

## FROM THE PLANT MICROBIOME TO THE PHYTOBIOME

# How Microbiome-Focused Studies Are Enhancing Our Understanding of Disease-Suppressive Soils

Linda Kinkel, APS Public Policy Board, [kinkel@umn.edu](mailto:kinkel@umn.edu)

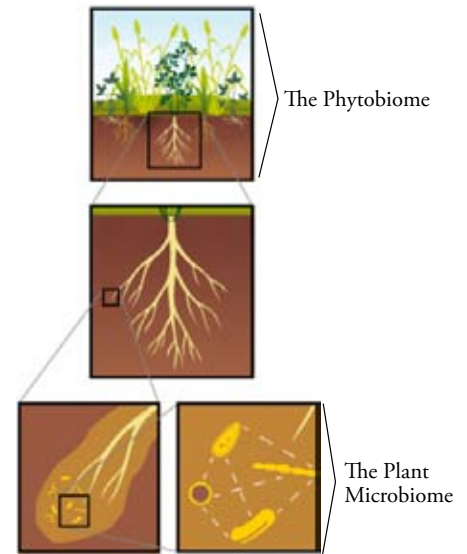


Disease-suppressive soils represent a compelling goal for plant pathologists. The prospect of obtaining high levels of disease suppression by modifying the soil microbial community has led to substantial research into the bases for disease-suppressive soils. Disease suppression is generally recognized to

be a function of the activities and composition of the soil microbial community and especially the capacities of the indigenous community to antagonize pathogen populations. However, rather than communities, most studies of suppressive soils focus on the role of individual culturable populations, especially *Pseudomonas*, *Fusarium*, *Streptomyces*, and *Trichoderma* spp., in disease suppression. Unfortunately, single-population studies have failed to provide reproducible means for managing the disease-suppressive capacity of soil communities and ignore the vast majority of the plant microbiome, which includes the microbes in, around, and associated with the plant host (the plant microbiome) and the physical and biological environment of the plant; thus,

these studies have ignored the potential roles of the phytobiome in disease suppression.

Recent plant microbiome-targeted studies are fundamentally changing our understanding of disease suppression and the role of the complex microbiome in suppression. For example, recent metagenomic analyses of bacterial microbiomes in disease-suppressive soils in the Netherlands found that relative abundance of multiple bacterial phyla was more important as an indicator of disease suppression than the presence of specific populations (Mendes et al., 2011). Similarly, metagenomic analyses of the fungal microbiome in suppressive soils in Australia found a consortium of 40 fungal genera associated with disease suppression, including many endophytic species (Penton et al., 2014). These studies highlight the significance of whole-microbiome as opposed to individual population approaches for understanding the phenomenon of disease suppression and suggest that many uncharacterized microbial taxa may be important contributors to pathogen suppression. In contrast to disease, which is understood predominantly as a two-species (host-pathogen) interaction, these microbiome studies suggest that suppression may reflect interactions of diverse microbial species with one another and with the pathogen. Microbiome-pathogen interactions are likely to capture a complex array of distinct



*The phytobiome encompasses the collection of biological, physical, and chemical factors that influence the individual plant, including other plants, insects, soil, and atmospheric physical and chemical properties, and micro-organisms. Microbial communities in bulk soil (the soil microbiome), the rhizosphere, the phyllosphere, and the endosphere (within the plant host) are components of the plant microbiome. Interactions within the microbiome are believed to be critical to generating disease-suppressive soils, but the influences of other components of the phytobiome on disease suppression are poorly understood. Figure adapted from Bakker et al., 2014.*

*Microbiome Studies continued on page 32*

## Students, Win \$500 for Travel to the APS Annual Meeting

Are you an APS student member giving an oral or poster presentation at the 2015 APS Annual Meeting in Pasadena? Did you know you can apply for an APS Student Travel Award to win \$500 toward your travel expenses to this conference? Awards are available to graduate students in all disciplines of plant pathology.

**Applications are due by noon, CST, on March 20, 2015, and advisor letters are due by noon, CST, on March 27, 2015.** Applications or advisor letters submitted after the deadline posted will not be accepted; the deadline is strictly enforced, so please apply early. Complete details can be found on the application website at [www.apsnet.org/members/foundation/apply/Pages/StudentTravelAwards.aspx](http://www.apsnet.org/members/foundation/apply/Pages/StudentTravelAwards.aspx). ■

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#### Submission Guidelines

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### Editor's Corner

## Annual Review of Phytopathology

### Still a Great Resource for Plant Pathologists

Doug Jardine, Kansas State University, [PhytoNewsEditor@scisoc.org](mailto:PhytoNewsEditor@scisoc.org)



I was recently searching for writing ideas when I Googled “plant pathology history.” One of the hits that came up was “Some Highlights in Plant Pathology in the United States” by **J. C. Walker**. Walker, of course, is in that elite group of our most famous plant pathologists. The article appeared in the 1975 issue of the *Annual Review of Phytopathology*. Pulling the volume off of the departmental library shelf, I glanced through the table of contents. There were reviews of various pathogens, such as “Present Status of Coffee Rust in South America,” by **C. Booth**, still a hot topic today, especially in Central America. Another review, “Chemical Control of Plant Diseases,” by **Ronald Sbragia**, was an interesting read. In the review, he discussed the long-range goals of

fungicide research, predicting quite accurately, “We are witnessing the growth of the first major divergence, the systemic fungicides. As usage of the systemics become more widespread, the role of the protectants will wane, although it is unlikely they will disappear.” Many other reviews were equally as interesting. This got me thinking about the history of the *Annual Review of Phytopathology*.

Finding the first volume, I noted that it was edited by **James G. Horsfall** and **Kenneth F. Baker**, representing both sides of the continent in the Connecticut Agricultural Experiment Station and the University of California, respectively. In addition to Horsfall and Baker, the first editorial committee consisted of **C. S. Holton**, **A. Kelman**, **R. A. Ludwig**, **G. S. Pound**, and **W. C. Snyder**. All are APS fellows and all but Baker and Ludwig are also past presidents of APS.

