

# 71st Annual Meeting

## Abstracts

### Georgia Entomological Society



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Georgia Center for Continuing Education  
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## Influence of Cover Crop and Herbicide Burndown Timing in Conservation Tillage on Thrips Infestations in Cotton

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GA Entomol. Soc. Annual Meeting 2007. 71: 4 (Abstract)

**Abstract** Two 2006 field experiments were conducted in conservation tillage cotton to determine the influence on tobacco thrips of cover crop (wheat and crimson clover), herbicide burndown timing (30, 15, and 5 days) of the cover crops prior to planting, and 3 different insecticide treatments. Results showed significant reduction in thrips numbers in noninsecticide treated cotton in conservation tillage as compared to conventional tillage, but degree of control was usually not as good as with any of the three types of insecticide treatments during 30 days of sampling. In conservation tillage, thrips numbers were similar on cotton planted in either wheat or crimson clover residues. Significantly higher numbers of thrips were found in crimson clover plots treated with a burndown timing of 30 days in one location, but a similar trend did not occur in the second test. Insecticide treatments reduced thrips population, but the reduction in Temik rate (6x reduction in per acre rate compared to the conventional in-furrow application rate) in precision placement plots had an additive control effect with conservation tillage (wheat cover only) in reducing thrips populations.

## Pine Tree Pollen Effects on Thrips Behavior

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GA Entomol. Soc. Annual Meeting 2007. 71: 4 (Abstract)

**Abstract** An initial test was conducted of an experimental bioassay technique designed to evaluate effects of pollen deposition on settling behavior of *Frankliniella fusca*. Arenas were arranged to evaluate choice behavior among 3 cabbage leaves: one untreated, one dusted with slash pine pollen and one dusted with loblolly pine pollen. Nine adult thrips were placed in each arena, the arenas sealed, and the number of thrips on the leaves observed in 15 min intervals over a period of 31 h. Thrips' settling on pollen-dusted leaves changed over time, indicating some attraction and repellency.

## A Proteomic Approach to the Identification of Cry4Ba Binding Proteins in Midgut Membranes from *Aedes aegypti*

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GA Entomol. Soc. Annual Meeting 2007. 71: 5 (Abstract)

**Abstract** Cry toxin receptors have been extensively characterized in Lepidoptera. In mosquitoes, only alkaline phosphatase (ALP) is identified as a receptor for Cry11Aa toxin, and an aminopeptidase (APN) is identified as a Cry11Ba binding protein and candidate receptor. A proteomic approach was taken to identify Cry4Ba binding proteins in brush border membrane vesicles (BBMV) prepared from *A. aegypti* larvae. Twelve Cry4Ba-binding proteins were identified in *A. aegypti* BBMV; including several alkaline phosphatases, actin and ATPase subunits. Alkaline phosphatase identifications were confirmed by western blotting. Several additional toxin binding proteins were identified by mass spectrometry and *de novo* sequencing, while several toxin-binding spots remain unidentified.

## Crapemyrtle Cultivar Response to Japanese Beetle

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GA Entomol. Soc. Annual Meeting 2007. 71: 5 (Abstract)

**Abstract** Crape myrtle species and cultivars were evaluated for potential resistance to the Japanese beetle, *Popillia japonica*. Floral and foliar damage and beetle densities varied considerably among the 41 cultivars tested at the Mountain Station in Blairsville, GA, during 2005 and 2006. Crape myrtle aphid achieved low densities at this location. Information currently available allows plant selection based on superior disease and insect resistance to multiple pest species.

## Negative Effects of Host Seroconversion on Mosquito Fitness

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GA Entomol. Soc. Annual Meeting 2007. 71: 6 (Abstract)

**Abstract** Vertebrate hosts are well known to respond to mosquito feeding by producing antibodies against salivary proteins, a process termed seroconversion. Host seroconversion has been shown to have negative effects on the fitness of other arthropods including sandflies and ticks. We determined that host seroconversion also negatively effects mosquitoes. Mice were exposed to weekly feeding by for a total of five weeks by one of four mosquito species, *Aedes aegypti*, *Aedes albopictus*, *Anopheles stephensi*, and *Anopheles gambiae*. Exposure to biting by any of these mosquitoes resulted in a progressive decline in the volume of blood taken, the number of eggs produced, and the number of those eggs that were viable. Host exposure to biting by one species reduced fitness for the congeneric species, but had no effect on mosquitoes of the alternate genus. Host seroconversion was confirmed by western blot. When mosquitoes (*Aedes aegypti*) were fed on B-cell knockout mice, which cannot seroconvert, no decline in blood meal amount, egg production, or egg fertility was observed, confirming that seroconversion is necessary for the fitness-decreasing effects of host immune experience to develop. These results suggest that host suitability as a blood-meal source declines as the host is exposed to mosquito biting and develops immune recognition of salivary antigens. Further, the suitability of a host can be influenced by its prior exposure to other related mosquito species.

