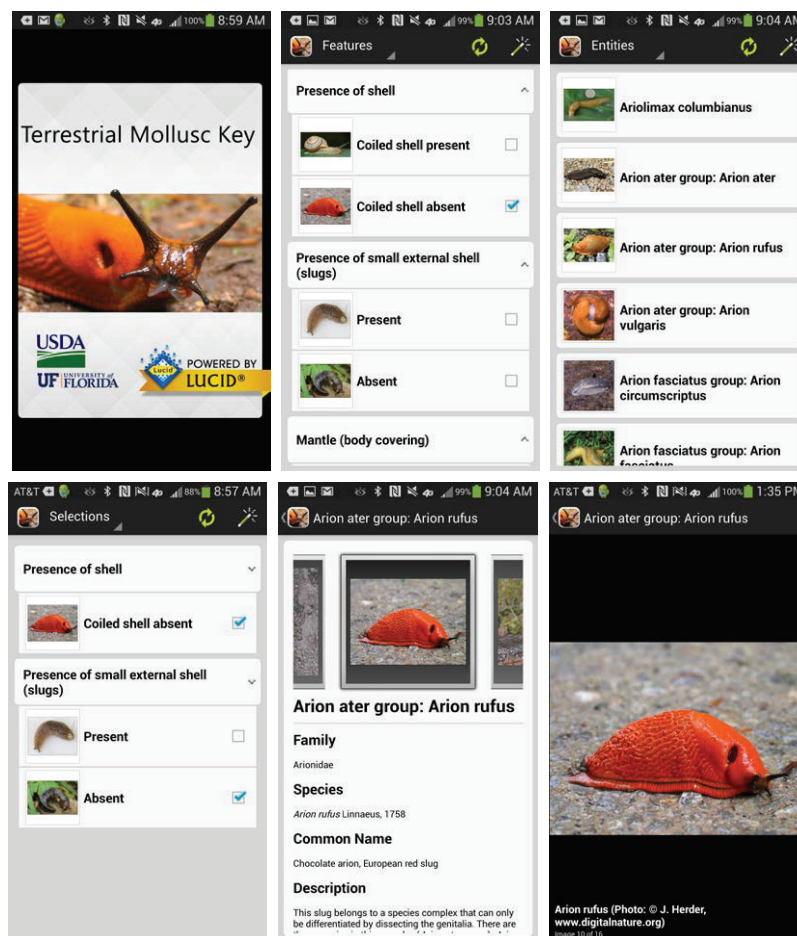
Screenshots from ITP's Lucid Mobile app, Terrestrial Mollusc Key (upper left to lower right): Splash page; Feature page showing characters and character states; Entities page showing taxa remaining after selecting a character; Selections page showing character states selected; Fact Sheet page; and an image view from the Fact Sheet page.

ABOUT LUCID MOBILE

Lucid Mobile is the latest software development from the QBIT team at The University of Queensland, Brisbane, Australia. Over the past 15 years, this team has been developing, maintaining, and supporting the Lucid platform for developing identification and diagnostic tools. The Lucid Builder software allows taxonomists, agronomists, and other developers to combine their expert knowledge with multimedia and an easy to use interface to produce identification and diagnostic tools for use by a broad range of users. Previously, access to these Lucid keys has been via a CD, a DVD, or online. Now, Lucid Mobile provides a more readily accessible means of accessing Lucid keys – via mobile phones and tablets. The release of Lucid Mobile means that existing or new Lucid keys can now be converted to an easy to use and intuitive app, allowing identification and diagnostic knowledge and expertise to be carried around in your pocket and opens up the possibility for in-field identification and diagnostic support without requiring an internet connection. Lucid Mobile supports both Android and iOS platforms – each Lucid Mobile app is packaged as a free or commercial stand-alone product, ready for download from Google Play Store or Apple iTunes.

