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IFAS EXTENSION

## **African Honey Bee: What You Need to Know<sup>1</sup>**

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### **What is the difference between African, Africanized and European honey bees?**

Several races or subspecies of honey bees reside in Africa. One of these, *Apis mellifera scutellata*, from the central and southern part of the continent, is the predominant parental type introduced into South America. This is the African or Africanized honey bee so often sensationalized in the media. The European honey bee is the race common to North America, and is an amalgam of many European subspecies imported over the past several centuries. To a much smaller extent, subspecies from Asia and Africa were also introduced.

Breeding occurs between the African and European races of honey bees, but the extent to which bee populations in the Americas are African-European hybrids has been debated. The term "Africanized" is traditionally applied to all progeny resulting from matings between European and African bees. The acronym "AHB" is now a commonly used, practical, identification term.

### **What is the history of the African honey bee?**

Honey bees from Africa were brought to Brazil in the 1950s. The purpose was to introduce genetic material from the tropically adapted African bees into the resident European bees, thereby making better honey producers. Unfortunately, some of the introduced bees were released. Their descendants quickly established a large wild population, which had not existed in South America previously. The success of the AHB reflects superior adaptation to the tropical environment compared to the European bee. Over the next four decades, the wild AHB population expanded into most of tropical and subtropical parts of the Americas. The AHB has several traits which are important to the beekeeper and general public.

### **What is the African bee parental type's most noticeable characteristic?**

The AHB defends its nest (stings) far more intensely than does the European honey bee. The African honey bee responds quickly to disturbances by people and animals 50 feet or more from the nest, and can sense vibrations from power equipment 100

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feet or more from the nest. AHB will chase an enemy up to a mile or more. Their defensive behavior is thought to have evolved because of the many biological competitors, including humans, in the bees' native Africa. There, only the most defensive bees can survive. Apicultural activity in much of Africa is confined largely to bee hunting rather than beekeeping. This practice is a form of selection that has favored a population of bees unpredictable in behavior.

By contrast, the European honey bee population in the U.S. has been selected by beekeepers for manageable traits (gentleness, reduced swarming, high honey hoarding). Consequently, the European bee is much more gentle and predictable in their behavior than the AHB.

### **What other traits can be seen in the African honey bee parental type?**

The survival strategy of the African parental type is to invest food resources into producing large numbers of progeny and generating many reproductive swarms. Thus, colonies are replaced that are frequently lost due to the severe predation and harsh environmental conditions of Africa. In response to these conditions, the African bee will also tend to abscond readily (abdicate its nest and move elsewhere). The African bee is physically smaller than the European bee and constructs its comb with smaller cells. African bees nest in smaller cavities and sometimes underground (water meters, animal burrows). A combination of such behavioral and physiological characteristics make the African bee well-suited to tropical environments.

The European honey bee's survival strategy is different from that of the African bee; it defends its nest, absconds, and swarms to a lesser extent. More energy goes into producing and storing honey needed to successfully get through long parts of the year (winters) when resources are absent. Such characteristics make the European bee well-suited to temperate environments.

### **What are the traits of the African honey bee in South and Central America?**

The AHB may show all degrees of behavior expected in either European or African bees. However, tropical conditions in South and Central America have favored the African parental type. The expression of African characteristics among the AHB such as defensive stinging, frequent swarming and absconding, has been well documented.

Genetics research has shown that the large wild AHB population is composed of unbroken African mother lines extending back to the queen bees originally brought to Brazil. As the wild AHB population expanded and encountered managed European bees, matings occurred between them. European queen bees from managed apiaries mated readily with wild African drones, and the "Africanized" progeny inherited and expressed the African characteristics, including highly defensive stinging. However, few matings between wild African queens and European drones seemed to have occurred, and, to a large extent, the few hybrid progeny produced appear not to have persisted. Superior adaptation to the tropics is probably largely responsible for preserving the African genetic composition.

### **What have been the effects of the African honey bee on South and Central American beekeeping?**

Bees with predominantly African characteristics initially brought disaster to much of South and Central American beekeeping. Beekeepers were not prepared for the large, wild population of AHB which invaded their area; they saw their own bees change rapidly and could not cope with the intense stinging behavior. Honey production rapidly declined in areas invaded by wild AHB colonies, as many beekeepers simply did not adapt and abandoned their apiaries. Those that stayed in business found locations increasingly more difficult to obtain, because of the bees' deserved reputation for extreme defensiveness. Finally, there is evidence that the wild African bee population has reduced nectar resources in certain

areas, making them unavailable to managed European bees.

Over time, beekeepers have devised ways to manage AHB. Beekeeping has been returning to many areas in South and Central America, although often in a much different form. This is certainly the case in Brazil. Reports from there that the AHB alone has increased honey production need to be tempered by the fact that beekeeping knowhow has also greatly increased. Also, the numbers of orchards have increased during this time.

