Integrated Pest Management Education and Applications

Norm Leppla and Bob McGovern

University of Florida
IPM for Certified Crop Advisors

- IPM Definition and Concepts
- Plant Medicine Program
- Entomology and Nematology Department
- Extension Training Programs
- Pesticide Information Office
- IPM Florida Program
A Comprehensive Definition of IPM

IPM is the coordinated use of pest and environmental information and available pest control methods --- to prevent unacceptable levels of pest damage by the most economical means --- with the least possible hazard to people, property and the environment.
IPM Actions

- Scouting
- Diagnosis
- Thresholds
- Management
- Evaluation
IPM System

REDUCE RISK...
- Pest outbreaks & disease epidemics
- Environmental contamination
- Human health hazards
- Pest mgmt. costs

INCREASE...
- Reliability
- Sustainability

Cultural Methods

Biological Control

Chem
IPM Transition

Invasive Pest

Resistant Crop
- Competitors
- Natural enemies
- Resistant varieties

Vulnerable Crop

Integrated pest management program
- Cultural practices
- Scouting, ID of pests & NEs
- Conservation of NEs
- Augmentation of NEs
- Reduced-risk insecticides
- Resistance management

Pesticide program
- New insecticides
- New formulations
- Application methods
- Resistance management
Where is IPM practiced?
Sustainable IPM Systems

- Economic profitability
- Environmental health
- Social and economic well-being
IPM Education and Training

- Identifying key pest and beneficial organisms
- Understanding the ecology and adaptability of the organisms
- Mastering scouting and other monitoring techniques
- Applying economic and other action thresholds
- Preventing pest outbreaks through habitat manipulation
- Designing systems of mitigation that minimize environ. impact
- Experience with the habitat, e.g., crops or buildings
- Understanding laws and regulations pertinent to pest mgmt.
- Familiarity with the safe and appropriate use of pesticides
- Exposure to pest management information and organizations
IPM Competencies

- **Education & experience.** An interdisciplinary education in the traditional scientific disciplines plus hands-on, practical experience are essential.

- **Synthesis & integration.** Education and training prepare pest managers to synthesize knowledge from across disciplines because plant health problems often are not limited to a single cause.

- **Problem solving & critical thinking.** Experience is gained in accurately diagnosing and rapidly solving plant health problems while minimizing environmental impacts and economic losses.

- **Speaking & writing effectively.** Superior communication skills, both written and verbal, are required to effectively communicate IPM principles and practices.
University of Florida
Plant Medicine Program

Teaching IPM To Future Plant Doctors

Director:
Dr. Robert McGovern

http://dpm.ifas.ufl.edu
**Mission**

*Plant Doctors* are helping to achieve maximum crop yields to feed a hungry world while sustaining the environment. Thus, Plant Medicine could become agriculture’s most important degree program for protecting crops.

1999- The Doctor of Plant Medicine (D.P.M.) degree is for practitioners, *Plant Doctors*, trained in all aspects of the prevention, diagnosis and management of plant health problems.
Impacts of the Plant Medicine Program on Agricultural Science

Changes the educational paradigm through integration

Forestry → Plant Medicine → Entomology
Agronomy ← Plant Medicine ← Horticulture
Pathology ← Plant Medicine ← Soil Science
Future Plant Doctors

- B.S. in agriculture or related science, 1/3 M.S.
- ≥3.0 (“B”) grade point average
- ≥1000 GRE (combined verbal + quantitative)
- ≥550 (paper test) or 213 (computer) TOEFL
Student Advisement and Examinations

- Students guided by a three member Supervisory Committee (Entomologist/ Nematologist, Plant Pathologist, Plant/Soil Scientist).

- Standardized written examination consisting of three sections (Entomology/Nematology, Plant Pathology, Plant/Soil Science). Each examination is 8 hrs and passing is 80%.

- Oral examination administered by a student’s Supervisory Committee.
Plant Medicine Program

A unique, multidisciplinary 3 to 4-year course of study requiring 120 credit hours of coursework and internships. Research and dissertation not required for the D.P.M. degree.
# Core Courses

<table>
<thead>
<tr>
<th>Department</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Plant, Soil &amp; Weed Science</td>
<td>21-22</td>
</tr>
<tr>
<td>Entomology &amp; Nematology</td>
<td>22</td>
</tr>
<tr>
<td>Plant Pathology</td>
<td>19</td>
</tr>
<tr>
<td>Other (Agric. Law, Integrated Plant Medicine, etc.)</td>
<td>13</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>75-76</strong></td>
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90 credits required (core plus electives)
Internships

90 credits of coursework + 30 internship credits = 120 credits in all relevant disciplines
Careers for Plant Doctors (50)

Consulting

Research

Diagnostics

Teaching

Extension

Regulatory
IPM Florida Graduates

- Javier Garces- Professor and Program Director, Valencia Community College
- Stephanie Bledsoe- Director of Training and Technical Services, Massey Services
- Dan Sonke- Program Manager, Protected Harvest; Senior Scientist, SureHarvest
- Esther Serrano- Plant Pathologist, USDA, APHIS
Dr. Denise Thomas
Doctor of Plant Medicine
Applied Biologist
U.S. Naval Facilities Engineering Command
Norfolk, VA

