

The Firefly

Proceedings of the 1993 (Twentieth)
Annual Meeting of the
Tennessee Entomological Society



October 21 - 22 , 1993
Drury Inn I-24 & Harding Road
Nashville, Tennessee

Volume Eight

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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 at least two weeks before the TES annual meeting to:

Dr. Steve Murphree (or current Awards Committee Chairperson)
Department of Biology
Belmont University
Nashville, TN 37212 - 3757

**PROCEEDINGS OF THE TWENTIETH
ANNUAL MEETING
October 21 - 22, 1993**

**Drury Inn I-24 & Harding Place
Nashville, Tennessee**

INSECT MONITORING SYSTEMS AND PHEROMONES

**Phillipp Kirsch
Trécé Inc.
Salinas, California**

Phillipp Kirsch, manager of field development for Trécé, Inc., Salinas, California, was invited to provide opening remarks at the 20th Annual Meeting of the Tennessee Entomological Society. Trécé, Inc. is a major international manufacturer and marketer of pheromone-based insect monitoring systems and components for agriculture, government and university research, food processing, transportation and consumer applications. Kirsch is responsible for worldwide field research and development efforts for the company, as well as registration and regulatory matters.

Phillipp's presentation will focus on the role and use of pheromones in insect pest management. With the increased interest in biologically-based management strategies, insect pheromones and semiochemical technology should become more important components of insect pest management systems.

**PRELIMINARY SURVEY OF THE MAYFLIES (EPHEMEROPTERA)
IN STONES RIVER, RUTHERFORD CO., TENNESSEE**

**Lewis Scott Long
Middle Tennessee State University
Murfreesboro, Tennessee 37132**

This study provides a baseline survey for mayfly naiads in the East Fork of the Stone's River. Collections of naiads were made from April to September of 1993. Ten families and fifteen genera of mayflies were identified from rapid and pool habitats along the river. This survey represents the first known attempt to establish baseline data from which future studies of the mayfly fauna of the East Fork of the Stone's River can be made.

SEASONAL INCIDENCE OF SELECTED INSECTS IN A NORTHERN RED OAK ORCHARD IN EASTERN TENNESSEE

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A northern red oak (*Quercus rubra* L.) seedling seed orchard was established in 1987 by the U.S.D.A. Forest Service within the Cherokee National Forest in Johnson County, TN. The primary purpose of the project is to harvest acorns for reforestation efforts.

As a first step in reducing the amount of acorn damage caused by insects, a general survey of the arthropod community in the northern red oak canopy was initiated in 1992. The primary objectives of this two-year study are to document the biodiversity of insect species on northern red oak and to monitor the seasonal incidence and abundance of these species.

Insect sampling was conducted every two weeks, from March through October of 1992 and 1993, on designated trees. These trees were selected from five genetic "families" based on their past acorn production. The sampling procedure began by placing plastic tarps on the ground beneath each tree, then spraying the canopies with an insecticide. After several hours the insects that had fallen onto the tarps were collected into individual containers and taken to the laboratory to be labelled and identified.

Over 29,000 total specimens representing 15 orders have been collected in these two years. Of special interest is the Asiatic oak weevil (*Crytepistomus castaneus*), a known oak pest. Adults of this species were found throughout the sampling season, peaking in early July, and comprising 25% of all specimens collected.

Also of interest was the occurrence of *Platycotis vittata*, an oak treehopper. In 1992, 804 individuals of this species were collected. However, in 1993, none were found. This dramatic change in incidence is most likely due to a blizzard that occurred on March 13 and 14 of 1993.

Variations in insect compositions found on different northern red oak genotypes are apparent; however, these results have yet to be analyzed statistically. An overall listing of insect taxa found on these trees, as well as differences between each northern red oak genotype, will be completed in the near future for use by orchard managers. This information will be helpful in developing an effective, integrated program of acorn pest management for eastern Tennessee's red oaks.

SEASONAL DISTRIBUTION OF PARASITIZATION OF THE
FACE FLY (*Musca autumnalis* De Geer) BY
Pariotenchium autumnale (NICKLE) IN EASTERN TENNESSEE

Mark Carder and Reid Gerhardt
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The face fly, *Musca autumnalis*, has been a pest of cattle in North America since it's introduction into the Maritime Provinces of Canada during the 1950's. Since it's introduction to the continent, the face fly has expanded it's range southward and is found throughout much of Canada and the United States. The face fly is considered an economic pest of both beef and dairy cattle. The protective and evasive actions of livestock in response to the feeding face flies cause sub-clinical production losses. Further, face flies have been implicated as a factor in spreading infectious bovine keratoconjunctivitis (IBK) and *Thelazia* (eye worms). Chemical devices are most often utilized for controlling face fly populations to prevent economic losses. *Pariotenchium autumnale* is a nematode which parasitizes face flies and is a candidate biological control agent. Bimonthly collections were made from April through October 1993 from five cattle operations in eastern Tennessee. Preliminary results will be presented on the distribution and occurrence of *P. autumnale* parasitizing *M. autumnalis* from these sites.

**SPECIES COMPOSITION AND SEASONAL ABUNDANCE
OF APHODIINAE DUNG BEETLES (COLEOPTERA:SCARABAEIDAE)
IN DUNG FROM IVERMECTIN-TREATED AND UNTREATED CATTLE**

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Numerous species of insects live in cattle manure where their activity contributes to the degradation of the dung and the subsequent recycling of nutrients. While most coprophilic insects are considered beneficial, the horn fly, *Haematobia irritans* (L.), and the face fly, *Musca autumnalis* De Geer, are two economically important pests of cattle.

Currently the pour-on formulation of the antiparasitic drug ivermectin is labelled for horn fly control on cattle. Ivermectin is a systemic pesticide which is excreted in the feces where it also possesses insecticidal properties. Some researchers fear that ivermectin may adversely affect other coprophilic insects, such as the Aphodiinae dung beetles, reducing their populations and perhaps disrupting the successional nature of the dung pat community.

The subfamily Aphodiinae consists of the lesser dung beetles, including the two common genera *Aphodius* and *Ataenius*. Members of these genera are small- to moderate-sized beetles which burrow into fresh cattle manure to feed and reproduce there.

Between April and September of 1993, samples of dung pats from ivermectin-treated and untreated cattle were collected and the insects extracted. This report will present a preliminary analysis of the species composition and the seasonal abundance of Aphodiinae dung beetles at the collection site in east Tennessee.

**ELECTROPHORETIC ANALYSIS OF THE GENE
FREQUENCY OF ESTERASE II OF A POPULATION OF
Anthonomus grandis IN WESTERN TENNESSEE**

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Esterases in the cotton boll weevil, *Anthonomus grandis*, have been demonstrated by electrophoresis to consist of four components (I-IV). Esterase II shows a variation of two mobilities, Fast and Slow. The two enzyme bands (Fast and Slow) of Esterase II have been demonstrated to be autosomal codominant alleles. Populations of weevils from western Arkansas have been shown to be in equilibrium when compared to Hardy Weinberg equilibrium. A population from western Tennessee was shown to have an excess of homozygotes and thus out of equilibrium. In this study one population from River Bluff Road in western Tennessee was shown to be in equilibrium in three studies beginning as early as 1977. F₁ weevils from squares collected when the adult weevils were obtained from the field were analyzed.

