

Evaluation of Graduate Students in Plant Pathology

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Progress in scientific fields such as plant pathology depends on the continual influx of fresh new talent into teaching, research, and extension positions in public and private institutions. Collectively, the caliber of individuals supplied by universities for these positions has lasting effects on the quality, productivity, and direction of research not only in the individual institutions but in plant pathology as a whole. Consequently, effective evaluation of students entering and completing a graduate program is one of

the most important responsibilities of a graduate faculty. Since much time, money, space, and effort are invested in graduate training, it is important that evaluation of graduate applicants identify students with the strongest potential for successfully completing the degree program in which they intend to enroll. This requires applicants to submit as much information as possible about their qualifications for graduate work.

Ideally, we want students with high Graduate Record Examination scores; good letters of recommendation; strong classroom records, particularly during the last 2 years of undergraduate work; complete undergraduate course work preparation; and documents showing clear potential for becoming a scientist, including evidence of creativity, capacity for independent research, and strong motivation. In practice, however, few applicants—particularly those with no prior graduate work—can provide such complete information about themselves. Further, most applicants more than meet minimum standards of acceptance but are deficient in some undergraduate course work preparation; many students, particularly those entering graduate work for the first time, have had few opportunities to demonstrate their potential for becoming scientists. We accept them on the premise that, once they are enrolled, course work deficiencies can be remedied and attributes relative to scientific ability can be developed and properly evaluated. We also see applicants with acceptable GRE scores in the quantitative, analytical, and advanced biology tests but poor scores in the verbal test. We are reluctant to accept such students because poor performance in this test portends below-average ability to write and communicate effectively.

What seems striking about these deficiencies is that many can be remedied at the undergraduate level by proper faculty guidance. More effort should be directed toward identifying promising undergraduate students as early as possible and placing those interested in graduate work in a study program that offers opportunities for developing and demonstrating potential for becoming a creative scientist. Students then will be able to provide the kind of information from which their qualifications for graduate work can be judged; they will be well prepared to begin graduate work if accepted.

Once students are enrolled in a graduate program, their progress and development must be followed closely. They must be clearly informed of the standards of performance expected of them. One of the most important evaluations occurs in the comprehensive examination that determines if the student should continue in the graduate program. Here questions arise as to the breadth and depth of knowledge we can expect students to have of subjects pertinent to plant pathology. Since the field of plant pathology embraces several disciplines in which knowledge is being generated rapidly, it is unrealistic to expect students to have in-depth knowledge of all relevant subjects. Yet

there is a danger that a student's knowledge of any single subject may become increasingly superficial. This problem is not new and will continue to escalate; it can make the comprehensive examination an exercise in testing breadth rather than in-depth knowledge of plant pathology and related subjects. The problem might be remedied by requiring students to acquire more in-depth knowledge of plant pathology, but this approach is not possible at present, since many universities expect students to complete the doctoral program within 5 years—in the same amount of time as a decade ago. Further, the expense of staying in graduate school is becoming increasingly prohibitive. Thus, an acceptable solution is not to extend the period of graduate training but to expect students to have in-depth knowledge of plant pathology and the discipline most closely allied to their research interests and less than an in-depth grasp of the information in other discipline areas.

Perhaps the most important evaluation concerns the ability of the student to do independent research. An occasional student will do a solid piece of work for a dissertation only to fall into obscurity the rest of her/his professional career; on the other hand, an occasional student completes an unexciting dissertation only to become a leader in the field later. While these represent the extreme cases encountered in any graduate program, nonetheless we are aware of cases in which the promise demonstrated by a student in graduate work was not fulfilled as a professional plant pathologist. Therefore, we must continue to critically assess a student's potential for becoming a productive creative scientist. While such attributes as initiative, drive, commitment, and enthusiasm for research are judged with relative ease, creativity and scientific judgment are assessed less readily. Likewise, agreeing on minimum standards of performance in these categories is difficult, and effective means of assessing a student's scientific capabilities are not always employed. A useful procedure is to require graduate students to periodically discuss their research before a group of other students, faculty members, and research associates in a format permitting free exchange of ideas. A student's ability to think creatively and to plan and carry out meaningful experiments should be revealed during these discussions. The student's major professor, with the assistance of the advisory or dissertation committee, must assume responsibility for evaluating the student's scientific ability, in addition to providing guidance and evaluation of the scientific merits of the student's research.

Most universities have developed effective procedures for evaluating a student's performance as a teaching assistant, and these procedures could be extended to evaluate the student's ability for effective written and oral communication. Furthermore, attention should be devoted to recognizing the special attributes of students and to help them realize their fullest potential. Whenever possible, the strengths and weaknesses of the student should be considered when defining the kind of position most suitable for her/his particular talents, capabilities, and personality.

While the faculty's expectations of student performance have remained the same over the past decade, the attitude of many students entering graduate work in plant pathology has changed significantly. Considerable numbers of students are unwilling to immerse themselves totally in science; rather, they prefer to place science alongside their other pursuits. Our current method of evaluation places such students, perhaps wrongfully, in the "uncommitted" category. Though we continue to question the validity and usefulness of some of our current methods of student evaluation, few attempts have been made to assess their effectiveness. We must periodically assess our procedures and criteria for evaluating graduate students and modify them if necessary. We must continue to search for methods that will give us the most information about both prospective and continuing students. In the final analysis, we must reserve advanced degrees for the most creative, committed students.