

UCC Program Review Committee Summary of Review

Program: Environmental and Plant Biology

Date of last review: AY 2015-2016

Date of this review: AY 2022-2023

The program offers the following degrees, minors, and certificates:

- Ph.D. in Plant Biology
- Ph.D. in MCB-Plant Biology
- M.S. in Plant Biology
- B.A. Applied Plant Biology
- B.A. Field Ecology
- B.S. Environmental and Plant Biology
- B.S. Environmental Science and Sustainability
- Environmental and Plant Biology minor

Recommendation: This program is found to be viable.

See report for commendations, concerns, and recommendations.

The report was forwarded to the program director and college dean. Their responses are attached.

The Graduate Council's comments are included as well.

Ohio University Curriculum Committee

External/Internal Academic Program Review

Department of Environmental & Plant Biology

John Z. Kiss, External Reviewer, Professor & Dean, Department of Biology, University of North Carolina - Greensboro

Kimberly Rios, Professor, Department of Psychology

Kristine Ensign, Associate Professor of Instruction, School of Applied Health Sciences & Wellness

January 23-24, 2023

The Department of Environmental & Plant Biology program underwent an external/internal program review on January 23rd and 24th, 2023. The Academic Program Review committee was comprised of John Kiss, External Reviewer, Professor, Department of Biology, University of North Carolina - Greensboro and two internal reviewers, Kristine Ensign (School of Applied Health Sciences & Wellness) and Kimberly Rios (Department of Psychology).

This report is divided into seven sections, directly organized as requested by the Ohio University Academic Program Review effort.

Summary

The department offers the following undergraduate degrees:

- B.S. Environmental and Plant Biology
- B.A. Applied Plant Biology
- B.A. Field Ecology
- B.S. Environmental Science and Sustainability
- Environmental and Plant Biology minor

The department offers the following graduate degrees:

- Ph.D. Plant Biology
- Ph.D. MCB-Plant Biology
- M.S. Plant Biology

1. The program as a whole:

- a. Is the current number and distribution of faculty sufficient to carry out the broad overall mission of the unit (Teaching; Research, Scholarship and Creative Activity; Service).**

The Program is fulfilling its university responsibilities of teaching, research, scholarship and creative activity, and service. Currently there are 12 tenured faculty, 1 assistant professor, and 1 instructional faculty in the department. Two of the tenured faculty are currently serving in administrative roles in the college and thus are not currently teaching. However, the two faculty members are still active in their research. The most recent faculty member departure has caused the inability to offer several elective courses in the program. Additionally, several service courses (i.e., BIOL 1010, PBIO 1000, PBIO 1030, and PBIO 1090) have large enrollments requiring the use of graduate teaching assistants to assist with grading assignments. The program emphasizes offering its service courses in addition to supporting tenured/tenure-track faculty research endeavors. Additionally, the creation of a new interdisciplinary major, B.S. in Environmental Science and Sustainability, has resulted in the addition of new majors to the Program and is increasing the teaching strain on the courses. The Program would benefit from at least one if not two additional faculty (tenure-track for research or instructional for teaching) to fully carry out the unit's broad mission.

- b. Is the level of the unit's RSCA appropriate for the program given the size of the faculty and the resources available to the unit? Is the unit's level of external funding at an appropriate level?**

The level of RSCA is appropriate for the Program given the size of the faculty and the resources available. In the past 7 years, the Program faculty have published an average of 82 papers, given an average of 39 research presentations (invited talks and poster presentations), and received a total of 138 internal and external grants. The Program's external funding level is appropriate for a Ph.D.-granting department; \$6,209,927 in external funding was obtained during the review period.

- c. Is the level of service, outside of teaching, appropriate for the program given its size and the role that it plays in the University and broader communities it interacts with? Is the unit able to fulfill its service mission?**

Faculty are contributing to service activities at the Program, college, and university level. The level of service expectations increases as seniority increases. While there is no set expectation of professional service, faculty members serve professionally in numerous ways including as editors, subject editors, associate editors, editorial board members of scientific journals. Several faculty members also serve on federal agency grant panels and as officers for regional, national, and international societies. Additionally, the faculty conduct outreach activities in the region for K-12 students providing education and exposure to the importance of plants to society, the environment, and industry. The unit can fulfill its service mission; however, there is currently a strain on the faculty because of the recent departure of a faculty member, making it more time consuming for the remaining faculty to maintain the community service activities.

