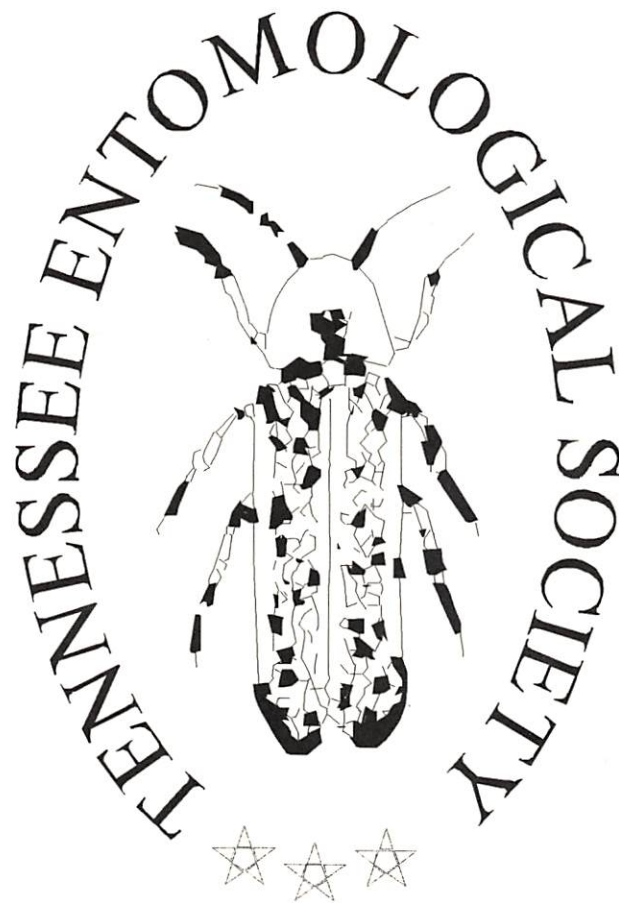


THE FIREFLY

**Proceedings of the 1996 (Twenty-Third)
Annual Meeting of the
Tennessee Entomological Society**



**October 17-18, 1996
Ramada Inn Governor's House & Conference Center
737 Harding Place (I-65, Harding Place & Trousdale)
Nashville, Tennessee**

Volume Eleven

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RICHARD E. CARON

OUTSTANDING ENTOMOLOGIST AWARD

NOMINATION FORM

The Awards Committee of the Tennessee Entomological Society invites nominations from any TES member for the Richard E. Caron Outstanding Entomologist Award. The award is awarded periodically to TES members who have distinguished themselves by making outstanding contributions to entomology in Tennessee.

Name of Nominee _____

Brief Description of His/Her Qualifications for the Award

Name of Nominator _____

Phone Number of Nominee: Area Code () _____

Please submit your nomination by August 1 to:

Dr. Gary Lentz
Department of Entomology and Plant Pathology
605 Airways Blvd.
West Tennessee Experiment Station
Jackson, TN 38301
FAX (901) 425-4760
gll5405@erc.jsc.c

**PROCEEDINGS OF THE TWENTY-THIRD
ANNUAL MEETING
OCTOBER 17-18, 1996**

**Ramada Inn Governor's House and Conference Center
Nashville, Tennessee**

**CURRENT STATUS OF AND FUTURE PROSPECTS
FOR AGRICULTURE IN TENNESSEE**

Dan Wheeler
Commissioner of Agriculture, Tennessee Department of Agriculture
Nashville, TN

The objective of this presentation was to provide a general overview of the current status of agriculture in Tennessee. Discussion also focused on the future of agriculture in the state and what may lie ahead for us and our farmers.

THE BIOLOGY OF SCORPIONS

Gary A. Polis
Biology Department
Vanderbilt University, Nashville, TN

This presentation provided an overview of the biology of scorpions. The following information was made available for attendees and is provided for additional information.

1. First fossils from Silurian (425-450 MYBP) are aquatic or marine
Marine and amphibious species = modern day crabs in habitat
Colonized land in the late Devonian or early Carboniferous (325-350 MYBP)
Terrestrial species are very similar to those today -
Except for great size (0.3->1m); *Gigantoscrapio*, *Brontoscorpio*
Modern scorpions are large compared to other terrestrial creatures
At birth, they are larger than most adult insects
Adults of larger species are bigger than many (20->60%) vertebrates
Hardrurus: largest in N. America and >20-35% of vertebrates in NA
Pandinus imperator: from W. Africa; heaviest in world (65g non-gravid female)

2. Mating, birth, molting, size structure. (Social scorpions).
3. Life History

Large size suggest how different scorpions are from typical terrestrial arthropods. They are more similar to long lived vertebrates in their life history.

 - a. Life history traits, reproductive parameters, age to maturity and longevity

Time in Months expressed as Mean \pm SD (range)

Gestation Period	Age to Maturity	Longevity
7.6 \pm 4.3	27.7 \pm 20.1	49.9 \pm 21.8
(2-18)	(6-83)	(24->96; 308)
 - b. Highlights:--some with longer gestation period than humans and whales
 - some take 2-6 years to mature (in contrast, a fly = 2-4 weeks)
 - can live to 5-25 years
 - lowest r_{max} (intrinsic rate of reproduction) on planet
4. ~1500 described species of modern scorpions (possibly 2000 total species).

Modern scorpions are distributed on all continents up to latitudes of 40-55°
(e.g. Germany, southern Canada, Tierra del Fuego)
5. They occur in many different habitats:
 - a. High mountains (>5500m under snow covered rocks in Andes and Alps)
 - b. Several species live in caves (*Alacran*, in Mexico, found at a dept of >800m)
 - c. 8-10 intertidal spp (e.g., *Vaejovis littoralis* from Baja with densities of 2-12/m²)
 - d. However, most successful in deserts (temperate--sub-tropical latitudes, 22-38°
Reach greatest diversities and densities:
5-16 sympatric species occur in a 1Km² area (highest in Baja)
e.g., Baja California with 61 spp; Namibia, 45; California, 42
6. Scorpion density and population biomass (=density x mass)
 - a. Average N in deserts range 0.3->1/m²
 - b. Population biomass/A (=Kg/m², hectare, acre) of all scorpions together > any other group of animals in the desert excluding termites and ants; greater than all the vertebrates combines (<--great number x relatively large size)
7. Scorpions are successful in deserts because they possess a number of remarkable adaptations that allow them to flourish in the dry, hot and variable desert environment.
 - a. They loose less water from their bodies than any other creature on the planet
Impermeable cuticle; dry nitrogenous wastes (urine) (guanine, xanthine)
 - b. They do not need to drink free water (water from their food)
 - c. They can withstand very hot temperatures (47°C = 115°F) before they die
(new record is Namib Desert pseudoscorpion = 71°C = 159°F)
 - d. Can go long periods without food: 3-12 months
 - Metabolize their body fats and will even resorb their young
 - Typical predator with large (30-40%) increase in body size at feeding
 - Possibly most remarkable is their extraordinarily low metabolic rates
individuals of many species probably feed only 2-5x/year

8. **Food**
 Since scorpions digest their food externally, their diet can be determined with accuracy.
 - a. Prey = insects (beetles, orthoptera), spiders, scorpions, small vertebrates.
 - b. Prey detection: substrate (seismographic) and airborne vibrations; odor cues.
 - c. Scorpion predation can influence significantly their prey: for example, in a 30 month experiment, with removal of >6000 individual *P. mesaensis* from 300 quadrants, spiders doubled and smaller species of scorpions increased 2-6x.

9. **Scorpions used by biologists as research tools:**
 - a. Great abundance and diversity in deserts makes them relatively easy to study.
 - b. UV light also greatly facilitates: fluoresce under UV radiation(=250- 400nm).
 Light apparently exerts little effect on behavior: courtship, homing, orientation, prey detection and capture are easily investigated in the field.
Major Benefit: Scorpions can be observed, collected and/or manipulated.

10. **Venom, medical importance**
 Perhaps scorpions are best known because of their potential to take human life.
 - a. However, only ~25 of >1500 spp can be lethal to humans; all family Buthidae.
 These species kill an estimated 1000-3000 people/year.
 - b. Most species kill young (<5 yrs) children and adults with health problems.
 Mortality rates are 5-10x> in children: adults
 Exceptions: *Androctonus* (N. Africa), *Tityus*, *Rhopalarus* (S. America);
Leiurus (NE Africa); *Parabuthis*, *Buthotus* (S. Africa)
 [*Centruroides* (Mexico, SW U.S.) 1800 reported deaths/year]
 - c. What distinguishes these species from non-lethal species?
 Venoms are distinguished: those that act on the nervous system and those that act on tissue or blood (hemotoxic). All lethal species are neurotoxic.

11. **Miscellaneous Information of Envenomation**
 Anti-stroke effects from (Natural Products Incorporated)
 Euphoric?

TEMPORAL VARIABILITY OF TWO MACROINVERTEBRATE COMMUNITIES IN HOLLY FORK CREEK, HENRY COUNTY, TENNESSEE

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In many aquatic biomonitoring programs macroinvertebrate samples are collected monthly. The possibility exists that samples could be completely different a week before or a week after the sampling date. The purposes of this study were to 1) describe the macroinvertebrate community over a three week period in both a sandy run and a gravel riffle (insects identified to family, others to

phylum or class), 2) evaluate the community variability at both sites during the three week period, and 3) make comparisons between the two sites for each week of the three weeks. Five randomly selected samples were collected from both sites during each week using a Hess sampler. These were described using the parameters of abundance, richness, evenness, diversity, biotic index, and five functional feeding group rations. In the sandy run all computed parameters were not significantly different among the three weeks. At the gravel riffle, abundance, richness, and rations of shredders and scrapers were the only parameters remaining consistent throughout the study period. Significant differences between the two sites varied depending on the parameter and week(s) compared. Abundance, and ratios of filtering and gathering collectors were always significantly higher at the riffle site. Richness was significantly higher at the riffle site during the latter two weeks, but the richness value of one sandy run sample provided enough variation that the two sites could not be considered significantly different during the first week. The results suggest that one collection over a three week period would give an accurate picture of the macroinvertebrate community in the sandy run, but might not in the gravel riffle. However, larger numbers of weekly samples, identification to generic or specific levels, life cycle effects on the reduction or addition of organisms, and collections from different seasons could provide other results. It may be beneficial for monitoring programs, as time and funds allow, to collect a set of weekly samples at least once during each season. This would provide a better understanding of the community variability in their streams.

ASSESSMENT OF Bt COTTONS FOR HELIOTHINE SPECIES CONTROL IN TENNESSEE

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Cotton insect pests cost farmers beltwide \$1.68 billion in 1995 due to yield losses, insecticide, and insecticide application costs. with increased insect resistance and environmental concerns, new and innovative control methods are needed. Several Bt cotton lines have been developed which carry an insecticidal protein from a soil bacteria inside the plant, which is toxic to many Lepidopteran cotton pests. Bt cottons were evaluated for resistance to injury from the bollworm, *Helicoverpa zea* Boddie, and tobacco budworm, *Heliothis virescens* F., which are Lepidoptera collectively called the Heliothine complex (Heliothines).

Data indicate that Bt cotton lines suffered significantly less Heliothine complex injury to squares and bolls throughout the season than the conventional cultivars. Bt cotton lines did not require Heliothine complex insecticide treatments to preserve their yields. These studies indicate that Bt cottons could play an important role in future cotton pest management and reduce insect control costs in production agriculture.

ANTIBODY PREVALENCE TO TICK TRANSMITTED DISEASE ORGANISMS IN DOGS IN TWO EASTERN TENNESSEE COUNTIES

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Blood was collected from 35 owner dogs in two communities in Cumberland County, TN and from 104 shelter dogs in Cumberland and Knox Counties, TN. Serological techniques (IFA, and ELISA) were used to determine the exposure of the dogs to the disease organisms causing Rocky Mountain spotted fever, Lyme disease, and canine ehrlichiosis. Data on canine risk factors for exposure to these disease organisms were obtained from owner questionnaires and tick collections at owner residences. The presence of white tailed deer and in turn the lone star tick appear to be factors influencing the canine exposure status for the owner dog population. A PCR technique testing for both *E. chaffeensis*, and *E. phagocytophila* are currently being worked out, but has not been successful thus far.

INCIDENCE AND PROGRESSION OF BEECH SCALE IN THE GREAT SMOKY MOUNTAINS NATIONAL PARK

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American beech, *Fagus grandifolia* Ehrlich, is a dominant species in cove hardwood, northern hardwood, and hemlock forests. It is primarily found in eastern North America, ranging from Nova Scotia to northern Florida and westward to eastern Texas and Arkansas. Beech scale, *Cryptococcus fagisuga* Lindinger, was accidentally introduced from Europe in the 1890's. Beech bark disease (BBD) is a complex which includes beech scale and the fungi *Nectria galligena* Bres. and *N. coccinea* var. *faginata* Lohman, Watson, and Ayers. Fungi infect bark via wounds made by scale when it feeds and kill the cortex, phloem, and cambium, which eventually kills the tree. In 1993 beech scale and *Nectria* spp. were discovered in beech stands in the Great Smoky Mountains National Park (GSMNP). A research project was initiated to monitor the progress of the scale and the disease, as well as assess the incidence and density of predatory mites in the GSMNP.

