

THE FIREFLY

**Proceedings of the Seventeenth
Annual Meeting of the
Tennessee Entomological Society**

**November 2 - 3, 1989
Music City Rodeway Inn
Nashville, Tennessee**

Volume Four

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PROCEEDINGS OF THE SEVENTEENTH ANNUAL MEETING

November 2 - 3, 1989

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The Biology and Sampling Techniques for the Pear Thrips (Taeniothrips inconsequens), an Important Economic Pest of Sugar Maples.

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Preliminary sampling for Taeniothrips inconsequens on sugar maples in southwestern Pennsylvania is discussed. Soil emergence traps were placed 2M and 4M from the base of the trees. Leave and buds from upper, middle and lower thirds of the trees were examined for the infestation by thrips. There was no significant difference between the three areas of the tree. The physical damage is that the trees become defoliated and the leaves misshaped. From this damage the tree goes through less photosynthesis and therefore produces less sap. The economic loss has been estimated at 5 million dollars.

A Light Trap Survey of Adult Female Mosquitoes of Craighead County, Arkansas

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A study was conducted from June through October of 1986 and April through October of 1987 to improve existing knowledge concerning the species of adult female mosquitoes in Craighead County, Arkansas. Through daily sampling with seven New Jersey light traps, and with occasional collection by hand and with a CDC miniature light trap, a total of 16 species representing seven genera was captured. Psorophora columbiae (65.4%), Anopheles quadrimaculatus (18.8%), and Aedes vexans (13.8%) were the most-frequently collected species in both years. The general biology, habitat preference, and seasonal distribution data for each species are reported.

**Observation on the Cellular Elements Found in the
Hemolymph of Phenacoccus gossypii Townsend and Cockerell**

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The hemolymph of the Mexican mealybug was microscopically examined to determine the hemocyte types that exist in this species. The five different hemocyte types characterized were: coagulocyte, granulocyte, plasmatocyte, prohemocyte, and the spherulocyte. The coagulocytes are distinguished by their large size, centrally placed nucleus and large inclusions in the cytoplasm. The granulocytes are medium sized cells with a centrally placed nucleus and large amounts of small, dense granules in the cytoplasm. The plasmatocytes are also medium in size but eccentric in shape with lots of filopodia. The spherulocytes are large cells with many large, eosinophilic granules in the cytoplasm. The prohemocytes are small, dense cells possessing a large centrally placed nucleus.

Functionally, the prohemocytes are implicated as the precursor cells for all the other hemocyte types. They may attach themselves to the surface of a foreign body but do not seem to be able to elicit much of an immune response. The plasmatocytes are thought to be involved in the phagocytic response to foreign material. Granulocytes are involved in phagocytic, coagulation and clotting reactions. The spherulocytes and coagulocytes are also thought to be involved in coagulation reactions.

This study was undertaken to help identify the hemocytes of this species so that they may be more readily separated from other cellular elements in histological sections. Additionally, characterization of the blood cell types can aid in understanding immune reactions and the types of pathogenic intrusion endemic for the Mexican mealybug.

Unknown fungal and bacterial elements were also found free in the hemolymph.

**The Use of B.T.I. for Mosquito Control
in NE Arkansas Rice Fields**

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The bacterial organism B.T.I. (Bacillus thuringiensis israeliensis) has been used as a biological control agent for mosquito larvae of rice field waters in several states outside Arkansas. A preliminary evaluation of B.T.I.'s effectiveness in NE Arkansas was conducted in 1989 utilizing the liquid B.T.I. formulation Teknar™. A treatment rate of one pint of Teknar™ in five gallons of water for every 4.05 hectares was applied to approximately 1,200 hectares of rice by way of five-gallon plastic dripping containers placed at selected levee gates in each field. Populations of adult Psorophora columbiae and Anopheles quadrimaculatus, the two most important rice-field related mosquito species in NE Arkansas, were monitored as B.T.I. effectiveness indicators.

Data from four New Jersey light traps located near treated fields revealed a 31 percent decrease in the P. columbiae population compared to catches from the same traps the previous year when no B.T.I. was employed. The A. quadrimaculatus population showed an increase of nearly 38 percent. Inhibited B.T.I. distribution due to greatly reduced irrigation water flow in late season rice was believed to have been the major reason for B.T.I.'s apparent ineffectiveness against A. quadrimaculatus, a typically late-season breeding mosquito in NE Arkansas rice fields.

**Parasitoids of the Tobacco Aphid, Myzus nicotianae Blackman:
Interactions among the Aphid, Predator,
Parasitoids, and Host Plants**

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A study was conducted to investigate the species composition of parasitoids of the tobacco aphid, Myzus nicotianae Blackman, on tobacco plants (Nicotiana tabacum L.) in both greenhouse and field, and to determine the roles of tobacco leaf trichome exudates in host plant-aphid-predator-parasitoid interactions. Three types of plant leaves were used in experiments: TN 86, a burley cultivar with secreting leaf trichomes and a medium level of exudates; GR 115, a burley breeding line with nonsecreting leaf trichomes and low level of exudates; and turnip, a suitable host plant for the tobacco aphid and used as a non-tobacco control.

Parasitized aphids on tobacco were common in greenhouses but rare in field plots. Five species of hymenopteran parasitoids of the tobacco aphid were collected from greenhouses and field plots in eastern Tennessee during 1989. Ten species of secondary hymenopteran parasitoids were found to be associated with the primary parasitoids.

During 1988 and 1989, aphid populations were significantly higher in TN 86 than on GR 115 in Knoxville and Greeneville. In laboratory studies, development time of the immature stages of the tobacco aphid was slightly shorter on TN 86 than on GR 115; however, the development rate and fecundity of the tobacco aphid were not affected by level of tobacco leaf trichome exudates.

Activities of the convergent lady beetle, Hippodamia convergens Guérin-Méneville, were significantly affected by the secreting trichomes on TN 86 compared to GR 115. Aphid predation was significantly lower on TN 86, and movement of adults was significantly inhibited by trichomes exudates on TN 86. Significantly more last instar

larvae and adults of the convergent lady beetle responded to GR 115 than to TN 86 in a Y-tube olfactometer.

In laboratory studies, parasitism of the tobacco aphid by both Diaeretiella rapae (M'Intosh) and Aphelinus asychis Walker on field-grown tobacco leaves was significantly lower on those leaves with secreting trichomes. Development of parasitoid larvae was not affected by differences in tobacco host plants. Adult emergence and sex ratios of A. asychis was, however, affected by host plants. Contact with leaf-surface exudates or exposure to volatile chemicals released by the tobacco leaves was toxic to the parasitoids, D. rapae and Alloxysta fuscicornis (Hartig). Significantly fewer parasitoids responded to TN 86 when compared to either GR 115 or non-tobacco host plant, turnip, in a Y-tube olfactometer.

The Damsel Flies of Arkansas

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No Abstract Submitted

Influence of Tobacco Leaf Exudates on Predation and Oviposition by Jalysus wickhami (Hemiptera: Berytidae) and Geocoris punctipes (Hemiptera: Lygaeidae)

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The quantity of exudates produced by glandular trichomes on leaves of different tobacco genotypes are responsible for altering the activities of both pest and beneficial insect species associated with this crop. This study was conducted to determine the influence of trichome exudate levels on oviposition and predation by the stilt bug (SB), Jalysus wickhami Van Duzee, and the big-eyed bug (BEB), Geocoris punctipes (Say), on tobacco leaves in the laboratory. Tobacco entries utilized in this study were GR 115, a burley breeding line with low exudate levels and non-sticky leaves; TN 86, a burley cultivar with moderate exudate levels and sticky leaves; and PDJA 309, a flue-cured breeding line with high exudate levels and sticky leaves. In both no-choice and free choice laboratory tests, SB demonstrated ovipositional non-preference for low-exudate leaves; whereas, BEB exhibited ovipositional non-preference for moderate or high-exudate leaves. In other laboratory tests, predation by BEB of tobacco aphids, Myzus nicotianae (Blackman), and tobacco budworm, Heliothis virescens (Fabricius), eggs was enhanced on low-exudate leaves. SB predation was not influenced by leaf exudate levels with one exception, predation of tobacco budworm eggs was reduced on high-exudate leaves.

