

87th Annual Meeting
of The American Phytopathological Society
August 13, 1995, Pittsburgh, PA

Facing the Issues: A New Role for APS?

Sue Tolin

Virginia Polytechnic Institute and State University, Blacksburg.

Being APS president has been both a challenging responsibility and a rewarding experience. I view this occasion, the traditional Presidential Address, as an opportunity to convey to the membership some of my activities and the activities of the Society during my presidential year and my thoughts on future directions for APS. Recent APS plenary sessions have addressed the difficult times for science as a whole, particularly in the Land Grant University system in which so many APS members are employed and have looked at plant pathology as a discipline and questioned whether it will survive. I firmly believe we will. I also believe it is now time to look outward and to learn how to use our expertise and scientific insight in the resolution of larger issues facing science and society today. My intent is to emphasize the role that APS and its members have taken and must take in the future to influence the major issues facing science and the relationship of our science to society. I selected the theme for this year's APS meeting after considerable deliberation and many attempts to narrow the focus to a single issue. I found that choosing from the many issues that I, on behalf of APS, have addressed during the last year became impossible. When I heard the words "Facing the Issues" used in a news broadcast from Washington DC, I decided to adopt them as a theme for APS. I am pleased that a large number of the session planners for this meeting took the theme into consideration and developed programs that face many of today's key issues for APS.

My interest in facing issues comes from the time I spent in Washington DC, from 1978 until about 2 years ago, as an IPA with the U.S. Department of Agriculture under the mentorship of John Fulkerson. My experiences there in science policy, particularly biotechnology, heightened my awareness of how a scientist can play a role in providing information relative to the important decisions of the day. My primary work in Washington DC was across federal agencies as a member of expert groups developing scientific principles for assessing the risk of recombinant DNA-containing organisms and drafting guidelines and regulations for contained research and field releases. Some of you may recall my address at the plenary session of the 1987 APS annual meeting in which I described my adventures. I will give an update on more recent activities later. Although my years with the USDA are over, I cannot help but have been influenced by my experiences during the nearly 15 years I had one foot in the government and the other in my academic position. I also have had the opportunity of being a member of the APS National Plant Pathology Board. This group, chaired by past-president Anne Vidaver, has been active in facing

several issues for APS since it was formed a few years ago during George Agrios's term at the helm of APS. In these positions, I became familiar with many of the inner workings of the federal government and found there is a tremendous amount that plant pathologists do not know but need to know. There is also a great deal that plant pathologists know that people in the federal government, as well as the general public, need to know.

Now to get to the issues: what has been done by APS, its officers, committees, and members, and how we might face them in the future. It is far from an exhaustive list. To paraphrase the words of John Fulkerson—if we don't do it, it will be done for us and to us, and we probably will not like the results.

The Changing Political Scene

The past year has brought greater changes in the U.S. Congress than ever before in the issues surrounding funding of agricultural research and science in general. There is a completely new leadership in the House of Representatives, and a new committee structure with new chairs, members, and staff. There have been proposals to totally reorganize the science agencies. There have been sweeping changes within the Department of Agriculture. Although the Agricultural Research Service—home to many APS members—appears to have retained its identity, the Cooperative State Research is now joined with Extension and Education agencies in an effort to provide better coordination.

These governmental actions have the potential to greatly influence APS and its members. Establishing the National Plant Pathology Board and joining the Council of Scientific Society Presidents (4) are actions that have been taken by APS to keep the officers of the Society informed on the latest developments, and to position APS to be more informed and hopefully more influential. It is now time for members also to become active, particularly in voicing their concerns to federal, as well as APS, leadership. If we do not do it, our positions are not likely to be made and our science misrepresented.

Plant Molecular Biology and Plant Pathology

The second issue is related more to maintaining the position of APS in the scientific community. In the last year, there were significant scientific discoveries contributing to the understanding of plant pathogens and their interactions with plants. Exciting new papers on cloning and identifying disease resistance genes were published. The question is, can APS keep in the forefront on these discoveries? Can APS keep the molecular biologists and their expertise with us? This is not a new question nor a new issue to be faced. APS started, under the guidance of former president Luis

Sequeira, the journal *Molecular Plant-Microbe Interactions*. The journal continues to grow stronger and will increase the number of issues next year. Our staff at APS headquarters also is helping the cofounder of the journal, the International Society for Molecular Plant Microbe Interactions (IS-MPMI), to become a stronger organization.

