

CURRICULUM VITAE

**JOHN A. SKINNER
ASSOCIATE PROFESSOR
ENTOMOLOGY AND PLANT PATHOLOGY
UNIVERSITY OF TENNESSEE
AGRICULTURAL EXTENSION SERVICE
205 ELLINGTON PLANT SCIENCES
KNOXVILLE, TN 37996-4560**

1996 - 2002

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I. BIOGRAPHICAL INFORMATION

NAME & TITLE

John A. Skinner
Associate Professor and Extension Apiculturist
Entomology and Plant Pathology Department
University of Tennessee

ADDRESS

(Work)
205 Ellington Plant Sciences
Knoxville, TN 37996-4560

(Home)
1158 Martin Mill Pike
Rockford, TN 37853

EDUCATION

Ph.D. in Entomology	University of California, Davis, CA. Emphasis: Apiculture	1987
MS. in Biology	University of Akron, Akron, OH. Emphasis: Botany, Pollination Ecology	1976
BS. in Biology	University of Akron, Akron, OH. Emphasis: Botany	1976

II. PROFESSIONAL EXPERIENCE

<u>Employer</u>	<u>Dates</u>	<u>Titles</u>
University of Tennessee Agricultural Extension Service Entomology & Plant Pathology Department	1995-Present	Associate Professor
University of Tennessee Agricultural Extension Service Entomology & Plant Pathology Department	1990-Present	Assistant Professor
University of California, Davis Environmental Toxicology Department	1988-90	Research Associate
California Department of Food and Agriculture Sacramento, CA	1988	Agricultural Inspector
University of California, Davis Mosquito Research Division	1987-88	Consultant

University of California, Davis University Extension	1987-88	Instructor
University of California, Davis Entomology Department	1981-87	Research Assistant
University of California, Davis Entomology Department	1981-85	Teaching Associate

III. PROFESSIONAL IMPROVEMENT

American Bee Research Conferences: 1990: Tuscon, AZ; 1992-93: College Station, TX; 1994: Weslaco, TX. ; 1995: Athens, GA; 1997: Memphis, TN.; 1998: Colorado Springs, CO; 1999: Baton Rouge, LA; 2000: Salisbury, MD.; 2001: San Diego, CA. and Port Deposit, MD.

Grant Writing Workshop, Write Winning Grants, UT, Knoxville. Sept. 26-28, July 16-17, 2001.

Update Training - Recognizing SMR Traits in Honey Bee Genetic Stock, J. Harbo and J. Harris, USDA Honey Bee Breeding, Genetics and Physiology Research Laboratory. Baton Rouge, LA. June 19-23, 2001.

UT Extension Strategic Planning Session. Knoxville, TN. Feb. 3, 2000.

Apimondia International Beekeeping Congress. Vancouver, BC, Canada. Sept. 11-18, 1999.

Training in Distance Diagnosis. University of Tennessee. Knoxville, TN. July 16, 1999.

Advanced Course in Honey Bee Instrumental Insemination. Ohio State University. Columbus, OH. June 23-25, 1999.

UT Extension Conference. Knoxville, TN. Nov. 15-18, 1998.

4-H Specialist Learning Workshop. Knoxville, TN. May 18, 1998.

UT Extension Powerpoint Training. Knoxville, TN. Feb 5-6, 1998.

4-H Wildfire Conference - Extension In-Service. Knoxville, TN. Mar. 11-13, 1997.

Extension Conference. Knoxville, TN, Nov. 18-21, 1996.

IV. EVIDENCE OF EFFECTIVE EXTENSION WORK

A. Job Description

John Arthur Skinner
Associate Professor
Agricultural Extension Service
Knoxville

The Associate Professor is responsible to the Professor and Leader of the Entomology and Plant Pathology Department. The major duty of the Associate Professor is to conduct an educational program in apiculture for the beekeeping industry in Tennessee. In this role his/her duties include:

EXTENSION RESPONSIBILITIES

1. Develop apiculture training for extension agents and beekeepers in basic fundamentals of beekeeping.
2. Develop and update publications relative to beekeeping practices.
3. Assist with 4-H Club beekeeping project activities.
4. Develop efficient bee disease and pest diagnostic services.
5. Develop teaching aids to effectively teach Extension agents and beekeepers.
6. Develop a public awareness and educational program on the African honey bee.
7. Conduct result demonstrations on honey bee management practices and control of honey bee pests and diseases.
8. Maintain a cooperative working relationship with research, teaching and extension units within the Institute of Agriculture, the Tennessee Department of Agriculture, and other apicultural and related industries.
9. Provide leadership for programs and activities that meet the needs of all eligible participants regardless of race, color, national origin, sex or handicap.

B. General Program Overview

Early Background - Defining the Needs

Prior to 1996, efforts were being made to address each of the responsibilities listed in the job description above and several programs were underway. Experiences with beekeepers throughout the state had defined current practices and determined needs of the beekeeping industry in Tennessee for the future. While information about the fundamentals of beekeeping was available (UT PB697, 4-H program series, and USDA bulletins) the arrival of tracheal mites into Tennessee in 1990 and *Varroa* mites in 1991, changed beekeeping in the state forever.

The northerly migration of the highly defensive Africanized honey bee from South America presented a public concern. An awareness program was needed to explain this bee and alleviate concern. Two publications were developed in 1994 to explain how to respond to Africanized Bees (PB 1513) and how to prepare for emergency situations with bees (PB 1522). Since the Africanized Bee has not appeared in Tennessee, these publications seem all that is needed at this time.

Current Needs - 1996 to Present

Educational training programs such as the Tennessee Beemaster Program need to be expanded and offered in several locations to encourage beekeepers to attend.

Youth programs in 4-H should be continued to encourage active participation in projects and programs to become productive citizens in the future.

More effective diagnostics techniques are needed, especially concerning mites.

More research/demonstrations are needed to develop new treatments that can be used in an integrated manner without contaminating hive products.

Beekeepers in Tennessee need new information to detect, diagnose and manage new pests and parasites.

The beekeeper database needs to be updated and increased to maintain records of statewide locations of active beekeepers. This should improve future communication with beekeepers and allow agents and specialists to plan multi-county activities.

Cooperation is needed with Tennessee agencies and beekeeper associations at the national, regional, state and local levels to communicate new ideas and information to improve the beekeeping industry in Tennessee.

Activity Summary (1996-2002).

Educational programs focused on presenting accurate current information in a timely manner to extension agents, beekeepers, growers and the public. Methods included providing written publications, conducting workshops, training sessions, demonstrations and presentations to international, national, regional, state and local associations.

Publications (33) produced [Listed in Section E, below] included a refereed professional journal article (1), a book chapter for an award winning book (1), abstracts and proceedings from professional meetings (11), peer-reviewed extension publications, fact sheets and reports (9), revised and reprinted publications and fact sheets (6), trade journal publications (2) including one international, Entomology and Plant Pathology information notes (4) and miscellaneous reports and publications (3). Additional literature was generated to support the Beemaster Program [Appendix A] including: course plans, information sheets, class outlines, tests, evaluation forms and certificates of achievement.

Visual support materials were used including slide sets, videos, and displays. New slide sets (17) were developed [Appendix B] and some of these (7) were also adapted for newer digital presentations. Previously developed slide sets (15) were revised and also used. Videos (13) [Appendix C] were obtained for loan to agents and beekeeping associations to assist in county programs. Displays used posters (2), trays of mounted insects, preserved samples, observation hives, honey, microscopes and videos. Displays were exhibited at numerous events including workshops, trade shows, conventions, in-service training, Beemaster classes, field days and county fairs. Agents and beekeepers often cooperated with exhibits.

Numerous presentations (244) [Appendix F] were made to professional organizations (33), invited from groups (44), for Tennessee state commodity meetings (57) and to local county associations (110).

Professional presentations including international (3), national (13) regional, (12), and state (5) venues.

Invited presentations include presentations (12) requested from regional (4) groups and presentations (40) requested for other state association meetings (15).

Local presentations included presentations (32) at multi-county meetings (14), presentations (40) at county association meetings (31) and talks (38) to garden/community clubs (26).

Newsletter/Press Releases - To provide current information to agents in a timely manner, articles (25) were written for the Entomology and Plant Pathology Departmental newsletter (What's Happening). Some of these articles (15) were also included in the newsletters of the Tennessee State Beekeepers Association, the Beekeepers of Tennessee and the Tennessee Beekeepers Association. An article was also sent to the UT Arboretum Society Newsletter. Press releases (29) [Appendix D] including television interviews (9) and nationally aired television programs (3) were made at the request of news media, to educate the public about the value of bees as pollinators, to inform and alleviate public concern, and for

public relations of UT.

In-service training was conducted (20 sessions) in extension districts offices as requested averaging three per year to update extension agents about new information pertaining to beekeeping issues. At each session, slide or digital (2002) presentations were accompanied by examples of pests or damage. Written handouts included new and revised publications. Agents indicated an appreciation for classroom training in beekeeping related programs.

Electronic Communications - In 2000, a **beekeeping web page** was developed that includes downloadable files of most UT extension beekeeping publications including links to three new ones developed in 2002. The publication, Beekeeping in Tennessee (PB697) was partially revised and subdivided to allow beekeepers to download a section at a time. A major revision of PB 697 is being done by chapters. Appendices providing addresses for suppliers of bee equipment, sources of queen and package bees and association contacts for national, Regional, state and local association are also available now.

Email - Thousands of e-mail communications (BEE-EXTL, 1996 -2002) with agents, other extension specialists, researchers and beekeepers have allowed prompt receipt and distribution of current information. In recent years (2000-2002), the number of Email communications exceeded 500 per year. Conversations with beekeepers indicate communication with agents has improved with the agents being more responsive to their needs. Multi-county meetings were well-received.

Apiaries - In 1997, two apiaries of twenty-five honey bee colonies were started and maintained at the Knoxville Exp. Sta. for mite research and to provide pollinators for the Vegetable Initiative Project. An additional apiary was added to the Ag Campus in 1998 for teaching purposes, to maintain observation hives and to assist with dogwood pollination studies.

Apiaries were used to make observation hives (live bees under glass) that were used as displays on 33 occasions (see specific program, Section 6, below and Appendix E, for a chronological list of events).

Please Note: **Cooperative activities are included in Section D below.**

C. Specific Programs

1. Pest And Disease Diagnoses (1996-2002).

Background

Tennessee beekeepers initially lost on average one-half of their colonies to mites and secondary causes from 1990 to 1995. The most severe losses occurred with beekeepers that were unaware of the mites. The microscopic tracheal mite was impossible for beekeepers to detect.

Diagnosics for Mites, Beetles and Diseases

Diagnoses have been conducted on approximately 450 samples of bees to detect tracheal and *Varroa* mites. More than half the samples were positive for mites. Disease and pest inspections were made for approximately 1,250 colonies. Twenty-five comb samples were examined and diagnosed for American Foulbrood.

Small Hive Beetle Survey

Approximately 250 colonies were monitored for small hive beetle using visual inspections, cardboard standard trap/treatments and a new trap made of wood/sticky bottom. Sponsored by USDA CAPS Program. John A. Skinner, Leader with J.P. Parkman and M. Studer. Collaborator Beekeepers- Harold Garland, Mountain City, TN.; Don Benefield, Hixson; TN; Paul Mallory, Memphis, TN.; Al Norton, Taft, TN.; and Craig Kimbrough, Pulaski TN. We did not find any beetles in these locations except for one adult that came from stored equipment.

In 2001 agents submitted several small hive beetle diagnosis requests using Distance Diagnosis System developed by colleagues in Nashville.

Greene County Resistant Mite Diagnosis

Mites sampled from 102 colonies from a beekeeper that had overwintered in Florida in 1997 were found to be resistant to Apistan, the only registered miticide at that time, according to a USDA test that we performed. We cooperated with the TN Dept. of Ag. to eradicate this infestation with coumaphos before it could spread.

