

Questionnaire on Advocacy Targets (sent out in October 2016)

The APS Public Policy Board is identifying the primary advocacy targets to focus on in the next few years and would like your input. We are looking to identify timely issues that would be considered as high priority for research funding and/or societal change.

In what areas should APS advocate for new funding in the upcoming years? What APS research areas would you identify as potentially impactful and compelling? What are major concerns/themes affecting plant pathology, or agriculture in general, that you would like addressed by the APS Public Policy Board?

Results (533 respondents) – each respondent could select two

Code	Answer	%	Count
1	Addressing emerging pathogens and the global movement of pathogens	29.3%	156
2	Climate change research with respect to plant productivity & health	22.1%	118
3	Continued improvements in disease management and control	19.3%	103
4	Public education of genetic technologies for pathogen control and plant improvement	14.6%	78
5	Safeguarding our food systems/food supply	12.4%	66
6	Phytobiomes as a systems-approach to agriculture	11.3%	60
7	Enhancing our capacity for bioinformatics and sharing/using big data in agriculture	10.3%	55
8	Ensuring the long-term success of the National Plant Diagnostic Network	9.8%	52
9	Ensuring the continued use of chemicals to control pathogens/Chemical control of plant diseases	9.6%	51
10	Educating the public about sustainable agriculture and food systems	9.2%	49
11	Ensuring the health of our soils	8.1%	43
12	Career opportunities in plant pathology	7.8%	41
13	Professional development for applied and extension careers	7.3%	39
14	Long-term support for microbial culture collections	7.1%	38
15	Increasing interdisciplinary training opportunities in Plant Pathology	6.9%	37
16	Enhancing and maintaining diversity in the agricultural workforce	2.4%	13
	Other (please specify):	12.6%	67
	Total	100%	533

We also received many other comments that could be classified into the following topical areas:

17	Advocating for continued support for extension and outreach
18	Ensuring crop diversity
19	Seed diagnostics
20	Improving research opportunities in agriculture
21	Increasing the focus on organic agriculture
22	Increasing the focus of APS on global agricultural problems
23	Improving state support for plant pathology
24	Other comments
25	Comments on the survey

Complete comments (grouped by topic)

1 Addressing emerging pathogens and the global movement of pathogens

- 1 Professional support for phytosanitary measures and diagnostics, and the restriction of pathogens on plants sold for planting, is of utmost importance. Please support all measures that restrict inter-continental movement of pathogens.
- 1 "Global movement of pathogens" may in principle also cover the pathways, with starting materials (seeds, cuttings, (even) tissue culture material, roots, bulbs). This is a complex and important issue. Starting material is moved world-wide for breeding and for production purposes. The benefits for society are important, but the risks of spreading pests via this pathway can be a threat even to food security.
- 1 Addressing the introduction of plant pathogens to new states through the sale of infected produce. if the produce is discarded because it looks 'spoiled" spores can move into weeds and fields and establish themselves. As one example, I bought downy mildew on lettuce last winter at a local grocery store. We have lettuce growers in the state but not downy mildew and a lot of growers are concerned that diseases are introduced in that way. When I contacted out state agriculture and food department, there was no interest.
- 1 Sustainable food production system will have to rely on sustainable pest management approach. Pest identification and management research should be on the priority list. Safeguarding our natural resources from invasive and endemic pests will continue to be a challenge and necessary actions to overcome it should also be on the priority list.
- 1 Emerging pathogens: e.g. Wheat blast now a big issue in Bangladesh, risk to spread beyond? How to control? Breeding efforts? - potential to collaborate with other organizations, e.g. CIMMYT, IRRI....
- 1 Creating public and academic awareness of regulatory quarantine policies safeguarding introduction of new plant pathogens and pests in the US agriculture.
- 1 Climate change and invasive species prevention to sustain forests/natural resources
- 1 Pathogens transmitted through starting material, esp. seeds

2 Climate change research with respect to plant productivity & health

- 2 I think that a focus on the impact of Climate Change on Plant Disease should be a higher priority than it is right now. there is money being distributed to various Universities and that is good but the APS does not have a prioritized strategy or support. this effort should be supported strongly by the board with a regular update in Plant disease on a quarterly basis. the NE is going to be dealing soon with higher T, higher rainfall, shorter growth seasons- how will the ag growers have the new information, varieties and disease control programs to deal with the changes that will appear in the near future. My findings are that some researchers are doing some good basic research but the society is not looking at the real impact over time on the needs that should be addressed.
- 2 Problems 1) Water shortage worldwide 2) Climate Change 3) Microbial Ecology Plant and plant yield.. System Sustainability
- 2 Although I think climate change is important, it is exceedingly hard to do good research in this area because climate change is multi-factorial and experimentally hard to study.