## Parasitoids of the Cabbage Seedpod Weevil, a Pest of Canola in Georgia, U.S.A.

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GA Entomol. Soc. Annual Meeting 2007. 71: 6 (Abstract)

**Abstract** Parasitoid species composition of the cabbage seedpod weevil (*Ceutorhynchus obstrictus* Marsham (Coleoptera: Curculionidae) was examined in winter canola (*Brassica napus* L.) during 1994 – 1996 in Georgia, USA. Five families and 13 species of Chalcidoidea (Hymenoptera) were reared from cabbage seedpod weevil samples over the 3-year period. *Lyriscus maculatus* (Gahan) was the most prevalent species comprising about 86% of total parasitoid fauna. This species plus three others, *Lyriscus perubius* (Girault), *Neocatolaccus tylodermae* (Ashmead) and *Eurytoma tylodermatis* Ashmead (Eurytomidae), account for over 96% of the total parasitoid fauna. *Ceutorhynchus obstrictus* represented a new host record for eight parasitoid taxa. Only six of the 13 parasitoids also are reported to parasitize *C. obstrictus* in western North America. Nevertheless, total larval parasitism did not exceed 7% in any year suggesting parasitoids have a limited impact on *C. obstrictus* populations in Georgia.

## Nitrogen and Biological Control of the Beet Armyworm, *Spodoptera exigua* by Its Parasitoid, *Cotesia marginiventris*: Testing Slow-Growth-High-Mortality Hypothesis

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GA Entomol. Soc. Annual Meeting 2007. 71: 7 (Abstract)

**Abstract** The slow-growth-high-mortality (SG-HM) hypothesis states that arthropods fed on suboptimal diets have prolonged developmental time, and the protracted growth will expose the arthropods to higher mortality from their natural enemies because the window of vulnerability to natural enemies is increased (assuming smaller organisms are more susceptible to enemies). Empirical support for the hypothesis has been mixed, partly because most studies are not specifically designed to test the hypothesis. In this study, SG-HM was tested with beet armyworm (BAW) and its parasitoid, *Cotesia marginiventris*. We demonstrated in the laboratory that there was a size threshold above which BAW caterpillars were not suitable for development of *C. marginiventris*. We then proved that BAW caterpillars reared on cotton plants with lower N level (42 ppm N) took longer to reach the threshold than caterpillars reared on plants with higher N level (196 ppm N). Finally, the SG-HM hypothesis was tested in greenhouse in cages, with *C. marginiventris* females given choices between BAW caterpillars of different sizes.

## Survey, Sampling and Taxonomic Identification of Thrips Species in Major Vegetable Growing Regions of India

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GA Entomol. Soc. Annual Meeting 2007. 71: 7 (Abstract)

**Abstract:** Thrips-borne tospoviruses are emerging as a significant limiting factor in sustainable vegetable production in India. Three tospoviruses (genus Tospovirus, family Bunyaviridae) that have been reported as common in this country include Peanut bud necrosis virus (PBNV), Watermelon bud necrosis virus (WBNV), and Iris yellow spot virus (IYSV). This survey attempted to identify the major thrips vector species in vegetable growing regions identified as hotspots for thrips vectors in India. The main genus identified to date that includes potential thrips vectors was Thrips spp., but other potential vector genera were also identified and will be reported for the first time.

## Continuing the Fight: Controlling Hemlock Woolly Adelgid in the Southern Appalachians

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GA Entomol. Soc. Annual Meeting 2007. 71: 8 (Abstract)

**Abstract** Hemlock Woolly Adelgid (HWA), *Adelges tsugae* Annand (Heteroptera: Adelgidae), is causing widespread mortality to eastern hemlocks, *Tsuga canadensis* [L.] Carr., in the eastern U.S., and was detected in northeast Georgia in 2001. Several beetle predators are currently being introduced to control adelgid populations. However, several predator rearing facilities in the southeast are experiencing widespread beetle mortality (50-90%) each year thus limiting the number of predators released to the forest. We are assessing two release methods for one adelgid predator to bypass high lab mortality, increase the numbers of beetles released to the forest, and reduce intense rearing labor.

## Georgia Entomological Society 2006 Founder Lecture Honoring Dr. Jerry Payne

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GA Entomol. Soc. Annual Meeting 2007. 71: 8 (Abstract)

**Abstract** Jerry A. Payne was born in the Blue Ridge Mountains of northern Virginia approximately 70 years ago. He attended local public schools before earning degrees from Virginia Polytechnic Institute, University of Tennessee and Clemson University. His early academic pursuits were in the areas of pre-medicine, mammalogy, speleology, forensic entomology, radiation ecology, radioactive waste disposal and wildlife biology.

## Invasive Species: Why Are We Concerned and What Are We Doing About It In Georgia

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GA Entomol. Soc. Annual Meeting 2007. 71: 8 (Abstract)

**Abstract** Invasive species are a threat to all agricultural, forested and natural ecosystems. Annual estimates of the economic impact of invasive species are \$137 Billion in the US to more than \$1.4 Trillion globally. From 50-80% of the loss of biodiversity is thought to be attributable to invasions of non-native species. Many federal and state agencies, organizations and private groups have developed programs to address invasive species issues. In this symposium you will be introduced to some of the species that are currently causing concern to us in Georgia. You will also learn about some of the ongoing regulatory, research, educational and management programs underway to trying to address these threats. See the Georgia Invasive Species Task Force website at: [www.GAInvasives.org](http://www.GAInvasives.org) and [www.Invasive.org](http://www.Invasive.org) for more information.

