

*An In-Depth Look At The Science Of
Plant Pathology And At America's
Highest Ranked Plant Pathology
Department - The University of
Wisconsin-Madison!*



THE GRASS ROOTS

an official publication of the Wisconsin Golf Course Superintendents Association

Volume XIII, No. 4

July/August 1986 Issue

Wisconsin is the home for many European immigrants. These settlers from the Old World brought with them not only their customs, but also their most precious possessions which included seeds and plants. Unwanted, unknown hitchhiking plant pathogens and weed seeds accompanied these plant introductions. One such crop, cabbage, was to play a major role in the formation of the Department of Plant Pathology.

The first record of cabbage grown in Wisconsin is a letter dated Sept. 12, 1840 and sent by Mr. Nicholas Le Provost, an immigrant from the Isle of Guernsey, to his aunt in France. Mr. Le Provost had purchased an eighty acre farm in Racine County. Growers in the area found a ready market for cabbage in the developing city of Chicago. Cabbage was harvested in the morning, packed in barrels, driven to the boat docks in Racine by horse and wagon, and delivered to Chicago by boat the next morning. With the continuation of excellent markets for fresh cabbage and kraut, growers planted cabbage year after year; but this eventually lead to "cabbage sick" soil. By 1890, crop failures were more common, than successes. The growers from Racine and Kenosha county called a meeting and invited Professor H. L. Russell from the College of Agriculture. Dr. Russell had been trained in the area of microbiology and had studied with many of Europe's great microbiologists, e.g. Pasteur and Koch. These scientists had finally provided firm evidence of the germ theory of disease. The meeting with the cabbage growers lead to Russell's in-

DEPARTMENT OF PLANT PATHOLOGY: 76 YEARS OF ACHIEVEMENTS UNIVERSITY OF WISCONSIN- MADISON

*By Dr. Douglas P. Maxwell,
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terest in diseases and his eventual discovery of a bacterial pathogen of cabbage. This experience with cabbage diseases must have impressed on him the importance of having a Department of Plant Pathology in the College. For when Professor Russell became Dean of the College of Agriculture in 1907, one of his first actions was to recommend the establishment of such a department as well as Entomology.

Dean Russell searched for an appropriate plant pathologist and found one in Professor L. R. Jones of the Botany Department at the University of Vermont. Since Dr. Jones was raised near Brandon, Wisconsin and had attended Ripon College, it was not difficult for him to return to his home State. Jones' early work lead to the release of disease resistant cabbage varieties.

Thus, the Department was born from the needs of growers; and this important relationship between faculty and grower needs

has been a strength of our College of Agricultural and Life Sciences. Growers have recognized the value of supporting research at the University; and currently, our Department receives support from many grower groups, e.g. arborists, turf industry, muck growers, potato, mint, ginseng, cabbage, cherry, cranberry and soybean organizations.

Professor Jones' capable leadership resulted in the Department's expansion to seven faculty members by 1923. These plant pathologists were primarily trained under his watchful eye: G. W. Keitt, R. E. Vaughan, J. C. Walker, A. J. Riker, J. G. Dickson, J. Johnson (Horticulture Department), and J. W. Brann. It is of interest, that in 1912, J. C. Walker, a lad from Racine county, decided to major in plant pathology as an under-

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graduate. Jones set Walker to work on diseases of vegetables which seemed natural because of his origins. This Wisconsin raised boy was to become the most highly respected plant pathologist in the world and retired at age 70 in 1964. He resides in Sun City, AZ.

Each of these faculty members brought vision and leadership to their program areas and shaped the direction of the Department for the next forty years. Keitt focused on diseases of fruit crops and chemical controls; and his research set the pattern for much of the epidemiological studies, i.e. weather and disease interactions, that were to follow. He also served for 25 years as the second Department Chairman. Vaughan was one of the first extension specialists in the USA and it is his son who established the Vaughan-Bascom Professorship held today by Professor Gayle L. Worf. Vaughan was instrumental in extending knowledge about disease diagnosis and control throughout the State, and he developed a spirit of interdepartmental cooperation that continues today. Vegetable diseases were the responsibility of Walker who developed strong programs on breeding for disease resistance. Riker was instrumental in the formation of the forestry program. His team was the first to identify oak wilt and to devise ways to slow its destructive spread. He and his successors, particularly R. F. Patton, implemented a breeding program for white pine blister rust resistance, the first of its kind in forestry. Riker also had an active research program on the nature of crown gall disease. The bacterial causal agent of this disease has become one of the major tools for plant molecular engineering. Field crop diseases were the responsibility of Dickson. Although not a major part of his program, he did study pink snow mold and fairy ring disease of turf. The Potato Seed Certification Program, which was the first in the USA, was started in 1913 under the direction of Brann. Johnson was responsible for tobacco diseases, but his major impact was in the area of virology.