Diagnoses Impacts.

The results of these diagnoses allowed hundreds of beekeepers to decide if treatment was necessary. Negative beetle survey results were good news to beekeepers who did not want to spend time and money for treatments. Quick eradication of the resistant mite population probably prevented the loss of two-thousand colonies located nearby, valued in excess of \$34,000.

2. Beekeeper Database and Beekeeper Surveys (1996-2002).

The statewide beekeeper database was updated in 1998 to include 2100 beekeepers from 94 counties in Tennessee. This update was the result of a cooperative effort of extension agents and beekeepers throughout the state.

Two surveys were distributed In December,1998 to 2100 beekeepers.

Survey one compared the method of treatment used by beekeepers with the numbers of colonies lost during 1997 and 1998 seasons. The returned surveys (294 from 64 counties) indicated that beekeepers using recommended practices in 1997 and 1998 had 28.5% and 24% less colony loss, respectively, than untreated colonies.

Survey One Impact: These figures indicate that recommended practices are significantly reducing colony losses.

Survey two questioned beekeepers about their preferences about the Tennessee Beemaster Program (See section below). The survey indicated that 29% of respondents had participated in the Hobbyist level and that an additional 35% would like to participate.

Survey Two Impact: The beekeepers want the Beemaster Program to continue.

3. Mite Pest Management Project (1996-2002).

Background

Parasitic mites have killed tens of thousands of honey bee colonies in Tennessee causing concern that our food supply is at risk due to insufficient pollination. There is no comprehensive system available to protect honey bees from mites. The main goal of our program is to reduce the losses of honey bee colonies. Objectives include developing safe alternative tactics that can replace chemicals that are either no longer effective or contaminate hive products. Tactics include new chemicals such as formic acid and ApiLifeVAR, a new botanical oil mixture, new genetically resistant stock, and physical barriers.

Summary of Mite Studies

We have conducted 9 experimental trials from 1996 to 2000 to test several treatments in varying combinations at different times of year to determine which materials are most effective in killing mites in Tennessee conditions.

Studies in 1996 were conducted in three locations (Greeneville, Chattanooga area, and Dyersburg), each with 30 colonies of honey bees in cooperation with beekeepers and agents. Eleven treatments were examined for efficacy with mites.

Results indicated Apistan controlled 96% of *Varroa* mites and that formic acid and thymol showed some efficacy and needed further study. Results were published in abstract form in the Amer. Bee J.

The most important results in subsequent studies with mite treatments involved the use of formic acid and ApiLifeVAR, a blend of botanical oils.

With **formic acid** we determined that: 1) formic acid was very effective against tracheal mites with 99% efficacy and 2) formic acid could also reduce *Varroa* mite populations by 80% by doubling the treatment size and applying the material in gel form when temperatures were moderate during fall season.

ApiLifeVAR, was most effective against both mites when applied in the fall season. Our data are being used to support a registration for ApiLifeVAR with the EPA. We have assisted the IR-4 Project personnel for two years to write a label for this material to support its impending registration in fall of 2002. This project was funded from 1996-June 2001 from Tennessee State Legislative Appropriations totaling \$258,000 received in 1996 through 1998.

Recent studies on IPM started in 2001, consisting of a multi-state cooperative project (TN, GA, SC), are being conducted to formulate an IPM program to manage mites of honey bees in the south. Study apiaries were established in 2001 and instrumentally inseminated SMR (Suppression of Mite Reproduction) queens were successfully introduced in TN (24), GA (30) and SC (27).

Population levels of *Varroa* mites in honey bee colonies will be monitored with sticky boards to determine effects of isolation, resistance (SMR) and screen bottom boards. **Funding acquired from July, 2001 through June, 2003 from SRIPM (CSREES) for \$156,000.**

Mite Management Project Impacts

Information from results of these studies have been presented on numerous occasions (56) including: International meetings (1), as papers/posters for professional organizations (11), as invited presentations to state and regional organizations (7), as presentations at Tennessee state association meetings (11) and at local beekeeper meetings (26).

Publications (13) produced from material in these studies include a refereed journal publication (1), abstracts and proceedings (7), extension publications and reports (4), and an Entomology and Plant Pathology information note (1) .

The research and extension programs in Tennessee for mite management have helped to reduce the beekeepers losses to less than 25% of their colonies. Before, beekeepers had lost, on average, 50% (20,000) of their colonies due to parasitic mites. **We estimate that beekeepers saved 10,000 colonies each year valued in excess of \$1,720,000.** This figure does not include suspected reduction in yield of fruits and vegetables that need pollination and it does not include the value of benefit to wildlife due to pollination.

Forty-eight presentations including 14 workshops were held throughout Tennessee (1996 - 2002), most with multi-county attendance, to demonstrate procedures for sampling, diagnosis and detection of mites, how to treat with chemicals and how to use better management. During the demonstrations a flex cam video camera attached to a microscope was used (2000 - 2002) to view live tracheal and *Varroa* mites.

4. The Tennessee Beemaster Program (1996-2002).

Program Background

The Tennessee Beemaster Program is a school for beekeepers. The program was initiated at the request of beekeepers in 1991 to organize educational efforts of the Agricultural Extension Service to provide knowledge throughout the state and to measure the level of acquired expertise in an objective manner. Eventually the program will train a group of master beekeepers who will serve as local instructors to for other beekeepers throughout the state.

Program Achievement Levels

The program is organized into two achievement levels based on the skill and knowledge of the participant including: **1) Hobbyist and 2) Inspector Training.** Two additional levels are in preparation including: **3) Sideliner and 4) Master.**

The **Hobbyist** is the entry level (15 hr classroom + apiary session) that teaches beekeepers how to start colonies and keep their bees alive. Ten topics are presented in 6 sessions using slide shows, videos and numerous demonstrations including assembling equipment and detecting pests. Testing occurs before and after the course to measure improvement. **An information packet provides 24 publications and outlines for classes (see Appendix A).**

The **Inspector Training Level** teaches the experienced beekeeper how to recognize bee diseases and pests including detection, diagnosis and treatments. The training includes two classroom sessions with handouts, demonstrations, slides, videos and laboratory preparations and at least one hands-on training session outside with bee gear in an apiary. Written and practical lab/field tests are conducted at the conclusion of the course.

Program Summary

The Tennessee Beemaster Program, started as a pilot in 1991 for 55 people from 3 counties, was expanded in 1992 and 1993 to include testing. By 1995 there were 303 participants from 35 counties. **Sixteen classes were conducted from 1996 to March, 2002 (listed under Appendix F #3 Beemaster program classes)**, including thirteen Hobbyist classes in seven different locations and 3 Inspector Training classes. **Enrollment has increased to 523 participants representing 60 Tennessee counties.**

Beemaster Impact --The Beemaster Program is serving as an educational focal point promoting cooperation between the University, state and local beekeeping associations. Enrollment increased 72% in 1996-2002. Comparisons of class pre- and post- test scores indicate on average a **27.1% improvement** for all participants (range 14% - 50% improvement). **Written evaluations of the program were very favorable with 96% of participants rating the course excellent or very good (range 92%-100%).** Several Inspector Training participants have positions as local inspectors. Four counties are conducting diagnosis for mites after being trained and beekeepers in fifteen counties are diagnosing problems for their local associations.

5. Youth/4-H Programs (1996-2002).

Elementary Schools - Twenty educational programs were conducted at elementary schools in Blount, Knox and Trousdale Counties using slide shows, beekeeping equipment, video and **live observation hives** to stimulate youth about bees and to emphasize the value of bees to Tennessee agriculture. Framed posters illustrating bee developmental biology and behavior were provided for 5 elementary classrooms. Materials and guidance were provided to beekeepers and extension agents from Knox, Anderson, Blount, Monroe and Sevier Counties to conduct an additional twenty-five presentations to youth.

Students - Two high school students were advised and coached how to conduct a field training experiment with honey bees for science fair projects. One was selected to represent her school in the regional competition. College students (2) were advised concerning how to conduct their senior projects involving honey bees from Tennessee Tech. (1997) and the University of Memphis (2001).

Boy Scouts - In June and July of 2000, boy scouts of troop 285 in Blount County were trained in entomology and apiculture during 4 meetings and summer camp (20 hr). Youth were taught about entomology at yearly **Bug Night at the Ijams Nature Center** in Knoxville (1998-2000). The staff at Ijams Nature Center was trained about using observation hives in their programs and an observation hive exhibit was planned and built with cooperation from a local beekeeper.

New Exhibit - A unique beekeeping exhibit was built by the Creative Discovery Museum in Chattanooga, TN. Over a two year period (2000-2001), we trained the staff how to handle bees, and designed the hive that was installed against a window on an observation deck. This allows safe indoor viewing behind glass of the inside of the hive while a beekeeper manipulates the colony from outside. The staff informed us that this is one of their most popular educational exhibits and is **viewed by thousands of groups of children annually**. A publication documenting this project is in progress to submit to a beekeeping trade journal.

We advised a high school principal and architect from Hamilton County Schools at their request how to design an observation hive exhibit for a new school under construction.

4-H Projects - Activities in the 4-H Beekeeping/Entomology Projects included judging project workbooks each year, judging junior and senior project winners by interviews at roundup and presenting awards to winners at roundup banquet. In 2000, I was selected by the dean to judge junior and senior citizenship projects at 4-H Congress. Twenty hives donated by beekeepers were sterilized (boiled in lye water) and distributed to fifteen 4-Hers that could not afford to buy equipment.

Mentors - Beekeepers (12) from associations in Memphis, Jackson, Knox, Blount, Anderson and Davidson Counties agreed to serve as mentors to teach 4-Hers about beekeeping. Two of these mentored youth won the state competition in the beekeeping essay contest and one became the national winner.

Fund Raising - A successful fund raising campaign for the 4-H Entomology/Beekeeping Project was initiated in 1998. Requests included a 4-H success story about a youth beekeeper and a letter explaining value of 4-H were sent to fifty-one groups including beekeepers and pest control operators. Several thousand dollars were solicited and a database made that can be used in the future.

4-H Camp - The apiary at the York 4-H camp in Crossville was maintained to use for youth and adult educational programs. The apiary was started as a joint project by students in the Tennessee Beemaster Program and members of the Tennessee Beekeepers Association. In addition, observation hives were installed in the science building of the 4-H camp in 1996 and 1999 to allow campers and beekeepers to view a live, working colony without chance of injury.

6. Public Education Program (1996-2002).

Observation hive colonies (bees inside a portable glass-walled hive) were used as safe exhibits during demonstrations (33) including "Ag Day" (5) and Spring Fling on the University of Tennessee campus, in displays at county farm/field days (5), experiment station field days (6), elementary schools (15), and museums (2).

Demonstrations manipulating bees inside cages have educated the public at experiment station field days (4) without any danger of being stung and demonstrations in apiaries (25) have educated beekeepers for Beemaster Programs

(16), 4-H Jr. leader training (3) at beekeeper field days (3) and at the Beardsley Inner-city Farm project in Knoxville (3).

Four publications written previously were revised and reprinted to help educate public concerns about honey bee related problems including: Bees in the wall, what can be done? (PB1508); Bee aware, Africanized honey bee facts (PB1513); and Preparing for honey bee emergencies (PB1522). Many favorable comments have been received about these publications from homeowners, beekeepers and from the Tennessee Emergency Management Agency.

Africanized bee awareness has diminished as an important public concern in Tennessee because these bees have not arrived here. If the situation changes, the publications mentioned above should alleviate public concern.

Involvement in regional and national meetings improved my ability to update and disseminate current information to assist beekeepers in Tennessee. I was elected as a director in the American Association of Professional Apiculturists for 1999-2002

D. Cooperative Efforts: Research, Industry, Teaching and Government Agricultural Agencies

Cooperation with Research and Private Industry

NATIONAL

Forgotten Pollinators Campaign. 1996. Assisted bee scientists from USDA and numerous Universities to improve public understanding of the importance of bee pollinators to their food supply. Supplied support data from studies on squash pollination. Contributed suggestions to improve the National Zoo Pollinarium Exhibit. Invited to participate at meeting in Washington D.C. Oct. 29, 1996.