**EFFICACY OF SELECTED ORGANOPHOSPHATES
ON *Lygus lineolaris* IN COTTON**

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Commonly used organophosphate (OP) insecticides are safer for the environment and do not accumulate in the food chain as do organohalides. The mode of action of these insecticides is disruption of the insect central nervous system by inhibiting the activity of acetylcholinesterase. There are approximately 6 - 12 subclasses of OP's. Among these are the phosphorodithioates to which the following compounds belong: Dimethoate, Malathion, Azinphos-methyl, and Sulprofos. These four insecticides are effective for use against the tarnished plant bug, *Lygus lineolaris*. In a study conducted in 1993 at the West Tennessee Experiment Station in Jackson, TN, these insecticides among others were tested for efficacy on the tarnished plant bug. Despite the chemical similarities among these insecticides the efficacy varied after an initial 48 hours and after a 72-hour residual period. After the initial 48 hours, percent mortality was as follows: Malathion, 98.3%; Sulprofos, 88.2%; Azinphos-methyl, 77.6%, and Dimethoate, 51.4%. The residual data yielded the following results: Malathion, 77.6%; Azinphos-methyl, 56.7%; Sulprofos, 45.8%; and, Dimethoate, 33.3%. It appeared that there was no statistical difference among Malathion, Sulprofos, and Azinphos-methyl, whereas Dimethoate did show a difference.

In the residual study, the statistical analysis showed no difference among any treatments. Based on this analysis, the use of the recommended chemicals Malathion, Azinphos-methyl, and Sulprofos, will yield good initial control against *L. lineolaris* as well as providing residual activity 72 hours after application.

SEASONAL ABUNDANCE OF ARTHROPODS IN FRASER FIR DETRITUS

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Leaf litter samples obtained from Fraser fir trees at three sites within the Great Smoky Mountains National Park from June 1991 to October 1992 were processed to determine the associated arthropod fauna. The four insect orders with the highest number of species represented were: Collembola, Coleoptera, Diptera and Hymenoptera. From 31 collections of arthropods from leaf litter, the arthropod fauna was found to be composed primarily of Acari and Collembola. These two orders represented ca. 97% of the 62 species of arthropods collected. The remaining arthropods, although low in number, consisted of several predaceous species and are important in maintaining the stability of the population. Based on leaf litter samples, the three study sites (Mt. Buckley, Mt. LeConte and Mt. Sterling) were similar in species diversity and evenness as determined by the Shannon-Weaver diversity index. Species diversity of Mt. Buckley was calculated to be 2.51, while Mt. LeConte and Mt. Sterling had a diversity rating of 2.52. Each of the three sites had an evenness rating of 0.63. The combined species diversity of the three sites was 2.21 and species evenness was 0.54. The greatest number of arthropods collected from leaf litter occurred in the summer months with a peak single collection of 7,141 specimens occurring in August 1991. The wide variety of arthropods collected and taxa represented in leaf litter illustrates the importance of the Fraser fir component within the ecosystem.

LARVAL LEPIDOPTERAN TREE USE IN BOTTOMLAND HARDWOOD FORESTS: PRELIMINARY RESULTS

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A current forestry and wildlife management practice in bottomland hardwood forests consists of promoting oaks (*Quercus* spp.) for increased mast production and economic value. This practice may not be best suited for insects as well as birds that feed on them. Five types of bottomland hardwood trees (*Acer* spp., *Celtis* spp., *Ulmus* spp., *Liquidambar styraciflua*, and *Quercus* spp.) and two vine species (*Toxicodendron radicans* and *Parthenocissus quinquefolia*) were sampled for lepidopteran larvae, an important dietary item for many forest birds. Preliminary results show that caterpillars were found most often on *Celtis* spp. and *Acer* spp., and most infrequently on *Quercus* spp. Although these results are not significant ($p > 0.05$) between tree types, this may be due to the low power of the test. These preliminary results indicate, however, that managing for oaks may not be the best management strategy for the overall bottomland hardwood forest ecosystem.

**DISSEMINATION OF *Discula destructiva* CONIDIA BY
THE CONVERGENT LADY BEETLE, *Hippodamia convergens***

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University of Tennessee, Knoxville, TN 37901

Discula destructiva is the fungal pathogen of the dogwood anthracnose disease. This disease has been reducing the fecundity of the eastern flowering dogwood, *Cornus florida*, in both natural and urban habitats for over 15 years. It has been hypothesized that insects may be involved in the rapid movement of the pathogen along the Appalachian Mountain range. Therefore, this study was designed to determine if insects could disseminate *D. destructiva* conidia.

The convergent lady beetle (CLB), *Hippodamia convergens*, was selected as the model insect for this research. Experiments were conducted to determine if CLBs exposed to *D. destructiva* could carry viable conidia externally and internally. Also, scanning electron microscopy was used to observe specific locations on CLB bodies where conidia were adhering and conidial densities could be compared. To complete the study, a greenhouse inoculation experiment was carried out to determine if infested CLBs could initiate infection on healthy dogwoods.

The results from our research were that CLBs transported and deposited viable conidia externally and/or internally up to 16 days after exposure to *D. destructiva*. Scanning electron microscopy showed that most conidia adhered to the ventral body surface on the mouthparts, legs, prothorax, thorax, and abdomen; as compared to the dorsal body surface where only the pronotum had similar conidial densities to that of the ventral regions. Greenhouse inoculation experiments resulted in 90% (n=10) of the trees subjected to infested CLBs becoming infected with *D. destructiva*.

The observations and data gathered from these experiments have led to the conclusion that insects can disseminate viable *D. destructiva* conidia. Also, dispersal of viable conidia to a healthy host by insects can lead to infection. This information when generalized to include all insects associated with dogwoods may suffice to explain infection throughout more than 2.3 million hectares of the southeastern United States.

ISOLATION OF AN INDUCIBLE CECROPIN-LIKE PEPTIDE AND LYSOZYME FROM HEMOLYMPH OF *Heliothis virescens* LARVAE

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An inducible cecropin-like peptide was isolated from larval hemolymph using gel filtration and cation-exchange chromatography. The cecropin-like peptide had an estimated molecular weight of 7,500 daltons by urea-SDS polyacrylamide gel electrophoresis. The molecular weight of lysozyme from the larval hemolymph was estimated to be 16,000 daltons by urea-SDS polyacrylamide gel. Antibacterial activity of the cecropin-like peptide was determined using acid polyacrylamide gel electrophoresis with a bacterial agar overlay. The cecropin-like peptide showed bactericidal activity against *Escherichia coli* K12 D31. Lysozyme activity was specific for *Micrococcus lysodeikticus*.

FOREIGN INSECT THREATENS HEMLOCK

Bruce Kauffman
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The hemlock woolly adelgid (HWA), *Adelges tsugae*, was introduced into Virginia approximately 30 years ago from the Pacific Northwest where it had been established after Asian introduction. It was a minor pest until the late 1980's when populations seemed to explode and its impact became serious. HWA is currently about 50 miles northeast of Bristol, Tennessee. The biology of the insect was outlined.

Eastern or Carolina hemlocks may be killed within four years of becoming infested. This mortality could destroy the unique habitat along streams in the 27 counties in Tennessee with significant hemlock stands. Currently there is no practical way to control HWA in the woods, but ornamental hemlocks can be protected with several types of insecticides. An HWA working group has been formed to focus federal, state, and university research and survey work for the problem in the East.

REGULATORY INSECT UPDATE FOR 1993

Steve Powell

Tennessee Department of Agriculture
Plant Industries Division
Ellington Agricultural Center,
Nashville, TN 37204

In 1993, 4654 gypsy moths were caught in the trapping program in Tennessee in 27 counties with new county records for Giles, Maury, Morgan, Polk, and Williamson Counties and a large infestation (4469 moths in 412 traps) in Grainger County.

Regulatory detections of imported fire ants were made in the following Counties: Anderson, Bedford, Blount, Bradley, Davidson, Grainger, Greene, Hamilton, Humphreys, Knox, Loudon, Madison, Marion, McMinn, Rhea, Rutherford, Sevier, Shelby, Warren, Washington, and Williamson. Natural migration of imported fire ants is occurring in the following Counties: Bradley, Chester, Fayette, Franklin, Giles, Hamilton, Hardeman, Hardin, Lawrence, Lincoln, Marion, McNairy, and Wayne.

Japanese beetle detections outside the generally infested areas were made in the following Counties: Cannon, Coffee, Crockett, Haywood, Montgomery, Robertson, and Wilson.

