

this pest as it relates to flower bud damage and infestation. Infestations seem to be worse following especially mild winters. Flea beetles are small metallic blue or silver beetles which feed on the leaf margins of new growth, especially southern highbush blueberries. They are usually not a serious pest, but populations can increase rapidly to a point where chemical control is warranted.

Birds, especially cedar waxwings in north-central Florida and robins in central and south Florida, are major pests of blueberries. The cedar waxwings' migratory journey through Florida usually occurs as the first southern highbush blueberries begin to ripen. It is not uncommon for harvests in commercial fields to be delayed one to two weeks because of foraging by the cedar waxwings. Currently, exclusion by netting is the only reliable means of bird control.

Conclusion

Blueberries can be successfully grown in the Florida home garden or landscape. Either rabbiteye, southern highbush, or both may be used depending on the geographic location, site characteristics, and anticipated harvest season. Generally, rabbiteyes are the best choice for areas north of Lake City and southern highbush are usually preferred for areas south of Ocala. Only the low-chill cultivars which have been specifically bred for mild climates are suitable for Florida. Proper site selection and preparation, and proper cultivar selection are probably the two most critical decisions for a home gardener. Rabbiteyes require cross-pollination and southern highbush benefit from cross-pollination. Cultivars should be mixed together and natural bee populations should be encouraged

for good fruit set. Growing several cultivars will also lengthen the harvest season. Major yield reductions can occur from spring freezes and birds, and *Phytophthora* root rot is the major cause of blueberry plant mortality in Florida.

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ENERGY EFFICIENT LANDSCAPING: A SELF-GUIDED TOUR

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Abstract. An energy efficient landscape was designed and installed at the Putnam County Agricultural Center in E. Palatka, Florida by 31 volunteer Putnam County Master Gardeners and Pat Grace, Putnam County Horticulture Extension Agent during 1993-94. Over 2,000 plants and trees were included in the landscape and Master Gardeners volunteered more than 1,000 hours of their time. The project was funded by the Putnam County Commission and a grant from the Florida Energy Extension Service. The site is used as a demonstration teaching tool for environmentally sound landscape practices. A Self-Guided Tour is available via signage in the landscape and a guiding pamphlet. The landscape reflects principles set forth in Environmental Landscape Management, an educational program of the University of Florida Institute of Food and Agricultural Sciences.

Many of Florida's residents—new, permanent or temporary—share misperceptions about landscape design and care. Faced with Florida's diverse and often unfamiliar environmental conditions, well-meaning individuals often waste water, fertilizer, pesticides, and energy through inappropriate landscape designs and improper landscape practices (Knox, Gilman, Park-Brown, Black, Short, Meeker, & Henley, 1990).

In an effort to address these environmental issues, the University of Florida's Institute of Food and Agricultural Sciences has designed an educational program called Environmental Landscape Management, commonly referred to as "E.L.M.". The purpose of the program is to teach participants environmentally sound landscape practices including water conservation and protection, energy conservation, reduced pesticide and fertilizer use, and recycling of landscape waste, while maintaining aesthetic and functional benefits for the user (Gilman & Park-Brown, 1991).

The E.L.M. program is delivered by County Extension Horticulture Agents to county residents utilizing various teaching techniques including publications, slide and video presentations, lectures and demonstrations.

The Putnam County Agricultural Center was built in 1986 but no funds were made available for landscaping. In 1992 the Putnam County Horticulture Advisory Committee, the Putnam County Master Gardeners and this author agreed that the Ag Center would benefit greatly from appropriate landscaping and that this landscaping should reflect the principles set forth in the ELM program. The Advisory Committee requested and received \$5,000 from the Putnam County Commission to initiate this project which, upon completion, would serve as a demonstration model of ELM techniques.

The demonstration method has a long and successful history in Extension teaching. The results of a recent study by Scott Barao (1992) suggests that shifting future Extension time and resources toward the establishment of demonstration projects has a number of advantages including the creation of an informal setting in which dissemination and evaluation can occur, and the actual implementation of available technology which can display the biological, economic, aesthetic and environmental benefits of new techniques.