Apicure (formic acid gel) - Cooperated with USDA personnel at the Honey Bee Research Laboratory, Beltsville, MD. and the manufacturer of Apicure , Better Bee Inc. to study formic acid in gel formulation to use for tracheal mite control. The material was registered for use in 2000 (1997-2000).

Checkmite + (coumaphos) - Supported studies to obtain Sect. 18 registration clearance for Checkmite+ used for *Varroa* mite and small hive beetle control. In cooperation with the registrant, the EPA and the Tennessee Department of Agriculture (1998 -2000).

ApiLifeVAR - Provided research data to obtain a Sect. 3 registration for ApiLifeVAR to be used for tracheal and *Varroa* mite control. Cooperated with the IR-4 Project to write label for this material and its use by beekeepers. Registration of this material should occur in Fall of 2002, according to latest EPA estimate (1999 - Present).

Meetings with National Beekeeping Industry Representatives

- 2001 Jan. 12-15. San Diego, CA. American Beekeeping Federation.
- 1999 Jan. 4-6. Baton Rouge, LA. American Honey Producers.
- Jan. 8-10. Nashville, TN. American Beekeeping Federation.
- 1998 Jan. 9-14. Colorado Springs, CO. American Beekeeping Federation.
- 1997 Jan. 8-12. Memphis, TN. American Honey Producers.
- Jan. 8-12. Memphis, TN. Apiary Inspectors of America.

National/Regional Invitations to Judge Honey Exhibits

- 2000 Eastern Apicultural Society. Seven Springs, PA.
- 1998 American Beekeeping Federation. Colorado Springs, CO.
- 1998 Eastern Apicultural Society. Salisbury, MD.

Tennessee Regional / State/ County Fairs - Honey Exhibit Judging

- 1998 -1999 TN State Fair, Nashville, TN.
- 1996 -1999 TN Valley A & I Fair, Knoxville, TN.
- 1999 Bedford County.
- 1996 -1999 Greene County.
- 1998 -1999 Sevier County.
- 1996 Anderson County.

REGIONAL

Walter T. Kelley Co. - Advised Ms. Sarah Manion, President of the Walter T. Kelley Co., a beekeeping supply company located in Clarkson, KY, how to include an observation hive and active beekeeping exhibit in a new beekeeping museum they are planning. I discussed options while touring their facility in Kentucky on February 11, 2000 and later provided them with digital images showing field use of a new bee suit they designed.

The Eastern Apicultural Society is a regional beekeeping association including beekeepers from states east of the Mississippi River. At the request of the Tennessee Beekeepers Association and with their assistance, Tennessee hosted the annual conference at Maryville College in 1999. I served as co-host and program chair for the short course and main convention which served 565 beekeepers from 18 states including 106 from Tennessee.

STATE

Commodities - Assisted with the UT Fruit and Vegetable Commodity Committee Variety Evaluations 1996 -1999. Cooperated with researchers and extension specialists in the departments of PS &LS, BEES, E&PP.

Vegetable Initiative - 1998 - Present. Researchers and Extension Specialists sponsored by Tennessee Experiment Station in E&PP, BEES, PSLs, etc. Seek improvement for vegetable industry in Tennessee.

Advised Sequatchie Valley Institute about maintaining two colonies of honey bees for their environmental farm that were donated for purpose of public education and pollination of fruits and vegetables. (2001 - Present).

Advised Ijams Nature Center on designing a new observation hive for their new facility. while teaching their staff about honey bees. February, 2000 and March, 2001. **The new hive is viewed by thousands of youth and adult visitors.**

Cooperated with the Creative Discovery Museum, Chattanooga, TN. to conduct beekeeping education programs. Designed a permanent indoor/outdoor observation hive for a new exhibit (2000-Present). [See New Exhibit under Youth Programs above]. **This unique exhibit is viewed by thousand of visitors.**

Cooperated with JFG Coffee Co. to develop new honey product. 1996. Subsequently (2000) Ms. Brenda Hubbel developed a new honey jelly which she now markets through her own company. **The product and her new company are becoming very successful.**

BNPCE - I have become involved with the Bioactive Natural Products Center of Excellence (BNPCE). The group has just been organized and includes research and extension personnel from UT and ORNL. Funding is being sought to examine bee products as well as to detect level of contamination in wax due to miticide use.

DOGWOOD TEAM - I have actively participated in this team study with UT faculty from PS&LS, Ag. Econ. and E&PP. (1996 - 2002).

Problem - Dogwood anthracnose and powdery mildew are two diseases that have caused extensive damage to dogwoods for the past decade. **The goal** of this team project was to produce a new dogwood cultivar that is resistant to powdery mildew and dogwood anthracnose.

Objectives of our part of this study were to: 1) Induce honey bees to visit dogwoods, a plant not normally attractive to bees, in cages. 2) Induce bees to pollinate a target dogwood cultivar (Appalachian Spring, resistant to anthracnose) with pollen from another cultivar (Cherokee Brave, resistant to mildew)

Methods/Results/Funding - We induced honey bees to visit both cultivars in cages by adding queen pheromone (as an odor cue) to sugar syrup (a food reward) and applying the mixture (false nectar) to the base of the flowers.

In 2001, pollination of dogwoods was successful in producing hundreds of seed from the target cultivar. We hope further study will verify that trees produced from these seed are indeed resistant. Over the past three years we have received a total of \$15,500 from the TN Agric. Exp. Sta. to support our portion of this team project.

Dogwood Team Impact - Developing a resistant cultivar would have a substantial financial impact on the ornamental nursery industry in Tennessee with estimated increased value of \$100 million.

Cooperative Efforts - Teaching

Extension Agent Education - In-Service Training (since 1996).

- 1996 Apiculture Updates with Handouts:
 - Jan. 23 - Greeneville - District V
 - Jan. 24 - Crossville - Districts III and IV
 - Jan. 25 - Nashville - District II
 - Jan. 26 - Jackson - District I
- 1997 Apiculture Updates with Handouts:
 - Jan. 21 - Crossville - Districts III and IV
 - Jan. 24 - Nashville - District II
 - Jan. 27 - Greeneville - District V
 - Jan. 28 - Jackson - District I
- 1998 Apiculture Update with Handouts
 - Feb. 3 - Greeneville - District V
 - Commercial Fruit and Vegetable with Handouts
 - Feb. 12 - Jackson - District I
 - Jun. 24 - Crossville - Districts III and IV
 - IPM and Home, Horticultural and Crop Pest Control
 - Feb. 24 - Crossville - Districts III and IV
- 1999 Apiculture Update with Handouts and Publications
 - Feb. 10 - Knoxville - Smoky Mountain District
 - Welcome to new 4-H Agents
 - Oct. 20 - Knoxville
- 2000 Apiculture Update with Outline Summary and Publications
 - Feb. 8 - Knoxville - Smoky Mountain District
 - New Agent Welcome
 - Apr. 5 - Knoxville
- 2001 Apiculture Update with Outline Summary, Specimens and Publications
 - Feb. 15 - Knoxville - Smoky Mountain District
 - Feb. 22 - Jackson - Western District
 - May 22 - Nashville - Central District
- 2002 Apiculture Update with Outline Summary, Specimens and Publications.
 - Jan. 18 - Knoxville - Smoky Mountain District

Invited lecturer to student classes:

- 2001 July 19 - UT. Knoxville. Insects in the Classroom. Guest lecture: Thinking like a bee. Observation hive demo and question/answer session (3hr).
- 2000 April. - UT. Knoxville. Field Crops and Vegetable Insects. A) Lecture and B) Lab session: Identifying common bee taxa (4hr.).
- 1999 November 9 - UT. Knoxville. Field Crops and Vegetable Insects. The importance of pollination and pollinators to agriculture (1hr.).
- 1998 Mar. 4 - UT. Knoxville. Economic Entomology Class. 1998. Why is pollination important to agriculture? (1hr.).
- 1996 Mar. 6 - UT. Knoxville. Economic Entomology Class. Pollination is important economically for food production. (1hr.).

Advising - Graduate Student (M.S) Committees, University of Tennessee

1997-1999	Ms. Sarah Hollins	Ornamental Horticulture
2000-2002	Mr. Danny Trieff,	Entomology and Plant Pathology
2000-2002	Mr. Chris Werle,	Entomology and Plant Pathology

Cooperative Efforts - Government - Tennessee Department of Agriculture

1995 Jan. 11 - Nashville, TN. Apiary Technical Advisory Committee Meeting.

1996 Jan. 17 - Knoxville, TN. Meeting with Apiarist.

Feb. 29 - Nashville, TN. Review of Honey Bee Treatment Schedule for Apiarist, Mr. Gray Haun.

Apr. 4 and Nov. 16 - Knoxville, TN. Meeting with Apiarist.

1997 Feb. 17 - Nashville, TN. Meeting with Apiarist.

Mar. 17 - Nashville, TN. Review of Grant for Local Apiary Inspectors.

Oct. 9 - Nashville, TN. Meeting with Apiarist.

1998 Jan. 24 - Maryville, TN. Meeting with Apiarist.

Jul. 9 - West TN. Exp. Sta., Jackson. Cooperative Public Demonstration.

1999 Jan. 25 - Knoxville, TN. Meeting with New Apiarist, Dr. Ray McDonnell.

Jan. 28 - Assisted State Apiarist in Request for Section 18 (FIFRA) for Checkmite+. Letter to Mr. Jace Burch.

Aug. 31 - Knoxville, TN. Meeting with Apiarist.

2000 Feb. 23 - Knoxville, TN. Meeting with Director of Plant Cert. and Apiarist.

2001 Mar. 17 and Oct. 17 - Knoxville, TN. Meeting with Apiarist and Director of Plant Cert.

2002 Feb. 1 - Treadway, TN. Joint meeting with Apiarist and Appalachian Spring Coop. Heifer Honey Bee Project.

E. Awards and Grants

Awards

- 2001 Eastern Apicultural Society, Certificate of Appreciation, Massachusetts Maritime Academy.
- 2000 Gamma Sigma Delta, UT Institute of Agriculture Team Award of Merit for Dogwood Breeding.
- 1999 International Apicultural Conference, Apimondia, Vancouver, BC, Canada. Gold Medal Winner - Honey Bee Pests, Predators and Diseases. 3rd Edition. Chapter 19 - Poisoning by Plants.
- 1997 U.S. Department of Interior Fish and Wildlife Service, Appreciation of contribution at Cross Creeks National Wildlife Refuge.
- 1997 Newport Kiwanis Club. Certificate of Appreciation.

Grants Awarded (Total from 1996 to 2001 = \$446,504.00)

- | | | |
|---------|-----------|--|
| 2001-03 | \$156,504 | Southern Region IPM; USDA/CSREES. Integrated pest management of the <i>Varroa</i> mite, <i>Varroa destructor</i> , in the Southern United States. J. A. Skinner, J. P. Parkman (UT), K. Delaplane (U GA) and W. M. Hood (Clemson). |
| 2001 | \$5,000 | Tennessee Agric. Exp. Sta., Dogwood Breeding. |
| 2000 | \$5,000 | Tennessee Agric. Exp. Sta., Dogwood Breeding. |
| 2000 | \$3000 | Tennessee Beekeepers Association. |
| 1999 | \$3,500 | USDA/CAPS, Survey for Small Hive Beetle. |
| 1999 | \$5,500 | Tennessee Agric. Exp. Sta., Dogwood Breeding. |
| 1998 | \$4,500 | Tennessee Agric. Exp. Sta., Dogwood Breeding. |
| 1998 | \$83,000 | Tennessee Legislature/ TN Agric. Ext, Service. Honey Bee Mites. |
| 1997 | \$3,000 | Tennessee Agric. Exp. Sta., Dogwood Breeding. |
| 1997 | \$75,000 | Tennessee Legislature/ TN Agric. Ext, Service. Honey Bee Mites. |
| 1996 | \$100,000 | Tennessee Legislature/ TN Agric. Ext, Service. Honey Bee Mites. |
| 1996 | \$2,500 | Tennessee Agric. Exp. Sta., Dogwood Breeding. |

Grants Submitted (Not Awarded)

2001	\$12,000	Consortium for Integrated Pest Management (CIPM).
2000	\$10,000	New Jersey Dept. of Agric.
1999	\$1,616	California State Beekeepers Association.
1998	\$408,000	Fund for Rural America. with ORNL and USDA. Cryobiological preservation of honey bee embryos.
1997	\$10,500	NAPIAP. Survey of chemical usage in honey bee colonies.

