$4.00

North Carolina Flower Growers' Bulletin

Volume 52, Number 3
June 2007

Official Publication of the North Carolina Commercial Flower Growers' Association

Floriculture Group at North Carolina State University

Brian Whipker, Colleen Warfield, John Dole, William Fonteno, and Christine Casey

The floriculture group at North Carolina State University involves individuals from a number of departments, including horticulture, plant pathology, and entomology. The core group in Horticultural Science includes John Dole, William Fonteno, Paul Nelson, and Brian Whipker. Paul has been on staged retirement and will fully retire at the end of June 2007, but will remain as Professor Emeritus. Christine Casey has been the key contact in the Entomology Department with her involved with Ornamental Extension and Research, but she will be leaving the position at the end of June to pursue a degree in Veterinarian Entomology. Colleen Warfield of the Plant Pathology Department is involved with Extension and Research for ornamental plant diseases. The strength of the floriculture group has been its focus on both applied industry related projects and also fundamental research.

Coursework and Educational Opportunities

Enrollment in the ornamentals area continues to be strong at North Carolina State University. John Dole teaches the Greenhouse Management, which typically has 28 students per semester. He also teaches the hands-on production course, Floriculture Production, which typically 20 to 25 students per semester. The Plant Nutrition courses are being taught by Paul Nelson, but with his retirement it is uncertain about the future of these classes. He alternates each spring between the undergraduate and graduate versions of the class. William Fonteno teaches the graduate level Professional Skills Development course. John Dole will begin teaching a new graduate course in the spring of 2007, Physiology of Flowering, which has 18 students enrolled. For the 2-year program courses, William Fonteno is the department coordinator and teaches two classes, Plant Growth and Development and Greenhouse Crop Production, and Colleen Warfield teaches Diseases of Ornamentals and Turfgrass to 60 to 65 students per semester.

NC State's influence on teaching also extends across the globe. Paul Nelson's Greenhouse Operations and Management book and Floriculture Principles and Species by John Dole and Harold Wilkins are the primary books used by most floriculture students (available at: http://www.ballpublishing.com/commerce/). Gus DeHertogh's Holland Bulb Forcers Guide and Physiology of Bulbs are still the two main resources for bulb growers (available at: http://www.ballpublishing.com/commerce/ and http://www.elsevier.com/wps/find/bookdescription.cws_home/524068/description#description, respectively). The next book to be published in September 2007 by the floriculture

(Continued on page 4) ▶

(Continued from page 1)

group is Nutrient Deficiencies in Bedding Plants.

Floriculture Extension and Outreach

Brian Whipker in Horticultural Science, Colleen Warfield in Plant Pathology, and Christine Casey in Entomology all have primary responsibilities for floriculture extension. Additional expertise comes from Charles Safley in Agricultural Economics, Joe Neal for greenhouse weed control, and given the industry focus of the floriculture program at NC State, the other floriculture faculty also provide assistance to grower questions.

Grower Publications

The writing of grower related production guides has been a primary emphasis of the floriculture group at NC State University. Problem identification guides for Pansies, Bedding Plants, Fall Crops, Vegetative Annuals, Poinsettias, Geraniums, and Insect and Mite Pests have been published (available at: http://www.nccfga.org/). These color photographic guides to the nutritional, physiological, insect, and disease problems are printed on plastic and are excellent for assisting in problem diagnosis. In addition, manuals have been written on Pansy Production, Plant Root Zone Management, Cut Flowers, and PourThru Monitoring. The latest effort by the NC State extension specialist are the GrowerTalks/NCSU Insecticide and Fungicide Guide by Colleen Warfield and Christine Casey and the Plant Growth Regulator Guide by Brian Whipker.

Plant Disease and Insect Clinic

An excellent resource for North Carolina and U.S. growers is the Plant Disease and Insect Clinic. Tom Creswell is the director, along with Shawn Butler, and David Stephan, provide a grower-based identification services for plant diseases and insect problems. North Carolina State University is uniquely different from most university diagnostic labs, in that sample diagnosis and providing management recommendations is jointly performed by faculty extension specialists (Colleen Warfield, Christine Casey, Joe Neal, and Brian Whipker) assigned to a particular commodity and the clinic. In addition, the clinic is one of the few locations growers can have ethylene samples tested when problems are suspected with their heating system. Additional information about sample submission and costs are available at: http://www.ces.ncsu.edu/depts/ent/clinic/.

