General Plant Pathology, Fall 2020

COURSE INSTRUCTOR: Dr. Brantlee Spakes Richter
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Office Hours: by appointment

TEACHING ASSISTANTS:
PLP4905: Eva Mulandesa, emulandesa@ufl.edu
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PREREQUISITE: Knowledge of basic plant anatomy and physiology
CREDITS: 4
COURSE WEB SITE (Canvas): https://lss.at.ufl.edu/
CLASS TIME/LOCATION: Tuesday and Thursday period 4 @ 10:40-11:30 am, online via MS Teams
DISCUSSION: Thursday period 7-8 @ 1:55-3:50 pm, online via MS Teams

TEXT (Recommended): Plant Pathology 5th Ed. (2005) by G. N. Agrios, Elsevier Academic Press, Inc. The 5th Edition is available at no cost in electronic version through UF Library course reserves for this course. The 4th edition of this book is also acceptable. Other assigned readings will be included within the course Canvas site.

COURSE: Fundamentals of Plant Pathology (PLP 3002C/4905) and General Plant Pathology (PLP 5005C/6905) are taught with concurrent lectures. Lectures are the same for both courses, but the discussions, exams, and grading structures are different; students enrolled for graduate credit are required to participate in additional discussions, have additional assignments, and have slightly different exams, reflecting the higher expectations for graduate level study.

INTRODUCTION & OBJECTIVES: Plant pathology is the science of plant diseases, the microorganisms that cause them, and the interactions between pathogens and hosts. The ultimate goal of plant pathology is to reduce the losses caused by plant diseases, thereby increasing quality and quantity of plant yields. Plant diseases are caused by many of the same types of organisms that cause diseases in animals and humans and, as such, many of the principles that apply to animal and human medicine also apply to plant diseases. This course introduces students to the many different types of plant pathogens, their basic biology, examples of the types of disease they cause, and the basic principles and concepts of disease development, spread, and management. This course will provide students with a solid, foundational understanding of disease cycles, host-pathogen interactions, and pathogen biology, and the graduate discussion section will emphasize deeper critical thinking and research skills. The learning objectives of this course are:

1. Students are expected to attain sufficient mastery of vocabulary in plant pathology so that they can converse effectively about a wide range of disease problems.
2. Students will gain adequate familiarity with the resources and conventions of the field so that they can locate, understand, and evaluate information and research about plant diseases.
3. Students will develop firm comprehension of the mechanisms underlying disease so that they can effectively use information sources to solve problems that they will encounter in their own fields of work.
4. Students will practice collaborative research and develop skills pertinent to leadership roles in academia, industry, government, and other sectors that employ MS, PhD, and DPM degreed professionals.

ATTENDANCE: You are expected to participate in synchronous classes, discussion meetings, and team meetings. Synchronous lectures will incorporate quizzes, Socratic questioning, and/or class activities which will contribute to your learning; it is to your advantage to participate synchronously, but recordings will also be made available (note: there will be a lag time of up to one day between the class meeting and availability of the recording). Attendance in the Thursday afternoon discussion meetings is required. Discussion meetings are interactive, and your contributions or lack thereof will impact others. Absences due to illness or emergency will be excused; documentation may be requested (doctor's note, accident report, etc.). Absences due to observation of religious holidays or participation in official university functions will be excused *only with advance notice*. Absences due to personal planning (i.e., planning to be somewhere other than class during class time) will not be excused, and missed points may not be made up. If you are having technical difficulties which are inhibiting your full and timely participation, please contact the instructor as soon as possible. We will work with you to resolve your issues or identify an alternate location for you to attend classes. Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

If you are experiencing COVID-19 symptoms (Click here for guidance from the CDC on symptoms of coronavirus), please use the UF Health screening system and follow the instructions on whether you are able to attend class. Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms. Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. Find more information in the university attendance policies.

