

Special Report

Pest Management in Residential Landscapes: A Student Project

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At Cornell University, we offer a five semester-credit course titled "Pathology and Entomology of Trees and Shrubs." The course, a cooperative venture of the departments of entomology and plant pathology, is offered in the fall semester, and approximately 20 students (juniors, seniors, and graduate students) take the course each year. Most are majors in floriculture and ornamental horticulture, but the departments of agricultural education, entomology, plant pathology, and natural resources are also represented. Courses in introductory plant pathology and entomology are prerequisites, so students taking our course already have basic backgrounds in both disciplines.

A fundamental assumption in the organization and presentation of the course is that most students, upon graduation, will be employed directly in the plant production/plant care industries (as arborists, nurserymen, pest management specialists, etc.) or in advisory roles such as those afforded by Cooperative Extension. Ours is the last formal course in pest management that most of the students will take, and we feel obliged to prepare them as best we can to compete for the kinds of jobs they desire and to "hit the ground running" once they are employed. With these goals in mind, several years ago we began to require completion of a project as part of the overall requirements of the course. The project has been so successful as a teaching tool and so popular with the students that we share it with the hope that others might find it or parts thereof useful in their educational endeavors.

The project

The class is divided into teams of two. In the case of an odd number, we either have one team of three or offer somebody the option of working alone. Each team is assigned to a residence in the Ithaca area and given the name, address, and telephone number of the cooperating property owner. Students must then contact the cooperator, make arrangements to visit the property in question, and in the course of several visits gather information to prepare the following:

1. A map of the property showing the location and identification of all woody plants. A minimum of 20 different species (30 for groups of three students) must be located and identified.

2. A list of all insect pests and diseases actually found on the identified plants. A formal collection, i.e., one to be submitted and graded, is not required, but we do ask that perishable specimens be kept in a manner that allows us to verify identifications of particularly unusual pests.

3. A pest management plan for the problems found and for others that are likely to occur on woody plants in the landscape.

In addition, we require submission of lists of common and/or serious insect pests and diseases that might occur in New York State on species identified and examined earlier. These lists can be obtained from the *Cornell Recommendations for Pest Control for Commercial Production and Maintenance of Trees and Shrubs*, a booklet given to each student the first day of class.

The results of these efforts are presented for grading in two formats. First, each team is required to give an oral report (not to exceed 20 minutes) describing the property studied, problems found, and management recommendations and rationale thereof. We also encourage each team to discuss pertinent conversations with and concerns of the property owners. Sharing these interactions with other students helps all to become more aware of the diversity of thoughts among the lay public.

Second, each team must submit a written report prepared and assembled in a manner that allows us to give the report, after we have graded it, to the cooperating homeowner. This adds a final touch of reality to the exercise.

The grade for the project is worth 15% of the total grade for the course. That is as much as for any single exam and is a good indicator of how we, as instructors, view the importance and value of the project to the overall learning experience of the students. Grading is necessarily subjective. The quality of the written report (completeness, accuracy, clarity, etc.) carries more weight than the quality of the oral report.

What the students learn

Conducting this project affords students the opportunity to use knowledge and skills gained in a variety of previous courses and experiences. Clearly, students must have some expertise in plant identification and, in the broadest sense, pest management. In addition, depending on the nature of the landscape and problems thereon, they may have to utilize expertise in soil science, weed science, plant identification, plant ecology, and plant physiology. Usually, at least one member of a team will have had course work in these subjects, but if not, they learn where on campus such expertise is available.

For the most part, the students become impressed with the notable lack of diseases and injurious insects in home landscapes. In contrast to the field trips and formal laboratories, where the emphasis is on pest-ridden plants, the students usually see relatively few serious problems in a mixed population of plants selected more or less at random. Sometimes, however, students find previously unnoticed severe problems.

Most insects and diseases occurring on the landscapes are common and are identified in various formats in other parts of the course. When a true "unknown" is found, however, students are advised to use one or more of the following references as starting points for their diagnosis:

- Anonymous. 1960. Index of Plant Diseases in the United States. U.S. Dep. Agric. Agric. Handb. 165. 531 pp.
- Drooz, A. T. 1985. Insects of Eastern Forests. U.S. Dep. Agric. For. Serv. Misc. Publ. 1426. 608 pp.
- Hepting, G. H. 1971. Diseases of Forest and Shade Trees of the United States. U.S. Dep. Agric. For. Serv. Agric. Handb. 386. 658 pp.
- Horst, R. K. 1982. Westcott's Plant Disease Handbook. 4th ed. Van Nostrand Reinhold Co., New York. 803 pp.
- Johnson, W. T., and Lyon, H. H. 1976. Insects That Feed on Trees and Shrubs. Cornell University Press, Ithaca, NY. 464 pp.
- Peace, T. R. 1962. Pathology of Trees and Shrubs. Clarendon Press, Oxford, England. 722 pp.
- Pirone, P. P. 1978. Diseases and Pests of Ornamental Plants. 5th ed. John Wiley & Sons, New York. 566 pp.
- Rose, A. H., and Lindquist, O. H. 1982. Insects of Eastern Hardwood Trees. Can. For. Serv. For. Tech. Rep. 29. 304 pp.