**Effect of Acremonium coenophialum in KY-31 Tall Fescue
on Immature Stages of Selected Soil Insects**

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Field and laboratory studies were conducted to establish if soil insects are adversely affected by Acremonium-infected (E+) or non-infected (E-) tall fescue plants. Studies with Japanese beetle, Popillia japonica Newman, indicated that factors toxic to that insect are present in the roots of E+ plants. Potted plants which were artificially infested with Japanese beetle eggs had significantly more third instar larvae surviving in 80% E+ plantings than 80% or 100% E+ plantings after 3 months. Field studies with natural populations of Japanese beetles or with artificial infestations did not produce conclusive results.

Thistle Research in Tennessee--An Overview

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Musk thistle, Carduus thoermeri, was introduced into Canada and the United States from Europe more than 100 years ago, and has become a serious problem in Tennessee. It is commonly found along highway and railroad right of ways, unkept ditchbanks, pastures, and unused farmland, and near suburban residences. This plant pest also may reduce the amount of pasture grass available for grazing. Because of problems associated with the area-wide management of thistle populations, a biological control program, using plant-feeding weevils, was initiated in cooperation with Tennessee Department of Transportation and Tennessee Department of Agriculture.

During 1989, two plant-feeding weevils were released at 11 locations in eastern and middle Tennessee. These weevils, which are native to Europe and feed exclusively on thistles, are the head weevil, Rhinocyllus conicus, and the rosette weevil, Trichosiromus horridus. The head weevil feeds on the developing seeds and the rosette weevil feeds on the rosette. Three additional sites were selected as control sites (i.e., no weevils were released). During mid to late May, ca. 300-400 adult head weevils were released, and during late June, ca. 125 adult rosette weevils were released. Types of information that were collected included plant height and density, number of buds/plant, number of flowers/plant, number of seed heads/plant, and number of weevil eggs or adults/bud/flower/seed head. Head weevil eggs were recovered at all 11 sites, though some were in low numbers. As weevil populations become established, their development and impact on thistle will continue to be monitored.

In conjunction with the biological control program, the seasonal incidence of arthropods on musk thistle was also monitored. Types of information collected included

plant height and density, number of buds, flowers, and seed heads/plant, arthropod type, number, and location on plant, and types of plant damage. One of the more common insects encountered during early season was a spittlebug (Cercopidae); soldier beetles, treehoppers, and plant bugs were also observed. During plant flowering, several different insect species, including scarab beetles, thrips, minute pirate bugs, bees, and moths, were encountered. Numerous spiders, including lynx, crab, and jumping spiders, also were observed. Thistle heads infested by a pyralid moth, Dicymolomia julianalis, were found at nine sites. Larvae of this moth fed on developing seeds in the bud, and seeds were seldom found in plant heads where larvae were present. This study will provide information on the effects of native arthropod fauna on thistle, as well as general information on insect/thistle relationships.

Aspects of Wing and Venation Features as a Factor of Phylogenesis in the Coccoidea

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The male Coccoidea are relatively conservative in their morphological structure. As such, they are extensively used to delineate coccoid relations. In a comparison of the wing features of Sphaeraspis (Margarodidae) with those of Aphis (Aphididae), numerous synapomorphies are revealed that aid in establishing the monophyletic nature of the two groups. Within the Coccoidea, wing features, along with other morphological features, are used to distinguish some two dozen family level taxa.

Motility in males is critical for dispersion of the group, particularly in regard to a progressively growing sedentary behavior in coccoid females. Therefore, it appears worthwhile to evaluate coccoid wing features from the archeo- to the neo-coccoid direction.

The most prominent features are: (1) Development of a normal broad based elongate wing blade, with a fully stretched costal margin, an obtuse apical angle, a broadly rounded apical margin that merges gradually with the anal margin, and the latter bordering an elaborate lobe-like anal area. The angle that the outer anal margin makes with the costal vein approaches a right angle. (2) A gradual petiolation, even within the same family level taxa, archaic or advanced, is a discernible apomorphic feature. (3) The appearance of the veins is irregular, but consistent. (4) In Matsucoccus, this plate appears parallel-sided. (5) In primitive taxa, all veins take their origin from the base of the wing. The maximum veins visible are: (a) costal complex, (b) radius, (c) radial sector between radius and media, and (d) a crease below media represents the cubitus or preferably cubitoanal.

This trend is consistent for all groups, except for the monophlebids where the full compliment of veins are developed. In Orthezidae and Margarodidae, they do not appear complete in number. With the exception of the radial and medial veins which form a fork, all other veins are lost or merged in the neo-coccoid taxa.

A notable feature with respect to the disposition of the veins is the greater length of the unjointed basal stem of the radius from the archeo- to the neococcoids. These veins remain unjointed by the medial. In Pseudococcidae, Kermesidae and Diaspididae, the base of medial vein becomes disjointed leaving some vacant space before starting its disposition.

**Impact of Mountain Pine Beetle, Dendroctonus ponderosae,
on Stands of Lodgepole Pine, Pinus contorta: 1989 Case Studies**

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A two-week visit to portions of Sawtooth National Forest (Idaho) and Teton and Yellowstone National Parks (Wyoming) was made in late June to early July, 1989, to observe lodgepole pine stands which were currently infested or had previously been infested with mountain pine beetle. This insect infested approximately 3.5 million acres annually in the U.S. during the 1980's. In 1988 alone, mountain pine beetle killed over 100 million cubic feet of timber in eleven western states. Fire suppression policies which were followed in the national parks prior to the late 1980's allowed large volumes of standing and fallen shags to accumulate as potential fuels in lodgepole pine forests; at the same time, regeneration of lodgepole pine, which is a fire-dependent species, was prevented. The slides shown at this meeting illustrate the natural sequence of mountain pine beetle-caused mortality, followed by wildfire and regeneration of lodgepole pine. That natural sequence had been restored to the national parks by a new policy which allows naturally-caused wildfires to burn until they are naturally extinguished.

**Organic Farming: A Source of Challenge
and Opportunity for Entomologists**

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Organic farming has become an important issue in present day crop and food production technologies. While many view organic farming as an alternative to maintain high production level without damaging environmental conditions, the others express skepticism about its role in agricultural production process. The objective of the present

discussion is to view organic farming as a complementary farming system rather than an alternative. Furthermore, it is aimed at highlighting the challenges and the opportunities in organic farming system. Conventional production system (chemical intensive agriculture) has been found exceedingly successful in achieving a very high level of food production worldwide. However, it has also affected the environment in an adverse manner. It is rather paradoxical to envision the present thrust of the World Health Organization of achieving health for all by the year 2000 in light of the environmental pollution posed by the conventional agriculture. Organic farming (purely organic or regenerative agriculture) offers certain features which would not only help to maintain a high level of production but will also improve the environmental quality. Therefore even a limited role of organic agriculture is thought to complement the conventional agriculture in producing abundant food with superior quality. For many, the concept of organic agriculture is confusing and controversial. There are certain factors which are considered to be important to intensify our misunderstanding about this important agricultural system. While many believe that organic agriculture is a reversion to the agriculture of the 40's, others consider its relevance only to backyard gardens. Additionally, the philosophy and principles of organic farming is evolved by the garden practitioners and farmers rather than the scientific community. Furthermore, its literature is written by the farmers for others who share an ill-defined but common set of goals and principles. We, as biologists, have great difficulty in sorting through the maze of controversial statements to arrive at an understanding of the subject of organic agriculture. Lack of an unambiguous definition and overemphasis on skepticism are other factors that limit our knowledge about the organic farming. Organic agriculture has some problems. However, it possesses potential challenges for agronomists and entomologists. Organic resources such as human waste (night soil), industrial, and animal wastes offer tremendous potential for fertilizer which would not only improve quantity and quality of our product but will also improve the quality of our environment. Adequate management of microorganisms will help reduce our dependence on chemical control of insect pests and diseases. It would also help to capture freely available atmospheric nitrogen through an increased understanding of nitrogen fixation process. Biotechnology and the genetic engineering are considered to be important tools to accomplish the aforementioned task. There are a few exotic and domestic trees that could be utilized as important sources of pesticides for the biological control of pests. However, this area needs additional emphasis through various research programs. Finally, there is a growing need to develop parameters to evaluate the standards and quality of the organic farming products.