## New Chemical Control Methods for Pecan Nut Casebearer and Hickory Shuckworm in Pecan Orchards

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GA Entomol. Soc. Annual Meeting 2007. 71: 9 (Abstract)

**Abstract** Chemical control of pecan nutcasebearer and hickory shuckworm with new insecticidal materials was effective in a 'Desirable' pecan orchard. Pecan nut casebearer and hickory shuckworm control was not associated with increased nut production and kernel quality was improved when trees were treated with chlorantraniliprole and tebufenozide.

## Regulatory and Economic Impacts of Exotic Invasive Plant Pests on Agroindustries

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GA Entomol. Soc. Annual Meeting 2007. 71: 9 (Abstract)

**Abstract** Exotic invasive plant pest introductions are often associated with the direct impact on natural resources. The economic impact of these introductions on agroindustries in the form of domestic and international trade restrictions can also impact businesses or geographical areas. Partnerships between private, government and university personnel are essential for exotic invasive plant pest detection and control.

## Sacred Systematics: Phylogeny and Classification of Noviini (Coleoptera: Coccinellidae)

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GA Entomol. Soc. Annual Meeting 2007. 71: 9 (Abstract)

**Abstract** When early Catholic farmers prayed for deliverance from aphids and other injurious pests, they were convinced that the colorful, dappled insects that saved their crops were sent directly from the heavens. They called these "The Beetles of Our Lady," and ladybeetles have been harbingers of good luck ever since. Coccinellid systematics has advanced significantly since those times, but classification of lady beetles is still problematic, largely due to ambiguous generic definitions that are not based on synapomorphy. Phylogenetic relationships of the tribe Noviini were inferred based on adult morphology. Implications of the phylogenetic hypothesis are discussed with respect to generic boundaries and the classification of Noviini.



## Plum Pox Virus: Vectors, Surveillance, and Threat to the Peach Industry

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GA Entomol. Soc. Annual Meeting 2007. 71: 10 (Abstract)

**Abstract** Plum pox virus (PPV) is one of the world's most serious viral diseases of *Prunus*, due to its economic importance and potential for loss. PPV was first detected in Bulgaria in 1915, and it has since spread throughout the Mediterranean, Eastern and Western Europe, and as of 1999, the USA and Canada. Of the four types of PPV (M, E, D, and C), the D-strain, detected in North America, is less virulent, and is also not seed borne. This viral infection is vectored by 4-6 primary aphid species, depending on location. Since its discovery, the PPV National Surveillance Program has been implemented to track PPV via a system of hierarchical sampling. Survey data from Georgia growers aims to assess grower awareness of PPV and its symptoms.

## The Red Imported Fire Ant: Current Status and Strategies

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GA Entomol. Soc. Annual Meeting 2007. 71: 10 (Abstract)

**Abstract** The red imported fire ant, *Solenopsis invicta* Buren, invaded the southeastern U.S. in the late 1930s and has since infested greater than 132 million hectares in North America. The aggressive nature of this invasive pest causes medical and health problems, disrupts ecological balance in habitats, impacts wildlife and domesticated animals, and causes damage to agricultural crops and equipment. The history of its invasion and eradication attempts will be reviewed with discussion of current status and strategies of management.

## The Evolution of Ladybird beetles (Coleoptera: Coccinellidae): Reconstructing Phylogeny Based on Molecular Data

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GA Entomol. Soc. Annual Meeting 2007. 71: 10 (Abstract)

**Abstract** Ladybird beetles are conspicuous elements of our fauna, comprising nearly 6,000 described species in 360 genera. The family represents one of the major radiations within Cucujoidea and exhibit considerable diversity in dietary preference, including predation, phytophagy, and mycophagy. To refine the classification of Coccinellidae and understand trophic shifts within the family, four mitochondrial genes -12S, 16S, COI, and COII - and four nuclear genes - 18S, 28S, *wingless* and *EF-1 $\alpha$*  - were sequenced from six outgroup taxa and fifty-three coccinellid species. Maximum parsimony analysis of the molecular data supported Coccinellidae as monophyletic. Two of the six currently recognized subfamilies, Sticholotidinae and Chilocorinae, were recovered as polyphyletic. Predation was supported as the ancestral dietary habit of coccinellids.

## The Redbay Ambrosia Beetle and Laurel Wilt Disease – An Exotic End for a Native Tree?

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GA Entomol. Soc. Annual Meeting 2007. 71: 11 (Abstract)

**Abstract** The redbay ambrosia beetle was discovered near Port Wentworth, GA, in 2002. Since then it has spread north to Charleston, SC, and south to Jacksonville, FL, leaving dead redbay trees (*Persea borbonia*) in its wake. The beetle vectors a vascular wilt fungus that kills redbay, sassafras and several other members of the Lauraceae. We will present data on the biology of the beetle, its fungal associates and host attraction.

## Comparison of Endosulfan (Avenger®) and Diazinon-Chlorpyrifos Combination (Warrior®) Cattle Ear Tags for Horn Fly Control

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GA Entomol. Soc. Annual Meeting 2007. 71: 11 (Abstract)

**Abstract** Horn flies (*Haematobia irritans*) are the most economically significant pests of pastured beef cattle. Insecticide resistance has made controlling these blood-sucking ectoparasites challenging, with tolerance in field populations to both organophosphates and pyrethroids. This field trial compared efficacy of a popular organophosphate tag with that of a new product containing the active ingredient endosulfan. Both endosulfan and combination (diazinon-chlorpyrifos) tags maintained horn fly numbers below 100 per side for the eight weeks of the test.