F. PUBLICATIONS - John A. Skinner

1. Refereed articles and refereed reviews appearing in peer-reviewed professional journals.

Skinner, J. A., J. P. Parkman and M. D. Studer. 2001. Evaluation of honey bee miticides, including temporal and thermal effects on formic acid gel vapors, in the central southeastern USA. *J. of Apic. Res.* 40 (3-4): 81-89.

2. Book chapters or books.

Skinner, J. A. 1997. Chapter Nineteen, Poisoning by plants: In *Honey Bee Pests, Predators and Diseases*. 3rd Ed., ed, R. Morse; A.I. Root Co., Medina, OH.

3. Abstracts and proceedings from professional meetings.

Skinner, J. A., K. Pickens, J.P. Parkman and M.D. Studer. and M.T. Windham. 2001. A novel approach using honey bees to pollinate flowering dogwoods. [Abstract]. *Am. Bee J.* Vol. 141 (12): 894.

Skinner, J. A., J. P. Parkman and M. D. Studer. 2000. Evaluation of ApiLife VAR and Checkmite+ for management of *Varroa* and tracheal mites in Tennessee. [Abstract] *Am. Bee J.* Vol. 140: 908.

Skinner, J. A., J. P. Parkman and M. D. Studer. 2000. Evaluating honey bee mite treatments: Coumaphos strips, ApiLifeVAR and a new application method for formic acid. *The Firefly (Proc. 27th Ann. Mtg. Tenn. Entomol. Soc.)*14:7-8.

Parkman, J. P., **J. A. Skinner** and M. D. Studer. 1999. Comparative efficacy of alternative honey bee mite treatments with an emphasis on formic acid gel activity over time. [Abstract]. *Am. Bee. J.* 139: 314.

Skinner, J. A., J. P. Parkman and M. D. Studer. 1999. Status of beekeeping pests and pest management options. *The Firefly (Proc. 26th Ann. Mtg. Tenn. Entomol. Soc.)*13:17-18.

Hollins, S. J., **J. A. Skinner**, W.T. Witte, M.T. Windham and R.N. Trigiano. 1999. Breeding resistant flowering dogwood (*Cornus florida*). Proc. of South. Nur. Assoc. Res. Conf. Vol. 44: 378-380.

Witte, W. T., M.T. Windham, R.N. Trigiano, **J. A. Skinner**, W. Klingman, J. F. Grant, E.T. Graham, P.C. Flanagan and R.M. Auge. 1999. The dogwood improvement program at the University of Tennessee. International Plant Prop. Soc. Comb. Proc. 49:71-74.

Skinner, J. A., J. P. Parkman, and M. D. Studer. 1998. Evaluating new methods to manage honey bee parasitic mites. The Firefly (Proc. 25th Ann. Mtg Tenn. Entomol. Soc.) 12:15-16.

Skinner, J. A., J. P. Parkman, and M. D. Studer. 1998. Comparing efficacy of formic acid (gel, board), Apilife VAR and 100% thymol crystals for management of *Varroa* and tracheal mites in Tennessee. [Abstract]. Am. Bee J. 138: 299-300.

Skinner, J. A., J. P. Parkman, and M. L. Studer. 1997. Honey bee mite studies in Tennessee: oily, minty and smelly. [Abstract]. Am. Bee J. 137(3):227-228.

Sauve, R. J., J. H. Craddock, J. T. Ling, S. E. Schlarbaum, **J. A. Skinner**, R. N. Trigiano, M. T. Windham and W. T. Witte. Fruit set in hand pollinated and honeybee pollinated dogwoods. Proc. of South. Nur. Assoc. Res. Conf. Vol. 41: 378-382.

4. Peer-reviewed extension publications, fact sheets and reports.

Skinner, J. A., J. P. Parkman, and M. D. Studer. 2002. Using Terramycin for the prevention of American Foulbrood. University of Tennessee. SP 596.

Skinner, J. A. and J.P. Parkman. 2002. Tracheal Mites in Tennessee. University of Tennessee. SP409-A (Revision).

Skinner, J. A. and J. P. Parkman. 2002. The small hive beetle - a new pest of honey bees. University of Tennessee. SP 594.

Vail, K. M., E. E. Burgess, R. Gerhardt, C. Jones, **J. A. Skinner** and C. Harper. (In Press, 2002.) Public Health Control: Pest. Cert. Man. - Category 8. UT Pub.

Skinner, J. A., J. P. Parkman and M. D. Studer. 2001. Evaluation of new treatments for parasitic mites of honey bees. 2000 Vegetable Initiative Progress Report: 208-209.

Vail, K. M. and **J. A. Skinner**. 2000. Yellowjacket wasps in Tennessee. University of Tennessee. SP 341M.

Skinner, J. A., J. P. Parkman, and M. D. Studer. 1999. Alternative Treatments for honey bee mite management. University of Tennessee Vegetable Initiative

Progress Rept. pp 378-380.

Vail, K. M., H. Williams, **J. A. Skinner**, and D. Hensley. 1999. European hornets tapping at your window at night? University of Tennessee. SP290-A. (Revision).

Skinner, J. A., J. P. Parkman, and M. D. Studer. 1998. Alternative controls for parasitic mites of honey bees, summer 1997 trial. University of Tennessee Vegetable Initiative Progress Rept. for 1998. pp 278-280.

The following publications and fact sheets were revised and reprinted at least once during the evaluation period (1996-2001).

Skinner, J. A. 1994. Swarming Honey Bees: What Should Be Done? Agriculture Extension Service, University of Tennessee. PB1524.

Skinner, J. A. 1994. Preparing for Honey Bee Emergencies. Agriculture Extension Service, University of Tennessee. PB1522.

Skinner, J. A. 1994. Making a Pollination Contract. Agriculture Extension Service, University of Tennessee. PB1516.

Skinner, J. A. 1994. *Varroa* Mites in Tennessee. Agriculture Extension Service, University of Tennessee. PB1511.

Skinner, J. A. 1994. Honey Bees in a Wall! What Can Be Done? Agriculture Extension Service, University of Tennessee. PB1508.

Skinner, J. A. 1993. Squash Pollination Guidelines for Tennessee Growers. University of Tennessee. SP409-B.

5. Trade journal publications.

Parkman, J. P. , **J. A. Skinner**, and M. D. Studer. [In Press, April, 2002] The Tennessee *Varroa* sticky board trap. Bee Culture.

Skinner, J. A. 1997. Como hacer un contrato para la polinizacion. Apitec. Noviembre/Diciembre: 31-33.

6. Entomology and Plant Pathology information notes.

Skinner, J. A. 2002. The Tennessee Beemaster Program. University of Tennessee. E&PP Info. 96.

Skinner, J. A. 2001. Apiculture 2001. Chapter for Tennessee apiculture recommendations. The Redbook. University of Tennessee. E&PP Info. 67.

Skinner, J. A. 1999. Using Terramycin in extender patties. University of Tennessee, E&PP Info. 642.

Skinner, J. A. and J. P. Parkman. 1999. The small hive beetle - a new pest of honey bees. University of Tennessee. E&PP Info. 637.

7. Miscellaneous reports and publications.

Skinner, J. A., J. P. Parkman, and M. D. Studer. 2000. Progress report and request for continued funding. Report to the Vice President of Agriculture. UTIA 6 p.

Skinner, J. A. and M. D. Studer. 1998. Tennessee honey bee losses, practices and Beemaster Program survey. University of Tennessee. Agric. Ext. Serv. 11 p.

Skinner, J. A., J. P. Parkman, and M. D. Studer. 1996. Report on honey bee mite research during 1996 at the University of Tennessee. Misc. Report to Beekeepers of Tennessee and Tennessee State Legislature. 6 p.

Manuscripts in Progress

Studer, M. D., **J. A. Skinner** and J. P. Parkman. Creative bees, using an observation hive as an educational tool. [For Bee Culture, 2002].

Parkman, J. P., **J. A. Skinner**, and M. D. Studer. Using ApiLifeVAR in the Southern USA: Efficacy, compatibility and comb contamination. [For J. Apic. Res, 2002].

V. PROFESSIONAL ORGANIZATIONS

A. MEMBERSHIP

American Association of Professional Apiculturists
American Beekeeping Federation
Eastern Apicultural Society
Entomological Society of America
Epsilon Sigma Phi
Gamma Sigma Delta
Tennessee Association of Agricultural Agents & Specialists
Tennessee Association of Extension 4-H Workers
Tennessee Entomological Society

B. OFFICES OR RESPONSIBILITIES

2002 - Departmental Representative - Gamma Sigma Delta
2002 - President-Elect. Program Committee Chair. Tennessee Entomol. Soc.
1999 - 2002. Director. Amer. Assoc. of Prof. Apiculturists.
1999 - 2002. Chair of Nominations Committee, Amer. Assoc. of Prof. Apiculturists.
1999 - 2002. Student Awards and Membership Committees, TN. Entomol. Soc.
1999 - Program and Short Course Coordinator and Host for Eastern Apicultural Soc. Convention, Maryville College, Maryville, TN.
1997 -2002. Apiarist Technical Advisory Committee. TN. Dept. Agric., Plant Industries.
1996 - 1998. Student Awards Committee, Tennessee Entomol. Soc.

1996 - 1998. Chair of Pollination and Poster Committees, Am. Assoc. Prof. Apic.

C. PUBLICATION/GRANT/PROMOTION REVIEWS

2002 - Grant: MS02-00172, SBIR.

2001 - Publications: MS E00-252, Environ. Entomol.; MS 01508, J. of Apicult. Res.; MS J01-043, J. Economic Entomol.;

Grant: MS 01-00043 SBIR.

Promotion: One for tenure and promotion to Assoc. Prof. (Cornell).

One for promotion to Prof. (Clemson).

2000 - Publications: MS 00461, Environ. Entomol.

1996 - 2001. Departmental E&PP Faculty Publications - Twelve.

VI. UNIVERSITY ASSIGNMENTS (COMMITTEE AND ADMINISTRATIVE)

2002. Search Committee - Molecular Systematist Position. E&PP Dept.

Gamma Sigma Delta - Departmental Representative. E&PP Dept.

2001 - 2002. Curriculum Committee, E&PP Dept.

Seminar Committee, E&PP Dept.

2001. Promotion Committee Chair for Mr. Tom Stebbins, E&PP. Dept.

2000. News Director Search Committee. Communications Dept.

Videographer Search Committee - Communications Dept.

1990 - 2000. Fruit and Vegetable Commodity Committee. UTIA.

1994 - 1998. Food Marketing Advisory Committee. UTIA.

1991 - 2002. Roundup Judge and Awards Presenter.

4 - H Workbook Judge.

2001. 4 - H Congress Judge.

1996. 4 - H Curriculum Reviews: in Beekeeping and in Entomology.

VII. COMMUNITY SERVICE

Alcoa Elementary:

PTO member, 1992 -2002.

Wesley Woods Camp volunteer, 1994, 2002.

Alcoa High School:

PTO member, 1999 -2002.

