

PROCEEDINGS OF



**RESEARCH
CONFERENCE**

Fortieth Annual Report

1995

Compiled and Edited by
BRYSON L. JAMES
P.O. Box 230
McMinnville, TN 37110



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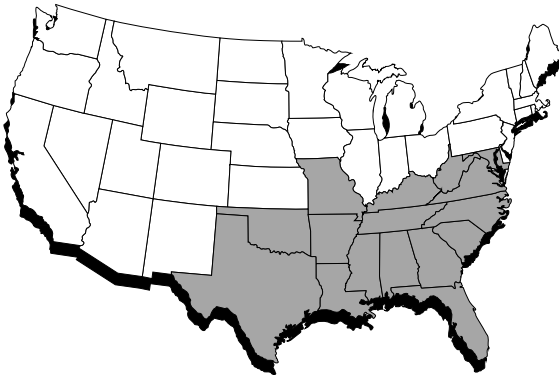
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SIXTEEN GREAT STATES and BEYOND!



Annual SNA Research Conference

This two-day Horticultural Research Conference is held annually in conjunction with the "The World's Showcase of Horticulture™" - recognized by Tradeshow 200™ as one of the 200 largest trade shows in the U.S. The event is held in Atlanta and has become world-renowned for quality research. Participants are the top horticultural research and educational leaders representing the South's top universities. Nurserymen and industry participants are invited to attend any and all sessions. 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 the Southern Nurserymen's Association at the following address:

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

NOTICE

Mention of a trademark name on a proprietary product does not constitute a guarantee and/or warranty of the product by the researcher(s) or their respective Universities or the Southern Nurserymen's Association and does not imply it's approval to the exclusion of other products that may also be suitable.

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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. Mailing addresses are listed in the back of this book. We would like to extend an invitation to you to attend all sessions of the Research Conference held in Atlanta each year in conjunction with "The World's Showcase of Horticulture™."



40th ANNUAL
SOUTHERN NURSERYMEN'S
ASSOCIATION

RESEARCH CONFERENCE REPORT
1995

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Proceedings of the SNA Research Conference is published annually by the Southern Nurserymen's Association and 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 Nurserymen's Association, pledge our continued support and gratitude for their tireless efforts in the pursuit of the advancement of our industry.

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**THE PORTER HENEGAR MEMORIAL AWARD
for
HORTICULTURAL RESEARCH
1995 RECIPIENT**



**Ted Bilderback Receives
Porter Henegar Memorial Award**

The Southern Nurserymen's Association (SNA) honored Dr. Ted Bilderback of the Nursery Extension at North Carolina State University by presenting him with the 1995 Porter Henegar Memorial Award on Friday, August 4. The award was presented during the recent 40th annual SNA Horticultural Research Conference, which is held in conjunction with the SNA Horticultural Trade Show. 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.

Dr. Ted Bilderback is a professor and Nursery Extension Specialist at North Carolina State University where he has been a member of the Horticultural Science Department since 1977. His research and extension programs have focused on container substrates, plant and substrate fertility levels and irrigation management. He received the American Association of Nurserymen's Extension Award in 1993, and in 1995, the Extension Education Award from the North Carolina Cooperative Extension Service for his extension education program "Environmentally Compatible Nursery Production Practices." His B.S. and M.S. degrees in biology and botany were received from Emporia State University, Emporia, KS and he received his Ph.D. in Horticulture from Kansas State University.

THE
BRYSON L. JAMES
STUDENT RESEARCH COMPETITION

1995 AWARDS

This long-standing program was renamed in August 1989, in honor of Dr. Bryson L. James, Director of Horticultural Research for the Southern Nurserymen's Association. Dr. James has been an active participant and leader in the annual Research Conference for more than 30 years, and 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 the guidelines for the Student Competition as well as this year's winners:

1. Any student of a university or college having researchers can participate in the Southern Nurserymen's Association Research Workers Conference if not more than a one (1) academic year removed from graduation and whose research was completed prior to graduation.
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 since it may provide unlimited funding and an unfair advantage.
3. Previous first-place winners are not eligible.
4. The student must have submitted a title to the SNA Conference Chairman by the specified time in the Call For Titles. The paper should be submitted to the Section Chairman for the Student Paper Award no later than **July 1**. Also, a copy should be sent to the appropriate "topic" Section Editor.
5. The paper should follow the guidelines for the SNA Research Workers Conference in relation to format and subject matter.
6. The student and his advisor should be listed as co-authors.
7. 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.
8. Judging shall be based on preparation of the paper (50 points) and oral presentation (100 points) for a total of 150 points.

