

UNIT REPORT

**Entomology Plant Path & Nemat-
Academic - APR Self-Study Report
by Academic Unit/Department**

Generated: 3/15/22, 2:28 PM

Program Mission

EPPN Departmental Mission Statement

Program Mission Statement:

The Department of Entomology, Plant Pathology and Nematology works to discover safe and healthy ways to protect our food and resources from pests and disease while also protecting our natural ecosystems. We are unique among universities in the Pacific Northwest and Intermountain West in offering a bachelor's degree with a major in Global Disease Ecology.

Program Goal (add a minimum of 3 program goal "plan items")

Goal 2 for EPPN Student Research Engagement

Goal Statement:

All enrolled students will present their research findings at a minimum of one professional scientific meeting in the course of their training. In addition, all students will produce or contribute to at least one publication in a peer-reviewed scientific journal or other venue as appropriate.

These are typical minimum goals for most graduate programs, and they are so for ours. Our goal for graduate students is for them to publish at least one peer-reviewed journal article as first author, and to publish other works as junior authors. Further, we expect graduate students to take an active role in scientific meetings and to present their research in oral or poster format. M.S. students should publish one paper and deliver one research presentation. Ph.D. students should publish two papers and deliver at least two research presentations.

The new Global Disease Ecology major requires students to complete a research project in collaboration with a mentor. Students in this program will present their research orally and be included as an author on one published peer-reviewed paper.

Alignment to UI Strategic Plan Goals:

Innovate (Goal 1): Scholarly and creative products of the highest quality and scope, resulting in significant positive impact for the region and the world.

Engage (Goal 2): Suggest and influence change that addresses societal needs and global issues, and advances economic development and culture.

Transform (Goal 3): Increase our educational impact.

Indicators/Metrics to Evaluate Progress:

A listing of publications and professional presentations examined before graduation for both graduate and undergraduate students.

List of Actions the Program Will Take to Achieve Goals :

All students are encouraged to attend national and regional scientific meetings. Most Entomology graduate students attend the Entomological Society of America meetings (either regional or national), and present their work as either poster or oral presentations. Plant Pathology graduate students typically attend for American Phytopathology Society meetings to present their work. There are multiple sources of financial support for these students, including support from their major professors, the department, the College of Agricultural and Life Sciences and at the university level. All students are encouraged to publish their work in peer-reviewed journals and via other venues in addition to these.

For undergraduate students there are multiple opportunities on campus for them to present work as well as professional meetings, which they are encouraged to attend.

Goal Achievement Level: In Progress

Goal 1 for EPPN Increase Enrollment

Goal Statement:

Increase enrollment in the undergraduate program, Global Disease Ecology, the MS in Entomology and the PhD in Entomology. Below are current enrollment levels:

Program	Enrollment in Fall 2021

B.S. Ag. L.S. (Entomology)	9
M.S. Entomology	10
M.S. Plant Pathology	6
Ph.D. Entomology	19

The BS in Entomology is scheduled for dissolution and will be gradually phased out. All current students will be allowed to graduate, but no new students will be enrolled starting Fall Semester, 2021. Replacing this major is the new Global Disease Ecology major. This program just enrolled the first students in Fall 2021, so no data are available as of yet. The goal is to enroll 5 students the first year and increase enrollment annually by 5-10 students.

The M.S. and Ph.D. Programs in Entomology have been stable for several years at the current levels. These are strong programs and continue to grow as we add new faculty to the programs.

The M.S. in Plant Pathology is a relatively new program, and enrolled the first students in Fall semester, 2019. The goal here is to bring this program in line with the M.S. ENT program in the next two years.

We do have Ph.D. students who are studying with EPPN mentors, but are working on degrees in Plant Sciences. This challenge exists due to the lack of a Ph.D. Program in Plant Pathology. There are approximately 15 such students currently. We are in the approval process for a new Ph.D. program in Plant Pathology, which is scheduled to go live in the Fall semester of 2023. Our goal is to increase enrollment in this program to approximately 20 students.

Thus, we anticipate a total of 20-30 undergraduate students in the Global Disease Ecology major within the next 3-5 years, and a total of approximately 60 graduate students in our four graduate programs.

Alignment to UI Strategic Plan Goals:

Innovate (Goal 1): Scholarly and creative products of the highest quality and scope, resulting in significant positive impact for the region and the world.

Transform (Goal 3): Increase our educational impact.

Indicators/Metrics to Evaluate Progress:

Enrollment statistics are available for all programs. For two graduate programs, we have limited or no data due to their recent or forthcoming launches. The B.S. in Entomology will phase out, being replaced by Global Disease Ecology, so statistics will be available starting next year. We will monitor the number of applications, number of acceptances and number of enrollments for each of these programs annually.