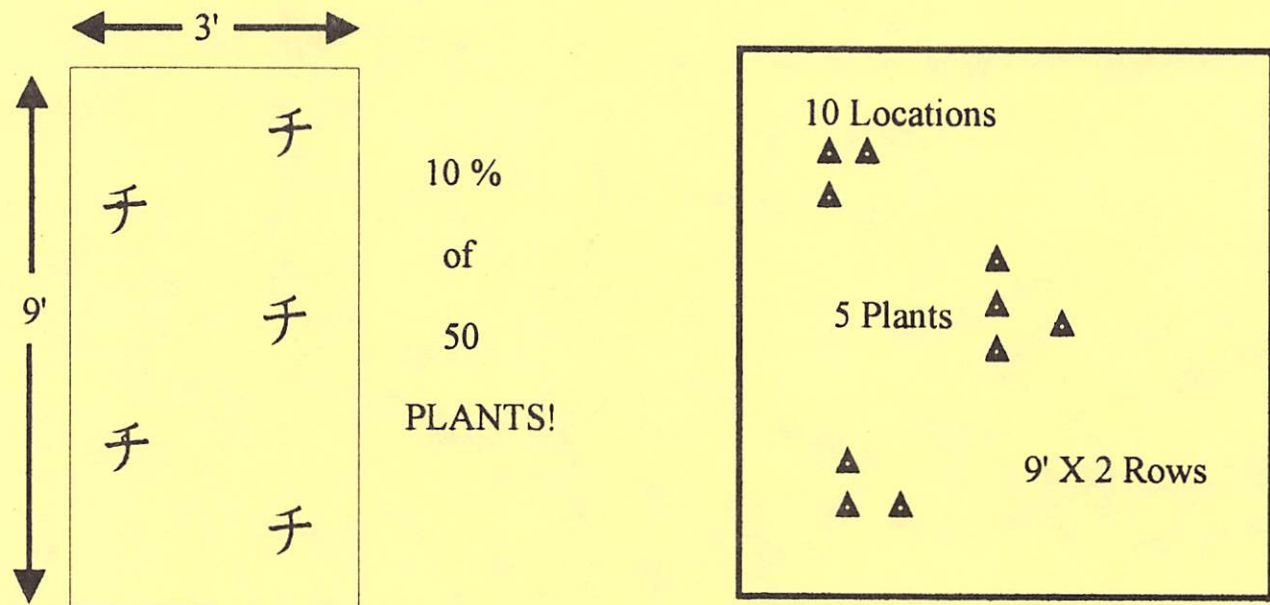
A NEW TECHNIQUE FOR ACCURATE SAMPLING OF PHYTOPHAGOUS ARTHROPODS IN CROPS

Ray Nabors
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Caruthersville, MO 63830

In times past, it was common to examine 100 plants for arthropod pests in a field. These plants were chosen 25 per location. There are 40,000 per acre in an average field of cotton. This translates to 3,200,000 plants in an 80 acre field. It is questionable if 100 plants is a statistically accurate sample. In an area 2 rows wide and 3 steps long (3' X 9') you will have approximately 50 plants. If 5 plants in such an area are examined, that is a 10% sample. That sample is statistically accurate for that 3' X 9' area. The question then becomes how many of these 2 row by 3 step areas must be examined in a field to reach a statistically accurate sample for that field. The answer is 7 to 10 locations in each field. These locations can be clustered 3 near one side, 4 near a corner and 3 near another side. However, locations must be 100 steps apart and 100 steps away from any field border to be considered a separate location. This protocol was developed for cotton. After working with this protocol for 3 seasons, I believe it adapts well to corn and grain sorghum scouting. This technique involves efficient use of time by reducing the total number of plants examined. It may be widely adapted to many crops. Research on adapting this practice of field inspection to other crops is recommended.

Reference

Williams, M.R. and J.L. Willers, et. al. 1991. Scouting Protocol for Arthropod Pests of Cotton in the Midsouth. MAFES Bull. 977, Mississippi State University.



SQUASH POLLINATION STUDIES IN WEST TENNESSEE: BUMBLE BEES "LIKE" SQUASH TOO

John Skinner

Extension Entomology and Plant Pathology
University of Tennessee, Knoxville, TN 37901

We can only guess what bees such as the honey bee or bumble bee "like" because we are not bees; however bees visit flowers to acquire food in the form of pollen or nectar. Bees respond to stimuli presented by the flower as advertisements of potential food reward. The bright yellow petals of the squash flower is within the visual range of the bee and probably provides the initial stimulus to attract the bee. The availability of a large nectar reward is "probably" the chief reason bees "like" squash.

Pollination studies were conducted in a 55 acre yellow crookneck squash field in West Tennessee in August and September of 1993. Bumble bees were the most numerous visitors to squash flowers in the four study plots with a total of 230 of 252 visitors = 91.3%. Honey bees accounted for only 8.7% of total visitors. Bumble bees visited female flowers more often than they did males (means: female, 0.17; male, 0.03 bees per flower). Five times as many male flowers were available per plant than were female flowers (male, 4479; female, 994). The preferential visitation of bumble bees to female flowers was believed to be directly related to higher volume of nectar produced by female flowers. Female flowers produced three times the volume of nectar produced by male flowers (female 64.5ul vs male 19.03ul) (ANOVA; $F=98.29$, $df 1,38$, $P < .0001$) The male flowers produced nectar with 3 percent higher dissolved solids than was produced by females (26.9 percent vs 21.8 percent; ANOVA; $F=36.19$, $df 1,38$, $P < .0001$).

An average visitation rate of 0.229 and 0.122 bumble bees per female flower yielded 6.96 and 6.92 fruit per plant for two study plots.

Of 45 trials a full fruit resulted 39 times (86.67%) after allowing a single visit by a bumble bee to a previously bagged flower.

Hand pollination indicate 200 or more pollen grains were needed to set a fruit. Results of hand pollinating stigmas with 200 or more grains set a fruit at a rate of 88.4% compared to placing 50 grains on a single stigmatic lobe which yielded fruit 47.6 percent of the time. The minimum amount of pollen to set a fruit is near 50 to 100 grains, however, some of these fruit were misshapen indicating more pollen was needed.

HUMAN EHRLICHIOSIS IN CUMBERLAND CO., TENNESSEE: PRELIMINARY REPORT

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Nine confirmed cases of human ehrlichiosis occurred at Fairfield Glades, Cumberland Co. during the summer of 1993. Several deer from the area had antibody titers for an *Ehrlichia* species very close to *C. haffeensis*. *Amblyomma americanum* (lone star tick) from deer and other animals, and human blood samples are being tested for *E. chaffeensis*. Results are pending. Risk factors include exposure to tick bite and playing golf on a course adjacent to Catoosa Wildlife Management Area.

TICKS (ACARI, IXODIDAE) INFESTING MEDIUM-SIZED WILD MAMMALS IN SOUTHWESTERN TENNESSEE

Thomas M. Kollars, Jr.

Institute of Arthropodology and Parasitology,
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Statesboro, GA 30460

Seven species of ixodid ticks (n=2661) were found on medium-sized wild mammals (n=295) during a 13 month study in Shelby County, Tennessee. The seven tick species collected were *Dermacentor variabilis*, *Amblyomma americanum*, *Rhipicephalus sanguineus*, *Ixodes texanus*, *I. cookei*, *I. scapularis* and *Haemaphysalis leporispalustris*. The raccoon had the greatest tick species diversity with all of the aforementioned ticks except *H. leporispalustris* and *R. sanguineus*. The raccoon and opossum accounted for 96.9% of the ticks collected and were the most commonly captured medium-sized mammals. The only tick collected in high enough numbers for statistical analysis was *D. variabilis*. Mammal species and habitat type were the most important factors affecting the mean number of adult *D. variabilis*/mammal ($p < .01$). The mean number of *D. variabilis* adults carried by raccoons was significantly higher than opossums ($p < .001$). Whether a habitat occurred within Memphis city limits or outside city limits also affected the number of adult *D. variabilis* on mammals ($p < .01$). The interaction between habitat, mammal, and whether inside or outside the city limits was near statistical significance ($p = 0.58$). I suggest that there is biological significance; within city limits, medium-sized wild mammals are forced into wooded areas where there is a subsequent increase in tick populations in these habitat patches.