1995 AWARD WINNERS

1st Place - \$1,000.00	Helen H. Tyler, North Carolina State University
2nd Place - \$ 600.00	Timothy Grey, Auburn University
3rd Place - \$ 400.00	Anne Marie Johnson, Clemson University

SECTION 1 - BRYSON L. JAMES STUDENT RESEARCH COMPETITION

Origin	Page No.	Title and Authors
AL	16-17	Control of Bittercress in Container-Grown Plants. Kevin Keel, Charles Gilliam, John Olive, Gary Keever and Joe Eakes.
SC	18-20	Light Degrades Iron-Chelates in Fertilizer Solutions, Affecting Physiology of Iron Acquisition in Marigold. (<i>Tagetes erecta</i> L.). Joseph P. Albano and William B. Miller.
SC	21-24	The Effect of Grassed Waterways in Reducing Pesticide Levels in Runoff Water of a Container Nursery. Jeanne A. Briggs, Melissa B. Riley and Ted Whitwell.
AL	25-26	Ozone Sensitivity of Buddleia Cultivars. Doug Findley, Gary J. Keever, Arthur H. Chappelka, D. Joseph Eakes and Charles H. Gilliam.
NC	27-30	Initial Seedling Growth of Atlantic White Cedar as Influenced by Temperature and Photoperiod. Laura G. Jull, Frank A. Blazich, L.E. Hinesley and Stuart L. Warren.
NC	31-32	Effect of Horticultural Oil and Pruning on Crapemyrtle Aphid Eggs. Gary Pierce, James Baker, Mike Linker and Stuart Warren.
AL	33-35	Use of Recycled Newspaper as a Container Medium Amendment. D. Smith, J. H. Edwards, C. H. Gilliam and C. Crossan.
NC	36-38	Irrigation Volume and Controlled Release Fertilizers Influence Plant Growth. Kelly M. Groves, Stuart L. Warren and Ted E. Bilderback.
VA	39-42	Alternative Utility Line Plants. Barbara Touchette and Bonnie Appleton.
SC	43-45	Extraction and Partial Purification of <i>Discula destructiva</i> Phytotoxins from Culture Filtrates. D.E. Wedge, M.B. Riley and F.H. Tainter.
TX	46-48	Lawn Maintenance Expenditures of Texas Single-Family Households. Clarinda L. Smith and Dr. Charles R. Hall.
AL	49-50	Accelerated Flowering of Foxglove. John M. Skelley and Gary J. Keever.
GA	51-53	Identification of Azalea Genotypes Resistant to Azalea Lace Bug and Possible Resistance Mechanisms. Yuefang Wang, S. Kristine Bramen, Carol D. Robacker and Karl E. Espelle.
NC	54-56	Influence of Storage Conditions on Long-Term Seed Viability of <i>Rhododendron catawbiense</i> , <i>Rhododendron maximum</i> and <i>Leucothoe fontanesiana</i> . Christopher T. Glenn, Frank A. Blazich and Stuart L. Warren.