Booster Club, 2000 -2002.

Boy Scouts of America:

Scoutmaster, Troop 86 - 1996 -98.

Asst. Scoutmaster, Troop 285 - 1999 -2002.

Scouting For Food - Canned Food Drive, 1992 -2001.

Logans Chapel United Methodist Church:

Pastor Parish Relations - 1999 - 2002.

Lay Speaker, 1994 -2002.

Lay Leader, 1999 -2002.

Trout Unlimited, Little River Chapter, Board of Directors - 2002.

VIII. APPENDICES

APPENDIX A

BEEMASTER PROGRAM LITERATURE

Overview - The Tennessee Beemaster Program, E&PP Info. 96 (revised 2002).
Publications Provided List (Revised 2002).
Recommended Reading List (Revised 2002).

Hobbyist Level

Course Syllabus - Dates, locations, and times of classes (Revised 2002).
Information Sheet - Name, address, experience, phone number, etc. of participant.
Pre-Test 101 - Test given before first class (Revised 2000)
Post-Test 102 - Test given after all classes (Revised 2002).
Evaluation Form (Revised 2001).
Class One Outline (Revised 2000).
Class Two Outline (Revised 2001).

Inspector Training Level

Course Plan
Information Sheet - Name, address, experience, phone number, etc. of participant.
Pre-Test 101 - Test given before first class
Inspector Training Test 1 - Final exam
Practical laboratory test answer sheet
Evaluation Form
Class One Outline
Class Two Outline
Diagnosis of Honey Bee Diseases, USDA Agric. Hdbk. 690 (Revised 2001).

APPENDIX B

SLIDE SETS REVISED AND USED IN 1996-2002:

Social insects - for grade school children, garden clubs, civic organizations.
The honey bee colony: basic biology and behavior.
The bee hive: construction and use of equipment.
Inspecting bees: communication, preparation, techniques.
Bee diseases: detection, prevention and treatment.
Tracheal and *Varroa* mites: detection, prevention and treatment.
Integrated pest management for honey bees.
Pollination ecology: theory and principles.
Crop pollination: the importance of bees as pollinators.
Honey from colony to jar.
Squash pollination.
Blueberry pollination.
Removing honey bees from walls.
Preparing for honey bee emergencies.
Africanized honey bees.

SLIDE SETS DEVELOPED IN 1996-2002. * = POWERPOINT FORMAT ALSO.

- * If flowers are restaurants to bees, what are bees to flowers?
Making and using pollination contracts.
- * Infertile queens, drone layers and laying workers.
- * Can you think like a bee?
Cucurbit pollination.
Alternative pollinators.
- * Honey bee preferences for foundation.
Other hive products.
- * Pests, pathogens and predators.
- * Preparation, prevention and protection: fall and winter management.
Stinging insects.
Beginning beekeeping.
Bees and the public.
- * Alternative controls for parasitic mites of honey bees.
Tennessee beekeeping, Southern Style .
Diseases and pests of honey bees.
Preparing honey for the fair.

APPENDIX C

EDUCATIONAL MATERIALS (VIDEOS) OBTAINED AND LOANED TO AGENTS/ASSOCIATIONS.

- 2001 Delaplane, K. University of Georgia, Cooperative Extension Service. Honey bees and beekeeping. A year in the life of an apiary. 3 hr.
- 2000 Richey, S. Spectral Films Inc. The honey harvest. 47 min. (Copyright 1988).
- 2000 Griffin, B. L. Knox Cellars. The orchard mason bee. 20 min.
- 2000 Three Groups: University of Arizona Cooperative Extension Service, Arizona Dept. Agric. and the American Assoc. of Prof. Apiculturists. Home owners guide to safe handling of honey bees. 26 min.
- 1999 Calderone, N. A. I. Root Co. The honey bee - a growers guide. How to evaluate honey bee colonies for pollination.
- 1998 Cobey, S. W. The Ohio State University. Instrumental insemination of honey bee queens. 25 min.
- 1998 Flottum, K. Bee Culture Queens: problems and solutions. American Beekeeping Federation Symposium. 45 min.
- 1998 Spivak, M. University of Minnesota, Extension Service. Successful queen rearing. 30 min.
- 1997 4-H Staff Be a champion...join 4-H. 8 min.
- 1997 Maddox, L. Tennessee Farm Bureau Federation AG Around America - Tennessee Bees - John A. Skinner interview. 20 min.
- 1997 Bayer AG Co. *Varroa*, the video on *Varroa* mites and their control. 24 min.
- 1996 Cowen, S. Commercial Honey Processing. 60 min.
- 1996 Tew, J.E. USDA, Extension Service Five Part Video:
A) Africanized Bees - Learning to live with them . 21 min.
B) Africanized Bees - Destroying Africanized Bee hives .16 min.
C) How to get started - Bees from a building . 18 min.
D) The Sting - Ground nesting yellow jackets . 6 min.
E) The Sting - The hornets highrise hive . 9 min.

APPENDIX D
PRESS RELEASES/IN-APIARY INTERVIEWS/TELEVISION PROGRAMS.

- 2001 Oct. 11 NBC. Weakest Link Program. Jamison Selby. Queen mating.
 2001 Oct. 9 NBC. Weakest Link Program. Jamison Selby. Drones?
 2000 Aug. 2 News Packet, UT Ext. Serv. Bees Make Comeback This Spring in Tennessee.
 1999 July/Aug Horticulture Magazine, Field Notes , Southeast. Bees. with Ms. Carol B. Miller.
 1999 July 27 UT Communications Dept. Press Interview for Eastern Apiculture Society Meeting, Maryville, TN.
 1999 July 21 Knoxville TV Channel 10, The value of honey bees as pollinators for Tennessee Agriculture.
 1999 July 9 Marketing Ag Column. UT Ext. Serv. Bees May Be Making a Comeback.
 1999 June 2 News Packet, UT Ext. Serv. New Weapons Added in Fight to Save Bees.
 1999 May 25 Nashville Tennessean. Beekeepers Swarm as Demand Grows. By Lisa Benavides.
 1999 Apr. 14 News Packet, UT Ext. Serv. Good News for Beekeepers.
 1999 Mar. 2-3 Reidland Productions, - Television, Nashville, TN. Plants to attract pollinators. HGTV/DYI Airing Nationally. 1999-2002.
 1999 Jan. 29 Reidland Productions, - Television, Nashville, TN. Bees and gardens. HGTV/DYI Airing Nationally. 1999-2002.
 1998 Sep. 23 News Packet, UT Ext.Serv., Another Pest Threatens Tennessee Honey Bees.
 1998 Jul. 9 TV (Memphis) Interview in cage with colony and reporter, Summer Celebration, Jackson, TN. Bees help TN Agriculture.
 1998 Jan. 16 Radio and TV Interview. Colorado Springs. The importance of bees to U.S. Agriculture.
 1997 June 20 Knoxville TV Channel 8. - Cold weather can effect honey bee mating.
 1997 Spring UT Ext. Serv. Green Tennessee: Do You Have a Garden Full of Flowers but No Fruit? You May Need Pollinators.
 1997 May Heartland Series. WIVK TV. The problem with bees. With Bill Landry. Program still being aired locally. 1997-2002.
 1997 Mar. UT Context: UT Study May help State Beekeepers.
 1996 Spring UT Ext. Serv. Green Tennessee: Your 1996 Guide to Profitable Farming. Bring in bee for proper pollination.
 1996 Spring UT Ext. Serv. Lawn & Garden: Bees are indispensable to your garden.
 1996 Oct. 22 ACU Press: Pollination Challenges/Tiny Parasitic Mites Still Huge Problem/New Studies.
 1996 Aug. 2 UT News Center: Africanized bees may never reach West Tennessee.
 1996 Jul. 31 News Packet, UT Ext. Serv. Mites Slow March of Africanized Bees.
 1996 July 8 Live at Five - Knoxville Channel 10 - Parasitic mites harming bees.
 1996 April17 Knoxville TV Channels 6, 8, and 10. - Dogwood Pollination.

APPENDIX E - DEMONSTRATIONS

Displays with Observation Hive:

1997 - 2001			Ag. Day. UT Knoxville Agric. Campus.
2001	Oct.	3	Smithsonian/Orkin Insect Safari for Kids. Knoxville, TN.
	May	18	UTIA. Spring Fling. UT Trial Gardens.
	Mar.	5	Creative Discovery Museum Training. Chattanooga, TN.
1996 - 2001			Elementary schools (15) in Knox and Blount Counties.
1997 - 1998, 2000			West Tennessee Experiment Station Field Day/Summer Celebration. Jackson, TN.
1997 - 1998, 2000			Anderson County Field Day. 450 4 th Grade students an public.
2000	Mar.	7	Creative Discovery Museum Training. Chattanooga, TN.
1999	Aug.	19	Small Farms Training, Plateau Experiment Station.
1998	Oct.	7	Beardsley Farm Project. Knoxville, TN.
1997	Jun.	12	Knoxville Experiment Station Field Day.
1996	Oct.	25	Farm Fest. Sommerville, TN, 450 5 th grade students.
	Oct.	9	Vegetable Machinery Expo. Knoxville Exp. Sta.

In Apiary Demonstrations:

1996 - 2002			Most Beemaster Classes listed as Beemaster Program Classes.
1996 - 1999			4-H Jr. Leader Training, Ag. Exp. Sta., Knoxville, TN.
1999	Aug.	10	Small Farm Field Day and In-Apiary Demonstration, Nidifer Farm, Carter County.
1998	Nov.	20	Beardsley Farm Project. Worker training. Knoxville, TN.
	Oct	7	

Beekeeping with caged bees:

1997-1998, 2000			West Tennessee Exp. Sta. Field Day/Summer Celebration. Jackson, TN.
1997	Jun.	12	Knoxville Experiment Station Field Day.

APPENDIX F - PRESENTATIONS

1. PRESENTATIONS FOR PROFESSIONAL ORGANIZATIONS (EACH LETTER INDICATES SEPARATE PRESENTATION)

INTERNATIONAL

40th Congreso Internacional De Actualizacion Apicola. May 16-18, 1997. Morelia, Mexico. Polinizacion con abejas y su Legislacion. **J. A. Skinner.**

Ontario Commercial Beekeepers Convention. Ontario, Canada. April 6-8, 1998. A) Alternative treatments for parasitic mites of honey bees. B) Using pollination contracts.

NATIONAL/REGIONAL/STATE

The 9th Annual Dogwood Anthracnose Workshop. April 1-4, 1996. Lake Gundersville, AL. Poster: Breeding methods for dogwood: hand pollination techniques and honey bee-mediated pollination used in development of new *Cornus florida* cultivars. J. H. Craddock, R. Sauve, S. Schlarbaum and **J. A. Skinner.**

American Association of Professional Apiculturists/ American Bee Research Conference. Jan. 8, 1997. Memphis, TN. Honey bee mite studies in Tennessee: oily, minty, and smelley. **J. A. Skinner**, J. P. Parkman, and M. D. Studer.

American Honey Producers Association. Jan.11, 1997. Memphis, TN. What you need in a pollination contract. **J. A. Skinner.**

Tennessee Entomological Society. Oct. 17, 1997. Nashville, TN. Evaluating new methods to manage honey bee parasitic mites. **J. A. Skinner**, J.P. Parkman, and M.D. Studer.

University of Tennessee Vegetable Initiative Progress Report Meeting. Nov. 4, 1997. Progress with alternative treatments for honey bee mite management. **J. A. Skinner.**

American Bee Research Conference/ American Association of Professional Apiculturists. Jan. 16, 1998. Colorado Springs, CO. Comparing efficacy of formic acid (gel, board), ApiLifeVAR and 100% thymol crystals for management of *Varroa* mite in Tennessee. **J. A. Skinner**, J.P. Parkman, and M.D. Studer.

