

American Association of Professional Apiculturists

AAPA Position Statement on the Health of the US Honey Bee Industry

Honey bees provide essential pollination services to US fruit, vegetable and seed growers, adding \$8-14 billion annually to farm income and ensuring a continuous supply of healthy and affordable foods for the consumer. About 2 million colonies are rented by growers each year to service over 90 crops. The almond crop alone requires 1.3 million colonies and is predicted to require 2.12 million by 2012 (about 95% of all colonies currently in the US). Increasing demand comes at a time when beekeepers are confronting the most serious challenges the industry has ever faced. A steady supply of healthy colonies cannot be guaranteed as parasitic mites and the rigors of migratory beekeeping continue to cause significant die-offs. A weakened beekeeping industry affects not only beekeepers, but also growers and consumers who pay higher prices for fewer goods. A weakened industry also contributes to social stress in rural America and increases our dependence on foreign sources of food. To ensure an adequate and sustainable supply of healthy honey bees, it is imperative that a new degree of cooperation be attained among researchers, beekeepers and growers, supported by elected and appointed government representatives.

Background

Since 1984, the beekeeping industry has witnessed multiple introduction of invasive species, including the parasitic tracheal mite *Acarapis woodi* (identified 1984), the parasitic mite *Varroa destructor* (identified 1987), Africanized honey bees (identified 1991), the small hive beetle *Aethina tumida* (identified 1996), Israeli Acute Paralysis Virus - IAPV (identified 2007) and *Nosema ceranae* (identified 2007). Several of these pests were present for varying lengths of time prior to the time that they were identified.

For the past 20 years, parasitic mites have caused extensive damage to honey bees. These mites transmit viruses to bees and cause significant colony losses each year. Mite-related losses reached record high levels during the winters of 1995/1996 and 2000/2001 when colony deaths in northern states ranged between 50 and 100% in many beekeeping operations. Even in years when losses are not catastrophic, the annual death rate is considerably higher than it was prior to 1984. Despite considerable research efforts at both state and federal levels, effective and sustainable controls have not yet been developed for these mites. Pesticide resistant mite populations and the inability to identify and disseminate stocks of tested and proven mite-resistant bees are major contributors to these losses.

During the winter of 2006/2007, a number of beekeepers once again reported exceptionally high losses. Some suspected elevated mite levels to be a contributing factor, and the widespread distribution of pesticide resistant mites combined with the limited success in incorporating mite-resistant bees into the commercial population support this claim. However, while many of the deaths during the winter of 2006/07 were due to parasitic

mites, a large number of colonies exhibited symptoms inconsistent with mites or any known disorder (estimates of total colony losses during the winter of 2006/2007 ranged from 500,000 to 1,000,000 colonies – survey by Apiary Inspectors of America). Migratory beekeepers trucking bees over great distances were especially hard hit. This new syndrome was named Colony Collapse Disorder (CCD); although, it has not been established that all of the colony deaths ascribed to CCD are from a single causal agent (i.e. CCD may itself be an aggregation of deaths from multiple causes). Hopes that CCD would be a transient phenomenon were quickly dashed when commercial beekeepers wintering in southern states during the winter of 2007/08 once again reported extremely high losses with colonies exhibiting many of the same symptoms as seen during the previous winter (estimates of total colony losses during the winter of 2007/2008 ranged from 750,000 to 1,000,000 colonies). These losses, combined with a cluster of previously unrecognized symptoms in many of the colonies, suggest that a new problem may have beset an already beleaguered industry.

While most of the deaths during the winters of 2006/07 and 2007/2008 can be attributed to parasitic mites, about 25% of deceased colonies exhibited symptoms inconsistent with mites or any other known disorder. Migratory beekeepers trucking bees over great distances have been especially hard hit. This suggests yet another problem has beset an already beleaguered industry. This new syndrome has been named Colony Collapse Disorder (CCD). However, it has not been established that all of the colony deaths ascribed to CCD are from a single causal agent (i.e. CCD may itself be an aggregation of deaths from multiple causes). A list of possible causes for CCD includes beekeeper management practices, new pesticides, pesticide use patterns, nutritional deficits associated with extensive monocultures, climate change, exotic parasites and pathogens, diminished immunity to pathogens and subtle interactions among two or more of these factors. The extent of losses has been reflected, in part, in rental fees for colonies used for pollination which have risen sharply over the past few years.

In the past, beekeepers have been able to recover from large losses, albeit at considerable expense. Historically, migratory beekeepers return to a southern wintering ground in the fall and over the next few months divide their remaining colonies and build back their numbers in time for the following spring bloom. With CCD, beekeepers are not able to restore their numbers because colonies taken to the south continue to die off over the winter and end up with inadequate worker populations. This means that the number of colonies available for pollination the following year is below normal.

The 2007 report of the NAS NRC “*Committee on the Status of Pollinators in North America*” offers a comprehensive review of the many problems affecting pollinators in general, and the beekeeping industry in particular. The NRC committee identified several major threats to the US bee industry. These include:

1. the development of pesticide resistance in the mite population and the lack of any effective resistance management program;
2. a failure of the bee industry to successfully incorporate the results of bee breeding efforts into the stock and queen production industries;

3. the development of resistance to the antibiotic oxytetracycline-HCl used to prevent American foulbrood, the primary bacterial disease affecting honey bees;
4. inexpensive, imported honey that maintains strong downward pressure on the prices paid to US honey producers; and
5. the Africanized honey bee that has begun to move into regions of the country critical to the sustainability of the US beekeeping industry. These areas, primarily in the southeastern US, are the major wintering grounds for migratory beekeepers and a major source of queen and package bees purchased by northern beekeepers to replace winter losses, which are high. Africanized bees out compete our traditional European bees in these areas and make it difficult to maintain pure lines of European ancestry. If germplasm from this highly defensive race of bees becomes common in the commercial population, colonies will become less manageable and liability issues for both beekeepers and growers may become significant.