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TN	57-58	An Inoculation Technique for Dogwood Anthracnose. Malissa D. Howard, Mark Windham and Robert M. Augé.
NC	59-61	Cyclic Irrigation Increases Irrigation Efficiency and Ammonium Retention. Helen H. Tyler, Stuart L. Warren and Ted E. Bilderback.
NC	62	Propagation of Sweetgum by Stem Cuttings. Heidi Rieckerman, Barry Goldfarb, Frank A. Blazich and Robert C. Kellison.
GA	63-64	Dissemination of <i>Thielaviopsis basicola</i> and <i>Fusarium proliferatum</i> by Fungus Gnats. Mary A. Harris, Ronald D. Oetting and Eugene H. Moody.
SC	65-68	Potential of Southeastern Wildflower Seed Production. Anne Marie Johnson, James J. Johnson, Jr. and Ted Whitwell.
AL	69-71	Initial Offset Number Affects Hosta's Response to BA. James M. Garner and Gary J. Keever.
AL	72-74	Cost Comparison of Pot-in-Pot Production to Above-Ground and In-field Production Methods. C.C. Montgomery, B.K. Behe, K.M. Tilt, J.L. Adrian and P.A. Duffy.
AL	75-76	Canopy Density Influences Herbicide Effectiveness. P.A. Merritt, D.J. Eakes, C.H. Gilliam and G.J. Keever.
NC	77-80	Flood Tolerant Hollies: Qualifiers for Quagmires. Clifford D. Ruth, Thomas G. Ranney and Everett P. Whitman, II.
AL	81-84	Absorption, Mobility and Filtration of Herbicides by Container Media. Timothy L. Grey, Glenn R. Wehtje, Ben F. Hajek, Charles H. Gilliam and Gary J. Keever.
KY	85-88	Selected Preemergence Herbicides for Weed Control in Four Annual Bedding Plants. J.C. Brown, L.A. Weston and R.E. McNiel.

SECTION 2 - CONTAINER-GROWN PLANT PRODUCTION

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GA	94-97	Preliminary Evaluation of Composted Poultry Litter as a Potting Mix Component. James T. Midcap.
FL	98-100	Evaluation of Waste Products as Peat Substitutes in Container Substrates. Gary Knox, Jeff Norcini and Don Covan.
NC	101-104	Growing Better Growers: Taking Applied Research into the Field. Al Cooke and Ted E. Bilderback.
AL	105-107	Evaluating the Phytotoxicity of Insecticidal Oil Sprays on Selected Container-Grown Plants. Charles P. Hesselein and Frederick W. Engle.

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TN	108-109	Fertilization Treatments of Pot Mums to Increase Efficiency of Nutrient Uptake. Christopher J. Cantanzaro and Roger J. Sauve.
VA	110-113	Effect of Cold Storage and Wax Covering on Shoot Water Potential of Bare-Root Washington Hawthorne and Norway Maple Trees. Rick M. Bates and Alex X. Niemiera.
VA	114-116	Post-Transplant Growth of Turkish Hazelnut. Patricia R. Knight, J. Roger Harris and Jody K. Fanelli.
TX	117-121	Growth Responses of Nuttall Oak to CU(OH) ₂ -Incorporated Fiber Containers and DCPTA Seed Soaks. Michael A. Arnold.
NC	122-124	Effects of Copper Hydroxide-Treated Containers and Water-Reservoir Containers on Root and Shoot Growth of Four Tree Species. Thomas G. Ranney, Everett P. Whitman, II and Richard E. Bir.
MS	125-128	Pine Bark Growth Media Amended With Coir Pith. Adolph J. Laiche, Jr.
TX	129-131	Water Relations, Growth and Development of Three <i>Rosa hybrida</i> L. Groundcover Rose Cultivars. Sein Hla Bo and Fred T. Davies, Jr.
MS	132-134	Shredded Waste Tires Used as a Media Amendment for Greenhouse Production. Richard L. Harkess, David Tatum and April Edwards.
VA	135-137	Growth Response of Nandina as Influenced by Substrate Temperature and Limestone Amendment. Ronald F. Walden and Robert D. Wright.
GA	138-139	Growth of Southern Magnolia in Pot-in-Pot and Above-Ground Production Systems. John M. Ruter.
NC	140-143	Growth Performance of Air-Pruned Tomato Seedlings. B.K. Huang and L. Wang.
AZ & GA	144-145	Climate Alters Growth and Foliar Nutrient Levels of Crapemyrtle. Chris A. Martin and John M. Ruter.