Ten permanent plots were established in different areas of the park. Each plot (20m²) contained at least 20 beech trees with a diameter at breast height (dbh) of greater than 3.5cm. Each tree was rated for beech scale on the north and south sides of the bole, using a rating square (33cm²) centered 122cm above the ground surface. The rating scale used to classify the density of beech scale on bark was: 0-None, 1-Low and Scattered, 2-Low and Uniform, 3-Moderate and Scattered, 4-Moderate and Uniform, 5-High and Scattered, and 6-High and Uniform. Scale ratings were conducted once in spring and once in fall.

A predatory red mite, *Allothrombium* sp. near *mitchelli* Davis, has been observed to feed on the scale, at times in large numbers on single trees. The predatory mite *Allothrombium* sp. was rated in four plots: Sweat Heifer, Indian Gap, Deep Creek, and Chimney Tops. The mite rating scale was: 0-None, 1-Present/Not Feeding, and 2-Present/Feeding.

The percent of trees infested with beech scale almost doubled from spring 1994, when 55% of the trees (n=382) were infested, to spring 1996, when 96% of the trees (n=316) were infested with beech scale. Tree mortality also increased in four plots: Fork Ridge, Chimney Tops, Sweat Heifer, and Forney Ridge. Although tree mortality had increased only slightly during these two years at Fork Ridge and Sweat Heifer, mortality increased from 0 to 15% at Chimney Tops and from 71% to 87%, a 16% increase, at Forney Ridge.

Allothrombium sp. mites were frequently found, sometimes as many as 45 on one tree, in two (Sweat Heifer and Indian Gap) of the four plots evaluated for mites. Other scale predators were rarely observed. Mite densities were highest at Sweat Heifer, where the mean number of mites peaked at about 4 mites per tree in May and September. At Sweat Heifer and Indian Gap, mites were found on numerous trees (ranging from 6-83% of the trees infested).

FOOD PARTITIONING AMONG COLLEMBOLA IN TALL FESCUE FIELDS

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Collembola, also known as springtails, are among the most common arthropods in soil. Collembola are important leaf and litter decomposers, primarily feeding on hyphae spores, and plant matter. Grazing and consumption studies have been performed to understand collembolan feeding habits. Food consumption analysis was performed on selected Collembola species from fescue fields at Ames Plantation in West Tennessee, and also from fields in Knox County. Samples were collected with pitfall traps by Cindy Williver during March at Ames Plantation (Hardeman County), and in

April, May, July, and August in Knox County. Contents of their mesenterons were examined microscopically.

Species in three families of Collembola were examined: four species of the family Entomobryidae, two of Isotomidae, and four of Sminthuridae. Foods eaten by these Collembola consisted of fungal hyphae, spores, pollen, plant matter other than pollen, diatoms, and mineral and amorphous material. Hyphae and spores were the most frequently ingested items by the Collembola examined. Food intake, however, varied from species to species. *Homidia socia* (Entomobryidae) consumed little plant matter, and most of the individuals examined consumed hyphae and spores. *Isotoma viridis* (Isotomidae) largely consumed diatoms.

Collembolan diet varied according to time of year and place of feeding. For example, fewer *H. socia* consumed pollen during May and in two fields from July collections than in a third field from July collections. Similar comparisons were made of the number of Collembola feeding and the food they consumed to determine if they fed selectively or fed on anything available. *Homidia socia* and most Collembola appeared to feed primarily on any readily available food.

Possible effects of endophyte infection of tall fescue on feeding were studied also. Fescue is often infected with a fungal endophyte that provides protection against animal and insect grazing, drought, and pathogenic plant fungi. Toxins produced by the endophyte have been demonstrated to reduce certain insect populations in the fescue field, but their effects on Collembola are unknown.

Overall, no changes in the diet of Collembola due to endophyte status were found. Hyphae and spore consumption by the most abundant Collembola remained about the same, as did consumption of plant matter other than pollen. A slight decrease in the amount of plant matter other than pollen was found in *Orchesella zebra* (Entomobryidae). *Isotoma viridis* ingested all major food groups in the endophyte-infected fields, but appeared to be more selective in endophyte-free fields. If food resources were less abundant in endophyte-infected fields, *I. viridis* may have had to consume more of less-favored food sources in those fields.

USE OF COFFEE AGROECOSYSTEMS AND PREMONTANE FOREST BY ARMY ANTS AND ANT-FOLLOWING BIRDS IN WESTERN PANAMA

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In the neotropical rain forests, army ants of several species swarm regularly across the forest floor. Multispecies assemblages of birds are commonly seen foraging above the advancing ant swarms, feeding on the arthropods flushed from the leaf litter. While the general biology of several species of ants and avian followers has been studied in the lowlands and foothills of Central and South America, reports from higher elevations are primarily anecdotal. Two life history traits of the diurnally raiding genus *Eciton* predispose it to require large tracts of suitable habitat: (1) a daily hunting area of between 500 and 2100 m², and (2) a cycle of migration based on the reproduction and larval development within the colony. Because of these large habitat requirements, army ants are highly sensitive to habitat fragmentation.

In western Panama, the original montane forests have been converted into a highly fragmented landscape dominated by coffee plantations intermixed with cattle pasture. Traditionally-grown shade coffee (coffee grown under a canopy of trees) is the dominant land use. In most cases, shade-grown coffee maintains high structural diversity and acts as a refuge form army forest species. However, a newly developed sun-tolerant variety of coffee is grown in the absence of any canopy. This new growing method is replacing many traditional shade farms.

My study addresses the question of whether two species of army ants, *Eciton burchelli* and *Labidus praedator*, occur at a high enough abundance to support regular and facultative avian followers between 1200 and 1800 M. by quantifying the occurrence of ants and ant-following birds in habitats with different disturbance levels [forest (unmodified), shade coffee (slightly modified) and sun coffee (highly modified)], I will assess whether or not these traditionally forest-dependent species can persist in human-altered landscapes.

Based on results from the 1996 field season, both *Eciton* and *Labidus* were regularly found in forest and shade coffee plantations; however, I did not find either species in sun coffee. My study is the first to document regular ant-following birds at these elevations.

DISTRIBUTION AND SPECIES AFFINITIES OF THE SCALE INSECT FAMILY ASTEROLECANIIDAE IN THE NEW WORLD

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Pit scales (Asterolecaniidae) constitute a large and economically important group of scale insects worldwide. The fauna is extremely rich and diversified with members occupying all of the major zoogeographical regions of the world (Kosztarab & Kozar 1988, Lambdin & Kosztarab 1977). Worldwide, there are over 250 species of Asterolecaniidae recognized in 10 genera. 46 of these species occur in the New World representing 7 of the 10 genera (i.e., *Asterodiaspis*, *Asterolecanium*, *Bambusaspis*, *Grammococcus*, *Mycetococcus*, *Pollinia* and *Sclerosococcus*).

Some pit scales can only be found on specific host plants (i.e., several species of the genus *Asterolecanium* solely feed on palms, genera *Asterodiaspis* and *Bambusaspis* are monophagous on oaks and bamboo, respectively), while others may feed on plants from different families (i.e., *Asterolecanium pustulans* exists on 46 plant families). Structures that may be used to separate taxa include different types of wax glands, 8-shaped pore patterns, number of anal ring setae and characteristic shapes of the clypeolabral shield. The morphological differences of the 7 pit scale genera (Asterolecaniidae) of the new World are evaluated and a phylogenetic tree is proposed.

“RAPID” METHODS OF SAMPLING MACROINVERTEBRATE COMMUNITIES FOR WATER QUALITY MONITORING IN WEST TENNESSEE STREAMS

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Methods of monitoring water quality using benthic macroinvertebrates have evolved over the past three decades in North America. Before 1970 bioassessment methods employed qualitative sampling and emphasized use of indicator species (presence/absence, abundance). Later methods used quantitative samples that were analyzed using several measures of community complexity (diversity, richness, evenness). These methods required that numerous replicate samples be collected. Sample processing, identification of the macroinvertebrates, and analyses of the various community measures requires much time. Because of the time and cost necessitated by the intensity of these methods, less time consuming and more cost effective alternatives were sought. Since the mid-1980's rapid

methods of bioassessment have been developed that rely on semi-quantitative samples of macroinvertebrates, usually from riffles/runs habitat, and qualitative samples of macroinvertebrates from various other habitats. Semi-quantitative samples are subsampled to accelerate the process of taxonomic identification. The relative abundance of each taxon (e.g., rare=1, common=3, abundant=10) is often used in subsequent calculation of biological metrics. These samples are analyzed with various community-based metrics to score the waterbody against some predetermined or concurrently measured reference conditions. The U.S.E.P.A. has endorsed these rapid bioassessment techniques in a formal protocol. In association with a nonpoint source pollution abatement project in the West Sandy Creek watershed of west Tennessee, a biomonitoring project using rapid bioassessment methods was developed. Modification of the U.S.E.P.A. protocol was necessary to adapt them to the sandy-bottom streams of this watershed. Semi-quantitative samples were collected from submerged root habitats, preserved in the field and returned to the laboratory for subsampling. Qualitative samples were collected from each of several habitat types present at each site (riffle, snag/CPOM, macrophytes, root mass) macroinvertebrates were hand-picked, and preserved on-site as individual habitat samples. Macroinvertebrates have been identified to the generic level in most cases. While most samples from the seven monitoring sites remain to be analyzed, initial findings suggest that these methods may not accurately indicate water quality improvements resulting from best management practices that have been implemented in the watershed and should be causing a generalized reduction of nonpoint source pollution.

SOIL INVERTEBRATES OF GLAUCOUS-WINGED GULL NESTS

David Ekkens
Southern Adventist University

ABSTRACT NOT AVAILABLE

BUTTERFLY CONSERVATION AND TENNESSEE NATURAL HERITAGE PROGRAM

Smoot Major
Tennessee Department of Environment and Conservation

ABSTRACT NOT AVAILABLE

DRAGONFLIES OF THE TROPICAL DRY FORESTS

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The objectives of this research were to determine the species diversity, relative abundance and spatial distribution of the Odonata (dragonflies) of the tropical dry forest. As opportunities arose, new species/females were to be described, and opportunistic behavioral observations were to be made.

In this phase of the study, odonates were collected in an area extending from the coast to 10 km inland and from 60 km N to 60 S of Chamela, Jalisco State, Mexico. Collections were made daily during daylight hours from 18 June through 26 July 1996. Seventy-one species were collected, 26 newly reported for Jalisco State. The phenology of the repopulation of Arroyo Zarco was recorded as the wet season began. *Archilestes grandis*, *Argia tezpi*, *Progomphus mexicanus* and *Orthemis levis* were pioneer species. The undescribed females of *Neoerythroma gladiolatum* and *Macrothemis ultima* were collected and will be described. Over 50 observations of oviposition behavior were made for *N. gladiolatum* and will be described in the future. Two species collected, *Protonura rojiza* and *Progomphus mexicanus*, were previously known only from the type specimens.

AN OVERVIEW OF THE PLANT PEST DIAGNOSTICS CENTER

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The Agricultural Extension Service plant and Pest Diagnostic Clinic is located in Nashville, Tennessee. Its purpose is to provide reliable and prompt disease diagnosis to extension agents and growers, to train graduate students and faculty, to record disease occurrences, to collect insect and plant specimens for grower and agent training and provide insight in new disease/pest outbreaks.

Services offered by the Diagnostic clinic are: disease/plant problem diagnosis, insect identification, nematode assays and tall fescue endophyte assays. There is no charge for the diagnosis of samples sent to the clinic unless it is a nematode test (\$5.00/sample), fescue endophyte test (\$15.00/sample), root assays (\$10.00/sample), bacterial leaf scorch (\$10.00/sample) and virus testing (\$10.00/sample).

Five Agricultural Extension Service specialists are stationed at the Plant and Pest Diagnostic Clinic: one entomologist (Dr. Frank Hale), two plant pathologists (Dr. Alan Windham and Dr. Steve Bost), one small farms specialist (Dr. Roy bullock) and one horticulturist (Dr. Wade Sperry). Between October 1, 1995 and September 30, 1996, the total number of samples diagnosed by specialists that process samples were: Dr. Frank Hale - 800 samples, Dr. Steve Bost - 800 samples and Dr. Alan Windham - 1,900 samples. For the first ten months of 1996, the total number of commercial vs. no-commercial samples precessed at the Diagnostic Clinic were: 1,445 commercial samples and 1,785 non-commercial samples.