Plant Tissue and Solution Analysis

The North Carolina Department of Agriculture and Consumer Services – Agronomic Division offers plant tissue, water, and fertilizer analysis services. The low cost of $5 for this service make it an excellent value for North Carolina residents. Sample submission guidelines and fees for out of state samples can be found at: http://www.ncagr.com/agronomi/index.htm.

Horticultural Substrates Laboratory

William Fonteno's lab is the testing center for the National Certification Program for the Mulch and Soil Council and also provides a diagnostic service for the Horticultural Substrates Laboratory (http://www2.ncsu.edu/unity/lockers/project/hortsublab/).

All America Trials

The J.C. Raulston Arboretum is a host site for the All America evaluation trials. Dennis Werner, Director of the J.C. Raulston Arboretum, and Bernadette Clark coordinate the trials. Each summer, a field day is co-hosted by the North Carolina Commercial Flower Growers' Association to highlight the trials. For 2007 the field day will be on July 11th. Trial reports are available online at: http://www.ncsu.edu/jcraulstonarboretum/. Select Annual Trial Reports from the publications link.

National Poinsettia Trials

The National Poinsettia Trial Program is a cooperative program with John Dole at NC State, Homewood Nursery and Garden Center of Raleigh, Allen Hammer at Purdue University, and James Barrett at University of Florida that evaluates new poinsettia cultivars each year. Two open houses each year allow the breeders, suppliers, growers, and consumers to evaluate the cultivars. The production characteristics of and consumer reactions to the cultivars are determined. Ingram McCall is responsible for growing the plants and the program is funded by a consortium of poinsettia breeders including Dummen, Ecke, Fischer, Florema, and Selecta.

Floriculture Research

An industry related focus has always been a priority of researchers at North Carolina State University. A

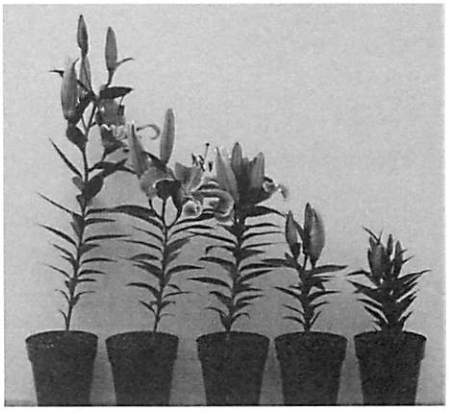
diversity of projects are underway that range from applied work to investigating fundamental issues.

Development of a PCR-based Detection Assay for Foliar Nematodes in Ornamental Host Plant Tissues for use as a Diagnostic and Research Tool
Project Participants: Colleen Warfield, Jamie McCuiston, and James Sugar
Funding Sources: American Floral Endowment, Fred C. Gloeckner Foundation, and Horticultural Research Institute.
We have developed an efficient, highly sensitive diagnostic assay and sampling scheme for screening plant materials for the presence of foliar nematodes. This diagnostic assay will help growers maintain nematode-free facilities through the identification of nematode-infested stock plants or by early detection of infested host plants introduced into a facility. In addition to screening plants, our diagnostic assay is being used as a research tool to study the life cycle and activities of this pathogen in a greenhouse/nursery setting, as well as a tool to measure the effectiveness of potential methods of control.

Disease Management of Floriculture Crops
Project Participants: Colleen Warfield and James Sugar
Funding Sources: North Carolina Commercial Flower Growers' Association, chemical companies, and industry suppliers.
Each year we evaluate management strategies for disease control of floriculture crops. These activities range from efficacy trials using traditional chemical fungicides and experimental products, to assessing the effectiveness of copper ionization in controlling pathogens in recycled irrigation water, to identification of potential sources that may introduce disease inoculum into greenhouse facilities.