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TN	147-148	A Survey of the Pot-in-Pot Growers in Middle Tennessee. Mark A. Halcomb and Donna C. Fare.
TN	149-151	The Use of Trifluralin for Root Control in the PNP System. Donna C. Fare and W. Edgar Davis.
NC	152-154	The Effect of Pine Bark Soil Amendments on Bed-Grown Hybrid Ericaceous Shrubs. R.E. Bir, J.L. Conner and C. Deyton.
KY	155-156	Long-Term Fertilization Study with Field-Grown Nursery Crops. Dewayne Ingram, Mike Klar and Elizabeth Diamond.

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- MS 158-177 Factors Influencing Residual Activity of Chlorpyrifos Against Imported Fire Ants (Hymenoptera: Formicidae) in Nursery Potting Media. Anne-Marie A. Callcott, Homer L. Collins and Timothy C. Lockley.
- MS & AL 178-184 Phytotoxicity of FIREBAN® 1.5G to Selected Cultivars of Foliage and Woody Ornamental Plants. Timothy C. Lockley, Adolph J. Laiche, Jr. and James C. Stephenson, Jr.
- MD 185-186 Oriental Beetle, *Exomala orientalis* (Waterhouse), as a New Nursery Pest in Maryland. K. Marc Tefteau and Mark J. Rothchild.
- TX 187-190 Reported Distribution of the Asian Ambrosia Beetle *Xylosandrus crassiusculus* (Motschulsky) in the Eastern United States and Associated Host Plants. Bill Lee and Leslie Hunter.
- NC 191-193 Efficacy of Naturally Occurring Feeding Deterrents Endogenous to Rosaceous Trees on Japanese Beetle. Cynthia A. Patton, Thomas G. Ranney, James D. Burton and James F. Walgenbach.
- GA 194-197 Susceptibility of Holly Species and Cultivars to Twolined Spittlebug. S. Kristine Braman and John Ruter.
- TN 198-200 Timing and Control of *Proteoteras aesculana* (Lepidoptera: Tortricidae) in Red Maple. F.A. Hale and M. Halcomb.
- NC 201-204 Natural Resistance to Eastern Tent Caterpillar Among Rosaceous Trees. T.G. Ranney, J.F. Walgenbach, J.D. Burton, E.P. Maness and D. M. Pharr.
- GA 205-206 Implementation of Integrated Management of Whitefly and Two-Spotted Spider Mite. Mary A. Harris, Beverly Sparks and Kristine Braman.
- VA 207-208 Evaluation of Aphid Control in Multi-Plant Containers. P.B. Shultz.
- TN 209-211 The Influence of Foliage Coloration on Insect Diversity among Three Cultivars of Dogwood. D. Scott Neitch, Jerome F. Grant and Mark T. Windham.

SECTION 5 - PATHOLOGY AND NEMATOTOLOGY

- AL 213-215 Reaction of Dogwood Selections to Powdery Mildew in Alabama. A.K. Hagan, C.H. Gilliam, G.J. Keever and D. Williams.
- AL 216-218 Resistance of Indian Hawthorn to Entomosporium Leaf Spot. A.K. Hagan, J. Olive, K. Tilt and R. Akridge.
- AL 219-221 Resistance of Crape Myrtle to Powdery Mildew. A.K. Hagan, G.J. Keever, C.H. Gilliam and D. Williams.

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- FL 222-225 Fungicide Management of Phytophthora Blight of Madagascar Periwinkle. Gary W. Simone and Valerie Jones.
- AL 226-227 Evaluation of Selected Fungicides for Control of Photinia Leafspot. John W. Olive, Austin K. Hagan and Leonard C. Parrott, Jr.
- TN 228 Chemical Control of Powdery Mildew of Poinsettia. Alan S. Windham and Mark T. Windham.
- AL 229-230 Blackspot Disease Management on Hybrid Tea Roses in Alabama. Kira L. Bowen and Bridget K. Behe.
- SC 231-232 Responses of *Cornus amomum* and *Raphanus sativus* to *Discula destructiva* and Toxic Metabolites. H.T. Irwin, D.E. Wedge and F.H. Tainter.
- TN 233-234 *Discula destructiva*, an Introduced Pathogen of North American Dogwoods. Robert N. Trigiano, Gustavo Caetano-Anolles and Mark T. Windham.
- GA 235-236 *Phytophthora* Suppressed by Pine Bark Extracts. Franklin A. Pokorny and M.G. Dunavent.

