

# Bee Harmony



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## Africanized Honey Bees

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There are about 25 recognized races of Honey Bees, but the ones most commonly managed in North America are the Italian, Caucasian, Carniolan, and German races. These are generally referred to as European bees, to distinguish them from the African bee subspecies, *Apis mellifera scutellata*, which is considered one of the most productive bees. Biologist Warwick E. Kerr introduced the African honey bee to Sao Paulo, Brazil in 1956. He attempted an experiment to cross breed them with his European bees to create a hybridized bee adapted to the

hot, moist Neotropics. He also hoped to reduce the defensive, aggressive behavioral traits of the African honey bee. Recognizing the aggressive behavior of the African honey bee, the program was set up in an area to isolate the African honey bees in a controlled breeding environment.

Unfortunately, a visiting beekeeper removed the queen excluders intended to prevent the imported bees from swarming. Twenty-Six African honey bee hives swarmed and rapidly usurped some of the existing European hives in addition to mating with feral European honey bee queens. The hybrid offspring

are known as "Africanized honey bees."

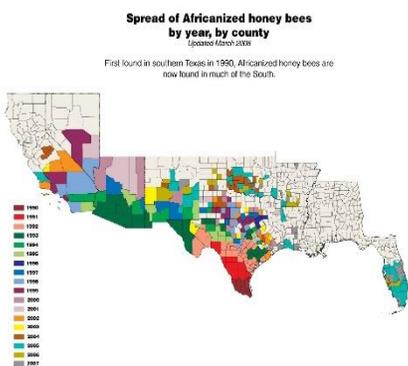
The Africanized honey bees began a rapid expansion through South and Central America, earning them the distinction of being the most successful biologically invasive species of all time and becoming one of the most-studied cases in hybridization. The ability of the Africanized honey bee to gain such a commanding position over an existing species occurred as a result of its ability to utilize existing environmental resources, such as food and hive sites, and the conveyance its dominate genes.

In less than twenty years the Africanized honey bees and their dominant genes had saturated South and Central American and reached Mexico by 1985. In 1990, the Africanized honey bees entered the United States at

Hidalgo, Texas. Over the next twenty-six years the Africanized honey bees spread through most of southern United States including the north central portions of California and east as far as Florida.



This map reflects the expansion of the Africanized honey bee from Brazil through South and Central America and the United States by area and year.



The map above, of the United States is color coded to show the location and year the Africanized honey bees were discovered in each area.

One trait of the African honey bee that exacerbates this rapid expansion is their "restless attitude," staying in a location

only long enough for the available forage to dwindle, then leaving for a new location with more expansive floral resources. This behavior is critical in an African desert environment where the bees migrate with the seasonal rains. This trait allows the African honey bees to move at a rate of 200 – 300 miles per year.

Although the Africanized bees continued to spread across the southern United States, their expansion rate was slower than occurred in South and Central America due to the Africanized honey bee's inability to survive in colder climates. Early researchers predicted the northern limit to be south of 34° latitude. One factor that changed this "Northern Ceiling" was climate change. As our winters became milder, the region of habitability expanded further north.

Joshua Kohn, a professor of biology at The University of California San Diego stated that, higher temperatures caused by global warming could mean that Africanized honey bees may continue to push north in the coming years.

In the dry, desert environment of Africa, the seasonal temperature differences are minimal. Rainfall is more of a determining factor for available nectar and pollen resources. African honey bees located in tropical areas construct smaller hives and are quick to abandon them when floral resources diminish with the season. The warmer climate and migratory trait of the African honey bee does not necessitate the need for a larger hive, and the

storage of honey (including the need for thermoregulation and clustering in tight balls) to survive a long, cold season. This African heritage of smaller hives and lack of honey storage leads to hive starvation in northern latitudes.

Along with warmer temperatures associated with climate change, it has been demonstrated by research that additional traits of the Africanized honey bee have contributed to their northern range expansion. Four other key traits found in the Africanized honey bee that individually or collectively could be contributing factors in their range expansion. These factors include: the continued adaptation and changes in genetic makeup as the Africanized honey bees continue to mate with European bees; the Africanized honey bee's ability to resist pests and pathogens; the genetic superiority and dominance of the Africanized honey bee; and the swarming, absconding and population traits associated with the Africanized honey bee.

This is particularly timely since there are enormous losses of European honey bee populations due to Colony Collapse Disorder and the associated need for agriculture pollination. As the aggressive behaviors of the Africanized honey bees move into new, previously uninhabited areas there is an immediate need to increase public awareness of the dangers associated with Africanized honey bees.