Undergraduate Program Review

Department of Botany and Plant Pathology

November 30, 2012

1. Summary of Findings and Recommendations

Faculty in the Department of Botany and Plant Pathology make major contributions to undergraduate teaching, student advising, and training students for careers in science. The Botany major has attracted relatively few students, yet it has high quality and prepares students in areas of importance to Oregon. Some of this training occurs in the labs and field activities of the many robust research programs of BPP faculty. This is the only place in Oregon where students can get a rigorous, science-based education in plant biology and pathology as well as extensive lab and field training opportunities. BPP faculty have a significant teaching role in OSU’s programs in many other programs at OSU, especially Biology and in Molecular and Cellular Biology. BPP faculty also support other programs by hiring many of their students to work in their research programs.

The objective of this review is to evaluate the BPP undergraduate program, including its curriculum, the quality of undergraduate teaching, student advising, and opportunities for students to develop lab and field skills outside the classroom. Based on material in the department’s self-study report and meetings with BPP faculty, staff, and students, our overall impression is that the BPP undergraduate program is excellent in almost all ways. The recently revised curriculum is rigorous and flexible. Clearly, BPP faculty are effective teachers and student advisors. The department as a whole provides many opportunities for undergraduate students to supplement classroom learning with lab and field experience. Students in the program are happy to be in it. The review team concludes that BPP is meeting its undergraduate mission, which is “undergraduate instruction in Plant biology for students in all areas of plant sciences, for other life sciences students and environmental sciences students, and for the general undergraduate population.”

One way in which the BPP undergraduate program has been viewed as needing change is in the number of undergraduate degrees per year. The University has mandated a minimum of 20 undergraduate degrees per year in an academic program. From 2002-2012, the BPP number ranged from 6 to 19 (Table 1.8, Self-study report). The review team is confident that BPP can meet the mandated minimum and recommends that BPP continue its efforts to attract undergraduate students to its program. At the same time, it is important to keep in mind that the BPP undergraduate program has high value because of its overall excellence, because it is the only program in Oregon with a rigorous curriculum in basic plant science, and because training in basic plant science is important to Oregon and the world.

We agree with the review team for the BPP graduate program about the importance of the number of tenure-track BPP faculty. Over the past decade, BPP has faced a major loss in the number of on campus tenured/tenure track faculty; 12 positions have been vacated due to retirement or departure from the department. During this time, BPP has acquired six positions,
with only three based on strategic hires. It is expected that high-quality scientists will be attracted by BPP’s great national and international reputation and that new faculty will thrive in BPP’s culture of excellence and collegiality. Allocating faculty positions to this exceptionally strong department will bring good returns to OSU.

Our overall recommendation is

Expand/Maintain

We encourage the College of Agriculture administration to work with BPP and the OSU Provost to make allocations of resources to this department commensurate with its high productivity and to redress severe BPP faculty losses.

2. Detailed findings

Introduction

The objective of this review is to evaluate the BPP undergraduate program, including its curriculum, the quality of undergraduate teaching, student advising, and opportunities for students to develop lab and field skills outside the classroom.

The undergraduate program of the Department of Botany and Plant Pathology (BPP) was reviewed on Nov. 30, 2012 by a review team of external and internal evaluators:

Christopher Campbell, Professor, School of Biology & Ecology (external)
Ed Jensen, Associate Dean, College of Forestry, Oregon State University (internal)
Daniel Stroud, Assistant Professor, Counseling Academic Unit, Oregon State University – Cascades (internal)

On November 30, 2012, the review team met with Dr. Lynda Ciuffetti, Head of the Department, College of Agriculture Dean Daniel Arp and Associate Dean Stella Coakley, Departmental Undergraduate Curriculum Committee, BPP undergraduate students, and the BPP faculty. We also toured facilities in Cordley Hall.

This report follows an outline provided by Dean McComb.

