Triple-mission willow riparian buffer: environmental stewardship, profits in the off-season, and youth involvement

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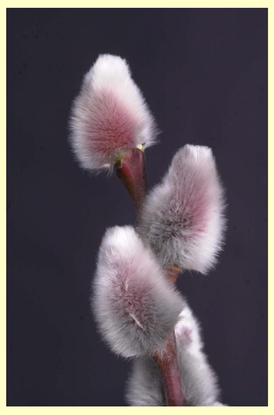
Producers in the central and eastern United States are showing considerable interest in growing alternative crops. Emphasis of this project is on multi-use plantings with the incorporation of horticultural enterprises and new crops that offer multiple benefits for the grower and his family, including effective runoff management, financial returns during off-season time, and the involvement of children. The program includes many aspects such as species selection, production practices, new product development, and comprehensive outreach throughout the entire process. Field trials, integrated on-farm demonstrations, extension publications and workshops will be developed to introduce growers to the practices and value-added off-season products.

Willow as a specialty cut flower



Willows has been growing in the United States as a cut flower for a long time and according to the Association of Specialty Cut Flower Growers more than 75 growers across the country have willow stems in production. Production of willow cut stems promises to be a profitable crop. Good cash return, up to $1.25 to $1.75 per stem of common pussy willow, has been previously reported, and annual gross financial returns for willow plants, up to $24.94, is much higher than for many other woody florals.

Only a few species (*Salix caprea* and *S. discolor*) are currently common in trade, but those taxa do not possess superior qualities. This project seeks to replace traditional species with superior varieties that are more suitable to the consumer's taste, that offer higher yields, exhibit improved stress and disease tolerance, provide a greater range of ornamental characteristics and prolonged harvest periods to broaden market opportunities; to test consumer preference and selling prices for harvested stems in order to identify final financial returns; to test spring markets for willow cut stems in large metropolitan areas located close to the producers, such as New York City and Boston.

Living Structures kits

Artists familiar with the technique participate in the development of a portfolio of *Living Structures* kits that will include a dome, wigwam, tunnel, fence, and maze.

The concept of using willow stems to create living structural elements to enhance children's environments is based on a relatively recent adaptation of traditional agricultural crafts. These living elements planted as dormant 6-10' long willow whips in spring, are bent into different simple shapes and configurations. By the beginning of summer they root and foliate, quickly naturalizing the playground. Many structures are easy to build without professional help if instructions are provided, and are suitable for children of different ages.

The project aims to develop a new appealing product - *Living Structures* and mini-villages for children constructed from brightly colored willow whips - that can be sold in kit form in late spring thus broadening the market window and supplementing growers' income. Effective outreach education materials will be created to stimulate interest and demand for construction of *Living Structures* in school playgrounds, community gardens, and residential gardens.

The *Living Structures* will grow for many years, maturing over time and changing according to the season.

Willow riparian buffer

A research field was established at the Research Farm of the Department of Plant Science of the University of Connecticut in spring 2006 to demonstrate the practice.

Buffer zones, including riparian vegetation, are known to decrease non-point source pollution, such as pesticide, fertilizer and animal waste runoff, improving water quality and habitat composition. Willows are an efficient component of riparian buffers due to their high transpiration rates and extensive root systems that effectively trap runoff from agricultural fields. This project seeks to incorporate ornamental species of willow into multi-use riparian buffers to achieve effective runoff management.

We are currently developing production practices, suitable for both "woody florals" and stems for *Living Structures* that are incorporated into the buffer. We adapt the short rotation coppice production system developed for willow biomass plantations that is based on dense planting and frequent coppicing, because it has proven to be an efficient practice resulting in high yields of stems and efficient land use. The plants will be grown under a specific rotation cycle in order to provide material with the required dimensions.

All stages of the trial demonstration are documented providing a wealth of cultural and economic details including evaluation of the harvesting stage, timing for harvesting, number of years to full production, establishment and maintenance costs, and annual yields. This information will benefit growers by providing guidance on plantation design and maintenance, as well as estimating production costs.

In the spring of 2007 a demonstration riparian buffer was installed at the Research Farm of the University of Connecticut. .

Youth involvement

Children Mini-Village in Storrs, Connecticut The willow stems for the construction of the garden was donated by the researchers at SUNY ESF.

Due to its relative ease of cultivation and visual appeal, willow is an engaging crop for junior members of the family that encourages children's involvement in the production cycle while teaching basic agricultural practices. The *Living Structures* introduce children to planting, growing, pruning and caring techniques in a very entertaining manner, empowering children to be the structure's stewards and providing them with the basic agro-forestry experiences.

The project will provide an opportunity for young people who have a strong inclination in agriculture to participate in a family operation and to learn the production practices based on short-rotation systems. The project is meant to include junior members of the family into product development and production cycles in order to provide a steady supply of interested, skilled and trained farmers to sustain future agriculture in the United States.