Proceedings of
38th Annual Horticulture Field Day

South Mississippi Branch Experiment Station
Coastal Research and Extension Center
Mississippi Agricultural and Forestry Experiment Station
Proceedings of

38th Annual Horticulture Field Day

Poplarville, Mississippi
October 6, 2011

South Mississippi Branch Experiment Station
Coastal Research and Extension Center
Mississippi Agricultural and Forestry Experiment Station
## CONTENTS

### Outstanding Ornamental Plants for 2011
at the South Mississippi Branch Experiment Station
Eugene K. Blythe, Michael Anderson*, Debbie Murchison,
David Lee, Louis DeJean, Scott Langlois, Christine Ladner, and Clay Mayeau ................................................................. 1

### MORE! Outstanding Ornamental Plants for 2011
at the South Mississippi Branch Experiment Station
Eugene K. Blythe, Michael Anderson*, Debbie Murchison,
David Lee, Louis DeJean, Scott Langlois, Christine Ladner, and Clay Mayeau ................................................................. 2

### New Edible and Ornamental Vegetables for Landscape
Planting and Container Growing from the 2011 Trial Garden
Eugene K. Blythe, Michael Anderson*, Debbie Murchison, David Lee,
Louis DeJean, Scott Langlois, Christine Ladner, and Clay Mayeau .......................................................................................... 3

### 2011 Update: All-America Selections at Mississippi State University —
Trialing New Flowers and Vegetables for Superior Garden Performance
Eugene K. Blythe* and Richard G. Snyder .................................................................................................................................. 4

### Essential Oils from the Ornamentals Artemisia abrotanum and A. pontica:
Chemical Composition and Mosquito Repellent Activity
Nurhayat Tabanca, Betül Demirci, Eugene K. Blythe*, Ulrich R. Bernier,

### Native Plant Combinations for the Home Landscape
Patricia Drackett* ......................................................................................................................................................................... 6

### Community Gardening: Local Is in Your Own Backyard
Christine Coker* ........................................................................................................................................................................... 7

### A Late-Flowering Ornamental Tung Oil Tree (Aleurites fordii)
Tim Rinehart*, Ned Edwards, and Jim Spiers ............................................................................................................................. 8

### Containerized Plants for Large-Scale Landscape Plantings:
Does Plant Performance Match Media Claims?
Glenn Hughes* ............................................................................................................................................................................. 9

### Ornamental Entomology Research at the Southern
Horticultural Laboratory: Assisting Southern Nurseries
Christopher Werle* and Blair Sampson ..................................................................................................................................... 10

### Backyard Beekeeping for Pleasure and Profit
Blair Sampson* and Christopher Werle ..................................................................................................................................... 11

### Determining the Suitability of Alternative Greenhouse/Nursery Substrates
Anthony L. Witcher*, Eugene K. Blythe, Glenn B. Fain,
Kenneth J. Curry, and Cecil T. Pounders .................................................................................................................................. 12

### Timing of Fungicide Sprays to Prevent Azalea Web Blight Symptoms
Warren Copes*, Austin Hagan, and John Olive ........................................................................................................................ 13

### Identification of Residential Problem Areas That Could Provide
a Conducive Environment for a Termite Infestation
K.C. Lee* and Eldon J. Mallette ................................................................................................................................................ 14

### Integrating Mississippi MarketMaker in Marketing
Flowers, Grains, Herbs, Fruits, Nuts, and Vegetables
Benedict Posadas*, Amanda Seymour, and Randy Coker ....................................................................................................... 15

### Two New Disease-Resistant Hibiscus: ‘Lufkin White’ and ‘Lufkin Red’
Cecil Pounders (presented by Robin Hayes*) ................................ .............................................................................................. 17

### Micropropagation of Solanum aethiopicum L. (Scarlet Eggplant):
Effect of Genotype and Culture Media
Carrie Witcher* and Hamidou Sakhanokho ........................................................................................................................... 18

*Scheduled Presenter
Outstanding Ornamental Plants for 2011 at the South Mississippi Branch Experiment Station

Eugene K. Blythe, Michael Anderson, Debbie Murchison, David Lee, Louis DeJean, Scott Langlois, Christine Ladner, and Clay Mayeux
Mississippi State University, Coastal Research and Extension Center, South Mississippi Branch Experiment Station, Poplarville, MS

Plentifall series Pansy [PanAmerican Seed]
Available from retail garden centers and mail-order seed companies.