The Plant and Pest diagnostic Clinic cooperates with: U.T. Soil Test Laboratory, Tennessee Department of Agriculture Division of Plant Industries, Tennessee Department of Agriculture Animal diagnostic Laboratory and USDA APHIS, Exotic Pest Surveys.

IMPACT OF ROOT BALL DIPS ON WHITE GRUB SURVIVAL

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Japanese beetles are a significant threat to the profitability of nurseries. currently, individual state quarantines require treatment or production practice-based certification for nursery stock originating in infested areas before plants are exported to uninfested areas. Dipping root balls of one foot diameter or less in insecticides is currently used by some nurseries as a method to eliminate white grubs, but there is little scientific evaluation of the efficacy of this method on larger rootstock. Additional research is also necessary to determine the effect of soil type, root ball size, and the duration of dipping. Therefore, a collaborative study was conducted to examine the efficacy of chemical dip treatments of 24 and 32 inch root balls, from two soil types, dipped for three different time periods, on control of white grubs.

Trees were selected from three nurseries in Ohio with high populations of white grubs. Two sites were in northern Ohio where the soil was sandy and well-drained. Trees selected from these two sites included magnolia, ash linden, and maple. Most of the grubs found from these root balls were Oriental beetle (81%), followed by European chafer (9%), Asiatic garden beetle (8%), and Japanese beetle (2%). The third site was located in southern Ohio where the soil was heavy (clay) and poorly drained. All the trees selected there were Sargent crabapple. Japanese beetle was the dominant grub (79%) followed by masked chafer (21%).

Treatments included Dursban 50 WP at 2 lb ai/100 gal., Dursban 4E at 2 lb ai/100 gal., and Oftanol 2F at 0.2 lb ai/100 gal. and at 0.4 lb ai/100 gal. Root balls were dipped for 1, 2, and 5 minutes in each of the chemical treatments. The control trees were dipped in water. There were 4 single-tree replications for each chemical-dip time combination. The root balls were evaluated five weeks after dipping. all the soil within each root ball was thoroughly examined for the presence of white grubs. The number of live and dead grubs were documented and the live grubs were identified.

Overall, insecticide treatments reduced the number of live grubs compared to the control treatment. Dipping for a minimum of 2 minutes with either insecticide gave the best results. The 5-minute dip performed similarly to the 2-minute dip. Insecticide treatments were essentially similar regardless of root ball size and soil type. Dursban 4E performed slightly better than Dursban 50WP and both rates of Oftanol 2F. The fewest number of live grubs were most consistently found in root balls dipped in Dursban 4E.

Dipping root balls can be an expensive and "messy" method of controlling white grubs, but it can be a reasonably effective regulatory treatment. Further research may allow for "fine-tuning" application rates and dip duration with reference to soil type, root ball size, and phytotoxicity.

**CONTROL OF A SHOOT BORING CATERPILLAR,
PROTEOTERAS AESULANA RILEY (LEPIDOPTERA:
TORTRICIDAE), IN RED MAPLE**

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Tennessee State University, Nursery Crop Research Station, McMinnville, TN 37110
Extension OHL D, University of Tennessee, McMinnville, TN 37110

A shoot boring, caterpillar, *Proteoteras aesculana* Riley, attacks the buds and shoots of red maple. If the terminal bud is destroyed an undesirable forked double leader is produced. A test was designed to delineate efficacy and timing using soil applied systemic insecticides and foliar applied insecticides (both systemic and not systemic).

The systemic insecticides Di-Syston 15G (5 lb/1000 linear feet) and Pinpoint 15G (13.2 lb/acre) were applied to seedling red maple on April 15 and April 17, 1996, respectively. The tree phenology on April 15 for 67.7 percent of the trees ranged from tight bud to half inch green while 32.3 percent ranged from 3/4 inch green to three pair of leaves. Foliar insecticide applications were made on April 24. Tree phenology on April 24 for 9.5 percent of the trees ranged from half inch green to one pair of leaves, 61.9 percent had two pair of leaves and 28.6 percent had three pair of leaves. The insecticides applied as foliar sprays were Orthene Turf, Tree and Ornamental {Orthene T, T & O} 75 SP (0.67 lb/100 gal) plus Tame 2.4 EC Spray (10.67 fl oz/100 gal), Orthene T, T & O 75 SP (1 lb/100 gal), Orthene T, T & O 75 SP (1.33 lb/100 gal), Tame 2.4 EC Spray (10.67 fl oz/100 gal) as a follow-up spray to trees treated on April 17 with Pinpoint 15 G, Talstar T & O 10 WP (0.96 oz/10 gal), and Talstar T & O 10 WP (0.96 oz/10 gal) as a follow-up spray to trees treated on April 15 with Di-Syston 15 G. The foliar sprays were applied at a 25 gal/acre rate using a CO₂ compression sprayer operating at 40 psi, equipped with two TXVS-18 hollow cone nozzles. The treatments of 35 feet of row were replicated four times. On May 3, a complete tree inspection for borer damaged shoots was made on all the trees in each treatment. The number of damaged shoots was recorded for each tree inspected.

There were no significant differences among treatments for either the mean percent trees with borer damaged shoots or for the mean number of borer damaged shoots. In a 1995 study (1) the Talstar T & O 10 WP treatment significantly reduced the mean number of damaged shoots so that there was 88.5 percent less damage than in the control. In the present study, the mean number of damaged shoots was reduced by 87.0 percent. The amount of insect damage in the 1995 study was much higher than in the present study. The number of shoots damaged per tree was 1.7 for the control in the 1995 study, while it was only 0.34 for the control in the present study. Given these circumstances, our sample size was not adequate to detect significant differences among the treatments.

1996 TENNESSEE STATEWIDE TICK SURVEY

Reid R. Gerhardt, Karen M. Vail, David J. Paulsen, and Eric J. Marsland
Department of Entomology and Plant Pathology
The University of Tennessee, Knoxville, TN 37901-1071

A survey to determine the common tick species that Tennesseans encounter was conducted during the spring and summer of 1996. Alcohol vials were mailed to all 95 University of Tennessee County Extension Offices and 50 mixed practice veterinary practices across the state. The extension recipients were also provided with a sample news story to publicize the survey in their county and instructions on how to return the vials. Extension agents were asked to concentrate on human and canine hosts, while veterinarians were urged to send ticks from as many different host species as possible.

By 15 October, 2,579 ticks had been received and identified (1,586 *Dermacentor variabilis* (say), 860 *Amblyomma americanum* (L.), 128 *Rhipicephalus sanguineus* (Latreille), and 5 other spp.). *D. variabilis* (American dog tick) were collected from 223 dogs, 54 humans, 19 cats, 5 cows, 2 horses, 1 goat and 2 pot-bellied pigs. The lone star ticks (*A. americanum*) were collected from 34 humans, 31 dogs and 1 cow. The only host for the brown dog tick was dogs. American dog ticks were received from 45 counties and lone star ticks from 26.

The identification and habits of the most common ticks were reviewed and plans for additional surveys to document the occurrence of Tennessee ticks were presented.

REGULATORY INSECT UPDATE: 1996

Steve Powell

Tennessee Department of Agriculture, Division of Plant Industries
Box 40627, Melrose Station, Nashville, TN 37204

A new county record for the black imported fire ant for 1996 is Moore County. Four counties: Crockett, Giles, Humphreys, and Marshall plus a portion of Madison (3 mile radius from the Huntersville - Providence Road intersection with Interstate 40) were added to the area of the state considered generally infested with Japanese beetle.

Surveys for the following insects in Tennessee were negative in 1996: oriental beetle, pine shoot beetle, pink bollworm, sweet potato weevil, spruce engraving beetle, spruce wood engraver, false codling moth, African cotton leafworm, Egyptian cotton leafworm, and khapra beetle.

A total of 18,279 traps were placed for gypsy moth in 1996 with 2,549 caught in 24 counties. New county records for gypsy moth in 1996 include the following: Fentress, Gibson, Henderson, and Scott. The following counties had at least one gypsy moth trap with two or more gypsy moths found: Blount (2), Davidson (1), Hamilton (1), Scott (140), Sevier (10), Sullivan (4), Unicoi (1), and White (1). A total of 2,410 gypsy moths were found in Scott County.

THE INCIDENCE OF NATIVE INSECTS ON SELECTED EXOTIC VEGETABLES

Hans R. Chaudhary

Division of Industry, Tennessee Department of Agriculture
Nashville, TN 37204

Vegetables are gaining important ground in the diet of American people. This is mainly in view of the fact that diet rich in vegetables is thought to play a significant role in lowering the incidence of cardiovascular and cancer related diseases. The introduction of exotic vegetables with proven nutritional values will further enhance the availability of wider choices for people in their quest for vegetable consumption. A selected group of exotic vegetables have been grown under home garden conditions for six years in Harriman, Tennessee. The objective of the present paper is to envision the economic and nutritional values of these vegetables. Also the intention is to discuss the incidence of native insects on these vegetables. Additionally, focus will be placed upon the future potentialities and challenges involved in the production and marketing for these vegetables.

Six exotic vegetables, namely egg plant, bittergourd, tindora (mini cucumber), Chinese okra (turia), gwarbeans, and clustered beans, have been grown under home-garden conditions since 1990. Data concerning their production, productivity, and marketing have been collected. The incidence of insect-pests on these vegetables have also been monitored.

The production data indicated that the vegetables in question are adaptive and productive under east Tennessee agro-climatic conditions. The main consumers of these vegetables are people from the Oriental and Middle East countries. However, the extension work using these vegetables have indicated a good degree of acceptance among local population. This is in light of the fact that the American population is searching for varieties of vegetables in their diets. Most of these vegetables did not show major problems with regard to the incidence of native insect-pests. Nonetheless, egg plants and clustered beans did indicate the insect infestation to a degree considered injurious to them, if not controlled. The most frequent encountered insects on egg plants were Black Flea Beetles and Blister Beetles. The clustered beans were infested with Mexican Bean Beetles. These insects were primarily controlled by employing organic means, such as Neem oil and chilly paste. However, a limited amount of Thiodan insecticide was also used.

These vegetables show great future potential both for producers and consumers. Nevertheless, they also present certain serious challenges to agronomists for their successful production and marketing management. The trends in the past have indicated clearly that American agricultural scientists and farmers have succeeded highly in introducing and cultivating other exotic crops such as corn, rice, soybean, and wheat. Therefore, the exotic vegetables should not pose any exception.

CURRENT STATUS OF BIOLOGICAL CONTROL OF MUSK THISTLE

Jerome F. Grant and Paris L. Lambdin
Department of Entomology and Plant Pathology
The University of Tennessee
Knoxville, TN 37901-1071

Musk thistle, *Carduus nutans* L., is an introduced plant pest classified as a "noxious" weed in many areas of the southeastern United States, where it invades nurseries, orchards, pastures, croplands, highway and railroad right-of-ways, and urban landscapes. This invasive plant grows in many areas that are inaccessible and uneconomical for herbicide use or mowing and impacts land use over a broad geographical region. Thus, the area-wide or regional management of musk thistle should be approached from a broad perspective. A multi-state, multi-institution/agency project was initiated to develop and integrate a sustainable weed management program that incorporates the release and establishment of two introduced thistle-feeding biological control agents. Releases of plant-feeding weevils have been previously shown to be successful in other states, such as Virginia. This regional project was supported by a grant from the Southern Region Sustainable Agriculture Research and Education/Agriculture in Concert with the Environment Program (SARE/ACE), the Federal Highway Administration, and the Tennessee Department of Transportation. This project involves the release and establishment of two introduced plant-feeding weevils (native to Europe) into thistle-infested areas and includes cooperators in Georgia, North Carolina, Tennessee, and Virginia.

During 1996, about 44,000 biological control agents were released against musk thistle in these four cooperating southeastern states. About 4,400 head weevils and 10,150 rosette weevils were collected and redistributed onto 80 thistle-infested sites in 13 counties in Tennessee. Since this program was initiated in Tennessee in 1989, head weevils have been released at more than 300 sites on farmland and along roadways in 67 counties in eastern and middle Tennessee. Weevils have survived and reproduced at most sites. In an IPM program, these biological control agents can significantly contribute to the decline of musk thistle. For example, musk thistle has decreased by about 94% at some sites in Tennessee since 1989. The end result of this program should be the implementation of a long-term, area-wide, economical, environmentally compatible and sustainable method of suppressing thistle over a large geographical area and a wide range of agricultural systems. This area-wide, regional IPM project should reduce the number of seed available for dispersal and ultimately reduce infestations of musk thistle in these areas. An IPM program incorporating area-wide management of musk thistle should improve management of this invasive plant on a localized basis and provide economical and environmental benefits to those affected by musk thistle.

