

# Africanized Honeybees

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**Figure 1.** Africanized honeybee feeding on water in Brazil.

- I. Principles & concepts introduced in this exercise**
  - A. What are Africanized honeybees?**
  - B. What makes them dangerous?**
  - C. Why are they so aggressive? Predation & evolution.**
  - D. How did they come to the New World?**

## **II. Introduction**

Africanized honeybees are of the same species as the more well known European honeybee but belong to a different *race* or subspecies, meaning that they have similar characteristics but come from different geographic regions. The two look nearly identical, and can only be distinguished from one another by measuring differences under a microscope and analyzing their DNA. Thus the variation between these two types of bees can be attributed mostly to differences in behavior as affected by climate, predator abundance, and resource distribution. European honeybees, as their name suggests, evolved in areas of Europe with temperate climates, whereas Africanized bees are native to southern Africa and thus evolved in tropical climates. Both races are social and nest inside hives, but European honeybees reproduce more slowly, build larger nests and rarely abandon them. This is because European bees need a large colony and honey supply to last through the cold temperate winter when there is relatively little food and temperatures are too cold for bees to forage. Since the winter is not very cold in the tropics, in times of reduced flowering or food *dearth*, Africanized bees are able to abandon their nests (abscond) and fly long distances searching for better resources. Africanized honeybees also build smaller nests and reproduce more rapidly; they work faster and die younger than their European counterparts.



**Figure 2.** Aggression is not just limited to Africanized honeybees! Take a look at this stingless bee attacking an Africanized honeybee. For more information, please take a look at the exercise on [stingless bee aggression](#).

The constant pressure from a higher concentration of predators in the tropics has also affected the evolution of Africanized honeybees, making them more aggressive since they are constantly having to ward off hungry nest attackers. Africanized honeybees are very sensitive to alarm pheromone (the odors, smelling a bit like banana, which foragers release from their sting gland and glands located in the head when they are alarmed) and produce much more of it than European honeybees. Africanized honeybee venom is not more painful or voluminous than temperate honeybee venom, its just that many more bees will sting! The threshold for stinging response in Africanized honeybees is much lower; only a minor disturbance such as a slight motion, vibration, or odor is needed. A study by Collins (1985) showed Africanized honeybees respond 2.4 times faster to alarm pheromone and about 30 times as fast to a moving target! Once Africanized bees have been stimulated, they are also much more likely to respond in group attacks. During such attacks they will sting anything in sight that is moving and may pursue a source of disturbance for up to a kilometer (Winston 1992).

The biology of Africanized bees, including their higher level of aggressiveness, is thought to play a role in their successful invasion throughout the New World. They were imported to Brazil in the 1950's for honey production, and have since spread north throughout South and Central America, Mexico, and the United States (they have been found in southern areas of Texas, Arizona, New Mexico, and California), as well as southward to Northern

Argentina. Africanized bees appear to be limited from expanding to more northerly areas because of cold winters, but in general survive better in the wild than temperate honeybees. These characteristics also make Africanized a potentially serious threat to native and managed pollinator communities in terms of competition for food sources and nest sites. According to [a study conducted in Mexico](#), the pollination of agricultural crops there has not been seriously affected by the arrival of Africanized bees. However, there have been considerable effects on beekeepers including reduced honey yields (because the bees produce less honey than European bees), fewer colonies (due to absconding), and higher worker wages (aggressive bees are harder to deal with). Beekeepers have been combating these effects with new approaches to beekeeping such as queen mating with European bees, providing feeding nectar, and moving colonies at night to decrease aggression and absconding (Ratnieks & Visscher 1996).

### III. Discussion questions & exercises

- A. [What should you do if you are attacked by Africanized honeybees?](#)  
*Run away* in a straight line and through trees or foliage if possible (the bees will have a harder time chasing you. Also, cover your eyes/ears/face as much as is practical.  
*Find shelter* that bees cannot get into (a car or house for example). Stay in the sheltered area even if a few bees come inside with you; Africanized bees (like European bees) will die after stinging once, and it is better to deal with a few bees than a whole swarm. **Do not allow yourself to become trapped in any area you can't get out of:** people have died as a result of hiding in caves with only a single exit. **Do not jump into water:** there is a danger of drowning as a result of panic, and when you surface for air the bees can follow and sting you.  
*Remove the stings* as quickly as possible, because they continue to release venom after you are stung. Wash areas where you have been stung and apply ice if swollen. If you have difficulty breathing, are allergic to bee stings, or have been stung more than a few times contact a doctor as soon as possible.
- B. If you met an Africanized honeybee on a flower far away from its nest, would it be more dangerous than a normal honeybee?  
 No. Africanized bees are aggressive only if they are being threatened, or if an intruder comes too close to their nest.
- C. Aside from humans, what animals are bee predators?  
 Many types of animals attack beehives in order to obtain food from the honeycomb, or to use the bees themselves as food. Mammals are the most destructive predators because they exclusively feed on the honeycomb, usually tearing it apart with their strong limbs and claws. Common predators include bears, sloths, badgers, and some birds. Even small predators such as ants and wasps can be deadly to bees, either because they are too small to effectively sting, or because they have good armor.
- D. Do bees have effective defenses against these predators?  
 Yes, bees can use threatening behavior (buzzing around an attacker) and ultimately they can sting (releasing painful venom) to ward off or even kill an attacker. Bees are stimulated to attack by vibrations, dark colors, hair, and carbon dioxide. This makes sense because mammals, which are common predators of bees (see above), are hairy, often dark colored, and exhale carbon dioxide. If you think about this you will realize that bees are drawn towards attacking sensitive areas around the head of a common predator.

*Some websites offering further information on Africanized bees:*

<http://www.invasivespecies.gov/profiles/afrhonbee.shtml>

<http://www.si.edu/resource/faq/nmnh/buginfo/killbee.htm>

[http://www.cdfa.ca.gov/phpps/pdep/ahb\\_profile.htm](http://www.cdfa.ca.gov/phpps/pdep/ahb_profile.htm)

<http://bees.ucr.edu/>

#### IV. References

Collins, A.M., 1985. Africanized honeybees in Venezuela: defensive behaviour. *Proceedings of the Third International Conference on Apiculture in Tropical Climates, Nairobi, Kenya*. International Bee Research Association: 117-122.

Crane, E., 1990. Bees and beekeeping: science, practice, and world resources. Ithaca, New York, Cornell University Press, 109-111.

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Winston, M.L., 1992. *Killer bees: the Africanized honey bee in the Americas*. Cambridge, Mass, Harvard University Press.