Undergraduate Teaching and Advising

The BPP curriculum has a science-based perspective on the biology of plants and plant pathogens. The curriculum has three areas of concentration: Ecology, Evolution and Conservation Plant Biology (EEC); Molecular, Cellular and Genomic Plant Biology (MCG); and Plant Pathology (PP). The only such program in Oregon, this 180 credit hour curriculum is flexibly distributed across courses in the Baccalaureate Core Curriculum (36-37 cr), Foundational Sciences (66-71 cr), Botany Core Curriculum (27 cr), Areas of Concentration (track requirements; 12-13 cr), and General Electives (34 cr).
The BPP curriculum was recently revised and is expected to be approved soon. A major change is in quantitative and analytical skills, with a shift from requiring traditional physics and calculus courses to a larger set of course choices, including courses dealing with the management and analysis of large datasets. This change is a good one, highlighting an important career track wherein BPP has expertise and increasing curricular flexibility that should attract students.

Now that BPP has revised its curriculum, it is moving forward with an assessment program, with assistance from the Office of Academic Programs, Assessment, and Accreditation.

Current BOT course offerings are primarily upper-division; of which six make up the botany-specific, 27-credit core courses (BOT 220, 313, 321, 331, 332, 341). Because of the reduction in tenure-track BPP faculty, some courses have been eliminated, and others have shifted to alternate-year offering. There is unmet demand for several BPP courses. Alternate-year status has made degree completion difficult for some students.

Four faculty (Halse, Liston, Johnson, and Spatafora) advise Botany students. Halse, the head advisor, guides 20-30 students per year, while the other advisors range from 10 to 14 advisees. Liston and 12 other BPP faculty advise 5-33 students in Biology and Environmental Sciences. During the meeting of the review team with undergraduate students, they gave Halse high praise for his advising. He frequently emails about courses, internships, and employment opportunities.

Although there is no structured mentoring program within the Department, many students are trained and learn while working in the Department’s numerous research labs, the herbarium, and off-campus research activities. One of us spent most of 29 November in the Herbarium and noticed a pretty steady stream of students and faculty into and out of the Herbarium. There was a lot of interaction among students and faculty.

In fulfilling the CAS and Plant Science missions at OSU, the program contributes extensively to plant sciences (BPP, Horticulture, Crop and Soil Sciences, Rangeland Ecology and Management, Natural Resources, and Forestry) and life sciences (Biology, Zoology, Microbiology).

The new course, Introduction to Plant Biology + Lab (BOT 220), was created to provide a more complete and integrated view of plant biology than what is included in general biology. This course was also anticipated to boost student recruitment and retention. There is only one other BPP course below the 300 level, BOT 101, a non-majors course and part of the Bacc Core. During the meeting of the review team with undergraduate students and in discussions with faculty, there was discussion of potential increases in undergraduate majors from additional 100- and 200-level courses.

There was also an awareness in students and faculty of the need for more field experiences in the curriculum. Another addition to the curriculum that might attract students is ECampus courses.

Recommendations:
1. Consider offering more lower-division courses to attract majors.
2. Develop a field management option and one or more field experiences. The Department is considering a summer field camp. Students would pay their way. This camp, it is anticipated, would help with recruitment into the Botany major.
3. Consider more ECampus courses to increase the number of BPP undergraduate degrees.

Faculty

BPP faculty are dedicated and effective teachers. One measure of teaching effectiveness is SET scores for faculty, which range from 4.1 to 5.9 (\(m = 5.2\)) for 14 selected BOT courses between AY06-AY12. Another indicator of effectiveness is student impressions. During the meeting of undergraduate Botany majors with the review team, students unanimously praised the faculty as excellent, great teachers, and passionate about their subject.

Tenured/tenure-track BPP faculty typically teach two courses per year. Non-tenure-track faculty and GTA’s tend to provide much of the remaining course instruction. Courtesy faculty tend not to teach, but some courtesy faculty have helped with student mentoring and provided guest lectures.

The faculty are appreciated for their attention to student advising (see section on Undergraduate Teaching and Advising above).

