BIOLOGY 4512WA

PLANT PROPAGATION

WINTER 2014

Dr. Peter Lee

Printed January 22, 2014. Fixed broken links in Lab 3, Grafting

Contents

About the cover

Class of 2014 successfully air layering a *Ficus* sp.

Acknowledgments

Growth chambers, glassware, soil analysis, Standard Operating Procedures (SOP) and technical assistance are provided to students courtesy of Lakehead University Environmental Laboratory (LUEL). LUEL is an ISO17025 laboratory accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). For more information about the lab you can visit their website at http://lucas.lakeheadu.ca/luel/. Job opportunities in the lab may be available through Dr. Lee's research funding or the Lakehead University Work Study Program. If interested, drop a resume off to CB3022 any time!

Lecture schedule for 2014

Classes begin		**January 6**
Week 1	Introduction to and History of Plant Propagation	January 6
Week 2	Propagation Environment; Biology of Propagation	January 13
Week 3	Propagation Environment; Grafting	January 20
Week 4	Soil Characteristics and Plant Nutrition	January 27
Week 5	Test 1 and Propagation by Cuttings	February 3
Week 6	Propagation Techniques-cuttings, layering	February 10
Mid-year Study Week	**NO CLASSES**	**February 17**
Week 7	Micropropagation Principles	February 24
Week 8	Micropropagation Techniques and Test 2	March 3
Week 9	Seed Production and Propagation Principles	March 10
Week 10	Seed Production and Propagation Techniques	March 17
Week 11	Vegetative Propagation Techniques-bulbs, corms, tubers, rhizomes and Test 3	March 24
Week 12	Commercial Tour of Greenhouse	March 31
Last day of classes		**April 4**
Examination period		**April 7–17**

Laboratory schedule for 2014

Classes begin		**January 6**
Lab 1	Intro and Facilities Tour	January 8
Lab 2	Substrates and Cuttings	January 15
Lab 3 & Lab 4	Grafting & Air Layering	January 22
Lab 5–setup; Quiz 1	Soil Toxicity	January 29
Lab 2–take down	Substrates and Cuttings	January 29
Lab 6	Soil Chemistry	February 5
Lab 5–take down	Soil Toxicity and Chemistry	February 12
Mid-year Study Week	**NO CLASSES**	**Feb 17–21**
Lab 7–start; Quiz 2	Micropropagation/Tissue culture	February 26
Lab 7-con't	Micropropagation/Tissue culture	March 5
Lab 8—start	Seed treatments	March 12
Lab 9–PRESENTATIONS	Facilitated Poster	March 19
Lab 7 & Lab 8–end	Micropropagation/Tissue culture	March 26
Lab 8-end; Lab 3, 4-end	Graft, air layer, seeds	March 19–31
Lab 10; Quiz 3	Tour of commercial greenhouse	April 2
Lab books	Random evaluations	**ANY LAB DAY!**
Last day of classes		**April 4**
Official examination period		**April 7–17**

Mark allocation

Break down of marks for this course are as follows:

LABORATORY	**50%**
LECTURE	**50%**
COURSE TOTAL	**100%**

The **lecture component** will be evaluated as follows:

Term Test 1	10%
Term Test 2	10%
Term Test 3	10%
Facilitated Poster	20%

All **term tests** will be written during class (dates to be determined).

The **facilitated poster presentation** must involve some scientific aspect of plant propagation that is of regional interest to local populations and/or issues in northwestern Ontario. Your proposal or "pitch" for the region MUST be realistic and commercially viable. Presentations are conducted by groups of students. Consult with Dr. Lee concerning potential topics BEFORE starting. Basically, you are to create a poster on your proposal and orally present the information to the class and guest judges. Your ability to disseminate information now will prepare you for future student poster competitions at conferences! Further details are presented in Lab 9. A marking rubric will be posted on Desire to Learn (D2L).