I see the major issue here as: can we as plant pathologists integrate the molecular understanding we are gaining about plant-pathogen interactions into the "practice" of plant pathology? I think we can, but we have to be smart about it, in both the scientific and political sense. APS must play a role in this continued integration for the sake of the science and our discipline.

Risk-Based Regulation for Biotechnology

The regulation of biotechnology continues to be an issue. We probably all agree that smart use of molecular knowledge is likely to result in genetically engineered resistant crops or microbes for biological control. Issues related to the safety of plants and microorganisms containing recombinant DNA have been discussed in numerous meetings. To its credit, APS has held one or more sessions on this topic at each of its annual meetings since at least 1979, usually organized by the Public Responsibilities or Biotechnology Regulatory Impact Assessment committees. APS also has submitted comments on many of the proposals made by regulatory agencies in the Federal Register.

The safety issues are now clearly defined and accepted by the many nations of the Organization for Economic Cooperation and Development (OECD). Many plant pathologists, including former APS president Jim Cook, joined me in the deliberations and landmark publications of the OECD's Group of National Experts on Safety in Biotechnology that spelled out these issues. Finally, the current regulations for field testing and commercialization were discussed in the plenary session address by USDA Assistant Secretary for Marketing and Regulatory Programs Patricia Jensen. What is needed now is a continued movement toward a commercialization process for biotechnology-based plant and microbial products that is equivalent to that used for traditionally based, similar products.

Both scientific and political progress has been made. In late 1994, the first plants engineered for disease resistance were approved. I speak, of course, of the ZW-20 virus-resistant squash approval granted to the Upjohn Company this year. Many others are in the pipeline. Review of the virus-resistance case, however, raised questions appropriately addressed by the plant virology community of scientists. The APS Virology Committee has worked closely with APHIS to identify knowledgeable scientists to meet and come to a scientifically based consensus on the potential for risk. The USDA has a congressionally mandated biotechnology risk assessment research program and has funded some projects on virus-host systems. A workshop, organized by AIBS, was held in April 1995. Sessions here at this APS annual meeting will continue these discussions. I see this as an excellent interaction and a model for the way we as plant pathologists and as a Society need to continue working in the future.

We are in an era of regulatory reform, with the Administration and Congress continuing to banter back and forth. The law and the science must be balanced! APS needs to continue seeing that its science is properly represented and presented. The following statement, which I made to the Senate Agriculture Committee, is an example of an approach to facing this issue. "APS sees a need for the 1995 Farm Bill to call for State and Federal researchers, the agrochemical, seed, and ag biotechnology industries, and USDA-APHIS and EPA regulators to come together under a mandate to reexamine the quality and utility of regulations dealing with plant pests, biocontrol organisms, and genetically engineered plants and microorganisms. Current interpretations of the plant pest and pesticidal regulations are not science or risk based. Revisions are needed that consider the potential hazards of individual pests, the

internationalization of plant produce and seed industries, and the different end uses of the transported or imported product."

Regulation of Resistant Plants as Pesticides

The EPA has proposed regulating, under FIFRA, certain plant and microbial genes introduced into plants as a category of pesticides known as plant-pesticides. As proposed by the EPA, plant-pesticides are substances, together with the genetic material encoding their production, that enable plants to protect themselves from disease and insect pests. The National Plant Pathology Board and I prepared extensive comments on this proposal, which I submitted to EPA on behalf of APS. Although proposed to be exempted from any particular regulation, every resistance gene is nonetheless termed a pesticide! The proposed rule might appear to be a legitimate interpretation of FIFRA, but the question is: should APS concur with the "plant-pesticide" terminology? We chose not to, on the grounds that it is unwise to use unnecessarily alarming terminology in a pesticide-averse society. A number of objections were raised, including the fact that the proposed regulation under FIFRA is based on conjectured risk, not on fact or recognized risk. This, we predict, is likely to lead to excessive and expensive testing to meet open-ended compliance requirements. Further, the EPA proposal does not recognize that the USDA and State Agricultural Experiment stations have a system in place for plant germ plasm approval, both genetically engineered and traditionally developed. APS, through the NPPB, is working to suggest an alternative to the EPA proposal. This issue is being faced in conjunction with a number of plant and soil science societies who will hopefully sign with APS on this issue.