Sorbet series Viola [PanAmerican Seed]
Available from retail garden centers and mail-order seed companies.

Incarvillea sinensis 'Cheron Pink' [Kieft-Pro-Seeds]
Available from retail garden centers and mail-order seed companies.

'Wasabi' Coleus [Ball FloraPlant]
Available from retail garden centers.

Archangel series Angelonia [Ball FloraPlant]
Available from retail garden centers.

Suncatcher Pink Lemonade Trailing Petunia [Ball FloraPlant]
Available from retail garden centers.
MORE! Outstanding Ornamental Plants for 2011 at the South Mississippi Branch Experiment Station

Eugene K. Blythe, Michael Anderson, Debbie Murchison, David Lee, Louis DeJean, Scott Langlois, Christine Ladner, and Clay Mayeux
Mississippi State University, Coastal Research and Extension Center, South Mississippi Branch Experiment Station, Poplarville, MS

Salvia farinacea 'Evolution White' [Benary]
Available from retail garden centers and mail-order seed companies.

Rudbeckia hirta 'Denver Daisy' [Benary]
Available from retail garden centers and mail-order seed companies.

Zinnia elegans 'Queen Red Lime' [Benary]
Available from retail garden centers and mail-order seed companies.

Accent Premium series Impatiens [Syngenta Flowers]
Available from retail garden centers and mail-order seed companies.

Kauai series Torenia [PanAmerican Seed]
Available from retail garden centers and mail-order seed companies.

Hibiscus acerosella 'Mahogany Splendor' [PanAmerican Seed]
Available from retail garden centers and mail-order seed companies.
New Edible and Ornamental Vegetables for Landscape Planting and Container Growing from the 2011 Trial Garden

Eugene K. Blythe, Michael Anderson, Debbie Murchison, David Lee, Louis DeJean, Scott Langlois, Christine Ladner, and Clay Mayeux
Mississippi State University, Coastal Research and Extension Center, South Mississippi Branch Experiment Station, Poplarville, MS

'Field of Dreams' Ornamental Corn
[Floranova]
Available from retail garden centers and mail-order seed companies.

'Pot Black' Eggplant
[Vegetalis]
Available from retail garden centers and mail-order seed companies.

'Emerald Isle' Eggplant
[Vegetalis]
Available from retail garden centers and mail-order seed companies.

'Cherry Falls' Tomato
[Vegetalis]
Available from retail garden centers and mail-order seed companies.

'Loco' Hot Pepper
[Vegetalis]

'Chenzo' Hot Pepper
[Vegetalis]

'Basket of Fire' Hot Pepper
[Vegetalis]
Available from retail garden centers and mail-order seed companies.
2011 Update: All-America Selections at Mississippi State University –
Trialing New Flowers and Vegetables for Superior Garden Performance

Eugene K. Blythe, Coastal Research and Extension Center, South Mississippi Branch Experiment Station, Poplarville, MS
Richard G. Snyder, Central Mississippi Research and Extension Center, Truck Crops Branch Experiment Station, Crystal Springs, MS

All-America Selections (AAS) was founded in 1932 by W. Ray Hastings as a way for home gardeners to learn which new varieties were significantly improved for better garden performance. AAS includes a network of over 40 trial grounds all over North America where new, never-before-sold varieties are grown and evaluated by skilled, impartial AAS Judges. Only the best performers are declared AAS Winners. AAS continues as the oldest, most established international testing organization in North America.

In Summer 2011, All-America Selections unveiled a new logo with a fresh, modern design. Mike Murgiano of Syngenta Flowers, chair of the AAS task force responsible for the new image of All-America Selections (AAS) said, “Our new logo honors the past 80 years of AAS history by maintaining the familiar red, white and blue, but in updated tones. We also are embracing our future with the strong use of the AAS acronym that represents an easily identifiable connection to our organization and our winning plants and flowers.”

Diane Blazek, AAS Executive Director, added “The words ‘All-America Selections’ encircling the acronym symbolizes how the organization embraces not only seed annual flowers and vegetables, but how we plan to embrace vegetatively propagated annuals and perennials in the future.”

