Connecticut African Honey Bee Action Plan

Connecticut, 2009

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This document is based, in part, on a working draft of an African Bee Action Plan prepared by Dennis vanEngeldorp (Department of Agriculture, Harrisburg, PA) and modified by Dewey M. Caron (Department of Entomology and Wildlife Ecology, University of Delaware, Newark, DE) as approved by the Mid Atlantic Research and Extension Consortium (MAAREC), March 2006. The MAAREC regional plan was developed to act as a guide for the development of individual state and/or regional action plans. Much of the AHB background material in this document was taken from the MAAREC approved regional plan. The Connecticut African Bee Action Plan was also based on information from plans/reports from several other states, particularly North Carolina and Florida with consultation and input from members of the Connecticut beekeeper associations. Other material was taken from the National Research Council's recent report on the Status of Pollinators in North America. This document is meant to provide an active plan in preparation for and the discovery, occurrence, or presence of African or Africanized bees in Connecticut specific to the needs of Connecticut and its beekeepers within the scope permitted by Connecticut Statute.

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Foreword

The Africanized honey bee (AHB) was introduced to Brazil in 1957 and accidentally escaped from confinement colonies. While maintaining its genetic identity, this race (sub species) of bee expanded its range in South and Central America. Due to defensive behaviors and difficulties managing AHB using European honey bee beekeeping methods, the AHB population has disrupted agriculture, beekeeping, tourism, recreation and public life in general as it spread. Hundreds of people and animals lost their lives in stinging incidents and many more were injured. It has resulted in disruptions and modifications to beekeeping and planned pollination throughout its colonization range.

The Africanized honey bee was first reported in northern Mexico in 1987. As it made its way north through Mexico, numerous human fatalities, and thousands of non-fatal stinging incidents, plus countless animal fatalities and injuries were attributed to the AHB. The first U.S. report of the AHB was in October 1990 in Hidalgo, Texas. Since, AHB have migrated west through New Mexico, Arizona, California, Nevada and Utah. Recently (2005) they have colonized Oklahoma, Louisiana, Arkansas, Alabama, and Florida. (Figure 1).

Through 2006, a total of 14 U.S. fatalities attributable to AHB have been reported. Hundreds of non-fatal stinging incidents have been reported. All, or nearly all, the wild (feral or non-beekeeper managed colonies in the SW states (TX west to So. CA) are totally of African bee descent, making it difficult for beekeepers to maintain genetically pure gentle European honey bees. In Florida, no bee-related human fatalities have yet been reported, but people have been hospitalized after attacks and there have been animal fatalities.

Intelligent planning and preparation, particularly by TX, AZ, and CA authorities, has proven to be useful in alleviating public panic and hysteria associated with AHB. It is unclear whether Africanized honey bees will become established permanently in the Mid-Atlantic States, and unlikely that these bees will become established in New England States. However, northern and north-central states rely on southern states, particularly Florida and Georgia as the source of package (replacement/expansion) colonies and queens each spring and commercial beekeepers routinely transport colonies to over- winter in southern states. These managed colonies are essential if the fruit and vegetable producer pollination needs are to be satisfied in the Mid-Atlantic and Northern states.

Florida and Alabama, unlike the states in the southwest, have not been subjected to the frontal wave of natural AHB migration. Their introductions of AHB, based on samples removed from trap lines set around major ocean ports in Florida and the Mobile Bay area of Alabama, has been via transport of goods. Global trade not only brings desired goods, but also hitchhiking pests and diseases. The ~500 AHB swarm traps set and monitored by the Florida Department of Agriculture and Consumer Services' Division of Plant Industry, Apiary Inspection Section surrounding deep water ports have captured many AHB swarms which hitchhiked from Central and South America. Unfortunately, some of these swarms have bypassed trap lines and feral populations of AHBs have begun to establish themselves. AHB populations are now established in the south-central part of the state (Figure 1).

Executive Summary

Commercial beekeeping in Connecticut is relatively small compared to many states and many hives are maintained by hobbyists. Nevertheless, agriculture in New England is dependent on honey bees to meet pollination needs and beekeeping is under pressure from pests and diseases and public interactions due to high density residential development. Commercial hives are transported through Connecticut. Connecticut beekeepers have relied on southern bee suppliers to replace colonies lost over the winter or from pesticides, predators (i.e., skunks, raccoons, and bears), parasites and disease such as the Varroa mite and American and European foulbrood. The Africanized honey bee (AHB) exhibits greater nest defensive behavior and is not as well adapted to non-commercial pollination and honey production as is the European honey bee (EHB – commonly referred to as domestic honey bees). These traits, combined with its ability to swarm more frequently and disperse rapidly make the AHB undesirable to agriculturalists and a potential threat to the public at large, particularly in highly developed areas.

A plan of action is thus required. This plan is tailored to meet the unique needs of Connecticut.

Primary goals of such a plan are to:

1) Reduce the likelihood of AHB introduction and establishment (this can include the encouragement of local production of package (replacement/expansion) colonies and queens;
2) Be prepared for the finding of AHB or dealing with an AHB incident in Connecticut;
3) Proactively train first responders in the appropriate emergency response to stinging incidents;
4) Develop and implement a public awareness campaign which will educate region beekeepers, the general public and specific targeted agencies and institutions that need to be aware of the risks presented by AHB so they can proactively plan to deal with a possible AHB finding or incident.

The MAAREC plan was developed to act as a guide for individual state plans. The State Entomologist formulated and articulated the goals and approaches outlined in this plan in cooperation with Connecticut beekeepers.

In concert with meeting the aforementioned primary goals of an AHB action plan the plan should address:

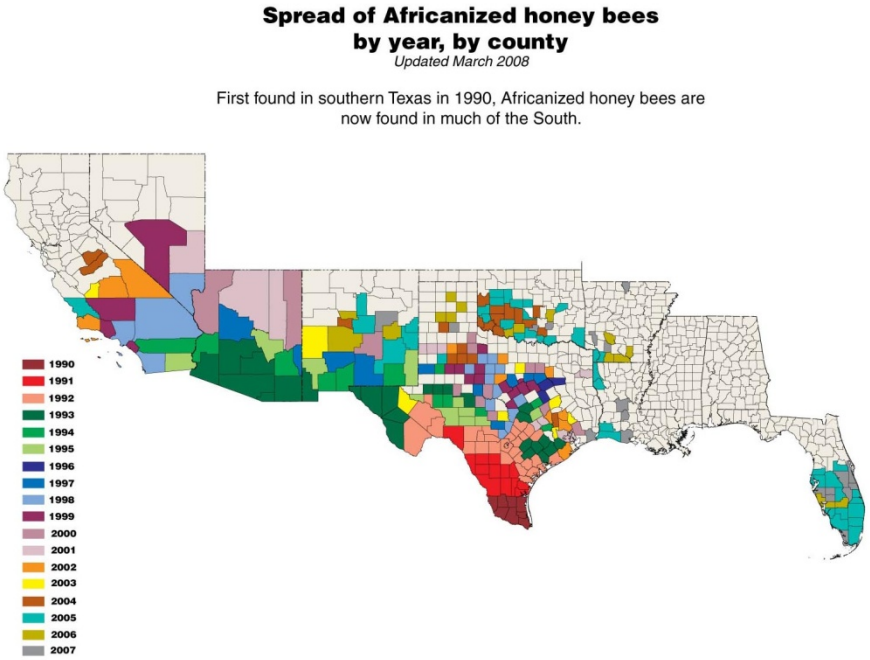
1. Issues of landowner liability;
2. Specific initiatives to increase the public's knowledge of AHB biology and behavior in northern states, and behavior modification of people in AHB infested areas;
3. Identification of personnel in the appropriate federal, state and local agencies to serve as points of contact for AHB, as well as to establish a network of contacts within the industry and media outlets;
4. Establishing and maintaining a data base on AHB incidence within Connecticut and resources to rapidly identify possible AHB samples; and
5. Initiate a "Bee Help" network which will provide timely and accurate information and assistance on AHB through various media.
6. Encourage local governments to develop response plans.