2 Climate change is an unfortunate banner for funding by government for what was an old banner of pollution control. Its unfortunate that the professionals in science disciplines can distinguish the difference. Climate change, global warming and now a disproportionate amount of funding for this political pork fest. I am embarrassed to see who is lining up at the trough. Climate changes occur due to cosmic modulations in Earth's orbit, gargantuan geological changes in the crust - volcanoes, huge forest fires, ocean temperatures changing in primary currents as a result of all of the factors I have described and others. Man made changes may have been more influential when London was a sooty mess in the early 1900's and now areas like China, Russia, India and third world countries where massively devastating pollution events occur are where efforts should be but the objective is not the tool of political fools to misdirect government funds and taxes to satisfy politicians who misuse this campaign. Very sad for biological science and in 20 years those who rode the bandwagon will be looked upon as fools for the politicians.

3 Continued improvements in disease management and control

3 Increase Disease Resistance of Plant Varieties/Hybrids

3 Disease management should be taken up in an Integrated approach. Now, public is more conscious on their health and are coming forward for growing crops especially vegetables for their house hold needs. Hence awareness may be provided on how to manage diseases at the onset itself using nonpesticidal approach. Prophylactic use of safer non synthetic pesticides may be encouraged. For commercial farmers, the importance on the selection of healthy & resistant seeds/ seedlings, maintenance of plant and soil health and constant surveillance for disease and pests should be advocated. The global change in climate aspect also need to be seriously taken cared off. Scientific studies on the actual metabolites of microbes present n various organic based preparations/ botanicals need to be identified and formulations need to be prepared as substitutes for chemical pesticides. Constant awareness to public and farmers is an absolute necessity.

3 plant disease comprehensive control based on disease prediction, resistant cultivar utilization, and various physical and agricultural measures.

3 In addition to the above, CRISPR-Cas 9 and other genetic tools for disease control....moving from research to field-level trials and regulatory approval, particularly with regard to invasive pathogens that are too expensive to control with traditional methods on a massive scale.

3 Find alternative means for crop disease control in order to reduce/eliminate the use of toxic chemicals

3 Priorities should include research to inform strategic decisions for disease management (Policy, research priority) which have large and long term impacts

3 Exploring other alternatives in controlling pathogens - using biologicals/biopesticides or Plant Growth Promoters (PGP)

3 Nanopesticides, Nanofungicides

3 Sustainable plant disease management

3 Enhancing host plant resistance as a tool for disease management

3 Scope and possibility of indigenous organic based methods for integrated disease management

3 Intelligent automation in Agriculture and disease control

3 Plant translational research in disease resistance

3 Biological control

3 Small Farm IPM

3 Biological control/ sustainable control management

3 Reducing the use of toxic pesticides/herbicides and antibiotics and protect water supply from toxic chemical contamination

3 Management of plant diseases using organic compatible approaches

3 Educating growers on the use and biology of biofungicides

3 Current status and prospects of Agbiotech to control plant pathogens

4 Public education of genetic technologies for pathogen control and plant improvement

4 Understanding both sides of the GMO debate--that of Plant pathologists (APS & ISPP) and the public.

4 I have discussed a proposal for a label for use of GMOs under otherwise organic conditions with the potential able GMOrganic. The reason I think this is important is that Plant Pathology is being held hostage by non-scientific based groups. This is a powerful tool and we can't sit to the side and allow it to be unused based on prejudice. Now that GMO labeling is mandated, attempting to establish another category of GMO label might not be so hard. The reason to connect to organic is that it would aid progressive organic growers to more easily produce crops without pesticides and it would associate GMOs with purity and healthy food. I would be very happy to discuss this idea further and take an active role if I could be helpful. I have discussed this idea with Jim Cook, Dennis Gonsalves, as well as a bit with Rick Bennett, they thought it was an interesting idea. Obviously this is an idea that needs more discussion and careful handling, but it is something that could help break the impasse of public resistance to GMO without scientific foundation. Thanks, Scott Gold.