In view of growing concern about the damaging effect of the conventional agriculture on environment, organic farming offers some relief. However, our wisdom and proper employment of education, research, and development facilities are key to experience the productiveness of organic agriculture to a fuller extent.

**The Honey Bee
Tracheal Mite
[Acarapis woodi (Rennie)]
Harry E. Williams, Professor
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The honey bee tracheal mite is an internal parasite in the thoracic tracheal system of adult bees. Queens, workers and drones are hosts of these mites.

Tracheal mites infest colonies either during the application of management practices or the activities of the bees. Infested bees may be shipped to you in packages or queen bee cages. Swarms may be infested with mites. Bees drifting from one hive to another may be infested.

The percentage of infested worker bees will increase during the late fall and winter. This occurs as the population of the worker bees decline and the bees are confined in the hive for long periods of time. High mite infestation levels in drones during the summer have been reported.

Mated female mites migrate from the host bees in which they developed to 1- to 9-day old worker or drone bees. The female mites exit through the spiracle of the original host, crawl to the tip of a hair and transfer to 1- to 2-day-old host bees. Mites transfer from one host to another when the bees are in contact in a cluster. Transfer is limited to fertilized, adult (mated), female mites, directly from one adult bee to another. The migrating female mites enter through the prothoracic spiracle and remain in the trachea of their second host throughout their adult life.

The oblong mites are whitish in color. The mouthparts are elongated into a beak-like structure that can pierce the tracheal wall of the host bee.

The size of the mite is best compared to the dimensions of a human hair. The average human hair is 100 microns in diameter, or 1/250 of an inch.

Female tracheal mites vary from 145 to 175 microns in length, and 75 to 84 microns in width. The females are about 1.5 times as long and 0.75 times as wide as the diameter of the average human hair.

The male mites are smaller than the females. They vary from 125 to 136 microns long by 75 to 84 microns wide.

An average female mite lays a total of 10 eggs throughout her adult life. Within 12 days after entering her host, she lays five to seven eggs. These unusually large eggs, about the size of an adult mite, hatch in three to six days.

Mites develop from eggs to adult in 12 to 21 days. Six-legged larvae, with one pair of well developed legs and two pairs of rudimentary legs, emerge from the eggs. Larvae are active feeders on the hemolymph (blood) of the host. Larvae do not molt, but transform into a pharate (late pupa) adult inside the larval skin.

Colonies infested by tracheal mites are weakened by the reduced flight efficiency of the bees, and a shorter life span of worker bees, especially under cooler climatic conditions. High levels of mite infestation result in decreased honey production,

decrease brood production and increased winter mortality of colonies. Large numbers of bees unable to fly, can be seen crawling on the ground near the hive. These bees may gather in small clusters.

The wings of walking bees are often held in an abnormal or dislocated position. The wings are unhooked and one or both hind wings are extended out to the side. The cluster of bees may extend loosely over the top bars of frames, and the bees act nervous similar to a queenless colony. The percentage of infested bees in a colony may range from 4 percent in May to more than 66 percent in February. This may be partially a result of the intimate contact of bees during the winter.

Place 2 ounces (56 grams) of menthol crystals, enclosed in screen wire or a nylon mesh envelope, on a slatted bottom board under the brood nest when ambient (surrounding) temperatures are about 70°F. Place crystals on top of frames in the center of hive bodies where bees are clustered when ambient temperatures are below 70°F. Repeat these treatments as needed, following label directions.

Update on Regulatory Insect Pest Problems in Tennessee

Michael E. Cooper

Entomologist III

Tennessee Department of Agriculture

During 1989 the major attention of this unit was focused on the "Red and Black Imported Fire Ants", "Honeybee Tracheal and Varroa Mites", and the "Gypsy Moth".

The Black Imported Fire Ant (*Solenopsis richterii*) continues to be detected in the state. The counties involved are Hardin, Wayne, McNairy, Hardeman, Chester, Lawrence and Giles. These infestations are a combination of natural spread from North Mississippi and artificial spread by man. State and federal quarantines have been placed on portions of McNairy, Hardin and Hardeman counties. Infestations in the remaining counties are small and most have been treated. Survey of these and adjacent counties is continuing.

Incidents involving the Red Imported Fire Ant (RIFA) (*Solenopsis invicta*) infestation in nursery stock continue to occur. There were 9 incidents involving the interstate movement of nursery stock that resulted in regulatory action. There were 56 known infestations of RIFA found and treated in the state. Some of the sites will get follow-up treatments this spring (1990). All of these infestations have been traced to the movement of nursery stock. In all there has been in excess of 150 regulatory incidents involving RIFA infested nursery stock since 1985.

Gypsy Moth (*Lymantria dispar*) trapping was concentrated in West Tennessee this year (one trap/four sq. mi.). Other high risk areas (i.e., state parks, campgrounds, tourist attractions, previous catch sites, etc.) across the state were also trapped.

In all 7,974 traps were set out resulting in 503 moths being caught in 20 counties. The Sequatchie County (located north of Chattanooga) infestation was delimited and 230 acres are slated for treatment during the spring of 1990. There were 291 moths and 340 egg masses collected at the site.

A second potential infestation has been found in northwestern Sevier County just outside Knoxville near Seymour, Tennessee. The infestation is located at the home of an antique dealer who makes frequent purchases from and trips to Pennsylvania. One egg mass was found on a camper trailer, and ten more spent ones on a purple martin house recently brought from Pennsylvania. Sixteen moths were caught in association with this site.

Trapping during the 1990 season will be concentrated in East Tennessee. The Sevier County site will be delimited this year. In Sequatchie County an intensive trapping program is planned in conjunction with the eradication program.

Surveys for the Tracheal (Acarapis woodi) and the Varroa (Varroa jacobsoni) mites continue. Currently 41 counties in the state contain apiaries infested with tracheal mites. At present no Varroa mites have been detected in the state.

Influence of Selected Management Strategies on Pest and Beneficial Species on Alfalfa

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Several studies were conducted to evaluate the influence of selected management strategies on pest and beneficial species in alfalfa fields. Pest species included the alfalfa weevil (Hypera postica), potato leafhopper (Empoasca fabae), and the threecornered alfalfa hopper (TCAH) (Spissistilus festinus). Beneficial species included big-eyed bugs (Geocoris spp.), nabids (Nabis spp.), several species of lady beetles, including sevenspotted, ninespotted, convergent, and pink lady beetles, and spiders. The objectives of this research were to: 1) monitor the seasonal incidence of selected pest and beneficial organisms, 2) evaluate the use of degree days in alfalfa weevil pest management, and 3) assess the impact of selected insecticides, used for early-season control of alfalfa weevil, on season-long densities of pest and beneficial organisms.

Predator populations were generally low during early season, when several species of lady beetles were the most commonly encountered predators. During mid- and late season (June and August), however, numerous predator species, especially big-eyed bugs and nabids, were abundant in alfalfa.

The use of degree days was easily incorporated into the overall alfalfa weevil pest management program. These temperature-dependent values may have potential for incorporation into management of alfalfa weevil in alfalfa fields in Tennessee.