**BOLL WEEVIL ERADICATION IN TENNESSEE:
WHEN, WHERE, WHY, AND HOW?**

Phillip M. Roberts

Agricultural Extension Service

University of Tennessee, 605 Airways Blvd., Jackson, TN 38301-3201

The boll weevil entered this country from Mexico around 1892 and quickly spread throughout the cotton belt to become the number one pest of cotton. Each year this pest inflicts \$300 million a year in losses upon the cotton industry. Historically, more insecticide has been used controlling boll weevils and the secondary pest problems it has caused than any other insect complex in U.S. agriculture. Eradicating this pest will deescalate the spiraling need for pesticides in cotton production, thereby reducing production costs and preserving environmental quality.

The current boll weevil eradication program (BWEP) in the southeast uses an integrated approach. Cultural and chemical controls are combined with an extensive trapping program. Boll weevil eradication has been highly successful in Virginia, North Carolina, South Carolina, California, and western Arizona. Boll weevils have been virtually eliminated from these areas and the use of cotton insecticides has been reduced by 50-95 percent.

Tennessee cotton producers must pass a referendum allowing expansion of the BWEP into Tennessee cotton producing areas. Cotton producing areas east of the Tennessee River could enter the BWEP in the fall of 1994.

HISTORY OF THE COCHINEAL SCALE WITH COMMENTS ON THE ULTRASTRUCTURE OF THREE HEMOCYTES

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University of Tennessee, Knoxville, TN 37901

Since the Spaniards conquest of Mexico and discovery of the Aztec's use of the cochineal scale as a dyeing agent in the 16th century, this dye became one of the most valuable commercial products, next to gold and silver, until the mid-20th century. The dye became known as "carmin dye", and is obtained from the hemolymph of cochineal scales in the genus *Dactylopius*. This pigment was used to dye a variety of articles of commerce until aniline dyes replaced them in the 1950's. The objective of this study was to examine and classify the hemocytes in the cochineal scale responsible for this red dye.

The hemocyte composition identified in the cochineal scale, *Dactylopius confusus* (Cockerell), consisted of four basic types: prohemocytes, plasmatocytes, oenocytes, and granulocytes. Prohemocytes were round to oval with a large nucleus that almost occupied the entire cell. However, they lack vacuoles, vesicles, granules and electron dense bodies. Plasmatocytes of various shapes ranging from ovoid to oblong to amoeboid were observed. The most distinctive feature of the plasmatocyte is the large, lobed nucleus with chromatin concentrated in masses around the periphery of the nuclear membrane. The oenocytoids are easily identified by their large size. They vary in shape from oval to triangular to oblong. This hemocyte is also distinguished by a small eccentric nucleus, the presence of large crystals, and fragmented microtubules throughout the cytoplasm. Granulocytes represent the most distinctive cell type found. These cells were round, oval or pear-shaped, and possessed a large, central nucleus with a prominent nucleolus. These cells were commonly characterized by specific secretory vesicles packed with fibrous material or electron dense material (i.e. granules).

**FROM TENNESSEE TO THAILAND:
AN ENTOMOLOGIST'S PERSPECTIVE**

Jerome Grant

Department of Entomology and Plant Pathology
University of Tennessee, Knoxville, TN 37901

During the summer of 1993 (23 July - 13 August), I participated in a three-week study tour of Thailand, sponsored by the University of Tennessee and Kasetsart University, Bangkok, Thailand. This study tour exposed the seven-member group to issues concerning agricultural and natural resource development in Thailand. I was specifically interested in agricultural and environmental issues, especially as they related to pesticide use and integrated pest management. This presentation will provide an overview of Thailand, from the viewpoint of an entomologist experiencing his first international travel.

We travelled throughout Thailand from Bangkok to the northern borders of Burma and Laos. We had an extremely busy itinerary (developed by the Faculty of Forestry at Kasetsart University), which consisted of visits to several Universities, field experiment stations, National Parks, forests, and other locations. At each visit, our group listened to reports detailing concerns and current research efforts in Thailand, and we also discussed our research interests.

This trip was my first exposure to international travel, and I feel that it far surpassed my expectations. I was exposed to a different culture and climate which made for an eye-opening and enlightening journey. This study tour was well arranged and organized, and the organizers simplified procedures (e.g., hotel and food) which made our stay much more educational and enjoyable. I would encourage anyone, if given the opportunity, to participate in this type of professional development.

TENNESSEE ENTOMOLOGICAL SOCIETY
Minutes of the Board of Directors Meeting
October 21, 1993

PRESENT: Jerome Grant, Jim Bogard, Steve Powell, Joe Dunn, Harvey Barton, Gray Haun,
Steve Murphree, Gary Lentz, Russ Patrick

Jerome Grant called the meeting to order at 10:42 a.m. The 1993 program was highlighted. The invited speaker, Phillipp Kirsch, of Trécé, Inc. will be allotted 25 minutes to open the program. Afternoon and morning breaks are to be limited to 15 minutes.

Local Arrangements were discussed by Jim Bogard. Luby's Cafeteria was chosen as the site for the informal banquet. Students' meals will be paid if they present papers. Bill Shamiyeh arranged for a hospitality suite at the Drury Inn which will be open after 8:00 p.m.

A Treasurer's report was presented by Harvey Barton. He indicated the records are ready for the Auditing Committee. The Firefly printing bill was increased over last year. Cost of printing the program for the 1993 meeting was \$52.70.

Program Chairman Russ Patrick moved the Society donate a pin to the invited speaker. Lentz seconded the motion. The Board approved the motion.

An Ad Hoc Committee Report was presented by Gary Lentz. A parchment in tribute to Richard Caron was developed by Lentz, Dunn and Grant and was available for viewing by the Board and membership. Following the meeting, it will be mailed to Katrina Caron in North Carolina.

A preliminary Operating Procedures Manual was distributed: To keep the manual updated, the Board approved placing it under the responsibility of the Constitution Committee and changed the committee name to Constitution and Operating Procedures Committee.

Minutes of previous meetings were published in the Firefly (volume 7). The membership will be asked to read these prior to the General Business meeting and approve them during the meeting.

Gray Haun reported that he was seeking artwork for the brochure.

Awards Committee Chairman Steve Murphree reported that the Student Paper Competition should be keen. The Howard Bruer Award to the Outstanding Young Entomologist will be presented. The Committee reported that the Outstanding Entomologist Award will not be given in 1993, but the committee plans to present the award in 1994. A nomination form will be included in upcoming issues of the Firefly.

The Nominating Committee report was presented by Bill Shamiyeh (Chairman Burgess was unable to attend due to health). Positions to be filled this year are President-Elect, Secretary (for a 3-year term; a 2-year term was just completed) and two Members-at-Large.

Historian Harry Williams was unable to attend the meeting. President Grant arranged for Kimberly Hutchinson, a UT student, to take photographs. For publicity, Mr. Williams had contacted the Nashville Tennessean and they will try to have a reporter attend the meeting.

The motion to adjourn the meeting (Lentz/Barton) passed at 11:30 a.m.

Gary L. Lentz
Secretary
Tennessee Entomological Society
TENNESSEE ENTOMOLOGICAL SOCIETY
Minutes of the Business Meeting
October 22, 1993

Dr. Jerome Grant, TES President, opened the meeting at 8:30 a.m. He called on Secretary Lentz to present the minutes of previous meetings. These were published in the Firefly and were approved as published. Lentz reported that copies of the Manual of Operating Procedures were available and suggestions for improvement would be welcome.

As Chairman of the Ad Hoc Committee to honor Dr. Richard Caron, Lentz displayed the framed parchment in tribute to Dr. Caron which will be sent to Katrina Caron following the meeting.