List of Actions the Program Will Take to Achieve Goals :

The EPPN graduate programs are well-known and we receive more applications annually that we can accept. The limiting factor is almost always funding. For the undergraduate major, we are actively engaged in recruitment efforts currently. This is such a new program that getting information to the public and to prospective students is our current focus.

Goal Achievement Level: In Progress

Goal 3 for EPPN Increase Funding Sources

Goal Statement:

Increase funding sources. EPPN currently receives the highest level of extramural funding in CALS. Most of this funding comes from competitive sources that include national funding agencies (National Science Foundation, National Institutes of Health, US Department of Agriculture), regional sources and from commodity groups. The funding has been stable, but the challenge faced is that these are relatively short-term sources. Typically commodity funding is allocated on an annual basis, and even the longest duration NIH grants are usually 5 years. Supporting graduate students is challenging because of this time frame.

We seek to develop more large enrollment classes that could lead to more Teaching assistant allocations for graduate student support as one additional source. We also seek to provide department-based support that would cover students for their first year of graduate school. The first year is difficult to fund on grants because the students are usually committed to taking coursework and their effort spent towards research is small, making it difficult to justify supporting them on these competitive grants.

This effort would help to recruit and retain graduate students. We currently have many more applications that come from qualified students that cannot be accepted because of faculty's reluctance to take a student without full support.

Alignment to UI Strategic Plan Goals:

Transform (Goal 3): Increase our educational impact.

Cultivate (Goal 4): Foster an inclusive, diverse community of students, faculty, and staff and improve cohesion and morale.

Indicators/Metrics to Evaluate Progress:

Our goal is to have every faculty member in EPPN have at least one federally funded grant that is active at all times. Currently we are close to this, but a few programs are limited to funding coming from state agricultural commodity groups, which is year-to-year. Federal funding is more stable with typical funding duration being 3-5 years.

We will monitor the number of endowments and other similar funding sources annually, working with the development team for CALS.

List of Actions the Program Will Take to Achieve Goals :

We will continue to actively engage with development with the intent of garnering more support for students via endowments and gifts. Easing the funding requirements for faculty (or at least providing a safety net for funding gaps) will improve morale and security.

We will encourage faculty, staff, postdoctoral scholars to participate in events sponsored by ORED that focus on funding opportunities. Our faculty do a good job of garnering funding, but our students, staff and postdocs need to be encouraged to search for funding opportunities at a greater rate.

Goal Achievement Level: In Progress

Student Learning Assessment Report (add one "plan item" for each major, degree, and/or certificate offered by dept)

New Student Learning Assessment Report - MS Plant Pathology

Assessment Report Contact: Edwin Lewis

Program Changes in Past Year:

No changes since last year. This is the second year of this program. Thus data are limited.

Learning Outcomes are Communicated to All Students in Program (check box if true): true

Learning Outcomes are Communicated to All Faculty (check box if true): true

Optional: Framework Alignment:

Import Outcomes Data (from Anthology Outcomes):

1.

Plant Disease

Plant Pathology graduate students will learn to recognize, define, and differentiate the causes and types of plant diseases and apply this information using diverse thinking strategies to address real-world issues.

Academic Year 2020-2021: **Plant Pathology (M.S.)**

Term: **Overview**

No Results

2.

Integrate Information

Plant Pathology graduate students will be able to integrate information across the scientific disciplines including Plant Pathology, Entomology, and Plant Sciences to implement disease control practices, solve problems, and make decisions that impact agriculture.

Academic Year 2020-2021: **Plant Pathology (M.S.)**

Term: **Overview**

No Results

3.

Communication

Plant Pathology graduate students will be able to convey knowledge using verbal and non-verbal methods of communication in a respectful manner that reflects our complex society.

Academic Year 2020-2021: **Plant Pathology (M.S.)**

Term: **Overview**

No Results

Summary of Student Learning:

Summary of Faculty Discussion:

As a faculty, we have made decisions on our new faculty hiring priorities based upon needs for this program. Thus, our top priority is for an epidemiologist. This hire would represent a position that would be valuable to this program as well as our two entomology graduate programs and for Global Disease Ecology undergraduate major.

Summary of Changes/Improvements Being Considered:

We seek to grow this program as it becomes more established. We do not have alumni yet to survey. EPPN currently has a graduate seminar course that was, in the past, geared toward Entomology graduate students. We now make efforts to include topics in plant pathology to accommodate these students, and to broaden the training for entomology students.