Alfalfa weevil larvae (AWL) were effectively controlled by insecticides, as densities of AWL in each insecticide treatment were significantly lower than those in untreated plots on 4, 7, and 13 days posttreatment. Carbofuran provided the most effective control throughout the 61-day-posttreatment period. Late in the season, densities of alfalfa weevil adults (AWA) were generally highest in dimethoate- and azinphosmethyl-treated plots. Significant differences in numbers of TCAH among treatments were detected

during mid-season, as densities were generally greater in dimethoate-treated plots. No significant differences in numbers of Bathyplectes adults among treatments were detected. Insecticide type influenced populations of certain groups of natural enemies (e.g., big-eyed bug nymphs, nabid adults, spiders) during selected intervals of the growing season. Significant differences in densities of selected predaceous insects (combined for eight predator groups) among treatments were observed during early season, as well as for season long averages. However, no significant differences among treatments were detected during late season. It is interesting to note that none of these predaceous insects was found in dimethoate-treated plots during early season.

Patterns of Culicoides Emergence from Tree Rot-Holes

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Tree rot holes were examined for Culicoides occurrence and seasonal abundance. These are not water filled mosquito holes, but holes filled with moist rotting plant materials. Collections were made from three different locations in eastern Tennessee. Tree species and physical measurements of the hole and tree were taken at the time of sampling. Samples were placed in one pint ice cream container with a one inch hole cut from the lid. The hole is covered with a strip of acetate which is covered with stick-um. The insects were allowed to emerge and were removed from the strips weekly and identified. After emergence was complete, the samples are examined for the types of plant and other materials remaining. The number and percentage of each species are: C. guttipennis 421 (32%), C. footei 296 (22%), C. paraensis 245 (19%), C. hinmani 208 (16%) and C. flukei 153 (12%). Material from 51 tree species has been collected, there was no emergence from holes which contained conifer needles or collections from holes in black cherry trees.

Development of the Willow Scale,

Chionaspis salicisnigrae Walsh, in Tennessee

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The willow scale, Chionaspis salicisnigrae, was originally described by Walsh in 1868 from specimens collected on Salix nigra. This species is recognized by its snow white test, and has been documented infesting the bark and leaves of species primarily in the genera: Amelanchier, Cornus, Fraxinus, Liriodendron, and Salix.

Damage to the host is caused by sap extraction which results in premature leaf-drop, loss of vigor, dieback, stunting and eventual death of the affected plant if treatment is not initiated. As a result, several ornamental trees, planted to enhance the aesthetic beauty of residential areas, are often lost due to this pest.

In Tennessee, the multivoltine willow scale overwintered as eggs deposited beneath the test of adult females on black willow. Eggs were present from November to April, early June, and early August.

First instars were initially mobile and required a few hours to 3 days to find suitable feeding sites and settle. Most females settled on the trunk and limbs of their host. Males usually aggregated together on leaves and small terminal branches or limbs separate from the females, although many were found adjacent to females. Once settled, the scales maintained this sessile condition throughout nymphal development.

Adult males emerged from late May to early June, late July into August, and in October. Upon emergence, the ephemeral adult males immediately began to seek out and fertilize adult females. Males do not feed during the pupal or adult stages. All females had deposited the overwintering generation of eggs by November.

**Tennessee Entomological Society
Minutes of the 1989 Annual Meeting
November 2 - 3, 1989**

**Board of Directors Meeting
(11:20 A.M., November 2)**

Present: Harry Williams, Mike Cooper, Bill Shamiyeh, Jay Avery, Rich Caron

- 1) Harry Williams called the meeting to order.
- 2) Dues and Registration were approved by the Board in September 1989 (\$5.00 and \$15.00)
- 3) The T.E.S. Brochure is not ready as yet. Charles Watson wrote a letter indicating that the Brochure is still in progress.
- 4) A T.E.S. committee sign-up sheet should be passed around during the meeting.
- 5) Name tags are ready. Name tags should be put in a box at the end of the meeting.
- 6) The Nominating Committee, Bill Shamiyeh, Chairman, presented the names of Bruce Kauffman for President-Elect and Charles Pless and Joe Dunn for Members-at-large. Nominations from the floor will be requested. Each nominee was contacted prior to the meeting.
- 7) Students should receive their student paper rating forms for future use.
- 8) This year's judges on student papers will be Jay Avery, Mike Cooper, Bruce Kauffman and Dalton Wilson.
- 9) Students awards (plaques) are retroactive (e.g., Laura Rogers and Jason Oliver).
- 10) There are no changes in the Program.
- 11) Rich Caron will present the Prediction and Evaluation committee report since Chairman Jaime Yanes is not present.
- 12) The Firefly is ready for distribution.
- 13) Mike Cooper needs abstracts from each speaker for the Firefly.
- 14) The Constitution Committee should add Members-at-large and their duties where needed in the Constitution. How are the Member-at-large and the Past President replaced if something should happen to them?

The Board Meeting was adjourned at 11:45 A.M.

Sessions of the Annual Meeting

The 1989 Annual Meeting of the Tennessee Entomological Society was called to order by Harry Williams at 1:00 P.M., November 2nd. Charles Pless chaired Session I including seven papers from 1:00 to 2:45 P.M. Harry Williams chaired Session II including three papers from 3:15 to 4:15 P.M.

A dinner was held at the Music City Rodeway Inn restaurant beginning at 7:00 P.M.

The T.E.S. Business Meeting was held on the morning of November 3, followed by paper Session III, including six papers and chaired by Gene Burgess.

Business Meeting (8:15 A.M., November 3)

President-Elect Harry Williams (in lieu of President Harvey Barton) called the Business meeting to order at 8:15 A.M., November 3. President-Elect Williams thanked all Committee Chairmen and their committee members, especially the Local Arrangements and Program Committees for their help in making the meeting a success. He recognized a strong response received from the "Call for Papers". He thanked Mike Cooper for his efforts in procuring the name tags and thanked Pat Phillips and everyone else who helped facilitate registration.

The minutes of the October 1988 Meeting and September 1989 Board Meeting (handed out during registration on November 2) were accepted by the membership.

Point System (Recertification) Report

Gene Burgess explained the recertification point system. Each person to be recertified needs 10 points every 5 years. Points may be derived from meeting attendance. The person in charge of the meeting needs to send the program to Gene. Points are then assigned to the meeting and given to those in attendance. County meetings, association meetings (e.g., T.E.S.), chemical company meetings (product updates) can serve as point system meetings. Points are meant for commercial applicators and not for private applicators.

Treasurer's Report

Rich Caron, Secretary/Treasurer, presented the financial status of T.E.S. up to November 2, 1989. At that time the T.E.S. account held \$2,060.15. The report was accepted by the membership.

Committee Reports

Membership Committee - Charles Pless (for Charles Watson, Chairman)

The Membership Committee has been working on the Brochure; a text has been prepared and the Brochure is being prepared at Clemson University.

Constitution Committee - Charles Pless (Chairman)

Last year's Constitution revision was extensive. There was no need for further revision; there was no formal meeting of the Committee this year.

Auditing Committee - Carroll Southards (Chairman)

The books were found to be in order.

Program Committee - Harry Williams (Chairman)

Harry thanked everyone for their support, response and participation on the program.

Prediction and Evaluation Committee - Rich Caron (for Jaime Yanes, Chairman)

The Prediction and Evaluation Committee reports were passed out. Only 4 reports plus a forest insect report were given. We need more participation in the Committee's report.

Publication and Editorial Committee - Mike Cooper (Chairman)

The Firefly (Vol.3) was completed and available at registration. Mike thanked his committee members for their help in reviewing the text. Bill Shamiyeh had The Firefly published at the University of Tennessee print shop in Knoxville.