Treasurer's Report

Harvey Barton presented the Treasurer's report which is published elsewhere in the Firefly. He noted the net income and expenses and emphasized that income for TES is primarily from registration fees.

Informal Banquet and Hospitality

President Grant thanked Bill Shamiyeh, Alan Hopkins and Jim Bogard (Chairman) for their efforts in organizing the Informal Banquet at Luby's Cafeteria which 30 members attended and the Hospitality Suite at the Drury Inn which most of the members enjoyed.

Program Committee

Russ Patrick summarized the 1993 program. The invited speaker, Phillipp Kirsch of Trécé, Inc, presented a very informative paper. Member participation was excellent. A letter of appreciation will be sent to Phillipp Kirsch.

Local Arrangements Committee

Chairman Jim Bogard complimented the Drury Inn on their facilities. Lee Greer and Steve Murphree were other committee members.

Auditing Committee

Chairman Carroll Southards reported that he and Gary Lentz audited the records yesterday afternoon. The records were found to be in order, expenditures and receipts were reconciled.

Publicity Committee

Jerome Grant reported for Chairman Harry Williams who was unable to attend. Williams sent out an announcement of the meeting through UT Communications indicating the time and location of the TES meeting. The Nashville Tennessean was also contacted and they indicated they would have a reporter attend.

Membership Committee

Co-Chairman Bancroft reported the addition of four student members and ten new members. He also discussed utilization of the Firefly as a means to recruit new members.

Prediction and Evaluation Committee

Chairman Steve Powell recognized Bill Shamiyeh, Randall Stewart, Bruce Kauffman, Bruce Cole, Rich Emerson and Harry Williams for their contributions. A number of reports were received from across the state and these will be incorporated into the Firefly.

Publications and Editorial Committee

Chairman Gray Haun noted the two goals of the committee in 1993 were publication of the Firefly and publication of the brochure. To complete the brochure, some artwork is needed. The committee hopes to have the brochure in good shape by mid-winter. Obtaining a Library of Congress number for the Firefly will be investigated. Lentz proposed that distribution maps of major introduced pest species be included in the Firefly.

Constitution and Operating Procedures Committee

Chairman Joe Dunn reported the Board approved the name change to the "Constitution and Operating Procedures Committee" to keep the Operating Procedures Manual updated. The President still has the responsibility of appointing committees.

A few years ago it was suggested that TES incorporate. After some investigation, Dunn suggested we not incorporate because it would limit what the Society could do. He moved that the previous motion to incorporate be tabled. The motion was seconded and passed.

Awards Committee

Chairman Steve Murphree thanked committee members Reid Gerhardt, Harry Williams and Bill Shamiyeh for their assistance. The 1993 Howard Bruer Award winner is Jennifer Lenter of Fayetteville, Lincoln County, Tennessee. The award will be presented to her through the county extension office.

The Richard Caron Outstanding Entomologist Award will not be presented in 1993, but the committee hopes to present it in 1994. A nomination form is available from the committee. This form will be published in future editions of the Firefly.

The Student Paper Contest judges, Alan Hopkins, John Skinner and Gray Haun, were recognized. Deanna Colby was named the winner! Students were commended for their good papers.

Nominating Committee

Bill Shamiyeh reported for Chairman Gene Burgess who was unable to attend for health reasons. Joe Dunn and Jim Keener served on the committee in the absence of other members.

For President-Elect the committee nominated Lynn Snodderly. No further nominations were made from the floor. Dunn moved, Gerhardt seconded, that nominations cease and Snodderly be elected by acclamation. The motion passed.

The committee nominated Gary Lentz for Secretary. No additional nominations were made from the floor. Nabors moved, Brown seconded, that nomination cease and Lentz be elected by acclamation. The motion passed.

The committee nominated Rich Emerson and Mark Carder for Members-at-Large. No additional nominations were made from the floor. Southards moved, Dunn seconded, that nominations cease and these nominees be elected by acclamation. The motion passed.

Gerhardt moved, Southards seconded, that the membership accept the committee reports. The motion passed.

President Grant informed the membership that the Board approved Nashville as the location of the 1994 TES meeting, that the time would be the second or third week of October and the Local Arrangements Committee would make the selections.

New members were introduced at the business meeting.

President Grant asked for any new business. There being none, he thanked those who had participated in the meeting. He then asked Past-Presidents of TES to escort new President Russ Patrick to the podium. Grant presented the Presidential gavel to the new President. President Patrick then asked Awards Chairman Murphree to present a plaque of appreciation to outgoing President Grant. After appointing Harold Bancroft to the Nominating Committee, President Patrick adjourned the meeting.

Gary L. Lentz
Secretary
Tennessee Entomological Society

TENNESSEE ENTOMOLOGICAL SOCIETY
Minutes of the Board of Directors Meeting
October 22, 1993

PRESENT: Russ Patrick, Jerome Grant, Jim Bogard, Steve Powell, Harvey Barton, Joe Dunn, Lynn Snodderly, Gray Haun, Mark Carder, Gary Lentz

The Board of Directors Meeting was convened by President Patrick at 11:55 a.m. Committee assignments were discussed. To help new committee chairmen carry out their responsibilities, it was suggested that the Manual of Operating Procedures be mailed out with the program and include guidelines on the student award. After further discussion, President Patrick indicated he would send copies of the Manual of Operating Procedures to the committee chairmen.

A flyer needs to be in the program mailout providing guidelines on Student Awards, membership or requests for the Prediction Evaluation Report.

Gray Haun was asked what kinds of artwork are needed for the brochure. He indicated he needed some insects, a curator and others.

Russ Patrick asked the Board's opinion on having a photo salon during the meeting. The most difficult problem is scheduling. Some suggestions would be hospitality suite, stand up display, run through them during the break, etc. Harvey Barton strongly urged a time slot be allocated.

Harvey Barton reported on expenses charged by the hotel which were unexpected - microphone \$52.50/day, meeting room \$120, audio-visual screen \$25/day, coffee \$30, soft drinks \$62.50, juice and soda \$62.50 totalling \$377.50 (reported verbally by the treasurer as \$277.50). The hotel should be encouraged to provide lighted microphone stand as standard equipment.

Harvey Barton suggested our dues are too low at \$5. Jerome Grant countered saying Georgia and South Carolina Entomological Society dues were \$10 with a quarterly journal. Members are more apt to pay an increased registration fee. Most of the dues are spent in publishing the Firefly, but the Society is dependent on registration fees to cover operating and those who don't attend don't help pay. The 1992 meeting netted \$588 (\$1,030 income minus \$518.12 expenses). The Treasurer pointed out numerous cost increases and it's not enough to just stay even. Joe Dunn moved, Jerome Grant seconded, that the registration fee be raised \$5 to \$20. The motion passed.

Joe Dunn discussed working out a contract with the hotel in which inclusions are specified. This locks both TES and the hotel into certain rates.

Russ Patrick asked the Board if the meeting should return to the Drury in 1994. Gary Lentz moved, Lynn Snodderly seconded, that we return to the Drury Inn in 1994. The motion passed. The Local Arrangements Chairman will set up the date of the meeting.

President Patrick will write letters of congratulations to Jennifer Leuter and Deanna Colby and a letter of appreciation to Phillip Kirsch, our invited speaker.

The Manual of Operating Procedures will include a "Necrology" Section under responsibilities of the Awards Committee. The Operating Procedures will be published in the next issue of the Firefly and then be included every few years.

