

EPWS (AGRO) 311/511 - INTRODUCTION TO WEED SCIENCE

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TEXT: Applied Weed Science, 3rd edition. M.A. Ross and C.A. Lembi. 2009. Prentice-Hall, Inc. Weeds of the West, Western Society of Weed Science (suggested, available through NMSU Cooperative Extension Service room N140 Skeen Hall or www.wsweedsociety.org)

HANDOUTS: The majority of the handouts provided in the lecture and laboratory will be posted on Blackboard CE8 (<https://learn.nmsu.edu/webct/logon/14675553121>). Students are expected to download and read materials before class or lab.

ADDITIONAL REFERENCES:

University of Nebraska, Library of Crop Technology, <http://croptechnology.unl.edu/>
Principles in Weed Management 2nd edition - R.J. Aldrich and R.J. Kremer. 1997. Iowa State Univ. Press
Weed Science: Principles and Practices, 3rd ed. F.M. Ashton and T.J. Monaco
Weed Science, Journal of the Weed Science Society of America
Weed Technology, Journal of the Weed Science of America
Invasive Plant Science and Management Journal Weed Science Society of America
Weed ID Guide and CD ROM, Southern Weed Science Society
An Illustrated Guide to Arizona Weeds. K.F. Parker
Weeds and Poisonous Plants of Wyoming and Utah, T.D. Whitson ed.
Arizona Flora, T.H. Kearney and R.H. Peebles
Weed Control Manual and Herbicide Guide, 2002
CDMS web site: herbicide labels and information <http://www.cdms.net/>
Other web sites are linked on Blackboard

COURSE DESCRIPTION: A discussion of weeds, invasive plants and methods of weed management with an emphasis on integrated weed management. The course is divided into lecture and laboratory sections.

LECTURE: The lecture portion of the class will include discussions of weed and invasive plant biology and ecology, weed interference and invasions, and methods of weed management including prevention, cultural control, mechanical control, biological control and chemical control. Herbicides will be discussed by family with regard to chemical structure, selectivity, mode and site of action, and dissipation. Five 40-minute lecture exams will be given during the last half of the class period plus a 2-hour comprehensive examination during finals week.

Exam dates are:

Exam 1- September 10

Exam 3 - October 15

Exam 5 - November 19

Exam 2- September 29

Exam 4 - November 3

The final exam will be comprehensive and given on December 10, 10:30 a.m. - 12:30 p.m.

Make up exams will be given only with prior approval or doctor's excuse.

Students enrolled for graduate credit (**EPWS 511**) are required to write a literature review on a topic of their choice in Weed Science. The topic must be different than the student's thesis topic. Each graduate student must discuss their topic with me prior to beginning their paper and before September 30. Research papers are due December 1 (before 5:00 p.m.). Papers should be no longer than 10 double spaced, typed pages and should thoroughly discuss the available literature on the chosen topic. Format should include an introduction, literature review, summary and references and should follow the directions to contributors for Weed Science (<http://www.wssa.net>). **Graduate student exams will also be graded separately from undergraduate exams.**

LABORATORY: The laboratory will concentrate on practical aspects of weed management including weed identification, weed biology, sprayer calibration, herbicide selectivity and injury symptoms, herbicide labels, and weed management recommendations. The laboratory schedule and outline of assignments are on a separate handout. Many of the labs will have assigned worksheets to complete during the laboratory period or over several laboratory periods.

Students are expected to print and read the lab materials before the lab each week. All of these worksheets must be turned in to the instructors on the due date listed in the report materials to receive full credit (150 points) for the lab reports. Quizzes will cover material discussed and observed during laboratory sessions. No make-up quizzes will be given for Quiz 1. Make up quizzes for Quiz 2 will be given only with prior approval or a doctors excuse.

A weed collection is required for satisfactory completion of this course. Thirty species are required and are due on or before November 5. In the event that an unsatisfactory (less than 25 specimens or extremely poor quality specimens) weed collection is turned in or no collection is turned in, the student will earn zero points (*13.8% of the course grade*) for the assignment. Directions for the collection are given in a separate handout.

The weed recommendation exercise will be a group assignment given on August 27 and due on December 3. Each group will have 3 to 4 people and will be assigned a location near campus. The objective of the exercise is to evaluate and develop a weed management recommendation for the location assigned. The assignment consists of two parts: Each group will turn in a draft recommendation for review on November 12 (returned on November 17) followed by the final written weed management recommendation on December 3. In addition, each group will present the situation and their recommendation in class on December 3. Students will be asked to evaluate the presentations made by other groups (the score for the oral presentation will be the average of student and instructor evaluations). Attendance for the weed recommendation presentations on December 3 is required to receive full credit for this exercise. Specific directions for this exercise will be given in a separate handout.

