

# The Floriculture and Nursery Crop Research Initiative: A Partnership of Government, Industry, and Universities®

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## INTRODUCTION

The floral and nursery industry comprises ca. 11% of U. S. crop agriculture's farm gate value, and is probably its fastest growing component. Although California, Oregon, Florida, and Texas contain the largest industry concentrations, the "green industry" is an extremely important element of the agricultural economy nationwide. Despite their importance, historically the Federal government has not played as large a role in supporting research on floral and nursery crops as it has with the major food and fiber crops. Producers have relied mainly on research funded by individual companies, industry groups such as the Horticultural Research Institute (HRI) and American Floral Endowment (AFE), land-grant universities, and the relatively modest in-house research of the United States Department of Agriculture/Agricultural Research Service (USDA/ARS) conducted at Washington, D. C., Beltsville (Maryland), Corvallis (Oregon), and elsewhere.

## PLANS FOR A NATIONAL RESEARCH INITIATIVE FOR FLORAL AND NURSERY CROPS

Plans for a national research initiative for floral and nursery crops originated in the late 1980s, spearheaded by Dr. Marc Cathey and industry leaders, such as the late Paul Ecke. In 1996, this effort evolved into the Floriculture and Nursery Environmental Horticulture Research Initiative, under the leadership of the American Nursery and Landscape Association (ANLA) and the Society of American Florists (SAF). The Initiative's primary goal has been to increase the USDA/ARS annual recurrent budget for floral and nursery crop research by a total of \$20.7 million (for more information, see Schmale, 2000). This Initiative's importance, and the value of sharply focused research to the floral and nursery industry in general, has been validated by Congress appropriating, as of fiscal year 2002 (FY02), an increase of \$5.2 million to the USDA/ARS annual budget to support the Initiative.

## RESEARCH OBJECTIVES OF THE INITIATIVE

The Initiative is focused on three broad research objectives: 1) Improve pest (insect, disease, and weed) management practices and strategies, \$11.9 million (57% of Initiative total); 2) Improve production system practices and strategies, \$5.3 million (26% of Initiative total); and 3) Improve environmental and resource management practices and strategies, \$3.5 million (17% of Initiative total). So far, Initiative budget allocations to those research objectives have roughly followed the preceding proportions.

About 45% of the Initiative funds have been allocated to strengthening the USDA/ARS's in-house floral and nursery research at locations such as the U. S. National Arboretum, Washington, D. C.; Corvallis, Oregon; Poplarville, Mississippi; Wooster, Ohio; Davis, California; and Ithaca, New York. But, most of the Initiative funds have been allocated, in the form of Specific Cooperative Agreements with the USDA/ARS, to floral and nursery researchers at twelve universities. Collectively,

the University of California (Davis and Riverside), Cornell University, Ohio State University (Columbus and Wooster), and Carnegie-Mellon University currently receive more than 75% of the Initiative funds allocated to universities.

### **CRITERIAL OF RESEARCH PROJECTS SUPPORTED**

The many individual research projects supported by the Initiative are characterized by: (1) focusing on the Initiative's priority research targets listed above; (2) complementing ongoing research funded by industry via, e.g., the AFE and the HRI; (3) an ability to attract complementary support from other sources, e.g., the National Aeronautics and Space Administration (NASA), and other university or USDA/ARS budgets; (4) strong adherence to other priority factors suggested by industry and universities. The projects described below exemplify the types of research supported by the Initiative, and may be of particular interest to members of the International Plant Propagation Society.

### **CHALLENGES FACING NURSERY INDUSTRY & RELATED RESEARCH PROJECTS**

**Innovative Means for Reducing Labor.** One of the most pressing challenges for the nursery and landscape industry is developing innovative means for reducing labor, which remains scarce in the U.S.A. The Initiative supports several innovative mechanization/robotic projects at the National Robotics Engineering Consortium (NREC), part of Carnegie-Mellon University in Pittsburgh, a world class robotics facility with state of the art equipment, and world leaders in developing robotic technology. One of the most important Initiative projects at the NREC, jointly supported by USDA/ARS, HRI, and matching funds from NASA (Anonymous, 1999), involves mechanizing the manipulation of container-grown plants, which now comprise ca. 60% of nursery production. Researchers at the NREC, in conjunction with leading U.S.A. nurseries and USDA/ARS scientists at McMinnville (Tennessee) and Wooster (Ohio) have already developed and tested prototypes for a robotic container mover/manipulator. Another NREC project, conducted in cooperation with NASA researchers in California and Texas, is developing "sensor webs": affordable, flexible, integrated, computerized sensor networks for monitoring and reporting key micro-environmental conditions in the nursery, such as ambient temperature, soil moisture, etc.

**Modeling Optimal Nutrient Input and Growth.** Initiative funding also supports a major joint USDA/ARS-University of California, Davis, long-term research project for modeling optimal nutrient input and growth of major ornamental crops such as roses. By constructing mathematical models to guide management of greenhouse and field irrigation, fertilization, and effluent load, this research will simultaneously increase crop production efficiency, and minimize environmental pollution from the run-off of excess nutrients, chemicals, and water.