CONNECTICUT AFRICANIZED HONEY BEE ACTION PLAN

Introduction

The Africanized honey bee (*Apis mellifera scutellata*) (AHB), popularized as the "killer bee," has steadily migrated northward since its accidental release from a breeding program in Sao Paulo, Brazil in 1957. The northern edge of its range, as of the spring 2005 includes Madera County, California (home of Yosemite National Park), eastward through southern Nevada, Utah and the states of Arizona, New Mexico, all of Texas west of Houston, and Oklahoma (Figure 1). At the present time, the Africanized honey bees have spread through parts of the southwestern states of Texas, New Mexico, Arizona, Nevada, into California, and in February 2009, had been reported in southern Utah. From Mexico, AHB was first found in the United States in Hidalgo, Texas in October 1990, and migration since then has been through southern Texas and westward into New Mexico (11/93), Arizona (7/93), California (11/94), Nevada (8/98), and Utah (1999). The AHB also moved into the U.S. Virgin Islands (3/95) and Puerto Rico (9/94). The AHB is now found in several counties in central Florida (2005) (Figure 1). There are discontinuities in the spread, especially between Louisiana and Florida where AHB spread is likely a result of human-assisted transport—such as AHB swarms hitchhiking on trucks, railroad cars, ships or airplanes. It should also be noted that there have been isolated reports of AHB being found at various U.S. ports, but those bees have been destroyed. For example, swarms of Africanized honey bees have been found and destroyed at the NC ports of Morehead City (1989) and Wilmington (1991). Those swarms of AHB "hitchhiked" rides on ships that entered those ports from areas that had Africanized honey bees. The bees were detected and destroyed by the joint efforts of the North Carolina Department of Agriculture and Consumer Services (NCDA&CS) and the Customs agents working for the U.S. Department of Agriculture (USDA).

Figure 1. Map of the spread of Africanized honey bee by year, 1990-2007, updated March 2008 (USDA-ARS; http://ars.usda.gov/AHBmap). For larger version, see Appendix A.



The eventual range of AHBs year round establishment has been the subject of much speculation. Most predictions (based largely on temperature models) suggest that this race of bee would not be able to survive along the east coast much further north than North Carolina. More recently, models based on human-aided distribution suggest AHB will eventually range throughout the US and into southern Canada. Regardless of the eventual range of AHB, their introduction and presence in Connecticut, even if for only part of the year, seems inevitable.

Figure 2. African [left] and European [right] honey bees on comb (Photo USDA-ARS, Scott Bauer, k11071-1).

Characteristics of AHBs

The European honey bee, (EHB) has been "managed" by commercial and hobby beekeepers worldwide for many centuries. The current bee is the result of adaptation to temperate climates, and has been intensely selected over thousands of generations by beekeepers for desirable traits such as gentleness, honey production, tendency not to swarm, winter hardiness and disease resistance.

The African honey bee, while still the same species as the European honey bee, is considered a separate race (sub-species by some) from EHB (Fig. 2). It has distinctive behavioral characteristics for survival in the savannah habitat of western and south central Africa. The name "Africanized honey bee" came about because it was initially thought that African bees would hybridize with European bees in the wild, especially in temperate areas as they lose a tropical climate advantage.

The AHB in North and South America, once thought to be a hybrid resulting from the cross mating of the African honey bee and managed European honey bee races is now considered largely a product of its African origin and not a hybrid. All AHBs in the Americas are thought to be descendents of 26 African bee swarms accidentally released in 1957.

Maintaining its own identity, AHB genetic material spread rapidly from the point of introduction, moving quickly southward and westward. Spreading northward, it crossed the isthmus into Central America in1982, reaching the Mexico/US border in 1990. Studies of AHB populations in tropical/sub-tropical areas, where the AHB has been present for several years, suggest that most, if not all, the genetic, physiological, and behavioral characteristics of wild bees become Africanized in a short time; the most infamous of these genetically linked behaviors is AHBs aggressive defense of its nest. In other words, genetic studies have shown that feral bee populations tend to become predominantly African after several years of hybridization.

Several biological factors help explain why European, and European/African hybrid stock are eventually replaced by pure Africanized bees when the bees are not actively managed in tropical/sub-tropical areas, including differences in mating behavior, a shorter queen development rate in AHB, and the acceptance of drifting African drones by European hives. All of these traits favor the selection of AHB genes. The rate of AHB spread and

displacement of European bees is also facilitated by the ability of small AHB swarms to "usurp" the queens in established EHB colonies, by AHBs tendency to swarm more often, and their ability to establish colonies in cavities too small for EHBs.

The apparent migration of hybridized genotype to near-pure African genotype under natural conditions in tropical and subtropical areas is unfortunate as hybridization often enhances the expression of undesirable AHB traits (see Table 1 next page for a comparison of traits).

Status of Beekeeping Nationally and Locally

Honey bees pollinate more than 100 commercially grown crops in North America with a value of $14 billion. Although some other species are often more efficient pollinators individually, honey bees are generally the pollinator of choice. The economic importance of honey bees is large, largely because honey bee management is highly developed, equipment is widely available, and the bees can be concentrated in high densities for pollination of crops in monoculture. However, managed honey bee colonies and feral colonies in the United States have declined in recent years, which has been linked to the occurrence of the tracheal mite, *Acarapis woodi* and, more importantly, to the varroa mite, *Varroa destructor*. Several diseases such as American foulbrood and European foulbrood continue to be an occasional problem. Colony Collapse Disorder (CCD) has become a national issue in late 2006 and early 2007 with a serious die-off of honey bees outside the hive. Heavy losses associated with CCD appear associated mainly, though not only, with larger migratory commercial beekeepers, some of whom have lost 50-90% of their colonies. CCD was reported from 24 states and returned a second year during the winter of 2007-2008. The number of honey bee colonies estimated to have died in the U.S. over the winter of 2007-08 was 750,000 to 1 million (Cox-Foster & vanEnglsdorp. Sci. American, April 2009). A case of CCD has not been confirmed in Connecticut. The cause or causes remains unknown, though suspects high on the list include neonicotinoid insecticides, bee viruses, and poor nutrition. Increasingly, CCD appears to be a condition triggered by multiple causes. Concerns have also been raised for other pollinators like bumble bees and other native wild non-*Apis* bees.

Most beekeepers in the United States (about 94%) are hobbyists with 25 or fewer colonies. Roughly 5% manage 25-300 colonies and only about 1% are commercial beekeepers with 300 to 60,000 colonies (Status of Pollinators in North America, National Research Council, 2006). The role of hobbyists is undercounted because of the way the U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS) currently tabulates data. Its annual survey focuses on honey production and beekeepers with five or more hives. Therefore, there is no current mechanism to count hobbyists except through a 5-year census. One of the recommendations of the National Research Council's report on the Status of Pollinators in North America suggests that NASS modify data collection to collect commercial honey bee pollination data including crops pollinated and leasing fees from beekeepers and from crop growers.

Table 1: Characteristics of the Africanized honey bee compared European

	AFRICAN HONEY BEE (AHB)	EUROPEAN HONEY BEE (EHB)
Defensiveness	Typically 10 x more stings then EHB Quicker response time Persistent (following upto1/4 mile) May not respond to smoke	Usually gentle Defensiveness is manageable with smoke
Swarming	16 times per year Longer swarming season	1 to 2 times per year Distinct swarming season
Absconding	Common after disturbance and period of dearth/poor resources Up to 16 times a year	Unusual (and not conductive to survival)
Robbing	Can be excessive at times	Usually only occurs during dearth and is beekeeper caused
Nest site	Smaller cavity acceptable allowing for easier establishment in urban environment	Require relatively large nesting cavity (> 40 L)
Wintering ability	Poorly adapted to cold winters (but becomes adapted with time)	Highly adapted to cold winter
Population density	High colony density	Low colony density
Colony takeover	Queen usurpation common Drone parasitism of European colonies common	Exceedingly rare
Calmness on the comb	Bees extremely nervous running and festooning on frames making management difficult	Usually calm on the comb

Connecticut beekeepers are required by State Statute to register with the State Entomologist (Appendix B). In Connecticut, there were 3,599 honey bee colonies belonging to 518 beekeepers registered with the Office of the State Entomologist as of April 2009 with a minimum value of $899,750 (assuming $250 per colony, actual value is probably higher). The number of registered colonies had declined in recent years (Table 2). The 2006 increase probably reflects greater registration. There are hundreds of local or regional associations and two national trade organizations; the American Beekeeping Federation (ABF) and American Honey Producers Association (AHPA). Regionally, the Eastern Apicultural Society (EAS) meets annually and provides educational opportunities for academics and beekeepers alike. In Connecticut, there are three associations. These are the Backyard Beekeepers Association, the Connecticut Beekeepers Association, and the Eastern Connecticut Beekeepers Association (Appendix C).

