

GUIDE TO THE THESIS IN BOTANY

Production of a thesis in Botany involves the successful completion of three courses:

Botany 4840. Thesis Readings (2) F, S

Literature search and evaluation, culminating in the writing of a thesis proposal. Prerequisites: Botany LS/SI1105 (if previously taken - no longer offered), or Botany SI2104 and Botany SI2114 and Botany 2121, two upper division Botany courses, and approval of thesis advisor.

Botany 4850. Thesis Research (2) F, S

Independent research related to a student's approved thesis proposal. May be repeated as long as satisfactory progress is being made on the thesis topic. Prerequisite: Botany 4840 and approval of thesis advisor.

Botany 4970. Botany Thesis (2) F, S

Written and oral presentation of thesis research results and evaluation. Also includes final evaluation of the student's portfolio and taking of Botany graduation assessment examination. Prerequisites: Botany 4850 and approval of thesis advisor.

Students are urged to complete Bot 4840 in their junior year, spend at least one semester doing thesis research for Bot 4850 credit, and register for Bot 4970 the last semester of their senior year. Prior to registering for Bot 4840, students should consult with the Botany faculty and select a thesis topic. At this time, a thesis committee should also be assembled. The committee must have at least three members: the thesis advisor (who must be a member of the Botany Department faculty) and two other members, one of whom may be from outside the Botany Department.

Obligations of the student:

Establish contact with a thesis advisor and begin discussion of thesis.

Fill out a Botany Thesis Contract form (Appendix I) and obtain appropriate signatures. Enroll in and successfully complete Bot 4840. Distribute copies of the thesis proposal to members of the thesis committee.

Conduct the research while enrolled in Bot 4850.

Enroll in Bot 4970. Write the thesis. The final draft is to be distributed to members of the thesis committee no later than three weeks prior to the start of Finals Week. Give an oral presentation of the thesis to an appropriate audience.

Obligations of the thesis advisor:

Assist the student with topic selection and proposal development.

Help the student complete the Botany Thesis Contract and chair the thesis committee.

Provide appropriate advice and assistance throughout the thesis process.

Oversee the final presentation of the thesis.

Review and evaluate the thesis project.

Obligations of the thesis committee:

Provide appropriate advice and assistance throughout the thesis process.

Review and comment on the completed proposal.

Review and evaluate the thesis.

Publication of the thesis

The student and thesis advisor should discuss the possibility of publishing parts of or the entire thesis upon its completion. An agreement about the authorship and order of authors should be reached early in the development of the thesis proposal. Students should be aware that publication may incur costs (page and reprint charges) that the Botany Department may not be able to subsidize, though every effort will be made to find support for this and related endeavors (e.g., presentations at scientific meetings). An agreement about ownership of patents that might arise from the research should also be reached early in the process. See the WSU Policy and Procedures Manual (PPM), Policy # 5-13 (<http://documents.weber.edu/ppm/5-13.htm>), for details.

Suggested timetable for a thesis

This is a suggested timetable for students interested in doing a Botany Thesis. It is **strongly recommended** that students complete these steps **no later than** the stated semester, earlier if possible.

Junior Year

1st semester – discuss ideas with appropriate faculty; select an advisor and topic; assemble a thesis committee; complete the Botany Thesis Contract.

2nd semester – enroll in Bot 4840; present thesis proposal to thesis committee; arrange for equipment, supplies, space, etc. to conduct the study.

Senior Year

1st semester – enroll in Bot 4850; conduct the research.

2nd semester – enroll in Bot 4970; write the thesis; give an oral presentation of the thesis; obtain final approval and acceptance of the thesis.

Guidelines for the Thesis Proposal

A thesis proposal is a research plan consisting of these sections:

Introduction

States the problem to be examined, gives a brief review of pertinent literature, states the

objectives of the study, and lists any hypotheses to be tested.

Methods

Describes all techniques, specimen handling, data analysis, etc. needed to meet the objectives. Addresses safety issues of the methodology. Remember that you will be keeping a lab and/or field notebook of your activities and data. Refer to *Writing the Laboratory Notebook* by Howard M. Kanare for notebook guidelines.

Supplies and equipment

Lists all major equipment and supplies needed to collect and analyze the data. Indicates degree of familiarity with the equipment to be used.

Literature cited

Lists the literature referred to in the written proposal.