## Peptide Fragments of Cadherin, Called BtBooster, Synergize *Bacillus thuringiensis* Cry1A Toxicity to Insects

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GA Entomol. Soc. Annual Meeting 2007. 71: 11 (Abstract)

**Abstract** Cadherin is a receptor for Bt Cry1A toxins in the midgut of caterpillars. In *Manduca sexta* BtR1 cadherin, the CR12-MPED region is required for receptor function. While feeding CR12-MPED peptide with Cry1A toxin to insect larvae, we unexpectedly observed increased insect mortality and called the peptide BtBooster (BtB). In binding analyses, BtB bound both brush border membrane and Cry1A toxins. BtB peptide lost toxin binding and enhancement properties when a binding site was deleted. The synergistic mechanism of BtB involves attaching Cry toxin to insect midgut microvilli thereby promoting toxin insertion and increasing insect mortality.

## Effects of Chlorpyrifos, Spinosad and Halofenozide on Big-eyed Bugs (*Geocoris* spp.: Geocoridae)

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GA Entomol. Soc. Annual Meeting 2007. 71: 12 (Abstract)

**Abstract** Seven concentrations each of chlorpyrifos, halofenozide and spinosad were evaluated using petri dish and conetainer (live grass) assays. Turfgrasses in conetainer trials included fall armyworm (FAW) resistant and susceptible varieties. All concentrations of chlorpyrifos resulted in significant big-eyed bug mortality in both trials. Fewer effects of chlorpyrifos and halofenozide were observed on big-eyed bug survival when applied to turfgrass (vs petri dishes). Big-eyed bugs exposed to chlorpyrifos had greater survival on FAW resistant grass.

## Efficacy of Baits Containing Chitin Synthesis Inhibitors to Control Termites (Isoptera: Rhinotermitidae) Based on Bait Deliver, Transfer, and Mortality

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GA Entomol. Soc. Annual Meeting 2007. 71: 12 (Abstract)

**Abstract** Insect-to-insect transfer of the Eastern subterranean termite, *Reticulitermes flavipes* (Kollar), fed different baits containing chitin synthesis inhibitors (CSI) were examined in a laboratory setting. Treated termites were introduced to untreated nestmates at various donor: recipient ratios. Our studies indicate the need for further research in understanding the mechanism of bait transfer for efficient termite control.

## A Preliminary Morphological Study of *Deretaphrus piceus* Germar (Coleoptera: Bothrideridae)

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GA Entomol. Soc. Annual Meeting 2007. 71: 12 (Abstract)

**Abstract** Inadequate morphological studies within the family Bothrideridae have led to rampant taxonomic problems including many synonymies and incorrect placements. A preliminary morphological analysis of a representative taxon, *Deretaphrus piceus* Germar, was performed as a precursor to a revision of the entire genus. Potential key characters were identified that may serve to delineate species. Specimens were dissected and structures were drawn and photographed for comparison.

## Managing Thrips Vectors and Spotted Wilt Symptom Expression in Flue-Cured Tobacco

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GA Entomol. Soc. Annual Meeting 2007. 71: 13 (Abstract)

**Abstract** Tomato spotted wilt tospovirus (TSW) is a serious economic problem for tobacco producers in Georgia, USA. This virus is spread, or vectored, by tiny insects called thrips (Thysanoptera: Thripidae) as they feed on the crop. Results are presented from replicated field trials conducted in flue-cured tobacco in 2001-2006 to assess whether certain pest management practices and production modifications can impact the incidence of TSW symptomatic plants. TSW was significantly lower in plots protected from early-season thrips infestations during the first 6-8 weeks after transplanting using either weekly foliar sprays of acephate or thrips exclusion cages. Tray drench applications of imidacloprid, and other neonicotinoid compounds, also reduced TSW symptom expression in every year of the study. Nitrogen fertility level (from 0 to 135 kg/ha) did not affect TSW incidence in most years. The tobacco thrips, *Frankliniella fusca* (Hinds), a reported vector of TSW, was the predominant thrips species on tobacco foliage. However, low numbers of other species also were observed. Flower thrips species (*F. occidentalis*, *F. tritici*, and *F. bispinosa*, combined) were more abundant on sticky cards during the season than *F. fusca*, but flower thrips were not common on tobacco foliage.

## Siesta® (Metaflumizone) A New Fire Ant Bait From BASF

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GA Entomol. Soc. Annual Meeting 2007. 71: 13 (Abstract)

**Abstract** Siesta®, with the active ingredient metaflumizone, represents a new class (semicarbazone) of broad-spectrum insecticide from BASF. Siesta® is a fire ant bait which controls ants primarily by ingestion and has limited contact activity. Once consumed, metaflumizone acts on the voltage dependent sodium channel by blocking the flow of sodium ions. Recognizing this unique chemistry, IRAC recently classified metaflumizone in a new sub-group “Group 22 B” of the insecticide “Mode of Action Classification”. Siesta® effectively controls ants in the genus *Solenopsis*.