The United States Department of Agriculture (USDA) has several bee research laboratories (Appendix D) and AHB is an insect of concern to the USDA, Animal Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ) (Appendix D). The USDA tracks AHB in the United States. The USDA-APHIS-PPQ is now allowing the importation of honey bee queens and packaged bees from Australia and New Zealand under free trade negotiations. With the establishment of AHB in some areas of the south eastern U.S., another issue may be that South American and Central American countries may begin to request permits to ship honey bees to the U.S. which will be genetically Africanized.

Table 2. Number of honey bee colonies in Connecticut registered with the State Entomologist, 2009-1995.

Year	No. of Colonies*	Est. value per Colony	Total Value All Colonies
2009	3,523	$250	$880,750
2008	3,583	250	895,750
2007	2,628	250	657,000
2006	3,000	150	450,000
2005	1,974	150	296,100
2004	1,197	150	179,550
2003	2,841	150	426,150
2002	1,554	150	233,100
2001	3,717	150	557,550
2000	2,372	150	355,800
1999	3,418	150	512,700
1998	2,368	150	355,200
1997	2,473	125	309,125
1996	2,950	100	295,000
1995	2,218	90	199,620

* Registrations for 2009 are those received as of 12/31/08; Total registrations as of 5/4/2009 were 3,523 colonies and 537 beekeepers.

Risks from AHB

Although not believed to be capable of becoming established in Connecticut, AHB poses a serious threat to the acceptance and viability of Connecticut beekeeping. The potential adverse impact is basically two-fold; 1) potential loss of bees for pollination of crops vital to our economy and food supply and 2) a potentially serious public health and safety threat. An AHB incident could lead to municipal or other legislative restrictions on the keeping of bees in Connecticut.

1. Loss Bee Pollination

The pollination demands of regional fruit and vegetable producers require large numbers of colonies to be moved annually from regions in which Africanized bees are, or likely will be, established. The most significant losses associated with heavy mortality or other loss or restrictions of honey bees would be in the decline of fruit production and associated business and personal income. Blueberries, cranberries, apples, pears, plums, cucumbers, strawberries, raspberries, and various cucurbits (i.e., squash, muskmelon, watermelon, and pumpkins) are some of the plants/crops in the northeast pollinated primarily by honey bees or for which honey bees play an important supporting role. Economic data on the value of apple and pear production in Connecticut is available. In 2007, the value of utilized production for apples, peaches, and pears in Connecticut was $14,009,000 (New England Agricultural Statistics, 2008). Conservatively based only on the value of these three commodities in the state and the relative role of honey bees (vs. other pollinators) in their pollination (Morse and Calderone, 2000. Bee Culture. 128:1-15), the value of the pollination services to Connecticut agriculture is at least $11,465,500 (Table 3). Colonies brought in for

blueberry and related production may transverse Connecticut and return to southern states during the winter months to provide needed pollination in those states, to decrease over-winter colony losses, and to ensure colonies are sufficiently strong to meet northern fruit and vegetable producers' spring and summer pollination needs. The impact on backyard and community gardens is unclear as there is little or no readily available data on what is grown. While bees are important pollinators for Brassicas, onions, carrots, garlic and other garden crops, the seed or fruit is not the consumable product. Bees are necessary for sunflower seed production. Honey bees are the primary pollinators of rapeseed and there is an increasing interest in the potential of rapeseed for bio-fuel production in Connecticut.

Table 3. Utilized production, estimated value, dependence on pollination, and value contributed by the honey bee for select crops in Connecticut.

Crop	Utilized Production	2007 value	Dependence on pollination	Dependence on honey bees	Value due to honey bees
Apples	2,200 ac	$10,729,000	1.0	0.9	$9,656,100
Peaches	400 ac	$1,980,000	0.6	0.8	$950,400
Pears	40,000 bu	$1,300,000	0.7	0.9	$819,000
Pumpkins	1,559 ac	ND	0.9	0.1	ND
Strawberries	ND	ND	0.2	0.1	ND
Total		$14,009,000			$11,465,500

2. Public Health and Safety Threat.

AHBs could pose a potentially serious public health and safety threat. AHB is unlikely to have an adverse impact tourism and recreation in Connecticut, but an incident could result in responses from the public and at the municipal and state level that could have severe repercussions on beekeeping. Educational institutions, emergency services, parks and recreational agencies, and others, all require training and AHB control plans to negate or reduce AHB risk to the public. Experience in other states shows that advance preparation and planned public awareness programs result in better understanding and cooperation that results in reduced negative impacts. Appropriate response rather than panic reduces the possibility of injury or death. Much can be learned from the Venezuela and Mexican AHB experiences. Human deaths due to stinging attacks reached a high of 100 per year in 1978 (three years after AHB introduction) in Venezuela, a country of ten million people. A public awareness program including cartoon posters helped reduce human deaths to 20 per year. Mexico prepared an even more effective public awareness program in advance, including cartoon

spots on TV. A country of 95 million, Mexico has recorded just over 200 human deaths during the first 18 years of the existence of AHB in Mexico. After introduction into Texas in 1990, there were 212 confirmed AHB stinging incidents from May 1991 through September 1993. The first U.S. fatality was in Harlingen, Texas in July 1993. However, a total of only 23 fatalities attributable to AHB have occurred in the United States since AHB colonization in 1990. The reduced impact is thought, in part, to be from carefully planned educational efforts. Still, there were 4 fatalities in Texas in 2007. The first Florida and latest fatality was in April 2008 in Okeechobee County.

One last concern that needs to be addressed is liability and its impact on the judicial system and insurance industry. Beekeepers involved with an AHB incident could be subject to litigation. Other beekeepers could potentially face unmerited litigation from an alarmed or overly sensitized citizenry; which could mean many will be unable to continue their businesses. Beekeepers could also potentially face actions from local Public Health Departments as a public nuisance or restrictions through local ordinances. Finding suitable, secure locations for bee colony apiary sites could be an escalating challenge for beekeepers, particularly hobbyists in high density residential areas and particularly sites that will be able to accommodate apiaries with larger numbers of colonies.

Anticipated Impact

The bulk of pollination needs in Connecticut is provided by colonies from within the state, although regionally colonies may derive from states other than where the crop is produced, whether over-wintered in Florida, Georgia, or elsewhere. Those beekeepers who take colonies south to over-winter will encounter areas in which the expansion and establishment of AHB populations is likely in the next several years or has already occurred. Africanized bees have spread into four new states since fall 2005 – Florida, Oklahoma, Arkansas and Louisiana. Human-assisted transport is probably contributing to this new spread. Further, it is from these states that the bulk of queens and packages currently originate to meet the demand created by winter losses to hobbyists, sideline, and commercial beekeepers in the region. Since the introduction of two serious bee parasites, honey bee tracheal mites and Varroa mites in the 1980's, these losses have become significant. As mentioned previously, a new "syndrome" has become an issue in 2007 called "colony collapse disorder". Bees in hives simply disappear with substantial losses in some areas. The cause is unknown. It should be noted that the publicity around the disappearing bees has raised concerns among some of the public about our bees.

