

**PLS 404
INTEGRATED WEED MANAGEMENT
SPRING 2016**

Lecture: MWF 9:00 – 9:50 am, N12 Ag Science North

Lab: M 1:00 – 2:50pm, GH 12 (greenhouse)

Instructor: Dr. Erin Haramoto
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I'm available by appointment for office hours. Please don't hesitate to contact me for a meeting.

Successful weed management requires knowledge of the biology and ecology of the weeds to be managed, the desired plant in which they are growing, AND the impact of management tactics on current and future weeds. The integration of this knowledge will result in a weed management strategy that is economical, effective, and environmentally responsible. This course is divided into three sections to effectively cover such diverse subjects. The first section pertains to the biology and ecology of weeds, the next section covers weed management techniques, and the last integrates concepts learned in the first two sections of the course to develop weed management strategies.

Student Learning Outcomes

1. Students will demonstrate proficiency in scientific and technical principles of the plant, soil, and environmental sciences and illustrate their interrelatedness.
2. Students will communicate clearly in oral and written formats.
3. Students will develop the critical thinking skills required to define a problem, retrieve and evaluate information, and propose and evaluate potential solutions.
4. Students will be able to address agricultural production from a global perspective.
5. Students will obtain the foundational skills for lifelong learning.

Course Objectives

1. Learn basics of weed biology (what makes weeds so weedy) and ecology (how weeds and desired plants interact with each other and with the environment)
2. Develop a broad understanding of current weed management tactics, including their limitations and mechanisms responsible for herbicide resistance in weeds
3. Learn the principles of integrated weed management and foundational tactics including cultural, physical, chemical, and biological contributions to management
4. Continue to develop:
 - a. Weed identification skills

- b. Familiarity with the scientific method—observe, hypothesize, experiment, analyze, communicate
- c. Critical evaluation skills through reading and critiquing journal and popular press articles
- d. Scientific communication skills, both written and oral

Required readings

Required and optional readings will be put on Canvas throughout the semester. These will include book chapters, primary literature, extension bulletins, and popular press articles. Please read assigned readings *before* class—see the section below on participation.

Attendance

I expect you to attend all lectures and labs—this includes being on time and not leaving early! I will take attendance. Excused absences are, of course, ok. Please notify me **at least one week in advance** when you will be absent for a sporting or academic event, or for a religious holiday. Notify me as soon as possible about illnesses and emergencies. Note that I may ask for documentation justifying these types of absences if they become frequent.

Participation / quizzes

You are expected to participate fully in class and lab; your participation grade will increase as you become more engaged in the class and lab and may decrease if you are consistently a detached zombie. In addition to your engagement in class discussions, participation will be evaluated through two means:

- a short quiz at the end of lecture on one random day each week to gauge your understanding of lecture material. I will drop your lowest quiz score in determining this portion of your grade.
- questions that I will ask during lecture about readings and assignments. Note that answering these questions will require you to read in advance!!!

Laboratory

You are expected to attend and participate in all laboratory activities, and attendance counts (quite a bit) towards your participation grade. The laboratory exercises are designed to augment information covered in the lectures. Your progress in the laboratory portion will be gauged via quizzes on weed identification (we will likely have three and I will drop your lowest grade), your lab reports, and your participation in activities.

Assignments

I will be assessing your progress in the course through assignments rather than through exams. This policy is meant to keep you more engaged with course material, to apply concepts and knowledge you gain in the course, and to practice written and verbal communication. Assignments will include, but may not be limited to:

- Frequent one-page responses (typically question/answer format) to required readings

- two lab reports (short answers to questions I provide)
- One paper on a pre-approved relevant topic written as a popular press article—as if you were explaining this concept to your parents or your neighbor
- An oral presentation—an “elevator talk”—in which you distill down the core of a scientific paper into a 3-5 minute presentation using only three slides.

Due dates will be clearly posted on the assignment and on Canvas. You are granted one “get out of jail free” card to use as you see fit with assignments. This allows you to turn in ONE assignment one day late without penalty and with no questions asked. This ABSOLUTELY CANNOT be used for the last due date of the final project. SERIOUSLY.

Final project

You will create an integrated weed management plan for an operation (pre-approved) of your choosing. Parts of this project will have due dates throughout the semester; details and due dates will be clearly posted on Canvas and discussed throughout the semester.