2011 AAS Winners:
1. Gaillardia ‘Arizona Apricot’
2. Ornamental Kale ‘Glamour Red’ F1
3. Salvia ‘Summer Jewel Red’
4. Viola ‘Shangri-La Marina’ F1
5. Pepper ‘Orange Blaze’ F1
6. Tomato ‘Lizzano’ F1
7. Tomato ‘Terenzio’ F1
8. Pumpkin ‘Hajink’ F1

For more information on AAS winners, visit: www.all-americaselections.org

AAS Display Gardens are located at the South Mississippi Branch Experiment Station in Poplarville and at the Truck Crops Branch Experiment Station in Crystal Springs. AAS flower trials are conducted in Poplarville and AAS vegetable trials are conducted in Crystal Springs.
Essential Oils from the Ornamentals Artemisia abrotanum and A. pontica: Chemical Composition and Mosquito Repellent Activity

Tabanca N1, Demirci B2, Blythe EK1, Bernard UR3, Ali A1, Wedge DE3, Wang M1, Khan IA4,5, Baser KHC4

1National Center for Natural Products Research, The University of Mississippi, University, MS 38677 USA; 2Department of Pharmacognosy, Faculty of Pharmacy, Anadolu University, 26470 Eskisehir, Turkey; 3Coastal Research and Extension Center, Mississippi State University, South Mississippi Branch Experiment Station, Poplarville, MS 39470 USA; 4USDA-ARS Center for Medical, Agricultural, and Veterinary Entomology, Gainesville, FL 32608 USA; 5USDA-ARS Natural Products Utilization Research Unit, University of Mississippi, University, MS 38677 USA; 6Department of Pharmacology, School of Pharmacy, The University of Mississippi, University, MS 38677 USA; 7Department of Botany and Microbiology, College of Science, King Saud University, 11451 Riyadh, Saudi Arabia

Abstract
Mosquito-borne diseases such as malaria, encephalitis, and Yellow Fever, and Rift Valley fever are diseases that result in significant morbidity and mortality in humans and livestock globally. Currently, the development of natural product-based insecticides and repellents has been explored to increase and improve our ability to protect humans from mosquito bites, and ultimately to reduce the incidence of mosquito-borne illnesses. We have undertaken a collaborative research project to discover new natural compounds for personal protection and control of mosquitoes. Artemisia abrotanum L leaves have reportedly been used as a moth and insect repellent. Therefore, we evaluated Artemisia abrotanum and A. pontica L essential oils for mosquito repellent activity against Aedes aegypti. Mice were treated orally or by intranasal instillation with essential oils obtained by hydrodistillation of aerial parts were analyzed by gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS). Artemisia abrotanum oil constituents were as follows: α-terpinene 32.6%, 1,8-cineole 15.3% and 1,8-cineole 10.9%, 3,5,6,7-tetrahydro-1,2,4-oxadiazole-2,5-dione 7.2%, 3,5,6,7-tetrahydro-1,2,4-oxadiazole-2,5-dione 7.2%, and 3,5,6,7-tetrahydro-1,2,4-oxadiazole-2,5-dione 7.2%. The oil showed repellent activity down to a minimum effective dose of 0.121 mg/cm² using cloth patch assay whereas A. pontica oil exhibited no repellent activity at the highest concentration tested (0.375 g/L). Our continuing research into exploring the repellency of specific compounds in the A. abrotanum oil will continue and be expanded to include other mosquito vectors and pinewood-resistant mosquito strains.

Introduction
Mosquitoes are arthropods of public health importance because of the diseases they transmit. The primary approach used for mosquito control relies on chemical control. However, frequent use of synthetic insecticides for vector control can lead to non-target effects and the development of insecticide resistance. Therefore, there is an urgent need to develop alternative insecticides to supplement synthetic insecticides for control of a wide variety of insect-vector diseases.

Essential oils could be new candidate products for control of vector insects. Each of the active compounds in a particular essential oil may be responsible for its biological activity. A variety of plant extracts and also, the individual components of plant extracts, are known to possess insecticidal, acaricidal, and antifungal activities and are being evaluated for their potential as novel biopesticides.

Materials and Methods
Plant materials: Stems of A. abrotanum and A. pontica was harvested from greenhouse, container-grown plants, using a single vegetatively propagated clone of each species. Stems were cut into 2-cm-long pieces and dried at 35°C for 3 days.

