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## Frontiers and Challenges in Plant Pathology Communications

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A quick review of our past reveals that, as a scientific society whose goal is to promote research and education in phytopathology, we have made tremendous progress. Over the decades, our numbers have increased greatly. While we published only one journal during the first 70 years of our existence as a Society, we now publish three journals as well as a sizable newsletter, and each of our journals increases in size every year. In addition, in the last 10 years we have published almost 100 books in plant pathology and a number of slide sets. Furthermore, we are co-owners of a spacious headquarters building and the employers of an outstanding staff who edit, publish, and distribute our journals, books, and slides; collect and manage our dues; provide all sorts of services to our members, committees, and officers; and plan and run our annual meetings. Above all, we have dedicated members who, as individuals, committee participants, or officers, contribute their time, ideas, and efforts in serving our Society and improving it. We can be proud of our progress.

We all know, however, that we must continually try to reduce or eliminate any problems associated with our Society and our profession. Three years ago, we all received a questionnaire asking us to identify the main issues for the Society. Numerous issues were mentioned, but the most common areas of concern to respondents were the high costs of dues and page charges; the lack of public recognition, understanding, and appreciation of our profession; the lack of contacts and influence with government executives, legislators, regulators, and other agencies; the gap between biotechnologists and applied plant pathologists; the lack of American students going into our profession; and the need for greater international participation and contributions by our Society.

The first of these issues—high costs—is mundane and perpetual. We must keep in mind how much more, in terms of journals and journal pages, services, and meetings, we get now for what we pay. Your committees and the Council have been reviewing several of the areas that cost us money (our journals, our affiliations with other societies or agencies, our meetings) with an eye to cutting costs.

The Council has established the National Board of Plant Pathology to improve our contacts with Washington and to keep the society informed of the issues of concern to us that are being discussed there. In consultation with the Council, the Board is to speak for the Society on these issues. The Board also will advise the Council on how a permanent national board may be established and funded, and how it might function.

There are also some continuing and worsening practical problems facing plant pathologists. First, the real, or sometimes perceived, contamination of food, water, and the environment with pesticides and other chemicals has resulted in reduced availability of effective fungicides and bactericides to control plant diseases on the farm. In addition, in the minds of some people there is suspicion as to the size of our involvement in this contamination. On the other hand, we, the plant pathologists, do relatively little to keep pesticides from being banned by the government, or withdrawn or abandoned by the manufacturers. We also do very little to explain to the public that we need pesticides to protect the quantity and quality of our food and

the profitability of our food production; that not all pesticides are dangerous if they are applied properly, as evidenced by the bactericides and fungicides doctors and veterinarians prescribe for infectious diseases of humans and animals; and that we, the plant pathologists, are as concerned about our food and our environment as the public is, and we deserve to be trusted to do the best that can be done to protect both of these from contamination.

Another problem associated with and impinging on the above is the lag in development of genetically engineered disease-resistant plants. The same can be said about biological control of plant diseases. In spite of some noteworthy advancements of our knowledge and methodology in this area, we still have no practical successes to report. All signs are that these problems will be solved someday and that, once resistance genes can be transferred to susceptible plants or suitable biocontrols become available, they will eliminate the need for most pesticides. The timetable for such events, however, continues to be pushed farther back into the future. Although large by earlier standards, the amount of money and effort spent in developing disease-resistant plants and biological controls is still minuscule.

Universities and experiment stations are underfunded to the point where little meaningful plant pathological research can be conducted with state and formula federal funds alone. The easy, inexpensive research was done long ago and, with the funds allocated, we simply cannot carry out the labor-intensive, sophisticated equipment-demanding laboratory or field work that is likely to produce important breakthroughs. Grant funds have become indispensable and often dictate the kinds of research that are carried out, to the point where the central government agencies that give the money now determine what type of research is funded and done throughout the nation. At the same time, competition for grant funds has become much more intense, with many more people and ideas competing for the same, or often smaller, pool of money. Due to low funding there are fewer jobs for Ph.D.s, because we cannot hire additional recently trained Ph.D.s. This affects the productivity and efficiency of our departments, not only in finding answers to our problems, but also in training graduate students in the latest developments in our science. Low funding combined with inadequate public relations also contributes to the attraction of smaller numbers of top-notch graduate students to plant pathology—as is the case for most agricultural sciences—and to the subsequent production of fewer top-notch faculty. Furthermore, the relatively greater availability of grant-funded graduate assistantships in the molecular areas tends to draw graduate students away from areas of applied plant pathology.

The last problem I will mention here is the lack of a concerted national effort to collect, organize, and package practical plant pathological information, and to disseminate it to private practitioner plant pathologists, to county agents entrusted with advising our growers on matters of plant disease, and to the growers themselves. Of course, some of it is done by state extension plant pathologists, but one would think that, in the days of computerized telecommunications, we would have developed a national network for such information, and our practitioners and our growers would be using up-to-the-minute data on disease and vector occurrence, disease diagnosis, and disease control. With the exceptions of very few diseases, we do not have even monthly or quarterly

reports and advice on such occurrences. We have largely ignored this area and we, as a Society and as a nation, have not acted to provide continuing current information on plant disease occurrence and control.