4 We also might want to promote genetic engineering approaches to controlling plant diseases. I believe these will become more feasible and have real potential to control plant diseases with minimal environmental impacts. Educating the public will be important for their application. Of course industry needs to do that too but I think APS needs to take a stronger position and provide more education in this area.

4 APS members and the public need a better understanding of the potential for protecting the global food supply with genetic technologies such as CRISPR/Cas9, zinc fingers, RNA interference, etc. It's human nature to fear what isn't understood. Anti-GMO activists are exploiting this to impede these advances in our science. APS members can provide the information needed for science-based decisions.

4 These are all good targets. I've made my selections but certainly can support just about anything chosen. I personally work in the area of " Public education of genetic technologies for pathogen control and plant improvement" so I did not choose that one out of a conflict of interest, but that topic is also important and worthy of attention.

4 So many people have little or no real understanding of how genetically modified plants affect their health. There are so many misconceptions regarding the safety of anything that is genetically modified and better education of the general populace would make our food supply more available to millions worldwide. Global climate change is happening for whatever reasons and with it pathogen and crop ecology will be modified. New crops and varieties and innovative disease control mechanisms should be a primary goal of agricultural research.

4 These are all very relevant topics for public policy. I believe education on GMOs are one of the most critical features that we can promote, as many of the pathogens that we study can best be controlled through use of genetic modification of crops (either through traditional trans gene approach or CRISPR approaches. We are have lots of global trade; focusing on prevention of importation of new pathogens is critical to reduce the disease stress on our national food supply.

- 4 All professionals in the field need to be more active in countering false information related to ag chemicals, GM crops and other critical components of the IPM toolkit so that fear-mongering doesn't cut agriculture off from the tools it needs to practice sustainable ag in the safest way possible.
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- 4 Genetic modification for disease tolerance/resistance, and international acceptance of GM technology
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- 4 Evolving regulatory landscape to commercialize genome editing crop plants
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- 5 Safeguarding our global food systems/food supply**
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- 5 More effort should be made to safeguard our food system and food supply and this should be the number 1 priority for APS's advocacy target.
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- 5 The vital role that Plant Pathology plays in ensuring our ability to provide a sustainable world food supply
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- 5 The risk to global peace caused by food insecurity in developing countries
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- 5 Building international links for coordinated approaches to plant health
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- 5 Enhancing international cooperation for global disease management and food security
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- 6 Phytobiomes as a systems-approach to agriculture**
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- 6 Phytobiome approach will be the most productive area of research resulting in improved crop protection during the next decade or so.
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- 6 Most of the research focus is to study the function and mechanism within a plant or a cell or a pathogen, however, plants are constantly interacting with microbes, pathogens, insects, and other parasitic plants. The communications among the interacting organisms are largely overlooked. Modern technology has advanced to a level that could make it possible to track and study such communications happen cross-kingdom or cross interacting organisms. So it is time to shift our focus to this largely overlooked area.
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- 6 We need to start treating agricultural production sites as ecosystems. we have found tha 1/3 of most farms produce very high yields, 1/3 produce an average crop and 1/3 under perform. If we can fix the poor zones we can increase agriculture yields in a major manner at much reduced costs. There is excellent correlation between the phytobiome and yield response but we do not what is driving this. It is related also to soil health as the same cultivar is being grown and climatic conditions do not seem to be a factor.
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- 6 Understanding plant nutrition as a means to suppress plant diseases and pathogens. Understanding soil microbes and their relationship to plant diseases.
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- 6 Integration of new tools to measure and monitor the pathogens as part of systems research
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- 6 As "plant doctors", It seems intuitive to have APS participate in a broader OneHealth disciplinary collaboration with our contemporaries in the medical and veterinary fields. OneHealth already encapsulates many of the advocacy factors noted above. We certainly contend with pathogens of emerging (and established) concern, mycotoxins, and in some cases, select agents. All are either direct or peripheral threats to public health, food safety, and economic prosperity. APS could be the inaugural (plant-based) signatory to a OneHealth agenda. We could subsequently organize a coalition of other plant-related organizations - ESA, ASHS, WSSA, and the Tri-Societies. What better way to raise the profile of our field and highlight the fluidity of plant/human/animal health? I feel that this would be more impactful than past initiatives. As an immediate past member of OPRO, I have raised this issue with Nicole Donofrio. I'd certainly be willing to assist in whatever capacity necessary: Tim Durham (tdurham@ferrum.edu) <http://www.onehealthinitiative.com> <https://www.cdc.gov/onehealth> https://www.cdc.gov/ncepid/dhcpp/one_health/index.html |
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could find one paper linking plants to OneHealth:
<https://www.ncbi.nlm.nih.gov/pubmed/20391392>

6 I would like to see less emphasis on phytobiomes; this initiative really hijacked support from different other important topics and only benefits a very small core group. I particularly dislike the Phytobiomes alliance's role in the process.