**Developing Environmental Resource Management Systems.** Complementing the preceding research is a large, Initiative-supported, multi-institutional project to develop environmental resource management systems for nurseries, greenhouses, and landscapes. Scientists at Clemson University (South Carolina), North Carolina State University (North Carolina), University of Florida (Florida), Tennessee State University (Tennessee), and USDA/ARS laboratories at Ft. Pierce,

Florida, and McMinnville, Tennessee are integrating grassy waterways, artificial marshes (“swales”) planted with grasses, rushes, and fast-growing trees, and carefully-managed holding ponds to minimize the environmental impact of large-scale, intensive nursery plant production.

**Phase-out of Methyl Bromide.** The progressive phase-out of methyl bromide, the premier soil fumigant for horticultural crops, will strongly affect nursery crop production in states like Florida. Supported by Initiative funding, University of Florida scientists, in collaboration with USDA/ARS researchers at Ft. Pierce, Florida, are assessing the merits of soil solarization, cover crops, and reduced-risk, environmentally compatible chemicals to effectively control root-knot and other plant parasitic nematodes in ornamental production systems.

**Biocontrol of Pests and Pathogens.** Biocontrol of pests and pathogens by parasitic insects or fungi may be very effective and also environmentally benign as compared to agrichemicals. Biocontrol is especially important for controlled environments such as greenhouses, where lengthy re-entry times following application of agrichemicals may greatly complicate the work schedules for labor-intensive ornamental crops. Effectively applying living biocontrol or bioregulating agents in large volumes requires novel application technology, which is under development by USDA/ARS scientists at Wooster, Ohio, with partial support by Initiative funds. These new spray or injection methods for applying biopesticides may protect horticultural and landscape crops against damage from pests and pathogens, while safeguarding environmental quality and worker safety.

**A New Gene Bank at Ohio State University.** Finally, Initiative funding has established a new genebank at Ohio State University, Columbus, Ohio for conserving and encouraging the use of herbaceous ornamental genetic resources. New staff at Ohio State, USDA/ARS’s technical expertise, and spacious, high-quality greenhouses at the university enable a broad spectrum of herbaceous ornamentals to be acquired, maintained, distributed, characterized, and evaluated. Ultimately, research at this genebank will identify plants with constituent genes valuable for improving ornamental merit, and resistance to severe environmental, insect, and disease pressures. New varieties will result, expanding the range of useful, widely adapted plants in the floral and nursery trade.

## CONCLUSION

After 4 fiscal years of funding, the Initiative has achieved success not only in addressing priority floral and nursery crop research goals, but also in a broader institutional or organizational context. The Initiative is widely recognized as truly “industry-driven,” with the floral and nursery industry collaborating, as never before, to jointly formulate a broad research agenda, and to successfully advocate increased Federal funding to address priority research targets. By building trust and consensus, it has catalyzed stronger industry-USDA/ARS-university research partnerships, which have in turn increased the efficiency of industry-USDA/ARS-university communications and decision-making regarding cooperative research agendas and priorities.

Forecasts are always hazardous, especially in these currently unsettled times, but what may be the Initiative’s future? Congressional FY 03 draft budgets would increase the Initiative’s allocation by an additional \$800,000. But that optimistic

scenario must be tempered by the current weakness of the U.S.A. economy, cuts in Federal tax rates, and a possible war in the Middle East. Should the Initiative's budget increase in the future, one priority for the new or redirected funds will probably be augmenting research on environmental and resource management practices and strategies.

At present, the Initiative supports research focused largely on challenges to floral and nursery production in the Pacific Northwest, the Mid Atlantic and Northeastern states, and the Southeastern U.S.A. In the future, the Initiative's geographical focus will likely broaden to address more vigorously the challenges facing the green industry in the North Central U.S.A., and U.S.A. subtropics and tropics. Finally, with Initiative funding now entering its 5th year, we expect an increased pace and volume of new research discoveries that lead to, or are accompanied by, solutions to the most pressing challenges facing the U.S.A. floral and nursery industry.

### LITERATURE CITED

- Anonymous.** 1999. Consortium responds to industry's need for mechanization. *Amer. Nurseryman* Oct. 1, 1999. pp. 12, 17-19.
- Schmale, L.** 2000. A \$3.2 million victory. *Floral Management* 16(12):41-45.

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## New Plant Forum<sup>®</sup>

**Compiled and Moderated by Jack Alexander**

### Presenters:

#### **Tomasz Anisko**

Longwood Gardens, P.O. Box 501, Kennett Square, Pennsylvania 19348 U.S.A.

*Camellia ×williamsii* 'Aida'  
*Clivia miniata* var. *citrina* 'Sir John Thouron'  
*Corylopsis glabrescens* 'Longwood Chimes'  
*Ilex ×attenuata* 'Longwood Gold'  
*Ilex opaca* 'Longwood Gardens'  
*Ilex serrata* 'Longwood Firefall'  
*Magnolia acuminata* var. *subcordata* 'Peirce's Park'  
*Wisteria frutescens* 'Longwood Purple'

#### **Darrel Apps**

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*Hemerocallis* 'The Jury's Out'

#### **Fred Bauer**

Phytotektor, Huntland, Tennessee 37345 U.S.A.

*Euonymus alatus* cv., Little Moses<sup>™</sup> dwarf burning bush, PP13168