Local Arrangements Committee - Jim Bogard (for Dennis Onks, Chairman)

No report. Harry Williams thanked the committee for the hotel accommodations.

Publicity Committee - Charles Pless (Chairman)

There will be a follow-up press release on the 1989 meeting highlights and comments on awards, etc. Mike Cooper sent last year's Firefly to 6 Universities.

Nominating Committee - Bill Shamiyeh (Chairman)

Bill placed the names of Bruce Kauffman (President-Elect) and Charles Pless and Joe Dunn (Members-at-large) in nomination. There were no additional nominations from the floor. Bruce, Charles, and Joe were elected by acclamation.

Awards Committee - Gary Lentz (for Harvey Barton, Chairman)

The 1989 student award winner is Steve Powell, U.T. Knoxville, who received a \$50.00 award and will receive a plaque.

Plaques were awarded (retroactive) to Jason Oliver (1988 student award winner) and to Laura Rogers (1987 student award winner).

An award of appreciation was presented to Rich Caron for his efforts as Secretary/Treasurer, 1985-88.

A plaque of appreciation was presented to Harvey Barton as outgoing President. The plaque was received by Larry Olsen who will give the award to Harvey upon returning to Arkansas.

Old Business

- Mike Cooper needs copies of abstracts for The Firefly.
- Harry Williams stated that the name tags were well made and thanked Mike Cooper for his efforts.
- The Brochure is being prepared
- A list of Universities and colleges was prepared and is available for T.E.S. membership use. Any other organizations, firms, or institutions employing entomologists are needed to add to the list.

New Business

- The 1990 Meeting (17th Annual Meeting) should be held in October as suggested by the membership.
- The Local Arrangements committee needs to supply a larger projector screen next year for papers.

- Joe Dunn commented on the following issues:

- a) Commercial (industry) members might increase in the future if we had more chemical-type papers.
- b) We need our meeting advertised in the farm presses. An individual from industry could get our meeting announced in agricultural presses (3 months before the T.E.S. meets).
- c) T.A.C.A. (TN Agric. Chem. Assoc.) will be developing an educational leaflet with facts based upon scientific research stating that pesticides are not all bad. We need to get the facts to the general public. T.E.S. members are welcome to submit ideas for the TACA leaflet.

President-Elect Harry Williams was escorted to the podium by Past Presidents Gary Lentz, Gene Burgess, Reid Gerhardt, Joe Dunn, Charles Pless, Mike Cooper and Bill Shamiyeh. Bill Shamiyeh passed the gavel (in place of Harvey Barton) to Harry Williams.

Board of Directors Meeting
(11:30 A.M., November 3)

Present: Harry Williams, Bruce Kauffman, Charles Pless, Joe Dunn, Rich Caron.

President Harry Williams called the meeting to order at the Music City Rodeway Inn, Nashville, TN.

- 1) President Williams thanked all for their assistance during the 16th Annual Meeting.
- 2) All new members were approved. These were Greg Aydelotte, Amy Cole, Lisa Duke, George Harp, Steve Powell, John Rochelle, Robert Sammons, Lou Ann Self, Russell Smith, Jian Song, Donald Sudbrink, and Elizabeth Vail.
- 3) At the beginning of the meeting we had 40 T.E.S. pins, now have 37 (sold 3 at the meeting).
- 4) The membership was willing to return to the Music City Rodeway Inn in 1990. The board approved the same meeting site and costs for October 18-19, 1990. Coffee charge will increase to \$60.00 for 2 breaks. We need to have reservations for 25 rooms or better and meeting room is free. Otherwise, we will pay \$60.00 for meeting room per session (\$120.00 for 2 days).
- 5) Jim Bogard (Local Arrangements Committee Chairman) will let the motel management know of our interests within a month.
- 6) Harvey Barton will need to send a letter of thanks to the hotel and to Pat Phillips (who helped during registration) and a congratulatory letter to the student contest winner.
- 7) The Board finished filling out the Committee sign-up sheet and chose chairpersons where needed.
- 8) A summer board meeting is needed and should be held near mid-August at the Ellington Center, Nashville.

The Board of Directors meeting was adjourned at 12:15 P.M.

**Tennessee Entomological Society
Minutes of the Board of Directors
and Committee Chairmen Meeting**

September 15, 1989

(This meeting was held as an organizational meeting prior to the annual meeting, November 2 - 3, 1989)

Present: Harvey Barton, Harry Williams, N.B. Shamiyeh, Mike Cooper, Russ Patrick, Jay Avery, and Rich Caron.

President Harvey Barton called the meeting to order (11:07 A.M.) at the Extension District II Auditorium, Ellington Agricultural Center, Nashville, TN.

The board reviewed the minutes of the October 1988 business meeting.

The board discussed the following topics:

- 1) The committees sign-up sheet. All committee name lines including chairman should be on the sign-up sheet. Rather than leave the sign-up sheet in the back of the room, the sheet should be passed among the membership at the business meeting.
- 2) Treasurer's Report. We have \$2,236.90 as of September 15, 1989. We have 40 T.E.S. pins on hand of the 50 pins purchased, 9 have been sold and 1 was given to Loretta Johnson for her help in registration over the years. We will continue to charge \$10.00 per pin. A record of the expenses and receipts was discussed.
- 3) The board agreed to get name tags specially made for the 1989 meeting. The board discussed name tag types, costs, and amounts to order. It was decided to purchase clip-on plastic name tags that could be reused. One thousand blank computer-feed tags would cost approx. \$36.00. Two hundred plastic holders would cost approx. \$80.00. A computer will be needed at the meeting registration. A motion to buy name tags was made and passed. The board agreed that Mike Cooper will be in charge of obtaining name tags.

Committee Reports

Nominating Committee - Bill Shamiyeh, Chairman. No nominees have been chosen for vacant positions as yet. President-Elect and Members-at-large nominees will be needed.

Membership committee - No report.

Awards Committee - Harvey Barton, Chairman. Harvey will contact committee members soon. Harvey discussed the possibility of getting the student contest rating form to students giving papers prior to the meeting. And, students should see how they did by reviewing their own score sheets.

The board agreed with Harvey that student contest plaques should be given (and be retroactive). The physical nature of the plaques should be fairly consistent year to year (The board agreed to change an earlier commitment to give a \$50.00 award and letter of commendation (only) to student contest winners).

Constitution Committee - No report.

Auditing Committee - No report.

Program Committee - Harry Williams, Chairman. Harry has mailed out meeting announcements and the call for papers. He has received 4 papers so far. He needs about 9 or 10 more papers at this time.

Prediction and Evaluation Committee - Rich Caron (for Jaime Yanes, Jr., Chairman). A request for the committee report was to be sent September 12 or 13 to appropriate T.E.S. members associated with specific commodities.

Publication and Editorial Committee - Mike Cooper, Chairman. "The Firefly" is ready for publication. "The Firefly" will be published annually. Approximate cost is \$115-\$120.

Local Arrangements Committee - Mike Cooper (for Dennis Onks, Chairman). The only change was the meeting date change to November 2-3.

Publicity Committee - No report.

Old Business -

- 1) Registration will be \$15.00 and dues will be \$5.00 as in 1988. We will again dine buffet style on Thursday night and pay for dinners for students who give papers. Student dues are \$1.00 (giving or not giving a paper). No registration fee is required for students. Honorary members pay no dues and no registration.

New Business -

- 1) Mike Cooper will look into T.E.S. name and logo on name tags. He will check out the feasibility and cost of the above and will purchase them if the cost is reasonable. The board discussed the name tag design and increased cost of adding the T.E.S. logo.