CLASS RECORDINGS: Our class sessions will be audio visually recorded for students in the class to review and for enrolled students who are unable to attend synchronously. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments in real time. The public chat comments will remain in the meeting channel for later viewing by class members, but will not be posted or shared anywhere else. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

EXAMS AND GRADING: Your grades will be weighted as follows, with 70% of your grade from lecture exams and 30% from discussions, assignments, and class project contributions:

Component	Percent of Grade
Unit 1 Exam (100 points)	14
Unit 2 Exam (100 points)	14
Unit 3 Exam (100 points)	14
Unit 4 Exam (100 points)	14
Final Exam	14
Discussion Participation & Assignments	15
Research Project Contributions	15
TOTAL	100

Exams: There will be five lecture exams (four mid-term exams and a final). Exams 1-4 are not comprehensive; each will focus on material from the preceding set of lectures. The final exam will be semi-comprehensive, with approximately 2/3 of the points from Unit 5 and 1/3 of points reviewing and synthesizing major concepts from the course. The exams will be online in Canvas, using the Honorlock proctoring service. Each exam will be open for a 5 day window, and students may take the exam at any time during the open window. Honorlock does not require you to schedule your exam time in advance, and you may take it at any time of the day or night.

Participation & Assignments: The participation & assignments grade will come from a combination discussion paper analyses and discussion meeting assignments. Discussion meetings will generally consist of a preparatory assignment, a group discussion, and a follow-up deliverable. Timely preparation will be key to the success of the discussions and the class project; late submissions of preparatory assignments will receive no credit. Late submissions of follow-up assignments or reading analyses (Perusall assignments) will receive partial credit.

Research Project Contributions: The project grade will be derived from (1) timely submission and quality of team check-ins and deliverables, (2) peer evaluation of your contributions to the work, and (3) an individual reflective analysis of your process and learning.

Grade Scale: Final grades will be designated according to the following grade scale. This course uses the grade book function in Canvas for records-keeping and grade calculation; your exam and quiz scores will be available to you as soon as they are calculated, so that you may track them throughout the semester. For information on current UF policies for assigning grade points, see: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Letter Grade	Percentage
A	92.00 – 100
A-	90.00 – 91.99
B+	88.00 – 89.99
B	82.00 – 87.99
B-	80.00 – 81.99
C+	78.00 – 79.99
C	72.00 – 77.99
C-	70.00 – 71.99
D+	68.00 – 69.99
D	62.00 – 67.99
D-	60.00 – 61.99
E	00.00 – 59.99

ACADEMIC HONESTY

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. In this course, any violation of the academic integrity expected of you will result in a minimum academic sanction of a failing grade on the assignment or assessment. Any alleged violations of the Student Honor Code will result in a referral to Student Conduct and Conflict Resolution. Please review the Student Honor Code and Student Conduct Code at sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/

Some assignments in this course will require collaboration, and collaborative study is generally encouraged. You may discuss your answers on lab hand-in sheets and in-class participation quizzes, unless otherwise notified; however, you may not work or collaborate with others on lab quizzes, lab exams, in-class exams, or any other take-home exams or assignments. If you have any questions about expectations for a particular assignment, about what constitutes plagiarism, or about how to ensure that you are using and crediting sources appropriately, please speak with your instructor or a TA. We are here to help, and we would much rather give you the guidance you need to avoid academic integrity violations, than have to report them after they occur!

SOFTWARE USE

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

CAMPUS HELPING RESOURCES

The University of Florida provides a wide range of student services to help with common issues which may interfere with your success, including disabilities, physical or mental illness, food insecurity, and personal safety. You can find links to many of these resources at http://www.ufl.edu/student-life/health-safety/
If you are experiencing problems that are interfering with your studies and you don't see an appropriate resource listed here, contact the Dean of Students Office (https://www.dso.ufl.edu/), and they can help connect you with the appropriate support.

Counseling Services: Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575,* www.counseling.ufl.edu/cwc/
  - Counseling Services
  - Groups and Workshops
  - Outreach and Consultation
  - Self-Help Library
  - Training Programs
  - Community Provider Database

- *Career Resource Center,* Second Floor JWRU, 392-1601, www.crc.ufl.edu/
  - Career planning
  - Resume preparation
  - Internship and job search assistance
  - Professional development workshops
  - Mentoring programs

Services for Students with Disabilities: 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/
The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student

disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

COURSE EVALUATIONS

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

COVID Safety Plan for PLP 6905 General Plant Pathology 2020

1. **Class Meetings**

This class will have no in-person meetings with the full class. All scheduled lecture and discussion meetings will take place via MS Teams. The discussion section will be divided into smaller project and discussion teams, which may opt to hold in-person team meetings. We will help teams arrange appropriate spaces, should they decide that in-person meetings are necessary to their function, during or outside of the scheduled discussion time.

