Sustainable Landscapes

Final Report for ANE92-009

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ACE Funds: $75,000.00
Region: Northeast
State: Rhode Island
Project Leader:

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Project Information

Summary:

The purpose of this project is to develop and distribute information on plants and practices that contribute to sustainable landscapes - those requiring reduced inputs of pesticides, water, and fertilizer. Through a collaborative effort involving faculty of the University of Rhode Island (URI) and the University of Massachusetts, we have developed and distributed a list of sustainable landscape plants for the region. The present edition of this list includes trees and shrubs that are adapted for various environmental conditions and landscape uses within this region. Over 5,000 copies have been distributed to nursery producers, landscapers, landscape architects, tree wardens, town planners, transportation departments and others involved in selection and establishment of trees and shrubs throughout the Southern New England states. The purpose of this list is to promote the production and use of low maintenance landscape plants.

We completed manual for designing sustainable landscapes which emphasizes plant growth requirements and attempts to minimize the plant stresses that often cause pest problems. This manual is in the form of several introductory chapters and tables added to the second edition of the Sustainable Plant List, published in February, 1995 . The list/manual contains descriptions of the plants including information on size, shape, shade and salt tolerance, soil and moisture requirements, etc. Written for professional landscapers, but in language applicable to homeowners, it has been be distributed, like the earlier editions, to landscapers, nurserymen and homeowners through Cooperative Education channels and through cooperating garden centers. (It is also available on the world-wide web through the Mass. Horticultural Society.

Many of these Sustainable Plants have been planted on the URI Campus to allow easy evaluation and promotion of them. They are featured in URI's new Learning Landscape - 3 acres of demonstrations for homeowners and professionals which has been expanded to include the URI Formal Gardens and the Commencement Area. By

holding summer meetings of the Nurserymen's Association, the American Society of Landscape Architects, and various homeowner programs such as Master Gardeners and the GreenShare Field Day at these facilities, we shall introduce growers and customers to these plants, hopefully stimulating both production and sales. The R.I. Nurserymen's Association has pledged $80,000 for maintenance of the gardens.

Project Objectives:

Overall Objective: To develop and distribute information on plants and practices that contribute to sustainable landscapes - those that require reduced inputs of pesticides, water, and fertilizer.

Objective 1. To develop and distribute a list of sustainable landscape plants for USDA hardiness zones 5 and 6 in the northeastern US.

Objective 2. To develop a logo, a point-of-sale tag, and consumer information on sustainable plants for retail centers.

Objective 3. To develop a manual on designing sustainable landscapes.

Objective 4. To plant demonstration landscapes showing plants and practices to nurserymen, landscapers, and the general public at two educational facilities.

Research

Research results and discussion:

Objective 1: The first edition of 'Sustainable Trees and Shrubs for Southern New England' was released in September, 1993. The second edition was distributed in February, 1995. This publication in its present form is in seven parts. It begins with a discussion of sustainability in landscaping and outlines the purpose of the manual, including a discussion of the role of native species in the sustainable landscape. The second introductory chapter covers planting - including plant selection, handling, installation, irrigation, staking, pruning, fertilization, etc. This section is followed by an index of common names which preceeds the plant list. The list itself, consists of a 17-page description of those plants we consider to be sustainable. This list describes approximately 160 useful landscape plants which, to our knowledge, are non-invasive and require reduced inputs of pesticides, water, and maintenance. Plant descriptions include a common and scientific name, USDA hardiness zone, mature size and shape, a few lines of text on important features or unusual requirements. . It presently has two appendices. The first is a single-page listing of the 42 flowering crabapple varieties that resist important diseases - including apple scab. This listing includes the size, shape, fruit, and flower color of these varieties. The second appendix is a series of lists indicating which of the sustainable plants are suited for demanding situations. These are organized under the following headings: (1) Drought or Dry Soils, (2) Wet Soils or Flooding, (3) Shade, (4) Soil Salt, Wind, Oceanside, Roadside, or Aerial Salt, (5) Tolerant of pH 4.5 or Lower, (6) Tolerant of pH 5.0, (7) Tolerant of pH 7.5 or higher, (8) Native Species, (9) Useful Beneath Power Lines, (10) Urban Conditions, and (11) Best Planted in Spring. The manual ends with a full-page map of USDA plant hardiness zones for the Northeast.