QBIT has provided an excellent 3½ minute demonstration video for first-time users of Lucid Mobile Android apps. If you are interested in learning more about Lucid Mobile, such as how to develop a Lucid Mobile key, visit QBIT's Lucid Mobile page. Lucid Mobile apps released through QBIT are available at the Google Play LucidMobile.

Overall Confidence Levels in National Repository

Mike Hill and Eileen Luke, CERIS, Purdue University and Karen Snover-Clift, NEPDN, Cornell University

There are a total of four confidence levels that can be applied to a pest/pathogen in the National Repository which consist of Confirmed, Not Detected, Suspected, and Inconclusive. Defintions for each of the levels are provided below and can also be found in a December 2010 newsletter article.

Terms and Definitions

Confirmed — the diagnosis was derived using approved molecular technologies, serological testing and/or morphological observations which allowed for the confirmation of the organism to Genus, species and/or race or pathovar level.

Not Detected — the sample was submitted as a suspect sample or as part of survey project. The pathogen was not detected on this sample at this time using approved molecular technologies, serological testing and/or morphological observations.

Suspected — diagnostic symptoms of the pathogen were present but evidence of the pathogen could not be confirmed at this time. This term may also be used at the species level if confirmations cannot be made. This term may also be used with abiotic entries.

Pest Genus	Genus Confidence	Pest Species	Species Confidence	Overall Confidence	Comments
Phythophthora	Confirmed	sp./spp.	Confirmed	**Confirmed**	When species is sp./spp. confirmation only reported to genus level!
Phythophthora	Suspected	sp./spp.	Confirmed	**Suspected**	When species is sp./spp. confirmation only reported to genus level!
Phythophthora	Not Detected	sp./spp.	Confirmed	**Not Detected**	When species is sp./spp. confirmation only reported to genus level!
Phythophthora	Inconclusive	sp./spp.	Confirmed	**Inconclusive**	When species is sp./spp. confirmation only reported to genus level!
Phythophthora	Not Detected	ramorum	Confirmed	**Not Detected**	If genus is "Not Detected" then overall confirmation is "Not Detected"
Phythophthora	Not Detected	ramorum	Suspected	**Not Detected**	If genus is "Not Detected" then overall confirmation is "Not Detected"
Phythophthora	Not Detected	ramorum	Not Detected	**Not Detected**	If genus is "Not Detected" then overall confirmation is "Not Detected"
Phythophthora	Not Detected	ramorum	Inconclusive	**Not Detected**	If genus is "Not Detected" then overall confirmation is "Not Detected"
Phythophthora	Confirmed	ramorum	Confirmed	**Confirmed**	Report to lowest level (species, sub-species if populated)
Phythophthora	Confirmed	ramorum	Suspected	**Suspected**	Report to lowest level (species, sub-species if populated)
Phythophthora	Confirmed	ramorum	Not Detected	**Not Detected**	Report to lowest level (species, sub-species if populated)
Phythophthora	Confirmed	ramorum	Inconclusive	**Inconclusive**	Report to lowest level (species, sub-species if populated)

Figure 1: Matrix for Overall Confidence Levels in National Repository

Inconclusive — although a suitable sample was received, a reliable result could not be achieved. For example, the test kit may have not worked correctly and there was no sample material remaining to perform the test again. Or, no DNA was detected in a PCR analysis. Inhibitors may have been present in the sample. A second attempt may have been made with the same results. The only conclusion is to label the sample as inconclusive.

Overall Confidence

During data entry confirmation levels are provided for the genus, species, and sub-species if populated. How these entries get translated into an overall confidence level is dependent upon the type of pest/pathogen that is selected. The matrix shown in Figure 1 covers three different scenarios and illustrates the impact each can have on the overall confidence level. The highlighted cells emphasize the confidence level that determines the overall confidence.