- d. Does the unit have an appropriate level of financial resources, staff, physical facilities, library resources, and technology to fulfill its mission?**

Currently the program has the minimum level of financial resources and staff to fulfill its mission. The physical facilities and technology appear to meet its mission but need additional support to insure their longevity. The Program has minimal non-payroll budget to support classroom laboratory supplies, greenhouse expenses, office supplies, printer services, printer paper, poster printing, maintenance of departmental vehicles, rental of university vehicles, and maintaining equipment used for teaching and research. Funding that has been moved centrally in the past several years has not been able to keep up with the demands of the Program. As a result, as may be typical for other science programs at OU, there is no mechanism for the department to plan for major equipment and vehicle replacements, new initiatives, or updating/refreshing department spaces.

As with other Departments in CAS, the centralization of support staff has placed a significant strain on the faculty and staff. The faculty report having to go through multiple people to get answers or services. Functions once managed by administrative support staff now must be managed by staff or faculty who do not have time in addition to their other responsibilities. This has resulted in the slowing of task completion and affecting the ability to fulfill the Program's mission.

The physical facilities are impressive in terms of teaching spaces, research lab spaces, and external research spaces (the OHIO Student Farm, the Greenhouse, the Herbarium, and regional access to state forests and land labs). Currently, the physical facilities within Porter Hall could use some support to replace plumbing (to prevent leakage of growth chambers) and service/repair of several pieces of equipment. Additionally, the Greenhouse needs replacement or major renovation. The Greenhouse is a vital resource to supporting the teaching mission of the Program.

2. Undergraduate Program:

- a. Is the unit fulfilling its service role, adequately preparing non- majors for future coursework and/or satisfying the needs for general education?**

The PBIO unit offers eight service courses with multiple sections each, including Plants and People, Plants in the Global Environment, Women in Science, Principles of Biology, and Americans and Their

Forests. Students from multiple departments across Ohio University regularly enroll in and enjoy these courses. For example, many students majoring in other STEM disciplines take Women in Science, students from first-year learning communities tend to fill Plants and People and Plants in the Global Environment, education majors are required to take a lab course (and often take a P BIO course to fulfill this requirement), and Biological Sciences majors are required to take at least one course on plant biology. Thus, the unit performs a much-needed service to the university by offering these courses to non-majors. In fact, the P BIO service courses often reach maximum enrollment, and even more students would enroll in these courses were it not for space constraints. However, faculty noted that the new BRICKS general education system may complicate the enrollment of non-majors in these service courses, and that they spend a great deal of time revising their courses to meet BRICKS requirements without being compensated for their efforts.

b. Is the program attracting majors likely to succeed in the program? Is the number of majors appropriate for the program? Is the program attracting a diverse group of students?

The P BIO program has 97 undergraduate majors as of Fall 2021, compared to 58 undergraduate majors in 2014 (a 67% increase). It is one of the more robust plant biology programs in the country. This growth in popularity of the major has occurred despite the reduced number of faculty in recent years. Undergraduate students in the program are unusually passionate about their field of study and have much direct contact with faculty members, through research and/or field work experience. Although racial and ethnic diversity is limited (i.e., the vast majority of P BIO undergraduate majors identify as White/European American), the proportion of female P BIO majors has risen from 29% in 2014 to 60% in 2021.

c. Does the undergraduate curriculum provide majors with an adequate background to pursue discipline-related careers or graduate work following graduation?

Undergraduate P BIO students appreciate the flexibility in the coursework they can take for their major. They also noted that the learning communities for first-year students provide a useful introduction to the classes, research experiences, and internship opportunities available to P BIO majors. The fact that P BIO majors are required to participate in either field work or research for experiential learning purposes positions them well to pursue discipline-related careers or graduate work after graduation. However, students expressed a desire for more elective courses, such as a course on the biology of fungi, which is listed as an official class but has not been offered in recent years due to lower numbers of faculty.

d. Are the resources and the number of and distribution of faculty sufficient to support the undergraduate program?

