

PROCEEDINGS OF



**RESEARCH  
CONFERENCE**

**Forty-Sixth Annual Report**

**2001**

Compiled and Edited by:  
Dr. Bryson L. James  
Post Office Box 230  
McMinnville, TN 37111



# Southern Nursery Association, Inc.

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## RESEARCH CONFERENCE

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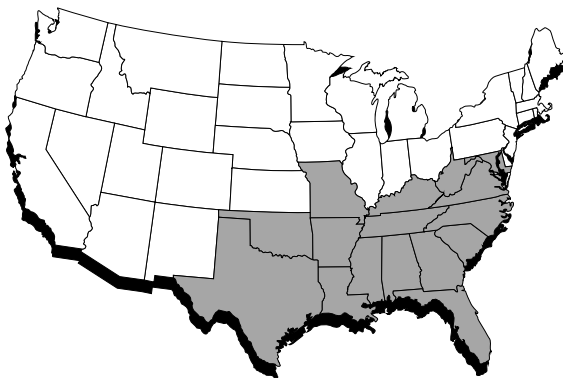
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## SIXTEEN GREAT STATES AND BEYOND!



### Annual SNA Research Conference

This two-day Horticultural Research Conference is held annually in Atlanta, GA in conjunction with the SNA... *The World's Showcase of Horticulture*<sup>®</sup> and has become world-renowned for quality research. Participants are the top horticultural research and educational leaders representing the South's top universities. All industry members are invited to attend any and all sessions. Hundreds of topics in twelve categories are shared in presentations that run approximately seven minutes each. The conference format allows you the opportunity to sit in on all or only those topics of interest to you. Research presented at the conference is published in the annual publication "SNA Research Conference Proceedings" contained herein. For more information on the SNA Research Conference or the SNA Horticultural Trade Show and Convention, contact:

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## ACKNOWLEDGMENTS

The Editor and the Board of Directors of the Southern Nursery Association wish to express their sincere appreciation to Gary Bachman, Donna Fare, Charles Hesselein, Mark Windham, Alan Windham, Mark Arena, Richard Harkess, Patricia Knight, Gary McDaniel, Gary Knox, John Brooker and Ken Tilt for the fine job they did as Section Editors and Moderators. Our special thanks go to William E. Klingeman who edited and moderated the Student Competition Section, and to Sandra Reed who edited and organized the Poster Section.

We would like to extend our gratitude to all the researchers and nurserymen who attended the 46th annual conference and/or contributed to these Proceedings and continue to make this annual event an industry success.

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## USING RESEARCH DATA SAFELY AND EFFECTIVELY

Good research is conducted under an exact set of controlled conditions, varying only the specific treatments which are to be evaluated. Results from the specific treatments are directly applicable to your operations only if all the conditions in your operation are controlled the same as in the research. Unfortunately, this seldom happens. However, this does not mean that you can not benefit from the research. What it does mean is that you should use the research information on a trial basis first, if your plant species, soil type, watering method, size and age of plant, climatic region, etc. is different than that described by the researcher.

What an alert grower should expect to gain from these research reports is ideas - ideas as to the best control for insects, disease, nematodes and weeds - labor saving ideas such as chemical pruning and using growth regulators to minimize maintenance. Also, ideas on water management, nutrition, alternative growing media, new plants for landscaping and guides for improving profits and marketing skills.

Should you desire additional information on any report, please write to the author. We would like to extend an invitation to you to attend all sessions of the SNA Research Conference held in Atlanta each year in conjunction with *The World's Showcase of Horticulture*®.



**46th ANNUAL  
SOUTHERN NURSERY ASSOCIATION**

**RESEARCH CONFERENCE PROCEEDINGS  
2001**

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Proceedings of the SNA Research Conference are published annually by the Southern Nursery Association. One copy is provided at no charge to all SNA members, horticultural libraries and contributing authors.

It is the fine men and women in horticultural research that we, the Southern Nursery Association, pledge our continued support and gratitude for their tireless efforts in the pursuit of the advancement of our industry.

**ADDITIONAL COPIES:**

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**THE PORTER HENEGAR MEMORIAL AWARD  
for  
HORTICULTURAL RESEARCH**



*Mark Windham*

The Southern Nursery Association (SNA) honored Dr. Mark Windham with the Porter Henegar Memorial Award on Friday, August 3, 2001, during the 46th annual SNA Research Conference. The conference was held in conjunction with the annual SNA Convention and SNA 2001... *The World's Showcase of Horticulture®* in Atlanta. The award, originally known as the Research Award of Merit, was created in 1968 to honor those individuals who have made outstanding contributions to ornamental horticulture research and, more specifically, to the SNA. In 1972, the award was renamed

the Porter Henegar Memorial Award to honor one of SNA's past Executive Secretaries, the late Porter Henegar. Nominations are made each year by the past four recipients and Dr. Bryson L. James, SNA Director of Research.