The early research programs reflected the strengths of the faculty members and the Depart-

ment became known as the center for research on the influence of environmental factors on disease development, on breeding for disease resistant vegetables, on forage, cereal, and forest pathology, and on disease physiology. This research led to the control of many of the major diseases affecting Wisconsin crops.

The next generation of faculty members, like the first, were

trained at Wisconsin. These included such men as G. S. Pound who was to become Chairman after Keitt and later Dean of the College. Emphasis during this period continued along the same lines as programs expanded and new faculty were hired. From the midsixties to the present, program expansion occurred primarily in disease physiology with smaller increases in nematology and soilborne plant pathogens. The



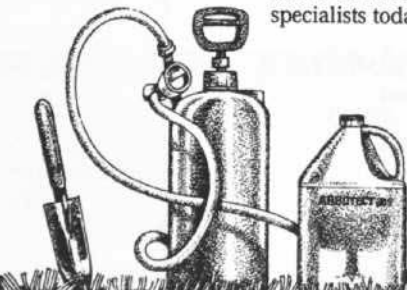
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creation of a USDA Unit for studies on disease physiology in 1964 brought four new positions to the Department. Kemp, a member of this group, was the first to achieve the expression of a gene in a plant from an unrelated plant, i.e. the transfer and expression of the gene for storage protein from bean in sunflower. In addition, the concept that certain bacteria serve as ice nucleation centers on plants was completed by members of this group (Upper, Arny, and Lindow). These bacteria are free-living on the surface of plants and are responsible for frost injury, thus it is possible to control frost injury through biological control methods.

Currently, the Department has twenty-six faculty members; and active research programs continue in most of the areas mentioned above. New programs include the use of computer modeling in the development of disease forecasting systems, the isolation of plant genes which control disease resistance, the development of biological control agents, the development of systems for studying the molecular biology of pathogens and for understanding the factors which determine the specificity of the interactions between plants and their parasites.

A strong emphasis has been placed on the training of graduate students. Over 600 individuals, more than from any other Department of Plant Pathology, have received advanced degrees from the Department. Foreign students have always been part of the graduate program and students have come from forty-three countries. The training of these foreign students has been one of the Department's greatest contributions to world agriculture. Undergraduate training has concentrated on the offering of a strong introductory course in plant pathology for plant science students in the College.

The Department has long been recognized for its leadership in the profession of plant pathology. Professor Jones was the first President of the American Phytopathological Society and seven other faculty members have served as President. Ten graduates from the Department have also been Presidents.

Faculty members have received many honors over the years. One of the most prestigious of these is election into the National Academy of Sciences. Five faculty members have received this honor. Arthur Kelman and Luis Sequeira are current faculty members and J. C. Walker is an Emeritus Professor.

In spite of the Department's international recognition and its dedication to furthering basic knowledge, it retains a commitment to the grower needs of the State. Examples include the applied research programs of many faculty and the Pathogen Detection Clinic. With this sense of responsibility, the history of the first seventy-five years of the Department, edited by P. H. Williams and Melissa Marosy, was written by past and present members of the Department and entitled "WITH ONE FOOT IN THE FURROW."



Editor's Note: Dr. Doug Maxwell started his career as a faculty member in the Department of Plant Pathology at the UW—Madison in 1968. He has served as the Departmental Chairman since 1980. Educated at Nebraska Wesleyan (B.A., 1963) and Cornell (Ph.D., 1968), Dr. Maxwell specializes in fungal physiology and plant breeding for disease resistance in forage legumes. We are grateful to him for his efforts in organizing and coordinating this special issue of THE GRASSROOTS.

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