GRADING: The total number of points for the semester equal 2900 for undergraduate students (graduate students equal 3100 including the research paper) - 1400 points over lecture assignments and exams and 1500 points for the laboratory. All grades will be posted on Blackboard CE8. The assignments can earn the following total points:

<u>Lecture (EPWS 311)</u>		<u>Lecture (EPWS 511)</u>		<u>Laboratory (EPWS 311 & 511)</u>	
<u>Task</u>	<u>Points</u>	<u>Task</u>	<u>Points</u>	<u>Task</u>	<u>Points</u>
Exams (5) 200 points per exam	1000	Exams (5) 200 points per exam	1000	Calibration problem set	100
				Lab reports	150
				Weed control recommendation	450
				Review of draft - 50 points	
				Oral presentation – 200 points	
				Written recommendation - 200	
				Weed collection	400
Final Exam	400	Final Exam	400	Quiz 1 (Weed ID)	200
		Research Paper	200	Quiz 2	200
Total Points	1400	Total Points	1600	Total Points	1500

Final grades for the course will be assigned based on performance in both the lecture and laboratory portions of the class.

For students in the 311 class, final point totals of 2610-2900 = A, 2320-2609 = B, 2030-2319 = C, 1740-2029 = D, < 1740 = F.

For students in the 511 class, final point totals of 2790-3100 = A, 2480-2789 = B, 2170-2479 = C, 1860-2169 = D, <1860=F.

Student Information. For a discussion of student responsibilities please see the NMSU Student Handbook 2009-2010.

Feel free to call Jerry Nevarez, Director of Institutional Equity, at 575-646-3635 with any questions you may have about NMSU's Non-Discrimination Policy and complaints of discrimination, including sexual harassment.

If you have, or believe you have, a disability and would benefit from accommodations, you may wish to self-identify. Feel free to call Michael Armendariz, Coordinator of Services for Students with Disabilities, at 575-646-6840 with any questions you may have on student issues related to the Americans with Disabilities Act (ADA) and/or Section 504 of the Rehabilitation Act of 1973. All medical information will be treated confidentially.

Draft Lecture Schedule – timing and order may change according to class need and instructor and guest lecturers' schedules

- August 20 Introduction to course and weed ecology (Chapters 1-6 of text)
- August 25 Persistence characteristics of weeds and invasive plants
- August 27 Persistence characteristics continued
- September 1 Weed interference characteristics
- September 3 Weed interference continued
- September 8 Harmful characteristics of weeds and invasive plants
Integrated Weed Management (Chapter 7)
- September 10 Integrated Weed Management – introduction and framework
Exam 1
- September 15 Integrated Weed Management framework
Practice scenarios
- September 17 Introduction to herbicides – public perceptions and herbicide registration requirements (Chapter 8)
- September 22 Characteristics of herbicides – selectivity (Chapters 8-10, 23, 24; Background Chapters 5, 6).
- September 24 Herbicide selectivity
Herbicide classification schemes
- September 29 Herbicide classification and symptom classes
Exam 2
- October 1 Fate of pesticides in the environment (Chapters 9, 10, p. 137-143, 486-493)
- October 6 Herbicide resistance – factors affecting selection for resistance and resistance management strategies (Chapter 11)
- October 8 Herbicide resistance – factors affecting selection for resistance and resistance management strategies
- October 13 General Growth Inhibitor symptom class (Chapter 15, p. 179-181)
- October 15 General Growth Inhibitor symptom class
Exam 3
- October 20 General Growth Inhibitor symptom class
Photosynthesis Inhibitor symptom class (p. 176-177, 260-268)
- October 22 Photosynthesis Inhibitor symptom class
- October 27 Biological Control of Weeds – guest lecturer Dr. David Thompson (p. 122-128)

October 29 Biological Control of Weeds

November 3 Contact Herbicide symptom class (Chapter 14, p. 178-179, 268-270)
Exam 4

November 5 Contact Herbicide symptom class

November 10 Hormone Herbicide symptom class (p. 170-172, 226-237)

November 12 Hormone Herbicide symptom class

November 17 Metabolic Growth Inhibitor symptom class (p. 172-175, 176; 237-251, 254-259)

November 19 Metabolic Growth Inhibitor symptom class
Exam 5

November 24 Thanksgiving break

November 26 Thanksgiving break

December 1 Integrated Weed Management Strategies (Chapters 16-21)

December 3 Integrated Weed Management

December 10 Final Exam

EPWS (AGRO) 311/511
LABORATORY SCHEDULE, FALL 2009
Place: SKH W139
Time: Th 12:25 - 2:25 p.m.