- 2) Is there a need for a T.E.S. Newsletter when we have the proceedings ("The Firefly")? An earlier printing of The Firefly may suffice as a T.E.S. Newsletter. Each Speaker should bring his/her abstracts to the meeting.
- 3) One year ago, members of the T.E.S. planned to meet on October 19-20, 1989. We originally got the hotel for October 12-13 because the hotel was booked for the 19th and 20th. The board decided to move the meeting to November 2-3 since members of the TN Dept. of Agric. would be unable to attend an October 12-13 meeting (a substantial loss of members).
- 4) The board will wait until the meeting for a report about the status of the T.E.S. brochure.
- 5) There is a need to standardize which Board members send letter of thanks or of commendation. A motion was made that the President who reigned over the current meeting each year sends (1) congratulatory letters (student award winners, etc.) and (2) thank you notes (registration help, hotel, etc.) as needed. The motion passed.
- 6) The Constitution Committee needs to amend the Constitution to make contingencies in case the President and/or Past President is unable to serve for whatever reason. How is the Past President replaced?

The Constitution Committee needs to add members-at-large Board members to the "Vacancies" section (Article 8, Section 6) of the Constitution.

The Members-at-large Board members should be checked for inclusion throughout the Constitution.

The Board Meeting was adjourned at 1:00 P.M.

Respectfully submitted by

Richard E. Caron
Secretary/Treasurer, T.E.S.

T.E.S. TREASURER'S REPORT
9/12/89 to 8/21/90

Balance: \$2,256.90
(as of 9/12/89)

Expenses (September 15 - October 30 1989)		
Stamps	\$ 20.00	
Plaques	<u>76.75</u>	
	\$ 96.75	\$2,160.15

Cash for November 1989 Meeting - \$100.00		\$2,060.15
		(as of 11/2/89 -

audited by Auditing Committee,
Carroll Southards, Chairman)

Expenses (November 1989 Meeting)

Music City Rodeway Inn (Student Meals)	\$ 51.24	
(Coffee Breaks)	44.60	

University of Tennessee (Firefly Printing)	161.30	
(Program Printing)	21.25	

Harry Williams (Stamps)	15.00	
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Mike Cooper (100 ID Clip Badge Holders)	44.13	
(1000 ID Cards With T.E.S. logo)	173.67	

Steve Powell (Student Award)	<u>50.00</u>	
	\$ 561.19	\$1,498.96

Income (November 1989 Meeting)

Dues	\$ 190.00	
Registration	540.00	
Pins (3)	30.00	
Sustaining Members	<u>80.00</u>	
	\$ 840.00	\$2,338.96

Deposited cash for Meeting - \$100.00		\$2,438.96
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Income (November 1989 - December 1989)

Student Meal Reimbursements	\$ 6.00	
Member Unclaimed Meal Reimbursements	3.00	
Dues	15.00	
Pins (2)	<u>20.00</u>	
	\$ 44.00	\$2,482.96

Expenses (January 1990) Plaque (Steve Powell)	\$ 20.91	\$2,462.05
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Expenses (August 1990) Postage Stamps	2.00	\$2,460.05
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Number of pins on hand: 35 (August 21, 1990)

**ATTENDANCEROSTER OF THE 1989 ANNUAL MEETING
OF THE TENNESSEE ENTOMOLOGICAL SOCIETY**

<u>MEMBER</u>	<u>AFFILIATION</u>	<u>LOCATION</u>
Avery, Jay P.	Univ. of TN	Trenton, TN
Aydelotte, Gregg R.	TN Dept. of Ag.	Springfield, TN
Bogard, James B.	TN Dept. of Ag.	Nashville, TN
Bolin, Ronald E.	TN Dept. of Ag.	McMinnville, TN
Brown, Robert C.	Univ. of TN	Morristown, TN
Burgess, Edward E.	Univ. of TN	Knoxville, TN
Cagle, Jimmy L.	TN Dept. of Ag.	Winchester, TN
Caron, Richard E.	Univ. of TN	Jackson, TN
Cate, Randy H.	Univ. of TN	Martin, TN
Chaudhary, Hans R.	TN Dept. of Ag.	Knoxville, TN
Clouse, William T.	TN Dept. of Ag.	Oak Ridge, TN
Cole, Amy M.	Univ. of TN	Knoxville, TN
Cole, Bruce A.	TN Dept. of Ag.	McMinnville, TN
Cooper, Michael E.	TN Dept. of Ag.	Nashville, TN
Crutchfield, Berry A.	Univ. of TN	Knoxville, TN
Davis, Sylvester	TN Dept. of Ag.	Nashville, TN
Duke, Lisa C.	Univ. of TN	Knoxville, TN
Dunn, Joe C.	American Cyanamid	Nashville, TN
Eisler, James I.	TN Dept. of Ag.	McMinnville, TN
Gerhardt, Reid R.	Univ. of TN	Knoxville, TN
Grant, Jerome F.	Univ. of TN	Knoxville, TN
Greer, Lee	Valent	Dunlap, TN
Harp, George L.	Arkansas St. Univ.	Jonesboro, AR
Heery, Frank L.	TN Dept. of Ag.	Harrison, TN
Kauffman, Bruce W.	TN Dept. of Ag.	Nashville, TN
Keener, James A.	TN Dept. of Ag.	Maryville, TN
Lambdin, Paris L.	Univ. of TN	Knoxville, TN
Lentz, Gary L.	Univ. of TN	Jackson, TN
Oliver, Jason B.	Univ. of TN	Knoxville, TN
Olson, Larry A.	Arkansas St. Univ.	Jonesboro, AR
Onks, Dennis O.	Univ. of TN	Springfield, TN
Pless, Charles D.	Univ. of TN	Knoxville, TN
Powell, Steve D.	Univ. of TN	Knoxville, TN
Rochelle, John B.	TN Dept. of Ag.	Elizabethton, TN
Sammons, Robert L.	Private Consultant	Toone, TN
Self, Lou Ann H.	TN Dept. of Ag.	Goodlettsville, TN
Shamiyeh, N.B.	Univ. of TN	Knoxville, TN
Smith, Russell L.	Univ. of TN	Knoxville, TN
Song, Jian	Univ. of TN	Knoxville, TN
Southards, Carroll J.	Univ. of TN	Knoxville, TN
Sudbrink, Jr., Donald L.	Univ. of TN	Knoxville, TN
Vail, Elizabeth R.	Univ. of TN	Knoxville, TN
Watson, E. Brown	USDA-APHIS-PPQ	Nashville, TN
Weed, G. Chris	ICI Americas, Inc.	Murfreesboro, TN
Williams, Harry E.	Univ. of TN	Knoxville, TN
Wilson, Dalton L.	USDA-APHIS-PPQ	Brentwood, TN

BOARD OF DIRECTORS

Harry E. Williams - President
Harvey Barton - Past President
Bruce Kauffman - President Elect
Richard Caron - Secretary/Treasurer
Charles Patrick - Historian
Charles Pless - Member at Large
Joe Dunn - Member at Large

COMMITTEES

NOMINATING

Harvey Barton - Chairperson
Gene Burgess
Jerome Grant
Charles Patrick
N.B. Shamiyeh
Omar Smith
Jamie Yanes

MEMBERSHIP

Charles Watson, Jr. - Chairperson
Jay Avery
Tommy Clouse
Amy Cole
Lisa Duke
Larry Olsen
Charles Pless
John Rochelle
Bob Sammons
Russell Smith
Charles Watson

AWARDS

Reid Gerhardt - Chairperson
Harvey Barton
Gene Burgess
Gary Lentz
Omar Smith
Dalton Wilson

CONSTITUTION

Joe Dunn - Chairperson
Harold Bancroft
Richard Caron
Russell Smith
Carroll Southards
Larry Thread

PUBLICITY

Joe Dunn - Chairperson
Hans Chaudhary
Tommy Clouse
Amy Cole
John Rochelle
Jamie Yanes

AUDITING

Mike Cooper - Chairperson
Reid Gerhardt
N.B. Shamiyeh

PROGRAM

Bruce Kauffman - Chairperson
Randy Cate
Lisa Duke
Lee Greer
George Harp
Paris Lambdin
Charles Pless
Omar Smith
Carroll Southards
Elizabeth Vail