6 **Cross-organisms and cross-kingdom communications**

6 Development of risk management systems that integrate decision support aides into a systems approach

6 The developing world ecosystem must get the major focus.

6 Biofertilizations with microorganisms such as *Trichoderma* sp and mycoeehixa arbuscular

6 OneHealth

6 Connecting healthy soils and healthy plants to human and environmental health (NIH funds?)

6 Understanding the host-pathogen interaction leading to resistance or susceptibility in major crop diseases

7 Enhancing our capacity for bioinformatics and sharing/using big data in agriculture

7 No comments

8 Ensuring the long-term success of the National Plant Diagnostic Network

8 Advocating to ensure the long-term success of the National Plant Diagnostic Network is in my opinion an absolute necessity. 2016 <http://apsjournals.apsnet.org/doi/abs/10.1094/PD-90-0128>
2014 <http://apsjournals.apsnet.org/doi/abs/10.1094/PDIS-08-13-0876-FE>

8 The NPDN is a vital network for detecting and tracking high risk/priority pathogens. The network also allows diagnosticians to stay in touch in order to quickly and accurately identify pathogens and pests.

8 Both NPDN and culture collections are infrastructure and should be supported as long-term investments where the benefits are acknowledged to be at some distance from the investment.

8 Advancement in rapid techniques for plant pathogen diagnosis will be important for addressing emerging pathogens and limiting global movement of plant pathogens. Continued funding of the NPDN is essential to this goal. Microbial culture collections are an extremely important resource for aid in documenting new or emerging pathogens or clarifying relationships among microbial pathogens, but their importance is often overlooked. If our professional society does not advocate for them, no one else is likely to understand their importance.

9 Ensuring the continued use of chemicals to control pathogens/Chemical control of plant diseases

9 Since 1963, Rutgers University IR-4 Project Headquarters has been the major resource for supplying pest management tools for specialty crop growers by developing research data to support new EPA tolerances and labeled product uses. As Fungicide Coordinator of Rutgers University IR-4 Project Headquarters, one of the major disease issues that has been facing growers throughout the U.S. has been bacterial diseases of various crops. IR-4 has received many Project Clearance Requests (to conduct residue and/or efficacy studies) for these needs. Over the past couple of years, the need for products to control bacterial diseases has increased. IR-4 has conducted or is in the process of conducting a number of residue and/or efficacy studies to support the registration of various antibiotics. IR-4 has also made two recent submissions to EPA: -A submission for streptomycin use on grapefruit to control citrus canker and streptomycin use on tomato to control bacterial spot and speck in January 2013 -A submission for kasugamycin use on cherry for control of bacterial canker and kasugamycin use on walnut for control of walnut blight in February 2016 EPA has communicated that these submissions must be reviewed by EPA, CDC and FDA as a joint effort. Since the use of antibiotics is becoming more restricted in both human use and animal agriculture, it is understandable that antibiotic use in plant agriculture is also being evaluated more carefully. However, registrations for antibiotic compounds on several plant commodities have been delayed for some time now. Because of this, growers have little or no tools to combat bacterial diseases on their crops. This is resulting in the loss of many crops. IR-4 and others believe that **a new policy for registration of antibiotics in plant agriculture** should be established for antibiotics in plant use at EPA, CDC and FDA. We are hoping that this may lead to a path forward in obtaining registrations of these compounds in the future. This past week, Dr. Jim Adaskaveg held a meeting to present the plant agriculture antibiotic issue and possible strategies that can be implemented in order to obtain registrations of antibiotics in plant agriculture. IR-4 would really appreciate if APS Public Policy Board can provide support along these lines.

9 **Educating the public about the excellent safeguards in our chemical registration system**

9 **Antibiotic use in plant agriculture**

9 **Approaches to minimize the development of fungicide resistance**

10 **Educating the public about sustainable agriculture and food systems**

10 Just to be clear, "sustainable" does not mean "Low input" or "organic." The educational aspect should teach that intensifying agricultural production with modern technology is a way to both feed more people and maintain uncultivated land in a natural state to protect critical biodiversity.