The committee's report includes a number of specific recommendations for responding to these problems.

The current problems being experienced by beekeepers highlight several areas for improvement. First, adequate methods for accurately assessing the health of the beekeeping industry do not exist. This makes it difficult to know the severity of losses with any meaningful degree of certainty. Estimates of colony losses during the winter of 2007/2008 range from 750,000 to 1,000,000 colonies, but there is no way to substantiate those numbers. It is imperative that this informational deficit be remedied. This information deficit was highlighted in the 2007 report of the NAS NRC "*Committee on the Status of Pollinators in North America*." Elected representatives and appointed government officials depend on accurate information in order to justify financial decisions. It is the responsibility of the industry to ensure that this information is available. This will require increased cooperation by members of the industry with government survey groups such as the National Agricultural Statistics Service (NASS). In addition, growers should be included in any survey of colony health in order to better assess availability of colonies for pollination and pollination fees.

Second, adequate methods for defining and assessing the cause or causes of death of honey bee colonies are not well defined, universally accepted or widely implemented; and in some cases, they do not exist. This makes it difficult to ascribe annual die-offs to specific causes, and that makes it difficult for beekeepers to know what problems should be demanding their greatest attention. This also makes it difficult for researchers to know how to best allocate their efforts on behalf of the industry. A well-defined list of symptoms for each honey bee pest, parasite, pathogen and predator should be developed to allow for differential diagnosis of honey bee pathologies. Due to the difficulty in diagnosing a problem that has already killed a colony, it may be necessary to collect and archive samples of bees from commercial operations on a regular basis. These samples can then be examined in the event of subsequent loss.

Third, the bee industry has not effectively incorporated the results of research on bee breeding for mite and pathogen resistant stock into its standard operating procedures. Only a small portion of bee breeders consistently monitor their stocks for levels of tracheal and varroa mite infestations and select breeder queens based on those assessments, and the effectiveness of introducing genes for hygienic behavior and other mite resistant traits into established commercial stocks remains unknown. Queen breeders still use long-standing, tried and true methods of rearing queens, and no research on new methodologies is being conducted. Finally, there is no independent stock certification program for honey bee stock; therefore, there is no way for beekeepers to know that the stock they are purchasing is truly resistant to mites and pathogens. Without such a guarantee, consumers will not pay higher prices for selected stocks; and without an economic incentive, queen producers will not adopt more rigorous standards because they cannot count on a return on their investment.

AAPA Recommendations:

1. AAPA supports the findings and recommendations of the report from the NAS NRC “*Committee on the Status of Pollinators in North America*” and urges government officials to use that report as a foundation for all decisions affecting their response to the current problem, especially as those decisions affect the direction of research and extension funds.
2. The NRC report was issued before the current problems with CCD arose. Therefore, AAPA supports adding CCD to the list of problems identified by the NAS NRC committee. CCD should be seen as an addition to, rather than as a replacement for, the recommendations contained in the committee’s report. Research in this area should focus broadly on the effects of environmental and genetic factors on bee health, including, but not limited to, management practices, nutritional deficits associated with large monocultures and climate change, pesticides, exotic pathogens and parasites and stock selection.
3. AAPA recommends that The National Agricultural Statistics Service adopt those recommendations of the NAS NRC “*Committee on the Status of Pollinators in North America*” that pertain to the collection of information on pollinators and honey bee health. Further, AAPA recommends the US bee industry cooperate fully with all efforts to collect information on the status of honey bee health in the US.
4. Reliance on pesticides alone for pest control has not proven a sustainable strategy for beekeepers. AAPA recommends that the US bee industry commit itself through its national organizations to the adoption of mite and pathogen resistant stocks of honey bees. An effective program for honey bee breeding and queen production should be developed that is based on cooperation among industry, research and extension personnel. This effort should involve an independent, third-party certification program to provide the service of testing selected honey bee stocks for incorporation of desirable traits.

5. Selected importation of bees from outside of North America would provide expanded genetic resources for breeding programs, but importations may introduce stocks that are not well adapted to the climate and are susceptible to parasites and pathogens on this continent. Imports also have inherent risks of introducing additional exotic pests to the US. AAPA recommends that APHIS maintain oversight of the introduction of stocks from outside the borders of the US.
6. Low prices for honey limits the adoption of sustainable management practices by beekeepers; therefore, AAPA recommends that the letter and spirit of the law regarding the importation of honey into the US should be strictly enforced to prevent the artificial lowering of prices paid to US honey producers.
7. AAPA recommends that the US bee industry commit itself through its national organizations to the adoption of IPM practices for the maintenance of honey bee colonies and the production of hive products. Several large food distributors have already expressed an interest in IPM standards for honey. Because low prices for honey provide obstacles for the adoption of sustainable management practices by beekeepers, a set of consumer-driven IPM standards for honey and other hive products should be developed along with an independent, third-party certification system to verify compliance. Products receiving certification will command a higher price in the market place and therefore, provide producers with an economic incentive for adopting these principals.
8. AAPA recommends that extension activities that focus broadly on colony health be pursued with increased vigor in order to ensure that stakeholders have access to the latest and most effective information. These activities should be pursued cooperatively among programs where possible.