Born and raised in Mississippi, Windham received a B.S. and a M.S. in Plant Pathology at Mississippi State University with a minor in Plant Physiology. He obtained a Ph.D. from North Carolina State University with a major in Plant Pathology and a minor Plant Breeding. He took a post doctorate at Colorado State University before joining the Department of Entomology and Plant Pathology at the University of Tennessee - Knoxville in 1985 and has since then risen to full professor.

A prolific writer, Dr. Windham has published over 30 journal articles since 1983, and over 50 SNA articles in the SNA Research Conference Proceedings since 1988. He has published approximately 40 other articles in other popular industry publications, and has delivered over 150 presentations at various professional and industry meetings. Attracting approximately \$880,000 in grant funding for more than 40 successful grants, he has taught 28 classes since 1986, both graduate and undergraduate. Windham has received three awards for research, most recently for leading a team research effort at his university. He has been a key co-inventor of four new cultivars of ornamental plants. Mark and his wife Karen have three children and reside in Knoxville.

THE  
BRYSON L. JAMES  
STUDENT RESEARCH COMPETITION  
2001 AWARDS

This long-standing program was renamed in August 1989, in honor of Dr. Bryson L. James, Director of Horticultural Research for the Southern Nursery Association. As Dr. James has been an active participant and leader in the annual Research Conference for more than 40 years, the award, named in his honor, is a tribute to his tireless efforts on behalf of the researchers, the association and the industry. Listed below are guidelines for the Student Competition as well as this year's winners:

1. Any student of a university or a college having researchers that participate in the Southern Nursery Association Research Conference, are not more than one (1) academic year removed from graduation and whose research was completed prior to graduation, are eligible to compete.
2. Research is to be that of the presenter and a part of his/her educational studies. Contract work, unless a part of a thesis or classroom report (credit given), is not acceptable, as it may provide unlimited funding and an unfair advantage.
3. The number of student papers from a single university or college may be limited, should time restraints dictate.
4. Previous first-place winners are not eligible to compete the year following their award.
5. The student must have submitted a title to the SNA Conference Editor by the May 15 deadline specified in the Call For Titles. The paper should then be submitted both to the Section Editor for the Student Competition, and to the appropriate "topic" Section Editor no later than **June 1**.
6. The paper must follow the guidelines for format and subject matter as stated in the Call For Titles for the SNA Research Conference.
7. Student and advisor should be listed as co-authors.
8. Oral presentation must be limited to seven (7) minutes. An additional three (3) minutes will be allotted for questions. A penalty of two (2) points per minute or part thereof for every minute over seven (7) minutes will be assessed.
9. Judging shall be based on preparation of the paper (50 points) and oral presentation (100 points) for a total of 150 points.

**2001 Bryson L. James Student Competition Award Winners**

**B.S. Candidates**

1st Place	-	\$500	Katherine Ellingson, Clemson University
2nd Place	-	\$300	Amanda Kidwell, Tennessee Technological University
3rd Place	-	\$200	Adam Newby, Motlow Community College

**M.S. Candidates**

1st Place	-	\$500	Tyler Burgess, North Carolina State University
2nd Place	-	\$300	Vickie Greene, Virginia Polytechnic Institute & State University
3rd Place	-	\$200	Richard Olsen, University of Georgia

**Ph.D. Candidates**

1st Place	-	\$500	James Altland, Auburn University
2nd Place	-	\$300	Amy Noelle Wright, North Carolina State University
3rd Place	-	\$200	Stephanie Burnett, University of Georgia