The first scenario uses *Phytophthora* sp./spp. as the pest. For all pest entries that have sp./spp. as the species the overall confidence level will only go to the genus level. There are some lab management systems that will send in an Inconlusive confidence for the species, however, it doesn't matter what confidence level is entered for the species because the overall confidence will only report out to the genus level as demonstrated in the first four rows in the matrix. The second scenario is *Phytophthora ramorum* where the confidence level of Not Detected is entered for the genus. In this case, it does not matter what confidence is entered for the species, the overall confidence will always get reported as Not Detected as demonstrated in rows 5–8 in the matrix. The final scenario is for *Phytophthora ramorum* where the genus confidence level is Confirmed. In these cases the overall confidence level will be based on the species or sub-species if it is populated as shown in rows 9–12 in the matrix. This scenario also holds true for entries where the genus confirmation level is Suspected or Inconclusive.

If you have any questions about confidence levels or your data in the National Repository please contact Mike Hill (mikehill@purdue.edu) or Eileen Luke (lukee@purdue.edu). 🍂

Diagnostic Guide for Gummy Stem Blight and Black Rot on Cucurbits

If you need help diagnosing gummy stem blight and black rot on various cucurbits, see my "Diagnostic Guide for Gummy Stem Blight and Black Rot on Cucurbits" recently published in Plant Health Progress, one of the journals in the Plant Management Network:
www.plantmanagementnetwork.org/php/elements/sum

Most land-grant universities and major agrichemical and seed companies have subscriptions to PMN. If interested, subscriptions are available online at the following link:
www.plantmanagementnetwork.org/subscriptions.

Anthony P. (Tony) Keinath
Clemson University Coastal Research & Education Center

GPDN 2014 Webinar Series

Linnea Skoglund, Schutter Diagnostic Lab, Montana State University

The Great Plains Diagnostic Network will be offering the 7th Diagnosticians' Webinar Series beginning January 22, 2014. Webinars begin at 10 CT/9 MT. They are open to anyone who would like to attend. You will need a computer with an internet connection and speakers. You can ask a question by typing it in or by using a microphone if you have one. To join go to http://connect.ksre.ksu.edu/gpdnseminars.

If you have any questions regarding this seminar series or connecting, contact Linnea Skoglund (linnea.skoglund@montana.edu, 406-994-5150) or Sharon Dobesh (sdobesh@ksu.edu, 785-532-1340). All webinars are recorded and can be viewed later at www.gpdn.org along with those from 2008 through 2013.

DATE	SPEAKER	TITLE
1/22/14	Carrie Harmon	Collaborative Research in Detection and Diagnosis: Meeting the Challenge of Invasive Species Detection and Economic Constraints
1/29/14	Jim Stack	Wheat Blast: An emerging disease in South America
2/5/14	Alison Robertson	Tips and Tricks for Diagnosing Goss's Wilt
2/12/14	Jim Jasinski	An Introduction to the Brown Marmorated Stink Bug
2/19/14	Sally Miller	International Plant Diagnostic Network
2/26/14	Alma Laney	Association and Detection of Rose Rosette Virus with an Old Disease
3/5/14	Nancy Gregory	Toward Single Scientific Names for Fungi and Oomycetes in Database Applications
3/12/14	Febina Mathew	Identification and Characterization of *Diaporthe* Species Infecting Sunflowers

NATIONAL NEWS

USDA Announces the Grand Opening of Atlanta's New Plant Inspection Station

APHIS Newsroom

On November 7, APHIS announced the grand opening of Atlanta's newly-expanded plant inspection station.

"To keep up with the increasing volume of fresh cut flowers and live plants imported into the United States, APHIS' Plant Protection and Quarantine (PPQ) program has built a state-of-the-art hub," said Osama El-Lissy, Deputy Administrator of PPQ. "This expansion will expedite shipment processing by allowing for the simultaneous inspection of multiple shipments, making it just one example of USDA's overall effort to facilitate and expand trade with our partners worldwide."

Features of the new plant inspection station include an operations control center to ensure the safety of entering agricultural products, water saving and energy conservation fixtures, and laboratories and inspection rooms that exceed current engineering and safety requirements.

Since 2005, plant cargo into Atlanta has increased from fewer than 4 million plant imports to more than 200 million plants.