SECTION 6 - ENGINEERING, ECONOMICS, STRUCTURES & INNOVATIONS

- TN 238-241 Landscape Businesses and Garden Centers: Opportunities and Problems. Enefiok Ekanem, Surendra P. Singh, Fisseha Tegegne and Sam O. Dennis.
- NC 242-246 An Automated Transplanting Apparatus for Container-Grown Plants. Jianhua Gao and Jianghong Yu.

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- TX 251-252 Growth Responses of Honeylocust to Pre-Germination Seed and Post-Germination Foliar Applications of DCPTA. Michael A. Arnold.
- MS 253-254 The Use of Ethephon (Florel) to Prevent the Formation of Gum Balls on Sweetgum Trees. David Tatum and Bob Rice.
- VA 255-258 Promotion of Flower Bud Development on *Kalmia latifolia* with Growth Retardants. T.J. Banko and M.A. Stefani.
- GA 259-261 Influence of Paclobutrazol on Growth of Lantana 'New Gold.' John M. Ruter.

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- NC 266-268 Response of Seedlings of Highbush Blueberry to *In vitro* Ericoid Mycorrhizal Inoculation. Mark C. Starrett, Frank A. Blazich, Larry F. Grand and Steven R. Shafer.
- FL & NC 269-271 Comparison of IBA and P-IPB for Propagation of Loblolly Pine by Stem Cuttings. Mack Thetford and Frank A. Blazich.
- NC 272-273 Propagation of *Quercus phillyreoides* by Stem Cuttings. Patrick J. McGuigan, Frank A. Blazich and Thomas G. Ranny.
- NC 274-277 Influence of Hedged Stock Plant Nitrogen Fertilization on Rooting Stem Cuttings of Loblolly Pine. D. Bradley Rowe, Frank A. Blazich and Farrell C. Wise.
- SC 278-280 *In vitro* Culture of Oak. N.D. Camper and Kimberly S. Crumbine.
- FL 281-284 Three Alternatives to Peat in the Propagation and Growth after Transplanting of *Buddleia*. James H. Aldrich, Joshua L. Roddenberry and Jeffrey G. Norcini.

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- SC 288-290 Harry Bittercress Seed Production, Dispersal and Control. Gary Bachman and Ted Whitwell.
- CO & MS 291-293 Horizontal Application of BioBarrier for Landscape Weed Control. Steven E. Newman and Jesse R. Quarrels.
- SC 294-296 Tolerance of *Buddleia davidii* 'Charming Summer' to Preemergence Herbicides. Robert F. Polomski, Ted Whitwell and Kevin Tucker.

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- GA 298-299 Hydroseeding Strategies for Wildflower Establishment. W.L. Corley.
- GA 300 Raphiolepis 'Eskimo' for Southeastern Piedmont Environmental Landscapes. W.L. Corley and O.M. Lindstrom.
- SC 301-303 Evaluation of Warm Season Perennial Grasses for Low Maintenance Landscapes. James B. Aitken.
- NC 304-307 The North Carolina Association of Nurserymen and NCSC Arboretum Program for Superior Plant Promotion. Tom Foley, Jr., and J.C. Raulston.

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NC	313-316	Ornamental Plant Cultivars Which Have Been Selected, Named and Introduced by the NCSU Arboretum. J.C. Raulston.
NC	317-319	The NCSU Arboretum Evaluation of Southwestern U.S. and Mexico Native Plants. J.C. Raulston, John Fairey, and Carl Schoenfeld.
NC	320-322	No-Spray Rose Trial. R.E. Bir, T.G. Ranney, R.K. Jones and J.E. Shelton.
AL	323-327	Pansy Performance in Alabama. Darby Quinn, Bridget Behe and Jimmy Witt.
TN	328-330	Cold Hardiness Evaluation of Eight Crape Myrtle Cultivars. Edgar Davis and Donna Fare.
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VA	332	Two New Landscape Plants: Chuck Hayes Gardenia and Virginia Beautyberry. Daniel C. Milbocker.