## Container- Grown Plant Production

Origin	Page(s)	Title and Author(s)
North Carolina	018-020	Color Crop Time to Market Is Influenced by Fertilizer Form - R. E. Bir and J. L. Conner
North Carolina	021-023	How Much Does Form of Nitrogen Matter? Helen T. Kraus and Stuart L. Warren
Georgia South Korea Tennessee	024-029	Whole-plant Responses to Drought of Mycorrhizal and Non-Mycorrhizal 'Iceberg' Roses-W. E. Klingeman, M. W. van Iersel, Jang-Goo Kang, R. M. Augé, J. Moore and P. C. Flanagan
Virginia	030-032	Success Rates for Inoculation of Pin and Scarlet Oak with Mycorrhizal Fungi - Thomas Martin, J. Roger Harris, Greg Eaton
Virginia	033-036	Growth and Drought Resistance of 15-Gallon Pot-in-Pot Scarlet Oak Colonized with Mycorrhizal Fungi-Thomas Martin, J. Roger Harris, Greg Eaton
Arkansas Kansas	037-038	Effect of Crapemyrtle Liner Age on Subsequent Growth in Container Production - James Robbins and Steven Wiest
Mississippi	039-042	Fertilizer Rate Effect on Chrysanthemum Production in Vermicompost Substrates - Pablo Hidalgo, Richard Harkess, Frank Matta
Georgia	043-044	Influence of #7 Fiber Pots on the Growth of Three Ornamental Trees -John Ruter, Keith Mickler
Georgia	045-047	Evaluation of Five Long-Term Controlled Release Fertilizers In # 5 Containers - Keith D. Mickler and John M. Ruter
Georgia	048-050	Wilbro Organic Liqui-Feed Improves Container Plant Growth of Abelia and Crapemyrtle. - Dr. James T. Midcap
Oregon	051-054	Dolomite Blend and Rate Influence Substrate pH and Growth of Nursery Crops - Sven E. Svenson, Juliana Buckelew, Alison Henderson, Jay Paxson and Kathy Sanford
Oregon	055-056	Influence of Pruning on Branching and Growth of <i>Daphne caucasica</i> 'Summer Ice' - Sven E. Svenson, Alison Henderson, and Kathy Sanford
Alabama	057-061	Evaluation of Three Controlled-Release Nitrogen Fertilizers for Short-Term Greenhouse Crop Production - Eugene K. Blythe, Jeff L. Sibley, Joshua L. Mayfield, Barrett C. Wilson, & Edgar L. Vinson III
Texas	062-064	Plant Growth and Colonization Effects of the Mycorrhizal Fungus <i>Glomus intradicies</i> in a Commercial Nursery Container Production System - F.T. Davies, Jr., J.A. Saraiva Grossi, L. Carpio, and A.A. Estrada-Luna

**SNA RESEARCH CONFERENCE - VOL. 46 - 2001**

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Texas	065-068	Container Volume and Substrate Composition Affect Production of Container-Grown <i>Helenium amarum</i> - Michael A. Arnold
Florida	069-071	Changes in Physical Properties of Peat, Bark, and Compost-formulated Media after Foliage Plant Production - Y. Huang, J. Chen, C. A. Robinson, and R. D. Caldwell
Georgia	072-073	Container Production of <i>Camellia oleifera</i> as Influenced by Light Level - John M. Ruter
Florida	074-077	Physical Properties of Substrates Evaluated During Educational Programs in Hillsborough County Florida- Tom Yeager & Roger Newton
Tennessee	078-080	Growth of <i>Echinacea purpurea</i> 'Bravado' and <i>Leucothemum x superbum</i> 'Alaska' in Coir-amended Pine Bark Media - Gary R. Bachman and Edgar Davis
Tennessee	081-083	Spring Growth of Two Woody Ornamentals in Response to Fall Fertilization Timing - Denita Hadziabdic, Gary R. Bachman and Edgar Davis
Tennessee	084-087	Growth of Japanese Holly and NO <sub>3</sub> -N Leaching is Affected by Controlled-release Fertilizer Application Method - Milisa Harrell, Gary R. Bachman and Edgar Davis
South Carolina	088-090	Isoxaben Degradation in Gravel Substrate Retention Basins - Gretchen L. Jameson, Melissa B. Riley, and Ted Whitwell
Alabama	091-093	Evaluation of Fall Potting Data and Controlled Release Fertilizer Rate for Container Production of Woody Ornamentals - T.L. Harbuck, D.J. Eakes, and J.W. Olive
Georgia	094-097	Photosynthetic Responses of Container-grown <i>Illicium</i> L. Taxa to Sun and Shade- Richard T. Olsen and John M. Ruter
Alabama	098-100	Night-Interrupted Lighting Effects on Cold Hardiness of <i>Coreopsis verticillata</i> 'Moonbeam' Darryl L. Rayburn, Gary J. Keever, Douglas A. Findley, J. Raymond Kessler, Jr., John W. Olive
Maryland	101-107	Nitrogen Uptake, Partitioning and Loss in Container-Production Systems - Andrew G. Ristvey, John D. Lea-Cox and David S. Ross
Virginia	108-112	Reducing Root Zone Temperatures of Container-Grown Plants - Vickie Greene, Bonnie Appleton, Eva Lynn Rudiger, and Gregory Eaton
Tennessee	113-116	Maple Growth Affected by Container and Liner Size - Adam Newby and Donna C. Fare
Tennessee	117-120	Herbicide Efficacy Affected by Cyclic Irrigation Donna C. Fare and Darren Robinson
Tennessee	121-122	Effect of Arcillite on Chrysanthemum Production and Nutrient Discharge from Containers - Christopher J. Catanzaro and Brenda M. Baird