As the states from which the region's beekeepers receive bees become colonized by AHB, we can expect some AHBs to be introduced, either in managed hives or as hitchhikers on cargo transportation (trains, trucks, ships etc.), our human-assisted transport. With the arrival of AHB comes an increased risk of stinging incidents. Any encounter with nesting colonies, whether in an urban or rural environment, is potentially lethal, given the insects' propensity to attack *en mass* to defend their colony. AHB commonly pursue or attack persons up to a ¼ mile from their nest site when disturbed. Children, the elderly and individuals with limited mobility or slow reaction time, people with an allergic reaction to bee venom, and anyone unable to rapidly retreat from attacking bees are at increased risk.

News reports of stinging attacks will promote concern and, in some cases, panic and anxiety, causing citizens to demand responsible agencies and organizations take action to help insure their safety. If proactive measures are not taken to educate the public about the

importance of EHBs as pollinators, how to deal with AHBs, and to establish procedures for rapid response to AHB incidences, the public may demand beekeeping be banned or limited in some urban and suburban areas. This action would be counter-productive with a corresponding loss of pollination services, honey production, and the beekeeping hobby. Reactions may include:

1. Over dramatization of the Africanized honey bees' aggressive behavior by the press may lead to public prejudice against the beekeeping industry.
2. Public fear of the Africanized honey bee in some municipalities will mandate unrealistic bee regulation over common sense and sound logic.
3. Municipalities may pass restrictive ordinances against keeping bees.
4. The swarming, absconding, and stinging behavior of the Africanized honey bee may cause hobby beekeepers to lose interest and quit keeping bees.

Managed colonies fill an ecological niche that would become vacant if beekeeping were severely restricted. Feral colonies have disappeared with the introduction of tracheal and varroa mites. In the southwest, part of the spread of AHB may have been due to empty nest sites because of the toll *Varroa* mites have taken on the feral bee population. Bumble bees and other native bees, while important, would not fill the niche and there are concerns about their status, for which limited information is available, particularly in the northeast.

AHB is less likely to have the same degree of negative financial impact on the recreational and tourism industries as southern states, but there could be some impact through public misconceptions. Permanent AHB colonies are unlikely to become established in Connecticut, but could thrive through a particular summer season. Those engaging in camping, hunting, fishing and hiking activities could encounter AHB in areas that may be a considerable distance from medical facilities. Golf courses, public parks and resorts, especially those having swimming pools or other permanent water sources, may pose a particular concern to the urban dweller and vacationer. Regional theme parks and historical sites are also vulnerable due to the presence of abundance of nesting sites, water, floral and food resources. The public will want to know where any reported AHB is and what is being done to protect them. With planning, it will be possible to address public concerns, reduce public health risks and decrease possible negative economic impact from AHBs.

Livestock and pets are also at risk. Horses confined to small acreages in urban areas and in riding stables will be unable to escape from a mass attack. Additionally, people who ride horses will be in danger of being thrown and stung. There are nearly 10,000 horses in Connecticut. Other penned livestock and pets (mostly dogs, fowl and goats) have been killed by stinging attacks in other states. In addition, AHB defensive behavior may trigger attacks on other wildlife coming into proximity of nesting colonies. The initial introduction of AHB into California, for example, was discovered because a workman observed a fox being stung to death in a mass AHB attack.

AHB will likely have its most dramatic impact on the region's largest industry – agriculture. Changes in agricultural practices and land use have already had an impact on beekeeping. Beekeepers must place their bees on other people's property (public or private) in order to provide the bees with adequate forage. Property owners are becoming more reluctant to allow beekeepers to use their land for apiary locations due to a fear of liability should someone be stung. Insurance companies are coming to the realize the potential costs of bee colony liability and a number have dropped their beekeepers' policies or are charging

much higher premiums for liability coverage. These factors translate into increased costs of doing business in a profession that already is having financial problems.

While the impact of AHB in the northeast is not likely to be as severe as in southern or even Mid-Atlantic States, their eventual arrival and presence in the region is inevitable, even if they don't become permanently established. Maine's apiary inspection has documented repeated importation of hybrids into that state over the last several years. These colonies originated in Texas and Florida and were temporarily imported to pollinate blueberries. AHB introduction may be the result of migratory beekeepers overwintering colonies in Florida counties where the presence of AHB has been confirmed. Recently, a hive in New York State from Florida was confirmed as AHB. Plans must be developed locally, statewide, and regionally to deal with the concern and the realities of AHB.

Local agencies will have to take responsibility for addressing local bee problems such as swarms, bees in buildings, and stinging incidents. Emergency phone number networks will need to be developed and utilized when problems arise. Beekeepers who currently respond to "swarm calls" will not be willing to capture swarms (presently many do this as a free service or for a small fee) when it is possible that the swarm may be Africanized. This is especially true if the beekeepers will be held financially responsible if they incite a massive stinging incident in a populated area.

Another inter-agency effort needs to address the training of emergency and medical professionals. First responders must be informed and trained in sting victim extraction procedures. Emergency room doctors must be educated on short and long-term care of multiple sting victims.

Public reaction to AHB, especially during the first phase of introduction will likely be strong. Professional beekeepers have the technology and the knowledge to identify and remove especially aggressive EHB colonies that may be perceived as AHB or colonies demonstrating any of the undesirable traits associated with AHBs. A well-informed public can also easily take precautions necessary to reduce the risks associated with AHB.

Response

To reduce impact of AHB on Connecticut beekeepers and the risk to visitors and residents, a reasoned and well-planned response plan is required. The purpose of this management plan is, in part, to assure that beekeepers have a strategy to maintain a viable honeybee industry for Connecticut. Any effective management of an Africanized honeybee incident or introduction must occur with the beekeepers working in cooperation with the State Entomologist and Bee Inspector using best practices management of honey bee colonies.

This plan should involve the following primary goals:

1) Reduce the likelihood of AHB introduction and establishment (this can include the encouragement of local production of package (replacement/expansion) colonies and queens;

2) Be prepared for the finding of AHB or dealing with an AHB incident in Connecticut;

3) Proactively train first responders in the appropriate emergency response to sting incidences;

4) Develop and implement a public awareness campaign which will educate region beekeepers, the general public and specific targeted agencies and institutions that need

to be aware of the risks presented by AHB so they can proactively plan to deal with a possible AHB finding or incident.

1) Reduce the likelihood of AHB introduction and establishment

Bees are needed to meet the pollination needs of Connecticut and the region. Fortunately, there are steps Connecticut beekeepers and regulators can take to prevent the movement of Africanized genes into northern bee stock.

- Honey bee Best Management Practices (BMP's) should be followed. Documented maintenance of European stock could become part of a beekeeper's defense against negligence law-suits in the case of any type of stinging incident.
- Beekeepers should buy European queens that have mated with European drones from a reliable queen breeder and clearly mark the queens before placing them in the hives. This applies to hobby beekeepers as well as large commercial beekeepers.
- Maintain re-queening records and sales receipts.
- Encourage local production of package colonies and queens.
- Beekeepers should monitor the behavior of their bees and replace the queen should the hive become hard to manage.
- Migratory operations originating in areas deemed Africanized, should regularly requeen all colonies with certified EHB stock.
- Inspect all honey bee colonies in the state for disease on a regular basis (once every 2 years), taking special note of field symptoms of potential AHB colonies. Bees that are especially defensive may be tested. All beekeepers are required to register with the State Entomologist and hives are inspected for foulbrood (see Appendix C).
- Provide education to all beekeepers regarding the presence or impending presence of AHB, the field symptoms of AHB, and appropriate best beekeeping practices.

  Develop fact sheets and web-based information regarding Best Beekeeping management practices that specifically emphasis the following issues:
  a. the importance of re-queening;
  b. issues surrounding the collection of swarms and feral hives;
  c. good neighborly practices;
  d. identification of undesirable traits; and
  e. general public information.

There are a number of national or regional goals that would assist in preventing introduction of AHB to new areas. However, some strategies require the development or implementation of new technology and/or procedures. Morphometrics remains the Agricultural Research Service's (ARS) official method of identification. Some states have begun using DNA analysis for identification, but DNA analysis is not a gold standard. For example, mitochondrial DNA will determine whether bees have an African or European mother. However, if the bees have a European mother that mated with African drones, the colony is likely to be more defensive, but the DNA analysis will characterize the sample as European (Kaplan, J. K. Agricultural Research. Feb. 2007). A certified regional identification laboratory would help with demands for identification.

