UNIVERSITY OF FLORIDA
EXTENSION
Institute of Food and Agricultural Sciences

FE469

Ornamental Teaching Gardens: Design, Development, and Use[1]

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Introduction

The teaching gardens at the University of Florida's (UF) Indian River Research and Education Center (IRREC) were developed as an outdoor teaching laboratory to provide on-site plant collections for hands-on learning activities. The educational value of the gardens is witnessed daily by demonstrated landscape design principles and visible plant nomenclature. In addition, the gardens have proven to be an enormous recruitment asset, as they are visually appealing and inviting to faculty, staff, students, and visitors. The gardens serve 8 courses offered at IRREC and provide an ideal location for variety trial testing, master gardener training, and leisurely visits from the general public. Local high schools and elementary schools use the facility, as well as local county extension offices and various garden clubs.

Other UF research and education campuses as well as county extension offices throughout the state have already developed, or plan to develop, teaching gardens for similar purposes (Worden and D'Angelo, 2002). Schools, church groups, garden clubs, and other educational centers may find teaching gardens to be a great addition to their current programs and the local community.

Figure 1. West view of IRREC ornamental teaching gardens, overlooking annual and perennial beds.

1. This is EDIS document FE469, a publication of the Department of Food and Resource Economics, Florida Cooperative Extension Service, UF/IFAS, University of Florida, Gainesville, FL. Published January 2004. Please visit the EDIS website at http://edis.ifas.ufl.edu.

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Design and Development of Ornamental Teaching Gardens

A 2-acre fallow piece of land directly west of the IRREC teaching greenhouses (Fort Pierce, FL) was transformed into a teaching garden over the course of 4 years. The north half of the garden was established as a subtropical fruit demonstration block displaying 88 specimens of mango, lychee, avocado, citrus, and other tropical fruit. The south half of the garden was designed as an ornamental display garden. The materials utilized and processes involved in the ornamental garden are outlined in Table 1. Many of the items listed were donated, but the estimated cost is shown to illustrate how costly creating even a small garden can be, when done professionally.

Figure 2. Initial site preparating of IRREC teaching gardens.

Initial Site Preparation

Site preparation required elevating the plot, installing an underground French-style drainage system, and creating berms for accent and definition. The French drains were located 5 feet deep (with increasing depth), every 40 feet, running south to north through the garden. The 4-inch corrugated plastic leach pipe was embedded in gravel and surrounded with a ground cloth to allow water to percolate to the pipe and drain to the north ditch.

Irrigation

An 8-zone irrigation system was professionally designed for maximum versatility and appropriate water usage. A 2-inch diameter PVC sub-main line was inserted along the central east/west axis of the garden. Nine 1-inch, full flow, low voltage irrigation

Figure 3. Installation of pond structure in IRREC ornamental teaching gardens.

PVC valves were teed directly on the main line: 8 for the irrigation zones and 1 for the pond. The irrigation on the berms was comprised of poly tubing for easy adaptability. Hunter rotor heads were placed in shrub and tree areas and mist heads were used in the lower growing herbaceous areas.

Plant Material

The garden contains over 225 plant species, of which 38 percent are non-native and 62 percent are native to Florida. Large trees and palms were relocated on-site to create immediate height and shade. Other foundation trees and shrubs were acquired and planted based on landscape design specifications. This created the foundation of the garden, to which other hardscapes and plantings were added. The exterior berms that define the boundaries of the garden were planted extensively with ornamental grasses, wildflowers, and ground covers.

Features of the ornamental teaching garden include a pond containing native aquatic plants, a rose garden, and a collection of salt tolerant species. In addition, students enrolled in Florida Native Landscaping (ORH 3815C) and Annual and Perennial Gardening (ORH 4804C) courses designed and installed a native plant garden and an annual and perennial display entrance.

Turf

The walking areas of the garden (approximately 8,000 square feet) were sprigged with seashore paspalum (*Paspalum vaginatum*, 'Sea Isle 1'), which