A common thread woven among many of the issues considered important to our members—the lack of public recognition, lack of visibility in state and federal governments, shortage of American students in our profession, shortage of contributions to international plant pathology—is the absence of recognition of our Society. We need to provide a better service to our ultimate clientele, the plant-growing public. We have been pursuing our noble scientific goals but, to a large extent, we have been ignoring the needs of the public for accessible and effective information on plant disease control, information that needs to be provided by competent professionals where and when it is needed.

We have been doing a reasonably good job in basic and even in applied research on plant pathology and plant diseases. All of our journals contain the results of such research, and each of us reads one or more of these journals. Most of us may have trouble understanding articles in each journal because they are outside our expertise. Nothing is wrong with that because we are all specialists. The extension pathologists, however, must simplify and “translate” the scientific jargon into a language that county extension agents, and perhaps growers, can understand. But how much of that do they have time to “translate”? And how often do they present it or update it? Considering the size of the task, the small number of extension pathologists, and the continually low funding of extension programs, not very often. Plant pathology on the farm and in the garden is in the hands of the county agents, many of whom never had even one course in plant pathology. Not only do they lack training and expertise, we hardly provide them with enough up-to-date, understandable information on new occurrences of diseases, new diagnostic techniques and tools, new epidemiological information on the many specific diseases with which they have to deal, or on new methods and materials that can be used to control the various diseases. In addition to the county agents, much advice for control of plant diseases is given to our growers by sales representatives of chemical companies, who often are agronomists or entomologists and therefore not only lack appropriate and sufficient education and training in plant pathology, but also have a vested interest in promoting and selling their company’s product, even when the disease and circumstances may require a somewhat different recommendation. But neither the county agents nor the sales representatives, not even the extension plant pathologists, can obtain useful, practical information on current disease appearance, occurrence, diagnosis, and control for most diseases present in an area. We, the plant pathologists, the only scientists who study and publish information on plant diseases, do not publish in our journals, or anywhere else for that matter, current, updated versions of what our growers and their advisers need.

Perhaps we don’t know how to do it. We have not figured out how to give credit to colleagues who obtain and report such information. We are all Ph.D.s.—even our extension plant pathologists are Ph.D.s.—trained to do research, not to diagnose and treat diseases. And, of course, persons who eventually apply the control measures are likely to have little or no training in diagnosing and treating plant diseases.

With no current information on treating plant diseases and with no trained persons to diagnose and treat plant disease, is it a wonder that the public knows little or nothing about us, understands us even less, and shows little or no interest to join us in either studying plant pathology, or in supporting our science and our professional society?

It is time our Society became more responsive to our ultimate clientele: the practitioners of disease diagnosis and control who, with the few exceptions of private consultants, are often the county agents and the growers themselves. We must develop a mechanism, whether a newsletter, a trade magazine, or one of our Society’s applied journals suitably modified, that will provide these clients with the information they need to diagnose and to control plant

diseases.

Our Society also needs to consider that perhaps a new kind of education and training, leading to a new kind of degree, should be given to students who study plant pathology with the goal of becoming practitioners of plant medicine, i.e., diagnosing and controlling plant diseases. We must continue to produce Ph.D.s who will go on to do basic and applied research on plant pathology and plant diseases. We must realize, however, that Ph.D.s are trained to do research, not to diagnose and treat plant diseases. Just as the medical schools and medical centers, as well as the veterinary schools, are manned by Ph.D.s, so will our departments of plant pathology and our research centers continue to be manned by Ph.D.s. As in human medicine, however, where disease diagnosis and treatment is carried out by nonresearcher doctors of medicine (M.D.s), whom we know as the general practitioners, and as in veterinary medicine where diagnosis and treatment are carried out by nonresearcher doctors of veterinary medicine, veterinarians (V.M.D.s), so, too, must we produce nonresearcher doctors of plant medicine (P.M.D.s), whose job will be to diagnose and treat plant diseases and all other plant problems, whether caused by pathogens, insects, nematodes, nutritional imbalances, or environmental extremes. It is unimaginable that the American Medical Society could flourish and serve the public without general practitioner doctors or that the Society of Veterinary Medicine could flourish and be useful without veterinarians. It is these practicing professionals who bring to the people the knowledge generated by the Ph.D.s, fill the needs people have, and in turn make people feel thankful for the service. The American Phytopathological Society could learn from this parallel and could profit considerably by developing the branch of plant pathology practitioners, plant doctors.