In the preface of that first volume it is written, “With this, the first issue, we launch a new ship. We shall sail on new seas. We venture to hope that our scientific colleagues will approve.” Later it goes on, “The establishment of the *Annual Review of Phytopathology* marks the emergence of our field as a science... We now have our own journal of synthesis, our own journal of critical review, our own journal of perspectives, in short, our own journal to ‘develop a consistent body of theory.’” Toward the end of the preface, the editors challenge authors. “We have asked the authors to synthesize new knowledge from the bits and pieces scattered through the literature. We ask for more than a critical evaluation and summary of the literature. We ask for an integration of knowledge.”

It’s also indicated in that first preface that the original intent was for APS to self publish, “But the society gratefully deferred to an older and more experienced organization when Annual Reviews, Inc. offered to publish it,” becoming the 21st title in the Annual Review series. So, what is Annual Reviews, Inc.?

From their website, I found that they are a Palo Alto, CA-based organization incorporated in 1934. “Each year they publish reviews for 46 focused disciplines within the biomedical, life, physical, and social sciences. Annual Reviews is a nonprofit organization whose mission is to provide the worldwide scientific community with a useful and intelligent synthesis of the primary research literature for each of the scientific disciplines they support.”

Annual Reviews was founded by **J. Murray Luck**, a biochemistry professor at Stanford. The first journal, *The Annual Review of Biochemistry*, was actually published in July 1932 by Stanford University Press with a \$10,000 grant from the Chemical Foundation. Annual Reviews was incorporated in December 1934. A great history of the organization is contained in Luck’s biography, *Confessions of a Biochemist*, and can be found at <http://bit.ly/1xqtHag>.

Lastly, I wonder if graduate students, who are getting more and more narrowly focused in their studies, realize what a great resource the *Annual Review of Phytopathology* or other closely related *Reviews* can be for starting that all-important literature review for their thesis or dissertation? The current volume contains a balanced number of basic and applied topics ranging from “Harnessing Population Genomics to Understand How Bacterial Pathogens Emerge, Adapt to Crop Hosts, and Disseminate” to “Fifty Years since *Silent Spring*.” If your library is like ours here at Kansas State University, it is also available online. ■

**Erratum**—In January’s *Phytopathology News* article, “Krishna Subbarao Leads New Editorial Board for *Phytopathology*,” **Kelly Ivors’** name was mistakenly left off the list of senior editors. We apologize for the error.

# Annual Audited Summary of APS Finances for Fiscal Year 2014

Steve Slack, APS Treasurer, [slack.36@osu.edu](mailto:slack.36@osu.edu)



The Financial Advisory Committee (FAC) and APS Headquarters staff meet periodically to review financial matters related to the operation of the society and to refine the APS strategic financial plan. FAC, headquarters staff, and

leaders of APS business centers update and revise the strategic financial plan annually to ensure that funds are available to support all activities of the society. An overall society programmatic strategic plan is in place to put forth a strategy to meet the mission and vision for the future. Council and the officers regularly analyze the external environment and make progress toward assigning responsibility for developing and executing strategies to attain the goals of the society's strategic plan. Having a strategic financial plan helps us, as a society, to provide a focus for our resources and is used as a guide for the various committees and staff to do their jobs. Strategic targets inform everyone as to what is expected from their programs several years in advance so they can build and execute strategies over several budget years. The role of FAC in this process is not to get involved in program specific strategy building, but rather to develop financial goals, build business plans to meet those goals, and monitor progress toward

each goal. FAC continually asks the difficult questions such as which programs should break even and which are expected to generate surplus to invest in our programs and services that best benefit our members. This plan continues to work for the society, allowing us to invest in our future.

The FY14 profit from operations (excluding investments) was concluded with a surplus of \$405,316. This net income from operations was before adjustment for the funded status of the APS pension plan of \$353,452. This adjustment reduced income and is based on an actuarial analysis with several variables and as such the amount can fluctuate significantly from year to year. The liability magnitude is currently higher due to reduced expected bond income.

The FY14 income and expense categories for the society are detailed in Table 1. Our total income (\$4,931,056) was derived from eight sources as indicated in Figure 1, and our total operating expenses (\$4,525,740) incurred during FY14 were partitioned as indicated in Figure 2. The income and expenses of the society for the most recent 11 FYs are presented in Table 2. The total assets of the society as of June 30, 2014, including restricted funds, were \$9.9 million and liabilities totaled \$5.7 million. This resulted in total net assets of \$4.2 million. ■

Fig. 1. Audited Income – 6/30/14

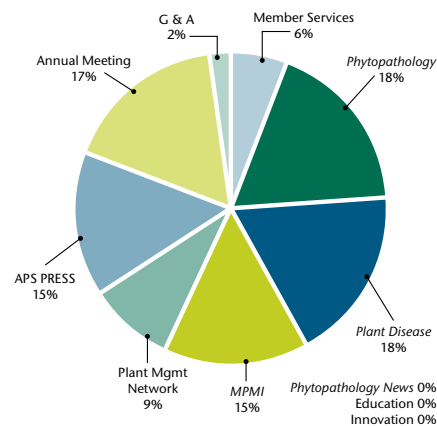


Fig. 2. Audited Expenses – 6/30/14

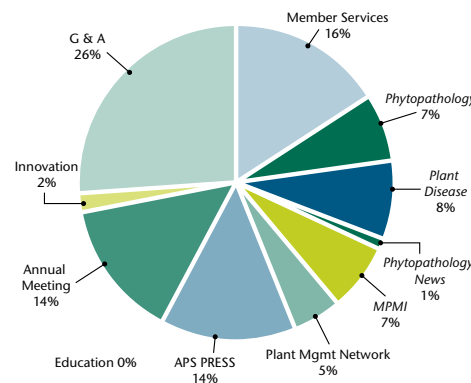


Table 1. Audited Summary of Income and Expenses—6/30/14 (Twelve Months)

