

Soil Science-Plant Path 323

Soil Biology

Fall Semester, 2015

When: MWF, 11:00 A-11:50 A
Where: Lectures: Soil Science Bldg., Room 357
 Labs: Russell Lab. Bldg., Room 187 - Sept. 5, 26, Oct. 3, 17, 24, 31 Nov. 7, 14
Instructors: Prof. William Hickey, Room 205B, Hiram Smith Annex, Phone: 262-9018
 E-mail: wjhickey@wisc.edu
 Prof. Ann MacGuidwin, Rm. 484 Russell Laboratories, Phone: 263-6131
 E-mail: aem@plantpath.wisc.edu
Materials: Textbook *Soil Microbiology: An Exploratory Approach* (M. Coyne) selected readings
 (below) and slides made available on Learn@UW
Grading: Grades will based on participation (10%), homework assignments (24%), and scores
 from two exams (66%).

Mtg.	Day	Date	Topic	Instructor
1	W	Sept. 2	Soil habitat	WH
2	F	4	Soil invertebrates	AM
3	M	7	Labor Day	
4	W	9	Soil prokaryotes	WH
5	F	11	Microbes and soil formation	WH
6	M	14	Microbes and soil formation	WH
7	W	16	Microbes and agriculture	WH
8	F	18	Microbes and agriculture	WH
9	M	21	Plants influence soil communities	AM
10	W	23	Plants influence soil communities	AM
11	F	25	<u>Life in the rhizosphere</u>	AM
12	M	28	Micro- and mesofauna	AM
13	W	30	<u>Fauna and the microbial loop</u>	AM
14	F	Oct. 2	<u>Nematodes as indicator species</u>	AM
15	M	5	Microbes and climate change	WH
16	W	7	Microbes and climate change	WH
17	F	9	Microbes and climate change	WH
18	M	12	Microbes and climate change	WH
19	W	14	Microbes and climate change	WH
20	F	16	Adaptations for living in soil	AM
21	M	19	EXAM 1	
22	W	21	Soilborne diseases of plants	AM
23	F	23	<u>Plant pathogenic bacteria</u>	AM
24	M	26	Plant pathogenic fungi	AM
25	W	28	Plant pathogenic nematodes	AM
26	F	30	<u>Root endophytes</u>	AM
27	M	2-Nov	Suppressive soils	AM

28	W	4	Managing soilborne diseases	AM
29	F	6	<u>Biological control</u>	AM
30	M	9	Soil genomics	WH
31	W	11	Soil genomics	WH
32	F	13	<u>Studying soil biology in the field</u>	AM
33	M	16	Microbes and environmental quality	WH
34	W	18	Microbes and environmental quality	WH
35	F	20	Microbes and environmental quality	WH
36	M	23	Microbes and environmental quality	WH
37	W	25	Thanksgiving recess	
38	F	27	Thanksgiving recess	
39	M	30	Microbes and environmental quality	WH
40	W	Dec. 2	Microbes and environmental quality	WH
41	F	4	Microbes and environmental quality	WH
42	M	7	Earthworms	AM
43	W	9	Soil Biology and Urban Gardens	AM
44	F	11	Impact of climate change and land use on soil organisms	AM
45	M	14	Wrap-up and discussion	AM & WH

Reading assignments

Mtg Reading

- 1 Soil Microbiology – Chapters 12 and 14
- 2 Soil Microbiology - Chapters 5 and 6
- 3 Labor Day
- 4 Soil Microbiology – Chapters 8 and 10
- 5-8 Soil Microbiology – Chapters 15-20
- 9-10 Reading (Learn UW) - Buffet hypothesis for microbial nutrition in the rhizosphere
- 11 What is the Rhizosphere? www.soilhealth.com/soils-are-alive/how-do-soil-organisms-affect-plants/p-01.htm#TopOfPage
- 12 Soil Microbiology – Chapters 5 and 6
- 13 Soil Microbiology – Chapter 4
- 14 Reading (LearnUW) - Nematode indicators of organic enrichment
- 15-19 Soil Microbiology – Chapters 18-29
- 20 Reading (LearnUW) - Microfaunal interactions in the rhizosphere
- 21 EXAM 1
- 22 Soilborne Plant Pathogens <http://www.soilhealth.com/soils-are-alive/how-do-soil-organisms-affect-plants/p-04.htm#TopOfPage>
- 23 Reading (LearnUW) - Ziems, A. D. Common scab of potatoes. <http://ianrpubs.unl.edu/live/g1940/build/g1940.pdf>
- 24 Take-all root rot. *The Plant Health Instructor*. DOI:10.1094/PHI-I-2000-1020-01

- 25 [Wherrett, A., and V. Vanstone. Cereal cyst nematode. https://s3.amazonaws.com/soilquality-production/fact_sheets/9/original/Biol_-_Cereal_Cyst_Nematode_web.pdf](https://s3.amazonaws.com/soilquality-production/fact_sheets/9/original/Biol_-_Cereal_Cyst_Nematode_web.pdf)
- 26 Reading (LearnUW) - What are endophytes?
- 27 Reading (LearnUW) - The Rhizosphere Microbiome
- 28 Reading (LearnUW) - Sustainable Management of Soilborne Diseases
- 29 Reading (LearnUW) - Microbial inoculant
- 30 No reading
- 31-32 No reading
- 33-41 Soil Microbiology – Chapters 30-32
- 42 Reading (LearnUW) - The future of soil invertebrate communities in polar regions
- 43 TBD
http://www.fao.org/fileadmin/user_upload/GSP/docs/WS_managinglivingsoils/Montanar%09ella_GSBI_2012.pdf
- 44 No reading

Grading Information

Homework Assignments (24% total). Assignments should be sent to the course dropbox no later than 10:00 a.m. on the day they are due. **Late assignments will not be accepted.** Each assignment is worth 2% of your final course grade.

Schedule:

<u>Assignment</u>	<u>Posting date</u>	<u>Due date</u>
1	Sept. 11	Sept. 14
2	Sept. 18	Sept. 21
3	Sept. 25	Sept. 28
4	Oct. 2	Oct. 5
5	Oct. 9	Oct. 12
6	Oct. 16	Oct. 19
7	Oct. 23	Oct. 26
8	Oct. 30	Nov. 2
9	Nov. 6	Nov. 9
10	Nov. 13	Nov. 16
11	Nov. 20	Nov. 23
12	Dec. 4	Dec. 7

Exams (66% total) There will be two exams. Exams will cover material from lectures, readings, in-class activities, and the homework assignments. The first will be an in-class exam on October 21 (50 minutes) and the format will be true/false, multiple choice, and short answer (up to 3 sentences). Requests for taking the exam on another date will not be considered after 10:50 a.m. on October 20th.

The second exam will be a take-home format. The exam will be distributed on the last day of class (December 14) and will be due in the dropbox on the LearnUW site no later than the end of the scheduled final exam on December 17th at 12:25 p.m. The exam will focus on the second half of the class, but students should expect to use all of the knowledge gained in the course to answer questions.

Participation (10%) We value active learning and encourage students to engage in the course by coming to class, taking notes, asking questions, and contributing to discussions. Three classes may be missed with no penalty to your participation grade.

Grading Scale

A	91 – 100
AB	88 – 91
B	83 - 87
BC	78 – 81
C	70 – 77
D	60 - 69