A MEASUREMENT TECHNIQUE WITH POTENTIAL TO SCREEN SPECIMENS OF *APIS MELLIFERA* L. FOR SUBSEQUENT AFRICANIZATION DETERMINATION

Raymond A. Nabors and Sanjay K. Bajaj
P.O. Box 1001
Caruthersville, MO 63830

Although the public fears associated with bees of African origin is somewhat exaggerated, apiculture professionals in each state will be expected to deal with the issue. Any colony of bees that is exceptionally defensive will be suspected of Africanization. Anyone that is a victim of bee sting could want a colony analyzed. A beekeeper who has recently ordered a new queen or package of bees may suspect Africanization if those bees have unusually enthusiastic defense reactions. It would be helpful to have a quick method of measurement on one or two morphometric characters that could screen sample for Africanization. A technique for measurement might satisfy that need for "someone to do something" and thereby provide rapid feedback to sting victims and beekeepers.

The correlation between various morphometric measurements and Africanization have been studied and reported (Daly and Balling 1978). If forewing length were used alone then the expected rate of error for bees from much of the United States would be approximately 8% (Daly and Balling 1978). The authors made mention several times that collections of bees from each colony would require measurement before determinations would be accurate. Complete morphometric separation of Africanized and European honey bees requires the use of twenty five characters. Sylvester and Rinderer, 1987, developed a faster method for screening. They determined that forewing measurement was the most powerful single character for determination. They suggest at least 50 bees and 2 morphological measurements be used for reasonable confidence. It has been determined that correlations between defensive behavior and morphometric identification was not significant in Venezuela (Collins et. al. 1994). Although the use of one or two morphometric characters is of little value to determine Africanization, such a method could be used for partial diagnosis and feedback on the local level. The measured bees could be subsequently sent to a national bee lab for DNA analysis or complete morphometric measurement when deemed necessary.

Samples containing one hundred honey bees, *Apis mellifera* L., were obtained from members of the Missouri State Beekeepers Association during 1995. There were thirty samples collected and measured. One sample was known to be Africanized and was provided by the U.S.D.A. Carl Hayden bee research center in Tucson, Arizona. The other 29 samples were collected from twenty-three counties within Missouri. One of the colonies measured was feral. We hope that data gathered will serve as a reference with which future samples can be compared. There were not any known colonies of Africanized bees within the state of Missouri in 1995. One character measured for this study was forewing length. Ten bees were selected from each sample and forewing length measured using a dissecting microscope with a calibrated ocular accurate to one tenth of one millimeter. The forewing is measured from the basal bulb of the costal vein which attaches with the humeral complex described by Snodgrass, 1956.

The forewing length of all samples of Missouri bees were significantly different than the sample of Africanized bees. The average bee from Missouri had a wing length of 9.32mm while the average Africanized bee wing length was 8.81 mm. It should not be assumed that the measurement and method presented here is accurate for diagnosis of Africanization.

TENNESSEE ENTOMOLOGICAL SOCIETY
Minutes of the Annual ~~Business Meeting~~ ^{Board of Directors}
October 17, 1996

President Lambdin convened the Tennessee Entomological Society Board of Directors Meeting at 10:35 a.m. at the Ramada Inn (I-65 and Harding) Governor's House in Nashville, TN. Copies of the minutes of the August Board Meeting were distributed to those present. Lambdin asked for comments on the minutes. Barton indicated a date should be corrected. Grant asked if "10 minute papers" were presentation times or whole time slots. The program had paper slots set at 15 minutes total including questions and answers.

Awards Committee Chair Murphree indicated that the Howard Bruer Award would be given this year. TES does not presently make a monetary award with the Bruer Award. Since the Society is not increasing its financial reserves, the Board chose not to begin giving a monetary award with the Bruer Award.

Barton presented the Treasurer's Report, copies of which were distributed. Plaque purchases were less than in previous years; Firefly costs were about the same as last year. Barton requested bills be turned in to him as soon as possible. This would help expedite the bookkeeping. Two corrections were made in the Treasurer's Report (10/15/96 and compounded).

Local Arrangements Committee reported that the room would be available until noon tomorrow, the Inn would provide coffee this afternoon and in the morning and the TES banquet would be at Luby's Cafeteria at 6:00 p.m. Lambdin thanked Bogard for his efforts as Chair of the Local Arrangements Committee.

Grant reported on Shamiyeh's efforts to raise funds for the refreshments at breaks and the hospitality hour which follows the banquet. Sponsors were American Cyanamid, Bayer, Ciba, Rohm & Haas and Valent. Bogard asked if orange juice could be provided in the morning. Grant would have some available.

The Publications Committee distributed copies of the Firefly. Doris Caldwell typed much of this issue. It was not printed by UT print shop because of the time, but by Sir Speedy and Kinko did the binding of 100 copies for a total cost of \$290. The 25 extra copies will be used in recruiting efforts.

Lambdin emphasized the need to get e-mail and FAX numbers into the Firefly. Some were included this year. This would facilitate communication when people are not always available by phone.

The Membership Committee recruited new members. The poster was taken to the Kentucky Academy of Science which met jointly with the Tennessee Academy of Science. Several people later contacted Grant about the TES.

Nominating Committee Chair Eisler submitted the following nominees: President-Elect: Steve Murphree; Editor: Gray Haun; Secretary: Gary Lentz; Treasurer: Harvey Barton; Members-at-Large: Cletus Youmans, Hans Chaudhary.

Prediction and Evaluation. Some reports have been received. These need to be sent to Ray Nabors. These submissions will be published in the next Firefly issue.

The Program Committee Chair Hale indicated that Mayor Bredesen declined our invitation to appear and did not volunteer to send anyone. Commissioner Wheeler will be the kick-off speaker. Dr. Gary Polis will present on scorpions world-wide. Smoot Major will talk on Butterfly Conservation. A late submitted paper will be put on the program. The program was printed at no cost to the Society on a UT laser printer.

Publicity had no formal report (Powell). He thanked Hale for getting Wheeler and spreading the news of the meeting. Lambdin expressed appreciation to the Board and Committee Chairs for organizing an outstanding meeting. The meeting was adjourned at 11:00 a.m.

Gary L. Lentz
Secretary
Tennessee Entomological Society

TENNESSEE ENTOMOLOGICAL SOCIETY

Minutes of the Board of Directors Meeting

October 17, 1996

8

President Hale convened the meeting at 12:30 p.m. Present were Hale, Lambdin, Murphree, Barton, Lentz, Bogard, Youmans, Chaudhary, Powell.

President Hale made suggestions to Program Chair (Pres.-Elect) Murphree concerning the Program Committee make up. Discussion on the Constitution and Operating Procedures Committee focused on the need for committee chairs to submit recommendations for improving the procedure guidelines to the Constitution and Operating Procedures Chair.

Lambdin suggested Grant should be on the Publication and Program Committee because he had a computer program that allowed for printing the program with little effort. Chaudhary suggested the Society needs to encourage Vo-Tech and high-school teachers to become members.

Committee assignments were discussed for 1996-97. These will be distributed soon (Prospective chairs underlined). Auditing: Youmans, Hale, Mizell. Awards: Hamilton, Snodderly, Mannion, Obenauer, Williams, Skinner. Publicity: Haun, Hendrix, Latson, Powell, Copley, Bancroft (who will direct the farming of the Web-Page). Publication: Haun, Snodderly, Nabors, Grant. Program: Murphree, Grant, Mannion, Hamilton, Gerhardt. Prediction/Evaluation: Kaufmann, Cagle, Eisler, Nabors, Burgess. Constitution & Operating Procedures: Lentz, Dunn, Burgess. Local Arrangements: Bogard, Cagle, Powell, Hale, Copley. Nominating: Harp, Snodderly, Keener, Barton. Membership: Chaudhary, Snodderly, Lambdin, Gerhardt, Grant, Lentz.

The Local Arrangements Committee discussed the facilities. The hotel appeared to be a good choice for entomologists because of the opportunity to demonstrate urban IPM. The date for next year's meeting was selected as October 16-17, 1997. Meeting in conjunction with the branch or national ESA did not appear to be in the best interest of the TES.

Treasurer Barton presented to the Board names of new members since the previous meeting. Regular members are C. Mannion, B. Hendrix, D. Ekkens, K. Joplin, D. Bryan, and student members D. Roberts, R. Mizell, T. Richmond, P. Obenauer, A. Bottomlee. Lentz moved (Lambdin second) that the new members be approved. The motion passed.

Barton reported the expenses to the hotel were \$389.36 which is similar to what was spent last year. Barton also wanted to set up a special fund to hold the \$250 solicited by Shamiyeh for breaks and hospitality. Approximately \$120 of that was spent this year. A total of 40 members registered for the meeting.

Murphree suggested changing the date on the nomination form for the Richard E. Caron Outstanding Entomologist Award to August 1 so the Board could consider nominees at the August Board Meeting. The meeting was adjourned by President Hale at 1:00 p.m.

Gary L. Lentz
Secretary

TENNESSEE ENTOMOLOGICAL SOCIETY

Minutes of The Annual Meeting ^{BUSINESS}

October 18, 1996

Howard Bruer -

The business meeting of the 23rd annual meeting of the Tennessee Entomological Society was convened by President Paris Lambdin at the Ramada Inn Governor's House and Conference Center in Nashville at 8:35 a.m. on October 18, 1996. He called for the reading of the minutes of the previous meeting. Secretary Lentz indicated these were published on pages 15-17 of the Firefly. He moved that these be approved as published. The motion passed. *24 22*

Harvey

Treasurer Barton presented the Treasurer's report. Two corrections were noted in the distributed report. There has been no real gain in financial reserves and the Society is spending about what it takes in each year. Chaudhary moved (Grant seconded) that the Treasurer's report be accepted. The motion passed. *So moved*

ask for a motion that the report be accepted or not.

Cletus Youmans

Auditing Committee Chair Lentz reported that the Treasurer's books and receipts had been reviewed and all was in order. The auditing report was approved.

Steve Hamilton

Awards Committee Chair Murphree recognized the committee for their participation. The winner of the Howard Bruer award was Stacy Milhahn, a high school student from Elora, Lincoln Co., Tenn. Seven students participated in the Student Paper Contest. Excellent papers were presented. The winning paper "Use of Coffee Agroecosystems and Premontane Forests by Army Ants and Ant-Following Birds in Western Panama" was presented by Dina Roberts of the University of Memphis. *Howard Bruer - so moved*

The Richard E. Caron Outstanding Entomologist Award was presented to Dr. Harvey E. Barton, retired Professor of Biology from Arkansas State University. Dr. Barton has served T.E.S. in many capacities and most recently as Treasurer.

Honorary membership - Harry Williams - Certificate will be forthcoming

Program Committee Chair Hale thanked the students for their participation in the program. The diversity of papers made for an outstanding meeting. He thanked the committee and especially Doris Caldwell for her assistance with the program. He also stressed that speakers needed to get their abstracts submitted. *so moved*

Gary Lentz

Constitution and Operating Procedures Chair Burgess was unable to attend. Committee member Southards reported there were no changes.

Stone Powell

Local Arrangements Chair Bogard thanked members Hale, Powell and Copley for their assistance. The management of the Ramada Inn apologized for the room mixup last night. President Lambdin thanked Bogard and also acknowledged the efforts of Bill Shamiyeh for the hospitality hour. Grant recognized the companies American Cyanamid, Bayer, Ciba, Rohm & Haas and Valent for their contributions. Cletus Youmans and American Cyanamid provided the meals for the student paper participants, saving TES a significant amount.

Jimmy Cogbe

The Prediction and Evaluation Committee made no report.

^{Gray Haun}
Editorial and Publication Committee Chair Haun could not be present but asked Snodderly to request abstracts be submitted as soon as possible. He thanked Doris Caldwell, Jim Keener, Jerome Grant and others who contributed to publishing the Firefly.

^{Larry Latson}
The Publicity Committee made no report.

^{Pris Lambdin}
The Membership Committee reported that membership stands at 77 now with three sustaining members. All members are very active. A poster is available to take to meetings. Murphree took it to the joint Kentucky-Tennessee Academy of Sciences meeting and generated interest. One activity of the committee was to obtain e-mail addresses and FAX numbers and include these in the Firefly. Thirty-nine members attended the meeting. President Lambdin would like for attendance to approach fifty for the annual meeting.

^{John} ~~President Lambdin~~ called for Old Business. There being none, he called for ^{Hale} New Business. Bancroft suggested that TES develop a Home Page on the World Wide Web. This would likely generate additional interest in T.E.S.

^{George Haug}
Nominating Committee Chair Eisler presented its slate of nominees for T.E.S. offices. These were Pres.-Elect-Steve Murphree; Editor-Gray Haun; Secretary - Gary Lentz and Members-At-Large Hans Chaudhary and Cletus Youmans. Nabors moved (Dunn seconded) that the nominations cease and the slate be elected by acclamation. The motion passed.