TENNESSEE ENTOMOLOGICAL SOCIETY
Treasurer's Report
August 31, 1993 - August 11, 1994

Balance on hand 8-31-93 **\$3768.75**
 Number of pins on hand 8-31-93 -----19

Expenses (October 1993 Meeting) (29.54)
 Kinko's (Dues receipts & Treas. Rpt (80.78)
 Lubdy's (Student dinners) (24.99)
 Reid Gerhardt (Plaques) (40.05)
 Russ Patrick (Letterheads & Programs) (86.32)
 Deanna Colby (Student paper award) (50.00)
 Drury Inn (A/V, Coffee, Juice) (277.50)

One pin donated to Phillip Kirsh, Invited speaker

TOTAL EXPENSES **(589.18)**

Income (October 1993 Meeting)

34 Reg. Member Registration & Dues 680.00
 1 Reg. Member Dues 5.00
 14 Student Member Dues 14.00
 1 Sustaining/Corporate Member Dues & # Reg. 40.00
 1 Sustaining Dues 25.00
 Joe Dunn, Cash donation 5.00

TOTAL INCOME **769.00**

Balance on hand 8-11-94 **3948.57**

Number of pins on hand 8-11-94 -----18

Submitted 8-11-1994

Harvey Barton, Treasurer

**ATTENDANCE ROSTER OF THE 1993 ANNUAL MEETING
OF THE TENNESSEE ENTOMOLOGICAL SOCIETY**

<u>MEMBER</u>	<u>AFFILIATION</u>	<u>LOCATION</u>
<u>Honorary Members</u>		
Brown, Carl D.	Memphis State (Ret.)	Memphis, TN
<u>Regular Members</u>		
Bancroft, Harold E.	Memphis State Univ.	Memphis, TN
Barton, Harvey E.	Arkansas State Univ.	Jonesboro, AR
Biggers, Charles J.	Memphis State Univ.	Memphis, TN
Bogard, James B.	TN Dept. Agri.	Nashville, TN
Bolin, Ronald E.	TN Dept. Agri.	McMinnville, TN
Cagle, Jimmy	TN Dept. Agri.	Winchester, TN
Cate, Randy H.	Univ. TN Martin	Martin, TN
Chaudhary, Hans R.	TN Dept. Agri.	Harriman, TN
Cole, Bruce A.	TN Dept. Agri	McMinnville, TN
Davis, Sylvester	TN Dept. Agri.	Nashville, TN
Dossett, Alice T.	Aquatic Res. Ctr.	Antioch, TN
Eisler, Jim	TN Dept. Agri.	McMinnville, TN
Emerson, Rich	TN Dept. Agri.	Jackson, TN
Gerhardt, Reid R.	Univ. of TN	Knoxville, TN
Grant, Jerome F.	Univ. of TN	Knoxville, TN
Haun, Walker G. (Gray)	TN Dept. Agri.	Louisville, TN
Heery, Frank	TN Dept. Agri.	Harrison, TN
Kauffman, Bruce W.	TN Dept. Ag. (Forestry)	Nashville, TN
Keener, Jim	TN Dept. Agri.	Maryville, TN
Kollars, Tom	GA South. Univ.	Statesboro, GA
Lentz, Gary L.	Univ. of TN	Jackson, TN
McGhee, Charles R.	MTSU	Murfreesboro, TN
Murphree, Steven C.	Belmont Univ.	Nashville, TN
Nabors, Ray A.	Univ. of MO	Portageville, MO
Ourth, Donald D.	Memphis State Univ.	Memphis, TN
Patrick, Russ	Univ. of TN	Jackson, TN
Powell, Steve D.	TN Dept. Agri.	Nashville, TN
Roberts, Phillip M.	Univ. of TN	Jackson, TN
Self, Anni	TN Dept. Agri	Nashville, TN
Shamiyeh, N. B.	Univ. of TN	Knoxville, TN
Skinner, John	Univ. of TN	Knoxville, TN
Snodderly, Lynn J.	TN Dept. Agri.	Strawberry Plains, TN
Southards, Carroll J.	Univ. of TN	Knoxville, TN
Stewart, Randall T.	TN Dept. Agri.	Manchester, TN

MEMBERAFFILIATIONLOCATION

<u>MEMBER</u>	<u>AFFILIATION</u>	<u>LOCATION</u>
	<u>Student Members</u>	
Bannister, Jennifer M.	Univ. of TN	Knoxville, TN
Carder, Mark C.	Univ. of TN	Knoxville, TN
Colby, Deanna M.	Univ. of TN	Knoxville, TN
Copely, Kenneth J.	Univ. of TN	Lyles, TN
Couch, Terry D.	MTSU	Murfreesboro, TN
Dellinger, Theresa	Univ. of TN	Knoxville, TN
Dickey, Laressa A.	Memphis State Univ.	Memphis, TN
Hughes, David N.	Univ. of TN	Knoxville, TN
Hutchison, Kimberly R.	Univ. of TN	Knoxville, TN
Lockey, Timothy	Memphis State Univ.	Memphis, TN
Long, Lewis Scotty	MTSU	Murfreesboro, TN
McCaskill, Amy J.	Univ. of TN	Knoxville, TN
McCasland, Curtis S.	Memphis State Univ.	Memphis, TN
Stanton, Robert C.	Univ. of TN	Knoxville, TN

Sustaining/Corporate Members

Greer, Lee	Valent	Dunlap, TN
Hopkins, Alan	Miles, Inc.	Little Rock, AR

BOARD OF DIRECTORS

President - Jerome Grant
Past President - Jaime Yanes, Jr.
President-Elect - Russ Patrick
Secretary - Gary Lentz
Treasurer - Harvey Barton
Editor - Gray Haun
Historian - Harry Williams
Member-at-Large - Alan Hopkins
Member-at-Large - Donald Ourth

COMMITTEES: 1992 - 1993

AUDITING

Carroll Southards, Chair
Frank Hale
Gary Lentz

AWARDS

Steve Murphree, Chair
Reid Gerhardt
Bill Shamiyeh
Harry Williams

CONSTITUTION

Joe Dunn, Chair
Charles Pless
Gene Burgess

LOCAL ARRANGEMENTS

Jim Bogard, Chair
Lee Greer
Steve Murphree

MEMBERSHIP

Harold Bancroft, Co-Chair
Charles Pless, Co-Chair
Hans R. Chaudhary
Alan Hopkins
Charles N. Watson, Jr.

NOMINATION

Gene Burgess, Chair
Bill Shamiyeh
Harry Williams
Jaime Yanes, Jr.

PROGRAM

Russ Patrick, Chair
Jerome Grant
Don Ourth
Bill Shamiyeh
John Skinner
Chris Stanton
Cletus Youmans

PUBLICATION/EDITORIAL

Gray Haun, Chair
Gene Burgess
Bruce Kauffman
Jim Keener
Paris Lambdin
Gary Lentz
John Skinner
Lynn Snodderly

PUBLICITY

Harry Williams, Chair
Lee Greer
Frank Hale
Steve Powell
J.T. Vogt

PREDICTION/EVALUATION

Steve Powell, Chair
Jimmy Cagle
Gray Haun
Paris Lambdin
Harry Williams

Tennessee Entomological Society

Prediction and Evaluation

Committee Report

October 21 , 1993

Steve Powell - Chairman

Committee Members:

Jimmy Cagle

Gray Haun

Paris Lambdin

Harry Williams

Interesting Pest Outbreaks

Frank A. Hale
University of Tennessee
Agricultural Extension Service

This past year has been an interesting one for an Extension Entomologist working at the Plant Pest Diagnostic Center in Nashville. The public is very adept at alerting me to when a certain insect increases to damaging or annoying levels. Comments often received with the insect samples include, if this is a new pest, will they be this bad next year, and I have never seen these before, what are they? Being fairly new to Tennessee, I was often found wondering some of these same thoughts. Here are just a few of the insects and related arthropods that caught people's attention over the past year. In October of 1992 we received many reports of ladybird beetles aggregating in large numbers on the side of houses in the warm afternoon sunlight. This behavior occurs prior to the beetles finding places to overwinter under the leaf litter in protected places around houses. Later in March, I received more complaints of these harmless ladybird beetles, this time getting inside of houses. In October of 1993, I received more reports of ladybird beetles aggregating or getting into the house. The large number of ladybird beetles may be the result of favorable conditions such as the cool, wet summer of 1992 which produced lots of aphids, which in turn were food for the ladybird beetles.