**Alverde® (Metaflumizone) A Novel BASF Insecticide for Control of Key Insect Pests in Vegetables**

Larry Newsom, Venkat Pedibhotla, Dawn Calibeo-Hayes,  
Joseph Mitchell, and Thomas Holt

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GA Entomol. Soc. Annual Meeting 2007. 71: 14 (Abstract)

**Abstract** Metaflumizone, representing a new class (semicarbazone) of broad-spectrum insecticide from BASF and to be sold under the trade name Alverde® 2SC, is expected to be registered in the USA for use in 2007. It controls insects primarily by ingestion and has limited contact activity. Once consumed, metaflumizone acts on the voltage dependent sodium channel by blocking the flow of sodium ions. Studies indicate that Alverde® controls insects harmful to Georgia vegetable production including such species as *Plutella xylostella*, *Pieris rapae*, *Manduca spp.*, *Trichoplusia ni*, and *Spodoptera spp.*

**Seasonal Population Dynamics and Kernel Damage of the Brown Stink Bug (Heteroptera: Pentatomidae) in Corn**

Xinzhi Ni<sup>1</sup>, Kedong Da<sup>2</sup>, David Buntin<sup>3</sup>, Ted Cottrell<sup>4</sup>, Gunawati Gunawan<sup>2</sup>, Penny Tapp<sup>1</sup>, Charles Mullis<sup>1</sup>, Matthew Krakowsky<sup>1</sup>, Robby Powell<sup>1</sup>, Glynn Tillman<sup>5</sup>, Dawn Olson<sup>5</sup>, Robert McPherson<sup>2</sup>, Jeffrey Wilson<sup>1</sup>, Dewey Lee<sup>6</sup>, and Anton Coy<sup>6</sup>

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GA Entomol. Soc. Annual Meeting 2007. 71: 14 (Abstract)

**Abstract** Seasonal population dynamics of the brown stink bug, *Euschistus servus* (Say) (Heteroptera: Pentatomidae) in corn was monitored weekly using pheromone traps between May and September in 2005 and 2006. Ten traps were used per field (ca. one acre), and three fields were used each year. The number of stink bugs captured by the traps differed significantly between the two years. Two population peaks were observed in 2005, while only one peak was observed in 2006. In addition, 16 adults per trap ( $n = 30$ ) were recorded at the peak in early June of 2005, while 9.1 adults per trap ( $n = 30$ ) were at the peak in late May of 2006. Although the pooled data showed that the number of the brown stink bugs captured in the traps was the same between edge and inside of the fields, the percentage of females captured at the edge (63%) was significantly greater than the inside (55%). Grid sampling (3x3 m) of pre-harvest kernel damage showed the *E. servus*-damaged kernels were clustered in the corn fields. However, kernel damage was not consistently correlated with either kernel aflatoxin level or trap location at pre-harvest.

**Ticks of the Florida Black Bear (*Ursus americanus floridanus*) in Florida and Georgia**

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GA Entomol. Soc. Annual Meeting 2007. 71: 15 (Abstract)

**Abstract** Seven species of ixodid ticks have been previously recovered from American black bears. Four of these have been collected from the Florida black bear in central Florida. We collected ticks from 18 bears in 8 northwest Florida counties (2004-2005) and from 19 bears in 4 southeast Georgia counties (2006-2007). We recovered the same four ticks plus *Ixodes affinis*, a new host association, from a black bear in Florida.

**Neuropeptide F Sequence from the Termite, *Reticulitermes flavipes* (Isoptera: Rhinotermitidae)**

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GA Entomol. Soc. Annual Meeting 2007. 71: 15 (Abstract)

**Abstract** Neuropeptide F (NPF) -like immunoreactivity has been demonstrated in the central nervous system and alimentary tract of *Reticulitermes flavipes*. We used seven high pressure liquid chromatography steps coupled with a radioimmunoassay to purify an NPF-like peptide from an extract of the worker caste. A partial amino acid sequence was obtained using Edman degradation and was used to design degenerate primers to obtain the cDNA sequence of *R. flavipes* NPF. The *Ref* NPF sequence shares considerable similarity to other known invertebrate NPFs, in particular *Locusta migratoria* and *Schistocerca gregaria*. Synthetic *Ref* NPF has been made for use in bioassays to determine potential functions of this peptide.



## Toxicity of Fipronil and Its Enantiomers to Marine and Freshwater Non-targets

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GA Entomol. Soc. Annual Meeting 2007. 71: 16 (Abstract)

**Abstract** Fipronil is a phenylpyrazole insecticide used in agricultural and domestic settings for controlling various insect pests in crops, lawns, and residential structures. Fipronil is chiral; however, it is released into the environment as a racemic mixture of two enantiomers. In this study, the acute toxicity of the (S,+) and (R,-) enantiomers and the racemic mixture of fipronil were assessed using *Simulium vittatum* IS-7 (black fly), *Xenopus laevis* (African clawed frog), *Procambarus clarkii* (crayfish), *Palaemonetes pugio* (grass shrimp), *Mercenaria mercenaria* (hardshell clam), and *Dunaliella tertiolecta* (phytoplankton). Results indicate that the most toxic isomer of fipronil is organism specific and that enantioselective toxicity may be more common in crustaceans than in other aquatic organisms.

## Management of Azalea Lace Bug with Neonicotinoid Insecticides

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GA Entomol. Soc. Annual Meeting 2007. 71: 16 (Abstract)

**Abstract** Dinotefuran (Safari) spray, drench and granular formulations, imidacloprid (Merit) spray and drench and clothianidin (Arena) sprays were compared during 2005 and 2006 for azalea lace bug control. Degree of suppression, time to achieve control and resultant foliar damage were assessed. All treatments except the Merit drench significantly reduced azalea lace bug numbers within the first week after application. By two weeks after application the numbers of lace bugs in the Merit-drenched plots were similar to the other treatments. After almost two months, damage ratings indicated that still visible damage was similar on the Merit drenched plots, the low rate of the Safari drench and the untreated control.

