

THE UNIVERSITY OF FLORIDA PLANT MEDICINE PROGRAM

Dr. R. J. McGovern, Professor and Program Director describes the new plant medicine course at the University of Florida

Program rationale and establishment

Since their establishment about 100 years ago, individual departments within agricultural science such as horticulture, plant pathology, and entomology have developed research methodologies to successfully address the numerous challenges faced by those who produce and maintain plants/crops. This trend continues to the present day. Of necessity (primarily for reasons pertaining to publication and funding) the focus of these researchers has become more narrowly defined over time.

Synthesis of increasingly complex and voluminous plant health data generated through agriculture research is essential for its proper use. Human and animal health professions have evolved practitioners, physicians (MDs) and veterinarians (DVMs), as a means of integrating and applying similar health information. We believe that comparably trained individuals knowledgeable in all aspects of the prevention, diagnosis and management of plant health problems (both biotic and abiotic), *Plant Doctors*, represent the natural and essential evolution of agricultural science. To that end the University of Florida College of Agricultural and Life Sciences established the Plant Medicine Program (PMP), the world's first doctoral level course of study leading to the Doctor of Plant Medicine (DPM) degree.

The DPM degree was first established in 1999 at the University by the joint action of the chairs of three departments, Drs. George Agrios (Plant Pathology), John Capinera (Entomology and Nematology) and Jerry Bennett (Agronomy). The first students entered the program in 2000 and the first graduates, who now total 34, completed their degrees in 2003. Students have come from 13 states in the US and 14 countries. Student data: 31% entered with an MS degree (a BSc in a relevant agricultural science discipline or

related field is the minimum requirement for admission); 20% are international; the ratio men:women is 52%:48%; and 35% are from under-represented minorities.



Bill Thomas, Extension Agent IV, leading DPM field trip

The DPM curriculum

Unlike the PhD but in common with the DVM and MD degrees, the DPM is not based on research and a dissertation, but on the completion of a rigorous and comprehensive curriculum that includes passing 90 credits of coursework and 30 of internships in agronomy, entomology, horticulture, plant pathology, soil science, and weed science. Core courses and internships taught by over 20 faculty members are taken in common by all DPM students and represent about 2/3 of the total credits hours (Tables 1 and 2). The remaining credits needed to complete the degree are furnished by elective courses and internships through which students may tailor their program of study to meet their crop or other professional interests.

A number of graduate certificates are also available to DPM students to meet their career interests including the Certificate in Plant Pest Risk Assessment and Management (http://dpm.ifas.ufl.edu/plant_pest_risk_assessment/index.shtml) coordinated by the Plant Medicine Program. The Certificate in Plant Pest Risk Assessment and Management was initiated in 2006 to address the increasing need in the US and worldwide for individuals trained in crop and natural resources biosecurity. The certificate is open to all graduate students at the University and may be available in future through distance education to additional students. The 16 graduate credits required for the certificate may also be applied to the DPM degree. About 1/3 of the current DPM



Dr. Carol Stiles teaching disease diagnosis course

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Table 1. Core DPM Courses

Competency Area, Credits	Course Number	Course Name*	Credits
Plant, Soil, & Weed Science (19 credits)	AGR 6422 or HOS 6412	Environmental Crop Nutrition or Nutrition of Horticultural Plants	3
	AGR 6442 or HOS 6345	Physiology of Agronomic Plants or Environmental Physiology	4
	PLS 5632	Integrated Weed Management	3
	PLS6655 or PLS 5652	Plant Herbicide Interactions or Advanced Weed Science	3
	SOS 5116	Environmental Nutrient Management	3
	Multiple options	Crop Production/Management	3
Entomology & Nematology (22-23 credits)	ENY 6166	Insect Classification	3
	ENY 5611	Immature Insects	4
	ALS 5136 or ENY 6203	Agricultural Ecology or Insect Ecology	3 or 4
	ENY 6651C	Insect Toxicology	3
	ENY 5241	Biological Control of Insects	4
	ENY 5245	Agricultural Acarology	2
	NEM 5707C	Plant Nematology	3
Plant Pathology (21 credits)	PLP 6262C	Fungal Plant Pathogens	4
	PLP 6241C	Bacterial Plant Pathogens	3
	PLP 6291	Plant Disease Diagnosis	3
	PLP 6223C	Plant Virology	4
	PLP 6404	Epidemiology of Plant Disease	4
	PLP 5102	Plant Disease Control	3
Other (8 credits)	AEB 6933	Agricultural Law	3
	ALS 6931	Plant Medicine Program Seminar	1
	ALS 6925	Integrated Plant Medicine	4
Total credits = 70 or 71			

Students must complete 20-21 additional credits of elective courses based on their career interests and these may include coursework also applied to graduate certificates. Although the DPM degree does not require research or a dissertation the majority of the DPM students do get experience in applied research through elective internships.