^{Hale}
President Lambdin thanked the membership for the opportunity to serve and turned the gavel over to incoming President ^{Steve Murphree} Frank Hale. Hale presented outgoing President Lambdin a plaque in appreciation of his service to T.E.S. in 1995-96.

^{Steve Murphree}
President Hale expressed appreciation to students for their presentations, to committees for their work on putting together a good meeting and admonished all speakers to turn in their abstracts. Hale than adjourned the meeting.

Gary L. Lentz
Secretary
Tennessee Entomological Society

Pres. Cbtax...
Treas. Steve Powell
Catherine...
Larry Latson

TENNESSEE ENTOMOLOGICAL SOCIETY
Minutes of the ~~Annual Meeting~~ ^{Board of Directors}
August 12, 1996

President-Elect Frank Hale convened the meeting at 11:10 a.m. at the District II Extension Office in Nashville. Present were G. Haun, S. Powell, R. Nabors, S. Murphree, J. Bogard, F. Hale, J. Grant and G. Lentz. Hale distributed the mail out letter "Call for Papers" which will be sent to members in late August. The time limit for papers was discussed and for this meeting will be set at 10 minutes. Special invitees for the meeting will be a representative of Mayor Bredesen's office (a welcome), Commissioner Dan Wheeler of TDA and Dr. Gary Polis of Vanderbilt University.

Murphree reported on new prospective members: Smoot Major of the TN Dept. Of Environment and Conservation, Kristine Johnson of U.S. Park Service (Great Smoky Mountains National Park) and Mike Hammonds, a prospective beekeeper.

To enhance communication, President Lambdin wants to get e-mail and fax numbers of all TES members.

Bogard discussed some of local arrangements at the hotel for the upcoming meeting. Since there are no extra rooms, the meeting room will be used for the Thursday evening mixer. The group dinner will be held at Luby's Cafeteria. All students presenting papers will have meals furnished. Coffee will be provided by TES at the breaks. Soft drinks will be solicited from benefactors.

Haun discussed the budget in the absence of Treasurer Barton. The balance on hand October 19, 1995 was \$4,595.73 (checking -\$3,538.68, CD - \$1,057.05). The number of pins on hand was 16. Expenses were listed at \$1,171.25, income at \$1,119.00, leaving a new balance of \$4,543.48 as of August 9, 1996. Haun also requested minutes of the meeting on a disk and an updated membership list.

Awards Committee Chair Murphree asked what plaques were to be awarded at the meeting. It was believed this was included in the Operating Procedures (OP) guide. Suggested changes in the OP manual need to be sent to Chair Burgess for consideration. The Howard Bruer Award winner does not presently receive any cash award. The board will discuss any changes in the procedures at the upcoming TES Board meeting.

Prediction and Evaluation Committee Chair Nabors asked for individuals to send 1996 insect summaries to him for compilation.

The responsibilities of TES officers as directed by the OP guide were discussed. Each officer should evaluate the responsibilities outlined and provide suggested changes to Chair Burgess. The meeting was adjourned about 12:10 p.m.

Gary L. Lentz
Secretary
Tennessee Entomological Society

TENNESSEE ENTOMOLOGICAL SOCIETY

**Treasurer's Report
October 1996 - August 1997**

Books and Records audited 10-17-96 by Auditing Committee (Gary Lentz, Chair)

Balance on hand 10-17-96

Checking	\$3486.43
CD #16518	\$1116.86
TOTAL	\$4603.29

Number of pins on hand 10-17-96 14

DISBURSEMENTS

Dr. Jerome Grant (Plaques, firefly print and bind)	(\$ 359.45)
Dina L. Roberts (Student Award)	(\$ 50.00)
Steve Powell (Hospitality)	(\$120.00)
Ramada Inn South (Mtg. Rm., Coffee)	(\$ 389.36)

TOTAL DISBURSEMENTS (\$918.81)

INCOME

29 Reg. Dues & Reg.	\$725.00
3 Late Dues	\$ 15.00
Cash Donation (Joe Dunn)	\$ 5.00
10 Student Dues	\$ 10.00
1 Corp. Dues	\$ 50.00
1 Corp. Dues & Reg.	\$ 45.00
Cash donations for hospitality	\$250.00

TOTAL INCOME \$1,100.00

BALANCE ON HAND (8-9-97)

Checking Account	\$3667.62
CD #16518	\$1116.86

TOTAL ASSETS (8-9-97) \$4,784.48

Number of pins on hand14

Respectfully Submitted

Harvey E. Barton, Treasurer

**ATTENDANCE ROSTER OF THE 1996 ANNUAL MEETING
OF THE TENNESSEE ENTOMOLOGICAL SOCIETY**

<u>MEMBER</u>	<u>AFFILIATION</u>	<u>LOCATION</u>
<u>Honorary Members</u>		
Dunn, Joe C.	American Cyanamid (Ret.)	Nashville, TN
<u>Regular Members</u>		
Bancroft, Harold	Univ. of Memphis	Memphis, TN
Barton, Harvey E.	Arkansas State Univ.	Jonesboro, AR
Bogard, James B.	TN Dept. Agri.	Nashville, TN
Cagle, Jimmy	TN Dept. Agri.	Winchester, TN
Chaudhary, Hans R.	TN Dept. Agri.	Harriman, TN
Cole, Bruce A.	TN Dept. Agri	McMinnville, TN
Copley, Ken	UT Ag. Ext.	Lyles, TN
Davis, Sylvester	TN Dept. Agri.	Mt. Juliet, TN
Eisler, Jim	TN Dept. Agri.	McMinnville, TN
Ekkens, David	Southern Adventist U.	Collegedale, TN
Gerhardt, Reid R.	Univ. of TN.	Knoxville, TN
Grant, Jerome F.	Univ. of TN	Knoxville, TN
Hale, Frank	UT Ag. Ext.	Nashville, TN
Hamilton, Steven W.	Austin Peay St. Univ.	Clarksville, TN
Harp, George	Arkansas State Univ.	Jonesboro, AR
Haun, Walker G. (Gray)	TN Dept. Agri.	Knoxville, TN
Heery, Frank	TN Dept. Agri.	Harrison, TN
Hendrix, Bill	Dow Elanco	Memphis, TN
Kauffman, Bruce W.	TN Dept. Ag. (Forestry)	Nashville, TN
Lambdin, Paris	Univ. of TN	Knoxville, TN
Latson, Larry N.	David Lipscom Univ.	Nashville, TN
Lentz, Gary L.	Univ. of TN	Jackson, TN
Mannion, Catharine	TSU	McMinnville, TN
Murphree, Steven C.	Belmont Univ.	Nashville, TN
Nabors, Ray A.	Univ. of MO	Portageville, MO
Powell, Steve D.	TN Dept. Agri.	Nashville, TN
Snodderly, Lynn J.	TN Dept. Agri.	Knoxville, TN
Southards, Carroll	Univ. of TN	Knoxville, TN
Stewart, Randall	TN Dept. Agri.	Manchester, TN
Williams, Harry E.	Univ. of TN (Ret.)	Knoxville, TN

Student Members

Bottomlee, Alan K.
Jones, Randy Sherman
Marsland, Eric John
Mizell, Randy
Obenauer, Peter T.
Parman, Kelly S.
Richmond, Tanisha
Roberts, Dina L.
Stumpf, Christof
Wiggins, Greg

Austin Peay St. U
Univ. of TN
Univ. of TN
Univ. of TN
Univ. of TN
Univ. of TN
Univ. of TN
Univ. of Memphis
Univ. of TN
Univ. of TN

Cedar Hill, TN
Knoxville, TN
Knoxville, TN
Knoxville, TN
Knoxville, TN
Knoxville, TN
Knoxville, TN
Memphis, TN
Knoxville, TN
Knoxville, TN

Sustaining/Corporate Members

Lee Greer
Clete Youmans

Valent Corp
American Cyanamid

Dunlap, TN
Dyersburg, TN

BOARD OF DIRECTORS

President - Paris Lambdin
Past President - Lynn Snodderly
President Elect - Frank Hale
Secretary - Gary Lentz
Treasurer - Harvey Barton
Editor - Gray Haun
Historian - Harry Williams
Member-at-Large - Steve Powell
Member-at-Large - Jim Bogard

COMMITTEES: 1995 - 1996

AUDITING

Gary Lentz, Chair
Frank Hale
Eric Marsland

AWARDS

Steve Murphree, Chair
Cletus Youmans
Steve Hamilton
Greg Wiggins

CONSTITUTION

Gene Burgess, Chair
Carroll Southards
Ray Nabors

LOCAL ARRANGEMENTS

Jim Bogard, Chair
Ken Copley
Frank Hale
Steve Powell

MEMBERSHIP

Jerome Grant, Chair
Hans Chaudhary
Reid Gerhardt
Jim Keener

NOMINATING

Jim Eisler, Chair
Gene Burgess
George Harp
Lynn Snodderly

PREDICTION/EVALUATION

Ray Nabors, Chair
Jimmy Cagle
Gray Haun
Bruce Kauffman
Phillip Roberts
Bill Shamiyeh

PROGRAM

Frank Hale, Chair
Jerome Grant
Gray Haun
Jim Keener
Bill Shamiyeh
Lynn Snodderly

PUBLICATION/EDITORIAL

Gray Haun, Chair
Jerome Grant
Ray Nabors
Lynn Snodderly

PUBLICITY

Steve Powell, Chair
Harold Bancroff
Charles Biggers
Dale Gallimore
Gary Lentz
Anni Self
Harry Williams

Tennessee Entomological Society

Prediction and Evaluation

Committee Report

October 17, 1996

**Ray Nabors - Chair
Committee Members:**

Jimmy Cagle

Gray Haun

Bruce Kauffman

Phillip Roberts

Bill Shamiyeh

INSECT PROBLEMS - 1996

Bill Shamiyeh
The University of Tennessee
Department of Entomology and Plant Pathology

SMALL GRAINS - WHEAT

Cereal Leaf Beetle: Infestation levels were light in Knox county and Middle Tennessee.

Aphids: Populations were light.

FORAGE CROPS - ALFALFA

Alfalfa Weevil: Alfalfa weevil larval counts were light in plots in Springfield averaging 2 larvae/sweep and moderate in Spring Hill averaging 12 larvae/sweep.

FIELD CROPS - FIELD CORN

European Corn Borer: Infestation levels were light in Middle and East Tennessee.

Fall Armyworm: Populations were well below the economic threshold in Springfield and Greeneville. No insecticide applications were necessary.

TOBACCO

Tobacco Aphid: Population densities of the red form were moderate in East and Middle Tennessee requiring only one insecticide application.

Flea Beetles: Populations reached threshold densities during the growing season at both locations.

Budworms & Hornworms: Budworm populations were above the economic threshold in Greeneville and Springfield requiring one insecticide application. Hornworm populations were light at both locations.

Blue Mold: The incidence of Blue Mold was very heavy in early August; the disease had spread throughout the entire plant in a very short period of time.

VEGETABLE CROPS: SNAP BEANS

Mexican Bean Beetle: Low population densities early in the season becoming heavier in late July and early August.

European Corn Borer: Corn borer population densities were light during the growing season.

BROCCOLI AND CABBAGE

Worm Complex: Pre-treatment counts at Crossville averaged one worm/plant in broccoli and in cabbage late in the growing season.

TOMATO

Early and Late Blight: Early blight disease incidence and severity were very low early during the growing season becoming severe later.

FRUIT TREES

Japanese Beetle: Beetle populations were very light at Crossville with very little defoliation of apple trees and ornamentals in 1996.

Mites: Two-spotted spider mite populations were moderate on apple trees late in the season averaging about 21 mites/leaf in 1996. One miticide application was sufficient. Kelthane 50WP is not as effective in mite control as it was two years ago suggesting a possible resistance problem.

INSECT PROBLEMS - 1996

Russ Patrick
The University of Tennessee
Extension Entomologist

CORN

European corn borer: Early infestations were heavy in several locations across the state primarily in southeastern Tennessee and in many middle Tennessee counties. Observations prior to harvest of many corn fields showed stalk breakage and ear droppage from second generation larvae. Some varieties of Bt corn were rated but due to low infestations in those fields, little was learned about the effect of the Bt transgenic corn.

Cutworms: Black cutworm was reported in several areas of the state causing damage rated from 1-10% girdled stalks of small corn plants.

Common stalk borer: This insect was reported causing damage to some middle Tennessee corn. In one case, over 60% of the plants was infested with the borers. Replanting of corn was necessary in this instance.

WHEAT

There were very few instances of aphid populations in wheat across the state during 1996. Trials in which Gaucho (a new systemic insecticide) was used to reduce aphids in wheat did not have aphid populations sufficient to determine effectiveness of the material. This material is seed applied for aphid control.

