

The Reporting of Estimated Plant Disease Losses

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Losses due to plant diseases are the *raison d'être* for plant pathology. Put another way, the bottom line for the existence of plant pathology and all of us who practice it is the damage to plants caused by plant-pathogenic microorganisms. However, there have been relatively few papers in either *PLANT DISEASE* or *Phytopathology* in recent years reporting plant disease losses. Since January 1980, papers whose titles identify them as being about plant disease losses number 14 in *PLANT DISEASE* and 11 in *Phytopathology*.

This is a low number of papers on a subject with application not only to plant pathologists, but also to other agricultural scientists, agricultural businesses, and government agencies.

The terms "evaluating," "measuring," "assessment," and, in one paper, "estimating" are used in the titles of the *PLANT DISEASE* papers, and "assessment," "evaluating," "quantifying," and "effect on" are used in *Phytopathology*. Also, several papers on crop loss models to predict disease losses have been published in *Phytopathology*. The purpose of all these papers is to somehow quantify plant disease losses. This is normally done by inoculating or not inoculating plants with the appropriate pathogen or by applying or not applying a fungicide to plants to protect them from a disease-causing agent. Parameters such as number of leaf spots or yield are then measured. Most, if not all, of this work is done in small plots.

This small-plot information is valuable in measuring the potential damage a plant disease can do, and in discussions among themselves, plant pathologists routinely interpret and apply small-plot loss data to larger areas. But they hesitate to write what they think losses would be over an entire state or a large geographic area and to publish them. In other words, "This is probably the loss this disease caused but don't quote me on it and I'm not signing anything!" In the back of their minds is the possibility they may be ridiculed by their colleagues for publishing an "estimate," not data from a replicated experiment with controls. Consequently, disease losses are seldom seen in print except in some extension publications and in popular agricultural magazines.

Knowing what disease losses are over a large geographic area would be of immeasurable value to government agencies, universities, and private businesses for making reliable judgments in allocating resources. As an extension plant pathologist, I am called on at least once a month to supply plant disease loss figures to private companies or government agencies, and I am uncomfortable providing "estimates" or, as we are fond of saying, "guestimates." But who is better qualified to give a quantitative estimate on disease losses of corn and soybeans in Iowa than a plant pathologist who has a "feel" for the crop and disease incidence and severity? The reluctance to publish this type of material is natural because our education and training as plant pathologists are research-oriented and center around controlled experiments.

This issue of *PLANT DISEASE* contains a paper on estimates of soybean disease losses in the southern United States in 1982 (see page 1394). This paper represents a departure from the standard research paper found in *PLANT DISEASE*. Previous efforts have been made to publish crop disease loss estimates. The 1982 American Phytopathological Society meeting included a symposium on "Estimated Yield Reduction of Major Food Crops of the World." Volume 1 of the Chemical Rubber Company's *Handbook of Pest Management in Agriculture* contains a chapter on plant disease losses and a table entitled "Estimation of Percentage Losses Due to Diseases of Selected Major Field Crops in the U.S." covering 1951-1960. These noteworthy efforts serve a good cause, but such information must continue. Publication of the paper on soybean disease loss estimates in a journal that publishes research papers is such an effort. Because the paper represents both an idea and an opinion based on observations of qualified plant pathologists, it is within the editorial policy of *PLANT DISEASE*.

In a traditional sense, many good and valid points can be made opposing publication of such a paper. The method of observation likely varies from observer to observer. The loss figures are only estimates. Yet an equally strong argument can be made for publication. Disease loss figures covering a large area are needed, and these estimates, however varied, represent a start. To improve a system, a start has to be made somewhere.

In a sense, we are admittedly practicing the art before we have properly studied the science. Historically, many fields of endeavor started in such a fashion. Electricity was a poorly understood toy used in parlor games until Benjamin Franklin and others began to organize the phenomenon into a discipline with defined principles through controlled experimentation. The Wright brothers did not fully understand why their airplane flew at Kitty Hawk. Despite years of intensive research into the splitting of the atom, some scientists feared the world would be blown to bits by the first atomic bomb. I suspect it will take a relatively long time to devise a method for gathering uniform observations into data that can be published as totally reliable plant disease losses for any political or geographic area. The process will be evolutionary, and researchers must learn to walk before they can run. We are just now beginning to crawl.

Progress in ascertaining disease losses will likely be in jerks and jolts, responding to the whims and wiles of agriculture with all its vagaries. As E. C. Stakman wrote, "For better or for worse, plant pathology had its genesis in fields and granaries more than in halls of ivy." If this kind of work could be accomplished solely in laboratories and field plots, progress would probably be faster and smoother. Perhaps someday a standard formula or a computer program will be devised to transpose losses from a small area to a large one. Meantime, we are attempting a beginning.

When reliable disease losses for a crop can be confidently recited from published information, government agencies can accurately regulate fungicide usage and research priorities, universities can appropriate resources toward solving the most critical problems, and private enterprise can examine crop management practices and explore pesticide development in areas that assure profitability. Perhaps in 2058, plant pathologists will be able to say that 15,123,421 bushels of soybeans were lost to the soybean cyst nematode in the United States. As Norman Borlaug wrote, "Our research must be good, but it must be good for something."