### **What has the African honey bee meant to the South and Central American general public?**

Like the beekeeper, the general public was unaware of the spread of wild, defensive AHB. As the wild population expanded in size and filled a large ecological vacuum, more bee-human contact was inevitable. The European bee is fairly selective for nest sites, but the AHB is not so particular. They nested in unexpected places. Most people were ignorant of bee behavior. Those with bee experience tended to treat AHB as they had the resident European bee.

With the AHB nesting in a wide variety of sites, along with their erratic defensive behavior, a substantial number of stinging incidents involving both humans and animals resulted. These incidents were often sensationalized by the local press. Once the invading wave passed, gradually the general public and public agencies had to contend with the reality that a large number of defensive honey bees would be a permanent part of their environment.

### **How will arrival of the African honey bee affect the U.S. beekeeping industry?**

Because the U.S. beekeeping industry will be better informed about the AHB, it may not suffer extensive damage from the invasion. It is anticipated that beekeepers will attempt to maintain European stock by more frequent requeening. Beekeepers will probably become involved in exterminating wild bee nests to protect their managed bees from resource

competition. Therefore, beekeepers will become one of the principle resources to whom the general public and agriculturalists can turn as they confront the AHB.

Sensationalized press releases and realistic concerns about stinging incidents will reduce the number of possible locations for managed bees. This will be alleviated to some extent by beekeepers' effectiveness in convincing the general public that managed colonies will lead to fewer wild, over-defensive colonies. Where wild populations of AHB build up, competition for resources with managed colonies will contribute to further reduction in forage availability.

Frequent requeening, loss of apairy locations, and resource competition will all add to the cost and labor of beekeeping operations. The profit margin from beekeeping will diminish. The problems caused by the AHB, along with other major problems faced by the bee industry, such as devastating parasitic mites and antibiotic-resistant disease bacteria, threaten the very existence of beekeeping businesses.

### **How much of the U.S. will the AHB occupy?**

AHB moved about 300 kilometers per year through the tropics. The first detection of the bee in this country was made in Texas in late 1990. So far, the rate of spread in temperate areas of the U.S. has been considerably slowed. However, since the AHB arrival, southern California, southern Nevada, all of Arizona, much of New Mexico and most of Texas have become occupied by wild populations of AHB. Isolated swarms have been discovered in southern Utah, Oklahoma, Arkansas, and Louisiana. By mid-2004, fourteen fatalities had occurred in the U.S. due to AHB stings. Hundreds of non-fatal stinging incidents have been reported.

As the AHB spreads into temperate regions, it will have fewer survival advantages than the resident European bee. Across about the southern third of the U.S., a hybrid zone is expected to be formed between AHB populations to the south and European bee populations to the north. If hybrids form that are able to survive well in temperate regions, they could serve

a vehicles for the more northward spread of African traits, including the excessive stinging behavior. Because the character of the bee populations may change as the AHB invasion spreads into the U.S., continual rethinking of the bees' effect on humans, animals and the environment will be in order.

### **Where is the AHB present in Florida?**

It had been predicted that the population of AHB that expanded northward from Mexico and into the southern U.S would quickly move across the Gulf Coast states and into Florida. However, for many years, for unknown reasons, the bees had not moved beyond eastern Texas.

Since 1987, AHB have hitchhiked as swarms on ships and have been regularly captured in bait hives located at Florida's deep sea ports. Over 500 bait hive traps are now in place at Florida ports, along interstate highway systems, and where positive AHB finds had been made previously. The bait hives are maintained and checked regularly by apiary inspectors of the Florida Department of Agriculture and Consumer Services. In the years since 2001, the number of captured AHB swarms has increased steadily. Most recently, the largest proportion have been found in the Tampa area. Some of these have created the greatest concern, because they have been found miles inland from the port. Still, the number of captured AHB swarms remains small, less than 100, and very few of these exhibited excessive defensive behavior. Only one serious stinging incident, involving an animal, had been reported by mid-2005.

Daughter queen bees from isolated AHB swarms have only resident European drones with which to mate. Therefore, the progeny will have diluted African tendencies. A concern is that once the numbers of AHB colonies in a given area reach a critical mass, AHB drones will be available to mate with AHB queens.

### **How will the AHB affect the Florida public?**

Florida's subtropical environment should be favorable to the establishment of a large wild AHB population. Experience in Latin America suggests

that there will be more bee-human contact. The possible effects of publicized stinging incidences could affect tourism and recreation in the state. Liability issues may impact the judicial system and insurance industry. The adverse impact on beekeeping businesses may result in a loss of honey bees for pollination of crops vital to our economy and food supply. Reduced availability and higher costs of certain foods may result.