FOREST HEALTH PROTECTION INSECT SUMMARY - 1996

Bruce W. Kauffman

Tennessee Department of Agriculture, Division of Plant Industries
Box 40627, Melrose Station, Nashville, Tn 37204

Eight counties in the State reported some **southern pine beetle** activity with all but one in the southwestern region (Chester, Fayette, Hardeman, Hardin, McNairy, Roane, Shelby and Wayne Counties). **Southern pine beetle** remained at low levels in all counties except Hardin (epidemic) with 185 spots and 4,344 trees killed statewide (137 MBF and 160 cords). **Ips** and **black turpentine beetle** infestations were low as well.

Although **spring and fall cankerworms** populations were down, over 100 acres of primarily white oaks were severely defoliated by the **variable oak leaf caterpillar** in June and July in five northwestern Highland Rim counties. The **cherry scallop shell leaf roller** heavily defoliated more than 30 acres of black cherry on the Cumberland Plateau and East Tennessee. **Locust leaf miner** defoliation was generally heavier than normal in Middle and East Tennessee.

Over 200 acres of shortleaf pine was severely defoliated by the **black-headed pine sawfly**, *Neodiprion excitans*, in Fentress County. **Spring feeding sawflies** (**loblolly pine** and **Virginia pine sawfly**) were at higher levels in Middle and northwestern Tennessee. The **introduced pine sawfly** was detected in one new Middle Tennessee county (Warren). **Red-headed pine sawflies** caused five percent mortality in a 15 acre loblolly pine seedling plantation, while **white pine weevils** damaged trees in six counties on the Cumberland Plateau and East Tennessee.

Fall webworm populations were higher than normal statewide with some smaller trees defoliated over 50 percent. The orange-headed race preferred cherry, persimmon and sourwood. Other common tree species affected were hickory, pecan, black walnut and sycamore. An unidentified **skeletonizer** of shingle oak in three counties in northern Middle Tennessee and an unidentified **hornworm** of sourwood in two counties on the Cumberland Plateau were at high defoliation levels totally defoliating some trees. The **scarlet oak sawfly** was at low damage levels in one northeastern Tennessee county.

More **forest tent caterpillars** than normal were found on banded oaks in Rhea, Sullivan and White Counties, but no significant defoliation was noticed. **Eastern tent caterpillar** and **yellow poplar weevil** population levels were low. **Bagworm** defoliation has been steadily increasing in Middle Tennessee as have scattered reports of **short-horned grasshopper** damage in the northeastern section of the region.

Two new **gypsy moth** infestations were discovered in Scott County (Elgin community) and Hamilton County (Signal Mountain). The Elgin area has been proposed for aerial treatment of 4,250 acres in May, 1997. The **oak lacebug** browned up chestnut, white and chinkapin oaks in over 10 counties in Middle and East Tennessee. **Sycamore lacebug** also was at higher levels in the same regions.

INSECTS AFFECTING NURSERY, SOD AND AGRICULTURAL CROPS IN TENNESSEE - 1996

Steve Powell

Tennessee Department of Agriculture, Division of Plant Industries
Box 40627, Melrose Station, Nashville, TN 37204

Boll Weevil

The boll weevil (*Anthonomus grandis* Boheman) has been a serious agricultural pest of Tennessee cotton since the early 1900's. According to the Tennessee Agricultural Statistics Service, 540,000 acres of cotton were planted in 1996, of which 530,000 acres were harvested. Production was valued at \$260.6 million. Of this total, cotton lint represented \$339 million and cotton seed \$31.6 million.

The Boll Weevil Eradication Program has been operational in Middle Tennessee counties since 1994. In 1996, the program monitored 11,781 acres of cotton in eight counties. The eight participating counties were Bedford, Coffee, Franklin, Giles, Lawrence, Lincoln, Maury, and Rutherford (Map 1). Trapping resulted in 166 weevil catches and indicated 4 reproductive fields. 353 acres were sprayed which represents 4% of the cumulative acreage in Middle Tennessee. These figures indicate that the boll weevil is virtually eradicated in Middle Tennessee.

Imported Fire Ant

Two species of the imported fire ant, *Solenopsis invicta* (red species) and *Solenopsis richteri* (black species), as well as their hybrid, are established in parts of Tennessee. Inspections of nurseries, greenhouses, and plant dealers are made by the Tennessee Department of Agriculture (TDA), Plant Certification Section. This section also participates in survey, eradication, and suppression efforts against imported fire ants.

The following areas are under federal and state quarantine regulations to prevent the artificial spread of the imported fire ant into non-infested areas (Map 2):

- (1) Bradley County. That portion of the county southeast of Interstate 75, southwest of the Hiwassee River, northwest of U.S. Highway 11, and northeast of Tennessee Highway 308; and that portion also of the county lying south of U.S. Highway 64.
- (2) Chester County. The entire county.
- (3) Fayette County. That portion of the county lying south of U.S. Highway 64.
- (4) Franklin County. That portion of the county lying south of latitude 35 degrees, 5 minutes.
- (5) Giles County. That portion of the county lying south of U.S. Highway 64.
- (6) Hamilton County. That portion of the county lying south of U.S. Highway 64.
- (7) Hardeman County. The entire county
- (8) Hardin County. The entire county.
- (9) Lawrence County. That portion of the county lying south of U.S. Highway 64.
- (10) Lincoln County. That portion of the county lying south of latitude 35 degrees, 5 minutes.
- (11) Marion County. Beginning at a point at the intersection of U.S. Highway 72 and Interstate 24: that portion of the county southeast of U.S. Highway 72 and south of Interstate 24.

- (12) McMinn County. That portion of the county southeast of Interstate 75, southwest of Tennessee State Highway 163, northwest of U.S. Highway 11, and northeast of the Hiwassee River.
- (13) McNairy County. The entire county.
- (14) Polk County. That portion of the county lying south of U.S. Highway 64.
- (15) Wayne County. The entire county.

Since 1994, new introductions of imported fire ants outside the quarantined area have been reported in the following 26 counties: Benton, Blount, Bradley, Chester, Coffee, Davidson, Decatur, Dyer, Gibson, Hamilton, Henderson, Humphreys, Knox, Lewis, Madison, Marion, Monroe, Moore, Montgomery, Polk, Rutherford, Sevier, Shelby, Sumner, Washington, and Warren.

Natural migration of imported fire ants now occurs in the following 16 counties: Bradley, Chester, Decatur, Fayette, Franklin, Giles, Hamilton, Hardeman, Hardin, Lawrence, Lincoln, McNairy, McMinn, Polk, Shelby, and Wayne.

A new county record for *S. richteri* for 1996 is Moore County.

Japanese Beetle

The Japanese beetle (*Popillia japonica*) became permanently established in the northeastern part of the state in the late 1960's. It continues to spread into more counties of West and Middle Tennessee.

All of Crockett County and a portion of Madison County in West Tennessee are considered generally infested due to permanently established artificial infestations. (See Map 4 for area of general infestation.)

Japanese beetle catches for 1996 by county are as follows: Giles (60), Henry (119), Humphreys (many hundreds - estimated), Lawrence (12), Lewis (10), Madison (3), Marshall (168), Perry (27), Shelby (107), and Weakley (4). The catches in Henry and Shelby Counties were associated with plant dealers. (See Map 3 for traps placed per county.)

Four counties (Crockett, Giles, Humphreys, and Marshall) plus a portion of Madison were added to the generally infested category in 1996.

Oriental Beetle

In 1995 a new county and state record occurred in Knox County for the oriental beetle (*Anomala orientalis*). A total of 25 traps were placed in 12 counties in Tennessee in 1996 with all traps negative. Counties with traps placed were as follows: Carroll (1), Davidson (3), Fayette (1), Hamilton (3), Knox (7), Madison (1), Montgomery (1), Shelby (2), Sullivan (1), Warren (3), Washington (1), and Williamson (1).

Pine Shoot Beetle

A total of 34 traps were placed in 19 counties in Tennessee in 1996 for the pine shoot beetle (*Tomicus piniperda*) with all traps negative (Map 5). Counties with traps placed were as follows:

Blount (1), Carter (1), Cumberland (1), Davidson (7), Decatur (1), Franklin (1), Gibson (1), Hamilton (1), Knox (1), Lincoln (1), Madison (1), McMinn (1), Putnam (1), Rutherford (1), Shelby (6), Tipton (1), Warren (4), Washington (1), and White (2). Surveys between 1993 and 1995 by county are shown on Map 6 with all results negative.

Pink Bollworm

A total of 269 traps were placed in 5 counties in Tennessee in 1996 for the pink bollworm (*Pectinophora gossypiella*) with all traps negative. Counties with traps placed were as follows: Dyer (58), Lake (24), Lauderdale (70), Shelby (40), and Tipton (77) (Map 7).

Sweet Potato Weevil

A total of 36 traps were placed in 3 counties in Tennessee in 1996 for the sweet potato weevil (*Cylas formicarius*) with all traps negative. Counties with traps placed were as follows: Franklin (10), Lincoln (14), and Weakley (12).

Gypsy Moth Program

Traps

A total of 18,279 traps were placed in Tennessee for gypsy moth in 1996, including 2,886 eradication, 14,004 detection and 1,389 delimiting traps.

Gypsy Moths

A total of 2,549 moths were caught in 1996 in 24 counties (Map 8). This total reflected an increase in the number of moths caught in comparison to 1995 (295 moths).

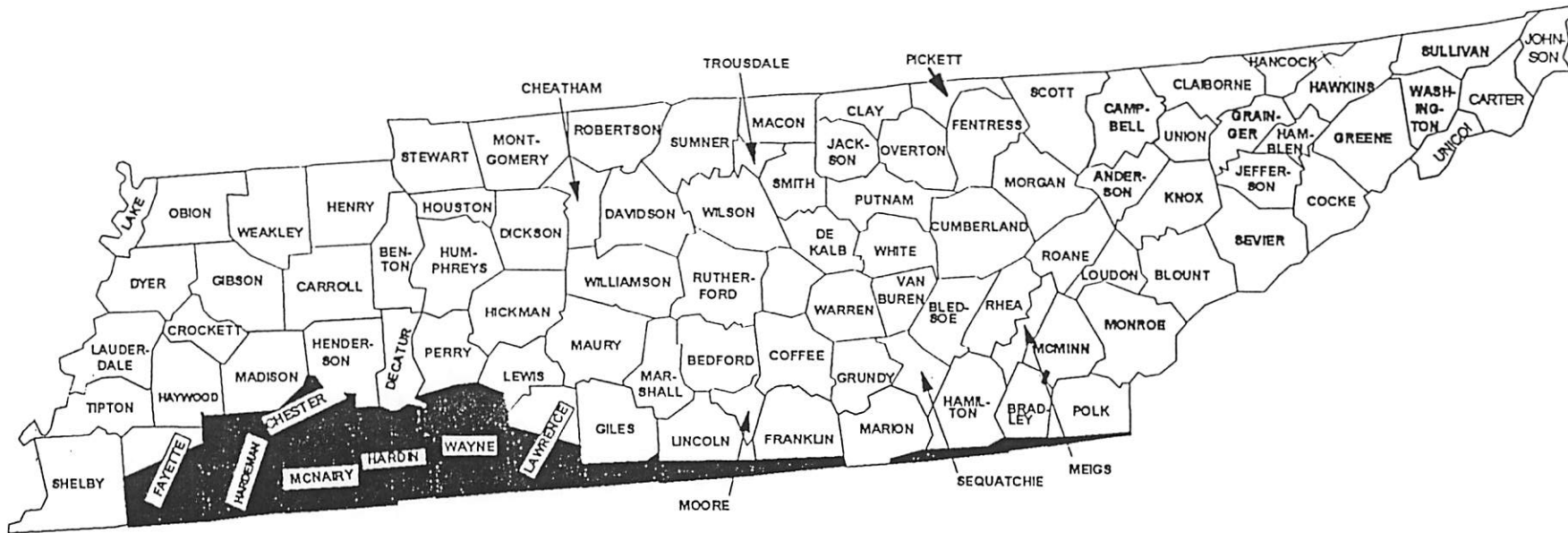
Table 1. Gypsy Moth Trap Catches - 1992 through 1996

	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>
Total Catch Areas	36	53	63	75	49
New Catch Areas	23	41	44	56	45
# Moths	227	4,654	1,304	295	2,549
# Moths/Area	6.3	87.8	20.7	3.9	52
# Traps	8,376	9,662	13,101	19,366	18,279
Program Costs	\$287,520	\$235,240	\$662,000	\$815,486	\$324,558

Eradication Sites

Of the ten areas that were infested in the State in April, 1996, two sites required ground treatments with one aerial treatment undertaken. A mist blower sprayer treated one acre each twice in Rhea County (Laurel Brook) and Sullivan County (Bristol). These treatments resulted in no moth