## Coragen (E2Y45, Rynaxypyr): A New Insecticide Option for Vegetable IPM

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GA Entomol. Soc. Annual Meeting 2007. 71: 17 (Abstract)

**Abstract** This last year, DuPont announced submission of registration applications for products containing the technical active ingredient DuPont<sup>(TM)</sup> Rynaxypyr<sup>(TM)</sup> insecticide to regulatory authorities in the EU (represented by Ireland and the UK), Australia, Canada, and the United States. Rynaxypyr(TM) is the first active ingredient from the anthranilic diamide class of insecticides and offers a novel mode of action. This product, which can be applied to plants systemically, has been shown in our trials to provide long-lasting, broad spectrum chewing insect control for vegetables and yet has very low mammalian toxicity and appears to be a good fit for insecticide resistance management for diamondback moth and whitefly.

## Shifts in Pyrethroid Susceptibility of Corn Earworm

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GA Entomol. Soc. Annual Meeting 2007. 71: 17 (Abstract)

**Abstract** Corn earworm (CEW) is a pest of cotton and many other cultivated crops grown in Georgia and the southeast. During recent years, susceptibility of CEW to pyrethroid insecticides has declined in some areas of the US. Reduced field control of CEW with pyrethroids in sweet corn grown in the Midwest has been measured. Elevated LD50s (the lethal dose to kill 50 percent of a population) of some CEW collections have been observed in LA and TX during recent years. During 2005, less than optimal control of CEW in some parts of southwest Georgia was observed when two or more applications of pyrethroids were applied to Bt cotton. Subsequent collections and testing of surviving CEW populations from problem fields during 2005 indicated elevated LD50s or increased tolerance to the pyrethroid cypermethrin compared with previous years. Due to concerns relative to the susceptibility of CEW to pyrethroids, monitoring efforts on the susceptibility of CEW to pyrethroids were expanded in southwest Georgia during 2006.

## Phylogeny of the LBJ's: An Attempt to Identify Natural Lineages in the Cerylonid Series (Coleoptera: Cucujoidea)

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GA Entomol. Soc. Annual Meeting 2007. 71: 18 (Abstract)

**Abstract** Phylogenetic relationships within the diverse beetle superfamily Cucujoidea are poorly known. The Cerylonid Series is the largest of all proposed superfamilial cucujoid groups, comprising eight families and representing most of the known cucujoid species diversity. The monophyly of the Cerylonid Series, however, has never been formally tested and the higher-level relationships among and within the constituent families remain equivocal. DNA sequence data (18S rDNA and 28S rDNA) were obtained for a broad taxonomic sampling within the Cerylonid Series and other cucujoid taxa. Phylogenetic analyses of these data were performed to 1) test the monophyly of the Cerylonid Series and its constituent lineages, 2) place the Cerylonid Series among the remaining cucujoid families, 3) investigate the relationships among the Cerylonid Series families, and 4) explore the evolution of host utilization among cucujoid lineages. These data support the monophyly of the families Bothrideridae, Cerylonidae, Discolomatidae, Corylophidae, and Coccinellidae. Endomychidae is polyphyletic. Other taxonomic and biological implications are discussed in light of our phylogenetic results.

## Insect Natural History in Costa Rica: International Service-Learning

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GA Entomol. Soc. Annual Meeting 2007. 71: 18 (Abstract)

**Abstract** Service-learning and study abroad opportunities are critical components of UGA undergraduate programs creating an environment of active academic engagement. Insect Natural History in Costa Rica allows students to obtain a meaningful field biology experience while enhancing their awareness of global, environmental, and cultural issues. Public outreach and service-learning experiences include providing insect collections to local Costa Rican schools, teaching San Luis elementary students about local insects and local community outreaches in Athens where students showcase the exotic insects they collected in Costa Rica and share entomological knowledge with the community.

## Service-Learning in Entomology: Bridging Theory & Practice

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GA Entomol. Soc. Annual Meeting 2007. 71: 19 (Abstract)

**Abstract** Service-learning was recently incorporated into UGA Entomology curriculum through the introduction of two courses. In *Entomology Outreach & Service-Learning* students participate in educational entomological outreach programs teaching the community about entomology emphasizing insects as teaching tools. *Insect Natural History in Costa Rica* is a discipline based international service-learning course where students created insect collections, conducted research-based field problems, and donated collections to local elementary schools in San Luis.

## Persistence of Inoculated Salmonella in Adult Darkling Beetles, *Alphitobius diaperinus* (Coleoptera: Tenebrionidae)

A.J. Roche<sup>1</sup>, L.J. Richardson<sup>2</sup>, N.A. Cox<sup>2</sup>, N.C. Hinkle<sup>1</sup>, R.J. Buhr<sup>2</sup>, and G.R. Siragusa<sup>2</sup>

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GA Entomol. Soc. Annual Meeting 2007. 71: 19 (Abstract)

**Abstract** *Alphitobius diaperinus* is a serious pest in the broiler industry. Infesting the litter of broiler houses, these pests add to poultry production costs for growers by destruction of insulation, decreasing bird growth efficiency, and transmission of pathogens. Understanding how broilers become colonized with *Salmonella* is key to prevention of food borne salmonellosis. Broilers are susceptible to colonization by *Salmonella* and other human food borne pathogens that conceivably can be transmitted via the beetle. The purpose of this study is to determine how long darkling beetles remain contaminated, allowing them to serve as effective vectors of *Salmonella* for poultry.