## SNA RESEARCH CONFERENCE - VOL. 46 - 2001

---

Oregon	123-125	Growth of Nursery Crops In Compost-Amended Douglas-fir Bark - Sven E. Svenson, Julianna Buckelew, Betsy Becker and Jay Paxson
Alabama	126-127	Coppicing as a Means of Increasing Regular Growth in Chinese Pistache - Melissa R. Miles, Jeff L. Sibley, Gary J. Keever, Charles H. Gilliam
Louisiana	128-134	Greenhouse Production of Liriope and Monkeygrass - Catherine Broussard, Ed Bush, Ann Gray, and Pat Hegwood
Louisiana	135-139	Supra-optimal Temperature Effects on Growth of Gaillardia - Melyssa Davis Vige, Jeff Kuehny
Louisiana	140-143	The Effects of Leaching Fraction and Fertilizer Concentration on <i>Euphorbia pulcherrima</i> 'Freedom Red' - Melyssa Davis Vige, Edward Bush, Jeff Kuehny
Alabama	144-146	Landscape Performance of Annuals Grown with Paper Pellet Filters in the Bottom of Containers - J. Glenn, C. Gilliam, J. Edwards, G. Keever, P. Knight

### Field Production

Origin	Page(s)	Title and Author(s)
Tennessee	148-152	Clay-based Protective Trunk Sprays for Ornamental Trees - W. E. Klingeman
North Carolina	153-156	Use of Poultry Litter in Field Nursery Production - Al Cooke, Ted Bilderback, Stuart Warren, and Robert Mikkelsen
Florida	157-159	Response of Field-Grown <i>Ligustrum</i> to Granular and Solution Fertilizer - Tom Yeager, Frank Melton, Sylvia Shives, and Geri Cashion
Kentucky	160-163	Irrigation and Pruning Influence Hydrangea Dried Cut Flower Production - Winston Dunwell, Dwight Wolfe, Robert McNiel, Sharon Bale, and Dewayne Ingram

### Entomology

Origin	Page(s)	Title and Author(s)
Texas	166-170	Inroads to Practical Biological Control in Texas - Kevin M. Heinz
Maryland	171-180	Pest Control Research for Nursery Crops – 2000 - J. Ray Frank
Alabama	181-183	Evaluation of Selected Insecticides on Cannas for Prevention of the Lesser Canna Leafroller - J.C. Stephenson and C. P. Hesselein
Tennessee	184-189	Bagworm Feeding Preferences among Native and Ornamental Maples - W. E. Klingeman
New York	190-191	Flea Beetles Damaging Perennials - P.B. Schultz, D.O. Gilrein, and M.S. Dills
Virginia		
Florida	192-195	Specialists, Generalists, and Opportunists: A Thinking Tool for the IPM Practitioner - Russell F. Mizell, III

Oregon	196-198	Insecticide Efficacy For Control of Adult Root Weevils on <i>Rhododendron</i> - Robin Rosetta, Thirza Collins, Neil Bell and Sven Svenson
Tennessee	199-202	A Survey of Borer Damage to Newly Planted Landscape Trees in Middle Tennessee - Frank Hale
Alabama Georgia	203-207	Evaluation of Several Insecticides for Control of Florida Wax Scale - Charles P. Hesselein, Joseph R. Chamberlin
Alabama Georgia	208-212	Control of Southern Red Mites ( <i>Oligonychus illicus</i> ): A Miticide Screening - Charles P. Hesselein and Joseph R. Chamberlin
Tennessee	213-218	Ambrosia Beetles Collected From Ethanol-Baited Traps and Chinese Chestnut in Middle Tennessee - Jason B. Oliver, Catharine Mannion
Tennessee	219-223	Nectar Thieves, Pollen Robbers and Pollinators of Hybrid Azaleas - Adriean J. Mayor, Jerome F. Grant and Paris L. Lambdin
Tennessee	224-227	Development of the Juniper Scale, <i>Carulaspis juniperi</i> (Bouché), on Leyland Cypress - Paris Lambdin, Mark T. Windham, Jerome F. Grant
North Carolina	228-232	Utilizing Natural Plant Metabolites as Feeding Deterrents for Adult Japanese Beetles - J. Dale Witt, Thomas G. Ranney, and Stuart L. Warren