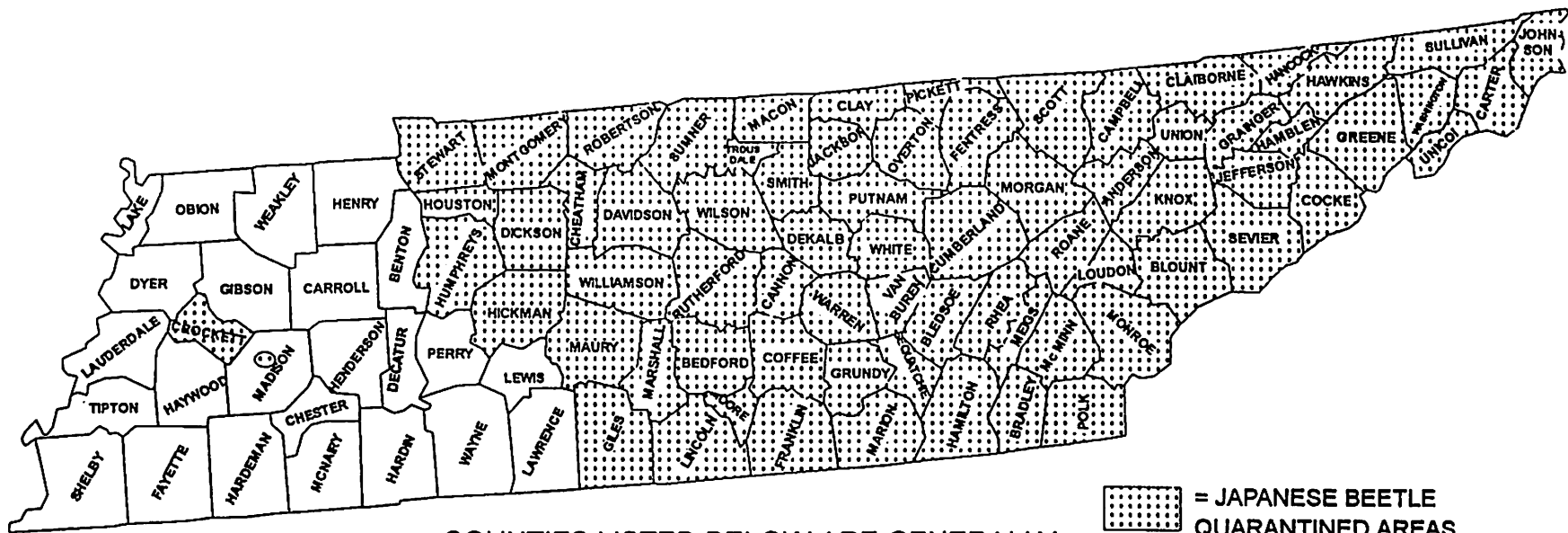
1996 TENNESSEE IFA Quarantine



Regulated Area

Map 2

TENNESSEE MAP INDICATING THE DISTRIBUTION OF JAPANESE BEETLE INFESTED AREA 1996



COUNTIES LISTED BELOW ARE GENERALLY
INFESTED WITH JAPANESE BEETLE

ANDERSON	CHEATHAM	DICKSON	HANCOCK	LINCOLN	MONROE	PUTNUM	SEVIER	UNION
BEDFORD	CLAIBORNE	FENTRESS	HAWKINS	LOUDON	MONTGOMERY	RHEA	SMITH	VAN BUREN
BLED SOE	CLAY	FRANKLIN	HICKMAN	McMINN	MOORE	ROANE	STEWART	WARREN
BLOUNT	COCKE	GILES	HOUSTON	MACON	MORGAN	ROBERTSON	SULLIVAN	WASHINGTON
BRADLEY	COFFEE	GRAINGER	HUMPHREYS	MARION	OVERTON	RUTHERFORD	SUMNER	WHITE
CAMPBELL	CROCKETT	GREENE	JACKSON	MARSHALL	PICKETT	SCOTT	TROUSDALE	WILLIAMSON
CANNON	CUMBERLAND	GRUNDY	JEFFERSON	MAURY	POLK	SEQUATCHIE	UNICOI	WILSON
CARTER	DAVIDSON	HAMBLEN	JOHNSON	MEIGS				
	DEKALB	HAMILTON	KNOX					

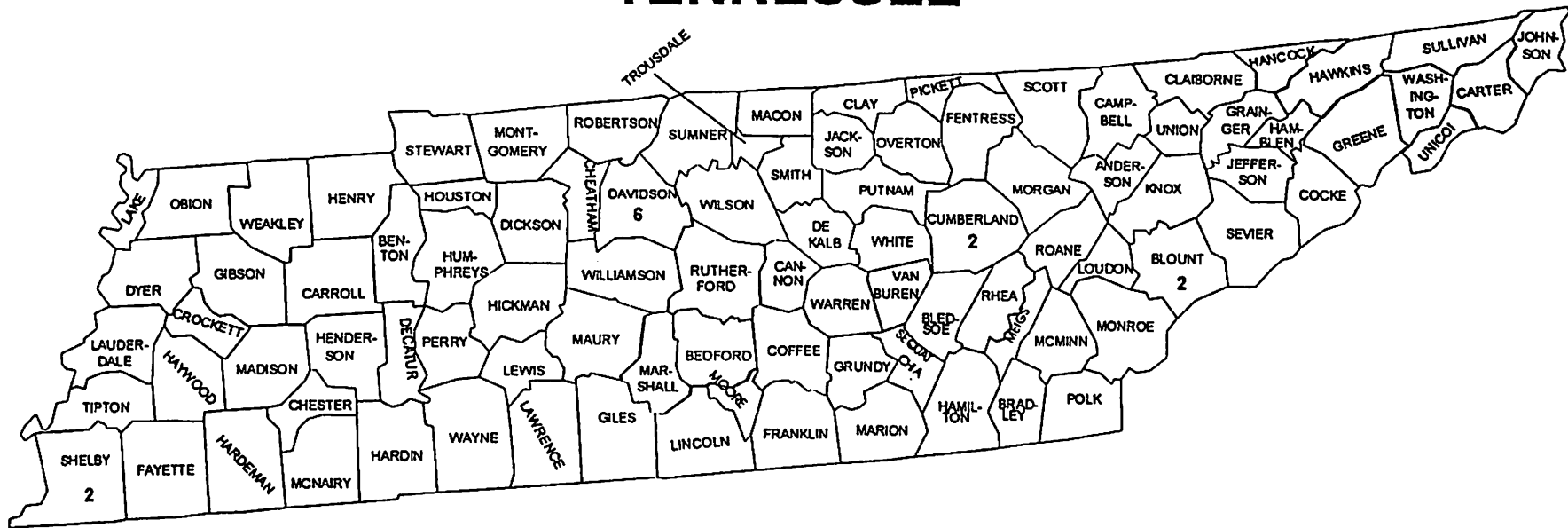
A Portion of - Madison County - 3 mile radius from Huntersville-Providence Road intersection with Interstate 40

COOPERATIVE EUROPEAN BARK BEETLE SURVEY

FY 1996

TRAPS/COUNTY

TENNESSEE



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SPRUCE ENGRAVING BEETLE
 SPRUCE WOOD ENGRAVER

Map 9

HISTORICAL NOTES

Presidents of the Tennessee Entomological Society (1973 - Present)

<u>President</u>	<u>Term</u>	<u>Affiliation</u>
Mendell Snodgrass	'73 - '74	USDA
Omar Smith	'74 - '75	Memphis State University
Don Clements	'75 - '76	Cook's Pest Control
Gary Lentz	'76 - '77	University of Tennessee
Chester Gordon	'77 - '78	Tenn. Dept. of Agriculture.
Gene Burgess	'78 - '79	University of Tennessee
Reid Gerhardt	'79 - '80	University of Tennessee
Harold Bancroft	'80 - '81	Memphis State University
Joe Dunn	'81 - '82	American Cyanamid Company
Bill Van Landingham	'82 - '83	Tenn. Dept. of Agriculture
Carl Brown	'83 - '84	Memphis State University
Charles Pless	'84 - '85	University of Tennessee
Michael E. Cooper	'85 - '86	Tenn. Dept. of Agriculture
Elmo Shipp	'86 - '87	Mobay
Bill Shamiyeh	'87 - '88	University of Tennessee
Harvey Barton	'88 - '89	Arkansas. State University
Harry Williams	'89 - '90	University of Tennessee
Bruce Kauffman	'90 - '91	Tenn. Dept. of Agriculture
Jamie Yanes, Jr.	'91 - '92	American Cyanamid Company
Jerome Grant	'92 - '93	University of Tennessee
Russ Patrick	'93 - '94	University of Tennessee
Lynn Snodderly	'94 - '95	Tenn. Dept. of Agriculture
Paris Lambdin	'95 - '96	University of Tennessee

Secretary-Treasurers of the Tennessee Entomological Society (1973 - Present)

<u>Secretary-Treasurer</u>	<u>Term</u>	<u>Affiliation</u>
Jimmy White	'73 - '76	Tenn. Dept. of Agriculture
Harold Bancroft	'76 - '79	Memphis State University
Lyle Klostermeyer	'79 - '82	University of Tennessee
Bill Shamiyeh	'82 - '85	University of Tennessee
Richard Caron	'85 - '88	University of Tennessee
Richard Caron	'88 - '91	University of Tennessee

Secretaries of the Tennessee Entomological Society (1991 - present)

<u>Secretary</u>	<u>Term</u>	<u>Affiliation</u>
Gary Lentz	'91 - '93	University of Tennessee
Gary Lentz	'93 - '96	University of Tennessee

Treasurers of the Tennessee Entomological Society (1991 - present)

<u>Treasurer</u>	<u>Term</u>	<u>Affiliation</u>
Harvey Barton	'91 - '94	Arkansas State University
Harvey Barton	'94 - '97	Arkansas State University

Editors of the Tennessee Entomological Society (1991 - present)

<u>Editor</u>	<u>Term</u>	<u>Affiliation</u>
Gray Haun	'91 - '92	TN Dept. of Agriculture
Gray Haun	'92 - '95	TN Dept. of Agriculture

**Board of Directors
Members at Large**

<u>Member</u>	<u>Term</u>	<u>Affiliation</u>
Gary Lentz	'87 - '88	University of Tennessee
Blake Bevell	'87 - '88	Arkansas State University
Michael E. Cooper	'88 - '89	TN Dept. Agriculture
Jay P. Avery	'88 - '89	University of Tennessee
Joe Dunn	'89 - '90	American Cyanamid Company
Charles Pless	'89 - '90	University of Tennessee
Paris Lambdin	'90 - '91	University of Tennessee
Jim Keener	'90 - '91	TN Dept. of Agriculture
Steve Powell	'91 - '92	TN Dept. of Agriculture
Lee Greer	'91 - '92	Valent
Alan Hopkins	'92 - '93	Miles, Inc.
Donald Ourth	'92 - '93	University of Memphis
Mark Carder	'93 - '94	University of Tennessee
Rich Emerson	'93 - '94	TN Dept. of Agriculture
Ray Nabors	'94 - '95	Univ. of MO
Alan Hopkins	'94 - '95	Miles, Inc.
Steve Powell	'95 - '96	TN Dept. of Agriculture
Jim Bogard	'95 - '96	TN Dept. of Agriculture (Retired)

**Historians of the Tennessee
Entomological Society (1973 - Present)**

<u>Historian</u>	<u>Term</u>	<u>Affiliation</u>
Charles Pless	'73 - '76	Univ. of Tennessee
Herb Morgan	'76 - '79	USDA
Mendell Snodgrass	'79 - '82	USDA
Russ Patrick	'82 - '87	Univ. of Tennessee
Russ Patrick	'87 - '92	Univ. of Tennessee
Harry Williams	'92 - '97	Univ. of Tennessee

**Honorary Members of the Tennessee
Entomological Society (1982 - Present)**

<u>Honorary Member</u>	<u>Year</u>	<u>Affiliation</u>
Myron Smith	1982	Hill-Smith Pest Control
Jimmy White	1982	Tenn. Dept. of Agric.
Howard Bruer	1983	Tenn. Dept. of Agric.
Mendell Snodgrass	1983	USDA
Carl Brown	1985	Memphis State
Myrtice Snodgrass	1985	Knoxville, TN
John A. Hammett	1987	Tenn. Dept. of Agric.
Joe C. Dunn	1990	American Cyanamid

**Howard Bruer Award (est. 1975)
Recipients of the Tennessee Entomological Society (1975 - Present)**

<u>Recipient</u>	<u>Year</u>	<u>Location</u>
Whitney Eckler	1975	Memphis, TN
Joe Martin	1976	Bolivar, TN
Bryan Peters	1977	College Grove, TN
Tidus Pollard	1978	Huron, TN
John Bentley	1979	??
Melissa Hart	1980	Watertown, TN
Gary Miller	1981	Knoxville, TN
Harold Glass	1982	Knoxville, TN
-----	1983	(No award given)
-----	1984	(No award given)
Penny Thompson	1985	Davidson County
Matthew Fumich	1986	Munford, TN
Christie Greer	1987	Greene Co.
Dottie Hodges	1988	Hamblen Co.
-----	1989	(No award given)
Tim Gentry	1990	Woodbury, TN