PREDICTION EVALUATION

Charles Patrick - Chairperson
Richard Caron
Hans Chaudhary
Mike Cooper
James Eisler
Reid Gerhardt
Paris Lambdin
N.B. Shamiyeh
Lynn Snodderly
Harry Williams
Jamie Yanes

PUBLICATION AND EDITORIAL

Jerome Grant - Chairperson

Mike Cooper

Bruce Kauffman

Charles Watson

LOCAL ARRANGEMENTS

Jim Bogart - Chairperson

Chris Weed - ICI

Dalton Wilson

Tennessee Entomological Society

Prediction and Evaluation

Committee Report

November 2 - 3, 1989

Jaime Yanes, Jr. - Chairman

**Committee Members: Richard Caron
Lee Greer
Bruce Kauffman
Russ Patrick
Charles Pless**

Insects of Medical and Veterinary Importance

Reid R. Gerhardt

Heavy rains in the spring and summer resulted in large populations of flood-water Aedes mosquitoes in eastern Tennessee. Aedes vexans and A. sticticus were produced in large numbers in flooded sinkholes, flood plains, and ditches. This activity resulted in increased calls to county and state Extension Service Offices. There was increased adulticiding activity by county health departments. This year was the first in four years that many mosquito habitats in eastern Tennessee had been flooded.

Culicoides spp. were abundant in many areas. Some were collected biting humans in daylight hours on overcast days. Culicoides sanguisga spp. and C. paraensis were the most commonly collected.

Horse and deer fly (Tabanidae) collections were very low in several eastern Tennessee locations. This may have been due to dry conditions in 1987 and 1988. Collections in Gibson county in western Tennessee were much higher, but this is often the case in western Tennessee.

Face flies were abundant in several eastern counties in September (20-30 flies/head). Horn flies are apparently still susceptible to pyrethroids as several treated heads were less than 30 flies per animal.

Insects of Importance to Cotton and Soybean

Gary L. Lentz

Cotton Boll weevil was a significant problem throughout Tennessee in 1989. Rainfall at the pinhead square stage prevented many growers from making applications to kill overwintering weevils. Rains also hampered in-season control of F₁ and subsequent generations of weevil. Estimated yield loss - 15%.

Cotton aphid was a problem in 1989. Aphids may have been favored by cool wet weather which may have reduced biological control. Chemicals did an effective job if coverage was adequate. Tests were conducted at Ames Plantation in August. Fungi reduced populations in late August. Estimated yield loss - 3%.

Heliothis was not a significant problem in areas where I conducted research this year. I suspect that growers did not average two applications for bollworm control. Even though we had heavy moth flights at times in Jackson, field populations did not develop as expected. We used the vial technique to monitor resistance in H. virescens and found low levels of resistance at the 10 ug rate. Estimated yield loss - 3%.

Soybeans Soybean loopers were collected in September at Jackson for the first time in several years. Populations were below threshold levels. Velvetbean caterpillars were also collected in October. Populations of Dectes stem borer were higher than in previous years. Damage from bean leaf beetle, green cloverworm and Heliothis was quite low.

The Cotton Insect Situation - Tennessee, 1989

Richard E. Caron

The cotton crop began to grow poorly due to cool and wet weather and seedling diseases in the spring. Thrips posed problems for cotton and further aggravated cotton growth with low to moderate populations in April and May. Cutworms were causing damage to seedlings by late May (e.g. Tipton County). During April to May pheromone trap captures demonstrated that boll weevil populations were more extensive numerically and geographically in 1989 than in 1988 due to the relatively mild winter.

By early June, aphids were more numerous than usual on presquaring cotton. Associated with aphids was the unusually early presence of adult and larval lady beetles. In mid-June, thrips and aphids were still present as were subeconomic levels of leafrollers and yellowstriped armyworms. From mid to late June, population buildup of beneficial (predator) insects was noted. These included minute pirate bugs, convergent and pink spotted lady beetles, big-eyed bugs, and spiders. Pinhead square insecticide applications were needed in boll weevil-infested counties. Rainfall hampered growers' efforts to properly make and/or time these applications. A few fields contained bollworms at subeconomic levels. During late June, thrips were still present, tarnished plant bugs were approaching economic levels, green stink bugs were beginning to invade cotton, and small holes were observed in tender terminals due to boll weevil (and, to a lesser extent, bollworm) feeding.

During early to mid July, boll weevils had begun to reproduce in early squares in many fields. Bollworm/tobacco budworm were nil to light populations. Moderate to heavy green stink bug populations were occurring and grasshoppers appeared to cause economic injury in Fayette County. In late July boll weevils were causing considerable damage. Generations 1 and 2 were beginning to overlap in fields.

In early to mid August, boll weevil dispersal occurred. Lake County reported boll weevil damage. More than 50% square damage was occurring in some areas of Tennessee. Beneficial insect populations were reduced where boll weevil insecticide applications were made. Bollworm moth populations were beginning to increase and aphids and green stink bugs were still problems. The last half of August was marked with continued damage by boll weevil (to squares and bolls). Weevil dispersal increased. Aphids were light to heavy; many were killed by parasites and a fungus disease. Spider mites were increasing in some hot, dry areas. Yellowstriped armyworms and leaf rollers were present in subeconomic levels.

September began with a big increase in bollworm moths and an upswing in tobacco budworm moths. Speckled bolls were found to contain boll weevil larvae. Aphids and green stink bugs were still causing problems. In mid September, growers were advised to apply boll weevil diapause control insecticide treatments and to destroy cotton stalks after harvest. Bollworm/tobacco budworm problems did not materialize to an appreciable degree.

Epilogue: The boll weevil returned to number one pest status in 1989 in Tennessee cotton. This year was much worse than any year since 1976. Growers made 4 to 12 insecticide applications for weevil control depending on their location in the state. It is probable that a record number (since 1976) of boll weevil adults have entered overwintering quarters around cotton fields. Another "mild" winter could allow a worse problem with boll weevils in 1990. Pheromone trapping next spring will show the intensity (numerically and geographically) of overwinter survival. It was fortunate that bollworm/tobacco budworm pressure was not intense concurrent with boll weevil damage in 1989.

The Soybean Insect Situation - Tennessee, 1989

Richard E. Caron

By mid June, little or no damage due to insect pests in soybeans had been reported. Growers were advised to watch for bean leaf beetles and threecornered alfalfa hoppers and for false chinch bugs in young soybeans planted into rapeseed stubble. In late June, minor leaf damage was reported due to grasshopper, bean leaf beetle and green cloverworm feeding. Many beneficial insects were present including big-eyed bugs, damsel bugs, pink-spotted lady beetles and green lacewings.

From early to mid July, grasshoppers, bean leaf beetles, and green cloverworms, continued to cause minor damage. Corn earworm eggs and young larvae were observed in low numbers and some threecornered alfalfa hopper injury to stems was reported. Snowy tree crickets were observed in soybeans. A short description of these insects and their damage is in order:

In Madison County, snowy tree crickets were observed in soybeans. They were probably responsible for feeding on the stem of the terminal trifoliates, causing the terminals to wilt and hang on the plant or drop off. Tree cricket adults are 3/4 to 1 inch long, pale green and flattened. They have fragile-looking membranous wings and have long slender hindlegs and antennae. Tree cricket damage is sometimes thought to be deer damage.

Emergence of first generation bean leaf beetles was occurring and green cloverworms were at low levels. Decetes stem borer adults were emerging. A description is as follows:

Adults are gray, velvety in texture and about 1/2" long. They have black legs and antennae. Decetes stem borer does not cause predictable economic damage. Threshold levels are unknown. Under high population levels, immediate harvesting following maturity, stalk destruction (or deep turning) and rotation reduce populations.