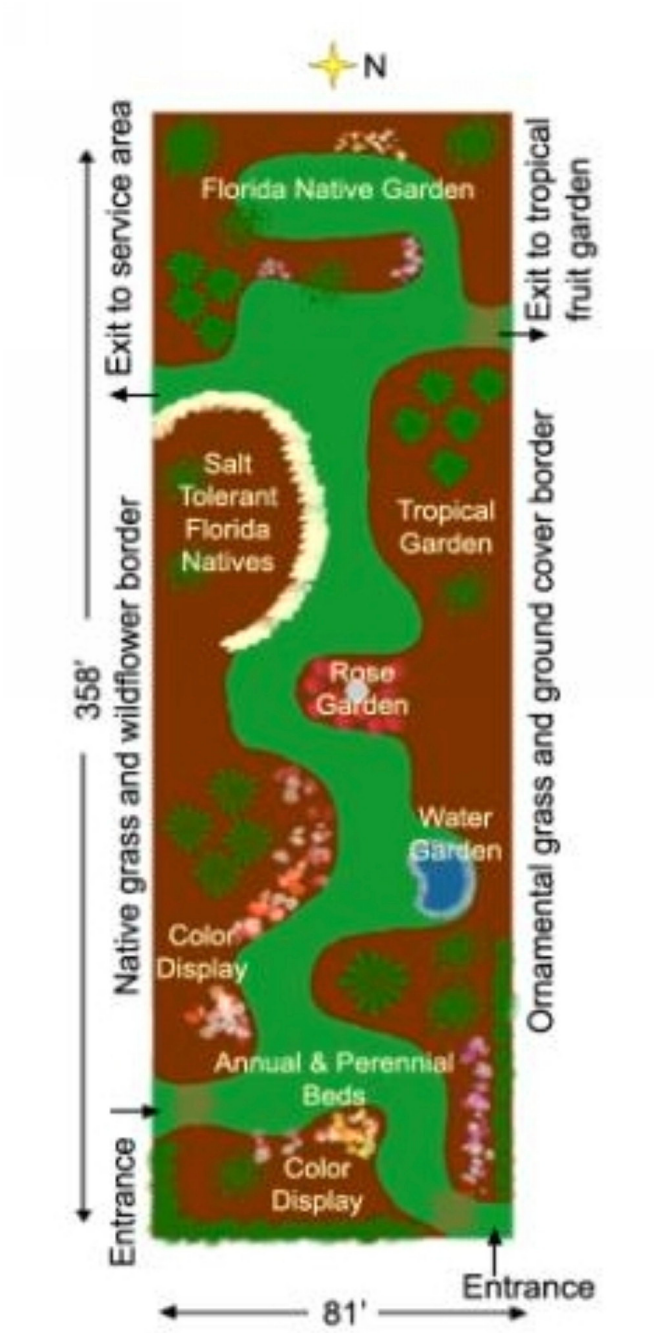

Figure 4. Layout of ornamental teaching gardens at IRREC.

was selected for its wear tolerance and chinch bug resistance (Duncan and Carrow, 2000). Sprigs (300 bushels) were hand spread and embedded into the soil with a straight disk. A roller was attached to the back of the disk to compact the soil around the sprigs.

Figure 5. East view of IRREC ornamental teaching gardens, overlooking salt tolerant Florida native plants (right side).

Edging and Lighting

Aluminum lawn edging was installed to prevent erosion and weed seed from entering the turf walkways. This is a patented interlocking snap-down splicing system for rapid, permanent installation that eliminates rusting, cracking, or rotting.

Low voltage landscape lighting was installed throughout the gardens so that laboratories can be conducted after dusk. Walkway lights, spotlights, and floodlights were incorporated throughout the gardens to brighten the walking areas, highlight some of the large plant groupings, and up-light some of the accent plants.

Signage

Plant material was labeled with signs designating the family, genus, species, and common name. Plant identification and informational signs were engraved on UV stable and weatherproof, non-glare laminated impact acrylic material sheets using a computerized engraving system (Xenetech, Baton Rouge, LA). Signs were cut to size using a table shear and inserted into metal sign/stake holders. Plants native to Florida were designated as such with a mechanically sketched outline of Florida. This style of signs was chosen for maximum flexibility so that cultivar names can be readily replaced, botanical names can be updated based on new taxonomic classifications, and the plastic portion of the sign can be readily turned backwards during student plant identification

quizzes. The material cost to manufacture each sign was approximately $3.50.

Construction Costs

The cost of the gardens to-date is estimated at $34,700 (Table 1). A multiplication factor of 2.5 was added to account for the use of in-house labor and equipment, resulting in a final total of $86,750. The majority of this cost was covered by donations and by using on-site agricultural assistants and equipment. Additional money was raised through the sale of bricks for sidewalks and walkways throughout the garden.

Use of Ornamental Teaching Gardens

Figure 6. Undergraduate students taking a plant identification quiz for Florida Native Landscaping (ORH 3815C).

Educational Value

A number of courses offered at IRREC will utilize various aspects of the garden (Table 2). Students enrolled in Florida Native Landscaping (ORH 3815C) were surveyed and asked to evaluate the educational value and function of the gardens. All of the students rated the teaching garden as an excellent outdoor laboratory resource with a broad range of applications for other courses. On average, students felt that the teaching garden served as a very good to excellent tool for illustrating bedding preparation, maintenance, and landscape design principles. All students rated the gardens as excellent for providing a constant source of plant material and reinforcing lecture and lab concepts. Overall, the students rated the value of the teaching gardens as very good to excellent.

VanDerZanden and Cook (1999) similarly reported the multifunctional use of a horticulture teaching garden established at Oregon State University. They found that because the students used the garden for a number of classes and were significantly involved with how it developed, they had a sense of ownership in the garden and viewed it not only as a learning laboratory, but also a reflection of the skills they developed during their undergraduate horticulture education.

Student Recruitment

As a new teaching program, alternative ways to bring IRREC exposure and to recruit students are continually being explored. Various aspects of the teaching gardens have been highlighted in numerous newspaper articles, magazine articles, radio shows, and television segments. These advertisements help to highlight IRREC for its excellence in teaching, research, and extension and to attract new students to our undergraduate, graduate, and certificate programs.