Grading

Lecture

Participation (including lecture quizzes)	100 points (~13.5%)
Assignments based on readings	150 (~20.3%)
Paper	100 (~13.5%)
Oral presentation	50 (~6.8%)
Final project	200 (~27%)

Lab

Weed ID quizzes (2)	40 (~5.5%)
Reports (2)	100 (~13.5%)
SUM	740

All students will receive a mid-semester evaluation of their progress in the course

Academic accommodations due to disability

If you have a documented disability that requires academic accommodations, please see me as soon as possible. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257- 2754, email address jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Administration

Canvas: Assignments, readings, your grades, and lecture notes will all be on Canvas. If you have difficulty with accessing Canvas, go to any Student Computing Service lab around campus (<http://www.uky.edu/SCS/documents/labs.pdf>), visit ‘The Study’ (<http://www.uky.edu/AE/>), the helpdesk@uky.edu, or phone 218-4357 for a quicker response.

Communication: I will communicate with you primarily through your UKY email address. Not checking email is not an acceptable reason for missing deadlines and important news.

Behavior

General: Comply with the Univ. of Kentucky's **CODE OF STUDENT CONDUCT**

Punctuality: I'll be on time, and I expect you to as well. I will end class on time, and I expect you to stay until the end of class.

Private conversations during class: Don't have them. If you have a question or if something is unclear, please raise your hand!

Devices: Turn **both volume and vibrate off** on your phone and anything else that makes noise. Laptops, tablets, and phones can be used in class to take notes. If you are distracted by someone's electronic device, or what they're doing on said electronic device, please let me know and I'll reconsider this policy.

Cheating & Plagiarism: Cheating is in no way tolerated and you will be penalized when you are caught. Plagiarism is also not tolerated; we will discuss plagiarism throughout the semester so you are clear what this means. Penalties include an immediate failing grade and a letter of warning that shall be kept in the office of the registrar as a record of the event. The full penalty will be determined in consultation with the Chair of the Department of Plant and Soil Sciences and the Dean of the College.

Lecture topics:

- Ecology basics
 - Niches
 - Carrying capacity
 - r vs. K selection
 - C-S-R classification
 - Invasions
- Weed biology basics
 - Classification
 - Characteristics of successful weeds
 - Phenotypic plasticity
 - Seed dormancy
 - Germination, emergence, establishment
 - Seed / propagule banks
 - Dispersal
- Weed / crop ecology
 - Competition—density and timing impacts, sensing early competition
 - Allelopathy
- Types of weed management
 - Cultural
 - Physical
 - Biological
 - Chemical
- Management in different systems
 - Non-crop areas
 - Pastures
 - Turf

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- Aquatic systems
- Integration

Tentative Laboratory Schedule (subject to change!):

January 25	Fun with seeds and rhizomes—examine propagules of different problem KY weeds Intro to weed ID using greenhouse specimens Seedbank discussion and call for soils Take initial measurements on resistant Palmer amaranth and marestail individuals, treat with glyphosate
February 1	Seedling ID using seedbank samples from north farm (Spindletop), establish student seedbanks More weed ID, seed ID Establish plant competition / critical weed threshold experiment (radishes and two species of “weeds” grown at different densities)
February 8	Potential weed science career day—featuring scientists from different disciplines attending the Weed Science Society of America annual meeting (as technology allows)
February 15	Establish residue-mediated effects experiment: terminate cover crops, plant weed (small) and crop (large) seeds
February 22	Initial measurements on marestail plants, glyphosate treatment
February 29	QUIZ #2 Library session—evaluating sources of information, research tools
March 7	Mid semester regroup Refresher on grass and grass-like species ID—auricles and ligules Count emergence in residue-mediated effects experiment. Plant additional seeds. Measure treated marestail plants (2 WAT—weeks after treatment)
March 14	NO LAB—SPRING BREAK WOO HOO!!!

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March 21 Harvest radishes and weeds in plant competition / critical weed threshold experiment
Count second round of emergence in RME
Measure treated marestail (4 WAT)

March 28 Field trip—cover crop farm in Fayette County???

April 4 QUIZ #3
Field trip— turf site (likely UK athletic facilities)

April 11 Field trip—Spindletop—weed ID and sprayer technology

April 18 Field trip— Spindletop or Horticulture Research Farm—weed ID

April 25 Field trip—cultivation demo at Horticulture Research Farm