By late July, green and brown stinkbugs were found in soybeans. Grape colaspis was found in wheat-beans (in Warren County) at subeconomic levels, but causing defoliation (holes in leaves). Growers were advised to watch for corn earworm problems. Whiteflies were active and beneficial insects were abundant.

From early to mid August, very high numbers of Japanese beetles were found feeding on foliage in eastern Tennessee. They caused more than 20% defoliation in bloom-stage soy-beans. Increases in corn earworm moth populations (based upon pheromone trap monitoring) were observed. During the last half of August, corn earworm moth populations continued to increase, economic populations of green and brown stinkbugs occurred, and defoliation by grasshoppers increased. Blister beetles were causing defoliation and subeconomic populations of saltmarsh and yellowstriped caterpillars were showing up. Beneficial (predatory) insects were prevalent and included big-eyed bugs, damsel bugs, lady beetles and assassin bugs. Growers were put on a corn earworm alert.

Early to mid September was marked with further increases in corn earworm moth populations across the state. Corn earworm larval populations were light to moderate due to a combination of 1) low natural survival (lack of oviposition and/or high incidence of predation) and 2) grower recognition of the problem and subsequent timing of insecticide applications. (Corn earworm damage was extreme in 1988). Stink bugs were still a problem. Still at large were blister beetles, grasshoppers, bean leaf beetles, and assorted caterpillar species (including loopers and green cloverworms).

Epilogue: Soybean insect pest problems were relatively minor in 1989. This year was overshadowed by the intense pressure by corn earworms in 1988. The potential for corn earworm damage existed in 1989 based upon pheromone trap counts in August and September.

Small Grains and Stored Grain

Charles R. Patrick

Small Grains

Wheat- Cereal Leaf Beetles were found in five new counties in West Tennessee. Damage to wheat was more severe in the Middle Tennessee portion of the State. Robertson County reported larger populations on their wheat.

Stored Grain

Corn and wheat stored in farm bins- Indian meal moths, sawtoothed grain beetles, rice weevils were found in several grain bins across the state. Many producers had to resort to fumigation to control these pests.

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
Don Clements	'75 - '76	Cook's Pest Control
Gary Lentz	'76 - '77	Univ. of Tennessee
Chester Gordon	'77 - '78	Tenn. Dept. of Agric.
Gene Burgess	'78 - '79	Univ. of Tennessee
Reid Gerhardt	'79 - '80	Univ. of Tennessee
Harold Bancroft	'80 - '81	Memphis State
Joe Dunn	'81 - '82	American Cyanamid
Bill Van Landingham	'82 - '83	Tenn. Dept. of Agric.
Carl Brown	'83 - '84	Memphis State
Charles Pless	'84 - '85	Univ. of Tennessee
Michael E. Cooper	'85 - '86	Tenn. Dept. of Agric.
Elmo Shipp	'86 - '87	Mobay
Bill Shamiyeh	'87 - '88	Univ. of Tennessee
Harvey Barton	'88 - '89	Ark. State Univ.
Harry Williams	'89 - '90	Univ. 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 Agric.
Harold Bancroft	'76 - '79	Memphis State
Lyle Klostermeyer	'79 - '82	Univ. of Tennessee
Bill Shamiyeh	'82 - '85	Univ. of Tennessee
Richard Caron	'85 - '88	Univ. of Tennessee
Richard Caron	'88 - '91	Univ. of Tennessee

Board of Directors
Members at Large

<u>Member</u>	<u>Term</u>	<u>Affiliation</u>
Gary Lentz	'87 - '88	Univ. of Tennessee
Blake Bevill	'87 - '88	Ark. State Univ.
Michael E. Cooper	'88 - '89	Tenn. Dept. Agric.
Jay P. Avery	'88 - '89	Univ. of Tennessee
Joe Dunn	'89 - '90	American Cyanamid
Charles Pless	'89 - '90	Univ. of Tennessee

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

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.

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.

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.

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

**CONSTITUTION
of the
TENNESSEE ENTOMOLOGICAL SOCIETY
(as of August 1989)**

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 Secretary-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 Secretary-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, 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 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-Treasurer: The Secretary-Treasurer 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-Treasurer of the Society. The Secretary-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 Secretary-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 Secretary-Treasurer. During each annual meeting, the Secretary-Treasurer shall give a report on the annual financial condition of the Society.

Section 5. 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 6. Vacancies in Office: Any vacancy in the office of President-Elect, Secretary-Treasurer, 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, 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 of 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 ('88), ('89) refer to last meeting attendance or last dues payment (\$5.00).

2. H = Honorary Member

**Tennessee Entomological Society
Membership List
August 20, 1990**

'89	Jay P. Avery 1252 Manufacturers Row Trenton, TN 38382 (901) 855-7656	'89	Ronald E. Bolin TN Dept. of Agriculture Rt. 1, Box 347A McMinnville, TN 37110 (615) 473-4145
'89	Greg Aydelotte 4016 New Chapel Road Springfield, TN 37172 (615) 360-0139	H	Carl D. Brown Dept. of Biology Memphis State University Memphis, TN 38111 (901) 454-2963
'88	Harvey E. Barton Box 501, AR State University State University, AR 72401 (501) 972-3082	'89	Robert C. Brown 1930 Bluebird Circle Morristown, TN 37814 (615) 974-7135
'88	Blake Bevill P.O. Box 11 Dell, AR 72426 (501) 564-2538	H	Howard L. Bruer 1604 Green Hills Drive Nashville, TN 37215 (615) 269-9740
'88	Douglas S. Bidlack Ent. & Plant Pathology P.O. Box 1071, Univ. of TN Knoxville, TN 37901-1071 (615) 974-7135	'89	Edward E. Burgess Ent. & Plant Pathology P.O. Box 1071 Knoxville, TN 37901-1071 (615) 974-7138
'89	James B. Bogard Plant Industries TDA Box 40627, Melrose Station Nashville, TN 37204 (615) 360-0130	'89	Jimmy L. Cagle P.O. Box 341 Winchester, TN 37398 (615) 967-1240

- '89 Richard E. Caron
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(901) 425-4718
- '89 Randy H. Cate
Brehm Hall, UT-Martin
Martin, TN 38238
(901) 587-7183
- '89 Houston Chandler
Atlas Termite & Pest Control Inc.
Suite 246, 4087 Summer Ave.
Memphis, TN 38122
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- '89 Hans R. Chaudhary
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- '89 William T. Clouse
113 Amherst Ln.
Oak Ridge, TN 37830
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- '89 Amy Cole
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- '89 Bruce A. Cole
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- '89 Michael E. Cooper
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- '89 Barry A. Crutchfield
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- '89 Sylvester Davis
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- '89 Lisa Duke
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- '89 Joe C. Dunn
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(615) 352-5669
- '89 James I. Eisler
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- '89 O.Z. Evers
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- H John A. Hammett
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- '88 Phoebe A. Harp
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- H Myron Smith
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Eads, TN 38028
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- '88 Robin M. Smith
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- H Mendell E. Snodgrass
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- '89 Dalton L. Wilson
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Brentwood, TN 37027
(615) 736-7250
- '88 Jaime Yanes, Jr.
American Cyanamid
7687 Deerfield Trace
Memphis, TN 38133
(901) 377-5779

Sustaining Members ('89)

American Cynamid Co.
ICI Americas, Inc.
Valent

**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 \$8.00.

PLEASE PRINT

Name of Prospective Member _____

Affiliation _____

Address _____ Zip Code _____

Phone Number _____ Area Code () _____

Occupation _____

Please Check

Annual Dues \$5.00

Society Pin \$8.00

Annual Due for Students \$1.00

Sustaining Member Dues \$25.00

Amount Enclosed _____

Please Remit to:

Dr. Richard Caron
U.T. Agric. Ext. Serv.
605 Airways Blvd.
Jackson, TN 38301