Certification plans are needed. This certification procedure should be in harmony with as many states as possible and certification provided by other states should be honored. A system must be implemented to assist in the certification of stock in states that do not have certification programs and from which significant queens or package bees are imported into the region.

2) Be prepared for the finding of AHB or dealing with an AHB incident in Connecticut. .

- Establish a plan of action for a stinging incident and AHB Action List (Appendix E).
- Bees deemed potentially Africanized based on behavior or involved in a stinging "incident" (not isolated stings of probable EHB) based upon an agreed criteria should be tested as outlined in Appendix F. Determination to test, collection of samples, and submission for testing to the USDA will be conducted by the State Apairy Inspector and Office of the State Entomologist. No rapid field or screening test is currently available. Identification requires at least 20 or 30 to 50 bees; individual bees cannot be reliably identified.
- The State Entomologist shall notify the State Plant Health Director, United States Department of Agriculture, Animal Plant Inspection Service, Plant Protection and Quarantine (APHIS, PPQ), of any potential or confirmed findings of AHB in Connecticut.
- All colonies found with AHB should be depopulated or de-queened and the colony re-queened with a certified EHB stock. The Connecticut State Entomologist does not have legal authority to order the destruction of AHB hives, but a recommendation for depopulation or re-queening shall be made. Connecticut beekeepers need to be educated on potential legal ramifications of an AHB incident and/or failure to depopulate a confirmed AHB hive.

3) Train first responders

Training of emergency, medical and other responders will be necessary. Many "bee" incidents or problems reported to the Connecticut Agricultural Experiment Station involve wasps, not honey bees and the ability to distinguish the two is important. These responders will need adequate training and instructions in medical aid, AHB behavior, and treatment and precautionary or abatement methods. Avenues for disseminating uniform medical treatment information to local health departments, hospitals and initial responders will be required. It is essential that uniform and consistent training or instructional material be provided to local fire, law enforcement, health departments, ambulance services, hotel or resort employees, and medical staff of amusement parks. First responders, especially fire departments, need to be trained in safe sting victim extraction methods. Further, training on safe removal of bees or swarms for Pest Control Operators (PCO's) will be needed as no one should try to remove an AHB colony unless they are an appropriately licensed and trained licensed professional pest control operator or bee keeper.

Uniformity is crucial in order to prevent inconsistent treatment or abatement methods, or inadequate medical procedures. Misinformation about AHB and its impact can be as dangerous as AHB itself. The state should oversee such training and help ensure its continuation in cooperation with Connecticut beekeeper organizations. A list of qualified beekeepers willing to respond to a potential AHB incident or other bee problems (i.e., accident with truck load of migratory colonies) should be generated and made available to

first responders. Given the turnover in employment, AHB reaction and response training should be part of new employee training in those industries where it is reasonably foreseeable that AHB contact may occur. A guide to what to do if attacked by potentially Africanized honey bees is given in Appendix G and a guide for firefighters and rescue personnel is provided in Appendix H (from USDA-ARS website).

The first Honey Bee Response Training class for first responders was held at the Connecticut Fire Academy's Fire School on June 4, 2008. The purpose of the class was to education firefighters about honey bees and how to handle a bee incident from a vehicle accident involving transported hives to a stinging incident with possible Africanized honey bees.

4) Public awareness campaign

One of the major goals in preparation for AHB arrival is to reduce public risk through education. The general public will need information concerning

a. possible presence or impending presence of AHB;
b. value of beekeepers to society and of bees to crop pollination;
c. general honey bee biology facts (such as what they look like especially as distinguished from yellow jackets, wasps, hornets, etc.);
d. precautions if swarms or nesting colonies are encountered;
e. who to contact for proper bee removal and control;
f. why it is desirable to contact persons trained and certified for AHB removal or control;
g. what to do if a stinging incident occurs; and
h. how to "bee aware" and avoid getting into a dangerous situation.

Aside from this general information, more specific and targeted information should be developed and disseminated to the following stakeholder groups:

a. Agriculturalists, kennel operations, equine operations and their workers;
b. Outdoor facilities including theme parks, historical sites, parks and recreational areas;
c. Convention and visitor bureaus;
d. Municipal and county governments;
e. Schools and daycare centers;
f. Wildlife officers; and
g. Pest control personnel.

Identification of personnel in the appropriate federal, state and local agencies to serve as points of contact for AHB, as well as to establish a network of contacts within the industry and media outlets

All agencies dealing with AHB should designate a contact person to act as clearing house for AHB information and act as the contact person to facilitate information regarding AHBs. City and county governments and volunteer agencies are the likely employers responsible for public AHB control activities e.g., fire fighters, law enforcement officers, ambulance and other emergency medical service workers that might deliver first aid to persons stung by AHBs. It will be very important to provide these people with appropriate information and equipment in a pro-active manner.

If we do not take proactive measures to educate the public about AHB and to establish procedures for rapid response to AHB we anticipate increased pressure from the public to ban

beekeeping in urban and suburban areas. This action would be counter-productive. Beekeepers maintaining managed colonies of domestic European bees are our best defense against an area becoming saturated with AHB. These managed bees are filling an ecological niche that would soon be occupied by less desirable colonies if it were vacated.

Theme parks, urban and recreational areas will need to develop control operations to suit their own needs. For instance, a local contact telephone number to report nuisance bees needs to be identified. Some areas would be subject to abatement activities. The transportation industries should be alerted to the possibility that they might be moving "hitchhiking" bees, and given information on how to prevent such movement. AHB abatement and control plans will need to be developed and implemented on high-use public property such as parks, golf courses, school playgrounds, campsites, interstate and turnpike rest areas, theme parks, and tourist sites. For all the foregoing reasons, public education and advanced training are imperative to ensure regional citizens successfully cope with AHB.

Other Issues of Potential Concern Related to AHB and Connecticut Beekeepers:

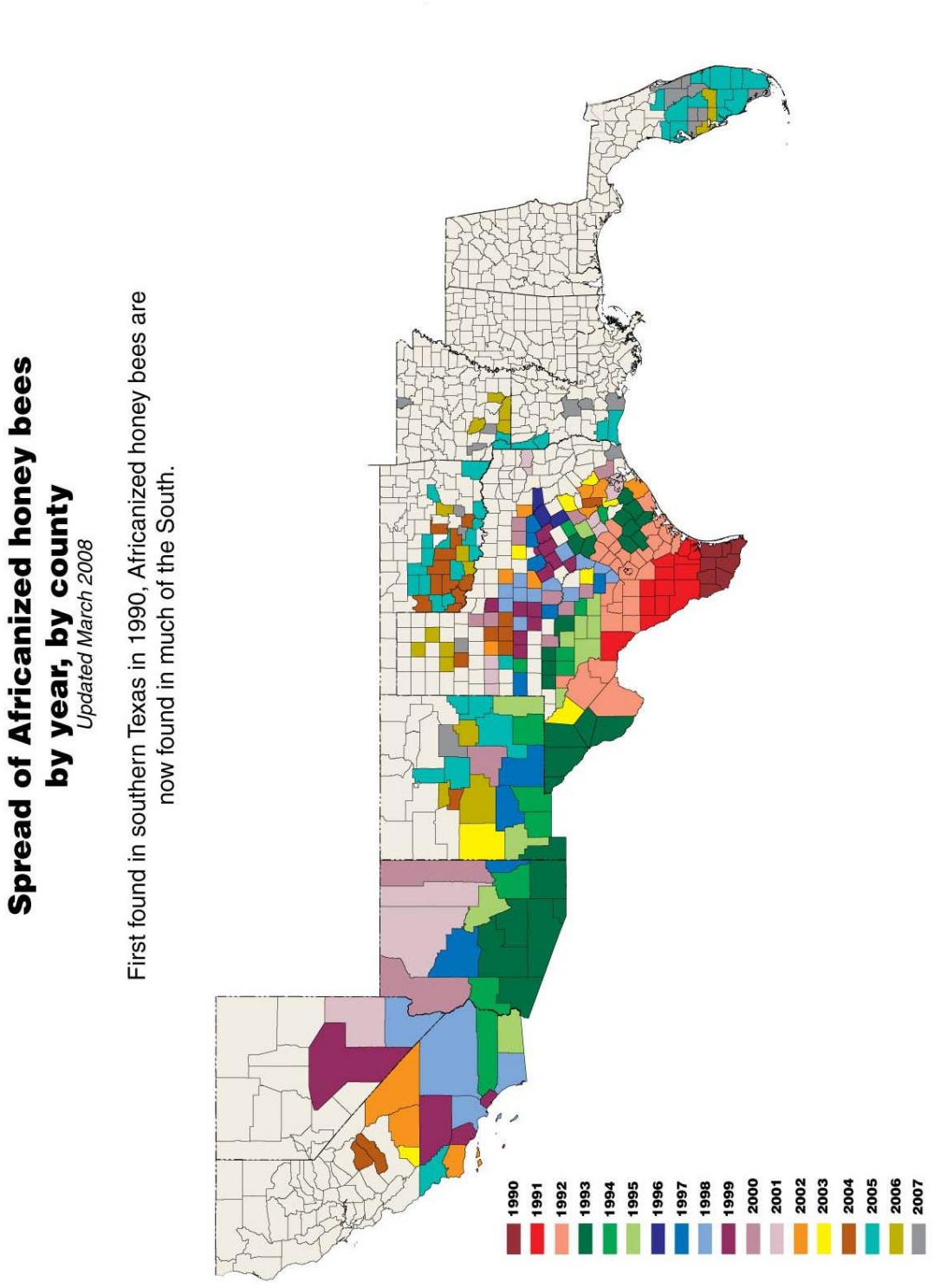
1. Landowner liability issues and current liability laws.