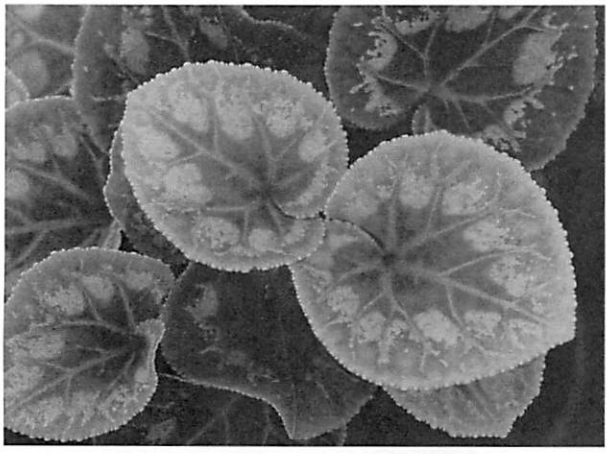
Cut Flower Production and Postharvest
Project Participants: John Dole, William Fonteno, Sylvia Blankenship, Ingram McCall, Diane Mays, Emma Locke, Erin Possiel, Erin Regan, and Beth Harden.
Funding Sources: American Floral Endowment, Association of Specialty Cut Flower Growers Research Foundation, Fred C. Gloeckner Foundation, Hill Foundation, Dole Foods, and various industry suppliers and producers including floral foods suppliers, breeders, perennial suppliers, and chemical suppliers.
North Carolina State University is recognized as the only university in the United States with a comprehensive research program on greenhouse and field cut flowers. Our program includes new cultivar evaluations, production studies, postharvest experiments, and marketing analysis. In cooperation with the Association of Specialty Cut Flower Growers (ASCFG), we coordinate the national ASCFG Seed, Perennial and Woody Plant Trial Programs which includes over fifty participating growers around the United States and Canada. Postharvest, in particular, has become one of the most important issues in the cut flower industry and our research focuses on developing postharvest protocols for new crops, anti-ethylene agents, and other methods for extending storage and vase life.

Plant Growth Regulator Research
Project Participants: Brian Whipker, Ingram McCall, Brian Krug and Dennis Carey
Funding Sources: Bayer, Chemtura, Fine, OHP, SePRO, Syngenta, and Valent USA.
We evaluate plant growth regulators for suitable formulations, new commercial uses, and determine optimal concentrations for labeling. ▶

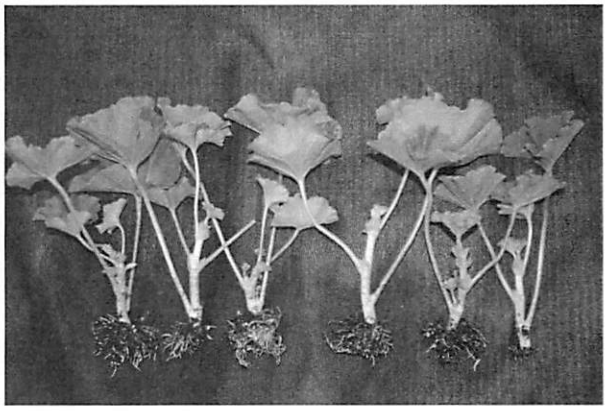


Boron Deficiency of Plugs
Project Participants: Brian Krug, Brian Whipker, and Ingram McCall
Funding Sources: Fred C. Gloeckner Foundation and seed companies.
Distorted growth of pansy, gerbera, and seed geranium plugs has been a production concern over the past few years. Growth is stunted and the plants fail to bloom. Brian Krug's Ph.D. research is determining the cause and corrective measures to prevent this problem.

Plant Nutritional Disorders
Project Participants: Brian Whipker, Ingram McCall, Ka Yeon Jeong, Paul Nelson, and Jonathan Frantz.
Funding Sources: USDA-ARS and Dole Foods.
The objective of this project is to create nutrient deficiencies and toxicities of potted plants in order to determine critical tissue concentrations and visual symptoms.



Postharvest Handling of Unrooted Cuttings
Project Participants: John Dole, Roland Leatherwood, Ingram McCall, and Diane Mays.
Funding Sources: American Floral Endowment and a consortium of unrooted cutting suppliers including Paul Ecke Ranch, Ball FloraPlant, and Metrolina Greenhouses.
This is a cooperative project among three universities, NCSU, Jim Faust at Clemson and Erik Runkle at Michigan State University, focusing on improving cutting performance by increasing our understanding of stock plant production, the post-harvest physiology of unrooted cuttings, the package environment, and subsequent effects on propagation, growth and flowering.



Horticultural Substrates: Standards and Safety
Project Participants: William Fonteno and Beth Harden
Funding Sources: Mulch and Soil Council and substrate industry.
The objectives of this project are: 1) to develop laboratory techniques for the measurement of physical and chemical properties of substrates; and 2) to develop physical, chemical and safety standards for potting soils, soil amendments and mulches.

Future

The NC State Floriculture group appreciates the excellent industry support of the program. The strong industry focus of research, extension and teaching areas help to keep the program relevant to the needs of the greenhouse industry. This partnership has worked well and the past and hopefully will continue in the future.