We have reserved FIF 2318 for the scheduled lecture meeting time. Although we are encouraging students to use their own private spaces for online meetings, this room will be available for up to 14 students to participate in the class meetings. Should you have technological barriers (e.g., poor internet signal, computer failure, etc.) or space barriers (e.g., no quiet space) that would prevent you from fully participating in the online discussions, this space is available to you. A needs survey will be conducted at the beginning of the semester to assess demand for these rooms, and we will ask that students contact us if their needs change during the semester; audio-visual equipment and links for class participation will be managed for any dates on which students have indicated their intent to participate from the classroom(s). Should you choose to participate from a classroom, you will be required to abide by all UF Covid-19 policies (see below).

2. **Class Rooms**

In addition to the scheduled lecture room (FIF 2318), students may access the teaching lab room (FIF 2306) during the fall term, in order to hold team meetings or have individual access to laboratory equipment needed to complete assigned project activities. Students are encouraged to use their own assigned research lab spaces to the extent possible, in order to reduce density and mixing.

Both rooms (2318 and 2306) have two doors, which will be marked for one way entry and exit. Please maintain a minimum of 2 m (6 ft) distance at all times, including entry, exit, and seating. The teaching laboratory room (2306) will have one seat available per lab bench, for a total of 5 work stations. These stations will be marked with a tape box on the lab bench, and will be arranged at alternating ends of each bench; remaining stations will be marked with an “X.” Access to the lab will be arranged through the Canvas Scheduler.

In order to reduce occupant density, keep capacity open for students, and allow flexible access, the teaching lab room will not be directly supervised at all times. You must be signed off by a professor or TA before scheduling yourself in the teaching lab room. Training will be conducted by appointment to

ensure that lab room users know the protocols for proper equipment use, biosafety, and waste management. Students will be required to sign out after using the room, verifying that they have followed designated procedures for sanitizing their station and properly replacing all equipment. Any failure to abide by room use protocols, including proper handling and storage of microscopes and other equipment, sanitation, distancing, and utilization of approved face coverings, will result in loss of access to the room for the remainder of the semester. A professor, TA, or department safety officer will be on call during scheduled open lab hours, in case of questions or emergencies.

UF has instated the following campus-wide policies regarding in-classroom interactions. If you choose to utilize lecture and/or laboratory classrooms, you will be expected to adhere stringently to these policies:

- You are required to wear approved face coverings at all times during class and within buildings. Following and enforcing these policies and requirements are all of our responsibility. Failure to do so will lead to a report to the Office of Student Conduct and Conflict Resolution.
- This course has been assigned physical classrooms with enough capacity to maintain physical distancing (6 feet between individuals) requirements, at the maximum levels shown above (14 in the classroom, 5 in the teaching lab). Please utilize designated seats and maintain appropriate spacing between students. Please do not move desks or stations.
- Sanitizing supplies are available in the classroom to wipe down your desks prior to sitting down and at the end of the class.
- Follow your instructor's guidance on how to enter and exit the classroom. Practice physical distancing to the extent possible when entering and exiting the classroom.
- If you are experiencing COVID-19 symptoms (Click here for guidance from the CDC on symptoms of coronavirus), please use the UF Health screening system and follow the instructions on whether you are able to attend class. Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms.

3. **Contingencies**

This course has been designed to be flexible, and for in-person components to be achievable through use of each student's designated research facilities. If in-person classes are cancelled, but graduate access to laboratories continues, we may make minor adjustments to project teams to ensure that each student's selected project role may be completed with the resources to which they still have access. If all non-essential campus activities are cancelled, the project objectives will be modified to be completed in a virtual format. Learning to make rapid adjustments and modify plans accordingly is a critical professional skill, with value of its own. Student involvement and process in modifying project plans will be considered part of the learning experience in this graduate-level course.

