Ent 5500: Biological Pest Control

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Course Description:
This course covers the philosophy, science, and practice of biological control. Successes and failures, and methods, of biological control of insects, mites, mollusks, nematodes, and weeds will be explored. Biology of major biological control agents including parasites, predators, and pathogens will be covered and hands on experience for work with major groups will be provided through a team research project. Methods of enhancing biological control through importation, conservation, and augmentation will be discussed together with discussions on commercial developments, regulations, and controversies about non-target effects of biological control.

Credits: 3
Lectures: 2/week
Laboratory: 1/week

Level: Senior undergraduate and Graduate

Learning Objectives: Students will learn:
- The ecological basis of biological control and its utility in sustainable pest management
- Host-parasite (or pathogen) relationships and biology of various biological control agents of insects, mites, slugs, nematodes and weeds
- Methods of mass-production, formulation and delivery of various biological control agents
- Factors affecting the successes and failures of biological control agents and ways to manage them to achieve predicative results
- Research approaches to discover, assess, and develop novel biological control agents
- The human influence on natural biological control

Course Grading:
Mid-term Examination: 30%
Final Examination: 30%
Research Project: 40%

**Course Grading Scale:** Standard percent scale, no curve. (e.g., 91-100% = A; 89-90 = A-; 87-88 = B+; 81-86 = B; 79-80 = B-; 77-78 = C+; 71-76 = C; 69-70 = C-; etc.)

**Schedule of lectures and labs:**

**Week 1**
- Introduction to the course, forms of biological control, and descriptions of functional groups of biological control agents
- Ecological basis for biological control: predator-prey dynamics
- Laboratory: Team research project discussion

**Week 2**
- Classical biological control: foreign exploration, quarantine, establishment, and evaluation
- Biology of parasitic and predatory insects
- Laboratory: Team research project and sampling and identification of predators and parasitoids

**Week 3**
- Biology of predatory mites and spiders
- Mass rearing and utilization of parasitic and predatory insects and mites
- Laboratory: Team research project and visit to the quarantine lab

**Week 4**
- Biology, mass-production, and application of entomopathogenic nematodes
- Biology of entomophilic nematodes
- Laboratory: Team research project

**Week 5**
- Biology and mass-production of insect-pathogenic bacteria
- Biology of insect-pathogenic protozoa
- Laboratory: Team research project

**Week 6**
- Biology and mass-production of insect-pathogenic fungi
- Biology and mass-production of insect-pathogenic viruses
- Laboratory: Team research project

**Week 7**

**Mid-term Examination (30%)**
- Biological control of weeds
- Laboratory: Team research project

**Week 8**
- Biological control of slugs
- Biological control of plant-parasitic nematodes
- Laboratory: Team research project

**Week 9**
- Registration of microbial pesticides
- Genetically-engineered crops
Laboratory: Team research project

Week 10
Endophytes as biological control agents
Tritrophic interactions and biological control
Laboratory: Team research project

Week 11
Habitat manipulation and natural biological control
Landscape manipulation and biological control
Laboratory: Team research project

Week 12
Soil microbes and induced plant defenses against pests
Integrated pest management (IPM) and biological control
Laboratory: Research project presentation

Week 13
Controversies in biological control
Non-target effects of biological control agents
Laboratory: Research project presentation

Week 14
Final Examination (30%)

Academic Integrity:
Please note that the university policy will serve as the basis for dealing with any such issues in this course. http://studentaffairs.osu.edu/pdfs/csc_12-31-07.pdf

Special Needs and Accommodations:
Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. Please contact the Office for Disability Services at 614-292-3307 (Fax: 614-292-4190; TDD: 614-292-0901) in room 150 Pomerene Hall, 1760 Neil Ave, Columbus, Ohio 43210 to coordinate reasonable accommodations for students with documented disabilities.
http://www.ods.ohio-state.edu/

Incomplete Grade Policy:
Incomplete grades will be given only in special circumstances as outlined in university policy.

General Information:
Additional information on general Ohio State University Policies can be found at:
http://trustees.osu.edu/ChapIndex/index.php

Late Policy:
A report that is handed in late will be reduced in value 10 percent per day that it is late.