	INCOME		EXPENSES		NET BEFORE OVERHEAD	NET AFTER OVERHEAD
Member Services	\$313,196	6%	\$738,727	16%	(\$425,531)	(\$681,544)
Phytopathology	877,610	18%	311,095	7%	566,515	434,457
Plant Disease	896,578	18%	377,040	8%	519,538	391,427
Phyto News	5,671	0%	42,846	1%	(37,175)	(42,561)
MPMI	744,144	15%	330,971	7%	413,173	282,077
Plant Mgmt Network	416,524	8%	198,272	4%	218,252	102,208
APS PRESS	739,710	15%	637,042	14%	102,668	(47,845)
Auxillary Meetings	0	0%	6,290	0%	(6,290)	(9,615)
Annual Meeting	820,338	17%	627,710	14%	192,628	39,849
Innovation	0	0%	63,137	1%	(63,137)	(63,137)
G & A	117,285	2%	1,192,610	26%	(1,075,325)	—
<b>Total</b>	<b>\$4,931,056</b>		<b>\$4,525,740</b>		<b>\$405,316</b>	<b>\$405,316</b>

Surplus (Loss) \$405,316

Table 2. Comparison of The American Phytopathological Society fiscal years 2004 to 2014 before reserve allocation

FISCAL YEAR	INCOME	EXPENSES	SURPLUS (DEFICIT)
FY14	\$4,931,056	\$4,525,740	\$405,316
FY13	\$4,888,696	\$4,849,155	\$39,541
FY12	\$5,223,752	\$4,766,446	\$457,306
FY11	\$4,922,737	\$4,865,606	\$57,131
FY10	\$5,116,883	\$4,572,696	\$544,187
FY09	\$4,935,612	\$4,508,102	\$427,510
FY08	\$4,734,346	\$4,712,582	\$21,764
FY07	\$4,538,077	\$4,327,412	\$210,665
FY06	\$4,289,254	\$3,754,227	\$535,027
FY05	\$3,959,027	\$3,819,096	\$139,931
FY04	\$3,963,006	\$3,700,013	\$262,993





species and mechanisms of interactions, which may contribute to the robust nature of disease inhibition in suppressive soils.

Beyond their insights into the potentially broad, community basis for disease suppression, microbiome-focused studies may also shift our understanding of the location where pathogen suppressive interactions occur. For example, the finding that fungal endophytic taxa are selectively increased in suppressive soils suggests the potential for antagonistic or disease-suppressive microbial interactions to occur in multiple compartments of the microbiome (e.g., endophytic vs. soil), broadening targets for research. While much work has focused on pathogen-microbe interactions in bulk or rhizosphere soil, it may be that bulk soil populations are important predominantly as a source of immigrants to the rhizosphere or the plant endosphere. In this case, rather than the primary habitat within which disease or pathogen suppression occurs, bulk or rhizosphere soils may supply an endophytic microbiome for disease suppression. Further characterization of variation in microbiome composition and functional characteristics across bulk, rhizosphere, or endophytic compartments of the plant microbiome may fundamentally shift the ways we think about microbial disease suppression.

Microbiome-targeted approaches have revealed novel taxa or microbial consortia associated with disease-suppressive potential (e.g., Rosenzweig et al., 2012). Recent work has also shown how the structure and co-association networks of microbial taxa shift in parallel with microbial community functional characteristics (Bakker et al., 2014). Characterizing networks of species co-association and interaction within microbiomes will provide critical insight into the ways in which the aggregate function or activity of the microbiome is distinct from the sum of its individual population components. Signaling, antagonistic, resource competitive, and mutualistic associations have all been well documented among microbial populations and may play significant roles in disease suppression or in generating disease suppressive microbiomes. Recognizing characteristic network or interaction structures associated with disease-suppression will shed light on specific microbial interactions that influence gene expression or community function in ways that support disease-suppression. Advances in transcriptomics and proteomics will be especially useful in such functional

analyses of intact and synthetic microbiomes. Specifically, in addition to helping to identify novel mechanisms of pathogen suppression, these approaches can be used to characterize relationships between microbiome composition and specific suppressive functions within the microbiome (e.g., aggregate antibiotic or enzyme production). Moreover, considering the phytobiome as a whole through systems biology and synthetic community analyses (e.g., Harcombe et al., 2014) offers a means to integrate cropping system physical and nutrient characteristics that influence disease suppression. Such approaches will provide a strong foundation for a comprehensive mechanistic understanding of phytobiome capacities to suppress plant diseases. In particular, the capacity to use whole genome sequence data to advance metabolic network models of species interactions in complex environments will be helpful in developing enhanced conceptual and predictive models for managing the phytobiome for disease suppression.

The past few years have seen tremendous advances in our ability to characterize the composition, structure, and functions of plant microbiomes. While plant pathologists continue to advance our understanding of the features of healthy plant microbiomes, we have enormous potential for advancing sustainable strategies for disease suppression by identifying the compositional, structural, and functional characteristics of disease-suppressive microbiomes. Further integration and application of approaches that explore the entire phytobiome

and span molecular, ecological, and evolutionary biology will propel plant pathologists toward accomplishing our long-sought goal of disease suppression via microbiome management.

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## New Book Reviews Molecular Research on Soil- and Plant-Associated Fungi



Genome sequencing has helped us understand how fungi recycle organic material in the soil, engage in positive and negative interactions with plant roots, and attack plants as pathogens.

*Genomics of Soil- and Plant-Associated Fungi* highlights the relevance of fungal genetic research and biotechnological applications in plant pathogenesis, biomass degradation, litter decomposition, nitrogen assimilation, antibiotic production, mycoparasitism, energy, ecology, and soil fungi turning to human pathogens.

This comprehensive book addresses the similarities and differences in the genomes of soil saprophytes, symbionts, and plant pathogens by using examples of model fungal species, *Neurospora* and *Aspergillus*, to provide an important view of pathogens and mutualists, such as *Trichoderma* spp., *Fusarium oxysporum*, *Cochliobolus heterostrophus*, *Penicillium chrysogenum*, *Rhizopus oryzae*, *Podospora anserina*, and other species belonging to Agaricomycetes, Archaeorhizomycetes, and Magnaporthaceae.