## Pathology and Nematology

Origin	Page(s)	Title and Author(s)
Georgia	234-236	Daylily rust caused by <i>Puccinia hemerocallidis</i> : A new disease on daylily in the U.S. - Jean L. Williams-Woodward and James W. Buck
Georgia	237-241	In Vitro Fungicide Sensitivity and Optimum Germination Temperature of the Daylily Rust Pathogen, <i>Puccinia hemerocallidis</i> - James W. Buck and Jean L. Williams-Woodward
Alabama	242-246	Resistance of Pansy and Viola Cultivars to Powdery Mildew and Cercospora Leaf Spot - A. K. Hagan, J. R. Akridge, M. E. Rivas-Davila
Alabama	247-251	Occurrence of Cercospora Leaf Spot on Indian Hawthorn - A. K. Hagan, M. E. Rivas-Davila, and J. R. Akridge
Alabama	252-258	Disease Resistance of Shrub and Groundcover Roses and the Impact of Fungicide Inputs on those Diseases - A. K. Hagan, M. E. Rivas-Davila, J. R. Akridge, and J. W. Olive
Tennessee	259-260	Evaluation of powdery mildew resistant flowering dogwood selections in Middle Tennessee - A. Windham, M. Windham, R. Trigiano, W. Witte
Tennessee	261-263	Isolation of <i>Seiridium</i> and <i>Botryosphaeria</i> spp. from Diseased Leyland Cypress - D. Ashburn, M. Windham, A. Windham, C. Canaday, and W. Klingeman

**SNA RESEARCH CONFERENCE - VOL. 46 - 2001**

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Tennessee	264 -267	Seasonal and Genomic Differences of <i>Discula destructiva</i> and <i>Discula</i> species -Aimee Sheer, Robert Trigiano, Alan Windham, Jerome Grant, and Mark Windham
North Carolina	268-271	Searching for Fire blight Resistance in Flowering Pears ( <i>Pyrus</i> spp.) - Andrew C. Bell, Thomas G. Ranney, Thomas A. Eaker, and Turner B. Sutton
Virginia	272-275	Evaluation of phosphite as an alternative phosphorus nutrient and control for Phytophthora disease - Thomas J. Banko, Chuan Xue Hong
Alabama	276-279	Improved Control of Black Spot Disease on Roses with Winter Fungicide Treatments - Kira Bowen
South Carolina	280-283	Fungicide Movement in Runoff Water at a Container Plant Nursery - Jeanne Briggs, Ted Whitwell, and Melissa B. Riley
Mississippi Washington	284-286	Influence of select inorganic elements and pH on the fungicidal activity of chlorine dioxide in water -W. E. Copes, G. A. Chastaganer, R. L. Hummel
Alabama	287-288	Evaluation of Azoxystrobin (Heritage) for Control of Southern Blight of <i>Aucuba</i> -J. Olive,A. Hagan
Tennessee	289-293	DNA Analysis of Powdery Mildew Pathogens of Dogwood - Natu C. Mmbaga, N. Aziz, R. Sauve, and M. Mmbaga
Tennessee	294-297	Host Resistance to <i>Microsphaera pulchra</i> in Dogwood -Margaret T. Mmbaga, Hongyan Sheng
Tennessee	298-302	Ascocarp Formation and Powdery Mildew Disease Severity in <i>Cornus florida</i> -M. T. Mmbaga, H. Sheng
Ohio	303-307	Effects of Late-Season Hardening on Development of Resistance to <i>Phytophthora</i> Root Rot in a Woody Perennial - H. Mathers, N. Tuttle
Georgia	308-310	Development of Bacterial Soft Rot on Hosta in Cold Storage -Kari Parda, Jean Williams-Woodward
North Carolina	311-314	Animal Manure Amendments to Container Mixes for Suppression of Root Pathogens - D. M. Benson, S. Hu
Virginia	315-316	Effect of chlorine concentration and contact time on zoospore survival of <i>Phytophthora nicotianae</i> - C. X. Hong

**Engineering, Economics Structures & Innovations**

<b>Origin</b>	<b>Page(s)</b>	<b>Title and Author(s)</b>
Tennessee	318-320	Economic Impacts of Construction on the Nursery/ Greenhouse and Landscape Services Sectors in Tennessee-J. Menard, K. Jensen, B. English
Tennessee	321-324	Economic Viability of Using Wood Residues as a Heating Source for Greenhouse Operations in Tennessee - Kim Jensen, Jamey Menard, Burton English, and William Park
North Carolina	325-328	Production Cost Estimates for Selected Field Grown Nursery Stock - Charles D. Safley, Herman A. Sampson, Ted Bilderback

Georgia	329-332	Economic Evaluations of Structure and Technology Adoption - Forrest Stegelin
Oregon	333-334	Retractable Shading Influences Growth of <i>Vaccinium</i> -S. Svenson, J. Paxson, A. Henderson