Inter-rater Reliability:

Faculty discuss learning outcomes and standards at faculty meetings.

Closing the Loop:

We continue to focus on curriculum and research training.

New Student Learning Assessment Report (PhD program in Entomology) Item

Assessment Report Contact: Edwin Lewis

Program Changes in Past Year:

No Changes in the past year.

Learning Outcomes are Communicated to All Students in Program (check box if true): true

Learning Outcomes are Communicated to All Faculty (check box if true): true

Optional: Framework Alignment:**Import Outcomes Data (from Anthology Outcomes):**

Graduate students gain the ability to communicate their research via written and oral venues. These outcomes are assessed by their enrollment in two participatory seminars in which they are required to present orally on topics that are related to their research efforts. All students are required to earn a passing grade in two of these classes (one may be in a different graduate program).

All PhD students are also required to perform a two-part qualifying exam that occurs close to when they complete their coursework. The first part can be either their preparation of a review paper, suitable for publication, or long-form written answers to questions provided by their graduate committee. Upon successful completion of the written portion of the exam, students are required to pass the oral section of the exam, which is also administered by their graduate committee.

1.

Communication Skills

Demonstrate effective oral and written communication skills among diverse audiences of science professionals and lay stakeholders.

Academic Year 2020-2021: **Entomology (Ph.D.)**

Term: **Overview**

No Results

2.

Research Skills

With a high level of independence and sophistication, advance the science of entomology and contribute to the solution of emerging problems in entomology by designing and conducting hypothesis-based research. Demonstrate competence in standard entomological research methods and advanced research tools and technologies. Contribute in a meaningful way as a member of interdisciplinary research teams that address complex issues

Academic Year 2020-2021: **Entomology (Ph.D.)**

Term: **Overview**

No Results

3.

Knowledge Skills

Demonstrate comprehensive understanding of fundamental principles and core knowledge in entomology and affiliated sciences. Demonstrate in-depth expertise in an entomological concentration area. Critically apply knowledge and expertise to the analysis and interpretation of novel problems in entomology; synthesize integrative conclusions and generate objective solutions.

Academic Year 2020-2021: **Entomology (Ph.D.)**

Term: **Overview**

Exceeded		0%	0
Met		100%	7
Partially Met		0%	0
Not Met		0%	0

Summary of Student Learning:

We have had no recent failures in either the seminar course mentioned above, nor the PhD qualifying exams. Thus, students are meeting expectations.

Summary of Faculty Discussion:

Our seminar course for graduate students is taught on a rotating basis. Thus, at the end of each semester, the faculty member who is leading the course for the next semester presents the structure for the course that will be followed. Discussion follows to refine the course.

Summary of Changes/Improvements Being Considered:

Some discussion has taken place about requiring publication of research conducted. Currently, this is decided by each faculty member for their research group, but a departmental policy might make this clearer to incoming students.

Inter-rater Reliability:

A dissertation committee comprised of faculty within and outside the department is required for each student. Further, many committees include members from outside UI who are either faculty at other universities or from relevant industries. Students are evaluated by this diverse committee.

Closing the Loop:

The current program is strong and has been consistent in numbers with some increase over the past few years. Our students do well after graduation. Encouraging students, or perhaps requiring them, to submit proposals for funding may increase their appreciation of preparing proposals that are original and compelling. Increasing the visibility of our students at the national level by supporting their participation at scientific meetings will also help them with their future plans and will increase the visibility of our program and facilitate recruitment.

Student Learning Assessment report - MS Entomology

Assessment Report Contact: Edwin Lewis

Program Changes in Past Year:

We anticipate no changes for the coming year.

Learning Outcomes are Communicated to All Students in Program (check box if true): true

Learning Outcomes are Communicated to All Faculty (check box if true): true

Optional: Framework Alignment:

Import Outcomes Data (from Anthology Outcomes):

MS students will gain the ability to communicate science, especially their particular area, clearly in both oral and written forms. They are required to write a thesis for completion of their degree, and are encouraged to publish this work in peer-reviewed scientific journals. Students are required to take a participatory seminar once during their tenure where they are required to present a scientific talk to the rest of the class. The quality of the presentation is evaluated by the faculty instructor and class members.

1.

Research Skills

Advance the science of entomology and contribute to the solution of emerging problems in entomology by designing and conducting hypothesis-based research. Demonstrate competence in standard entomological research methods and advanced research tools and technologies. Contribute in a meaningful way as a member of interdisciplinary research teams that address complex issues.

Academic Year 2020-2021: Entomology (M.S.)