Materials and Methods

The first step in this project was the landscape plan which was prepared by the author. The design encompassed all aspects of ELM including soil improvement, water conservation, proper plant selection, energy conservation, reduced fertilizer and pesticide use, recycling of yard waste and mulching, proper planting and maintenance, and utilization of groundcovers instead of turf where practical.

A local contractor was employed to design the micro-irrigation system for the landscape. The system utilizes micro-jet sprinklers throughout, contains three zones, and can be automatically or manually controlled. The contractor provided the plan and the materials and supervised the installation of the system.

All labor for the project was provided by 31 Putnam County Master Gardeners. The mean age for this group was 57; the mode was 65. These volunteers worked every Tuesday morning from 9:30 A.M. to 12:00 Noon with one break. The majority of the work was completed between October, 1993 and May, 1994, the cooler part of the year. Master Gardeners were supervised by the author, who worked with them each Tuesday morning, and by the irrigation contractor during irrigation system installation.

Plants were purchased wholesale from a local nursery and delivered to the Ag Center in September, 1993. They were stockpiled at the fairgrounds which is adjacent to the Ag Center. Since plants were installed over a period of approximately seven months it was necessary to water them several times a week. This was accomplished using a portable overhead sprinkler. This task was performed by the Ag Center building caretaker.

All landscape beds were tilled and amended with approximately 2" of compost which was provided by Envirocomp Services, Inc. of Jacksonville. The compost was produced from municipally collected landscape waste. The tillers were provided by the Master Gardeners.

The landscape was planted section by section. The author marked out plant locations utilizing a variety of materials including spray-paint, flags, limerocks that had been spray-painted green, and occasionally plastic pots.

All plants were planted at the same depth they were in the nursery and root systems were loosened if the plants were pot-

bound. Plants were thoroughly watered in upon planting and then watered every day for approximately two weeks. Watering was gradually decreased until the rainy season began in July at which time the system was turned off.

Upon completion of a section, it was mulched. The mulch was supplied by Envirocomp Services, Inc. of Jacksonville and consisted of ground-up landscape waste. Under the mulch were placed several layers of newspaper to aid in weed control. Pinestraw mulch was used in the pathways and sitting area. The pinestraw was underlain with a heavy felt-like material obtained from the local Georgia-Pacific paper processing plant.

Landscape installation was completed early in May, 1994. Master Gardeners worked a total of 1,000 hours to complete this project.

Results and Discussion

On May 4, 1994 Putnam County hosted the Fourth Annual Area Advanced Master Gardener Training Program which was attended by 90 Master Gardeners from five counties. A guided tour of the landscape led by Putnam County Master Gardeners was included in the program. The response to the tour and the landscape was overwhelmingly positive. Sixty-seven written evaluations of the landscape tour were received from participating Master Gardeners. Sixty-nine percent rated the tour "Excellent" and another 25% rated it "Very Good." Comments such as "Absolutely spectacular," "Fantastic", and "Most effective demonstration I've ever seen" were received.

An additional grant from the Energy Extension Service in the amount of \$2430.00 was received to complete this project. Engraved signs labeling all plants and techniques used, and a picnic table and bench manufactured from recycled plastic have been purchased and installed in the landscape.

The Master Gardeners of Putnam County submitted this project under the "Beautification" category for the Florida Master Gardener Awards of Excellence for 1994. They received this award and it was presented to them at the Annual Master Gardener Banquet in Gainesville in September, 1994.

Since the Master Gardeners also volunteered to maintain this landscape, many hours of their time still go into this project.

A number of observations can be made based on this experience. First, significant amounts of time, money (or in-kind contributions) and skill are necessary to successfully complete a project such as this. Someone must be in charge and attend to all the details—both small and large. The person responsible for the project must also be committed on a long-term basis. In this case it was the Horticulture Agent who assumed these responsibilities. The project consumed a significant amount of her time over a one-year period.

As mentioned earlier, the mean age of Master Gardeners participating in this project was 57, and the mode was 65. The age range was from 35 to 72. Most of the Master Gardeners participated in all aspects of the project. Heavy work including tilling and irrigation main line installation was performed by the more physically able. No injuries of any kind were reported. The Horticulture Agent encouraged participants not to exceed their physical capabilities.