Yellow poplar weevils were quite numerous last spring and early summer. The adults feed on the new leaves of tulip tree, magnolias, and sassafras in April, produce blotch leafminers, and emerge as adults again in early June. The small, black weevils often land on people when they are outside picnicking or watching ball games. Also, in late May and early June, unbelievable numbers of the hackberry butterfly were reported as occurring in Rutherford, Cannon, Giles, Wilson, and other counties. People living in the wooded areas where these butterfly explosions occurred couldn't go outside without being practically covered with these light brown butterflies.

Millipedes were also extremely plentiful early this past summer. This was particularly a problem for residences in or around wooded areas. Shade and heavy use of mulch may make these habitats very favorable for outbreak of millipedes. In early July, there were many reports of barklice aggregations being found on tree trunks. These harmless barklice, which are related to booklice, feed on molds and pollen found on or around trees. Nuisance bees and wasps often reported include the carpenter bee, cicada killer wasps, and Scolia dubia, a wasp parasitoid of the green June beetle.

I received many samples of imported fire ants. Agricultural Extension agents and landowners are more aware of these pests and are doing a good job of sending in samples they suspect to be imported fire ants. The Korean lady beetle, Chilocoyus kuwanae, an introduced predator of euonymus scale and San Jose scale, has been found to overwinter in Tennessee and seems to be an effective predator.

One pest that was surveyed for and fortunately not found was the pine shoot beetle, Tomicus piniperda (L.). This exotic pest of pine trees was first detected on July 1, 1992, in Lorain County, Ohio. This European insect is thought to have been introduced from wood dunnage used in hauling cargo in ships coming from Europe to the Great Lakes ports. A survey for this pest was done in July and August of 1993 as part of the Cooperative Agricultural Pest Survey (CAPS) in Tennessee (a cooperative agreement between the Tennessee Agricultural Extension Service and USDA-APHIS). The survey of pine plantings was done in N.E. Tennessee, and in locations around Knoxville, Chattanooga, Nashville, Jackson and Memphis. The survey will be continued in the summer of 1994.

INSECT PROBLEMS---1993

BILL SHAMIYEH
UNIVERSITY OF TENNESSEE
ENTOMOLOGY AND PLANT PATHOLOGY

SMALL GRAINS - WHEAT

Cereal Leaf Beetle: Infestation levels were moderate in Robertson County averaging 1.0 larvae/stem.

Aphids: Populations were light.

FORAGE CROPS - ALFALFA

Alfalfa Weevil: Alfalfa weevil larva counts were low in plots in Springfield averaging 28.15 larvae/sweep and moderate in Spring Hill averaging 13.5 larvae/sweep.

FIELD CROPS - FIELD CORN

European Corn Borer: Infestation levels were very 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 high in Middle and East Tennessee with the development of sooty mold fungus. At Greeneville, aphid populations were moderate 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.

VEGETABLE CROPS: Snap Beans

Mexican Bean Beetle:

Very 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

Worm Complex:

Pre-treatment counts at Crossville averaged 2.5 worms 80/plants.

Sweet Corn

Corn Earworm:

Earworm populations at Crossville were very heavy averaging 1.5 worms/ infested ear.

Ornamental and Fruit Trees

Japanese Beetle:

Beetle populations were very heavy at Crossville with about 75% defoliation of apple trees and grape vines. Beetles were also heavy on crab apples and purple leaf plums.

Mites:

Two-spotted spider mite populations were very heavy on apple trees late in the season averaging about 284 mites/ leaf. One miticide application was sufficient.

TENNESSEE GYPSY MOTH PROGRAM 1993 SUMMARY

Bruce W. Kauffman
Forest Pest Specialist
Tennessee Department of Agriculture, Division of Forestry
Nashville, Tennessee

Egg mass surveys were carried out at five locations during the winter of 1992-93 (Grainger, Sequatchie, Sevier, Unicoi and Washington Counties). These areas were surveyed due to the high number of moth catches during 1992. All sites were negative except Sequatchie and Washington Counties.

The Sequatchie County area (Lewis Chapel) had three viable egg masses located on the foundation of a house. This structure was located in the infested area detected in 1988. A total of 155 acres was treated with Gypchek twice aerially on May 6 and 8, 1993. The spray project was coordinated by the State Department of Agriculture (TDA), Plant Industries Division, with technical assistance provided by USDA Forest Service. A USDA APHIS-PPQ airplane from Mission, Texas applied the nucleopolyhedrosis virus. Burlap bans (39) were monitored prior to and following the treatment. Fifteen larvae were destroyed, and no larvae were found after May 18, 1993 when two caterpillars were collected in the third instar.

An egg mass survey near the Fall Branch community in Washington County located one egg mass at a rural residence where a relative from Maryland had parked a recreational vehicle during a summer visit. An area of 840 acres in Washington County and adjacent Sullivan County involved two applications of *Bacillus thuringiensis* (Foray 48B) at 24 BIU's per acre undiluted sprayed from an Ag Cat on April 28-29 and May 7, 1993. Burlap bands (5) were monitored before and after the treatment, and no larvae were found.

TDA under a cooperative agreement with the USDA APHIS PPQ hired 20 individuals to place traps in 40 central and eastern counties. Traps were placed at a rate of one per four square miles. In addition, TDA personnel under the same cooperative agreement placed traps at the rate of one per one square mile within the city limits of Knoxville, Columbia and Franklin and all incorporated cities of Rutherford and Wilson Counties. USDA APHIS PPQ personnel placed traps at the rate of one per one square mile within the city limits of towns in eleven western and four central Tennessee Counties. In Davidson County and portions of Sevier and Shelby Counties, the trapping rate was one per one square mile. Delimiting surveys were carried out by TDA personnel in portions of Bledsoe, Carter, Grainger, McNairy, Rhea, Sequatchie, Sullivan, Unicoi and Washington Counties (9 to 36 traps per square mile).

There was an aggregate of 9,662 traps placed in 92 counties by several cooperating state and federal agencies. A total of 4,654 moths were caught in 27 counties in 501 traps (341 multiple catch traps - see attached map). The greatest increase was in Grainger County where

a new infestation was found. Four new counties (Giles, Maury, Morgan, Williamson) trapped gypsy moths for the first time.

In the infested portion of Rhea County, approximately 30 square miles were trapped at the rate of nine traps per square mile by the TDA. A delimiting grid of four traps per acre over 45 acres was employed in the center of this area. Five positive catch sites from 1992 were delimited at nine traps per acre. Five moths were trapped in two traps with one trap in the same location as 1992. Trapping will continue until no moths are caught for two successive years.

The Sequatchie County infestation at Lewis Chapel was trapped at the rate of 16 traps per square mile, an area of six square miles, by the TDA. A 20 acre area was trapped at the rate of nine traps per acre at previous catch sites and the center of the infestation. No moths were trapped in the area. Trapping will continue until no moths are caught for two successive years.

In Sullivan County in 1993 at the Jacob's Creek Job Corps Center, a delimiting grid of 104 traps was put in place over four square miles by the U.S. Forest Service. No moths were recovered. No infestation has been found at this location to date.

In nearby Washington County at the Fall Branch community, a delimiting grid of 161 traps was placed over nine square miles. No moths were detected following the May, 1993 treatment. Trapping will continue until no moths are caught for two successive years.

In June, 1993, an infestation was discovered in the Joppa community of Grainger County where 69 moths were trapped in 1992. A total of 635 traps were placed over a 20 square mile area where 4469 moths were caught (414 positive traps; 313 multiple catches). Over 80 percent of the catches were in a 50 acre area where 321 larvae and 48 pupae were removed. Plans are being made to treat 6,000 acres in the spring of 1994.

A delimiting grid of nine square miles with 91 traps in Unicoi County (Scioto Road) and adjacent Carter County caught 52 moths in a location where seven were trapped in 1992. In McNairy County, a delimiting grid of nine square miles with 102 traps caught eight moths. This location at the Eastview community trapped five moths in 1992.