Term: Overview

No Results

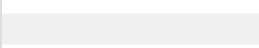



2.

Communication Skills

Demonstrate effective oral and written communication skills among diverse audiences of science professionals and lay stakeholders.

Academic Year 2020-2021: Entomology (M.S.)

Term: Overview

Exceeded		0%	0
Met		100%	7
Partially Met		0%	0
Not Met		0%	0

3.

Knowledge Skills

Demonstrate broad understanding of fundamental principles and core knowledge in entomology and affiliated sciences. Demonstrate in-depth expertise in an entomological concentration area. Critically apply knowledge and expertise to the analysis and interpretation of novel problems in entomology; synthesize integrative conclusions and generate objective solutions.

Academic Year 2020-2021: Entomology (M.S.)

Term: Overview

No Results

Summary of Student Learning:

All students in the program in the past year who have taken the seminar class have passed, indicating that they are able to communicate effectively. All MS students who have completed their degree have submitted a thesis which has been approved by their thesis committee and most have contributed to publications that include their work.

Summary of Faculty Discussion:

Faculty discussion centers on maintaining high standards for our MS students. The program has recently produced a new grad student handbook, which was approved by all faculty.

Summary of Changes/Improvements Being Considered:

No changes are currently being considered.

Inter-rater Reliability:

All students have a thesis committee comprised of their major professor and at least two other faculty. Students have annual progress meetings throughout their program and a report is filed as to whether they are making appropriate progress in their work.

Closing the Loop:

The MS in Entomology program continues to grow in enrollment. The addition of the Plant Pathology MS has significantly broadened the outlook of many students, especially since they now are required to take the same seminar class.

New Student Learning Assessment Report - BS Global Disease Ecology

Assessment Report Contact: Edwin Lewis

Program Changes in Past Year:

This is the inaugural year for this undergraduate major.

Learning Outcomes are Communicated to All Students in Program (check box if true): true

Learning Outcomes are Communicated to All Faculty (check box if true): true

Optional: Framework Alignment:

Import Outcomes Data (from Anthology Outcomes):

No data are available for this program.

Summary of Student Learning:

Summary of Faculty Discussion:

Summary of Changes/Improvements Being Considered:

Inter-rater Reliability:

Closing the Loop:

Student Achievement

New Student Achievement Item

Student Retention:

Student Persistence:

Student Completion:

Student Postgraduate Success:

Identify Equity Gaps:

Effective Learning Environment and Closing Equity Gaps:

Demand and Productivity

New Demand and Productivity Item

External Demand:

There are currently five programs in EPPN: Entomology BS, Global Disease Ecology BS, Plant Pathology MS, Entomology MS and Entomology PhD.

The Entomology undergraduate major is being phased out and is no longer accepting new students. This program will remain active only until the remaining students graduate. However, all courses taught in support of this program will remain active.

The Global Disease Ecology major is new as of September 2021. Graduates from the Global Disease Ecology program will be qualified to pursue careers in medicine, veterinary medicine, public health and plant pathology. These graduates could work for state and local public health agencies as well as organizations such as the Centers for Disease Control, the World Health Organization, and the U.S. Department of Agriculture. We anticipate that demand for the major will be high once it is established. There are currently no data available.

The MS in Plant Pathology is also a new program at UI and began accepting students September 2020. Students in this program gain skills to understand organisms and agents that cause disease. Discover how plants grow and how disease affects them. Use modern scientific equipment and techniques to find out how pathogens attack plants and understand the effects of environmental conditions on disease development. There have been two graduates from this program, thus no useful data are available.

The MS in Entomology has had steady or slightly increasing enrollment for the last few years. The program prepares students for either careers in agriculture, public health or other STEM related fields, or for further academic pursuits toward a PhD. Of the graduates, about 2/3 go to employment and the rest continue either at UI or elsewhere for a PhD. The MS in Entomology degree is quite marketable, with many career pathways open to graduates.

The PhD in Entomology has an increasing enrollment over the past few years. We have made recent faculty hires in the department that have facilitated this increase. Advertising and recruitment have been helpful in attracting new students to the program as well. The department started a recruiting event for PhD students that was held in February, but due to restrictions imposed by COVID, the department has not had this event for two years. When conditions permit, it will be reinstated.

Internal Demand:

The department offers undergraduate courses with ENT, PLP, or EPPN classification. Graduate courses are offered as ENT or PLP. There are more than 20 courses offered in addition to various options for research credit. Several courses are offered at the 400/500 levels. Over the past 4 years, the department has significantly increased the number of students in the classes offered, with the largest increase due to taking on EPPN 154/155, which is a general microbiology course. EPPN also has developed new courses, which are indicated below. In addition to the new courses, the new Global Disease Ecology major began accepting students fall semester 2021, which is expected to further bolster internal demand for EPPN coursework. Below are listed either new or larger-enrollment classes offered.