Is it worth it? APS has been active in addressing the issue of planned introduction of genetically engineered organisms for several years and has recently been recognized as one of the few scientific societies, together with the American Society for Microbiology, that provides worthwhile comments and has had a voice in the forefront of many debates (3). This recognition comes in part from submitting responses to Federal Register announcements inviting comments on proposed actions. They can be as much as 30 to 50 pages of three columns of fine print that require considerable time to decipher and comment on. The NPPB usually prepares a first draft, but input from any member is certainly invited.

Phytosanitary Permit Issues

There is a need for risk-based regulation of the movement and use of plant pathogens and pathogen-containing plant materials and plants. APS should work toward an agreement on accepted scientific practices for conducting research with plant pathogens. The stringency of the practices should be a measure of the assessment of actual, not perceived, risk. A Federal Register announcement appeared this year from USDA-APHIS proposing new regulations on importation and movement of all nonindigenous organisms. APS commented on this extensive proposed rule, both in writing and in a public hearing in Washington DC, stating that it was not in agreement with it and giving specific reasons why the proposal was scientifically unsound. All other commentators said essentially the same thing, some more strongly than others. Because of all of the negative comments, APHIS has withdrawn it. It is worth it! International trade issues will increasingly involve the need to demonstrate that all risks have been managed. Where plant pathogens are involved, it is important that there be a mechanism for keeping science in the decision process, despite politics. Let me give you two examples. For seed health issues, the American Seed Trade Association has been the key player in the United States in drafting a Plant Seed Health Initiative. This has come to APS Council's attention via the Seed Pathology Committee. APS as a society has not been directly involved, although knowledgeable APS members have been. I think it is legitimate to ask if APS should have a role. Should APS be setting the standards for what tests should be used or in reviewing standards proposed by others? If not, why not? And, if not, who should be?

Secondly, I was invited to meet last spring with the Eastern Plant Board in Richmond, VA. It was my first opportunity to attend one of their meetings. Conversations with the president of the National Plant Board (NPB) and other participants convinced me that APS should, in the future, interact far more with this group of scientists and contribute to dealing with the issues and problems they face. For example, the NPB has drafted a new publication, *Plant Quarantine and Nursery Inspection Guidelines*. The indication I have is that they will be involving the scientific community and the relevant scientific societies in its review. This is a welcome overture, for such interactions help APS to face this issue. Hopefully, discussions with APHIS and the NPB can extend to an issue that has been a bone of contention between many plant pathologists for years—requiring a permit for interstate shipment of all known plant pathogens. If the organism is to be used only in containment or is already well established in the environment surrounding the laboratory, it would seem appropriate to have a set of practices acceptable to all that would minimize both the potential for inadvertent release into the environment and the consequence if it were to occur. Such practices have been in place with microbial human pathogens for years.

It is gratifying that discussions have begun on this issue. There is now a system for expedited permits for plant viruses. This was achieved only through the interaction of the APS Plant Virology Committee and APHIS by a cataloging of virus incidence in each state. It is a beginning, but it is not enough. Much still needs to be done to face these issues and balance the risks with the regulations, and if the time is appropriate to modernize plant-pest legislative authorities, I think APS should support doing it.

The Role of Plant Pathology in Sustainable Agriculture

In all of the discussions on sustainable agriculture, APS should assure that in the forefront is the idea that plant disease and its management are important. We must make sure we do not just talk to ourselves about this issue. Here are a few examples of what is happening. An article, written by the NPPB as a position paper and published in *Bioscience* this spring (2), was widely distributed to the sustainable agriculture community. The Council for Agricultural Science and Technology (CAST), under Dick Stuckey's guidance, has held a series of meetings on sustainable agriculture. An AIBS/USDA meeting on the role of research in sustainable agriculture was attended by several plant pathologists and reported to the membership (5). In Pittsburgh, a symposium with the title "Pathways to Agricultural Sustainability: Issues and Opportunities" was organized by Mary Powelson and the APS councilors-at-large and division councilors. The topic was chosen by this group of elected APS councilors as their highest priority.