The **laboratory component** will be evaluated as follows:

Assignment	5%
Formal Lab Reports	30%
Quizzes	5%
Lab Notebook	10%

Assignment 1 will be marked on a rubric posted on D2L. You will create a **one page factsheet** on a randomly drawn plant/greenhouse pest or disease. Students are to include references on a separate page. You should follow the referencing format used in the Canadian Journal of Plant Sciences (see the instructions for authors page), although some modifications are allowed. See Section 1.6 and D2L for additional submission information.

Formal laboratory reports are required for **Propagation Media and Stem Cuttings** (Lab 2), **Soil Toxicity and Soil Chemistry** (Lab 5 and Lab 6, combine data) and **Seed Treatments** (Lab 8). Marking rubrics for lab reports will be posted on D2L. Keep your reports short and to the point! Students should closely follow the scientific method; ask a question or propose a hypothesis, test it, present your findings (data) and discuss their implications. Lab reports are to be typed and formatted as per the Canadian Journal of Plant Science, converted to PDF format and submitted electronically. This includes line numbering! Use headings and sub-headings as required (e.g. Materials and Methods, Results, Discussion). Label all figures and tables and be sure to reference them in the body of your report. Remember, figure captions are on the bottom, table captions are on the top. DO NOT use vertical lines in tables and reserve horizontal lines for top and bottom rules and header rows. Figures and tables may be embedded in the text or placed at the end as per journal guidelines. Please consult scientific journals and review some peer reviewed literature for further writing style conventions. Additional information is provided in the Report Format Section below. "Writing coaches" may be available through the library.

There will be a few **quizzes** throughout the term. These will be on materials found in this laboratory manual **AND** on materials posted to D2L deemed relevant to the lab. Quizzes are designed to test your knowledge of lab concepts BEFORE the lab takes place. Ideally, you should review all labs in this manual before coming to lab!

Quiz 1 will concern the **Soil Toxicity Lab (Lab 5)**. You should review the Environmental Protection Series document (EPS, 2005) so you understand the test procedures and some basic terminology. **Quiz 2** will concern the techniques involved with **micropropagation** (Lab 7). You should review your textbook and lecture materials in addition to this lab manual. **Quiz 3** will concern the **tour of a commercial greenhouse** (Lab 10). You MUST attend the tour to receive full credit for the quiz. The delivery of the quizzes may occur during the actual lab time slot or may be distributed via D2L.

You **require a hard covered lab notebook BEFORE Lab 1**. There may be some free ones available during the first lecture (first come first serve), otherwise they are available in the bookstore. Prepare your lab book by first numbering each page. Never remove pages of a lab notebook! Lab notebooks will be marked for completeness of observations and answers to questions posed in the text of this manual. Students are encouraged to read lab instructions and research techniques in advance, jotting notes in their books. Inclusion of tables and simple sketches are encouraged.

Lab notebooks will be randomly assessed throughout the term; **YOU WILL NOT RECEIVE PRIOR NOTICE OF LAB BOOK EVALUATIONS**, so bring your lab book to every lab!

Late assignments and lab reports are subject to a **10% penalty per day (including weekends)!** Assignments and laboratories are due by the date posted in the lab manual. An exact time will be indicated by the Teaching Assistant and/or in D2L (usually 11:59 pm). The system will allow you to submit late, but you will still be assessed the late penalty.

Assignment, Report, Term Test and Quiz Due Dates

Assignment 1 (Common Pests and Diseases; Section 1.6)	January 22
Quiz 1 (Pre-lab soil toxicity Lab 5)	January 29
Term Test 1	February 5
Lab Report 1 (Substrates and Root Cuttings Lab 2)	February 12
Quiz 2 (Micropropagation Lab 7)	March 5
Term Test 2	March 5
Lab Report 2 (Soil Chemistry and Toxicity- Labs 5-6)	March 12
Presentations	March 19
Term Test 3	March 31
Lab Report 3 (Seed Treatments-Lab 8)	April 4
Quiz 3 (Post Lab 10)	April 9
Lab notebook	Any lab period