*Genomics of Soil- and Plant-Associated Fungi* also offers an analysis of how specific interactions with hosts and the influence of the environment may have shaped genome evolution. This APS PRESS-recommended title is now available in the APS PRESS Bookstore for \$199. APS members, save \$20 using your 10% member discount! ■

# Moving Beyond the Boundaries of Our Discipline

Sally Miller, APS Annual Meeting Program Chair, [miller.769@osu.edu](mailto:miller.769@osu.edu)



The 2015 Annual Meeting abstract submission period is underway, closing March 16, and already we're seeing cutting-edge work from both our early career and established scientists. This breadth of knowledge will lead

to great opportunities for communication and interaction in Pasadena. The Poster Huddles, so successful in Minneapolis, will be expanded this year to encourage lively discussion. We will also bring back PhytoViews and Idea Cafés, with topics chosen to engage attendees and foster problem-solving interactions between panel members and the audience.

## Preliminary Program Cuts Across Disciplines

While we expect most oral and poster presentations to focus on research in our discipline, technical sessions will also illustrate how we can *and do* move beyond the boundaries to advance the science of plant health.

APS committees, boards, and offices, along with APS staff and the Annual Meetings Board, have done a great job putting together this year's special sessions, workshops, and field trips. In keeping with this year's theme "Crossroads in Science," the program offers a wide range of speakers and activities that cut across subdisciplines within plant pathology

and into others. Want to know how drones can be used to track plant pathogens and improve disease management? How about using new knowledge of the microbiome to develop products effective against nematodes? They're both on the program.

## Special Sessions

Special sessions have been planned to provide the latest research on detection and containment or management of invasive/emerging pathogens, including *Phytophthora tentaculata*, downy mildews, and Fusarium wilt of banana. Applications of RNAi technology in both plant and animal systems will be featured in the special session "Advances in Gene Silencing." A special session on postharvest practices will include new research on treatments and technology to improve food safety and overcome export barriers. Climatologists, meteorologists, and pathologists will come together to present the latest on climate cycles, weather forecasting, and disease prediction. The special session on mycotoxins will feature speakers presenting their research on mycotoxin synthesis, detection, and effects on animals and people. Look for another special session on "Phytobiomes: What We Know, What We Need to Know."

## Field Trips

Several field trips are scheduled to take advantage of the unique agricultural and forest systems of southern California as well

as constraints due to diseases, pests, and the serious drought the area has experienced the past several years.

## Workshops

There will be a lot to learn in workshops. The Epidemiology Committee will sponsor workshops on multivariate statistics in R and simulation modeling, and also team up with the Evolutionary Genetics and Genomics Committee to sponsor a hands-on workshop on analysis of population genetic data in R. To round out the statistics offerings, the USDA National Agricultural Statistics Service (NASS) will provide hands-on training in the use of the extensive NASS databases in a workshop sponsored by the APS Public Policy Board.

The Evolutionary Genetics and Genomics Committee will sponsor "Design and Analysis of RNA-seq Experiments."

APS will lead a workshop on food and feed improvement technologies, including crop breeding, disease management, and molecular traits in the supply chain.

## Join Us in Pasadena

A strong program requires participation from our international network of plant health experts and you are encouraged to submit an abstract today and join us for a stimulating meeting in beautiful Pasadena, CA, this August, [www.apsnet.org/meet](http://www.apsnet.org/meet). ■



A glimpse of the bustling Poster Huddle session at the 2014 APS-CPS Joint Meeting.



Breathtaking view of sunset in Pasadena, CA.



## ATTENTION ARTISTS

# Art in Phytopathology Contest Now Accepting Submissions for 2015

The Art in Phytopathology contest, sponsored by the APS Graduate Student Committee and BASE, is designed to highlight the artwork of students and members in the area of phytopathology. Since its inception in 2002, hundreds of entries have been displayed, ranging from crochet to digital imagery to drawings. At the 2014 APS-CPS Joint Meeting, 42 works of art were entered into the competition! All of last year's submissions can be viewed at [www.apsnet.org/members/apsleadership/comm/Pages/ArtinPhytoResults.aspx](http://www.apsnet.org/members/apsleadership/comm/Pages/ArtinPhytoResults.aspx).

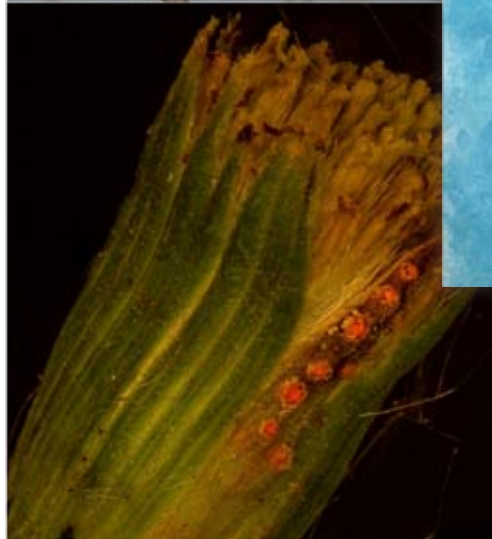
The Graduate Student Committee is now accepting submissions for the 2015 Art in Phytopathology contest! All APS members are welcome to submit artwork; graduate student participation is especially encouraged. Art in any medium is welcome, but all artwork must be submitted in a digital format. Winners will be announced at the 2015 APS Annual Meeting in Pasadena, CA, and awards will be distributed in September.

Thank you, BASE, for supporting the competition for seven years in a row!

Competition categories include Arts and Crafts, Nature, Microscopy, Digitally Altered, and Humor. Judges give each entry points based on creativity, aesthetic value, technical merit, shade and color, originality, and relatedness to plant pathology. Winners in each category are awarded a \$50 check and the best in show wins an additional \$50. Submissions will only be accepted in a digital format. Two- or three-dimensional art must be digitally photographed for online submission. Entries must be in JPEG format with a minimum resolution of 300 dpi. All artwork must be original, related to the general theme of plant disease, and have been created by a current member of APS. Each entrant may submit up to three pieces.