10 The general public has a poor understanding of agriculture production. Many of the topics listed above are related to that general topic, but developing tools to communicate with the public about the benefits and safety of new genetic tools for improved plant health is important. Too many pseudoscience studies are misinforming the public.

10 Educating the public and supporting research about differences between sustainable and organic systems and risks associated with organic. For example one study from Australia showed more environmental damage from organic fungicides on grapes than conventional, but lamented (accurately) that there has been very little work to compare this to on impacts of organic practices and pesticides on the environment. Similarly, little has been done on the health effects, impacts on pathogen populations, and environmental impacts of not screening for mycotoxins and organic pesticide residues in organic food and feed. For example, research has been done on how conventional pesticides break down in composting, but little has been done with organic pesticides (e.g. coppers, which would be expected to have a long residual).

10 We need to address science in the schools, science in public discourse, science in public policy. We are otherwise doomed.

- 10 The struggle to inform the general public about the importance of agriculture is frustrating. This endeavor needs the help of professional, upright public relations experts ("attention masters") to help scientists put forth our message in reputable and honest ways that outshine the more underhanded, secretive and nefarious methods that advertisers and greedy profiteers use to sway public opinion.
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- 10 Educating the public about sustainable agriculture and safe storage of food materials, free from storage fungi that lead to production of hazardous toxic chemicals is an important area of study and relevant for a country like India. The preliminary research carried out by me in different food products viz. agri products, edible forest products, medicinal plant produce and tree borne oil seeds, indicate higher concentration of aflatoxin B1 (one of the hazardous mycotoxins) in the stored products.
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- 10 It was really difficult to select just two from the list above! I didn't specifically select this from the list, but there is obviously a huge gap in the work that we do as plant pathologists and what the public understands about us and agriculture in general. I think a focus on making our field more visible and getting regular people to understand why plant path is so important is also a really great way to go. Thanks for what you do, PPB!
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- 10 I find it appalling that APS has done so very little to increase the awareness of the general public about the very existence of plant pathology as a scientific discipline. For more than 45 years I have observed our profession waning in terms of public awareness and interest in what we do. For all of my career, and personal involvement in our Society, I have been a consistent proponent of bringing in young people at the high school and even middle school levels for the simple purpose of introducing them to our profession and the sciences that underpin it. I have seen precious little follow through from our leadership toward this objective. I firmly believe that our very existence as a scientific endeavor is unsustainable if this trend toward ignorance continues. Never mind all the fluffy air-headed issues listed above. Get out and interact with the young people who should constitute the future of our profession.
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- 10 One of the most important activities that APS can do is the outreach to the public and persons in government about our successes and importance of our work to agriculture and the well being of our citizens. Most do not know what we do!
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- 10 We need those who fund human health work to recognize that funding work that improves soil and food quality and food systems is necessary to fully address human health challenges.
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- 10 There are two areas that are a drag on being plant pathologist. After over 125 years as a profession, most people do not know us and what we do. The second is that 95% of the population are scientific illiterate. Most people are good consumers when it comes to cars and appliances. If it is a scientific concept, they do not know how to be good consumers. They usually do it like a religion, blind faith. They do not know how to be objective and to be impartial. With the benefit of the internet, falsehoods can be kept alive but it is easy to find the truth. A promotion to recognize plant pathologist occupation and how to do the scientific method, would help us. This would open up more research and funding for plant pathology. How can one get funding if your profession is unknown. They definitely will not fund plant pathology if they never heard of it. Funding plant pathology looks like the wasteful congressional spending grants one hears on TV. Most people think that if you are organic farmer, there are no pest problems. This is not helping the field of plant pathology. I guess after 40 years, I am tired of explaining my profession.
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- 10 All the areas are important, but the two selected are usually in crisis mode. Another need is to educate high school students about careers in plant pathology and what we do as plant pathologist.
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- 10 We need to address public understanding of science in general.