## Growth Regulators

Origin	Page(s)	Title and Author(s)
Virginia	336-338	Using PGRs to Hold Containerized Perennials in the Nursery - Joyce G. Latimer, Thomas J. Banko and Velva Groover
Virginia	339-341	Response of Mature, Cut Back Perennials to Growth Regulators - Hoyt W. March, Thomas J. Banko and Joyce G. Latimer
South Carolina	342-344	Seed Germination and Seedling Growth Under Photoselective Films - Katherine A. Ellingson, Teresa A. Cerny and Nihal C. Rajapakse
Georgia	345-348	Anoxia Induced Height Control of Seedlings - Stephanie E. Burnett and Paul A. Thomas
Louisiana	349-352	Effect of Light Intensity and PGR application on Growth & Flowering of Ornamental Ginger - Maria del Pilar Paz, Patricia C. Branch, Jeff S. Kuehny
Kentucky	353-355	Height Reduction in Container-grown Passion Flowers using Bonzi - Bailey S. Hale, Robert Geneve, Robert Anderson and Sharon Kester

## Propagation

Origin	Page(s)	Title and Author(s)
Alabama	358-361	Effects of Medium on Rooting of <i>Clematis socialis</i> Stem Cuttings - L. L. Bruner, D. J. Eakes, J. Sibley, C.M. Morton, P. R. Knight, J. J. Cain
Alabama	362-364	Effects of Commercial Rooting Hormones and Environment in the Cutting Propagation of <i>Rosa banksiae</i> 'Lutea' - Eugene K. Blythe, Jeff L. Sibley
Mississippi	365-367	Impact of Hormone Concentration for Propagation of Native Azaleas - Patricia R. Knight, Shani L. File, Robert F. Brzuszek
North Carolina	368-370	Propagation Advances at the JC Raulston Arboretum - Christopher Todd Glenn, Mitzi Hole, and Todd Lasseigne
Florida	371-373	Rooting 'Little Gem' Magnolia: Cell-U-Wett or Water? - Karen Childs, Richard C. Beeson, Jr.
Tennessee	374-376	A Preliminary Genetic Study of Pigmented <i>Cornus kousa</i> Cultivars - R. N. Trigiano, M. H. Ament, M. T. Windham and W. W. Witte
Mississippi	377-378	Calibration of irradiation for <i>Magnolia grandifolia</i> Seed - Cecil Pounders
Arkansas	379-382	Propagation of <i>Chrysactinia mexicana</i> using Various Hormones, Media and an Anti-transpirant - J. K. Pittcock
Arkansas	383-385	Propagation of <i>Acer barbatum</i> and <i>Cotinus obovatus</i> - J. Kim Pittcock

Arkansas	386-387	Propagation of <i>Bouvardia ternifolia</i> - J. Kim Pittcock
Tennessee	388-390	Integration and expression of GUS and BAR genes in transformed Chinese Elm ( <i>Ulmus parvifolia</i> Jacq. cv. King's Choice) - X. Meng, S. Zhou, A. Aziz, and R. Sauve
North Carolina	391-393	Propagation of <i>Castanopsis sclerophylla</i> By Stem Cuttings - Peter Conden, Frank A. Blazich
North Carolina	394-397	Influence of Stratification, Temperature, and Light on Seed Germination of Southern Seaots ( <i>Uniola paniculata</i> ) - Tyler L. Burgess, Frank A. Blazich, and David L. Nash
Tennessee	398-401	Influence of Prostart™ on Germination of Two Herbaceous Perennial Species - Amanda Kidwell, Kris Lorange, Edgar Davis, Gary R. Bachman
Tennessee	402-403	Comparative AFLP Profiles of Selected <i>Hypericum</i> Species - Mary Cherry, A. Naseer Aziz, and Roger J. Sauve
Tennessee	404-406	Anther Culture of Selected <i>Echinacea</i> Cultivars - Sarabjit Bhatti, A. Naseer Aziz, Roger J. Sauve
Tennessee	407-410	Hybridization of <i>Clethra alnifolia</i> and <i>C. pringlei</i> - Sandra M. Reed
North Carolina	411-412	Propagating <i>Baptisia</i> 'Purple Smoke' and Keeping It Alive - Joseph L. Conner, Richard E. Bir
Tennessee	413-415	Amplification of DNA from Individual <i>Echinacea</i> Pollen Grains - A. Aziz, S. Zhou, and R. Sauve
Tennessee	416-418	Agrobacterium Mediated Transformation of Japanese Flowering Cherry ( <i>Prunus incisa</i> ) - S. Zhou, A. Aziz, and R. Sauve