   Landowner liability should be carefully reviewed, examined and studied. AHB may be viewed as a natural, but inherently dangerous, condition by the courts. Issues of the liability of private homeowners, agricultural landowners and commercial or hobby beekeepers need to be critically examined and understood by beekeepers. Insurance impacts should also be researched, reviewed and addressed. However, beekeepers will need to consult legal consul to properly address their liability issues.

2. Additional research to increase our knowledge of AHB biology and behavior in northern states, particularly Connecticut and New England, and the modification of people's response to AHB. Some of the consequences and actions in this report are based on assumptions that AHB will respond as they have in native tropical climates.

Appendix A

Map of the spread of Africanized honey bee by year, 1990-2007, updated March 2008 (USDA-ARS) (http://ars.usda.gov/AHBmap)



Appendix B

Laws Pertaining to Honey Bees in Connecticut

Sec 22-89. Registration of honey bees. Each person owning one or more hives of bees shall, annually, on or before the first day of October, make application to the State Entomologist for the registration of bees. The State Entomologist shall issue to such applicant a certificate of registration without fee. The State Entomologist shall (1) keep accessible to the public a record of the registration, the name and place of residence of the registrant and the definite location in the municipality where the bees are kept and (2) transmit a copy of such information to the town clerk of the municipality in which the registrant resides. Any owner of bees who fails to register as required by the provisions of this section shall be fined not more than five dollars.

Sec. 22-90. Inspection of bees for contagious diseases. The State Entomologist shall, to such extent as he deems necessary or expedient, examine apiaries and quarantine such as are diseased and treat or destroy cases of the disease known as foul brood. The State Entomologist may appoint such inspectors as he deems necessary or expedient, and he or any person whom he appoints for that purpose shall have access at reasonable times to any apiary or place where bees are kept or where honeycomb and appliances are stored. He is authorized to make suitable regulations regarding inspections and quarantine and to prescribe suitable forms for permanent records which shall be on file and open to public inspection, and to make reasonable rules for the services of such inspectors, and may pay a reasonable sum for such services. No person or corporation shall remove bees under quarantine to another locality without obtaining the written permission of an authorized inspector. No person or transportation company shall receive for transportation any colony or package of bees, unless such colony or package is accompanied by a certificate of good health, furnished an authorized inspector. No person or transportation company shall deliver any colony or package of bees brought from any other country, province, state or territory unless accompanied by a certificate of health furnished by an authorized inspector of such country, province, state or territory. Any person or transportation company receiving a shipment of bees from without the state, unaccompanied by such certificate, shall, before delivering such shipment to its consignee, notify the State Entomologist and hold such shipment until inspected by an authorized inspector. If contagious diseases are found therein, such shipment shall be returned to the consignor or delivered to an authorized inspector of this state for treatment or destruction, provided the requirements of this section shall not apply to shipments of brood comb, with or without bees, suspected of being diseased and consigned to the State Entomologist, the Agricultural Experiment Station or any authorized apiary inspector of the state or to the Bureau of Entomology of the United States or the United States Department of Agriculture, and provided there shall be no destruction of any shipment of bees as herein provided in the absence of reasonable notice to the consignee thereof. No person shall resist or hinder the State Entomologist, or any inspector whom he appoints, in the performance of the duties imposed by this section. No person or corporation shall sell, to be removed to another location, bees, brood comb, frames or hives that have been in use, with or without combs, until they have been inspected by an authorized inspector, who shall issue a certificate of health if they are found free of contagious disease. Any person violating any provision of this section shall be fined not more than fifty dollars.

General Statutes of Connecticut, Chapter 426, Revision of 1989.

Appendix C

Connecticut and Regional Beekeeper Organizations

The Backyard Beekeepers Association (2008)
http://www.backyardbeekeepers.com

Officers

President
David Blocher
Redding, CT
(203) 938-2539
dblocher@optonline.net

Vice President
Andrea Azarm
Southport, CT
(203) 255-2525
aazarm@optonline.net

Co-Vice Presidents
Serge Boyce
Fairfield, CT
(203) 259-4861
sergeboy@optonline.net
- and -
Patty Pulliam
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(203) 259-4861
pattpull@optonline.net

Secretary
Jeff Brown
Greenwich, CT
(203) 625-0260
14farley@optonline.net

Treasurer
Pat Harrington
Scarsdale, NY
(914) 231-5315
pharring@worldnet.att.net

Ex Officio
Robert Mendela
Stamford, CT
(203) 359-1443
rmendela@aol.com

Connecticut Beekeepers Association (2009)
www.ctbees.com

Officers

President
Ted Jones
55 Wolf Pit Road
Farmington, CT. 06032
Telephone: (860) 677-9391
E-mail: t.c.jones@snet.net

Vice President
Scott MacDonald
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Telephone: 860-267-8464
E-mail: beezabuzzin@msn.com

Secretary
Francis Bowen
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Treasurer
Becky Jones
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Farmington, CT 06032
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E-mail: t.c.jones@snet.net

Eastern Apiculture Society Director
John Baker
52 Headquarters Road
Litchfield, CT 06759
Telephone: 860-567-8427
E-mail: berryledges@optonline.net

Program Chair
Steve Dinsmore
57 Chesterfield Road
East Lyme, CT 06333
Telephone: 860-739-2756

E-mail: steveandden@sbcglobal.net

Eastern Connecticut Beekeepers Association

President
Adam Fuller
143 South Brook Rd.6
Hampton, CT. 06247
Telephone: (860) 455-1145

Vice President
Richard Norman
387 County Rd.
Woodstock, CT. 06281
Telephone: (860) 974-1235

Secretary
Timothy Grilley
222 West Rd.
Salem, CT. 06420
Telephone: (860) 859-3678

Treasurer
Bill Paluska
4 Pine Cone Rd.
Ellington, CT. 06029
Telephone: (860) 533-3225 (day), (860) 871-1303 (evening)

Board Member
Jim Gray
15 Isleib Rd.
Marlborough, CT. 06447
Telephone: (860) 295-8972

Eastern Apicultural Society of America, Inc. (EAS)
www.easternapiculture.org

The Eastern Apicultural Society of North America, Inc. (EAS) is an international non-pro

fit educational organization founded in 1955 for the promotion of bee culture, education of beekeepers, and excellence in bee research. EAS is the largest non-commercial beekeeping organization in the United States and one of the largest in the world.