For a panoramic 3D tour of the gardens visit our website at http://irrecenvhort.ifas.ufl.edu.

References

Duncan, R.R., and R.N. Carrow. 2000. *Seashore Paspalum: The Environmental Turfgrass*. Chelsea, MI: Sleeping Bear Press.

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Worden, E.C., and C.J. DAngelo. 2002. Demonstration Gardens in the University of Florida Cooperative Extension Service. Electronic Data Information Service (EDIS) ENH865, Department of Environmental Horticulture, University of Florida, Gainesville, FL. http://edis.ifas.ufl.edu/ENH865.

Table 1. Rounded costs, including donations, for the IRREC teaching gardens.

#	Description	Company / Source	Rounded Cost ($)
1	Initial Elevation and Grading; Installing French-Drainage System	River Country Citrus, Fort Pierce, FL	2,650
2	Irrigation and Electric	Boynton Pump & Irrigation, FL Instant Lair, Fort Pierce, FL Home Deport, Fort Pierce, FL Park's Rental, Fort Pierce, FL	5,075
3	Trees / Shrubs	Plant Haven, Fort Pierce, FL Tripson Trail Nursery, Vero Beach, FL Hackberry Hammock Nursery, Fort Pierce, FL Horizon Nursery, Vero Beach, FL Skinner Nursery, Plam Beach Gardens, FL Rockledge Nursery, Rockledge, FL Oasis Tree Farms, Pahokee, FL	3,300
4	Pond and Aquatic Garden	Gordon Barney & Assocaties, Baton Rouge, LA International Stone & Marble, Fort Pierce, FL Home Depot, Fort Pierce, FL Earthwise Mulch, Stuart, FL	2,200
5	Native Garden	Environmental Equities, Inc., Hudson, FL Hackberry Hammock Nursery, Fort Pierce, FL Maple Street Natives, Melbourne, FL Plant Haven, Fort Pierce, FL Indian Trails Native Nursery, Lake Worth, FL Mesozoic Landscapes, Inc., Lake Worth, FL The Natives, Inc., Davenport, FL Green Images Nursery, Christmas, FL Native Plant Society, Stuart, FL Sanibel Captiva Conservation, Sanibel, FL	1,350
6	Annual and Perennial Beds	Emerald Coast Growers, Pensacola, FL Speedling, Sun City, FL St. Lucie County Master Gardeners, Fort Pierce, FL Home Depot, Fort Pierce, FL The Crape Myrtle Nursery, Gainesville, FL	600
7	Rose Garden with Fountain	Whitten's Landscape, Fort Pierce, FL Sam's Club, Fort Pierce, FL Home Depot, Fort Pierce, FL	275
8	Salt Tolerant Native Garden	The Natives, Inc., Davenport, FL Indian Trails Native Nursery, Lake Worth, FL Mesozoic Landscapes, Inc., Lake Worth, FL Green Images Nursery, Christmas, FL	225
9	Aluminum Edging	Permaloc Corporation, Holland, MI	2,075
10	Lighting	The Highliter of Vero Beach, Inc., Vero Beach, FL	3,650
11	Turf (*Paspalum Vaginatum*, 'Sea Isle 1')	Emerald Island Turf, Inc., Punta Gorda, FL	2,400

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#	Description	Company / Source	Rounded Cost ($)
12	Soil Amendments and Mulch	Earthwise Mulch, Stuart, FL Universal Enterprises, Pompano Beach, FL Home Depot, Fort Pierce, FL Florida Pine Straw, Mayo, FL	3,075
13	Garden Hardscape (concrete parth, flagstone walk, trellieses, benches, etc.)	Trellis Structures, Beverly, MA Tidewater Workshop, Egg Harbor City, NJ D&M Concrete, Inc., Fort Pierce, FL Home Depot, Fort Pierce, FL Select Stone Company, Fort Pierce, FL	4,875
14	Signage (University of Florida logo and plant signage)	UF Work Management, Gainesville, FL Johnson Plastics, Atlanta, GA Collier Metal Specialties, Garland, TX	2,425
15	General Supplies (fertilizer, soil, chemicals)	BWI, Apopka, FL Agro Distribution, Plant City, FL UF Soil Testing Lab, Gainesville, FL Home Depot, Fort Pierce, FL	525
Subtotal			34,700
X 2.5 (multiplication factor to account for use of in-house labor and equipment)			52,050
Total Estimated Cost			86,750

Table 2. Courses offered at UF/IRREC that utilitize the teaching gardens.

Prefix	Course Title
ORH 3815C	Florida Native Landscaping
ORH 4804/5804C	Annual and Perennial Gardening
PLS 3221/5221C	Plant Propagation
HOS 3013C	General Horticulture
PLP 3002C	Fundamentals of Plant Pathology
ORH 3513/5513C	Environmental Plant Identification
FRC 3213L	Citrus Culture and Production
FRC 3252	Tropical and Subtropical Fruits
ENY 3005C	Princples of Entomology