T.A.: James Hill
email: jhill@nmsu.edu
Office hours: W 9:30-11:30
OR by appointment
Location: Skeen Hall N245

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| August | 20 | Introduction
Weed Collection, Weed I.D./Weed Characteristics |
| | 27 | Introduction to weed recommendation exercise (Chapters 7, 16-20; web references), Weed I.D. |
| September | 3 | Weed I.D./Weed Characteristics. Field trip to weed garden |
| | 10 | Herbicide Formulations and Surfactants (Chapter 22; Lab Report 30 pt) |
| | 17 | Calibration - practice problems, homework problems
Spray equipment (Chapter 23; Lab Report 20 pt) |
| | 24 | Herbicide selectivity (Chapter 9), calibration, apply preemergence treatments |
| October | 1 | QUIZ 1 – WEED I.D. (Fresh specimens)
Work on weed recommendation exercise, Calibration |
| | 8 | Leaching experiments (Chapter 10), Herbicide selectivity (Chapter 9), apply postemergence, observe preemergence herbicides; Calibration Homework DUE |
| | 15 | Herbicide Labels, MSDS (Lab Report 30 pt) |
| | 22 | Observe leaching columns (Lab Report due, 20 pt) and herbicide selectivity treatments (Lab Report due, 50 pt), review calibration homework, TURN IN all lab worksheets. |
| | 29 | QUIZ II - (over material covered after Quiz I) |
| November | 5 | Trouble Shooting Weed Management Problems (Chapter 25), Dr. Phil Banks, Marathon Consulting; WEED COLLECTIONS DUE |
| | 12 | Weed Control Recommendations; DRAFT RECOMMENDATION DUE. |
| | 19 | Weed Control Recommendations |
| December | 3 | PRESENTATIONS; WRITTEN RECOMMENDATIONS DUE |

EPWS 311/511 Introduction to Weed Science: Course Objectives

The major objectives of the course are to provide an overview of the discipline of Weed Science and discuss the tools used in effective weed management programs. Although much of the semester is spent discussing herbicide families, emphasis will be placed on the fact that herbicides are only one aspect of effective weed management programs.

1. Students should be able to spell and define the terms commonly used when describing weeds and weed management technologies.
2. Students should be able to describe characteristics of weeds that make management a challenge and increase their survival and invasiveness in disturbed agroecosystems and natural ecosystems.
3. Students should be able to discuss why managing weeds is important for maximizing economic yield of agronomic and horticultural crops.
4. Students should be able to discuss why weeds are not just a problem for agricultural crops but that introduction of weeds (exotic plants) into native areas will impact wildlife, native habitats, recreational areas, and the preservation of endangered species.
5. Students should be able to discuss the methods and technologies available for weed management and what is meant by 'integrated weed management'.
6. Students should be able to discuss the differences in weed management objectives and technologies available for managed ecosystems (agricultural production, turf, orchards, etc.) and natural ecosystems (native lands, aquatics, rangeland, wildlands).
7. Students should be able to list and discuss the factors that influence herbicide fate in the environment.
8. Students should be able to explain the principles of herbicide selectivity, why many herbicides will harm some plants and not other plants.
9. Students should be able to describe herbicide classification based on symptoms, mode of action, site of action, and chemistry.
10. Students should be able to describe the different herbicide symptom classes.
11. Students should be able to describe the following when they see a herbicide structure or chemical name: herbicide family, symptom class, mode of action, selectivity, example of use (how it is applied and situations used in), types of weeds controlled, persistence characteristics, unique characteristics and/or problems associated with its use.

12. Students should be able to discuss the problems associated with the use of herbicides: weed resistance, persistence that is too long or too short, off-target movement, food safety and others.
13. Students should be able to discuss how development of crops genetically modified or bred by conventional means have impacted agricultural technology and production, weed management and development of herbicide resistant weeds.
14. Students should be able to identify many of the common weeds found in southern New Mexico.
15. Students should be able to list the components of a spray system, explain how a sprayer is calibrated, and do the calculations involved with calibration.
16. Students should be able to recognize injury symptoms and the agricultural practices which induced them (i.e. sandy soil, bad nozzle, overlap, cultivator).
17. Students should be able to list and describe the common symptoms exhibited by sensitive plants after treatment with herbicides having different modes of action.
18. Students should be able to list and describe herbicide formulations and when and how additional adjuvants are used.
19. Students should be able to read and use a herbicide label and be able to make weed control recommendations for some situations, including those situations where the use of a herbicide may not be the best recommendation.