Essential oils: GC and GC-MS analysis of critical point dried essential oils obtained by hydrodistillation of aerial parts were analyzed by gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS). Essential oils were analyzed by capillary GC and GC-MS using an Agilent 7890A GC system. The same column and analysis conditions were used for both GC and GC-MS.

Table 1. Composition of the essential oils of Artemisia abrotanum and A. pontica.

<table>
<thead>
<tr>
<th>Compound</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,8-Cineole</td>
<td>32.6</td>
</tr>
<tr>
<td>α-Terpinene</td>
<td>15.3</td>
</tr>
<tr>
<td>3,5,6,7-Tetrahydro-1,2,4-oxadiazole-2,5-dione</td>
<td>7.2</td>
</tr>
</tbody>
</table>

Results and Discussion
In the search for environmentally safe and effective ways of controlling mosquitoes, both Artemisia oils were evaluated for repellent and insecticidal activity against Aedes aegypti. Each of the oils was subsequently analyzed by GC and GC-MS systems in which the individual components were identified according to their relative retention indices with their relative percentages (Table 1).

Forty seven compounds were identified from A. abrotanum and A. pontica oils which correlated 66.5% and 71.1% of the total oil. The A. abrotanum oil was characterized with 32.6% 1,8-Cineole, 15.3% 3,5,6,7-tetrahydro-1,2,4-oxadiazole-2,5-dione, 7.2% 1,8-Cineole, and 7.2% α-Terpinene.

Mosquito Larvicide Bioassays: Larval bioassays were performed as described previously. A. abrotanum and A. pontica was diluted in distilled water (D2O), and serial dilutions were performed at 125, 62.5, and 31.25 ppm. A. pontica oil showed higher larvicidal activity against An. aegypti larvae than A. abrotanum oil. Larvae were assayed at five dilutions to determine the minimum effective concentration. The larvicidal activity was determined by the number of larvae remaining alive in each well (100 μL of larvae food solution, and 11 μL of D2O) scored at 24 h post-exposure. Mortality data were recorded in 24-h post-exposure.

Table 2. Larval biting deterrent effects of isolated compounds at 25 min/cm².

<table>
<thead>
<tr>
<th>Compound</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,8-Cineole</td>
<td>High</td>
</tr>
<tr>
<td>α-Terpinene</td>
<td>High</td>
</tr>
<tr>
<td>3,5,6,7-Tetrahydro-1,2,4-oxadiazole-2,5-dione</td>
<td>High</td>
</tr>
</tbody>
</table>

Mosquito Larvicide Bioassays: Larval bioassays were performed as described previously. A. abrotanum and A. pontica was diluted in distilled water (D2O), and serial dilutions were performed at 125, 62.5, and 31.25 ppm. A. pontica oil showed higher larvicidal activity against An. aegypti larvae than A. abrotanum oil. Larvae were assayed at five dilutions to determine the minimum effective concentration. The larvicidal activity was determined by the number of larvae remaining alive in each well (100 μL of larvae food solution, and 11 μL of D2O) scored at 24 h post-exposure. Mortality data were recorded in 24-h post-exposure.
Native Plant Combinations for the Home Landscape
• Based on native plants displayed at The Crosby Arboretum

The WOODLAND EXHIBIT
Located in Picayune, MS, The Crosby Arboretum is the premier native plant conservatory in the Southeast.

The Arboretum features a variety of plant communities, representing the native flora of the Pearl River drainage basin in Mississippi and Louisiana.

The SAVANNA EXHIBIT
The habitats provide many learning opportunities for Mississippi gardeners, and for all ages to learn about nature through educational programs, tours, and events.

The AQUATIC EXHIBIT

The Crosby Arboretum / MSU Extension Service
Mississippi State University Coastal Research & Extension Center
www.crosbyarboretum.msstate.edu
Community Gardening: Local is in Your Own Backyard

Christine Coker, Gary Bachman, Corey Wheeler, and Susan DeBlanc
Mississippi State University, Coastal Research and Extension Center

8 Steps for a Successful Community Garden
- Decide Your Type of Garden
- Look for Community Partners
- Find a Location
- Plan Your Garden
- Develop Your Supply List and Gather Resources
- Develop Your Promotion and Education Strategy
- Develop Your Work Plan
- Get Started and Have Fun!