**TO ENTER:** Send your artwork as an e-mail attachment to [phytopathart@gmail.com](mailto:phytopathart@gmail.com). Please include your name, job title, employer address, title of your artwork, permission for APS to reproduce or publish your submission, and a brief description of your artwork (include medium, dimensions, what the art depicts, etc.). **Entries must be submitted by July 1, 2015.**

If you have any questions, please send them to **Margarita Marroquin-Guzman** ([mmarroquin-guzman@huskers.unl.edu](mailto:mmarroquin-guzman@huskers.unl.edu)) or **Elisha Allan** ([eballan@cns.umass.edu](mailto:eballan@cns.umass.edu)). ■



# Submit Your Next Applied Paper to *Plant Health Progress*



*Plant Health Progress (PHP)*, a peer-reviewed journal of The American Phytopathological Society, is a multidisciplinary science-based journal covering all aspects of applied plant health management in

agriculture and horticulture, including plant pathology, entomology, and nematology.

*PHP* is currently located on the Plant Management Network (PMN), a suite of resources widely read by extension agents, applied scientists, policymakers, and practitioners throughout the world. This makes *PHP* an excellent location for science-based information that can be applied to the field, greenhouse, high-tunnel, orchard, and other crop management venues.

There are various other reasons to submit your manuscript to *PHP*.

- Articles are rapidly published upon acceptance
- Page charges are very low at just \$100 to \$150 per article
- Manuscripts go through a rigorous peer-review process
- Content is permanently cited in CrossRef for easy linkability to other articles
- Publication of color images and even video is included at no extra charge

*PHP* is also widely promoted to thousands of researchers through the APS Research Update—and to thousands of practitioners through the PMN Update. Proceedings are promoted to the media, commodity groups, and extension channels at no extra cost.

In addition to research and reviews, *PHP* publishes diagnostic guides, perspectives, letters to the editor, and briefs documenting the discovery of new or invasive pests. *PHP* is also an excellent venue for symposium proceedings, particularly for those highlighting research that applies to the field. Submit your next manuscript to *PHP* today. Learn more and view our submission guidelines at [www.plantmanagementnetwork.org/php](http://www.plantmanagementnetwork.org/php). ■

# Let's Recognize Our Outstanding APS Volunteers

*Eric Tedford, APS Councilor-at-Large, [eric.tedford@syngenta.com](mailto:eric.tedford@syngenta.com)*

APS is a non-profit organization that provides opportunities for our diverse global community of scientists to share credible and beneficial information related to disease control and advocate and participate in knowledge exchange with the public, policymakers, and the larger scientific community.

APS is fortunate to have an excellent staff of professionals at APS Headquarters in St. Paul to ensure business gets done. However, APS is also fortunate to have a plethora of dedicated member volunteers. Much of the heavy lifting that keeps our annual and regional meetings interesting, that brings new and interesting symposia, workshops, and tours to life, and that stimulates the discussions and focus for the future come from their efforts. You know who I'm talking about. We are fortunate to have the opportunity to recognize the volunteers who go the extra distance. Now is the time to submit your nomination for the volunteers you know have really made a difference. These are the folks who lead by example and make committees productive. They bring their A-game with creativity, passion, and new ideas to improve our organization. The APS councilors-at-large want you to nominate these exceptional volunteers for the 2015 APS Outstanding Volunteer Award. This is your opportunity to honor an APS member for the hard work they do for our society. Tell us who these individuals are so APS can show them our appreciation! Submit your nomination (nominees must be APS members) via e-mail to the attention of APS Councilor-at-Large **Eric Tedford** ([eric.tedford@syngenta.com](mailto:eric.tedford@syngenta.com)) with "APS Volunteer Award" in the subject line by **May 15, 2015**.

The one-page nomination letter should be saved as a PDF document. In the nomination letter, include a description of your nominee's recent volunteer activities (within the last five years) and how the nominee excelled in the quality, timeliness, and/or scope of these activities. Current council members of APS and editors-in-chief and senior editors of APS journals are not eligible in their area of responsibility. Nominations will be reviewed by the councilors-at-large. More than one award may be given annually. For more details and a list of past awardees, visit [www.apsnet.org/members/apsleadership/Pages/OutstandingVolunteerAward.aspx](http://www.apsnet.org/members/apsleadership/Pages/OutstandingVolunteerAward.aspx). The recipient(s) will be honored during the 2015 APS Annual Meeting by APS President **Rick Bennett**. ■

## Office of International Programs

# OIP Holds Eleventh Annual Silent Auction



The APS Office of International Programs (OIP) will hold its eleventh annual Silent Auction on Sunday, August 2, 2015, from noon to 6 p.m. during the APS Annual Meeting in Pasadena. We invite members to join us for this one-of-a-kind fundraising event. To date, OIP has raised more than \$29,500 to support OIP's Global Experience Program, which aims to connect APS plant pathologists with scientists and extension personnel in developing countries in training and outreach efforts. Funds raised will support graduate students, post-doctoral associates, faculty, and staff in conducting short courses, workshops, or training programs in collaboration with a host country cooperating institution. To participate in this year's Silent Auction, we request that you gather fun and unique cultural items from around the world to be part of the auction. Popular donations in the past have included jewelry, fabric, wood carvings, books, and other items that reflect your culture or cultures you have visited. When travelling, please keep us in mind and donate your unique, cultural souvenir to a great cause. Items should be brought with you with a completed donation form (available online) or sent to **Lauren McGinty's** attention at APS Headquarters. If your organization is interested in sponsoring this year's auction, please complete a sponsorship form, available online. All auction details are available online at [www.apsnet.org/members/outreach/oip/Pages/SilentAuction.aspx](http://www.apsnet.org/members/outreach/oip/Pages/SilentAuction.aspx). ■

# Listening: The Critical Skill for Effective Leadership

Randall C. Rowe, Emeritus APS Member, The Ohio State University, [rowe926@gmail.com](mailto:rowe926@gmail.com)



When I was a graduate student at Oregon State University (back in the dark ages when we rode dinosaurs to class), **Roy Young** had recently stepped down as department chair to take an upper administrative post. The department was sorry to see him leave. It was said about Young that he could call a faculty member into his office to discuss a contentious issue and, following the discussion, the faculty member would leave with a smile on his face, the issue having been resolved. Furthermore, he/she would think that the outcome was his/her idea! Now, that is effective leadership.