Thirteen (Blount, Cocke, Davidson, Giles, McNairy, Maury, Morgan, Rhea, Rutherford, Sevier (3) and Unicoi Counties) sites have been targeted for egg mass surveys. Detection trapping by the TDA and USDA APHIS PPQ in the 1994 season will be focused on the central Tennessee region of 32 counties. Delimiting trapping will be undertaken in Blount, Carter, Cocke, Davidson, Giles, Grainger, Knox, McNairy, Maury, Morgan, Rhea, Rutherford, Sequatchie, Sevier, Sullivan, Unicoi, Washington and Wilson Counties. Larval bands will be placed in Blount, McNairy, Morgan, Rhea, Sequatchie, Unicoi and Wilson Counties.

The State Division of Forestry, U.S. Forest Service, and other federal agencies will place 2300 traps at high visitor use sites within the State.

1993 NEW RECORDS - STATE AND COUNTY

AMBROSIA BEETLE [*Xylosandrus crassiusculus* (Motschulsky)]
 (Data according to PPQ & TDA)

<u>Date</u>	<u>County</u>	<u>Crop</u>	<u>Record Type</u>
7/20/93	Wilson	White Dogwood	state

DOGWOOD ANTHRACNOSE (*Discula destructiva*)
 (Data according to US Forest Service & TDA)

<u>Date</u>	<u>County</u>	<u>Crop</u>	<u>Record Type</u>
7/09/93	Grainger	Dogwood	county
7/09/93	Wilson	Dogwood	county

DOWNY MILDEW (*Peronospora sparsa*)
 (Identified by Dr. Alan Windham)

<u>Date</u>	<u>County</u>	<u>Crop</u>	<u>Record Type</u>
4/30/93	Humphreys	Rose	state
5/10/93	Dickson	Rose	county

KOREAN LADYBEETLE (*Chilocorus kuwanae*)
 (Identified by Michael D. Bryan, USDA APHIS PPQ)

<u>Date</u>	<u>County</u>	<u>Crop</u>	<u>Record Type</u>
3/22/93	Davidson	Euonymus	county

NINETEEN SPOTTED (HALLOWEEN) LADYBEETLE (*Harmonia axyridis*)
 (Identified by Dr. Frank Hale)

<u>Date</u>	<u>County</u>	<u>Crop</u>	<u>Record Type</u>
10/19/93	Johnson		county
11/01/93	Carter		county
11/15/93	Moore		

PINK BOLLWORM (*Pectinophora gossypiella*)
 (Data according to PPQ & TDA)

<u>Date</u>	<u>County</u>	<u>Crop</u>	<u>Record Type</u>
9/30/93	Dyer	Cotton	state
10/05/93	Lauderdale	Cotton	county

1993 New Records - State and County (continued)

Need for
1994 + 1995

POWDERY MILDEW (*Oidium* sp.)
(Identified by Dr. Alan Windham)

<u>Date</u>	<u>County</u>	<u>Crop</u>	<u>Record Type</u>
1/11/93	Humphreys	Poinsettia	county

RED IMPORTED FIRE ANT (*Solenopsis invicta*)
(Data according to PPQ & TDA)

<u>Date</u>	<u>County</u>	<u>Crop</u>	<u>Record Type</u>
4/08/93	Anderson	established	county
4/08/93	Grainger	established	county

ROSE ROSETTE DISEASE (*Unknown causal agent*)
(Identified by Elizabeth A. Long)

<u>Date</u>	<u>County</u>	<u>Crop</u>	<u>Record Type</u>
7/21/93	Grundy	Multiflora Rose	county

SEVEN SPOTTED LADYBEETLE (*Coccinella septempunctata*)
(Identified by Dr. Frank Hale)

<u>Date</u>	<u>County</u>	<u>Crop</u>	<u>Record Type</u>
5/13/93	Giles	PPQ Survey	county

TOMATO SPOTTED WILT VIRUS
(Identified by Elizabeth A. Long, Dr. Steve Bost & Dr. Alan Windham)

<u>Date</u>	<u>County</u>	<u>Crop</u>	<u>Record Type</u>
4/28/93	Overton	NG Impatiens	county
6/16/93	Dickson	Tobacco, B	county
6/21/93	Cannon	Tobacco, B	county
7/02/93	Humphreys	Tobacco, B	county
7/13/93	Fentress	NG Impatiens	county

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

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

Secretary of the Tennessee Entomological Society

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

Treasurer of the Tennessee Entomological Society

<u>Treasurer</u>	<u>Term</u>	<u>Affiliation</u>
Harvey Barton	'91 - '93	Arkansas State University

Editor of the Tennessee Entomological Society

<u>Editor</u>	<u>Term</u>	<u>Affiliation</u>
Gray Haun	'92 - '93	Tenn. 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 Bevill	'87 - '88	Arkansas State University
Michael E. Cooper	'88 - '89	Tenn. 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	Tenn. Dept. of Agriculture
Steve Powell	'91 - '92	Tenn. Dept. of Agriculture
Lee Greer	'91 - '92	Valent
Mark Carder	'92 - '93	University of Tennessee
Rich Emerson	'92 - '93	Tenn. Dept. of Agriculture

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 William	'92 - '93	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.

**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

**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

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 Chairman 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 ('92), ('93) 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

MEMBERSHIP LIST

AUGUST 1993

- | | | | |
|-----|--|-----|---|
| '93 | Harold Bancroft
Dept. of Biology
Memphis State University
Memphis, TN 38152
(901) 454-2592 | '93 | Ronald E. Bolin
Rt. 1, Box 347A
McMinnville, TN 37110 |
| '93 | Harvey E. Barton
909 Chestnut
Jonesboro, AR 72401
(501) 932-4347 | H | Carl D. Brown
Dept. of Biology
Memphis State University
Memphis, TN 38111
(901) 454-2963 |
| '93 | Jennifer M. Bannister
483d1 Summit Cir. #188
Knoxville, TN 37919 | H | Howard L. Bruer
1604 Green Hills Dr.
Nashville, TN 37215
(615) 269-9740 |
| '93 | Biggers, Charles J.
Biology Department
Memphis State University
Memphis, TN 38152
(901) 454-2592 | '92 | Edward E. (Gene) Burgess
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P.O. Box 1071
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(615) 974-7138 |
| '93 | James B. Bogard
Plant Industries TDA
Box 40627, Melrose Station
Nashville, TN 37204
(615) 360-0130 | '92 | Jimmy L. Cagle
P.O. Box 341
Winchester, TN 37398
(615) 967-1240 |
| | | '93 | Mark C. Carder
205 Ellington Pl Bldg
Univ. of TN.
Knoxville, TN 37901 |

- '93 Randy H. Cate
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- '92 Houston M. Chandler
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- '92 Jack Chandler
Good Earth Termite and
Pest Control Company
PO Box 281196
Memphis, TN 38168
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- '93 Hans R. Chaudhary
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- '93 Deanna M. Colby
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- '93 Bruce A. Cole
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- '93 Kenneth J. Copley
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- '93 Terry D. Couch
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- '93 Alice T. Dossett
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- H Joe C. Dunn
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- '93 James I. Eisler
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- '93 O. Z. Evers
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- '92 James T. Vogt
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- '92 Stephen L. Weldon
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(901) 377-5779

Sustaining Members ('92)

Jaime Yanes, American Cyanamid Company

Clete Youmans, American Cyanamid Company

Sustaining Members ('93)

Lee Greer, Valent

Alan Hopkins, Miles Inc., Agri. Division

**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 () _____

Occupation _____

Please Check

Annual Dues \$ 5.00

Society Pin \$10.00

Annual Dues for Students \$ 1.00

Sustaining Member Dues \$25.00

Amount Enclosed _____

Please Remit to:

Dr. Gary Lentz
U.T. Agric. Ext. Serv.
605 Airways Blvd.
Jackson, TN 38301