American Beekeeping Federation 55th Annual Convention. Jan. 14-18, 1998. Colorado Springs, CO. Poster Display and brochure: The American Association of Professional Apiculturists: Research, Extension, Teaching, and Regulatory Efforts. **J. A. Skinner.**

PRESENTATIONS FOR PROFESSIONAL ORGANIZATIONS (Cont.)

- Southeastern Branch, Entomological Society of America. Mar. 3, 1998. Chattanooga, TN. Poster: Alternative controls for parasitic mites of honey bees. J.P. Parkman, **J. A. Skinner** and M.D. Studer.
- Eastern Apiculture Society Conference. Jul. 14-18, 1998. Seven Springs, PA. Short Course: A) Conservation of pollinators. B) Other hive products. Paper: Cucurbit pollination. **J. A. Skinner**.
- American Bee Research Conference/ American Association of Professional Apiculturists. Jan. 5, 1999. Baton Rouge, LA. Comparative efficacy of alternative honey bee mite treatments with emphasis on formic acid gel over time. J.P. Parkman, **J. A. Skinner** and M. J. Studer.
- American Beekeeping Federation 56th Annual Convention. Jan. 8, 1999. Nashville, TN. A) Presentation: Beekeeping across Tennessee. B) Workshop: Pollination contracts help beekeepers and growers. **J. A. Skinner**.
- Eastern Apiculture Society Conference. July 26-31, 1999. Responsibilities: A) Short Course Coordinator. B) Conference Program Chair. C) Moderator: Beekeeping with a southern touch. Presentations: A) Using sticky boards, **J. A. Skinner** and T. Webster. B) Panel: Dealing with the press. **J. A. Skinner**, K. Delaplane, J. Tew and D. Caron. C) Tennessee beekeeping. Workshop: A) In the beeyard, inspecting honey bee colonies.
- Tennessee Entomological Society. Oct. 21, 1999. Nashville, TN. Status of beekeeping pests and pest management options. **J. A. Skinner**, J. P. Parkman and M. D. Studer.
- Joint Conference: Eastern Apicultural Society and the American Association of Professional Apiculturists (Including American Bee Research Conference). Salisbury, MD. July 30-Aug 5, 2000. A) ABRC Paper: Evaluation of ApiLifeVAR and Checkmite+ for management of tracheal and *Varroa* mites. **J. A. Skinner** and J.P. Parkman. B) Workshops (2): Infertile queens, drone layers and laying workers. C) Assisted with live colony demonstrations.
- Tennessee Entomological Society. Oct. 12, 2000. Jackson, TN. Evaluating honey bee mite treatments: coumaphos strips, ApiLifeVAR and a new application method for formic acid. **J. A. Skinner**, J.P. Parkman, M.D. Studer and R.S. Daniels.
- Joint Conference of the American Beekeeping Federation and the American Association of Professional Apiculturists (Including American Bee Research Conference). Jan.11-15, 2001. San Diego, CA. A) Paper: Comparing dose levels and application methods of formic acid for *Varroa* control. **J. A. Skinner**. B) Nominations Chair Report and Election of Officers.

PRESENTATIONS FOR PROFESSIONAL ORGANIZATIONS (Cont.)

Eastern Apiculture Society Conference. Aug. 6-12, 2001. Massachusetts Maritime Academy, Cape Cod, MA. A) Symposium Chair: Alternative Pollinators. B) Presentation: Alternative pollinators, an overview. Workshops: C) Inspecting a honey bee colony (three sessions). D) Honey bee seasonal management.

American Bee Research Conference. Sep. 7, 2001. Donaldson Brown Conference Center, Port Deposit, MD. Paper: **J. A. Skinner**, J.P. Parkman, M.D. Studer, K. Pickens and M.T. Windham. A novel approach using honey bees to pollinate dogwoods.

Tennessee Entomological Society Meeting. Oct. 13, 2001. Austin Peay University, Clarksville. Paper: **J. A. Skinner**, J.P. Parkman and M.D. Studer. Comparing formic acid application methods for *Varroa* mite management.

2. A) INVITED PRESENTATIONS TO STATE AND REGIONAL BEEKEEPING/COMMODITY ORGANIZATIONS (EACH LETTER INDICATES SEPARATE PRESENTATION)

Georgia State Beekeepers Meeting, Nov. 1-2, 1996. University of Georgia. Athens, GA. A) Pollination management. B) Africanized Bees. C) Youth education: Bees in the schools .

Indiana State Beekeepers Association Convention. Apr. 4-6. 1997. Purdue University, West Lafayette, IN. A) Crop pollination and pollination contacts. B) Teaching kids is fun.

Arkansas State Beekeepers Meeting. Oct. 31 - Nov. 2, 1997. Little Rock, AR. A) Making a pollination contract. B) Bees in a wall, what can be done? C) Alternative Pollinators.

Michigan State University ANR Week. Kellogg Center. East Lansing, MI. Beekeeping Program. Mar. 13-14, 1998. A) Getting to know honey bee biology. B) Controlling parasitic mites with ApiLifeVAR. C) Bees in the wall - What do you do?

Eastern Apiculture Society Directors Meeting. Harrisburg, PA. Jan. 30, 1998. Suitability of Maryville College as a site for 1999 Convention.

Eastern Apicultural Society Board Meeting and Tour for 1999 Convention. Maryville College. Maryville, TN. Oct. 30-31, 1998. Welcome to Maryville in 1999.

New Mexico Beekeepers Association Annual Meeting. Albuquerque, NM. Nov. 13-14, 1998. A) Testing new mite treatments. B) Pollination means cooperation: food for bees, food for us.

INVITED PRESENTATIONS (CONT.)

Virginia State Beekeepers Association Convention. Staunton, VA. Nov. 5-6, 1999.
A) Can you think like a bee? B) Pollination contracts. C) Using ApiLifeVAR and formic acid to manage tracheal and *Varroa* mites.

Alternative Agriculture Workshop 2000 - Sponsored by UT and UK Colleges of Agriculture. Mar. 18, 2000. McCreary County, KY. A) Beginning beekeeping. B) Advanced beekeeping.

Joint Meeting of the Kentucky and Indiana State Beekeepers Associations. Feb. 11-12, 2000. North Liberty, IN. A) Discussion panel: Chemical contamination of hive products. B) Thinking like a bee. C) Tennessee beekeeping, southern style.

Oregon State Beekeepers Association Conference. Nov. 2-4, 2000. Hood River, OR. A) If flowers were restaurants to bees, then what are bees to flowers? B) Hobbyist beekeeping, Tennessee style. C) Banquet auctioneer with Mike Burgett.

Georgia Beekeeping Institute. June 7-9, 2001. Young Harris College, Young Harris, GA. A) Honey bee biology B) Honey bee mites; Workshops: C) Advances in diseases and mite control D) What about tracheal mites?

The Purdue University Intensive Beekeeping Short Course. June 27-29, 2001. Purdue University. West Lafayette, IN. A) Colony management and diseases. B) The latest research on *Varroa*. C) Year-round management strategies.

The Illinois State and Indiana Beekeepers Associations Conference. June 30, 2001. Purdue University. West Lafayette, IN. Those Interesting Calls : You say the weevils killed your bees dead?

Alabama Farmers Federation 29th Annual Commodity Producers Conference, Aug. 1, 2001. Birmingham, AL. Bees and beekeeping are important for crop production.

California State Beekeepers Convention. Nov. 13-15, 2001. Sacramento, CA. A) Can you think like a bee? Workshops: B) Fall/Winter management: preparation, prevention and protection C) Pests and predators of honey bees.

Nebraska State Beekeepers Association Convention: BEETOPIA. Nov. 16-17, 2001. Lincoln, NE. A) Can you think like a bee? B) Honey bee preferences: wax or plastic? C) If flowers are restaurants to bees, what are bees to flowers?

2. B) PRESENTATIONS TO TENNESSEE BEEKEEPING/COMMODITY ORGANIZATIONS (EACH LETTER INDICATES SEPARATE PRESENTATION)

Tennessee State Apiarist Advisory Meeting. Ellington Center, Nashville, TN. Jan 11, 1996. How the University of Tennessee can cooperate.

Beekeepers of Tennessee Directors Meeting. Maryville, TN. Jan 13, 1996. Update on University of Tennessee programs in apiculture.

Tennessee Fruit and Vegetable Producers Meeting, Nashville, TN. Feb. 18-20, 1996. Two posters: A) Squash pollination studies in West Tennessee. B) The value of bees as pollinators, the problems with mites, and solutions from the University of Tennessee. C) Presentation: Using pollination contracts.

Beekeepers of Tennessee Annual Conference. Knoxville, TN. Mar. 29-30, 1996. A) Making a pollination contract B) Options for mite treatments in 1996.

Beekeepers of Tennessee Directors Meeting. Maryville, TN. June 22, 1996. Mite research planned for 1996-1997.

Tennessee State Beekeepers Association Regional Meeting, Shelbyville, TN. August 10, 1996. What's happening with bees at UT.

Tennessee State Beekeepers Association Convention. Oct. 17-19, 1996. Johnson City, TN. A) New treatments for *Varroa* mites. B) Presentations to schools must be fun.

Beekeepers of Tennessee Directors Meeting. Nov. 16, 1996. University of Tennessee Knoxville, TN. The 4-H beekeeping project in Tennessee.

Tennessee Fruit and Vegetable Association Convention. Feb. 11, 1997. Nashville, TN. A) Display: If you want to produce fruits and vegetables, you need bees to pollinate. B) Presentation: Using pollination contracts.

Beekeepers of Tennessee Annual Convention. May 9-11, 1997. Clyde York 4-H Center, Crossville, TN. A) Presentation: Apiculturist's update: new challenges and new alternatives. Workshops: B) In apiary demonstration of how to find a queen. (with Mr. Don Benefield, commercial beekeeper) C) Setting up an observation hive and installing bees. D) Monitoring colonies for *Varroa* mite.

Beekeepers of Tennessee Directors Meeting. Sep. 20, 1997. University of Tennessee Knoxville, TN. Making a beekeepers database.

Tennessee State Beekeepers Association Directors Meeting. Oct. 9, 1997. Nashville, TN. Update on UT apiculture programs for 1997.

Tennessee State Beekeepers Association Annual Convention. Oct 10-11, 1997. Nashville, TN. A) Bees in the wall; What do you do? B) Alternative pollinators.

TENNESSEE BEEKEEPING/COMMODITY ORGANIZATIONS (CONT.)

Beekeepers of Tennessee Directors Meeting. Jan. 24, 1998. Maryville, TN. Update from the American Beekeeping Federation meeting.

Beekeepers of Tennessee Annual Convention. Mar. 28, 1998. Tennessee Wesleyan University. Athens, TN. A) Presentation: Update on research in Tennessee and from the ABF convention. B) Poster: Tiny mites are huge problem; What solutions are possible? C) Poster: The American Association of Professional Apiculturists: Research, Teaching, Extension and Regulatory.

Tennessee State Beekeepers Association Regional Meeting. Lebanon, TN. Aug. 1, 1998. Using sticky boards to detect *Varroa* mites.

Tennessee State Beekeepers Association Annual Convention. Memphis, TN. Oct. 15-17, 1998. A) Bee research at the University of Tennessee. B) Getting started in beekeeping.

Vegetable Initiative Progress and Planning Meeting. Knoxville, TN. Oct. 27, 1998. Progress on apiculture research for 1998.

Small Farms Sustainable Land Use Conference. Farmers Market, Nashville, TN. Nov. 10, 1998. Four repeating sessions: Using bees on small farms to pollinate as well as providing income from honey and other hive products.

Tennessee Fruit and Vegetable Producers Convention. Chattanooga, TN. Feb. 16, 1999. A) Presentation: Managing bees in vegetable crop production. B) Display: If you want to produce these...then you need bees to pollinate . C) Video: The golden harvest.

Tennessee Beekeepers Association Board of Directors Meeting. Nashville, TN. Mar. 6, 1999. What s happening in the apiculture programs at the University of Tennessee.