EPPN has one very large enrollment class, EPPN 154, “Microbiology and the world around us”; EPPN 155 is the accompanying laboratory. This class is offered every spring semester and has an enrollment of approximately 100 students at each offering from all majors relating to biological sciences. Enrollment is steady. This is a new course, first offered in 2019.

ENT 322, General and Applied Entomology is offered every fall semester and has an enrollment of approximately 30 students at each offering.

EPN 411/511, Veterinary & Medical Entomology is offered alternate spring semesters and has enrollment of approximately 30 students. This is a new course first offered in 2018.

ENT 438, Pesticides in the Environment is a General Education Senior experience class. It is offered every spring semester and is cross listed with PLSC 438 and SOIL 438. Enrollment for all three listings summed is approximately 30-35 students.

ENT 476/576, Medical Parasitology, is offered alternate spring semesters and has an enrollment of approximately 25 students. This is a new course, first offered in 2019.

EPPN 110, Introduction to Global Disease Ecology, is a new course, first offered fall 2021. This course is open to all majors and focuses on preparing students for undergraduate research. It will be offered every fall semester.

EPPN 220, Global Disease Ecology Seminar, is yet to be offered, but will take place every spring semester.

Credit Productivity:

Strengths: EPPN has developed a new undergraduate major, Global Disease Ecology and is phasing out the Entomology major. Entomology majors around the country are shrinking in enrollment and fewer universities are offering this major. The replacement of the low-enrollment Entomology major with the new Global Disease Ecology major is expected to increase undergraduate enrollment in EPPN. The new Plant Pathology MS will also increase graduate enrollment in the department, as will the PhD in Plant Pathology, which is scheduled to go live in 2023. UI has had no programs in Plant Pathology prior to this. The two Entomology graduate programs are steady in enrollment with about 30 graduate students total. New coursework offered by the department will continue to increase the visibility of EPPN on and off campus.

Weaknesses: The Entomology Major has been low enrollment for several years, and was not expected to increase, thus it was discontinued. The department has been primarily focused on research since its inception in 2017, thus graduate education has been at the center of efforts in instruction. With no plant pathology graduate program, graduate students working with plant pathologists in EPPN were forced to enter the Plant Sciences graduate program. This situation posed two problems; there was no off-campus visibility for plant pathology research, despite having well-known researchers on the faculty and giving credit to EPPN for these students was problematic. These problems will hopefully be alleviated by the recent changes made.

Opportunities: The new GDE undergraduate major offers two new courses, both focused on preparing undergraduates for research in UI laboratories. GDE itself requires each student to take these courses, find a research mentor, prepare a research proposal and conduct the research. This will provide an opportunity for our undergraduates to compete for internal and external funding and to publish their work. The other opportunity is presented by the fact that these courses are no limited to GDE students, so students in any STEM major interested in getting involved in research, but unsure of how to accomplish this will be attracted to these courses, increasing enrollment and departmental visibility.

Threats: It is always challenging to start new programs. During the past two years, with COVID restrictions in place, it has been substantially more difficult. This is a significant threat to new programs, such as GDE and the Plant Pathology graduate programs. The other threat is funding. EPPN has an astoundingly good record for acquiring external funding via grants. However, internal funding presents a challenge. More teaching assistantships would make funding for graduate students more predictable, and with increased enrollment perhaps this will occur. But, with only 12 or so TAs provided for all of CALS, this does not seem likely.

Financial Health and Resources

New Financial Health and Resources Item

Financial Health:

EPPN is consistently the top performing unit in CALS in terms of extramural funding. In fact in 2020, EPPN garnered more funding than the entire College of Science. This funding results from small and large grants and contracts received by faculty, by fee collection for diagnostic services, gifts to the department and to individual faculty and a small number of endowments. Typically EPPN receives approximately \$100,000 in F&A returns per year. Twenty-five percent of these funds are returned to faculty and the remainder is used for departmental operations.

Efficient Use of Resources:

Most of the endowment money and funds from F&A returns are used to support students. One use is to provide GRA support for new faculty who have this as part of their start-up support. These funds are also used when faculty experience a funding gap in their student support. We have also used these funds to provide support for graduate students to attend meetings and to complete minor repairs on various equipment. In addition, EPPN has partnered with CALS for some remodeling efforts for new faculty.

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