Table 2. Core DPM Internships

Competency Area, Credits	Course Number	Course Name*	Credits
Plant & Soil Science (2 credits)	SOS 6932	Soil & Plant Tissue Testing Internship	2
Entomology & Nematology (6 credits)	ENY 6942	Insect Diagnostics Internship	2
	PMA 6228	Field Techniques in IPM Internship	2
	NEM 6942	Nematode Diagnostics Internship	2
Plant Pathology (3 credits)	PLP 6942	Plant Disease Clinic Internship	3
Total credits = 11			

Students must complete 19 additional credits of elective internships based on their career interests and these may also include internships applied to graduate certificates.

students are pursuing the certificate. Students interested in careers in certain segments of the agricultural industry such as agrichemical companies and crop production firms may acquire skills related to applied field research through participation in the Plant Medicine Program, Clinical Trials (http://dpm.ifas.ufl.edu/clinical_trials/index.shtml).

Student advisement and evaluation

To guide their course of study each DPM student is required, with the assistance of the program director, to form a three-member Supervisory Committee (S/C) by the midpoint of their third semester. By definition, the DPM S/C must include each of the following: a Plant/Soil/Weed Scientist, Entomologist/Nematologist and Plant Pathologist. Students are encouraged to consider broadening their S/C through inclusion of off-campus UF-IFAS faculty and additional Special S/C Members from state and federal agencies and segments of the agricultural industry.

DPM students must maintain a minimum grade point average of 3.0/4.0 ("B") to remain in the program and are routinely evaluated by their S/C. Their committee members also assist students in the identification of elective internships and their evaluation, and in providing employment leads.

At the completion of their course of study, DPM students must pass three standardized 8-hour comprehensive written examinations in Entomology/Nematology, Plant/Soil/Weed Science, and Plant Pathology. The written examinations are coordinated by faculty from the PMP Curriculum Subcommittee and consist of questions developed by the instructors of the DPM core courses. Following successful completion of all three written examinations ("B" = passing grade), DPM students must pass an oral examination administered by their S/C. It generally takes 3-4 years to complete the program.

It is anticipated that as Plant Medicine evolves and the numbers of Plant Doctors grow, state licensing examinations and continuing education programs will be developed to promote and maintain the professionalism of the discipline. Until that time, Plant Doctors may elect to seek certification through crop consulting and/or other professional scientific organizations.

Graduates

Based on US demographics, it is estimated that a significant number of leaders in this country from all segments of agriculture will be retiring in the next 5-10 years. Broadly trained individuals will no doubt be in high demand to fill agricultural leadership roles including in the area of plant health management.

To date there have been 34 recipients of the DPM degree. DPMs are working as crop consultants, plant pest regulatory officials (US and abroad), cooperative extension agents, educators, plant health managers (golf courses, crop production companies, and public gardens) and in other segments of agriculture. We believe these new Plant Doctors are making significant contributions to agriculture in the US and worldwide by providing rapid and accurate diagnoses for plant problems and strategies for their management that are both cost effective and environmentally conscious. Information on graduate employment may be found at: http://dpm.ifas.ufl.edu/careers/jobs_held_by_graduates.shtml

Additional information about the University of Florida Plant Medicine Program may be found at its website (<http://dpm.ifas.ufl.edu/>) or by contacting the program director (rjm@ifas.ufl.edu).



Robert McGovern is Director of the Plant Medicine Program and a Professor in the Plant Pathology Department, University of Florida, Institute of Food and Agricultural Sciences. His baccalaureate was obtained at Fordham University, and MS and PhD degrees were obtained at Cornell University. He is a member of the American Phytopathological Society, American Society for Horticultural Science and Soil and Crop Science Society of Florida.