So, what was going on there? First was a leader who took the time to listen to what was on the mind of those whom he was leading. Second was a leader who made a decision and put forth a plan of action based first on listening and then by adding his own experience and wisdom. Third was a leader who worked closely with those he was leading so they felt their ideas and concerns were taken seriously and who made clear that outcomes were based, at least in part, on what he heard.

We have all heard comments regarding leaders that go something like “we have a lousy department chair—he/she never listens.” So, what does that mean? It may mean that the leader in question really doesn’t listen, but just moves forward according to his/her own ideas without seeking input from those being led. However, in some cases, there are people who think that unless a leader does things the way he/she wants, they “do not listen.” These people equate “listening” with doing things their way.

When leading a group of well-educated people, like plant pathologists, the “herding cats” analogy is often put forth. Any chance of success in such a leadership role mandates that one first listen to what the “cats” are saying. This is an important first step, so they do not become convinced you are insincere in asking their opinions. If they conclude it’s only “window dressing,” then next time the “cats” are very likely to just brush you off and go their own way.

It has been said there are many paths to success, but a certain path to failure is trying to please everyone. Leaders walk a fine line between listening to what those who they are leading have to say, and accommodating all

*Listening does not mean doing whatever those you are leading say or want, but rather learning of their aspirations and concerns, soliciting their ideas and seeking any consensus that may be there, and then formulating a logical plan to achieve the visions of the group.*

these opinions. In most cases, if the leader has made clear that he/she is open to hearing input from everyone and will seriously consider each person’s views, a variety of opinions will be expressed. Listening does not mean doing whatever those you are leading say or want, but rather learning of their aspirations and concerns, soliciting their ideas and seeking any consensus that may be there, and then formulating a logical plan to achieve the visions of the group. The final decision must take into consideration not only the views of those being led, but the personal vision of the leader, and also the realities of what is being sought or demanded by those further up the leadership chain.

The challenge of effective leadership is to be acutely aware of the needs, wants, and opinions of those you lead and making it clear to the group that you are aware of these, but then to formulate policy that works to the best advantage of the group as a whole in advancing toward a common vision. It is unlikely that everyone will approve of all decisions made by a leader, but if everyone believes they “have had their say” then most will go along with decisions made. However, regardless of what approach the leader takes, some in the group may object. In my experience, to be effective, a leader must have the support of at least two-thirds of the group, preferably more. Every group is composed of those willing to lead, those who prefer to follow, and a few off on their own agenda. Recognizing that, and knowing who is who in your group, is important information for any leader.

Young had considerable interpersonal skills in working with people and was well respected for that. Working effectively with those you lead requires that you approach everyone with respect and often on their level. Former Secretary of Defense **Robert Gates** in his recent book, *Duty—Memoirs of a Secretary at War*, stated that he tried to treat everyone with the respect deserved by professionals.

“I would approach decisions by seeking out their ideas and views, by giving them serious consideration, and by being open and transparent. Everyone would know the options under consideration, and everyone would have a chance to weigh in with his or her point of view.” He also believed that “symbolic gestures have substantive and real benefits.” He “resolved to meet regularly with them *in their space*.” Instead of summoning them to his office, he “traveled to their headquarters as a gesture of respect.” He also made a point not to talk to people across his desk, which he considered “a barrier to open one-on-one conversation.” I very much agree with this approach and, when I was department chair, set up my office in such a way that I could talk with people personally without the symbolic separation of the leader’s desk.

If leaders make it well understood that they are open to talking and listening freely with those they lead, whatever decisions finally result will much more likely be accepted and embraced. Furthermore, members of the group will then be more willing to work together toward achieving the stated goals and vision. My friend, **Ray Martyn**, in a recent APS Leadership Institute column stated that “leadership is about having a clear vision and empowering others to help achieve that vision.” An important component of this empowerment is engendering in each person a belief that his/her opinions are sought in good faith and taken into serious consideration before decisions are made. In the end, effective leadership is the ability of leaders to learn and understand the needs and aspirations of those they lead and then to make informed decisions based on their own vision, experience, and understanding of the situation in which their decisions must be implemented. In this way, the group and the leader can all move forward as a team. ■



Student Degree



**Anna Leon** recently completed requirements for her Ph.D. degree in plant pathology at Washington State University. Her dissertation was entitled “Quantification and determination of

inoculum threshold levels of *Fusarium commune* in Douglas-fir nurseries.” Her committee included **Gary Chastagner** (chair), **Tim Paulitz**, **Ned Klopfenstein**, and **Lynne Carpenter Boggs**. Damping-off of Douglas-fir seedlings is a major problem in conifer nurseries in the Pacific Northwest. Recent work has implicated *Fusarium commune* as a cause of damping-off, but it is morphologically indistinguishable from *Fusarium oxysporum*, which has been shown to be less virulent. Leon developed a quantitative real-time PCR (qPCR) assay to quantify *F. commune* and distinguish it from *F. oxysporum*. She conducted greenhouse inoculum trials to determine the mortality threshold for Douglas-fir germinants and found that *F. commune* was virulent and caused mortality on Douglas-fir. Based on her results, she recommend that if a grower wishes to keep the Douglas-fir damping-off below 5%, soil should be managed below a level of approximately 500 CFU/g *F.*

*commune* or  $2.3 \times 10^{-6}$  ng/ $\mu$ l *F. commune* DNA. She also determined the disease threshold level in field nursery beds and validated the qPCR assay using infested field nursery soil. Leon will work as a nursery pathologist with Weyerhaeuser.

New Positions



**John Bowman**, senior agricultural advisor at USAID, was recently named leader for the Safe and Nutritious Foods Program Area in the Agriculture Research and Policy Office in the Bureau for Food Security. Bowman supervises collaboration between 12 global projects worth over \$100 million focused on research in horticulture, livestock, aquaculture, biofortification, nutrition, mycotoxins, and post-harvest loss. He also supervises IPM programming for USAID. In the past two years, he has given plenary speeches in Beijing, Manado, and Brisbane on USAID research

activities in horticulture and IPM and helped to organize a session on international funding opportunities at the recent APS-CPS Joint Meeting in Minneapolis.