The P BIO unit has four laboratories used for undergraduate instruction. These laboratories are adequate for teaching and are well kept, due in large part to a dedicated staff member in charge of maintaining the laboratories. However, faculty noted that more resources are needed for the interdisciplinary program on Environmental Studies and Sustainability (e.g., there are not enough instructors to teach all the courses the ESS program can possibly offer) and that the demand for service courses exceeds the number of faculty available to instruct them. Thus, the P BIO program would be well served by hiring at least one new faculty member who can teach undergraduate courses. Additionally, some equipment used in undergraduate research is outdated or needs attention. For example, the large centrifuge has

limited temperature control and therefore freezes when bacteria are being prepared, the plants in the growth facilities are sometimes overcrowded, and the future of the student farm is uncertain due to retirements.

e. Are pedagogical practices appropriate? Are program learning outcomes adequately assessed?

The pedagogical practices within PBIO include a great deal of experiential learning, which Ohio University's location facilitates due to its proximity to forests and other natural resources. Students are required to participate in either research or fieldwork prior to graduation. The PBIO program administers and distributes a post-graduation survey to alumni, but at times it can be difficult to get enough alumni to complete the survey. One suggestion could be to establish connections with students prior to graduation and to tell seniors that they will be approached in (for example) six months to complete the survey.

f. Are students able to move into discipline-related careers and/or pursue further academic work?

Students had extremely positive things to say about their faculty mentors and expressed gratitude for the opportunity to be involved in research and field work early on, as well as for faculty members' willingness to help place them into internships. Several students who collaborate with faculty on research have already attended academic conferences, which is impressive. Most students reported that they intend to work in non-academic jobs after graduation, and then perhaps attend graduate school. However, students did suggest that it would be useful to have an "advising packet" indicating which courses are most beneficial for specific careers. Additionally, students voiced some concern that the broad nature of the PBIO major (as opposed to, for example, a major in forestry) might be a barrier to entry for certain types of jobs. This type of tension between broad training and specialization is a healthy academic debate. Overall, though, the PBIO program appears to prepare students very well for both academic and non-academic career paths.

3. Graduate Program:

a. Is the program attracting students likely to succeed in the program? Is the number of students appropriate for the program? Is the program attracting a diverse group of students?

The quality of the graduate students in PBIO is very good as judged by objective and subjective criteria. Graduate students are very successful in that they attend conferences and publish peer-reviewed papers with their mentors. Of the 40 students that graduated since the last 7-year review, 95% of the graduate students were placed in a position in their discipline within 3 to 5 years (see Table 27)—a very good statistic. The department would like to enroll more graduate students as they do not have enough to serve as TAs—a good problem in that the faculty have been successful in supporting students through their external grants. In terms of diversity, there is a good balance between domestic and international students. The domestic student population could be more diverse in terms of race and ethnicity (Table 22), but one difficulty may be the lack of minority communities in the Athens, Ohio area.

b. Does the graduate curriculum provide an adequate background to pursue discipline-related careers following graduation?

The graduate curriculum is appropriate, and students are provided with the appropriate background to pursue discipline-specific careers. Again, the data in Table 27, which shows the current employment of

2015-2021 PBIO Ph.D. and M.S. students, shows that the graduates of the program go on to appropriate discipline-related careers. Graduate students expressed some concerns about having graduate-student only classes (rather than cross listed classes with undergraduates) but this is a resource consideration, and many universities use the same approach to cross listed classes as PBIO at OU.

c. Does the program provide adequate mentoring and advising to students to prepare them for discipline-related careers?

Graduate students expressed satisfaction in terms of the mentorship provided. Some students expressed concern that they would like to learn more about opportunities outside of academia (i.e., Government and industry). Some professional mentoring is also provided by invited speakers in the weekly PBIO colloquium series—a great idea. Faculty are not directly assessed on graduate student advising. However, in the first annual survey (Nov. 2021) to graduate students the results were positive: 70% of the students strongly agreed faculty mentorship is providing students with essential skills to build and maintain an active member in the scientific community, 18% somewhat agreed, and 6% neither agreed nor disagreed. From the graduate student perspective, there is a desire for graduate students to provide feedback to advisors and supervisors. We are pleased the department and graduate program welcome this feedback and will continue to gather this type of feedback.

d. Are the resources and the number of and distribution of faculty sufficient to support the graduate program?