## Does Field Edge Structure Affect Penetration of Cotton Fields by Stink Bugs?

John R. Ruberson, Phillip M. Roberts, Russell J. Ottens,  
Melissa Thompson, and J. David Griffin

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GA Entomol. Soc. Annual Meeting 2007. 71: 19 (Abstract)

**Abstract** Cotton plots were separated from peanuts by 12 meters of 3 different border types: (1) bare soil, (2) grain sorghum, and (3) sorghum sudangrass. Stink bugs and boll injury were sampled at progressive distances from the border to assess the impact of the border type on distribution of stink bugs in the cotton. There were no differences among border type in distribution of bugs relative to the border, but in all cases, there was an increased concentration of reproduction and boll injury as sampling drew nearer to the border, with increasing numbers over time.

**Persistence of Two Entomogenous Fungi in Soil Amendments for Control of the Pecan Weevil (Coleoptera: Curculionidae)**

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GA Entomol. Soc. Annual Meeting 2007. 71: 20 (Abstract)

**Abstract** Laboratory assays were conducted to determine the persistence of two entomogenous fungi, *Beauveria bassiana* (Balsamo) Vuillemin and *Metarhizium anisopliae* (Metchnikoff) Sorokin, in three common soil amendments (composted cow manure, Erthfood<sup>®</sup>, and pine mulch). Persistence was quantified with periodic counts of viable colony-forming units (CFUs) on selective media and bioassays using *Tenebrio molitor* (L.) larvae. These measures demonstrated the activity of viable infective units in the soil amendments as opposed to non-amended orchard soil over a 28 day period. It appears that soil amendments may indeed enhance persistence of these entomogenous fungi and be candidates for alternative methods of applying the infective units to orchard soils for the management of the pecan weevil (Coleoptera: Curculionidae).

**Mitochondrial DNA Variation of the Subterranean Termite Genus *Reticulitermes* (Isoptera: Rhinotermitidae) in Coastal Georgia**

David Sillam-Dussès<sup>1</sup>, Tracie M. Jenkins<sup>2</sup>, and Brian T. Forschler<sup>1</sup>

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GA Entomol. Soc. Annual Meeting 2007. 71: 20 (Abstract)

**Abstract** Sequencing of the mitochondrial DNA cytochrome oxidase II (COII) gene was undertaken to determine genetic variation and distribution of the subterranean termite *Reticulitermes* in two sites separated by more than 200 km in Georgia (USA). Four hundred samples were collected from the field every month from 2002 to 2005 and preserved in alcohol. A 716 base pair region of the mtDNA COII gene was amplified from an individual termite from each sample in both directions using polymerase chain reaction (PCR) and sequenced. The sequence data was used to define 19 maternal lineages. Eighty polymorphic sites were identified among these lineages. Termites which shared one maternal lineage were collected from disparately distant sites. Phylogenies for these sequences were estimated by neighbor-joining, maximum-parsimony and maximum-likelihood analysis. All methods resulted in trees with highly similar topologies. Node support resulted from 1000 bootstrap pseudoreplicates or 100 nonparametric pseudoreplicates. Most of the maternal lineages were very close which indicate that the termites of these lineages could share a common maternal ancestor. However, other lineages were very different which likely represent different species. Information on *Reticulitermes* gene flow will help to facilitate development of novel treatment strategies and a better understanding of the social and ecological factors affecting gene flow.

Linda A. Smyth

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GA Entomol. Soc. Annual Meeting 2007. 71: 21 (Abstract)

**Abstract** A method is discussed for promoting entomology in a non-traditional manner and unconventional setting - on Georgia's Race Tracks. The Killer Bee is a Porsche race car decorated with insect designs. The driver, a retired entomologist, made her track debut in 2005 and creates an interest in entomology when ever she races. Another vehicle was added to the collection this year - a Spyder.

**Thrips Species Composition Shift in the Vidalia Onion Region - Potential Cause and Implications for Pest Management**

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GA Entomol. Soc. Annual Meeting 2007. 71: 21 (Abstract)

**Abstract** Thrips species composition in commercial onion fields in the Vidalia growing area have been monitored for the past four years. In the 2006-07 production season, an obvious increase was detected in the abundance of onion thrips, *Thrips tabaci*, which have historically represented less than 2 percent of thrips collected from onions in this region. This species is of considerable concern as it is reported as the primary vector of Iris Yellow Spot Virus, which does occur in the Vidalia region and has been a severe production problem in other onion production regions. Several factors may have contributed to the observed shift in thrips species composition, including the possible introduction of a different biotype of onion thrips and differential response to insecticides. The potential role of these factors and the implications for future pest management in onions will be discussed.