Jennifer Hartsell	1991	Hamblen Co.
Jessica Taylor	1992	Lincoln Co.
Jennifer Lenter	1993	Fayetteville Co.
Jeremy Smith	1994	Savannah Co.
George Carroll	1995	Anderson Co.
Stacy Milhahn	1996	Lincoln Co

**Outstanding Entomologist (Tennessee Entomologist of the Year)
Award (est. 1981) Recipients of the Tennessee
Entomological Society (1981 - Present)**

<u>Recipient</u>	<u>Year</u>	<u>Affiliation</u>
Myron Smith	1981	Hill Smith Pest Control
Harry Williams	1985	Univ. of Tennessee
John A. Hammett	1987	Tenn. Dept. of Agric.
Joe C. Dunn	1991	American Cyanamid

Richard E. Caron Outstanding Entomologist Award

<u>Recipient</u>	<u>Year</u>	<u>Affiliation</u>
Harry Williams	1995	Univ. of TN (Retired)
Harvey Barton	1996	Arkansas State Univ. (Retired)

**Graduate Student Award (est. 1986) Recipients of the
Tennessee Entomological Society (1986 - Present)**

<u>Recipient</u>	<u>Year</u>	<u>Location</u>
Jay Avery	1986	Knoxville, TN
Laura Rogers	1987	Knoxville, TN
Jason Oliver	1988	Knoxville, TN
Steve D. Powell	1989	Knoxville, TN
Robert C. Brown	1990	Knoxville, TN
Donald L. Sudbrink, Jr.	1991	Knoxville, TN
Deborah Landau	1992	Knoxville, TN
Deanna Colby	1993	Knoxville, TN
Lee Holt	1994	Knoxville, TN
Kenneth Copley	1995	Knoxville, TN
Dina Roberts	1996	Memphis, TN

CONSTITUTION
of the
TENNESSEE ENTOMOLOGICAL SOCIETY
(as of October 1991)

Article 1. Name

This Society is formed in the name and style of the "Tennessee Entomological Society", as an educational institution, not contemplating financial gain or profit. It is herein and after called the Society.

Article 2. Purpose

The purpose and object of the Society is to foster entomological accomplishment among its members and to promote the welfare of all of the State of Tennessee through the encouragement of: (1) the preparation, reading, and/or publication of papers, (2) association and free discussion among all members, (3) the dissemination of entomological information to the general public, and (4) cooperative efforts in statewide insect surveys.

Article 3. Membership

Section 1. Original Members: Any person designated at the organizational meeting of the Society to occupy the status of "Member" shall be considered as and be a Charter Member. Thereafter, the organizational membership shall have no authority to name or appoint members of the Society.

Section 2. Membership: Membership shall be open to all persons interested in Entomology.

Section 3. Sustaining Membership: Sustaining Membership is open to commercial or industrial organizations upon meeting approval and requirements of the Board of Directors.

Section 4. Honorary Membership: Honorary Members may be selected from time to time by a majority vote of the Board of Directors.

Section 5. Student Membership: Student Membership is open to students enrolled in any education institution and meeting the requirements of the Board of Directors.

Section 6. Procedure to Obtain Membership: Any person desiring to become a member of the Society shall do so by application and payment of dues to the Treasurer. After approval of the majority of the Board of Directors, said applicant shall become a duly constituted member.

Section 7. Members in Good Standing: A member who is current in payment of dues.

Article 4. Membership Rights

Section 1. Voting: Each member in good standing shall be entitled to one vote at any regular or special meeting or by mail. Voting by proxy shall not be allowed.

Section 2. Privileges: All members in good standing shall have equal privileges in the presentation of papers and discussions at meetings.

Article 5. Membership Certificates

Section 1. Certificates: The Board of Directors shall decide upon what evidence of membership each member in good standing shall be entitled to receive.

Section 2. Transfer: Evidence of membership in the Society will not be transferable or assignable.

Article 6. Dues

Section 1. Annual Dues: The amount of the annual dues for membership in the Society will be established by the Board of Directors from time to time. The use or uses of dues collected shall also be determined by the Board.

Section 2. Time of Payment: The Board of Directors shall set such times during each year as it deems advisable for the payment of annual dues by members. Generally, annual dues shall be paid during registration at the annual meetings. However, a member may mail dues to the Treasurer of the Society if the member cannot attend a given annual meeting. If a member fails to pay dues two (2) years in a row, such member shall be dropped from the rolls.

Section 3. Honorary Members: There shall be no dues required for Honorary Members or others specially designated by the Board of Directors.

Article 7. Meetings of the Society

Section 1. Annual Meetings: The Society shall hold annual meetings at such times and places as may be designated by the Board of Directors and specified in the notice thereof, for the election of officers and any other business as may be properly brought before the meeting.

Section 2. Registration Fee: A registration fee, in the amount to be determined by the Board of Directors, shall be paid at each annual meeting by all members and non-members who attend. The Board of Directors will determine the use of these fees.

Section 3. Special Meetings: Special meetings of the Society shall be held at any time and place as specified in the notice thereof whenever called by the President or any two (2) or more members of the Board of Directors.

Section 4. Notice: Notice of all meetings of the Society, annual or special, stating time, place, and agenda shall be mailed to each member by the President, Secretary, Treasurer, or Directors calling the meeting not less than seven (7) days prior to the meeting.

Article 8. Officers

Section 1. Officers: The officers of the Society shall consist of a President, President-elect, Secretary, Treasurer, Editor, and Historian, all of whom, except the President, shall be elected by and from the membership by a majority vote of members or by mail. The first President of the Society shall be elected by and from the membership at the organizational meeting for a term extending to the beginning of the first annual meeting. Thenceforth, the President-Elect shall automatically accede to the office of President at each annual meeting, or when the President is unable or unwilling to act for any reason. Nominees for each elective office of the Society shall be selected by a nominating committee of three (3) members appointed at the annual meeting by the President. Nominations may also be presented from the floor. The President and President-Elect shall hold office from the date of election at the annual meeting until the election of their successors at the next annual meeting, and shall not be eligible for re-election to the same office for a successive term. The Secretary, Treasurer, and Editor shall hold office from the date of election at the annual meeting until the election of a successor at the third following annual meeting and shall be eligible for re-election. The Historian shall hold office from the date of election at the annual meeting until the election of a successor at the fifth following annual meeting and shall be eligible for re-election. No member shall occupy more than one office at any one time.

Section 2. Duties and Powers of the President: The President shall be the Chief Executive Officer of the Society and shall preside at all meetings of the Society and the Board of Directors, have and exercise general and active management of the Society, execute and enforce all orders and resolutions and regulations duly adopted by the Board of Directors, execute all contracts in the name of the Society, and perform such other duties as assigned by the Board of Directors.

Section 3. Duties and Powers of the President-Elect: In the absence of the President, or in the case of failure to act, the President-Elect shall have all the powers of the President and shall perform such other duties as shall be imposed by the Board of Directors from time to time.

Section 4. Duties and Powers of the Secretary: The Secretary shall attend and keep the minutes of all meetings of the Board of Directors and the Society, shall have charge of the records and seal of the Society, and shall, in general, perform all the duties incident to the office of Secretary of the Society.

Section 5. Duties and Powers of the Treasurer: The Treasurer shall keep full and accurate accounts of the books of the Society and shall deposit all monies and the valuable properties and effects in the name of and to the credit of the Society in such depository or depositories as may be designated by the Board of Directors. The Treasurer shall disperse funds as may be ordered by the Board, getting proper receipts for such disbursements; and shall render to the Board of Directors whenever required by it, an accounting of all transactions as Treasurer. During each annual meeting, the Treasurer shall give a report on the annual financial condition of the Society. The Treasurer shall, in general, perform all the duties incident to the office of Treasurer of the Society.

Section 6. Duties and Powers of the Editor: The Editor shall be a member of the Board of Directors and Chair of the Publication and Editorial Committee and be responsible for editing and publishing such publications as directed by the Board of Directors and passed by the majority of the voting membership at a called meeting.

Section 7. Duties and Powers of the Historian: The Historian shall maintain and be responsible for keeping a complete and accurate history of the activities of the Society from year to year.

Section 8. Vacancies in Office: Any vacancy in the office of President-Elect, Secretary, Treasurer, Editor, or Historian, however occasioned, may be filled, pending the election of a successor by the Society, by a majority vote of the remaining Directors. Should an office be filled by vote of the Board of Directors, the person so elected shall not become the officer upon the next annual meeting unless elected as such by the Society according to the procedures set forth for the election of officers of the Society in Article 8, Section 1, of this Constitution.

Article 9. Board of Directors

Section 1. Makeup and Responsibilities: The Board of Directors shall consist of the immediate past-President, the President, President-Elect, Secretary, Treasurer, Editor, and Historian of the Society and two members-at-large. The members-at-large shall be elected at the Annual Meeting of the Society and shall serve a term of one year. Any three (3) Directors shall constitute a quorum for the transaction of business. All properties, property rights, objects and purposes of the Society shall be managed, promoted, and regulated generally by the Board of Directors.

Section 2. Installation and Term of Office: The members of the Board of Directors shall be installed after their election as officers of the Society as set forth in Article 8, Section 1, of this Constitution, at the annual meeting of the Society, or at any adjourned meeting, or at any special meeting called for that purpose. All installed Directors shall serve for a term corresponding to that of the office in the Society to which each was elected by the members and thereafter until their successors are elected, accept office, and are installed.

Section 3. Annual Meetings: The Board of Directors shall meet immediately after the adjournment of the annual meeting of the members for the transaction of such business as may come before the Board. No notice of such meeting shall be required, and should a majority of the newly-elected Directors fail to be present, those present may adjourn, without further notice to a specified future time.

Section 4. Other Meetings: The Board of Directors shall not be required by this Constitution to hold regular meetings but may, by resolution or otherwise, establish such order of meetings as it deems desirable. Special meetings of the Board shall be held at any time at such places as may be specified in the notice thereof, whenever called by the President or any two (2) or more Directors.

Section 5. Notice: Notice of all meetings of the Board of Directors, other than the annual meeting, starting time, place, and agenda for which the meeting was called, shall be given to each Director by the President or Directors calling the meeting not less than three (3) days prior to the meeting.

Section 6. Vacancies in Board of Directors: Any vacancy in the office of any Director, however occasioned, may be filled, pending the election of a successor by the Society, by a majority vote of the remaining Directors.

Article 10. Miscellaneous Provisions

Section 1. All checks and drafts shall be signed in such manner as the Board of Directors may from time to time determine.

Section 2. At all duly constituted meetings of the Society or Board of Directors of the Society, 10% of the eligible members, or 3 Directors, respectively, present shall constitute a quorum for the transaction of any business presented at such meetings.

Section 3. All notices required to be given by this Constitution relative to any regular or special meeting of the Society or the Board of Directors may be waived by the Directors or members entitled to such notice, either before or on the date of the meeting and shall be deemed equivalent thereto. Attendance at any meeting of the Society or the Board of Directors shall be deemed a waiver of notice thereof.

Section 4. General Prohibitions: Notwithstanding any provision of this Constitution and By-Laws which might be susceptible to a contrary construction. A. No part of the activities of the Society shall consist of carrying on propaganda, or otherwise attempting to influence legislation. B. This Society shall not participate in, or intervene in, (including the publishing or distribution of statements), any political campaign on behalf of a candidate for public office.

Article 11. Amendments

Section 1. This Constitution may be altered or amended or By-Laws adopted by a majority vote of the quorum present at any annual or special meeting of the Society membership, provided that notice of such proposed amendment or By-Laws shall have been given to the membership prior to the meeting.

1. Dates ('95), ('96) refer to last meeting attendance or last dues payment.
(\$5.00 Regular, \$1.00 Student, \$25.00 Sustaining/Corporate).

2. H = Honorary Member

TENNESSEE ENTOMOLOGICAL SOCIETY

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**Application for Membership in the
TENNESSEE ENTOMOLOGICAL SOCIETY**

I (we), herewith, submit this application for membership in the Tennessee Entomological Society. Society pins are available to members for \$10.00.

PLEASE PRINT

Name of Prospective Member _____

Affiliation _____

Address _____ Zip Code _____

Phone Number _____ Area Code () _____

FAX Number _____ Area Code () _____

email address _____

Occupation _____

Please Check

Annual Dues \$5.00

Society Pin \$10.00

Annual Due for Students \$1.00

Sustaining Member Dues \$25.00

Amount Enclosed _____

Please Remit to:

Dr. Gary Lentz
Dept. Entomology and Plant Pathology
605 Airways Blvd.
West Tennessee Experiment Station
Jackson, TN 38301