In general, there is an adequate number of and distribution of faculty sufficient to support the graduate program. However, there is some concern about having a critical mass in ecology and forestry. In the longer term, hiring a TT ecologist would contribute to both the graduate and undergraduate program. Alternatively, adding a teaching faculty member also would be helpful.

e. Does the program offer appropriate financial support to graduate students?

The graduate stipends (coupled with tuition waivers) appear to be competitive for plant biology programs in the Midwest region, especially since the cost of living in the Athens area is reasonable. Students seem to have adequate support to attend professional conferences and meetings. Attending and presenting at these meetings is essential for their professional and career development. Currently, the healthcare subsidy provides partial support for premiums of some graduate students. As at other universities, the graduate students expressed concern about this issue since it is expensive for them to purchase health insurance given their modest income. This is a complicated issue at many universities, and OU is working with the graduate student association to increase the university contribution toward health insurance.

f. Are program learning outcomes adequately assessed?

As is the case with many graduate programs, assessment of student learning outcomes is less formal (and less rigorous) compared to the undergraduate program. For instance, if the Graduate Chair learns of issues from graduate students, graduate student annual reports, or annual graduate student surveys, the Graduate Chair discusses the issues directly with the faculty advisor and/or the Department Chair. The department, however, would benefit from more direct metrics to assess learning outcomes, faculty advising, and supervision of graduate students and supervisors in the future. The good news is that in the self-study, PBIO is aware of these limitations and will strive to improve soon. For example, the

department in Spring 2022 updated the graduate catalog for certain courses (e.g., MS2111 and PH2111) to be more consistent with their assessment of graduate student education. In addition, in Fall 2021, based on feedback from graduate students from an annual assessment online survey (Fall 2021), there were changes and improvements in curriculum. In addition, the Department Chair examines student-based evaluations for all departmental courses each semester. If low evaluations or problematic comments are observed/seen, the Chair contacts the instructor to discuss the evaluation and ways to develop potential solutions to improve quality and student learning outcomes in the future.

g. Are students able to move into discipline-related careers?

As stated above, the data in Table 27, which shows the current employment of students who have completed their graduate degrees, illustrates that the graduates of the program go on to appropriate discipline-related careers. Concerns were expressed by the graduate students on their TA assignments and how they would like a variety of classes throughout their graduate careers to prepare them for the academic job market. The department states in their self-study that more care has been taken to match a graduate student's career goals with their assigned teaching assistant (TA) duties with pre- and post-TA assignment questionnaires. They are striving to integrate their TA assignments into their graduate program as opposed to just arbitrarily serving faculty with respect to the department's teaching mission.

4. Areas of concern.

The committee has identified the following areas of concern:

- Due to dwindling numbers of faculty, there are a limited number of electives offered within the major, and the demand for sections of service courses for non-majors exceeds supply.
- Among both undergraduate and graduate students, racial and ethnic diversity is limited, as are efforts to recruit students from diverse populations.
- Much of the infrastructure is aging or needs maintenance and financial resources should be provided to ensure the longevity of physical facilities that support the teaching and research mission of the Program (e.g., the leaks in the building affect both teaching and research, greenhouse maintenance issues).
- Due to Ohio University's centralization of staff in 2020, there is a lack of administrative support within the PBIO unit. This lack of support takes time away from the teaching, research, and service activities of the faculty.

5. Recommendations.

The committee recommends the following:

- Be more proactive about addressing diversity-related issues in department (e.g., graduate students, undergraduates, faculty) - there are institutional barriers to acknowledge but making more active efforts for recruitment would be helpful.
- More active recruitment overall, rather than by labs, would benefit graduate program (e.g., use professional networks – does not have to be costly).

- Recommend an additional faculty member – clear that department wants tenure track (would help with recruiting graduate students), but if that is not possible, we urge thoughtful consideration of adding an instructional faculty.
- Use some kind of shared/fractional model for administrative staff (e.g., having an admin in building shared between departments) --rather than 100% central in the College of Arts & Sciences.

6. Commendations.

The committee commends the Department for the following:

- Lots of experiential learning for undergraduates (e.g., research, internships) - students speak well of department
- Collegiality – everyone gets along, instructional faculty feels welcome as does the only assistant professor
- Balance between commitment to teaching and research among faculty (e.g., good external funding record)
- Gender diversity (e.g., women in science class, increasing proportion of female PBIO majors)
- Interdisciplinary activities
- Largest number of PBIO undergraduate majors out of departments/programs at peer institutions or higher, especially given small number of faculty
- Undergraduate service courses are extremely popular among non-majors
- Graduate students had positive things to say about mentorship/networking opportunities

7. Overall judgment: Is the program viable as a whole?

Overall, the review committee sees this program as **viable**.