The Atlanta Plant Inspection Station, established in 2005, is one of 16 such facilities located at major ports of entry across the United States. It is currently the nation's second-busiest point of entry (behind Miami) for foreign-grown flowers, ornamental shrubs, and

other plant material. Since 2005, plant cargo into Atlanta has increased from fewer than 4 million plant imports to more than 200 million plants.

In today's global marketplace, the volume of international trade brings increased potential for the introduction of foreign pests, diseases, and noxious weeds that could threaten American agriculture and natural resources. The results of such introductions can have a devastating effect on the U.S. food supply and cost hundreds of millions of dollars in eradication and control measures. This ultimately can result in higher priced agricultural products for the consumer. In fiscal year 2012 alone, more than 1.3 billion plants were imported into the United States. Each of these imports goes through a series of overlapping safeguarding measures prior to U.S. entry.

The Obama Administration, with Agriculture Secretary Vilsack's leadership, has aggressively worked to expand export opportunities and reduce barriers to trade, helping to push agricultural exports to record levels. U.S. agriculture is currently experiencing its best period in history thanks to the productivity, resiliency, and resourcefulness of our producers and agribusinesses. Today, net farm income is at record levels while debt has been cut in half since the 1980s. Overall, American agriculture supports 1 in 12 jobs in the United States and provides American consumers with 83 percent of the food they consume. Strong agricultural exports contribute to a positive U.S. trade balance, create jobs, boost economic growth and support President Obama's National Export Initiative goal of doubling all U.S. exports by the end of 2014. 🌿

JOB OPPORTUNITY

Area Integrated Pest Management (IPM) Advisor, UC Cooperative Extension
Serving Sacramento Valley and Surrounding Areas

Across California, the University of California's Division of Agriculture and Natural Resources (UC ANR) is an engine for problem solving. Serving as the network linking local issues to the power of UC research, our more than 300 campus-based specialists and county-based advisors work as teams to bring practical, unbiased, science-based answers to Californians.

We seek an academic advisor who can conduct a multi-county-based extension, education and applied research program to serve as an expert for issues related to IPM and provide leadership in promoting IPM through research and extension activities.

We seek an advisor who is:

- An innovative researcher, who can develop an applied research program, evaluate programs, and report accomplishments, results and potential or actual impacts to scientific and lay audiences.

- A collaborator, who can develop partnerships and leverage resources to deliver innovative approaches that will develop, strengthen and expand the local

delivery of statewide programs; one who can collaborate with UC ANR program teams, advisors and specialists, pest control advisers, industry, public agencies, and others within the research/extension network; a member of the IPM team who can contribute to ANR's wide offering of IPM educational tools.

- An educator with a passion for delivering extension education programs using traditional and innovative delivery techniques; whenever possible using field research opportunities for hands-on teaching and learning.

- A visionary, who can complement ANR's Strategic Vision, optimizing opportunities for conducting outstanding research and extension programs that meet the needs of Californians.

This position is an academic career track appointment; a Master's Degree is required, though other advanced degrees are encouraged, in pest management, plant pathology or a closely related field. For a full position vacancy announcement and application procedures, please visit http://ucanr.edu/jobs or contact Soo Hsieh at syhan@ucanr.edu 530-750-1285 and refer to position listing AP#13-19. To assure full consideration, applications should be submitted by **December 15, 2013** (open until filled). 🌿

UPCOMING EVENTS

Training/Workshops

May 2014
Bark and Ambrosia Beetle Academy
University of Florida
Gainsville, FL

CONTRIBUTE

Share Tips and News with Your Colleagues
Recently write an article for a trade journal? Do you have a tip, announcement, regional news or network update you would like to include in the *NPDN News*? Email Rachel McCarthy at rachel.mccarthy@cornell.edu

Have a tip you would like to share with your fellow diagnosticians? Or a technique you would like to learn more about?
Email Gail Ruhl at ruhlg@purdue.edu