(Continued from page 3)

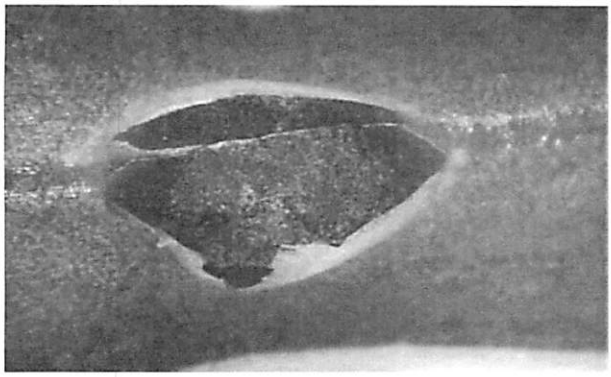


Figure 1. Rust on dianthus.

downy mildew, or Southern Blight (Figure 3). We also looked at pansy roots infected with Thielaviopsis root rot. While the black tissue could be seen, the light levels were insufficient to easily highlight the fungal spores (endoconidia) inside the root – which is used to identify the disease. The endoconidia were visible at 100X with the high quality microscope, but at a cost of over $1,000 it is not a viable option for most greenhouse operations.

Overall, for $300 it is money well spent for a greenhouse operation. The IPM scope will provide close up viewing of many problems encountered in the greenhouse. In addition to aid in diagnosis, below are listed an insect identification guide and disease identification guide which may be beneficial.

IPM Scope

Available from Spectrum Technologies for $299 + shipping. (http://www.specmeters.com/IPM_and_Plant_Health_Tools/IPM_Scope.html)

Identification Guides

Insects and Related Pests of Flowers and Foliage Plants (AG-136). This guide of the most common pest problems of floriculture plants contains line drawling and a simple key for identifying insects and mites. It would be an invaluable reference with the IPM Scope. Available for $10 (already includes postage in the price) from Communication Services, Box 7603, North Carolina State University, Raleigh, NC 27695-7603. Communication Services only accepts checks and can not process credit card payments.

Compendium of Flowering Potted Plant Diseases. This guide is geared primarily for diagnostic labs and scientist and a few diseases can be identified with the IPM Scope. (Many of the diseases listed will still require a sample to be sent to a lab for proper diagnosis, but it will still be an excellent reference.) The compendium is also published in Spanish. Available from APS for $49 + postage (http://www.shopapspress.org/disease-diagnostic-series.html).

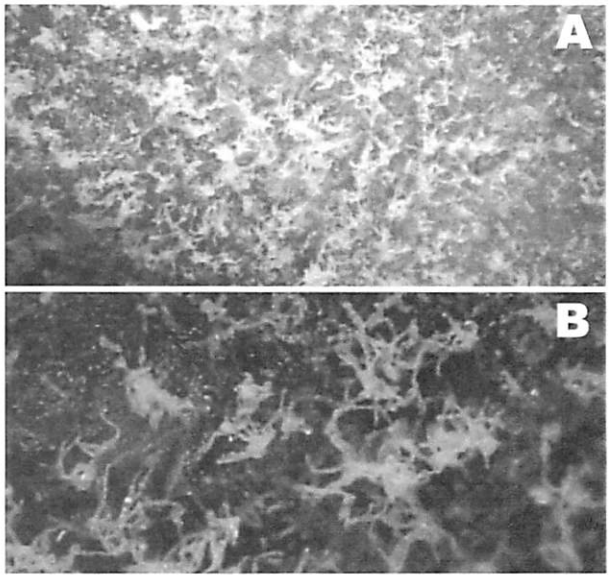


Figure 2. Powdery mildew magnified at 40X (A) and 140X (B).

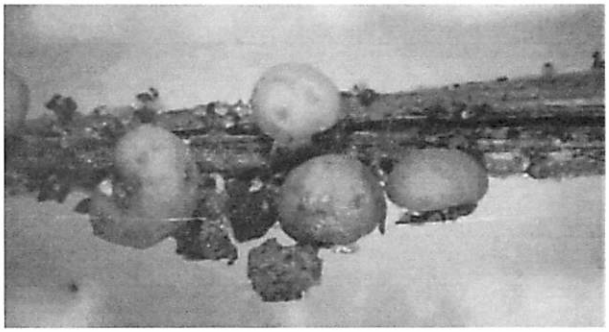


Figure 3. Sclerotia of *Sclerotium rolfsii* (Southern Blight) at 40X.