Tennessee Beekeepers Association Spring Convention. Maryville, TN. Mar. 27, 1999. A) Mite research at UT in 1998: Formic acid, ApiLifeVAR, and oil strips: Do they work? B) Apiculture at UT: Plans for the future.

Small Farms Training, Plateau Experiment Station, Crossville, TN. Aug. 10, 1999. A) Display: Tennessee farms need bees for pollination. B) Presentation: Renting honey bee colonies insures pollination and increases quality and yield.

Tennessee Beekeepers Association Fall Convention. Lebanon, TN. Oct. 28-30, 1999. A) Workshop: Medications for honey bees (repeats next day) B) University of Tennessee apiculture programs update.

TENNESSEE BEEKEEPING/COMMODITY ORGANIZATIONS (CONT.)

University of Tennessee Vegetable Initiative Progress Report Meeting. Knoxville, TN. Nov. 4, 1999. Summary of apiculture program accomplishments for 1999. **J. A. Skinner**, J. P. Parkman and M. D. Studer.

Tennessee Fruit and Vegetable Producers Convention. Chattanooga, TN. Jan 23-24, 2000. A) Presentation: Making a pollination contract. B) Display: The importance of bees as pollinators to Tennessee agriculture C) Video: Pollination for growers.

Tennessee Beekeepers Association Spring Conference. Mar. 24-25, 2000. West TN Exp. Sta., Jackson, TN. A) Status of mite management research at UT. B) Small hive beetle could be a problem.

Tennessee Beekeepers Association Fall Convention. Oct. 20-21, 2000. Oak Ridge, TN. A) Update on mite management research at UT. B) Panel Grill the experts with J. Tew and K. Delaplane.

Tennessee Pest Control Association Convention. Nov. 28, 2000. Knoxville, TN. Bees in the wall and other stinging insects, what do you do?

Tennessee Fruit and Vegetable Association Convention. Jan. 15-16, 2001. Chattanooga, TN. Display: The value of bees as pollinators, challenges from mites, and solutions.

Tennessee Beekeepers Association Directors Meeting. Mar. 17, 2001. Cookeville, TN. Update on UT apiculture programs for 2001.

Tennessee Beekeepers Association Convention. Oc. 19, 2001. Williamson County Ag. Expo., Franklin, TN. A) Apiculture extension and research programs for 2001. B) Panel Discussion on Integrated Pest Management.

Tennessee Beekeepers Association Directors Meeting. Mar. 1, 2002. Plateau Exp. Sta. Crossville, TN. Apiculture program update for 2002.

3. BEEMASTER PROGRAM CLASSES

Tennessee Beemaster Program, Hobbyist Level, Knoxville, TN, Mar. 12-17, 1996. Classroom (15 hr) and apiary (4 hr). A) Honey bee biology. B) Use of equipment. C) Pollination. D) Diseases. E) Mites. F) Seasonal management. Testing before and after course (**50% improvement**). Apiary demonstration at Knoxville Exp. Sta. **Evaluation: 98% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Inspector Training Level. University of Tennessee, Knoxville. April 4-6, and makeup session in field on Apr. 13, 1996. Classroom Presentations: A) Inspecting Bees: communication, preparation, techniques. B) Seasonal management: swarm prevention, over-wintering, using treatments safely. C) Pollination contracts. Laboratory demonstrations: D) Tracheal and *Varroa* Mites: detection, prevention and treatment. E) Bee Diseases detection, prevention and treatment. Exams: 1) Practical laboratory. 2) Written. 3) Field - In apiary at Knoxville Exp. Sta. **Evaluation: 95% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Inspector Training Level. East Tennessee State University, Johnson City, TN. April 25-28, 1996. Classroom Presentations: A) Inspecting Bees: communication, preparation, techniques. B) Seasonal management: swarm prevention, over-wintering, using treatments safely. Laboratory demonstrations: C) Tracheal and *Varroa* Mites: detection, prevention and treatment. D) Bee Diseases detection, prevention and treatment. Exams: 1) Practical laboratory. 2) Written. 3) Field - In apiary at Mr. Ken Sailor's farm, Jonesborough, TN. **Evaluation: 93% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Hobbyist Level, Memphis, TN, May 13-19, 1996. Classroom (15 hr) and apiary (4 hr). A) Honey bee biology. B) Use of equipment. C) Pollination. D) Diseases. E) Mites. F) Seasonal management. Testing before and after course (**32.1% improvement**). Apiary demonstration at Shelby County Extension Office. Memphis, TN. **Evaluation: 100% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Inspector Training Level. Cumberland College Lebanon, TN. May 30 - June 2, 1996. Classroom Presentations: A) Inspecting Bees: communication, preparation, techniques. B) Seasonal management: swarm prevention, over-wintering, using treatments safely. C) Pollination contracts. Laboratory demonstrations: D) Tracheal and *Varroa* Mites: detection, prevention and treatment. E) Bee Diseases detection, prevention and treatment. Exams: 1) Practical laboratory. 2) Written. 3) Field - Martin's apiary in Lebanon, TN. **Evaluation: 94% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Hobbyist Level, Knoxville, TN, April 15-19, 1997. Classroom (15 hr) and apiary (4 hr). A) Honey bee biology. B) Use of equipment. C) Pollination. D) Diseases. E) Mites. F) Seasonal management. Testing before and after course (**33.5% improvement**). Apiary demonstration at Knoxville Exp. Sta., Knoxville, TN. **Evaluation: 96% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Review Session. Crossville, TN. May 9, 1997. Classroom (3 hr) and apiary (1 hr). A) Biology and bee behavior B) Diseases and pests of bees. Testing before and after class (**33.9% improvement**). **Evaluation: 92% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Hobbyist Level, LaFollette, TN. Oct. 20, 21, 23-25, 1997. Classroom (15 hr) and apiary (4 hr). A) Honey bee biology. B) Use of equipment. C) Pollination. D) Diseases. E) Mites. F) Seasonal management. Testing before and after course (**25.9% improvement**) Apiary training at Campbell County Inspectors Apiary. La Follette, TN. **Evaluation: 98% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Hobbyist Level, Knoxville, TN, Mar. 30, 31, April 2-4, 1998. Classroom (14 hr) and apiary (4 hr). A) Honey bee biology. B) Use of equipment. C) Pollination. D) Diseases. E) Mites. F) Seasonal management. Testing before and after course (**20% improvement**). Weather delayed apiary demonstration at Knoxville Exp. Sta., Knoxville, TN. May 9, 1998. **Evaluation: 95% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Hobbyist Level. Shelbyville, TN. April 23-25, 1998. Classroom (12 hr) and apiary (4 hr). A) Honey bee biology. B) Use of equipment. C) Pollination. D) Diseases. E) Mites. F) Seasonal management. Testing before and after class (**14% Improvement**). Demonstration at local apiary, Shelbyville, TN. **Evaluation: 95% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Hobbyist Level, Knoxville, TN, April 5, 6, 8-10, 1999. Classroom (15 hr) and apiary (4 hr). A) Honey bee biology. B) Use of equipment. C) Pollination. D) Diseases. E) Mites. F) Seasonal management. Testing before and after course (**33.1% Improvement**). Apiary demonstration at Knoxville Exp. Sta., Knoxville, TN. **Evaluation: 92% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Hobbyist Level, Refresher Course. March 23, 2000. West TN Exp. Sta., Jackson, TN. Classroom (3 hr) A) Honey bee biology and use of equipment B) Managing diseases and mites. Testing before and after course (**19.53% improvement**). **Evaluation: 93% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Hobbyist Level, Knoxville, TN, April 3, 4, 6-8, 2000. Classroom (15 hr) and apiary (4 hr). A) Honey bee biology. B) Use of equipment. C) Pollination. D) Diseases. E) Mites. F) Seasonal management. Testing before and after course (**25.6% Improvement**). Apiary demonstration May 5, 2000. at Knoxville Exp. Sta., Knoxville, TN. **Evaluation: 96% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Hobbyist Level. Chattanooga, TN. April 26-29, 2000. Classroom (12 hr) and apiary (4 hr). A) Honey bee biology. B) Use of equipment. C) Pollination. D) Diseases. E) Mites. F) Seasonal management. Testing before and after class (**46% Improvement**). Demonstration at local apiary, Chattanooga, TN. **Evaluation: 100% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Hobbyist Level, Knoxville, TN, Mar. 26, 27, 29-31, 2001. Classroom (15 hr) and apiary (4 hr). A) Honey bee biology. B) Use of equipment. C) Pollination. D) Diseases. E) Mites. F) Seasonal management. Testing before and after course (**25% Improvement**). Apiary demonstration at Knoxville Exp. Sta., Knoxville, TN. **Evaluation: 98% of participants rated program as excellent or very good.**

Tennessee Beemaster Program, Hobbyist Level, Knoxville, TN, Mar. 11, 12, 14-16, 2002. Classroom (15 hr) and apiary (4 hr). A) Honey bee biology. B) Use of equipment. C) Pollination. D) Diseases. E) Mites. F) Seasonal management. Testing before and after course. Apiary demonstration at Knoxville Exp. Sta., Knoxville, TN.

4. LOCAL/COUNTY BEEKEEPING ASSOCIATION /CIVIC CLUBS/ WORKSHOPS AND MEETINGS

Trousdale County Farm and Home School. Hartsville Elementary, Hartsville, TN. Jan. 25, 1996. Four Sessions: Honey bees and beekeeping principles.

JFG Industry Meeting. Knoxville, TN. Feb 6, 1996. Developing new products using honey.

Knox County Beekeepers Association. Knoxville, TN. Feb. 6, 1996. Diseases and pests of honey bees.

Greene County - Davey Crockett Beekeepers Association. Feb. 27, 1996. Parasitic mite workshop and demonstration with microscope, camera and video monitor. A) Detecting tracheal mites in your bees. B) *Varroa* mite biology, detection and control C) Honey bee anatomy up close.

Knox County Beekeepers Association. Knoxville, TN. Mar. 5, 1996. Sampling your bees and detecting tracheal and *Varroa* mites.

Hawkins County Area Beekeeper Meeting. Multi-County, Rogersville, TN. Mar. 7, 1996. Parasitic mite workshop and demonstration with microscope, camera and video monitor. A) Detecting tracheal mites in your bees. B) *Varroa* mite biology, detection and control C) Honey bee anatomy up close.

New Horizon Montessori School, Maryville, TN. May 6, 1996. Presentation about beekeeping with observation hive demonstration.

Green Thumb Garden Club. Tazewell, TN. May 8, 1996. Bees are important to pollinate you fruits and vegetables. Observation hive demonstration.

Alcoa Elementary School, Alcoa, TN. May 10, 1996. First grade classes. Bees are cool and we need them to help make our food. Observation hive and honey tasting demonstrations.

Senior Class Day Celebration, Proffits Department Store. Maryville, TN. June 4, 1996. Demonstration on beekeeping and honey with observation hive.

Blount County Beekeepers Association. Maryville, TN. July 1, 1996. Detecting *Varroa* mites with an ether roll and a sticky board.

Greene County Fair. Greenville, TN. Aug. 5, Display: The value of bees for our crops and the problems with parasitic mites.

Sevier County Beekeepers Association. Sevierville, TN. Sep. 3, 1996. A) Detection and treatment of honey bee colonies for mites. B) Honey characteristics.

Blount County Beekeepers Association. Maryville, TN. Oct. 14, 1996. Preparing honey for the fair.

Knox County Master Gardeners Training. Nov. 14, 1996. Knoxville, TN. You need bees to pollinate your garden crops.

Knox County Kiwanis Meeting. Nov. 14, 1996. Knoxville, TN. Luncheon speaker: If you want to eat these, then you need bees.

Ossoli Womens Club Meeting. Feb. 3, 1997. Knoxville, TN. Honey bee sociality.