**Jeffrey Coleman** joined the Department of Entomology and Plant Pathology at Auburn University as an assistant professor. His research program focuses on host-specific virulence factors that reside on supernumerary chromosomes in fungi. He will be responsible for instructing the departmental mycology class.

**Ray Hammerschmidt** has been named interim director of Michigan State University (MSU) extension. Hammerschmidt had been interim associate director of MSU extension since July 2014. Previously, he was the associate chair of the MSU Department of Plant, Soils, and Microbial Sciences, where his research and teaching focused on the physiology and biochemistry of plant disease and disease resistance. Hammerschmidt received a bachelor’s degree in biochemistry from the School of Agriculture at Purdue University in 1974 and a master’s degree in plant pathology in 1976. In 1980, he received a Ph.D. degree in plant disease resistance from the University of Kentucky. Hammerschmidt joined MSU in 1980 with a research and teaching appointment and conducted fundamental and applied research on potato diseases.

Award

The Iowa Soybean Association (ISA) presented a plaque to Iowa State University (ISU) acknowledging ISA’s 50-year investment of \$50 million in soybean check-off funding and their continued commitment to soybean research conducted by ISU scientists. The award was presented during the ISU versus University of Kansas men’s basketball game on January 17, 2015. The plaque was presented by the ISA president and ISA executives. Among those representing ISA was **Ed Anderson**, APS member and senior director of supply and production systems. Representing ISU were APS member and ISU President **Steven Leath**, College of Agriculture & Life Sciences Dean **Wendy Wintersteen**, and APS member **Greg Tylka**, professor and director of the newly founded Iowa Soybean Research Center at ISU.



Ed Anderson, Steven Leath, Wendy Wintersteen, and Greg Tylka

**Sang-Wook Park** recently joined the Department of Entomology and Plant Pathology at Auburn University (AU). Park’s research focuses on the role of cellular hormone signaling and redox homeostasis in innate immune responses during infectious diseases. Prior to joining AU, Park earned his bachelor’s and master’s degrees from Chung-Ang University, Korea, in 1998 and 2000, respectively, and a Ph.D. degree in plant biochemistry from Colorado State University in 2004. From 2004 to 2008, he served as a post-doctoral fellow at the Boyce Thompson Institute for Plant Research and, in 2008, was named a senior research associate at Virginia Bioinformatics Institute at Virginia Polytechnic Institute and State University.

People continued on page 38

## In Memory

**James Edson DeVay**, professor emeritus of plant pathology at the University of California (UC)-Davis, passed away on December 4, 2014. Jim was born on November 23, 1921, in Minneapolis. He joined the Navy during World War II and served as a pilot and flight instructor. As a returning veteran, he attended the University of Minnesota (UMN), receiving his bachelor's degree in 1949 and his Ph.D. degree in plant pathology in 1953. His doctoral research was mentored by **E. C. Stakman** and **John B. Rowell**, where he conducted biochemical studies of sex and pathogenicity in *Ustilago zaeae*.

After a brief post-doctoral appointment, Jim joined the faculty in the UMN Department of Plant Pathology as an assistant professor in 1954 and associate professor in 1957. That same year, he accepted an opportunity to join the faculty in the Department of Plant Pathology, UC-Davis, where he was promoted to professor of plant pathology in 1965. During his distinguished 35-year career at UC-Davis, Jim was chair of the plant pathology department and served as an associate dean in the Division of Biological Sciences. Jim received a number of honors during his career, including APS Fellow in 1972 and the E. C. Stakman Award in 2001.

DeVay was internationally recognized and respected for his research on plant-pathogen interactions, where early on he recognized the importance of knowledge of sequential interactions of host and pathogen and applied modern biochemical techniques to the study of host-parasite physiology. He researched a variety of pathosystems throughout the course of his career, and often at multiple



levels of inquiry that included basic studies of the plant-microbe interaction to applied aspects of epidemiology and disease management. Jim and his many students, post-doctoral associates, technical staff, and faculty collaborators also worked closely with growers in the field, providing information on etiology and control. His early research at UC-Davis focused on fungal and bacterial diseases of orchard crops, particularly bacterial canker of stone fruits, *Ceratocystis* canker of almond and prune, and hull rot of almond. The pioneering research of Jim and his group on *Pseudomonas syringae* led to a number of seminal discoveries, including isolation and characterization of the phytotoxin syringomycin, as well as uncovering aspects of the etiology of bacterial canker disease. In later years, he worked on the etiology, epidemiology, and management of diseases of cotton, particularly fungal seedling diseases and Verticillium and Fusarium wilts. Jim was among the first investigators to rigorously evaluate solarization for management of soilborne diseases in cotton and other crops in California. A perusal of his publications reveals the remarkable diversity of his research interests and significant contributions to plant pathology. Jim's research studies were an integral part of his teaching. For many years

he co-taught courses on fungal physiology and the physiology of host-parasite interactions, and later he brought his wealth of experience and knowledge to teaching introductory plant pathology. Colleagues who had the privilege of teaching with him and students in his classes were enriched by his enthusiasm and his historical knowledge of physiological plant pathology that was both crucial and critical because he was a big part of it.

Jim was active in APS, serving as chair of the Disease and Pathogen Physiology Committee (an early precursor to the Molecular and Cellular Phytopathology Committee) and associate editor of *Phytopathology*, as well as serving on other committees. He was also on the Editorial Board of *Physiological Plant Pathology*. He was a frequent speaker at international meetings, including the First International Congress of Plant Pathology and the U.S.-Japan Joint Science Seminar series and was on the organizing committee for the Second International Congress of Plant Pathology.

Jim retired from UC-Davis in 1992 and continued to remain active and drop by the department for many years. Jim was predeceased by his beloved wife of 67 years, Mary Alice DeVay, who passed away in September 2014, and a granddaughter. He is survived by his six children, 15 grandchildren, 12 great-grandchildren, and his sister and brother.

