The State Botanical Garden of Georgia: A Living Laboratory for Student Education

A.J. Lewis¹ and J.M. Affolter²

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SUMMARY. The State Botanical Garden of Georgia serves as an important academic resource for the University of Georgia by supporting interdisciplinary learning experiences in fields including botany, horticulture, environmental design, ecology, anthropology, geography, instructional technology, science education, entomology, forestry, and art. Field trips, independent study, internships, work-study and other botanical garden experiences strengthen and support the university's teaching, research and public service/outreach missions.

College and university affiliated botanical gardens can serve significant roles in both undergraduate and graduate education. The State Botanical Garden of Georgia (SBGG) has established numerous collaborations with academic departments on campus in an effort to enhance its value as an educational resource within the University of Georgia (UGA).

SBGG provides students in horticulture and botany an opportunity to see plants in context with the natural environment as well as designed landscapes. Field trips, independent study, undergraduate and graduate research opportunities abound, ranging from taxonomic surveys and plant systematics to plant conservation projects (Fig. 1). For example, both undergraduate and graduate students have been involved in our plant conservation program on a variety of levels, from conducting simple propagation experiments for research and public display purposes to more sophisticated studies determining genetic diversity in rare plant populations.

In addition to horticulture and botany, SBGG serves as a base for student projects in environmental design and ecology. Our garden frequently serves as the site for design projects that originate from both classes and individual assignments. We work as clients with teachers, major professors and students to make the projects real and to ensure that they relate as much as possible to our master plan.

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¹Director, State Botanical Garden of Georgia, 2450 S. Milledge Ave., Athens, GA 30605, and professor of horticulture, University of Georgia.

²Director of research, State Botanical Garden of Georgia, and associate professor of horticulture, University of Georgia.

Recent studies have included renovation and expansion of our Native Flora Garden and a conceptual plan for a Japanese garden. While these projects seldom yield designs that can be implemented verbatim, they do provide good ideas for refinement and presentation to prospective donors at a later date, e.g., conceptual plans for the Heritage Garden, now funded and slated for construction. Our garden is presently serving as a test site for form-Z (auto-des-sys, inc., Columbus, Ohio) a three dimensional modeling software package being integrated into the UGA School of Environmental Design's teaching curriculum.

While graduate students in ecology have used our garden for various research projects, undergraduate students are being introduced via an innovative project funded by the National Science Foundation's Division of Undergraduate Education. Project RELATE (Realizing Environmental Literacy through Advanced Technology and Experimentation) was developed in collaboration with faculty in the departments of Geography and Instructional Technology. The purpose of the project is to involve undergraduate students in two long-term ecological research studies that take place in the garden's natural areas.

The RELATE Forest Lab examines the effect of past land-use (agricultural practices) on secondary succession. Students compare tree species (composition and biomass) in two forest plots, one that developed in the absence of topsoil and one that developed on intact topsoil. In the Stream Lab, students sample macroinvertebrates from a stream bed and calculate a bioindex of stream quality based on the presence of tolerant, somewhat sensitive, and sensitive taxa (Fig. 2).

A primary goal of Project RELATE has been to develop multimedia software to prepare students for field work at the garden and to assist them in analyzing their data. The software enables students to construct, explore, and visualize their data sets in a creative fashion. Project RELATE also utilizes ArcView software (Environmental Systems Research Institute, Inc., Redlands, Calif.) to introduce students enrolled in an undergraduate geography course to computerized geographic information systems (GIS). Using a GIS database depicting the

topography, soils, and natural vegetation of the garden's 313 acres (126 ha), students formulate and compare alternative scenarios for future site development at SBGG.

The development team for Project RELATE included graduate students in the departments of Instructional Technology, Geography, Ecology, and Horticulture. In addition to supporting their studies by providing research assistantships, the project has become an important component of the research theses and portfolios of several of the students. More information on Project RELATE is available on the Internet (Environmental Research Support Site, 1997; Project RELATE, 1997).

Other disciplines which SBGG serves are anthropology and ethnobotany. For several years, students in anthropology have planted and tended a native American garden using cultural methods and techniques appropriate to the period. Projects such as this often provide a good basis on which to build general public education programs, e.g., Early America as a Garden, an interdisciplinary lecture series cosponsored by the UGA History Department exploring themes in American history and ethnoculture.

The Garden is currently cooperating with UGA's Center for Latin American and Caribbean Studies to develop a Latin American Ethnobotanical Garden on the UGA campus, adjacent to the building that houses the department of Anthropology. This collection incorporates wild-collected plant species from sites in Mexico, Argentina, Costa Rica, and other Latin American countries where UGA faculty and students are conducting research concerning the indigenous use, production, and conservation of medicinal plants. In

addition to assisting in the design of the garden and propagation of plant material, SBGG is also providing expertise in collections management and interpretation (Fig. 3).

Because of its high profile location on campus and the emergence of UGA as a center for ethnomedical studies, the Latin American Ethnobotanical Garden is an important resource for education and research as well as an attractive display garden for the public. The SBGG Director of Research is a collaborator in a newly funded \$2.5 million grant from three federal agencies that will explore biodiversity and chemical properties of Mayan medicinal plants in the Mexican state of Chiapas. Many of these species will be included in collections at SBGG and on campus.

Science education is another area

Fig. 1. An ecology student earns graduate credits by assisting State Botanical Garden of Georgia staff in research concerning the pollination of Indian Pink (*Spigelia marilandica* L.) (photo by H. Nourse).

Fig. 2. As part of Project RELATE, undergraduate students in an environmental literacy course measure the cross-section of a stream in one of the State Botanical Garden of Georgia's natural areas (photo by J. Affolter).

in which SBGG plays a vital role. We have offered several teacher training workshops in environmental education using our native plant collections [e.g., pitcherplant (*Sarracenia* L.) bog] as resources. A new program begun in 1996 and cosponsored by the Georgia Plant Conservation Alliance is the Georgia Endangered Plant Stewardship Network. Through this network, students across the state are learning about and actually growing endangered plant species. For schools to participate, teachers must first attend a

Fig. 3. As part of his research assistantship, a horticulture graduate student propagates plants collected in Chiapas, Mexico, for addition to the Latin American Ethnobotanical Garden at the University of Georgia (photo by H. Nourse).

workshop preparing them to teach about endangered plants and related science inquiry activities. Teachers receive continuing support through a web site (Georgia Endangered Plant Stewardship Network, 1999), listserve and newsletter. Programs about plant conservation have also been offered off-site via Georgia's distance learning network, GSAMS.

SBGG support for undergraduate and graduate education is by no means limited to the few disciplines mentioned. Entomology students are involved in several of our recurring programs, notably Insectival, which introduces children and adults to the fascinating world of insects. Students create displays, answer questions, and handle live

insects. Forestry students in dendrology use the garden as a site for field trips. Art students frequently use the garden as subject matter and have exhibited their work indoors and outdoors.

In addition to a formal internship program, we also offer venues for work-

scholarships provided by The Garden Club of Georgia as well as opportunities for UGA students to learn on-the-job. These opportunities go beyond horticulture and gardening; students work in conservation biology, public relations, special events, plant records, educational programs, and other areas. Two recent international students have further broadened this experience.

In summary, SBGG offers a broad platform for students in many disciplines to explore diverse topics within a highly relevant and holistic context, a living laboratory. While SBGG justifiably serves as a public display garden and local cultural amenity, more importantly it underpins and supports the academic experience of countless students at UGA and beyond. More information about SBGG can be found on the Internet (The State Botanical Garden of Georgia, 1997.)

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