What I heard repeatedly as I listened to papers at the APS Division meetings this last year was the expanding number of examples of increased plant disease as the result of utilization of sustainable practices. It even whetted the interest of Philip Abelson, deputy editor for Engineering and Applied Sciences of *Science* magazine. He ultimately highlighted the biocontrol work of Jim Cook for a featured editorial (1). This was extremely important for raising awareness of the discipline. Any of you with a good story to tell should make an effort to have it published in a high visibility journal like *Science*, as well as the popular press. Only in this way will the knowledge of plant pathologists reach a diverse group of scientists and the public. APS also should continue the efforts begun by the Public Relations Committee and headquarters to make press releases available.

Integrated Pest Management (IPM)

A good piece of news for plant pathologists is that there is a new initiative for funding IPM within the USDA. Barry Jacobsen, an APS member who spoke at the 1993 APS plenary session in Nashville, TN, is directing that program now. He tells me that IPM is USDA's number one priority in terms of funding for the

next fiscal year. With Jacobsen as director, and a protest registered from several of the plant pathology department heads in the southern region that IPM should be more than just insect pests, we can better face the issue of management of plant pathogens within the context of IPM. Furthermore, the relationship between sustainable agriculture and IPM appears to be better resolved now but needs vigilant surveillance. Programs that assure the transfer of fundamental discoveries into technology for on-farm management of plant diseases are needed. They must continue to include multidisciplinary and systems-level research and educational systems to train personnel, including mechanisms for certification of professional practitioners. It is critical that expertise in disease control is a major part of integrated systems for totally sustainable, production packages. The USDA must be urged to support research on the development of alternatives to synthetic pesticides and the integration of chemical and biological approaches in modern production systems. The use of pesticides for control of survival and dissemination of plant pathogens is a concern to the public for a number of reasons, including contamination of natural waters and ecosystems and long-term effects of residues or breakdown products on plant and animal health. Pesticides are a concern to farmers and producers because of their high cost and increasingly stringent regulatory requirements. Pesticides are also a concern to plant pathologists because of the demonstrated ability of pathogens to develop resistance to chemicals, limiting the ability of pesticides to control diseases.

The knowledge base currently available on alternatives, both biological and environmental, is simply not sufficient. This is true both in high-acreage crops and in high-value, low-acreage crops. There is no way to maintain competitiveness in national and international markets if certain pesticides, such as methyl bromide, are restricted or if pathogens become resistant to pesticides. Alternative control methods are needed. New, highly effective fungicides have been discovered, but methods for their judicious use to avoid development of resistance and to minimize risk to humans and the environment have not been developed yet.

An issue somewhat related to IPM as well as to disease management and control is the Prescription Pesticide Program and its relationship to resistant varieties and to resistance management. This also has become an issue for genetically engineered resistance. Certification of plant pathologists by ARCPACS remains an issue that is just off the ground but that has great potential to change the way we operate.

Emerging Pathogens

Emerging pathogens and reemerging diseases are increasingly important in plants, just as they are in humans and animals. Agricultural crops are often grown regionally. Consequently, a localized emerging disease problem is either not recognized or is thought to be so minor as to have no effect on national or international competitiveness and so is ignored until it has become an intractable problem. In the future, we must not be afraid to talk about new diseases because of fear of economic or other reprisals. Diseases should be recognized as facts of life, and efforts for recognizing and dealing with them should be rewarded, not penalized. Emerging pathogens and reemerging diseases may be prevalent in areas where new specialty or alternative crops are grown or where new practices such as mass off-farm production of transplants are being used for economic gain. U.S. farmers must have the best technology available for preventing losses from plant diseases to maintain competitiveness. This is not a task that can be done by private industry, because there is no system comparable to human or veterinary medicine to address plant health in this nation. Quarantines and regulatory exclusion approaches are only temporary and often inadequate solutions. There should be a realization that no amount of regulation, or threat of liability, can create a "sterile environment" or a "risk-free" agriculture free from new diseases.

APS has suggested to Congress that agriculture research and education titles of the 1995 Farm Bill should include provisions for the USDA to establish and coordinate multidisciplinary teams with plant pathology expertise to recognize and address new disease problems. It is essential that the education and maintenance of trained research and extension personnel be supported in Land Grant universities and other positions in the areas of epidemiology, surveillance, and coordination of efforts to identify, track, and intervene in plant disease spread when it is initially noticed. Better methods of detecting and monitoring pathogen populations are needed, which in turn would allow better prediction of diseases and application of control practices at critical times. Better coordination and use of electronic databases on pathogen distribution also is needed. APS should explore the role it could play in this area.