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TX	345-348	Comparison of Lawn Maintenance Expenditures Among Households in the Southern Region. Charles R. Hall, Curtis F. Lard, Clarinda L. Smith and Brad E. Seidel.
AL	349-351	Product and Service Quality Perceptions of Five Traditional Garden Centers in Charlotte, North Carolina. Bridget Behe, Jay Hudson, Harry Ponder and William Barrick.
AL	352-355	Service Quality Evaluation of a Non-Traditional Garden Center. Jay T. Hudson, B.K. Behe, H.G. Ponder and W.E. Barrick.
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- VA 368-372 Comparison of Morphological Features Affecting Water Loss in Norway Maple and Washington Hawthorn Stems. Rick M. Bates and Alex X. Niemiera.
- GA 373-374 Growth Responses to and Physical Properties of and Isolite-Amended Container Medium. Michael B. Triff and Timothy J. Smalley

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- TN 376-378 Identification of Genetic Diversity Among *Loropetalum chinense* var. *rubrum* accessions. Nick J. Gawel, and G.R. Johnson.
- AL 379-381 Foliage Characteristics of Selected Red Maple Cultivars. J.L. Sibley, D.J. Eakes, C.H. Gilliam, G.J. Keever and W.A. Dozier, Jr.
- FL 382-384 Response of Azaleas to Split Fertilizer Applications. Tom Yeager and John Darley.
- TN 385-387 Natural Occurrence of Conidia of *Disculla destructiva* Causal Agent of Dogwood Anthracnose, on Insects and Related Organisms. H. Lee Holt, Jerome F. Grant and Mark T. Windham.
- KY 388-391 Seed Storage Effects Persimmon Germination. Winston C. Dunwell and Dwight E. Wolfe.
- VA 392-393 Tree Selection and Planting Posters. Bonnie Lee Appleton and Sybil Kane.
- GA 394-395 Do Garden Mints Suppress Root-Knot Nematodes? Jerry T. Walker and John Melin.
- LA 396-398 Evaluation of Fertilizers in Field Production of River Birch and Bald Cypress. Allen D. Owings.
- LA 399-400 Performance of New Cut Flower Sunflower Cultivars. Allen D. Owings and Traci A. Compton.
- FL 401-403 *In Vitro* Propagation of *Stewartia malacodendron* L. (Silky Camellia). Murdock Ray Gillis and Michael E. Kane.
- MS, CO 404-406 Shredded Tire Rubber as a Container Medium for Greenhouse-Grown Plants. Xiaomei Zhao, William L. Kingery and Steven E. Newman.
- SC 407-410 DsRNAs in Eastern and Western Isolates of *Disculla destructiva* are Different. S.D. McElreath, J.M. Yao and F.H. Tainter.

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AL	414-417	Hollies as Alternative Christmas Trees in Containers. Ken Tilt, Bridget Behe, David Williams and Heath Potter.
MS	418-421	Growth of Bedding Plants in a Kenaf-Based Potting Medium. Nancy A. Reichert and Brian S. Baldwin.
TN	422-427	Growth of Maple Taxa in Tennessee. Willard T. Witte, Phillip C. Flanagan and Roger Sauve.
TN	428-431	1994 Powdery Mildew Ratings and Growth of Oak Taxa in Tennessee. W.T. Witte, M.T. Windham, R.J. Sauve and P.C. Flannagan.
FL	432-435	Phytotoxicity of AquaGro 2000L and Dish Soap Used as a Wetting Agent. Karen D. Baril and James E. Barrett.
AL	436-439	Development of Electronic Fuzzy Logic System for Irrigation Control. Quanxing Zhang, Chwan-Hwa "John" Wu and Ken Tilt.