## Weed Control

Origin	Page(s)	Title and Author(s)
North Carolina	420-421	Comparison of Glyphosate and Clopyralid for Mugwort ( <i>Artemisia vulgaris</i> ) Control in Field-Grown Nursery Crops - Joseph Neal, Craig Adkins
North Carolina	422-424	Effects of Herbicides and Application Timing on Rooting of Azalea and Japanese Holly Cuttings - Jennifer C. Cook and Joseph C. Neal
North Carolina	425-426	Preemergence Weed Control in Container Ornamentals using Flumioxazin - R. Wooten, J. Neal
Georgia New York	427-432	Evaluation of Weed Control in Three Container Grown Ornamentals to Flumioxazin - Mark A. Czarnota, Jacob N. Barney, Leslie A. Weston
Tennessee	433-434	Oxalis Weed Species Reduce Growth of <i>Echinacea purpurea</i> 'White Swan' Liners - G. Bachman, E. Davis
Tennessee	435-438	Rabbits as Weed Vectors and Vegetative Dispersal Agents - S. Conlon, W. E. Klingeman
Michigan	439-442	Weed Control In Perennial Production Utilizing Self-felting Wool Pellets - D. Bradley Rowe and R. Thomas Fernandez
Oregon	443-444	Using AlbaGro For <i>Marchantia</i> Control - Sven Svenson and Wes Deuel

**SNA RESEARCH CONFERENCE - VOL. 46 - 2001**

---

Oregon	445-447	Composts and Shading Influence <i>Marchantia</i> Infestations In Container Grown Nursery Crops- Sven Svenson, Jay Paxson, and Kathy Sanford
North Carolina	448-450	Preemergence Control of <i>Microstegium vimineum</i> - Caren A. Judge, Joseph C. Neal
Alabama	451-453	Evaluation of Biodac as a Herbicide Carrier - Glenn B. Fain, Charles H. Gilliam, Timothy L. Grey, Glenn R. Wehtje, and Ken M. Tilt
Georgia	454-456	Evaluation of a Year Long Weed Control Program for Container Grown Ornamentals - Keith D. Mickler and John M. Ruter

**Landscape**

<b>Origin</b>	<b>Page(s)</b>	<b>Title and Author(s)</b>
Florida	458-460	Evaluation of Three Pruning Methods on Landscape Performance of Two Crape Myrtle Cultivars - Alejandro Bolques, Gary W. Knox, and Edward F. Gilman
Alabama Mississippi	461-463	Mulches Reduce Herbicide Loss in the Landscape - Patricia R. Knight, Charles H. Gilliam, Shani L. File, Dan Reynolds
Virginia	464-465	A Native Plant BayScape Garden -Laurie J. Fox
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Florida	472-474	Reaching Diverse Homeowner Audiences with Environmental Landscape Programs: Comparing Lawn Service Users and Nonusers - Glenn D. Israel and Gary W. Knox
Virginia	475-477	Mycorrhizal Fungal Inoculation of Existing Street Trees - Bonnie Appleton, Joel Koci, Susan French, and Miklos Lestyan
Georgia	478-480	Highway Landscapes and Departments of Transportation: Economics Or Aesthetics? Forrest Stegelin
Delaware	481-485	Enhancing Delaware Highways: A Natural Vegetation Project - Susan Barton
Florida	486-489	Characterizing the Potential Invasiveness of Ornamental Plants in the Florida Landscape - Sandra B. Wilson and Patrick C. Wilson
North Carolina	490-491	Heat and Flooding Stresses in <i>Taxus</i> and <i>Cephalotaxus</i> - F. Todd Lasseigne, Stuart L. Warren, Frank A. Blazich, Thomas G. Ranney
North Carolina	492-496	Improving Adaptability of Cupressaceae with Stress-tolerant Rootstocks - Bradley T. Holland, Stuart L. Warren, and Thomas G. Ranney
Mississippi	497-499	Organic Amendments In a Clay Soil Affect Pansy Growth - R. Crofton Sloan, and Richard L. Harkess