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- 10 Educate young people about the very existence of the science & profession of plant pathology
- 10 Plant pathology education and research at primarily undergraduate institutions
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- 10 Communicate the contributions and impact of plant pathology to the grand challenges of today.
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- 11 Ensuring the health of our soils**
- 11 No comments
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- 12 Career opportunities in plant pathology**
- 12 Enhancing opportunities for mid career professionals to diversify their careers and develop security.
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- 12 Job that are being closed need to be kept open to maintain our current state or else fewer students should move through training
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- 13 Professional development for applied and extension careers**
- 13 No comments
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- 14 Long-term support for microbial culture collections**
- 14 microbial culture collections are at risk of being lost. An advocacy strategy is needed for long-term preservation of culture collections is needed.
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- 14 NGS techniques which depend on maintaining culture collection for reference.
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- 15 Increasing interdisciplinary training opportunities in Plant Pathology**
- 15 All targets listed are important. I have checked off the ones I felt are essential. Combining plant pathology and plant breeding efforts and training more plant breeders with strong background in pathology can be another target.
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- 15 The ultimate success of agriculture to meet the staggering needs that are projected will hinge heavily on adoption and adaptation of new technology. However, one aspect of much of new technology is that its successful use will be dependent on a greater knowledge base to apply it in the field. We need more people in the professional ranks who have a deeper understanding of plant pathology and its impacts and interactions within production systems. Thus, more high level interdisciplinary education programs are needed to develop this interdisciplinary professional expertise and complement the current graduate programs that focus on narrower disciplinary research.
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- 15 Strengthening the capacity of Plant Pathologist on interdisciplinary training and find the role of Plant Pathologist in the globalization of agricultural trade and sustainable agriculture.
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- 15 Strongly encourage interdisciplinary collaboration/cooperation at the advocacy level. United voices are more effective on a national basis. Build additional linkages with groups such as AAAS
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- 15 While my formal training is as a plant pathologist, I have spent my career the last 35 years as a crop consultant. Production, and productive, agriculture requires that we integrate and apply all extant knowledge to the task, not only disease control. Plant pathologists are uniquely qualified to improve production of food and fiber in the field because of their solid background in plant physiology and appreciation of climate effects on plants (and pathogens of course). Interaction with, and appreciation of, other disciplines such as soil science and fertility are needed.
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- 16 Enhancing and maintaining diversity in the agricultural workforce**
- 16 Although maybe not a specific issue for PPB, but want APS to plan and conduct meetings in locations that are ACCEPTING of the diversity embodied in our membership. States with laws that allow inequality should not receive our funds, which are generated by the diverse membership.
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- 16 Enhancing diversity in the agricultural workforce, what part of it?. According to a gap representation by Boston Consulting Group, 2013, the women in science gap arises as early as Bachelor level and continues throughout the scientific career. UNESCO Data for US, UK, France, Germany, Spain Japan and China, indicated that in High School males represent 51% and females 49%. BSc completion: males 68%, females 32%; top academic achievement: 89% males and 11% females. Women on boards of major scientific institutions in the US is 27%, is selection from academic institutions? Organizational change takes time, Academia may not be so agile in this change, APS is doing better. Another area where I see need for change is the unspoken age barrier in hiring at academic institutions, women who have taken time to have children may be more affected.
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- 16 Promoting gender equality in plant sciences and other STEM fields, locally and globally.
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- 17 Advocating for continued support for extension and outreach**
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- 17 Obviously, many of the above listed advocacy targets are appropriate and needed, but in my opinion we need to focus for a few years on the following: 1) Advocating for Extension Plant Pathology and its needs, 2) to more effectively communicate the contributions and impact of plant pathology at all levels (National, State and Local/Institutional levels), and 3) Continue support for increased funding for agricultural research, but with emphasis on the needs of the breadth of plant pathology from the molecular to the farm levels. Keep up the good work and best.
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- 17 Focused advocacy and support for Extension/outreach of Plant Pathology
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- 17 Applied research
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- 17 Collaborative grant funding with Research and Extension across state lines
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- 17 Focusing on applied agriculture. Highlighting Extension work and the work with growers and the associated Industry. I strongly feel that APS has gotten too molecular!
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- 18 Ensuring crop diversity**