Objectives 2 & 3: We found we were unable to develop an appropriate logo and a point-of-sale tag. (When the funding for this project was reduced by over 50% from the requested amount, we decided to try to cover this aspect among ourselves instead of getting a professional. In the end, we agreed we needed professional help.) Likewise, there was insufficient funding for development of a point-of-sale

poster. Much of the information that was anticipated for a manual was incorporated directly into the plant list through the introductory chapters and the appendices.

Objective 4: The development of a demonstration landscape received a large boost with the decision of the R.I. Nurserymen's Association to provide the plant materials and labor (a donation on the order of $100,000.) for a "Learning Landscape" designed and managed by the Cooperative Education. Center on the URI campus. This one-acre landscape which surrounds the Center is intended to demonstrate the latest in low maintenance techniques and plant materials for homeowners. Trees and shrubs were selected from the Sustainable List, demonstrating many excellent plants less familiar to the trade. This landscape was dedicated on September 19th, 1993 at the GreenShare Field Day - the third annual event sponsored by Cooperative Extension which again drew roughly 2,000 people interested in low maintenance landscapes and gardens.

The original "Learning Landscape" represents roughly 1/3 of the grounds surrounding the URI greenhouses. The remaining land is a formal garden featuring stone walls built through the WPA in the 1940's. We have completed the design and construction plans for renovating this garden into an extension of the Learning Landscape, making extensive use of perennials and groundcovers. The renovation of this garden began in the Fall of 1993 with the removal of the annual beds and privet hedges. In the Spring of 1994 we installed a new annual garden in which the annuals actually play a minor role in a landscape which displays all of the dogwoods known to resist dogwood Anthracnose and dogwood borer. In addition to nearly two dozen dogwoods, this garden features heathers, heaths, hostas, astilbes, ornamental grasses, and day lilies. Impressed by our efforts, even URI threw in some of its scarce money for benches, stonework, and a trellis. With the completion of this annual garden and the Learning Landsca, two parts of our four-part plan are complete.

The major portion of our Formal Garden which formerly featured square hedges and rectangular annual beds has been totally reworked. Approximately 3 dozen trees of 2.5 inch caliper were installed, primarily around the edges of the garden and border beds were established for shrubs and perennials. The trees, funded by a separate grant, were all chosen from the Sustainable List to demonstrate the best of the smaller landscape trees. Last Fall the site was regraded and tilled in preparation for a spring seeding of a low-maintenance lawn of dwarf varieties of endophytic hard and Chewings fescues. The beds were laid out and planted with shrubs and perennials in April and May of 1995 and we held Commencement in the new garden in late May. During the summer, the plantings were labelled. There are two remaining beds to be planted in this part of the garden in 1995. The beds are prepared, and the plants are already lined up for planting.

The last garden to be planted will contain azaleas and rhododendrons planted in an open deciduous understory. This garden is designed on paper and we have made arrangements for the plants. We started several thousand cuttings of select azaleas and rhododendrons three years ago and these plants are all growing in the greenhouse. They will be ready to transplant into the landscape in the Spring of 1996 to supplement the more mature plants already promised by a local azalea garden. The Rhode Island Nurserymen's Association has again, come through with a pledge to prepare the azalea garden for planting by removing some trees and a large forsythia hedge. We anticipate completing this last garden next summer.

When complete, the Formal Garden and Learning Landscape will provide an unparalleled opportunity for us to educate the entire community including students, homeowners, landscape architects, and nurserymen about the use of sustainable plants and designs. Massachusetts nurserymen, inspired by the effort of their Rhode

Island colleagues, are presently considering creating a similar demonstration landscape in their state and they have begun discussions with Roberta Clark and Ken Lagerquist, major participants in this project. The Rhode Island Nurserymens Association has been very pleased with the landscape and they have pledged an $80,000. endowment to the gardens to be used for garden maintenance.