Mechanics and Style of the Thesis

The thesis will follow the standard format for scientific writing. It should be typewritten, double spaced, 12 point font (Times Roman) on good quality paper with 1" margins. Left justify the text. Page numbers should be placed in the lower right corner of the thesis. The style should conform to that of recent issues of a scientific journal in the appropriate area of botany. Refer to *Scientific Style and Format: The CBE Manual for Authors, Editors, and Publishers*, 6th ed., prepared by the Council of Biology Editors Style Manual Committee, for questions of style. A good source of guidance while writing your thesis is *How to Write and Publish a Scientific Paper* by Robert A. Day (any edition) or *Writing Papers in the Biological Sciences* by Victoria E. McMillan (any edition). The classic place to find answers to questions about grammar is the *Harbrace College Handbook*, now in its 13th edition.

The final draft of the thesis will consist of a cover page (see Appendix II) followed by these sections (the dashed line indicates that you should start a new page):

Title

A short descriptive phrase clearly defining the contents.

Abstract

A concise summary of the paper emphasizing the results obtained.

Introduction

A brief definition of the problem investigated, review of pertinent literature, and statement of objectives.

Materials and Methods

A description of all experimental procedures and conditions, data gathering, data analysis, specimens, and other materials used. If the project involved field work, a description of the study area will be included. This section must be complete enough that the results can be reproduced.

Results

The findings of the research. Text, tables and figures (graphs, drawings, photographs, flow charts, etc.) will be used as needed. Tables and figures should not duplicate each other or material in the text. Tables and figures should be numbered so that they can be referred to in the text. Each figure and table should be on a separate page, with these pages placed after the Literature Cited section of the thesis.

Discussion

The principles, relationships, and generalizations shown by the results. This section will show how the results and interpretations agree or disagree with other people's work. It will tell what is significant about the findings. Conclusions are stated and the evidence for each is summarized.

Acknowledgments

Recognizes the assistance of all individuals contributing to the research and/or writing.

Literature Cited

An alphabetical list of all sources cited in the thesis. Use the following formats for the different types of literature sources:

journal article:

Nakamura, K., K. Matsuoka, and M. Nishimura. 1993. Protein targeting to the vacuole in plant cells. *Plant Physiol.* 101: 1-5.

chapter from a multi-author book:

Albersheim, P. 1976. The primary cell wall. In: J. Bonner and J. E. Varner, eds, *Plant Biochemistry*, Ed 3. Academic Press, New York, pp 226-274

(Note: If this were a first edition, "Ed 3" would be omitted. Also, if this were the fourth volume of the third edition of a multi-volume treatise on plant biochemistry, "Ed 3, Vol 4" would be in the citation.)

book:

Salisbury F. B. and C. W. Ross. 1992. *Plant Physiology*, Ed 4. Wadsworth Publishing Company, Belmont, CA.

web site:

Author AB (if known). Date (if known). Title. If part of a larger work or site, its title in italics. URL in angle brackets. (date of visit)

example:

Anonymous. Helpful Links. *Weber State University Writing Center*.
<<http://weber.edu/writingcenter/Links.htm>> (29 Aug 2002).

The in-text citation will follow the author-year format:

One author: Smith (1985) or (Smith 1985)

Two authors: Smith and Wesson (1986) or (Smith and Wesson 1986)

Three or more authors: Jones et al. (1990) or (Jones et al. 1990)

If you have more than one citation per statement, alphabetize the citations by first author: (Jones et al. 1990, Smith 1985, Smith and Wesson 1986).

Appendix I Botany Thesis Contract

The student should select a Botany faculty member to serve as his or her thesis advisor based on the faculty's research interests. The student should discuss the research project with the faculty advisor before filling out and signing section I of this form. The student and advisor should then identify two additional committee members. One of the additional members may be from a department other than Botany. After reading the summary in Section I, interested faculty will sign in Section II, indicating their agreement to serve on the thesis committee. After the department chair's signature has been obtained, the thesis advisor will retain the original form and see that copies are given to the committee members and the student.

Section I. Please type a brief summary of the project you wish to conduct. Include your research topic, hypothesis, and a brief summary of your planned research.

During which semester(s) do you plan to conduct your research?

I am aware that this project might incur expenses that are beyond the means of the Botany Department. These expenses could include travel, equipment, supplies, special services, and personnel. I know that if expenses cannot be covered, I will not be able to complete my project.

Student's signature: _____
Date

Section II
Obtain the following signatures in the order in which they appear.

Thesis advisor: _____
Date

Committee members: _____
Date

_____ Date

Department chair: _____
Date

Appendix II
Thesis Cover Page

Weber State University
Ogden, Utah

Proteases of Pea Seedlings

Submitted in partial fulfillment of the requirements for the Botany Thesis

by

Joan Q. Student

June 1993

The thesis of Joan Q. Student is approved:

(Thesis advisor)

(Department chair)