There is a perception in BPP that contributions by BPP faculty to teaching in other programs, such as Biology, are not accounted for in the allocation of resources to BPP. Arguably the most critical resource is faculty positions. The reduction in tenure-track faculty over the past decade could be limiting, especially in light of the high-ranking research productivity of the department. From FY05 through FY11, BPP ranked in the top three OSU departments in grant and contract dollars (Self-study report, p. 74).

Recommendations:

1. Credit BPP with student-credit-hours from courses in the department and outside the department.
2. Allocate faculty positions to BPP that meet their needs in teaching, that redress faculty losses over the past decade, and that continue to reflect fully their research and teaching contributions.

Students

Over the past ten years, undergraduate Botany majors have ranged from 25 to 48. 80%, or more, of undergraduate Botany majors are typically in-state residents, 2010/11 was an uptick in out-of-state student enrollment, resulting in nearly one third of students coming from out of state. Almost all students identify as “white”, and most are female. No international students are reported. Over the last five years, an average of 22 students applied to the program, 60% were admitted, and 87% matriculated. High School GPAs average 3.24. Many BPP majors are transfer
students who chose OSU because of BPP. BPP student GPA at time of graduation is 3.22, compared with an overall CAS graduation GPA of 3.09.

Exit interviews have been completed with BPP graduates (n = 49 over 10 yrs). Findings indicate 82% are or will be working in botanical fields. 88% already had jobs secured with organizations such as USDA, USFWS, BLM and various non-profits; working in research labs, farms and related settings. 82% were planning to attend graduate studies in MS, PhD Botanical Science programs, as well as in teaching and medical fields.

A total of 13 students attended the meeting with the review team. Strengths of the BPP program from the student perspective are that

- the faculty are excellent, great teachers, passionate about their subject, take the time to learn a student’s name,
- students enjoy (overwhelmingly) the opportunity to work in a Botany laboratory,
- students have the ability to get to know faculty on a one-on-one basis if they choose to do so,
- small class sizes, and
- it is like a family.

Weaknesses perceived by students include

- a field management course is needed (see recommendation in Undergraduate teaching and advising section above),
- there is only one lower-division course; additional lower-division courses might draw more BOT majors, and
- alternate year course delivery sometimes make it difficult to graduate in a timely fashion.

BPP graduation rates are below the most recent OSU metric (n = 20). The department has taken steps to attract more students. Faculty have revised the undergraduate curriculum, modernized courses, and developed a 200-level course. BPP has considered other ways to attract more undergraduates to the BOT major (Self-study report, pages 27-29). Given the quality of the BPP undergraduate program, the review team is confident that BPP can attract enough students to graduate at least 20 per year.

Recommendations:
1. BPP should implement plans to promote and publicize its undergraduate program that are detailed in the Self-study report.
2. BPP should encourage gifts to support major initiatives for students in the department.
3. The CAS administration should work with BPP and the OSU Provost to make OSU allocations of faculty positions to this department commensurate with its high productivity.

Facilities

Facilities are a major concern for BPP generally because lack of air-conditioning, power outages, and other problems have a large, negative impact on research productivity, staff morale, and potentially faculty recruitment. These problems, while less of a direct concern for the BPP undergraduate program, can, nevertheless, affect undergraduate students who work in labs.
without air-conditioning or whose experiment is disrupted by loss of electricity. Poor facilities may adversely affect student recruitment. The BPP self-study report inventories undergraduate classroom and laboratory facilities (p. 18) and does not indicate serious problems with these facilities. On our tour of Cordley Hall, we visited a teaching lab that appeared to be adequately equipped.

Recommendations: While not clearly a large issue for the undergraduate program, inadequate facilities should be corrected.

Administration

Department Head Ciuffetti appears to be not only leading the unit effectively but also directly involved in teaching, research, interactions with undergraduate students, fund-raising, and outreach. It appears that the dedicated, hardworking support staff is insufficient in number given the size of BPP.

Recommendations: CAS administration and BPP should determine necessary administrative staff composition to provide adequate program support.