Locations
- Schools
- Hospitals
- Retirement Communities
- Soup Kitchens
- Churches
- Community Centers

Types of Gardens
- Vegetable gardens
- Herb gardens
- Wildlife gardens
- Pollinator gardens
- Rain gardens
- Flower gardens

For more information about Community Gardens contact Dr. Christine Coker @ ccoker@ra.msstate.edu

The People’s Garden Initiative
- promotes health and wellness
- helps the environment
- creates teaching opportunities
- enables social and cultural expectations
- fosters pride
A late-flowering ornamental tung oil tree (*Aleurites fordii*).

**What do you name a “nutless”, late-flowering ornamental tung oil tree?**


---

**Late flowering selection blooms one month later, probably due to temperature.**

March is peak flowering time for normal tung oil tree.

April is peak flowering time for late-flowering tung oil tree.

Air and soil temperatures for Poplarville, MS (minimums and maximums)

Normal and late-flowering on March 14. Normal tung oil tree has open flowers.

Daily air and soil temperatures for Poplarville, MS provided by Mississippi State University, South MS Branch Experiment Station.

---

**Jennifer Currell** is the USDA-ARS technician responsible for the tung oil tree research. She also discovered a variegated tung oil tree growing beside the road in Pearl River County. This chance seedling has been propagated and will be evaluated for potential release alongside the later-flowering selections.
Containerized Plants for Large-Scale Landscape Plantings: Does Plant Performance Match Media Claims?

H. Glenn Hughes, Extension Forestry Professor, MSU Extension Service, Purvis, MS

Introduction

Katrina destroyed some 320 million mature trees. Many efforts to restore hardwoods damaged by Katrina focused on large-scale plantings of container-grown trees. These trees, grown in a proprietary medium, were claimed to grow “three times faster” than normal trees.

Methods

Container-grown hardwood seedlings were planted on privately-owned land damaged by Katrina. Containers were two-gallon in size, and seedlings were 5-7 feet tall when planted in the spring.

To evaluate the performance of container-grown seedlings relative to other sources, research plots were established that compared the survival and height growth of nuttall oak and swamp chestnut oak from the following sources:

• two-gallon container-grown stock
• six-inch plugs
• traditional bare root stock

Research sites were located in Hancock and Pearl River County, sprayed with herbicide in the Fall of 2008, planted in the Spring of 2009, and received no supplemental water.

This poster focuses on survival and height growth comparisons of the most expensive trees (container-grown) and the least expensive trees (traditional bare root seedlings) two years after planting. Approximate costs to purchase and plant the seedlings were $20 each for the container-grown stock and $1 each for the bare-root stock.

Results

Survival and height growth data are shown in Table 1 below.

<table>
<thead>
<tr>
<th>Stock</th>
<th>Container</th>
<th>Bare Root</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survival (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuttall Oak</td>
<td>96.5</td>
<td>94.5</td>
</tr>
<tr>
<td>Swamp Chestnut Oak</td>
<td>93.0</td>
<td>91.5</td>
</tr>
<tr>
<td>Height Growth (cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(with dieback)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuttall Oak</td>
<td>1.7</td>
<td>18.3</td>
</tr>
<tr>
<td>Swamp Chestnut Oak</td>
<td>3.7</td>
<td>14.1</td>
</tr>
<tr>
<td>Height Growth (cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(w/out dieback)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuttall Oak</td>
<td>3.2</td>
<td>19.7</td>
</tr>
<tr>
<td>Swamp Chestnut Oak</td>
<td>5.6</td>
<td>15.6</td>
</tr>
</tbody>
</table>

Survival with both container and bare-root stock was very high, with little difference in seedling stock. Height growth was appreciably greater with bare root stock. This is true in cases where plants that died back were kept in the sample (with dieback) and where plants that died back were excluded from the sample (without dieback).

Conclusions

Container-grown stock did not live up to the claims. They in fact grew more slowly, and there was no difference in survival. These data, coupled with a 20-fold difference in seedling cost, do not justify planting such stock on a large-scale landscape basis.