This syllabus is a living document, and may be modified during the semester. Class announcements supersede syllabus statements. Students will be notified in class and via Canvas Announcements of any changes to the course schedule. It is incumbent upon students to attend class and check announcements in order to stay informed of updates and changes to the class schedule and deadlines.

Page numbers given in the course schedule refer to chapters/pages of Agrios 5th edition text which correspond to the lecture topics. You will not be responsible for materials within these chapters that are not also covered in lecture and/or discussion. The Agrios text covers many more examples than will be highlighted in this class; use the course slides as a guide to direct your reading.

COURSE LECTURE SCHEDULE Fall 2020

Date	Topic	Reading (Agrios 5th ed.)
	Unit 1: Central Concepts in Plant Pathology	
Sept 01	Introduction to Plant Pathology, terminology	Ch. 1: 4-42, 71-75
Sept 03	Diagnosis & Abiotic diseases	Ch.10: 358-383
Sept 08	History of Plant Pathology	Ch. 1: 4-42, 71-75
Sept 10	Disease development and cycles	Ch. 2: 77-89, 96-102
Sept 15	Effects of pathogens on plant physiology	Ch. 3: 106-121
	Unit 2: Fungal & Bacterial Pathogens	
Sept 17	Intro Plant Pathogenic Fungi & Fungal diseases	Ch. 11: 385-404
Sept 22	Fungal Pathogens I: Cytrids, Mucoromycota, Ascomycota	Ch. 11: 433-561
Sept 24	Fungal Pathogens II: Basidiomycota	Ch. 11: 593-610
Sept 29	Fungal Pathogens III: Rusts & Smuts	Ch. 11: 562-592
Oct 01	Non-Fungi Fungal Pathogens: Oomycota & Co.	Ch. 11: 404-433
Oct 06	Intro Plant Pathogenic Bacteria & Bacterial Diseases	Ch. 12: 615-627
Oct 08	Bacterial Pathogens	Ch. 12: 627-703
	Unit 3: Virus & Nematode Pathogens	
Oct 13	Intro Plant Pathogenic Viruses & Viral Diseases I	Ch. 14: 724-756
Oct 15	Intro Plant Pathogenic Viruses & Viral Diseases II	Ch. 14: 724-756
Oct 20	Virus Pathogens	Ch. 14: 757-824
Oct 22	Plant Pathogenic Nematodes	Ch. 15: 826-836
Oct 27	Nematode Pathogens	Ch. 15: 838-874
	Unit 4: Pathogenicity & Host Defense	
Oct 29	Genetics of Plant disease	Ch. 4: 125-174
Nov 03	Genetics of Plant disease	Ch. 4: 125-174
Nov 05	How pathogens attack plants	Ch. 5: 176-203
Nov 10	Plant defenses – structural & biochemical	Ch. 6: 210-236
	Unit 5: Epidemiology & Management	
Nov 12	Environmental factors & infectious diseases	Ch. 7: 249-265
Nov 17	Plant disease epidemiology	Ch. 8: 266-289
Nov 19	Cultural control of plant diseases	Ch. 9: 295-348
Nov 24	Biocontrol of plant diseases	Ch. 9: 295-348
Nov 26	*Thanksgiving break – No class*	
Dec 01	Chemical control of plant diseases	Ch. 9: 295-348
Dec 03	Integrated approaches to disease management	Ch. 9: 295-348
Dec 08	Exam Review	

PLP 6905, Fall 2020 DISCUSSION SCHEDULE*

Date	Topic

Sept 03	**Discussion Orientation**
	• **Focus**:
	  ○ Semester project overview
	• **Preparation**: Complete Needs & Interests survey
	• **Activity**: Project Team on-boarding
	• **Assignment**:
	  ○ Perusall reading: pathogenic and non-pathogenic endophytes
	  ○ Meet with Project Team: Introductions & general discussion, set up team page