More than 10 years ago, our Society rejected offhand the creation of a doctor of plant health degree. Obviously, neither the time nor the proposal was right for such an action. Our Society also rejected then the creation of a National Registry of Professional Plant Pathologists which, without affecting anybody else, would have given our colleagues in private practice some legitimacy and stature among their clients while keeping unqualified people from calling themselves, or functioning as, plant pathologists. Other Societies (entomology, agronomy, agricultural engineering, soil science) went ahead and created their registries and certification of their practitioners, while our own colleagues are still trying to get approval to form a national registry. Our private practitioner colleagues must try to get a National Registry of Professional Plant Pathologists under the auspices, handling, and protection of another society, the Agronomy Society, because ours is still afraid to move into the real world of practical plant medicine. We have not yet realized that we need to practice plant medicine on the farm and garden, where we need to have colleagues trained in plant medicine and applying the information developed by our Ph.D. researchers and by Ph.D. researchers of related disciplines, such as entomology.

Our Society needs to promote practical plant medicine just as we are promoting basic research in all areas, including molecular plant pathology. We must continue, and must accelerate, our basic and applied research in all areas, particularly in molecular genetics of plant pathology, and we must support our MPMI and the other journals to disseminate that type of information. At the same time, however, we must realize that more and more of our faculty are molecular plant pathologists with little understanding of, or interest in, the practical plant pathology problems on the farm. That kind of faculty also produces Ph.D.s who have similar interests and deficiencies. Our Society and our departments of plant pathology must realize that, and we must balance this trend towards molecular Ph.D.s with an effort to produce practitioners of plant medicine, capable of caring for the total health of the plant. Besides, with environmental concerns of the public and the legislators being what they are, we can expect soon to have plant protection by prescription. In some states already, a grower must get a certificate (read: prescription) from the county pest control advisor as to which and how much

of a pesticide he can buy and how much and how often he can apply it on his crops—and he must keep detailed records about it. This may become the new reality for all states before too long.

I would like today to propose to you that, wherever possible, our departments of plant pathology work together with their respective departments of entomology and, in cooperation with the departments of agronomy, horticulture, forestry, soils, etc., develop an interdisciplinary degree of Doctor of Plant Medicine. This should be a professional degree, similar to the M.D. and V.M.D. It should aim to train students who already have a B.S. degree. These students would take courses, with labs, for three years, and also would get practical training through a one-year internship. The education and training will be primarily in the science and art of diagnosing and treating plant problems whether they are caused by pathogens, insects, nematodes, weeds, nutrient imbalances, chemical toxicities, air and soil pollutants, field mice, or birds. Such persons would take a course in problem-solving and would work and write a report on a special problem. They would not, however, do Ph.D.- or M.S.-type research or write a thesis. Such persons would, instead, take five or six courses, with labs, in plant pathology, five or six courses in entomology, one or two courses in nematology, one to three courses each in plant nutrition, soils, weeds, ecology, experimental techniques, environmental science, economics, business management, regulatory laws, use of computers, and statistics. The one-year supervised internship would be spent with extension specialists in the different disciplines, with private consultants, or in industry. Programs in the Doctor of Plant Medicine degree would be accredited by an accreditation body appointed by the appropriate scientific societies. Graduates from such a program would pass a final examination, be licensed by the state in which they operate, and be required to maintain their expertise by periodic retraining. Neither our society nor the entomological society really needs to take any action or suffer any great costs. Almost all of the courses required are already in place in several universities. All that is desired is that the officers and members of the two societies start thinking about this concept.

The Doctor of Plant Medicine degree will be an interdisciplinary degree involving primarily the departments of plant pathology and entomology, but also several other departments. I would hope, however, that departments of plant pathology would play a leadership role and lead the way in the establishment and continued function of the Doctor of Plant Medicine degree programs. Plant medicine graduates will do for plants what general practitioners do for humans and veterinarians do for animals—they will diagnose plant problems and recommend measures for their control. Graduates of this program will be true plant doctors. They will work as private consultants to growers and to consumers, as directors of plant disease clinics, as extension personnel at the county, regional, or state level, as plant protection specialists for large farms or agricultural enterprises, as industry representatives for product development and sales. Many foreign students also may elect the Doctor of Plant Medicine program since with that they would take home with them training and expertise they could use right away. And there are plenty of jobs for plant doctors. We estimate that Florida alone could employ about 60 of them right now.

I know that many of you feel embarrassed about using terms like plant medicine and plant doctor. But you do not have to apply these terms to yourselves. More importantly, these terms are correct by definition, and they convey a clear, understandable meaning to everyone. Medicine and doctor are terms people understand and respect. Plant medicine and plant doctor, like veterinary medicine and veterinarian, simply convey that the host of concern is different. The time for this new profession has arrived. It will provide a service to our growers that is only occasionally available now; it will provide employment to many young people interested in the diagnostic and control aspects of plant protection but not in Ph.D.-type research; it will prepare us to meet the new realities of plant protection in the face of the public's concern for food and environmental safety; and it will improve our standing with and respect by our growers, consumers, university administrators, and state and federal legislators and regulators. Much is to be gained and nothing to be lost.