Ornamental Entomology Research at the Southern Horticultural Laboratory: Assisting Southern Nurseries

C. T. Werle and D. J. Sampson

The Strawberry Rootworm: A New Method for Pest Insect Monitoring at the Nursery

The strawberry rootworm, *P. fragariae* (Wilcox), is a primary pest of containerized azalea at southeastern nurseries. Control costs at a large nursery have been reported to approach $30,000 annually. There are several chemical options available that can be highly effective when paired with smart cultural practices and a monitoring program. Monitoring can help pest control professionals decide when to spray. We have developed a trapping station that, when fitted with a wider-generated light, is highly effective at collecting *P. fragariae* (Fig. 1 & 2). Our trapping station can be in turn help nurseries save money from their pest control budgets (Werle and Sampson, 2011).

Nurse Weevils: Controlling root insect pests with nematodes

Inoculate *P. fragariae* occur in soil around the roots of their host plant where conventional (herbicide) sprays are not as effective. While soil drenches have been shown to be effective at controlling immature insects, and possibly adults in the case of systems, they can be expensive in terms of labor and product costs. We plan to test entomopathogenic nematodes (Fig. 3) against *P. fragariae*, with the hypothesis that targeting this immature insects, when combined with conventional sprays targeting adults, will make pest control programs more effective. In addition, the possibility of applying nematodes through existing irrigation equipment may be less labor intensive than insecticidal sprays.

Exotic Ambrosia Beetles: Assessing community composition and predicting emergence

Exotic ambrosia beetles are becoming serious nursery pests, tunneling into a variety of tree species and cultivating fungal therein. This fungus, which kills the host tree, is fed upon by their infesting larvae. In collaboration with scientists in OH, VA and TN, we are assessing which species of ambrosia beetles are present and determining their emergence times. This knowledge can then be used by nurseries to apply preventative treatments, currently the best way to protect an ornamental tree crop.

Ambrosia beetles are attracted to ethanol, which is released by stressed trees. We are testing ethanol-based monitoring tools, including low-release ethanol lures, ethanol-injected trees, and pellets cut from ethanol-injected trees (Fig. 4). We have identified a dozen species of ambrosia beetles, including those of primary economic importance: Xylosandrus crassiusculus, *X. mali* and *X. compactus* (Fig. 5) (Werle, Sampson and Oliver, in press).

Insect chemical ecology to augment pest control efficacy

Many insects utilize pheromones as a way to locate other members of their species. Others use plant volatiles, or pheromones, to locate mates. We believe *P. fragariae* may also use plant volatiles like benzene sulfoxide and cymene, which we have isolated from several plant species known to be hosts (Fig. 6 & 7). We plan to refine our trap design by including a potential lure that can increase trapping efficiency. This improved trap station will be a highly effective tool not only for pest monitoring, but it could potentially become a control measure in itself.

Fig. 1. Total *P. fragariae* collected from 2008 and 2010 monitoring research.

Fig. 2. Mean & P. fragariae collected with three methods in 2009. Bars with the same letter are not significantly different (Faring 0.05; Tukey HSD = 0.3).

Fig. 3. Exotic ambrosia beetles collected from nursery stock evaluated for monitoring potential.

Fig. 5. Insecticide trial results from nursery stock evaluated for monitoring potential.

Fig. 6. Stereomicroscopy image of *P. fragariae* adult head, and adult injection system.

Fig. 7. Insecticide trial results from nursery stock evaluated for monitoring potential.
**Backyard Beekeeping for Pleasure and Profit**

Blair Sampson and Chris Werle

---

**Females prepare to leave on their foraging flight**

Many Native Solitary bees prefer cavities in wood, cardboard, or even styrofoam to build their nests; these materials are easily supplied. You may simply drill suitably sized holes into soft wood such as pine. White paint helps.

**Once mated, female bees soon begin provisioning their nests with nest lining materials such as mud, leaf pieces, leaf pulp, or resin. They sculpt pollen balls, which serve as their larvae’s only source of nourishment.**

**Think like a Bee!**

Establish nest sites in sheltered areas where there is plenty of weathered wood as well as protection from wind, rain, and ants. Nest should face SE, so bees get a lot of sun.