APS also has called for support of systematics programs (identification and classification of organisms) and maintenance of cultures that have been isolated previously to ascertain whether a disease is caused by a new or a reemerging pathogen. Culture collections also are valuable genetic resources for comparing current field isolates with those used in disease-resistant plant-breeding programs or chemical and biocontrol programs but are grossly underfunded. APS, through the NPPB and with the help of the American Society for Microbiology (ASM) and AIBS, organized a briefing for government personnel on this and related topics of microbial diversity held at the Smithsonian Institute in October 1994.

In the current climate of Ebola virus and antibiotic-resistant bacteria, the activities of ASM make the news. Until recently, new diseases of plants went unnoticed. We didn't report them! One can envisage the scenario that if we do our job right, no one knows we do it, but if there is a new disease problem, we must have done our job wrong, or monoculture caused it, or it was imported! Somehow we have to get over this mind-set! We need to discuss these issues among ourselves, then with the public, and face the fact that plant pathogens do, like any good microorganism, adapt to changing conditions. Late blight, wheat scab, and gray leaf spot of corn certainly are being "talked up" widely. It's about time, but lets make sure the story is right.

Consideration of Plant Pathogens in Food-Safety Issues

Food safety also has been a politically hot topic in the last year, largely related to microorganisms pathogenic to humans. In fact, the first draft of a report of the Food Safety, Security, and Production Subcommittee of the National Security Technology Committee (NSTC) ignored any reference to plant pathogens. I mentioned this oversight in my review of it, and APS was included in the next version in relation to security of the food supply as well as safety. Greater details on this issue were given in testimony on behalf of APS that I gave to the U.S. Senate Agriculture Subcommittee. I stated: "Grains, fruits, vegetables, and other plant products used for human or animal consumption may appear healthy at harvest but develop disease during storage or marketing. These post-harvest diseases either ruin the product by decay or contaminate it with toxin-forming microorganisms, particularly fungi. These problems often go unreported since knowledge of their presence causes tremendous economic losses. Examples of fungal toxins include the human carcinogen aflatoxin in peanuts, toxins in maize that killed several horses in the southeastern United States in 1994, and a toxin produced by scab infection of small grains that limits grain use in bread and cereals, and in the brewing industry."

Toxic compounds in foods, resulting from fungal contamination, are documented to cause tremendous safety concerns. Yet a recent CAST report on foodborne pathogens did not include mycotoxins because (at least it was not totally ignored) they had been covered in a 1989 report. An APS press release from the Public Relations Committee was issued out of headquarters recently on

the scab epidemic in wheat and barley. It engendered a call from a CBS radio science reporter in San Francisco, referred by Headquarters to me. He wanted to know all about our organization, APS, which he had never heard of it. Of course I had to explain what our name meant. We're beginning, through the activities of the Committees and Headquarters, to face this issue and get it the attention that it warrants.

Education and Communication in the APS Future

A large number of our members are university based and, as such, are in the research/teaching infrastructure of Land Grant universities. APS has begun, and must continue, programs and activities of the Youth and Teaching committees. It is important that our subject is taught at all levels. The book from the Youth Committee on lab exercises with plant pathogens published by the National Association of Biology Teachers was extremely well received. Paul Tooley tells me that this year the hands-on workshop sponsored by the Youth Committee has had to turn teachers away—the room only holds 30. This is great! We need to take this show on the road to meetings, as well as have them come to our meetings. We have an attractive biological discipline that is scientifically challenging, critically important to the world, and attractive to students with an interest in biology. But what about getting jobs for them! Why is it that we have to tell these students its going to be hard to make a living as a plant pathologist! We should keep in mind, however, that whether these students can ever become plant pathologists, it would be wonderful to be in a world where a few more people don't think we live in a sterile environment and that all food comes from the local grocery store.