Sept 10	**Diagnostic information, Koch's Postulates & hypothesis-building**
	• **Focus**:
	  ○ Sample information
	  ○ Biotic vs. abiotic plant problems
	  ○ Pathogens and Endophytes
	• **Preparation**: Find and document a putative leaf spot disease on a *Smilax* sp. sample
	• **Activity**:
	  ○ Class discussion of research approach and goals
	  ○ Break-out examination of samples collected
	  ○ Perusall reading wrap-up
	• **Assignment**:
	  ○ Research sample documentation and tissue plating
	  ○ Project Team check-in: Approach and timeline

Sept 17	**Plant Disease Diagnosis & Testing**
	• **Focus**:
	  ○ Classical & Molecular methods for confirming a pathogen
	  ○ Confidence levels in diagnostics vs. research
	• **Preparation**: Enter Project Team Update
	• **Activity**:
	  ○ Project Team briefings
	  ○ Methods discussion: matching methods to objectives: advantages, limitations, and decision factors
	• **Assignment**:
	  ○ Virtual Ride-along in the PDIC
	  ○ Perusall reading: **Fungal pathogen survey**

Sept 24	**Fungal Pathogens**
	• **Focus**:
	  ○ Signatures of fungal pathogens
	  ○ Detection and identification of fungi
	• **Preparation**: review fungal morphology vocabulary
	• **Activity**:
	  ○ Break-out examination of Smilax Project fungal plates
	  ○ Discussion of fungal identification "triage" process
	  ○ Methods for encouraging sporulation in Mystery Cultures
	  ○ Perusall reading wrap-up
	• **Assignment**:
	  ○ Genus identification of a fungus (*Smilax* or other found sample)

Oct 01	**Oomycetes**

	• **Focus**:
	  ○ Convergent features of fungi and oomycetes
	  ○ Importance of proper identification
	• **Preparation**: Case study reading
	• **Activity**:
	  ○ Project Team briefings, culture census
	  ○ Breakout Case study discussion
	  ○ Discussion of methods for distinguishing oomycetes from fungi
	• **Assignment**:
	  ○ Perusall reading: **Bacterial **

Oct 08	**Bacterial Pathogens**
	• **Focus**:
	  ○ Signatures of bacterial pathogens
	  ○ Detection and identification of bacteria
	• **Preparation**: Bacterial disease examples (photo gallery)
	• **Activity**:
	  ○ Project Team briefings
	  ○ Guided discussion: connecting bacterial biology and bacterial signatures
	  ○ Methods for isolating and identifying bacteria
	  ○ Breakout: why culture when we have PCR?
	  ○ Perusall reading wrap-up
	• **Assignment**:
	  ○ Diagnostic case study discussion post

Oct 15	**Plant Pathogenic Viruses**
	• **Focus**:
	  ○ Plant virus symptoms and look-alikes
	  ○ Detection methods for plant-infecting viruses
	• **Preparation**: Case Study reading
	• **Activity**:
	  ○ Project Team briefings
	  ○ Cassava Virus Case Study
	• **Assignment**:
	  ○ Perusall reading: **Virus **

Oct 22	**Plant Pathogenic Nematodes**
	• **Focus**:
	  ○ Pest or pathogen?
	  ○ Detection and identification of nematodes
	• **Preparation**: Nematode methods reading
	• **Activity**:
	  ○ Project Team briefings
	  ○ Breakout discussion: Nematode methods
	  ○ Perusall reading wrap-up
	• **Assignment**:
	  ○ Just for fun: what pathogen are you?

Oct 29	**Genetics of Pathogen-Host Interactions**
	• **Focus**:
	  ○ The pathogen arms race as population biology
	  ○ Using differential cultivar sets to identify pathogen races

	• **Preparation**: Online interactive module
	• **Activity**:
	  ○ Project Team briefings
	  ○ Breakout discussion: Interpretation of differential inoculation results
	• **Assignment**:
	  ○ Perusall reading: **Nematodes**

Nov 05	**Pathogenicity & Virulence Factors**
	• **Focus**:
	  ○ What makes a pathogen pathogenic?
	  ○ How do virulence factors define races and cultivars?
	• **Preparation**: Disease resistance reading
	• **Activity**:
	  ○ Project Team briefings
	  ○ Discussion: Connecting old and new disease resistance terminology
	  ○ Perusall reading wrap-up
	• **Assignment**: Project Team Work