**Within minutes or hours of emerging from their cocoons, male and female bees locate one another and mate. Fertilized eggs become female brood, whereas unfertilized eggs are destined to be male.**

**Arrays of bee nest condos in a dilapidated wooden structure.**

**Two species of native orchard mason bees are peaceably nesting side-by-side. One species is an important blueberry pollinator, the other pollinates apples, cherries, & almonds.**

**Mature larvae, pupae, and young adult bees spend 96% of their life in the nest and in tough silken cocoons. Many pests and predators will eat these nutritious tidbits. Sometimes you may have to bird- and lizard-proof the bee condos.**

**YEAR (X)**

- Exposed female larva

**YEAR (X + 1)**

- Exposed male larva

**NEST ARCHITECTURE**

- Linear sequence of cocoons (brood)
Determining the Suitability of Alternative Greenhouse/Nursery Substrates

Anthony L. Witcher¹, Eugene K. Blythe², Glenn B. Fain³, Kenneth J. Curry⁴ and Cecil T. Pounders¹

¹USDA-ARS Southern Horticultural Lab, Poplarville, MS
²Coastal Research and Extension Center, Mississippi State University, South Mississippi Branch Experiment Station, Poplarville, MS
³Department of Horticulture, Auburn University, AL
⁴University of Southern Mississippi, Department of Biological Sciences, Hattiesburg, MS

Greenhouse and nursery crop producers have greater awareness and access to materials not traditionally used as container substrates. Materials such as composted plant debris and animal wastes, industrial by-products, and wood biomass have been successfully used for crop propagation and production. Reduced plant growth in wood-based substrates has been attributed to a variety of factors, including phytotoxicity. The objective of our research was to develop a method for identifying phytotoxicity in processed whole pine tree, while examining the potential of other alternative substrates. A seedling growth test was conducted to evaluate root growth of three plant species (lettuce, oat, and tomato) in four substrates (aged WPTA and fresh WPT, whole pine tree, pine bark, and a peat-lite mix [PL]). Total root length was significantly greater for PL within each species, while aging the whole pine tree material did not result in significantly greater root length. Substrate air space had a greater effect on root length compared with the substrate chemical properties. Further investigation of substrate physical properties is required to determine which factors contribute to reduced root development.
Timing of Fungicide Sprays to Prevent Azalea Web Blight Symptoms

Warren Copes, Research Plant Pathologist, USDA ARS
Austin Hagan and John Olive, Auburn University

GOOD INFORMATION IS KEY TO MAKING SOUND ECONOMIC DECISIONS!

Truth or Myth: Rhizoctonia web blight develops after frequent rains.

Research Facts and Developing Information
About Web Blight.
1. Many azalea cultivars are infested with the web blight pathogen (binucleate Rhizoctonia fungi) in the nursery.

2. Web blight naturally develops in an irregular manner. Web blight develops at different rates within a block of plants of the same age, and between blocks of plants of different ages and cultivars (over about a 5 week period).

3. Web blight development starts before afternoon rain patterns begin, because daily irrigation provides the moisture conditions needed for slow to moderate disease development.

4. The only way to verify which blocks have a high risk of web blight is to look into the canopy of about six plants per block. Also assess risk of web blight based on past and current history of plants (cultivar, plant age, spacing, placement in nursery, weather). By checking several blocks it will be obvious which blocks of plants have more advanced symptoms.

5. Count the number of dead leaves deep within the canopy of about six plants per block. Small plants could have 5 to 30 dead leaves. Large plants could have 10 to 60 dead leaves. The important point is to spray when there is an increased count of 10 to double the number of dead leaves per plant from the previous week.

6. Scouting takes about five minutes per block. Alternatives are to spray on set calendar dates or when rainy periods are forecast. Call me if you have questions.

The above data has not been fully analyzed yet. The full analysis will include identifying weather conditions that promote the rapid appearance of web blight and will be completed by next spring.

Fungicides inhibit pathogen colonization of plant tissue and prevent (limit) symptom development.
Fungicides are a sophisticated technology, but should not be the first line of defense if other options are economically justified.

Sanitation is a practical control strategy that needs to be developed further for ornamental plant production systems. The goal is to restrict pathogen movement, so clean plants don't become infected with a potential disease problem.
Currently sanitation practices rely on generalized facts and possibly are not achieving maximum benefit.
Reasons sanitation can be effective are: 1) new growth media is used for each crop, 2) areas can be sanitized prior to introducing a new crop, 3) plants moveable thus can be placed in specific areas of the nursery to minimize across crop contamination, 4) management activities can be used beneficially, and 5) the entire plant is removed from the location when sold.