Dr. Brian Jackson
Doctor of Plant Medicine
Agronomist
USDA-National Resources and Conservation Service
Euphrata, WA
UF, CALS, Entomology and Nematology Department

Urban Pest Management*

Plant Protection*

Pre-professional Studies

Biology Education

Basic Sciences

Ecotourism
Pest Management Courses on Campus or RECs

- Capinera - ENY 5231 Insect Pest and Vector Mgmt.
- Cave - PMA 3010 Fundamentals of Pest Management
- Crow - NEM 6708 Field Plant Nematology
- Liburd - PMA 4570C, PMA 6228 Field Techniques in IPM
- McSorley - ALS 3153, ALS 5136 Agricultural Ecology
- Kern - ENY 3228, ENY 5228 Urban Vertebrate Pest Mgmt.
- Koehler - ENY 4228 Pesticide Application, ENY 5222C Biology and ID of Urban Pests, ENY 5226C Principles of Urban Pest Management
Urban Pest Management (Urban IPM) - Phil Koehler
Certificate in Urban Pest Management

(15 credits from this list of courses)

- Principles of Entomology/Graduate Survey of Entomology (2)
- General Entomology Laboratory (1)
- Insect Classification (3)
- Insect Pest and Vector Management (3)
- Principles of Urban Pest Management (2)
- Urban Pest Management Laboratory (1) or
  - Urban Pests: Structural (2)
  - Urban Pests: Structural Laboratory (1)
- Biology and Identification of Urban Pests (2)
- Biology and Identification of Urban Pest Laboratory (1) or
  - Urban Pests: Bite/Sting (2)
  - Urban Pests: Bite/Sting Laboratory (1)
- Medical and Veterinary Entomology (3)
- Medical and Veterinary Entomology Laboratory (1)
- Urban Vertebrate Pest Management (2)
Certificate in Landscape Pest Management

(15 credits from this list of courses)

- Principles of Entomology/Graduate Survey (2)
- General Entomology Laboratory (1)
- Insect Pest and Vector Management (3)
- Fundamentals of Pest Management (3)
- Fundamentals of Plant Pathology (3/4)
- Landscape IPM: Ornamentals and Turf (3)
- Tree and Shrub Insects (3)
- Principles of Nematology (3)
Urban IPM Curriculum

Entomology Courses
- Princ. of Entomology
- Insect Classification
- Fund. of Pest Manag.
- Biol. & Id. of Urban Pests
- Princ. of Urban Pest Manag.
- Urban Pesticide Application
- Medical & Vet Entomology
- Principles of Nematology

Allied Courses
- Food Microbiology
- Fund. of Plant Pathology
- Envir. Plant Ident. & Use
- Turfgrass Culture
- Weed Science
- Landscape and Turfgrass Management
- Food Safety and Sanitation
- Construction Materials
- Construction Techniques

Business Courses
- Princ. of Agribusiness Mgmt
- Human Resources Mgmt in Ag Business
- Agricultural Law
- Principles of Marketing
Certificate Programs at RECs

http://solutionsforyourlife.ufl.edu/map/
http://pested.ifas.ufl.edu/
IPM Florida provides statewide, interdisciplinary and inter-unit coordination and assistance for UF/IFAS integrated pest management research Extension and education faculty
Thrips Pest Management

- Thrips 101
- Scouting
- Identification of thrips
- Identification of natural enemies of thrips
- General IPM practices that reduce thrips populations
- Thrips management in specific crops
- Challenges of thrips management
- Tracking thrips resistance to insecticides
- Specialist working group
- Education and training activities
- Grower’s IPM Guide for Florida Tomato and Pepper Production
- Grower’s IPM Guide for Florida Tomato and Pepper Production Screensaver
- Links
  - Vegetables Page
  - Agriculture IPM Page

Downloads
  - Adobe Acrobat
  - Microsoft Powerpoint

UF/IFAS Publications
  - Apribusiness and
Proper species level identification can be difficult:
- small size (adult is <1/10 in.)
- hand lens
- dissecting scope
- compound microscope
- sample to Distance Diagnostic and Identification System (DDIS)
- sampling either with aspirator or white paint board

Photo credit: Lance Osborne
Western Flower Thrips
Frankliniella occidentalis

Adult female
Can be confused with other species

Larva

Photo credits:
Joe Funderburk
Other Thrips Species

Florida flower thrips
*Frankliniella bispinosa*

Melon thrips
*Thrips palmi*

Tobacco thrips
*Frankliniella fusca*

Photo credit: Cheryle O’Donnell

Photo credit: Kelly Sims

Photo credit: Kelly Sims
Thrips Damage

Photo credit: Hank Dankers

Photo credit: Stuart Reitz
Completed Educational Activities

- Chilli thrips polycom training
- Thrips identification and sampling training
- Florida Landscape and Ornamental Thrips Workshop
- Polycom meeting of statewide thrips specialists at UF

Photo credits: Lyle Buss
Extension Programs

- In-service training
- Field days
- Classroom education
- Diagnostic training
Information on IPM Education and Applications

http://ipm.ifas.ufl.edu