Participation Summary

Education

Educational approach:

Dissemination of Findings

The most important information dissemination from this project is through the production and distribution of the sustainable plant list. We have distributed this list to all 310 members of the Rhode Island Nurserymen's Association and through the American Society of Landscape Architects. We mailed it to the R.I. Dept. of Transportation and to all the the Town Planners and Tree Wardens of this state. We have also made it available to the public at large, and gave it to U. Mass. and U. Conn. to copy and distribute as they wish. We know of over 5,000 copies that have been distributed. The Massachusetts Horticultural Society has also copied it and distributed it to its members as well as putting it on the World-Wide Web.

Dr. Maynard has also been writing feature articles describing plants from the sustainable list and publishing them in the R.I. Nurserymen's Newsletter and sending a copy to the Providence Journal which has published several. Project participants have been in high demand on the lecture circuit talking about sustainable landscapes and the plants that go into them. For example Casagrande's sustainable landscape talks in the 1993/94 season included a program for the International Society of Arborists in Newport, RI (Nov. 2, 1993), a seminar at the Univ. of Vermont (Nov. 11, 1993), a class for the R.I. Nurserymen's Shortcourse (Jan 12, 1994), classes for the Mass. Hort. Society (Feb. 16 & Oct. 13) a lecture at the Vermont Plantsmen Association in Rutland, Vt. (Feb. 23), a class for the Narragansett Bay Classroom (April 21), URI Master Gardeners Training (March 9), URI Greenshare Training (April 28) and URI GreenShare Field Day (September 18), not to mention guiding several tour groups through the Learning Landscape. The 1994/95 season was equally busy with similar training within R.I. and several presentations through the Mass. Hort. Society. In January, 1996. I am scheduled to give a sustainable landscaping lecture to an anticipated audience of 2,000 at New England Grows in Boston. Other project participants have been equally busy with the same types of talks. Dr. Maynard has given a number of presentations on sustainable plants this year, including talks to the Newport Tree Society and the R.I. Master Gardeners, and even an invited lecture in Oregon. He has incorporated the list and principles of sustainable design into his arboriculture course, PLS 306 and he gave a poster session on our Sustainable Landscape project at the national meetings of the Hort. Society. Our landscape architects, Angelo Simeoni and William Green have each given several presentations and have incorporated the sustainable lists into their course instruction. We gave a special seminar series at URI in the fall of 1995 on Sustainable Landscaping which included lectures by most of the project participants including Casagrande, Maynard, Lagerquist, Simeone, and Gordon. This seminar series was well attended with about 40 students and several faculty present at most lectures. Roberta Clark, a county horticultural agent gave more talks on sustainable landscaping than any of us.

No milestones

Project Outcomes

Impacts of Results/Outcomes

A. Potential Impacts: The practical applications of this project for the landscaping industry are enormous. The sustainable plant list is an outgrowth of innumerable discussions we have held with both producers and consumers of nursery stock. For years we have heard the comments: "We can't use it because no one grows it." and "We can't grow it because no one buys it." and the common question: "So what's left now that we can't grow hemlocks, dogwoods, black pines, etc." This list, a direct outgrowth of these discussions, is being providing to both producers and consumers of landscape plants in an effort to let everyone work with the same "menu". Those nurseries that quickly respond to this list should have a competitive advantage over others who continue planting Canadian hemlocks, flowering dogwood, and other pest-prone plants that are getting increasingly difficult to sell.

From the consumer's perspective there are equal benefits. For instance, a local landscaper recently installed a hedge of approximately 75 Canadian hemlocks (6' - roughly $85 each) and 3 flowering dogwoods (10' - roughly $110. each). The homeowner, who spent at least $6,700, not counting labor can look forward to annually applying insecticides against the hemlock woolly adelgid which is presently killing his neighbor's hemlocks. He'll also need up to 3 annual sprays of fungicides on the dogwoods to control anthracnose disease. With diligent care, these trees will mature to a size where they are too large and costly to spray. They will die later, rather than sooner with a substantial cost for removing and replacing them. This same hedge could have been planted in Japanese or western hemlocks and the dogwoods could have been Cornus kousa or Stellar Series hybrids and these pests could have been avoided.