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There are many other references for specific groups of trees or specific groups of pests. A more complete list is distributed at the beginning of the course, and copies of all references thereon are available for use in the laboratory.

Students using the aforementioned references to list possible insects or diseases may happen upon a picture or vivid description of the problem being worked on and complete the diagnosis. When that does not happen or if identification remains doubtful, further progress on the diagnosis requires collection of suitable specimens, preparation of material for microscopic viewing, and use of taxonomic keys. All of these techniques are described in the formal laboratories. Instructors assist in identifying unknowns only after the students have attempted to do so on their own.

Our students quickly learn another lesson that many plant pathologists already know: Admission of knowledge about plant problems can open the door to a barrage of questions about *anything* to do with plants. It is not unusual for the students to be queried about care of houseplants, turf, herbaceous ornamentals, and backyard vegetable gardens as well as trees and shrubs—and also to have their counsel sought on landscape design and plant selection. For them to spend much time on these “extracurricular” questions is far beyond the scope of the project per se, but the students are placed in a “real-life” situation for which we think there is no better training than experience. Hopefully, they are gaining confidence in their abilities as horticulturists and, at the same time, getting used to admitting that they do not know all the answers.

Finally, the project affords an opportunity for students to hone their written and oral communication skills. The oral presentations to classmates are at a level of sophistication where liberal use of technical jargon and advanced concepts are understood and accepted. The written reports, however, are presented in a manner that may be less sophisticated but actually require more skill to prepare. This is because the goal is to accurately inform homeowners, without using technical jargon, of the condition of woody plants on their landscapes, the best pest management schemes, and the rationales used.

A few alumni of the course report incorporating pest record keeping and “map making” learned as students into routine procedures in their arboricultural or landscape maintenance businesses. They find that the course exercises put them a step ahead in offering integrated pest management services to homeowners.

Some relevant observations

Our experiences and those of colleagues are that keeping team size for class projects to a minimum ensures that each participant is actively involved and carries his or her own weight in performing the duties. Two seems to be just the right team size for this project. There is enough work to keep two people busy but not too busy, and two heads are often better than one

for making diagnoses and solving other kinds of problems. We would rather have one student work alone on a small landscape than to have three work together on a large one. For whatever reason, three do not seem to share the work load equally, and we face a difficult situation in assigning final grades.

We allow the students to pick their own partners, but one team member must have had previous course work in plant identification. Given the large percentage of students with majors in floriculture and ornamental horticulture, this has not been a problem.

Our decision to require each team to examine at least 20 different species of plants was arbitrary but apparently a good one. In landscapes with more than 20 species, students are encouraged to choose a representative variety (deciduous vs. evergreen, trees vs. shrubs) for intensive examination.

We are often asked to put examples of what we consider good projects from previous years out for display, but we have not done so for fear of stifling the creativity and ingenuity of each team. Instead, we try to impress upon the students that there is no one right way to accomplish the goals of this effort. The approach for each residence is inherently different and can depend not only on the physical nature of the landscape but also on the personal characteristics of the “client.”

Student reaction to the project has been overwhelmingly positive on all counts. Students especially seem to appreciate that at least some of what they are learning in formal lectures and laboratories is directly applicable to real-life situations. With repeated visits to a residence, the students often become acquainted with the homeowners on a personal as well as client basis and seem to feel uniquely obliged to do the best they can on someone else's behalf. As a result, the written reports are usually very well done—clear, neat, well organized, and often laden with extension publications and other pieces of information that help answer questions brought up during the conduct of the project.

At a time when the quality of teaching at institutions of higher learning is under fire, the value of this project in conveying a positive image for both departments and for the university cannot go unnoticed. Although our “audience” to date has been small and limited mostly to personal acquaintances, responses have been favorable. We are now at a point where we will have to solicit the cooperation of homeowners we may not know, but our experiences to date enable us to do so with confidence.

We enthusiastically encourage teachers of courses in forest and shade tree pathology or entomology, or both, to implement a similar project as part of their overall teaching effort. Even courses in introductory plant pathology may benefit from some variation of the general theme. For example, students could be assigned to collect specimens and identify problems in backyard vegetable gardens. In satiating students' desires to put their educations to work, there seems to be no substitute for exposure to real-life situations.