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- 18 Ensure genetic diversity in our crops, preventing bottlenecking of our seed bank due to patented genetic modifications
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- 18 Crop Wild Relatives (mining genebank collections of wild species related to crop plants for useful traits...like adaptation to biotic and abiotic stresses)
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- 19 Seed diagnostics**
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- 19 The phytobiomes initiative has shown the potential of next-generation sequencing (NGS) to reshape agriculture in the 21 century. One of the most exciting application of this technology (NGS) is in seed health testing. As mentioned by other colleagues, the movement of plant pathogens throughout infected seeds is a big concern and represents an important challenge facing modern agriculture. My suggesting is to invest massively in projects related with the usage of next-generation sequencing (NGS) to improve seed health testing sensitivity and specificity. NSG will also help us to develop new molecular tools capable of measuring the aggressiveness of seedborne pathogens and its influence on seed quality utilizing "seed health biomarkers". Thanks, rpedrozo@ksu.edu
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- 19 Next-generation seed health testing: using metagenomics for identification of "pathogenic activity" in seed lots.
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- 19 Increasing sensitivity and specificity of seed health testing methods using next-generation sequencing
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- 20 Improving research opportunities in agriculture**
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- 20 Research funding trends and support of junior faculty are other topics that warrant consideration.
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- 20 Funds toward tackling plant parasitic nematodes was declined tremendously in the last few years and should given more attention to this in the coming years.
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- 20 I think APS needs to pay careful attention to new funding trends at the nexus of food, energy, and water (e.g., the RFPs from NSF and USDA). The movement of pathogens from aqueous environments (natural and managed) is a hot area for research right now.
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- 20 1. interdisciplinary studies of biological control of weeds to deal with the problem of herbicide resistance. This is a good area to combine forces together between pathologists and weed researchers. 2. to deal with the emergent problem/issue of ergot disease on wheat. Egyptian government has rejected contaminated wheat grains with ergots..
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- 20 Control of Fusarium Wilt in Bananas
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- 20 issues include Fusarium dieback (PSHB), Foamy bark canker (western bark beetle), Thousand canker of walnut (twig beetle), citrus HLB, Lethal yellows and TPPD palm, pitch canker pine (various beetles), beech bark disease (scale), Laurel wilt (ambrosia beetle), oak wilt (sap beetles).
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- 20 This insight into the host-pathogen interaction would lead us to explore sensible strategies to combat pathogen in major crop plants.
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- 20 **Fundamental research on plant-pathogen interactions**
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- 20 **Fundamental understanding of host-pathogen interactions**
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- 20 **Increase funding to support agricultural research**
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- 20 **Enhancing knowledge within the plant pathology community to new technologies that can be applied to their field of study**
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- 20 **Vectors of plant pathogens**
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- 20 **Greater need for research with insect vectored pathogens**
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- 20 **Food Safety and human pathogens interacting with plant pathogens**
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- 20 **Phenomics (high throughput plant phenotyping...including plant disease resistance phenotyping)**
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- 20 **Sustaining research on specialty crops**
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- 20 **Increasing research on PAMP triggered immunity in plants**
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- 20 **Geospatial sciences for plant health**
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- 21 Increasing the focus on organic agriculture**
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- 21 More focus should be on organic food production
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- 21 As organic farming is the fastest growing sector of today's agriculture, it is an excellent opportunity for our society to address ecologically-responsible means of plant disease control and food production.
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- 21 **Increasing research on organic agriculture**
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- 22 Increasing the focus of APS on global agricultural problems**
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- 22 There are elements of internationalism in several of the above topics, but I'd like to see it more explicitly addressed. We need to think beyond academia, creating alliances not only with other scientists but between extension and advisory services, for example, where the US is a powerful model for change. Seems a little stingy only allowing two choices! I'd have been happier ranking my priorities and having more choices.
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- 22 I believe continued engagement of the Board in Public Policy that affects global agriculture in relation to Plant Pathology is important.
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- 22 International research collaboration should be more focused. Because there are plenty of plant disease problems in the under developed world however not much research has been done. if we
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could understand pathogen systems across the countries, different geographical zones, this will safe guard food availability and beat hunger.