Every summer EAS conducts its Annual Conference consisting of lectures, workshops, vendor displays, short courses for beginning and advanced beekeepers, and annual business meeting in one of its 26 member states or provinces in the eastern U.S. and Canada. Over 400 people

generally attend the conference each year. EAS publishes its newsletter, The EAS Journal, four times a year, sponsors awards to deserving bee researchers and graduate students, and offers modest research grants for applied research projects.

Appendix D

United States Department of Agriculture

A. Bee Research Laboratories

Beltsville Agricultural Research Center
Bee Research Laboratory
http://www.barc.usda.gov/psi/brl/brl-page.html

Baton Rouge Bee Lab
Honey Bee Breeding, Genetics, and Physiology Research Unit
http://nola.srrc.usda.gov/usdadsrc/area/ms_hbb.htm

Weslaco Bee Lab
Kika De La Garza Subtropical Agricultural Research Center
http://weslaco.ars.usda.gov/

Tucson Bee Lab
Carl Hayden Bee Research Center
http://gears.tucson.ars.ag.gov/

Utah Bee Lab
Bee Biology & Systematics Laboratory
http://www.loganbeelab.usu.edu/

B. USDA, APHIS, PPQ Connecticut

Patricia M. Douglass
State Health Plant Director
USDA, APHIS, PPQ
900 Northrop Road, Suite C
Wallingford, CT 06492

(203) 269-4277

Appendix E

AHB ACTION LIST

The following list is composed of representatives with honey bee and/or AHB responsibilities from The Connecticut Agricultural Experiment Station and U.S. Department of Agriculture. One of the persons listed below should be contacted in the event of an incident where it is suspected that AHB is involved.

The Connecticut Agricultural Experiment Station
Office of the State Entomologist

STATE ENTOMOLOGIST
Kirby C. Stafford III
Department of Entomology
123 Huntington Street – Box 1106
New Haven, CT 06504-1106
Phone: (203) 974-8485
Toll free in CT:1-877-855-2237
Fax: (203) 974-8502 (For CAES)
E-mail: Kirby.Stafford@ct.gov

DEPUTY STATE ENTOMOLOGIST
Victoria L. Smith
Department of Entomology
123 Huntington Street – Box 1106
New Haven, CT 06504-1106
Phone: (203) 974-8474
Toll free in CT:1-877-855-2237
Fax: (203) 974-8502 (For CAES)
E-mail: Victoria.smith@ct.gov

APIARY (BEE) INSPECTOR
Ira Kettle
Griswold Research Center
190 Sheldon Road
Griswold, CT 06351-3627
Phone: (860) 376-4503
Cell Phone: (203) 530-5743
E-mail: Ira.Kettle@ct.gov

STATE NURSERY INSPECTOR
Stephen J. Sandrey
Department of Entomology
123 Huntington Street – Box 1106
New Haven, CT 06504-1106
Phone: (203) 974-8479
Fax: (203) 974-8502 (For CAES)
E-mail: Stephen.Sandrey@ct.gov

The United States Department of Agriculture (USDA)
Agricultural Plant Health Inspection Service (APHIS)
Plant Protection and Quarantine (PPQ)
Connecticut

STATE HEALTH PLANT DIRECTOR
Patricia M. Douglass
USDA, APHIS, PPQ
900 Northrup Road, Suite C
Wallingford, CT 06492
Phone: (203) 269-4277
Fax: (203) 284-9031

Appendix F

Identification of African Honey Bees (USDA-ARS)

In order to certify date and location of bee samples and maintain a chain of custody, potential Africanized bees in Connecticut shall be collected by a Connecticut Bee Inspector and submitted through the Office of the State Entomologist to the USDA for identification.

Fast Africanized Bee Identification System (FABIS) test can be performed. Starting with a sample of 50 to 100 bees, 10 bees are randomly sorted. The right wing is removed from each and mounted on microscope slides, and the average wing length is calculated. If the average wing length is over 9mm, the bees are European Honey Bees. If the average wing length is under 9mm, the bees are suspect Africanized Honey Bees. This test is NOT definitive.

The Carl Hayden Bee Research Center in Tucson, Arizona, is the USDA-ARS laboratory for the official USDA identification of honey bees as Africanized. This work is done in support of federal and state agencies. The USDA does not have the resources to provide all of the testing for the United States.

Identifications are made using morphometrics - a system of measuring morphological characteristics to determine honey bee type. Complete morphometrics is a series of very precise measurements of various parts of the bees in the sample. Some involve lengths of specific body parts, some involve the angles of wing veins. These measurements are then averaged and compared to a standard. Morphometrics remains ARS's official method of identification. The CHBRC laboratory analyzes samples nationwide in an effort to provide vital information on the migration of Africanized honey bees. Information on the identification of African honey bees using morphometrics is available from the Carl Hayden Bee Research Center website (http://www.ars.usda.gov/Services/docs.htm?docid=110530).

Sending honey bee samples for Morphometric analysis:

1. Samples will first be analyzed using FABIS (Fast Africanized Bee Identification System). This is a preliminary procedure to determine honey bee type. If the sample has been identified as African using the FABIS method, a full morphometrics analysis may be performed that measures 37 different physical characteristics to confirm the identification.

2. Please send a sample of 30 to 50 bees in a tightly sealed jar or vial with enough alcohol (ethanol) to cover all of the bees.

3. If you have questions, please contact Mona Chambers by phone at the number given below or from our email contact page. Otherwise, send your samples to:

Mona Chambers
Carl Hayden Bee Research Center
2000 E. Allen Rd.
Tucson, AZ 85719
Phone: (520) 670-6380 ext. 105

Appendix G

What to do if Attacked by Africanized Honey Bees (USDA-ARS)

Remember these important steps:

1. RUN away quickly. Do not stop to help others. However, small children and the disabled may need some assistance.

2. As you are running, pull your shirt up over your head to protect your face, but make sure it does not slow your progress. This will help keep the bees from targeting the sensitive areas around your head and eyes.

3. Continue to RUN. Do not stop running until you reach shelter, such as a vehicle or building. A few bees may follow you indoors. However, if you run to a well-lit area, the bees will tend to become confused and fly to windows. Do not jump into water! The bees will wait for you to come up for air. If you are trapped for some reason, cover up with blankets, sleeping bags, clothes, or whatever else is immediately available.

4. Do not swat at the bees or flail your arms. Bees are attracted to movement and crushed bees emit a smell that will attract more bees.

5. Once you have reached shelter or have outrun the bees, remove all stingers. When a honey bees stings, it leaves its stinger in the skin. This kills the honey bee so it can't sting again, but it also means that venom continues to enter into the wound for a short time.

6. Do not pull stingers out with tweezers or your fingers. This will only squeeze more venom into the wound. Instead, scrape the stinger out sideways using your fingernail, the edge of a credit card, a dull knife blade or other straight-edged object.

7. If you see someone being attacked by bees, encourage them to run away or seek shelter. Do not attempt to rescue them yourself. Call 911 to report a serious stinging attack. The emergency response personnel in your area have probably been trained to handle bee attacks.

8. If you have been stung more than 15 times, or are feeling ill, or if you have any reason to believe you may be allergic to bee stings, seek medical attention immediately. The average person can safely tolerate 10 stings per pound of body weight. This means that although 500 stings can kill a child, the average adult could withstand more than 1100 stings.

9. Only a small percentage of people develop severe reactions (anaphylaxis) to insect venom. Signs and symptoms of a severe reaction include facial swelling, difficulty breathing and shock.

Appendix H

A Guide for Fire Fighters and Rescue Personnel (USDA-ARS)

Africanized honey bees (AHB) are found in the southwest U.S. and Florida. They could be imported into northern states, although they are not expected to become established in New England. Their attacks can be a life- threatening emergency. Fortunately, rescue personnel can help people under attack by using (with slight modification) equipment and materials common on fire trucks, ambulances and hazardous materials response vehicles.

This guide can also be used to protect people from swarms of domestic honey bees, which to the naked eye are indistinguishable from the AHB, and wasps.