Fountain City Garden Club. Feb. 5, 1997. Fountain City, TN. Plants need bees to help them reproduce.

Hawkins County Multi-County Beekeepers Meeting. Feb 11, 1997. Rogersville, TN. A) Honey bee diseases. B) Mites of honey bees: diagnosis and treatments.

Knoxville Home and Garden Show. Feb 21-23, 1997. Knoxville, TN. Display: The value of bees, problems with mites and solutions being sought at the University of Tennessee.

Putnam County Beekeepers Meeting. Mar. 3, 1997. Cookeville, TN. Update of treatments used to control honey bee mites.

Newport Kiwanis Club. Mar. 4, 1997. Newport, TN. Honey bees: value and biology.

Anderson County Beekeepers Association. Mar. 4, 1997. Clinton, TN. Diseases and pests of the honey bee.

Coffee County Area Multi-County Beekeepers Meeting. Mar. 6, 1997. Manchester, TN. Diseases and mites of honey bees: detection and treatments.

Greene County - Davey Crockett Beekeepers Association. Mar. 18, 1997. Greenville, TN. New treatments for mites in Tennessee.

Rotary Club, Mar. 20, 1997. Crossville, TN. Are bees important to you?

Grundy County Beekeepers Meeting. Mar. 25, 1997. Coalmont, TN. A) Detecting and treating honey bee mites B) Bottling and labeling honey for sale.

Anderson County Beekeeping Association. Apr. 26, 1997. Demonstration in apiary: this is an allergic reaction.

Sevier County Beekeepers Association. May 5, 1997. Sevierville, TN. Update on new study: mite management in Tennessee.

Stewart County Earth Camp 97. June 16-17, 1997. Animals in Our Environment Cross Creek National Wildlife Refuge. Dover, TN. Four Presentations: Bees pollinate food for wildlife. Demonstration with live colony inside a cage.

Alcoa Elementary. July 29, 1997. Multi-age Classes. 175. students. A) How can you think like a bee? B) Let's act out what bees do in a hive.

Greene County Fair. Aug. 4, 1997. Display: The value of bees, tiny mites are huge problem and what can we do?

Tennessee State Beekeepers Association Regional Meeting. Aug. 9, 1997. Nashville, TN. A) UT Apiculturist Update on Apiary Programs. B) Detecting *Varroa* in your colonies.

Anderson County Beekeepers Association. Sep. 15, 1997. Clinton, TN. Parasitic mite syndrome?

Boy Scout Troop 86 Meeting. Oct. 28, 1997. Maryville, TN. Honey bee biology and beekeeping overview. Observation hive demonstration.

Knox County Beekeepers Association. Nov. 4, 1997. Knoxville, TN. Over-wintering honey bee colonies in Tennessee.

Anderson County Master Gardeners Training. Oak Ridge, TN. Jan. 29, 1998. Importance of bees as pollinators and honey producers.

Hamblen Jefferson and Hawkins Multi-County Beekeepers Meeting. Feb. 19, 1998. Morristown, TN. Research on new mite treatments.

Suburban Hill Garden Club. Knoxville, TN. May 19, 1998. Why do plants have flowers?

Creative Discovery Museum. Chattanooga, TN. May 22, 1998. Designing an observation hive.

Chapman Highway Garden Club. Knoxville, TN. Aug. 20, 1998. Pollinators like bees are important for your garden.

Knox County Beekeepers Association Meeting. Knoxville, TN. Sep. 1, 1998.
Wintering your bees.

Knox County Beekeepers Association Meeting. Knoxville, TN. Feb. 2, 1999. Spring honey plants.

Washington County Beekeepers Association, Jonesborough, TN. Mar. 11, 1999.
Detection and new treatments for tracheal and *Varroa* mites.

Polk County Area Multi-County Beekeepers Meeting. Benton, TN. Mar. 15, 1999.
A) Getting started in beekeeping. B) Seasonal management for honey production. C) Diseases and pests of honey bees.

Grainger County Inspection Training Demonstration, Apiary of Mr. Wallace Bumgardner, Rutledge, TN. April 13, 1999. Procedure to inspect colonies suspected to have American Foulbrood Disease and how to treat colonies.

Johnson County Area Multi-County Beekeepers Meeting. Mountain City, TN. April 27, 1999. A) Thinking like a bee. B) Detection and treatment for honey bee diseases. C) Detection and new treatments for parasitic mites.

Alcoa Elementary School. First Grade Classes. Alcoa, TN. April 29, 1999. A) The honey bee colony. B) How do bees make honey?

Knox County Beekeepers Association. Knoxville, TN. May 4, 1999. Spring honey plants in East Tennessee.

Blount County Beekeepers Association. Maryville, TN. May 10, 1999. New information about parasitic mites and a new pest, the small hive beetle.

Hamilton County Beekeepers. Chattanooga, TN. May 21, 1999. A) A new pest, the small hive beetle. B) Tracheal mites are still a problem in Tennessee.

Blount County Beekeepers Association Inspection Course. Maryville, TN. Sept. 3, 1999. Identifying diseases in the apiary.

Alcoa Elementary School 3rd Grade Classes. Alcoa, TN. Jan. 21, 2000. Bees work hard for people. Demonstration with observation hive and honey.

Sullivan County Ag. Expo., Kingsport, TN. Jan. 29, 2000. Display: Importance of bees to Tennessee agriculture. Presentation: Bee biology and the challenge of parasitic mites.

Knox County Beekeepers Association. Knoxville, TN. Feb. 1, 2000. Queen rearing.

Creative Discovery Museum Demonstration. Mar. 3, 2000. Chattanooga, TN.
A) preventing wax meltdowns. B) Re-queening. Using live bees on roof observation hive.

Hamilton County Area Multi-County Beekeepers Meeting. Mar. 28, 2000. Chattanooga, TN. A) overview of TN Beemaster Program. B) Small hive beetle detection and control.

Oak Ridge Farmers Market Directors Meeting. Apr. 10, 2000. Oak Ridge, TN. A) Importance of pollinators for your crops. B) UT Apiculture Program.

Anderson County Beekeepers Association Field Day. Apr. 22, 2000. Oak Ridge, TN. Demonstrations in apiary of Mr. Robert Ellwood (8 hr).

Hamilton County Farm Visit and Demonstration in Apiary. 4/27 and 4/29, 2000.

Campbell County Family Farm Field Day. 5/16, 2000. Cove Lake, LaFollette, TN. Display: Importance of bees to Tennessee agriculture and the problems with mites. Equipment demonstration and observation hive.

Roane County Farm Visit. May 24, 2000. Kathleen and Dick Conner's Farm. Inspected 2 colonies and explained honey bee biology to 12 guests.

Creative Discovery Museum Observation Hive Demonstration. May 24, 2000. Chattanooga, TN. Maintaining an observation hive and inspecting for pests.

Multi-County Beekeepers Meeting. Jun. 13, 2000. Mountain City, TN. A) Diseases of bees. B) New products and practices for managing parasitic mites. C) Bees in the wall, what to do?

Johnson County Farm Visits. Mountain City and Vicinity. June 13-14, 2000. Inspected 5 Apiaries and trapped for small hive beetle.

Franklin County Apiary Demonstration, June 15, 2000. Winchester, TN. Provided 2 colonies to extension leader to use for education of local beekeepers.

Multi-County Beekeepers Meeting - Lincoln, Giles and Franklin Counties. June 15, 2000. Fayetteville, TN. Demonstration and presentations: 1) Managing parasitic mites. 2) New pest - the small hive beetle.

Lincoln County Apiary Demonstration. June 15-16, 2000. Taft, TN. Inspection and trapping of queen breeder Mr. Al Norton for small hive beetles.

Giles County Apiary Demonstration. June 16, 2000. Pulaski, TN. Inspection of Mr. Moore's apiary with 10 other beekeepers.

Giles County Apiary Demonstration. June 17, 2000. Stella, TN. Inspections of 3 apiaries of Mr. Craig Kimbrough for small hive beetle.

Sequatchie Valley Institute Beekeeping Workshop. June 20, 2000. Moved 2 colonies to farm and instructed in bee management.

Sequatchie Valley Apiary Visit. June 20, 2000. Inspected and trapped apiary of Mr. Don Benefield for small hive beetle.

Campbell County Fruit/Beekeeping Field Day. June 29, 2000. Mr. Adrian Baird's Farm. LaFollette, TN. A) Pollination is a must for fruit yields. B) Inspection and demonstration of 12 colonies for diseases and pests.

Shelby County Farm Apiary Visit. July 11-12, 2000. Memphis, TN. Inspection and trapping for small hive beetle at apiary of Mr. Paul Mallory.

West Tennessee Exp. Sta. Apiary Management. July 11, 2000. Jackson, TN.

Summer Celebration Field Day. July 13, 2000., West TN Exp. Sta. Jackson, TN. A) Display: The value of bees to Tennessee agriculture and new treatments for *Varroa* mites. B) Basic beekeeping - Getting started. (3 sessions). C) In-Cage Live demonstrations (4).

Anderson County Beekeepers Meeting. July 17, 2000. Clinton, TN. Alternative Pollinators.

Campbell County Area Multi-County Beekeepers Meeting. Aug. 8, 2000. LaFollette, TN. A) Getting started in beekeeping. B) Mite management. C) Starting an association. with Mr. Robert Ellwood.

Macon County Farm Apiary Visit. Aug. 31, 2000. Billy Freeman Farm. Inspected 30 colonies and advised management practices. with Mike Studer and Extension leader Steve Walker.

Vegetable Production Clinic. Dec. 5, 2000. West TN Exp. Sta. Jackson, TN. Importance of bees in vegetable production and making a pollination contract.

Knoxville Garden Club Meeting, Feb.8, 2001. Orangery, Knoxville, TN. Bees are so valuable as pollinators in our gardens

Blount Count Beekeepers Shortcourse. Feb. 12, 2001. Maryville, TN. Using Terramycin, treating for mites and a new pest, the small hive beetle.

Dogwood Elementary School 5th Grade Class. Feb. 15, 2001. Knoxville, TN. A) Thinking like a bee. B) Demonstration about honey bees with observation hive.

Franklin County Beekeepers Shortcourse. Feb. 26, 2001. Winchester, TN. A) Detection and treatment of parasitic mites. B) Getting started in beekeeping.

Washington County Beekeepers Association Shortcourse. Mar. 1, 2001. Jonesboro, TN. Bees and the public.

Creative Discovery Museum Beekeeper Training Workshop. Mar. 5, 2001. Chattanooga, TN. A) Use of beekeeping equipment including protection. B) Colony seasonal management. C) Make it fun and safe.

Grundy County Area Multi-County Beekeepers Workshop. Apr. 5, 2001. Coalmont, TN. A) Getting started in beekeeping. B) Pests and diseases of bees. C) Beekeeping management principles.

Campbell County Field Day. May 15, 2001. LaFollette, TN. A) Display: The value of bees as pollinators, challenges from mites, new pests and solutions. B) Demonstration: Bees and beekeeping with live observation hive.

Rutherford County Beekeepers Meeting. June 4, 2001. Murfreesboro, TN. A) Getting Started in beekeeping. B) Managing pests and diseases of honey bees.

Johnson County Beekeepers Meeting, Sep. 11, 2001. Mountain City, TN. A) Honey bee biology. B) Honey bee mites and diseases - treatment updates. C) The small hive beetle.

Meeting with Hamilton County Schools Architect and High School Principal. Oct. 9, 2001. Creative Discovery Museum. Chattanooga, TN. How to design an observation hive for a new school.

Appalachian Spring Cooperative Heifer Project Meeting. Jan. 1, 2002. Treadway, TN. Introduction to the Heifer honey bee project (with Paul Miller).

Appalachian Spring Cooperative Heifer Project Meeting. Feb. 1, 2002. Treadway, TN. Organizing the Heifer honey bee project (with Paul Miller and Ray McDonnell).