To face this issue, APS must continue to look at new avenues for the outlet of our science. Perhaps jobs in the future will not be "in our image" as researchers and teachers, and we should consider stopping training graduate students for jobs that won't be there in the future. Perhaps in the future, many of our APS members will be private practitioners and certified crop consultants, and they will be using new ways to deliver the knowledge that other members generate. We must get the word out there! As a scientific society, we have made a great beginning with APSnet and our publications. Our journals and APS Press are the envy of other societies. I challenged the Electronic Technology Advisory Committee when I met with them in June to make APSnet the same high quality and linked as far and wide into cyberspace as we can. All those surfers on the World Wide Web need to find us and ask us what is wrong with their plants, instead of settling for some of the answers I have seen. We need to find where the questions are coming from on diseases and other areas related to our expertise and explore these sources as new markets. One of the things I made a point of doing as APS president this past year was to participate in a number of meetings in which presidents of scientific societies were invited. The American Association for the Advancement of Science, the venerable AAAS, called two meetings of heads of affiliate societies in 1995. The first, held in conjunction with their annual meeting in Atlanta, drew over 150 society representatives who had a rousing discussion that concluded with many lamentations that "someone really has to do something". Rita Colwell, current AAAS president, organized a follow-up, 1-day meeting in Washington on 26 June that I also attended. The bottom line is that our impact as scientists will be greater if groups circle the wagons and fire out, instead of inward. At the AAAS meeting as well as the CSSP sessions, there has been a concerted call for scientists to communicate and give information, not just to ask for money.

APS has become more active. I have participated actively in the Coalition for Funding Agricultural Research Missions (CoFARM) and in the informal Plant and Soil Science Societies Forum, which consists of the agronomy and horticultural professional societies, plant physiology, entomology and weed science. It meets often in conjunction with the CSSP meetings or those called by the Na-

tional Research Council's Board on Agriculture. These groups have effectively replaced the old Intersociety Consortium for Plant Protection. APS also has been active in other groups related to science education.

Coordination of all of the outreach-related activities is becoming increasingly difficult and demanding of the president. APS is usually represented by individual members appointed by Council or by elected officers. They have little opportunity to talk to each other and to reach a consensus on what APS positions should be on issues as they come to the table. Randy Rowe when he was APS president initiated discussions on the need for coordination and proposed an Office of Public Affairs and Education. Council has approved the office and is in the process of reorganizing the activities of the Public Relations, Public Responsibilities, and Youth committees and some efforts of the NPPB into this office. Others committees, including Regulatory Plant Pathology and Extension, have asked to be included. It is becoming clear the office will encompass many activities of APS in the future, so Council is proceeding carefully to achieve the proper structure.

One problem, undoubtedly, will be the resources that will be necessary to make this work. By way of historical reflection, I present to you some figures from the 1964 Annual Report of the Society. At that time, member dues were \$12, of that \$3 was arbitrarily credited to APS activities. Meeting registration was \$6, and the contribution suggested for Sustaining Associates was \$100. Of this, \$1,500 was budgeted to the Public Relations Committee and \$2,000 to the Program Committee for the annual meeting. Although we are certainly in a different era now, I challenge the Financial Advisory Committee, as well as the APS Foundation

and the membership, to find a way to support the promotion of our discipline.

I see APS as the focal point for the discipline of plant pathology in the United States, a statement that appears in the APS Strategic Plan. I see APS continuing to grow and becoming stronger in the future. Our 5,000 and growing members certainly shows that it is happening, but to be effective, we have to find new strategies and have the structure and individuals to do it. We have to make our science known, to make our priorities the priorities of the public, the department of agriculture, the science agencies, and, most importantly, because they have control of the federal dollars, Congress! The mission of APS, in our Strategic Plan, is to promote the science of plant pathology and provide information and technology to those interested in the health of plants and the environment. I believe that in this age, promotion by facing the issues is increasingly important.

LITERATURE CITED

1. Abelson, P. A. 1995. Plant pathogens in soils. *Science* 269:1027.
2. Cook, R. J., Gabriel, C. J., Kelman, A., Tolin, S., and Vidaver, A. K. 1995. Research on plant diseases and pest management is essential to sustainable agriculture. *Bioscience* 45:354-357.
3. Huttner, S. 1995. Government, researchers, and activists: The critical public policy interface. Pages 459-493 in: *Biotechnology*. 2nd ed. Vol. 12. H.-J. Rehm and G. Reed, eds. VCH, New York.
4. Madden, L. V., and Tolin, S. A. 1995. APS joins CSSP. *Phytopathology News* 29:27.
5. Neher, D., and Powelson, M. L. 1995. Workshop on research in support of sustainable agriculture. *Phytopathology News* 29:11.