**SNA RESEARCH CONFERENCE - VOL. 46 - 2001**

---

Louisiana	500-501	Fall and Spring Landscape Performance of African Marigold Varieties - Allen Owings, Gordon Holcomb, Drew Bates, Anthony Witcher
Louisiana	502-505	Micronutrient Concentrations for 'El Toro' Zoysiagrass - James N. McCrimmon
Louisiana	506-508	'Raleigh' St. Augustinegrass Micronutrient Concentrations in Response to N, K, and Mowing- James N. McCrimmon
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Virginia	512-514	Use of Air Excavation of Roots in Research, Extension, Education and Commerce - Susan French and Bonnie Appleton
North Carolina	515-518	Exposure and Plant Size Affect Landscape Establishment of <i>Kalmia latifolia</i> - Amy N. Wright, Stuart L. Warren, and Frank A. Blazich
Alabama	519-521	Rapid Determination Of Nitrogen Status In Bedding Plants - J.E. Altland, C.H. Gilliam, G.J. Keever, J.L. Sibley, and D.C. Fare
Alabama Florida Mississippi	522-524	Preparation and Evaluation of Annual Vinca ( <i>Catharanthus roseus</i> ) Extracts as Feeding Deterrents to White-tailed Deer - Christine E. H. Coker, D. Joseph Eakes, Eric H. Simonne, Micheal Davis, M. Keith Causey
North Carolina	525-527	Comparative Light Tolerance Among Taxa of <i>Illium</i> - Jason J. Griffin and Thomas G. Ranney
Virginia	528-530	Recycled Water for Landscape Plant Irrigation- Norman Grose, Laurie J. Fox, Bonnie Appleton, Stephen Donohue
Louisiana	531-534	Landscape Performance of Dwarf and Miniature Crape Myrtle Varieties (1999-2000) - A. Owings, G. Holcomb, D. Bates, R. Trawick, E. Bush

**Marketing**

<b>Origin</b>	<b>Page(s)</b>	<b>Title and Author(s)</b>
Georgia	536-538	Role of Point-Of-Sale Information On Consumers' Purchase Decisions - Forrest Stegelin
Georgia Mississippi	539-541	State Plant Promotion Programs: Histories and Perspectives -Forrest Stegelin, Steven Turner and Patricia Knight
Tennessee	542-545	U.S. Export and Import of Greenhouse and Nursery Products: Profile and Trends - Safdar Muhammad, F. Tegegne, E. Ekanem, A. Akuley-Amenyenu, S. Singh
Louisiana	546-549	Differences Between Mail Survey Respondents and Non-Respondents in Louisiana's Trade Flows and Marketing Practices Survey -Roger A. Hinson, and Wade Hampton
Mississippi	550-551	The Mississippi Medallion Promotion Campaign- Norman Winter, Ken Hood, David Tatum

Tennessee	552-555	An Examination of Changing Needs of Professionals in Green Industry: Cultivating Green Industry Professionals - S.P. Singh, E.Ekanem, S. Muhammad, F. Tegegne, A. Akuley-Amenyenu
Michigan	556-560	Survey of Southern Growers of Annuals and Perennials - Bridget Behe, Kathleen Kelley, Jim Heilig, Rachel Walden
Mississippi	561-562	Poinsettia Marketing - Outside the Box - Ken Hood, David Tatum, and Clarence Watson
Michigan	563-566	Telephone Survey Results Show that Home Landscapes are Important to Consumers - Meredith Phares, Kathleen Kelley, Bridget Behe
Texas	567-569	The Economic Impact of the Green Industry in Texas - Charles R. Hall and Melissa K. Jupe
Florida	570-573	Market Analysis of the Capillary Mat Irrigation Technology for Wholesale Nurseries in the Southeastern United States - Alan W. Hodges and John J. Haydu
Florida	574-577	Strategic Market Opportunities for Turfgrass Producers in Southeastern United States - John J. Haydu, Alan W. Hodges
Tennessee	578-581	Regional Differences in Horticultural Crop Marketing Channel Selection: A Review of U.S. Census of Horticultural Specialties Data- E. Ekanem, S. Singh, F. Tegegne, S. Muhammad, A. Akuley-Amenyenu
Tennessee	582-585	Added Value of a Powdery Mildew Resistant Dogwood - John R. Brooker, David B. Eastwood, William E. Klingeman

## **Water Management**

<b>Origin</b>	<b>Page(s)</b>	<b>Title and Author(s)</b>
Maryland	588-591	The Importance of Water in the Nutrient Management Process-David S. Ross, John D. Lea-Cox, K. Marc Tefteau
Florida	592-594	Water Use of Marketable-size Shrubs in Containers - A 2-year Average -R. C. Beeson, Jr.
Maryland	595-599	Time Domain Reflectometry Accurately Monitors Plant Water Use and Reduces Leaching Volumes in Soilless Substrates - Jason D. Murray, John D. Lea-Cox, David Ross
Alabama	600-601	Ground Cover Production Using Low Nutrient Water-C. Pounders, R.K. Malik, C. Beyl, C. Gilliam
Georgia Tennessee	602-605	Transport of Simazine in Soil Amended with Pine Bark Wood Fiber - Sam O. Dennis, Sunnie A. Aburime and R. E. Harrison
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