22 Many of the questions posed above focus on the USA. With increasing globalization it is very important to consider world-wide problems. The APS could take a lead in this

23 Improvng state support for plant pathology

23 The focus of activity for PPB has been Washington DC. However, the battles that are being fought over the survival of our discipline are at the state and institutional level. Advocacy in Washington will have little relevance to the discipline if it continues to be eroded at the state level. PPB will advocate for an ever-shrinking cohort of survivors. Both APS as a society and PPB as the advocacy arm of APS must discover effective means to mitigate and reverse erosion at the state level. The solution is not necessarily in Washington, and it is certainly not exclusively so.

23 Advocacy for plant pathology as a discipline at the state level

24 Other comments

24 I believe that enough technologies have been developed, but they do not reach the majority of farmers. And therefore technology transfer should be one of the priority areas. However, only such technologies need to be disseminated which have been found viable under field condition. The scientists in enthusiasm wish to pass on crtain technologies which have not performed well under field evaluation tests consistently and therefore its a kind of crime to take it on to farmers field for adoption. Recommendation of biocontrol agents (fungi/bacteria Vam fungi etc) must be demonstrated in bigger plots before they are included in package of practices. . Thanks for seeking advice of scientists world wide

24 I also like that APS groups have been looking into professional development/diversity/career options- but I think that this type of work is best done by hiring an expert to provide guidance/education- not necessarily something APS should tackle on its own. But I do think for Public Policy we should stick with the topics we know best: diagnostics/disease management/disease epidemiology- etc. and maybe expand these on how climate change or global economy impacts these topics.

24 I personally feel that the most effective use of APS resources would be to pursue increased scientific knowledge by research and application of that research. By doing so we will be able to make effective decisions in the area of phytopathology as it relates to agricultural production, our surroundings and therefore each persons quality of life. We are scientists and as such should strive for scientific goals leaving the social engineering to those with whom facts and logic are luxuries, not necessities.As many of the above suggestions demonstrate, this social agenda is an increasing trend which deviates from an academic approach to plant pathology.. It is my hope that the APS leadership sees the folly in this and adheres to more scientific guidelines in the future.

24 Please keep wildland vegetation and natural resource protection in mind in all these items!

24 Mainly good to survey, collect, identify and preserve pathogens every year, every plant in all production location will help the design the future strategy for control, understand the dynamics, related with environmental factors and soon. Use of IDM as the best alternative to minimize chemical use and sustain resistant varieties for long time use, will also reduce the pathogenic mutation of the pathogen.

24 Improve public access to Society literature.

24 Increasing collaboration and sharing of information with the world.

- 24 Board needs to have membership that will allow responsiveness to unforeseen issues. This Board has very little practical AG background and I think that would be wise investment.
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- 24 There were many additional topics on your list that I think are of importance, specifically phytobiomes research, addressing emerging and global movement of pathogens (educating the public at border points about restricted items and why they are restricted), public education on genetic technologies, and ensuring the long-term success of NPDP and microbial culture collections.
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- 24 I am encouraged you find another environmentally friendly ways to produce good. I have been working with Integrated soil and pest management the last 15 years and i have accomplished excelents results Regards Pedro
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- 25 Comments on the survey**
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- 25 So far APS is doing a great work in asking for members opinions in plant pathology and other factors that run concurrently. Therefore I feel part and parcel of APS community in the journey of solving societal problems, by giving my contributions.
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- 25 As an non-american APS member I have selected advocacy targets that in my opinion, could be considered in terms of "think locally and applied globally", but I find each of your proposals as real valuable challenges. Thanks, Mariana Ittu
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- 25 I am currently at a conference in Botswana on Solutions for Food Security in Africa through sustainable soil fertility management of ecosystems under climate change, which is attended by Africans of many countries as well as some Europeans and Americans. There is no doubt that many of the issues put forth above are worth pursuing. I wish I could have chosen more than two. The two I choose are directly related to my expertise, however.
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- 25 I understand that these targets are for outreach - ie, outside the usual close circle of professional plant pathologists. This is why I chose items with a wide societal resonance and public concern. Many other items are of relevance for our profession, but more for an internal strategic agenda than for public outreach at this stage.
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- 25 Several of the topics on this list have already "had their day" or are too general to attract much interest. The two topics I selected are those that I feel have the best chance of attracting enough federal interest to be funded.
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- 25 Limiting it to two was very hard.
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- 25 It is so difficult to pick only 2! I would have liked to pick 10!
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- 25 Thanks
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- 25 excellent job plant pathologists.
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- 25 All of these areas are important.
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- 25 Increasing collaboration and sharing of information with the world.
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- 25 Todos los temas son muy interesantes pero la información sobre el buen manejo de la microbiología para tener un suelo sano es para mi prioridad gracias por su oportunidad de compartir
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- 25 This list is too long to only select two choices. Would like to have ranked all of them numerically
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- 25 It was very tough to limit the response to two items!
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- 25 Wish we could pick 3-5. thanks for your work!
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