Nov 12	Veterans' Day – Asynchronous Activity Week **Assignment**: Project Team Work

Nov 19	**Epidemiology**
	• **Focus**:
	  ○ Modeling epidemics
	  ○ Identifying critical drivers
	• **Preparation**: Reading
	• **Activity**:
	  ○ Project Team briefings
	  ○ Breakout: Relative impact of starting inoculum on mono- vs. polycyclic diseases
	• **Assignment**: Webidemics citrus canker simulation

Nov 26	Thanksgiving Break

Dec 03	**Risk & Management**
	• Focus:
	  ○ Components of risk
	  ○ Management decisions
	• **Preparation**: Case study reading
	• **Activity**:
	  ○ Project Team Wrap-up
	  ○ Disease Management Case Study discussion
	• **Assignment**: Submit remaining Project Team components

**This is a tentative schedule; topics and dates may be adjusted. Students will be notified in class of any changes to the course schedule.*

Smilax Disease Survey Project

Background: *Smilax* spp. (common name "greenbrier") are ubiquitous native vines in both managed and unmanaged ecosystems. In agricultural settings, they are considered a weed, and in landscape settings a nuisance due to their sharp thorns and tendency to overgrow other plants. As a native plant, however, they do have forage value for deer, and birds and small mammals utilize them for both food and shelter.

Leaf spots are relatively common on *Smilax* spp., but have not been well studied. While many potential pathogens have been noted in the literature, the records are often incomplete, with either the host or the pathogen identified only to genus, and Koch's Postulates (KP) unfulfilled. In an earlier class project, we performed isolations and KP on several local *Smilax* samples, and were able to confirm pathogenicity of a *Colletotrichum* species, *C. siamense*. Fungi in the *C. siamense* species complex have also been identified as pathogens of blueberry, and a student intern subsequently confirmed that a *Smilax* isolate could cause disease on blueberry, and that a blueberry isolate could also cause disease on *Smilax*. We do not know, however, how widespread *Colletotrichum* infections are on *Smilax*, nor whether a single *Colletotrichum* species predominates on this host. This information is important to determine the possible role of *Smilax* as a reservoir for crop infections by *Colletotrichum* species.

Objective: The objective of this project is to survey native *Smilax* species for pathogens which may be of importance in cultivated plants. Through this project we will determine the prevalence and taxonomic position of *Smilax*-infecting *Colletotrichum* species in Florida.

The class project will have multiple roles, and each student will participate in at least one role, beyond sample collection. Together, we will conduct all aspects of a research project. The available roles are:

- ***Sample collection***: all students will participate in this role by collecting one or more symptomatic *Smilax* samples, making detailed observations, and documenting the sample for inclusion in the project. Participation in this role will allow you to develop your observational skills with regards to plant disease symptoms and signs, and gain experience in data management for research. We will work with you to collect and collate class-wide sample observations, and develop a collaborative sample identification and tracking system.
- ***Literature review and synthesis***: this team will conduct a literature review and write a synthesis, suitable for a manuscript introduction. Participation in this role will allow you to develop your literature search, analysis, and writing skills, and will familiarize you with databases and publications relevant to work in plant pathology and mycology. We will work with you on scientific writing, and help you develop your professional writing voice.
- ***Methods and protocol development***: this team will help fine-tune the pathogen identification methods by examining methods used in current literature and applying knowledge from their other coursework and research. Participation in this role will allow you to develop your knowledge base in molecular methods and phylogenetics. We will facilitate discussion around the selection of primer sets, software, and parameters, and help you develop confidence in making defensible decisions about your research methods.
- ***Pathogen isolation, confirmation, and identification***: this team will isolate putative pathogens from *Smilax* samples, develop tentative identifications based on morphology, conduct KP analyses, and prepare DNA samples for sequencing. To participate in the hands-on portion of this project, you will need access to a laboratory with standard laboratory equipment. You may work in your own research lab, in Gainesville or at an REC, or you may schedule time to work in the Fifield teaching lab. We will make materials and tools available for check-out for those who need them. Participation in this role will give you hands-on experience with key procedures used in plant pathology diagnostics and research. We will work with you on techniques and troubleshooting, and will help you develop your laboratory toolbox.