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February 9, 2023

Dr. Bärbel Such
Associate Professor of German, Dept. of Modern Languages
Chair, UCC Program Review Committee
Ohio University
Athens, OH 45701

Dear Dr. Such,

I have carefully read the site visit report and agree with its content. I do not feel any further response is needed from me.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Allan M. Showalter'.

Allan M. Showalter, Ph.D.
Professor and Chair (Email: showalte@ohio.edu)



College of Arts and Sciences
Office of the Dean
Wilson Hall, College Green
Athens OH 45701-2979

March 21, 2023

Dear Members of the UCC Program Review Committee,

This is my response to the 2023 report submitted by the Program Review Committee for the programs associated with the Environmental and Plant Biology Department. The review commends the department's success in teaching for both majors and non-majors as well as successful mentoring of graduate students. It also recognizes the opportunities for experiential learning in the department's undergraduate programs and the role that the department and its program play in enhancing gender diversity in the sciences at OHIO. I add my congratulations to the department, the chair and the faculty for their successful undergraduate and graduate programs as well as their excellent research and service across the institution.

The review committee's report also notes a few areas of concern and some associated recommendations including increasing instructional capacity to meet demand, expanding recruitment to include greater racial and ethnic diversity, improving access to staff resources for the department, and addressing maintenance of facilities issues.

Instructional Capacity and Student Demand

I commend the department and its faculty for the innovative creation of the collaborative and interdisciplinary Environmental Science and Sustainability major. While the department has experienced growth in their departmental majors from about 70 students in 2017 to about 90 students in 2022, the new interdisciplinary major which officially started in 2021 has 90 students as of Fall 2022. Since this is a relatively new interdisciplinary program, we will need to determine how students move through the program and determine what areas need additional instructional support. The college is committed to working with the department to meet any unmet student demand for this new and growing major as well as their growing departmental majors. In this case, as the ESS major grows, I would encourage the department to consider an instructional position with teaching expertise across departments that contribute to the ESS major, some of which also have increasing instructional needs.

Focusing on DEI and Recruiting

We commend the department's efforts and success in the area of gender diversity and would encourage them to continue and expand this focus to other underrepresented groups. This year the college created the CAS Committee on Inclusive Excellence to focus on promoting inclusion in the college.

Through this committee we plan to support department efforts to promote DEI goals including student recruitment. The college looks forward to working with the department in this important area.

Staffing and Facilities

Departments do have access to centralized staff support. All departments have a specific academic and finance team contact that works with their department. The college has engaged in more frequent and structured communications to make departments and their faculty aware of these contacts and the activities that they can assist with. However, we also recognize that departments need assistance with additional activities and are working actively to expand our staffing to support other important departmental activities that coincide with college and university priorities. The college is also actively with University Planning to prioritize addressing facilities needs that impact the work of the department, including the greenhouse. We are committed to working with the university community to create and maintain facilities and spaces that enhance our teaching and research mission.

I want to thank the review committee for their thoughtful report and to the department faculty and leadership and its leadership for its thorough conscientiousness self-study and commitment to the program review process.

A handwritten signature in black ink that reads "Sarah Poggione". The signature is written in a cursive style with a small dash above the letter 'i' in "Poggione".

Sarah Poggione

Interim Dean

College of Arts & Sciences

Ohio University

From: [Mather, Peter](#)
To: [Such, Barbel](#)
Subject: Environmental and Plant Biology
Date: Friday, April 14, 2023 9:51:02 AM

Hi Barbel,
Please see the report to Grad Council below.
Pete

Environmental and Plant Biology

Environmental and Plant Biology offers three graduate degrees: PhD in Plant Biology, PHD in MCB-Plant Biology, and an MS in Plant Biology. The program review suggests viability at the graduate program level, highlighting strong professional mentoring, networking and career placement.

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If you'd like to make an appointment, please book here:

<https://outlook.office365.com/owa/calendar/PeteMather@catmail.ohio.edu/bookings/>