Educating the public, the beekeeping industry and emergency first-responders will become a priority. This should lead to a more informed public concerning the value of bees to agriculture.

### **What action should be taken by the beekeeping industry and regulatory officials to deal with the AHB?**

Officials and beekeepers should keep aware of the bee's movement. Beekeepers must show the general public that they are the first defense against the AHB. They can do this by managing their bee stock to maintain gentleness.

Experience in Latin America has shown that wild AHB swarms, although gentle themselves, can develop into large colonies of extremely defensive bees. Thus, the common and rewarding practice of capturing and maintaining wild swarms (those from unmanaged apiaries) may become illegal. In any case, it should be avoided by inexperienced beginning beekeepers and modified by those who are experienced. Requeening captured feral swarms with European queens, not yet practiced to a high degree in South and Central America, will have to be adopted by North American beekeepers in Africanized regions. This procedure will have two benefits; possible elimination of bees that might cause highly publicized stinging incidents and reduction of wild competition for colonies of managed, docile European bees.

First-responders (police, fire-fighters, paramedics and other rescue personnel), need to be trained how to most effectively and quickly respond to bee stinging emergencies. They must be properly equipped with appropriate protective clothing and with gear to shield victims from the bees. Preferably,

as part of the training, rescue personnel will have had the experience of being in the presence of large numbers of bees.

### **What action should be taken by the general public?**

The public should be educated to recognize and avoid wild bee nests. People must hold a healthy respect for all bee colonies and swarms as potentially populated by over-defensive honey bees and, therefore, suspect. Any wild swarms found near residences or close to domestic animals (horses, cows, poultry, hogs, dogs) must be destroyed. In addition, information on what provokes defensive behavior, and how to minimize the effects of stinging incidents, should be disseminated. Workers, hikers, and campers in more remote rural or wild areas should be particularly alert and may consider packing mosquito head nets or lightweight bee veils.

### **What should I do if I locate a swarm or colony of bees on my property?**

If you find bees on your property, stay away. If the swarm or colony is disturbed:

- Get away from bees as quickly as possible. Africanized bees defend their nest so moving away from the nest is a good strategy
- Protect your face and eyes as much as possible
- Take shelter in an enclosed area
- Call a local beekeeper, pest control company or your Cooperative Extension Agent for information. Pest control companies may need to be engaged to destroy the nest
- Do not stand still and swat at the bees; rapid movements will cause them to sting.

### **What action should I take if I'm stung by bees?**

Try to prevent stings by protecting yourself in a safe area (building, car, truck) as quickly as possible. If stung,

- Scrape stingers from skin with a blunt object as soon as possible. If not done, venom will continue to be injected over time
- Wash effected area with soap and water and apply ice to relieve pain and swelling
- If allergic reaction occurs such as difficulty in breathing or hives over large areas of the body, inject adrenaline from an emergency sting kit, administer antihistamines and seek medical attention
- If many stings are received, there is risk of toxic envenomation and medical attention should be sought. The treatment for this is renal dialysis. Many physicians may not be familiar with this situation because it generally only arises due to massive defensive behavior by AHB.

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### **List of References**

Anonymous, 1972. "Final Report of the Committee on the African Honey Bee". Washington, D.C.: *Natl. Res. Counc. Natl. Acad. Sci.* 95 pp.

Anonymous, 1986. *Proceedings of Africanized Honey Bee Symposium in Atlanta, GA*. The American Farm Bureau Research Foundation. Park Ridge, IL.

Gary, N. E., H. Daly, S. Locke and M. Race. 1985. "The Africanized Honey Bee: Ahead of Schedule." *California Agriculture*, November-December, pp 4-7.

Hall, H. G. 1992. DNA Studies Reveal Processes Involved in the Spread of New World African Honeybees. *Florida Entomologist* 75: 51-59.

Hall, H. G. 1992. Suspected African honeybee colonies in Florida tested for identifying DNA markers. *Florida Entomologist* 75:257-266.

Harrison, J. F. and Hall, H. G. 1993. African-European honeybee hybrids have low non-intermediate metabolic capacities. *Nature* 363:258-260.

McDowell, R. 1984. "The Africanized Honey Bee in the United States: What Will Happen to the U.S. Beekeeping Industry?" *Agric. Econ. Rep. No. 519*. Washington, D.C., U.S. Govt. Printing Office. 33 pp.

Taylor, O. 1985. "African Bees: Potential Impact in the United States." *Bulletin of Entomological Society of America*. Winter, 1985, pp. 15-24.

Spivak, M., D. Fletcher and M. Breed, eds. 1991. *The 'African' Honey Bee*. San Francisco, CA: Westview Press. 435 pp.

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