Protective Clothing

Conventional heavy turnout gear worn by most fire fighters protects all areas of the body except the head and neck. Consequently, veils are essential, but they must be adapted to the headgear worn. Bee veils are available from beekeeping supply houses. Mosquito veils can be obtained from military surplus and sporting goods stores. Seal the veil at top and bottom with string or duct tape. Tape should also be used around the waist, wrists and ankles, and to close any other gaps. Leather areas of turnout gear, such as gloves, may antagonize the bees. Plastic or rubber gloves are best.

Disposable hazardous materials suits, such as those made of Chemrel R, Saranex R or Tyvek R, provide good protection, especially if worn over street clothing or uniforms.

Reflective aluminum suits work but may limit movement, and veils and duct tape is needed.

Wetting Agents

Bees are easily immobilized and killed by wetting agents (surfactants) - including commercial liquid dishwashing detergent. Nonfoaming fire control chemicals and fire fighting foams with surfactant characteristics such as the aqueous film-foams (AFFF) also work (Fig. 2).

Not all commercially available products have been tested, but most such wetting agents should be equally effective. Chemicals tested so far include: original Palmolive dishwashing liquid, 9-55 R fire control chemical, Silv-ex R foam concentrate and FC-600 Light Water brand ATC/AFFF. All had a light but

Figure 3. Northwest Fire District's Captain John Estes of Tucson, Arizona, uses a widespray of water and chemical wetting agent as a means of subduing Africanized honey bees. Looking on is ARS entomologist Eric Erickson (retired), who taught this control method to fire departments throughout Arizona. (Photo USDA-ARS, Jack Dykinga, k9737-14).

distinctive odor. A one percent solution was sufficient to immediately immobilize honey bees and apparently kill them within 60 seconds.

If there is doubt whether a particular chemical will work, rescue personnel should enlist the aid of a local beekeeper. Clearly, human and animal safety must be the most important consideration. The U.S. Environmental Protection Agency has conditionally approved detergents for use against AHB¹s.

Victim Rescue

After arriving at a site, rescue personnel first should assess the situation from within their vehicles. Then they should retreat several hundred yards, put on protective clothing and move any onlookers to a safe distance.

Each situation is unique, but to rescue a victim, two things must be done as quickly as possible: establish an adequate insect barrier, and neutralize the insects¹ alarm odor - which consists of chemical components of venom that enable more bees to find and attack the victim.

Fire and rescue units responding with standard fire fighting equipment can quickly accomplish both objectives by using water plus a non-toxic wetting agent.

Using standard fire fighting procedure set up a line with an educator capable of delivering a one to three percent spray of one of the foaming/wetting agents and a nozzle capable of delivering a wide fan patter. A light initial application to the victim will stop the attack by most of the insects on or near the victim within 60 seconds. These insects, unable to fly, will begin to suffocate and can be quickly brushed aside.

If an obvious line of insect flight can be determined, a vertical wall of spray 20 to 30 feet in the air should intercept further flight activity. Or, the nozzle can be inverted near the victim to provide a curtain of safety.

Rescuers wearing proper protective gear then can carry a victim into a house, van or ambulance for treatment and transport. Many bees, however, will follow to continue their attack.

In a house, bees which have been attracted to windows by light can be vacuumed up. In a rescue vehicle, drive away and then roll down the windows and chase the insects out.

Sting Removal

Once the victim is protected, remove stings as quickly as possible. Otherwise, the white, translucent, venom sac - with its nerves and muscles attached - will continue to pump venom into the wound for a minute or more. Removing the victim¹s outer layer of garments may help because stings embedded through the fabric will be dislodged in the process.

The best way to remove stings is to simply scrape them away with a fingernail, credit card or similar instrument. Never pinch, tweeze or otherwise attempt to pull stings out, as this will simply inject the remaining contents of the venom sacs.

After sting victims have been cared for, rescuers should launder the bees[1] alarm-odor chemical from suits, veils and equipment.

Training

Fire and rescue personnel should familiarize themselves with normal activities of stinging social insects in their area. Local bee experts or beekeepers can provide extremely valuable advice and assistance, particularly when unusual situations arise. All states have active beekeeper organizations, as do many local communities, and they usually welcome requests for assistance.

Most beekeeper groups would welcome an invitation to help develop training exercises, where bees would be used to simulate an actual attack and allow rescuers an opportunity to practice their skills.

The State Entomologist and apiary inspector with the participation of the Connecticut Beekeeping Association (CBA) and Backyard Beekeeping Association (BYBA), and support of the Eastern Connecticut Beekeeping Association (EBA) organized the first Honey Bee Response Training class at the Connecticut Fire Academy's Fire school on June 4, 2008 (Fig. 4-5). The purpose of the class was to education firefighters about honey bees and how to handle a bee incident from a vehicle accident involving transported hives to a stinging incident with possible Africanized honey bees. Instructors were Kirby Stafford and Ira Kettle (CAES), Winthrop Baum (BYBA), and Theodore Jones (CBA).

Figures 4 and 5. Firefighters learn to apply foam to control honey bees at the Connecticut Fire Academy Fire School (left) and Ted Jones, President of the Connecticut Beekeepers Association, shows a frame with dead bees (right) (K. Stafford).

Example Standard Operating Procedures (SOP)

Source: Northwest Fire/Rescue District, Tucson, AZ
Standard Operating Procedures 7701 Response to Africanized Bees

Purpose: To outline a process by which Fire Suppression personnel will approach and manage an Africanized Honey Bee (AHB) attack/swarm.
Scope: All fire suppression personnel.
Procedure:

Dispatch

When the Dispatch receives a call for AHB attack, an engine or ladder company, and an ALS transport shall be dispatched. Upon arrival, units should take care not to commit themselves in the path of the source of bees -- approximately 150' from the colony. Firefighters shall don full protective clothing including bee hoods.

On-scene

Upon arrival at an AHB incident site, a rapid evaluation should be made by the first arriving fire company officer and the following activities implemented:

Determine if there are any victims that will require rescue and/or medical treatment.

Designate a Level II staging area for subsequent arriving fire department units and/or other agencies which are also responding.

Once on the scene, three crew members shall don a helmet, their turnout coat, gloves, and bunker pants. No SCBA is necessary. Ankles and waist shall be taped tight to prevent bees from crawling up the chest or legs. The firefighters shall don bee hoods over their helmet and upper chest. If possible the hoods should also be taped down to prevent bee access.

Approach

A quick attack, Class A capable 1-3/4" hose line shall be deployed and charged to a minimum 95 gpm, at 0.3% foam. Prior to advancing the line, it is imperative that an effective foam flow is confirmed. The hose line shall be advanced by the firefighter at a quick pace towards the affected patient, with a full fog pattern on the nozzle -- sweeping the air surrounding the firefighters and patient. The patient should be quickly picked up while at the same time sweeping the surrounding air with the Class A foam line. The foam shall continue to be sprayed into the air and on the firefighters and patient while the firefighters retreat to a minimum safe distance of approximately 150 feet from the swarm. At this time, it should be reevaluated to determine if the area retreated to is far enough away to begin more definitive treatment of the patient.

Securing the area

The Class A foam will kill the AHB within approximately 60 seconds of contact. The Class A foam should be used to kill the swarm after patients have been rescued. The same sweeping motion should be used to approach the bee colony completely flooding the hive with the Class A foam solution. This is an acceptable action to prevent further exposure to multiple bee attacks.

Response with no indications of an attack

In the case of a call to report a swarm or the existence of a possible swarm (evidence of a hive, abnormally large amounts of bees in the area), a single Engine or Ladder Company shall be dispatched. The apparatus shall approach the scene in a non aggressive manner without lights or sirens as this type of activity may provoke/attract an attack from the bees. Keep all doors closed and windows in the rolled up position. It may also be advantageous to treat the call as if it were a Haz-Mat call, i.e. do not over-commit, conduct an investigation as to the immediate potential danger and if necessary, establish a hot zone. An accurate and thorough scene size up is critical to a successful outcome. Once this has been completed, assess the information and determine a course of action. Normally if the bees are not posing an immediate threat and the calling party wants the bees removed, the calling party should be directed to contact a pest control company for removal.