*Written by Richard M. Bostock, John Andrews, David G. Gilchrist, and R. Joseph Wakeman. The full version of DeVay's obituary can be found on the APS website. ■*



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## Important APS Dates to Remember

### March 2015

- 16 APS Annual Meeting Call for Papers closes
- 20 Applications due for Student Travel Awards

### May 2015

- 15 Outstanding Volunteer Award nominations due

### July 2015

- 1 Art in Phytopathology entries due

## Here are just a few of the headlines you missed from the APS Twitter feed.

NPR: California's Strawberry Feud Ends, But Who Will Breed New Berries?

<http://n.pr/1DjeQWb>

A New Look at Plant Health with Google Glass <http://bit.ly/1AxZr47>

The Chocolate Curse: Seeking a Solution for Witches' Broom in Ecuador via @nprnews Episode 601: <http://n.pr/1uYlmlI>

Little Cherry Virus Checks Reveal Extent of Disease <http://ab.co/19gcI6O>

Leaf Blotch Disease in Wheat: The Science Solution <http://bit.ly/1ESxAy0>

Research to Fight Pathogens That Infect Canola Takes Root at Rutgers-Camden <http://bit.ly/1IDHyPJ>

New Tools to Help Manage SDS <http://bit.ly/1xYwHvj>

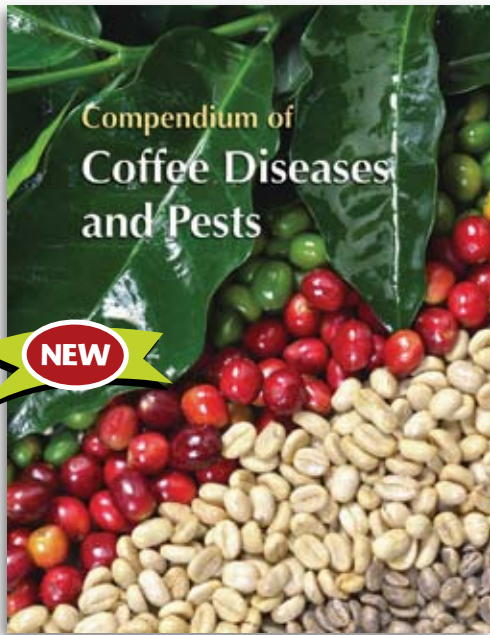
USDA: \$30 million to fight citrus greening <http://bit.ly/1vJstNG>

Race to save Britain's beloved ash trees <http://t.co/SRQaUPwwoj>

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United States of America

## Calendar of Events

### APS Sponsored Events

#### March 2015

- 11-13 APS Potomac Division Meeting.**  
Rehoboth Beach, DE. [www.apsnet.org/members/divisions/pot](http://www.apsnet.org/members/divisions/pot)

#### June 2015

- 10-12 North Central Division Meeting.**  
East Lansing, MI. [www.apsnet.org/members/divisions/nc](http://www.apsnet.org/members/divisions/nc)

#### July 2015

- 19-23 Caribbean Division Meeting.**  
Mexico City, Mexico. [www.apsnet.org/members/division/carib](http://www.apsnet.org/members/division/carib)

#### August 2015

- 1-5 APS Annual Meeting.** Pasadena, CA.  
[www.apsnet.org/meet](http://www.apsnet.org/meet)
- 1-5 Pacific Division Meeting** (in conjunction with APS Annual Meeting).

#### July 2016

- 30-Aug 3 APS Annual Meeting.**  
Tampa, FL.

### Other Upcoming Events

#### March 2015

- 8-13 2015 Gordon Research Conference and Seminar on Chemical and Biological Terrorism.** Ventura, CA. [www.grc.org](http://www.grc.org)
- 17-22 28th Fungal Genetics Conference.** Pacific Grove, CA.  
[www.genetics-gsa.org/fungal/2015/index.shtml](http://www.genetics-gsa.org/fungal/2015/index.shtml)
- 19-20 Plant Genomics Congress: Asia.** Kuala Lumpur, Malaysia.  
[www.globalengage.co.uk/plantgenomicsasia.html](http://www.globalengage.co.uk/plantgenomicsasia.html)
- 23-27 Eighth International IPM Symposium, IPM: Solutions for a Changing World.**  
Salt Lake City, UT. [www.ipmcenters.org/IPMSymposium15](http://www.ipmcenters.org/IPMSymposium15)
- 24-26 61st Annual Meeting of the Conference on Soilborne Plant Pathogens.** University of California-Riverside. <http://soilfungus.ars.usda.gov>
- 26 Climate Change and the Future of Plant Life Symposium.** Cambridge, MA.  
[www.newenglandwild.org/sym](http://www.newenglandwild.org/sym)

#### May 2015

- 11-12 Third Plant Genomics Congress.** London, England.  
[www.globalengage.co.uk/plantgenomics.html](http://www.globalengage.co.uk/plantgenomics.html)
- 18-21 CROPS 2015.** Huntsville, AL. <http://hudsonalpha.org/crops>

#### June 2015

- 8-12 23rd International Conference on Virus and Other Graft-Transmissible Diseases of Fruit Crops.** Morioka, Japan. [www.icvf23.jp](http://www.icvf23.jp)
- 16-17 35th New Phytologist Symposium—The Genomes of Forest Trees: New Frontiers of Forest Biology.** Boston, MA. [www.newphytologist.org/symposiums/view/37](http://www.newphytologist.org/symposiums/view/37)

#### August 2015

- 10-28 2015 Rice Research to Production Course.** IRRI, the Philippines.  
<http://ricediversity.org/r2p>
- 24-27 XVII International Plant Protection Congress.** Berlin, Germany. [www.ippc2015.de](http://www.ippc2015.de)
- 30-Sep 2 CCC/EUCHIS 2015.** Münster, Germany. <http://chitin2015.eu>

#### September 2015

- 14-15 Third Plant Genomics Congress: USA.** St. Louis, MO.  
[www.globalengage.co.uk/plantgenomicsusa.html](http://www.globalengage.co.uk/plantgenomicsusa.html)
- 14-16 Resistance 2015.** Rothamsted Research, Hertfordshire, United Kingdom.  
[www.rothamsted.ac.uk/resistance2015](http://www.rothamsted.ac.uk/resistance2015)
- 14-16 Australian Plant Pathology Conference.** Fremantle, Western Australia.  
[www.apps2015.com.au](http://www.apps2015.com.au)