B. New Hypotheses: There are several spin-off projects from this Sustainable Landscape project. One involved grafting susceptible hemlocks on resistant rootstocks in an effort to identify, and perhaps exploit, the resistance mechanism. We found that interspecific grafts within the genus Tsuga are quite difficult and that resistant roots confer little, if any resistance to susceptible grafts. We have established a closer working relationship with the nursery industry through this project, and they have identified several new priorit research needs, including work on salt tolerant species. The Sustainable Landscape project has generated considerable momentum throughout the region, leading to the funding for related projects at URI including a R.I. Teaching Arboretum ($2,000) and several evaluation plantings ($6,195) for species included on the list, but less common in present day landscapes.

Economic Analysis

Serious economic analysis is beyond the scope of this educational project. We use the occasional example - for instance comparing the installation and maintenance cost of a 6' Tsuga canadensis (adelgid susceptible hemlock) with a T. diversifolia (adelgid resistant hemlock). In general it will cost less to produce a sustainable plant than one which is prone to pests, but the big savings will be realized by the consumer who will be living with these plants and their problems longer than the growers. The major impact of this project should be a gradual transition to the

production of more sustainable plants as consumers change their preferences and nurserymen change their inventory.

Farmer Adoption

Farmer Adoption and Direct Impact

A. Changes in Practice. Nurserymen throughout the northeast have shown considerable interest in our plant list and recommended practices. We have been invited to give several presentations at nursery meetings (as listed), including a panel discussion (Casagrande and Green) at the RINA winter meeting (Feb. 1994) in Newport, RI. Several of the larger nurseries have followed our lead by designating several of the plants in their catalogs as low-maintenance.

B. Operational Recommendations. We are recommending that growers produce more of the plants on the sustainable list and fewer from the list of less-sustainable plants. We are attempting to stimulate the market for these sustainable plants by recommending them to landscapers and homeowners as well.

C. Farmer Evaluations. We have received many favorable comments,and a few negative ones. Some growers are worried about being stuck with large inventories of pest-prone plants as a result of our promoting alternatives. We are being careful not to criticize these plants in the media while promoting alternatives. Privately, we are reminding growers that we have been telling them to stop growing these "dogs" for a decade. This Fall, three of our largest wholesale nurseries announced major cutbacks in production of pest-prone plants while increasing holdings from the sustainable list. It seems to be working! Another oft-cited problem is that several plants on the sustainable list are not yet readily available in the trade. This, of course, is the reason for the entire program. It will take time to convince growers to grow new plants and then it will take additional years while they grow to a marketable size.

D. Producer Involvement. There are approximately 24 commercial nursery producers in Rhode Island and perhaps 75 who hold and grow out some nursery stock. Virtually all of them were at the summer meeting of the R.I. Nurserymen's Association in July, 1993 where they had a chance to visit our exhibit on Sustainable Landscapes and get a review copy of the plant list and free samples of Western hemlocks. Over 100 attended a Nurserymens Short Course on sustainable landscape plants by Maynard and Casagrande on January 11, 1994 and even more attended the workshop by Casagrande and Green.

Areas needing additional study

There are numerous specific projects that we are interested in, but a general area which we feel needs additional work is that of salt-tolerance. There are many plants which are adversely affected by coastal salt and we find the literature on this to be limited and often inconsistent. We are also aware of benefits apparently attributable to coastal salt. Some plants, commonly infested with fungal pathogens in inland locations, thrive closer to the coast where the pathogens are apparently inhibited by salt. Research on this area should not only benefit coastal states, but all northern states where road salt significantly impacts roadside plantings.

Information Products

- Sustainable Trees and Shrubs for Southern New England (Bulletin)
- Winerberry is Hardiest Holly
- The Stately Red Maple is a Native Beauty

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