**Managing and Monitoring Populations of Brown Stink Bugs in Southeastern Farmscapes**

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GA Entomol. Soc. Annual Meeting 2007. 71: 21 (Abstract)

**Abstract** In the U. S., the brown stink bug, *Euschistus servus*, has increased in importance as a pest in cotton. These stink bugs can disperse from alternate host plants, especially peanuts, into cotton, and thus, trap crops can be useful in intercepting dispersing stink bugs. Also, a capture trap baited with a stink bug pheromone and/or other attractive compound could possibly be a useful tool for monitoring and/or controlling stink bugs in the field. Thus, an on-farm test was conducted to determine the ability of a sorghum trap crop along with capture traps baited with the brown stink bug pheromone in preventing these stink bugs from dispersing into cotton at the interface, or common boundary, of a peanuts-cotton farmscape. For both years of the test, brown stink bugs were significantly lower in cotton fields with sorghum trap crops with pheromone-baited capture traps compared to cotton fields without a trap crop and capture traps. These results demonstrate that this strategy can be effective in managing stink bug populations.

## Rapid Assessment of Insect Fragments in Flour

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GA Entomol. Soc. Annual Meeting 2007. 71: 22 (Abstract)

**Abstract** The relationship between internal insect infestation in stored wheat and number of insect fragments in the flour produced by milling that wheat is poorly understood. We characterized the number of insect fragments produced from milling small lots of wheat spiked with known densities and life stages of the rice weevil. Fragments were enumerated with near-infrared spectroscopy (NIRS), a quick non-destructive procedure, and with the standard flotation method. These data suggest that NIRS could be adopted for rapid assessment of insect fragments resulting from relatively low levels of infestation with immature life stages.

## Neonictionids for the Control of Citrus and Madeira Mealybug

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GA Entomol. Soc. Annual Meeting 2007. 71: 22 (Abstract)

**Abstract** Control of the mealybug was evaluated in greenhouses at the UGA, Griffin campus. Different rates and spray schedules of neonicotinoids were tested to determine efficacies. Citrus mealybugs were controlled with Safari drenches. Adequate control was obtained with foliar sprays of TriStar and Aria. Reduction of mealybug populations was observed with all neonicotinoids tested. The Madeira mealybug populations were reduced with Safari drench. Flagship and Tristar were not as efficacious as Safari. Safari & Talus provided better control than TriStar as foliar sprays.

## Vertical and Horizontal Distribution Patterns of Beetles in a Temperate Deciduous Forest

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GA Entomol. Soc. Annual Meeting 2007. 71: 22 (Abstract)

**Abstract** To better understand how the abundance, species richness, and composition of insect communities differ among forest strata, we compared the beetle fauna captured at two heights above the ground (15m and 0.5m) in a temperate deciduous forest in the southeastern United States. A total of 15,012 specimens were collected representing 73 families and 558 morphospecies. There were no differences in overall abundance or species richness between the two layers. However, there were many differences at the family level and species composition differed considerably between the two layers.

## Impact of the Red Imported Fire Ant (*Solenopsis invicta*) on Soil Arthropods of a Cotton Agroecosystem

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GA Entomol. Soc. Annual Meeting 2007. 71: 23 (Abstract)

**Abstract** There is a limited body of evidence suggesting that the red imported fire ant (*Solenopsis invicta*) may have a significant impact on soil fauna. This study examines the effect of fire ants on soil arthropod communities over the course of one cotton-growing season at the Horseshoe Bend Agroecosystem in Athens, GA. Predation efficiencies, at both the plant canopy and soil surface levels, were also estimated using egg masses of the beet armyworm (*Spodoptera exigua*) as a common prey item. Results, to date, suggest that fire ants may significantly decrease soil arthropod diversity. Predation efficiencies indicate that while predation due to fire ants may decrease towards the end of the season on cotton foliage, it remains high throughout the season at the soil surface.

## A 106-kDa aminopeptidase is a putative receptor for *Bacillus thuringiensis* Cry11Ba toxin in the mosquito *Anopheles gambiae*

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**Abstract** Aminopeptidase N (APNs) have been identified as receptors for *Bacillus thuringiensis* (Bt) insecticidal toxins in several insect species. In our study, a 106-kDa APN released by phosphatidylinositol-specific phospholipase C (PI-PLC) from *Anopheles gambiae* Brush border membrane bound Cry11Ba toxin. Its corresponding cDNA was cloned. Immunohistochemistry localized the APN to the microvilli of the posterior midgut. Furthermore, a 70-kDa fragment of the 106-kDa APN expressed in *Escherichia coli* bound Cry11Ba and reduced Cry11Ba toxicity to *A. gambiae* larvae. These data are evidence that the 106-kDa GPI-anchored APN is a specific binding protein, and probably a receptor, for Bt Cry11Ba toxin.

**It's All About The Legs: Molecular Confirmation That  
Chrysomelid Leg Morphology Matters**

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**Abstract** *Altica litigata* Fall mitochondrial DNA (mtDNA) sequence data was analyzed from collections on host plants belonging to the *Onagraceae* and *Lythraceae* families in order to: verify the taxonomy, illuminate the maternal population structure and gain insights into beetle dispersal history through phylogeographic analyses. Flea beetles were collected across four southeastern states which included four terrestrial provinces. Most of the beetles had characteristically dark legs. A few light-legged beetles, however, were collected. These were assumed to be habitat-associated ecotypes. Phylogenetic and morphological studies revealed that these light-legged phenotypes were not *Altica litigata* ecotypes but a different species. There appeared to be a general host- and clade-specific feeding preference, although no intraspecific phylogenetic structure based on geography was observed. We discuss the significance of these findings for flea beetle taxonomy, intra- and interspecific population structure, and evolution.