Sophisticated Disease Controls Have To Be User Friendly To Be Useful To Commercial Producers!
Identification of residential problem areas that could provide a conducive environment for a termite infestation

- Joints, Vents, Eaves, Windows, and Siding
- Leaky Plumbing
- Outdoor Lights
- Gutters and Downspouts
- Landscape Mulch
- Wood to Ground Contact
- Crawl Spaces
- Foam Insulation
- AC Units
- Wooden Attachments
- Firewood
Integrating Mississippi MarketMaker in Marketing Flowers, Grains, Herbs, Fruits, Nuts and Vegetables

Dr. Benedict Posadas, Amanda Seymour and Randy Coker
Mississippi State University, Coastal Research and Extension Center

What is MarketMaker?
MarketMaker is an interactive mapping system that locates businesses and markets of agricultural and seafood products in Mississippi, as well as in other member states, providing an important link between producers and consumers.

Why should you register your business in MarketMaker?
MarketMaker is FREE for marketing your business and products. As of now 16 states and Washington D.C. are registered with MarketMaker and currently undergoing the registration process are two more states. That is a lot of geography covered for a FREE marketing tool!

What can happen if I do not register with MarketMaker?
You could lose potential clients and sales because you are not participating in the FREE marketing tool. On the other hand, absolutely nothing could happen, but that is not a good thing either!

What Information do I need to register in MarketMaker?
- Business Type
- Products available
- Contact Information
- Hours of Operation
- Up to five pictures (optional)
- Anything else you would like the public to know about your business!
Integrating Mississippi MarketMaker in Marketing Flowers, Grains, Herbs, Fruits, Nuts and Vegetables

Dr. Benedict Posadas, Amanda Seymour and Randy Coker
Mississippi State University, Coastal Research and Extension Center

How do I register and update my business on MarketMaker?

1. Step one: Go to Mississippi MarketMaker by finding it on Google and/or Yahoo and click on the state where your business is located.

2. Step two: Click on "Register Your Business"

3. Step three: Follow the on screen instructions to input your business information.

**Once you submit your information, you will automatically receive an email from MarketMaker that will include your username and temporary password. This access will allow you to make changes to your profile and keep the information up to date. When you receive the email, log into your account through the URL in Step 1 and change your password to one that you will remember. Your information should appear on the website within 1 to 2 business days.**

Are there any workshops or technical assistance if needed?

Yes! The MarketMaker team hosts a workshop every couple of months, to view the schedule, check out the webpage: http://coastal.msstate.edu/MSMMWorkshops.html. Also, team is available to call or email for assistance, information is below.

Benedict Posadas, 228-546-1024 or benp@ext.msstate.edu

Amanda Seymour, 228-546-1044 or aseymour@ext.msstate.edu

Randy Coker, 228-762-7783 or rcoker@ra.msstate.edu
Hibiscus ‘Lufkin Red’ & ‘Lufkin White’

Cecil Pounders
Southern Horticultural Laboratory
USDA, ARS, Poplarville, MS 39470
cecil.pounders@ars.usda.gov

The Agricultural Research Service, United States Department of Agriculture, has released *Hibiscus laevis* ‘Lufkin Red’ and ‘Lufkin White’, two new hardy native ornamental hibiscus. These cultivars are recommended for trial by gardeners and horticulturists as summer flowering perennial landscape plants nationwide, but selections are particularly adapted to conditions in the South. Plants have exceptional flowers and outstanding disease resistant foliage. The form and scale of the selections are ideally proportioned for inclusion as a component of perennial borders and gardens.

Plants develop rapidly in containers and, in addition to leaf-spot resistance, display good tolerance to other common pests. Ultimate plant size is dependent on container size and environmental conditions with plants in a #3 nursery pot growing to 2 feet high x 1 foot wide within 3 months under optimum conditions. Under landscape conditions plants should mature to approximately 4 feet high x 5 feet wide. Plants die to ground level each winter and build a large multi-stemmed clump after several seasons of regrowth.
Micropropagation of *Solanum aethiopicum* L. (Scarlet Eggplant): Effect of Genotype and Culture Media

Carrie Witcher and Hamidou Sakhanokho

A copy of this poster will be available as a hand-out at the field day.
We are an equal opportunity employer, and all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability status, protected veteran status, or any other characteristic protected by law.

Mention of a trademark or proprietary product does not constitute a guarantee or warranty of the product by the Mississippi Agricultural and Forestry Experiment Station and does not imply its approval to the exclusion of other products that also may be suitable.