A number of observations can also be made about our cultural methods. Our biggest problem in the landscape has been controlling dollarweed (*Hydrocotyle spp.*) in landscape

beds, particularly in groundcover areas. The use of pre-emergent herbicides in areas that contain such difficult weeds is highly recommended. The project budget did not include money to purchase herbicides. Thus they were not used. Mulch was relied upon to control these weeds. However, the mulch we used for this project did not prove satisfactory. It contained a great deal of partially broken down organic material which proved to be an ideal environment for weed growth. Switching to a pine straw mulch has provided significantly better control. The frequent rains received during the past year exacerbated the dollarweed problem also. In 1995 herbicides will be used in the landscape to aid in dollarweed control. Hand weeding can only accomplish so much, particularly when environmental conditions are extremely favorable for weed growth.

The majority of plants used in the landscape have doubled or tripled in size in a year's time. The Asiatic Jasmine groundcover which we used extensively in the landscape has solidly covered these areas (gallon containers were split four ways and planted 24" on center.) The compost-amended soil has proven to be an excellent medium for plant growth. As noted previously, sufficient irrigation was provided consistently during plant establishment.

Several problems with the micro-irrigation system have been encountered. The main problem has been clogging of the spray jet heads. There are filters on the system but the clogging is occurring in spite of the filters. Other problems in-

clude the spaghetti tubing slipping off the connectors and leaks occurring in the system. Because of these problems, the system has required a great deal of maintenance. When working properly, however, it does a satisfactory job of irrigating the landscape using low volumes of water.

Conclusions

This project was a major undertaking for this group. It taxed them all at times but it also forced them to learn to work together to accomplish a common goal. The increase in the unity of this Master Gardener group is very apparent.

The landscape produced is an excellent example of applied ELM principles and has been, and will continue to be, an extremely useful tool for teaching ELM techniques to the public via the demonstration method.

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EVALUATION OF *CATHARANTHUS* (VINCA) CULTIVARS FOR THE LANDSCAPE

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Abstract. Nineteen vinca (*Catharanthus roseus* L.) cultivars were evaluated for number of days to flower, flower diameter, flower color, plant dimensions, and appearance during the summer and fall seasons of 1993. **Summer:** Days from sowing to flowering ranged from 58 to 64 days. Flower diameter ranged from 1.7 to 2.3 inches, with 'Parasol' producing the largest flowers. Mature plant dimensions at 84 days after sowing were similar among entries within cultivar series. The 'Car-

pet' entries, prostrate types, were shorter than all others. Appearance ratings were similar among all entries at 85 and 109 days after sowing. **Fall:** Days from sowing to flowering ranged from 51 to 58 days. Flower diameter ranged from 1.7 to 2.0 inches with 'Orchid Cooler' the only entry with significantly smaller flowers than 'Parasol'. Plants measured at 99 days after sowing were similar among entries within respective cultivar series, except for those in the 'Little' series. Appearance ratings at 109 and 141 days after sowing were similar for all entries; however, at 166 days 'Dawn Carpet' and 'Pink Carpet' had significantly lower ratings than 11 other entries due to frost damage. The 'Carpet' series was the only series to sustain heavy frost injury.

Interest in *Catharanthus roseus* L. (periwinkle or vinca) has risen in recent years. Vinca is tolerant of heat, drought, and air pollution. Insect problems are infrequent and the plant is easily propagated from seed. These attributes make vinca an attractive plant for use in Florida landscapes. Vinca has been among the top ranked items grown in the U. S. for the last decade (Behe and Beckett, 1993).

Vinca cultivars were last evaluated in field trials at the Gulf Coast Research & Education Center in Bradenton, FL during the spring, summer and fall seasons of 1986 (Howe and Waters, 1988). Since that time, several new cultivar introductions have been made to the horticultural industry and the need for updated information on landscape performance was indicated. Nineteen cultivars were examined for earliness of flowering, flower diameter, flower color, plant dimensions and

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The information contained in this report is a summary of experimental results and does not provide recommendations for crop production. Where trade names are used, no discrimination is intended or endorsement implied.

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