



# European and Africanized Honey Bees

O & T Guide [T-#05]

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Although common and widely recognized as beneficial pollinators of many crops, landscape and wild plants, honey bees, both European and Africanized, can be potentially dangerous and damaging pests in some turf and ornamental settings. Both European (EHB) and Africanized (AHB) honey bees are members of the same species, look alike and are similar biologically. However, AHBs have a well-deserved reputation for defensive, unpredictable behavior. Bee stings can seriously injure or kill people, pets, livestock and wildlife.

**Metamorphosis:** Complete

**Mouth Parts:** chewing (larvae); chewing-lapping (adults)

**Pest Stage:** Adult

**Typical Life Cycle:** Eggs are laid singly in the 6-sided wax cells of bee combs. → Series of Larvae. Mature worker larvae are about ½ inch long while those of drones (males) are slightly larger. Mature queen larvae are larger yet. Larvae are confined to the 6-sided cells in the wax comb where they are fed and tended by worker bees. → Pupae are found only inside the 6-sided, wax capped cells of the bee comb. Caps of drone pupae are often raised above the surface of the comb since they are larger than workers. Caps of queen cells may be higher yet; slightly larger queen cells also may be located near the edges of bee

combs. → Adult, for each of the three castes in both AHB and EHB colonies: queen, worker and drone.

Both EHB and AHB are social insects, living in usually large, perennial colonies of several to many thousands of individuals. In healthy but queenless colonies, surviving workers will raise several potential queens.



Adult honey bee worker, *Apis mellifera*, gathering nectar and pollen. Note the ball of pollen on the hind leg. Photo: John A. Weidhass, Virginia Polytechnic Institute and State University, [www.forestryimages.org](http://www.forestryimages.org)

Slightly larger than the workers, a virgin queen mates with as many as 15-20 drones during a single mating flight. Upon returning to her colony, she kills all rival queens before settling down to lay eggs for the rest of her life.

When a colony becomes overcrowded, the old queen may “swarm” with part of her offspring, leaving the old colony to

establish a new one elsewhere; the remaining workers again raise several replacement queens which mate and compete for survival in the old colony.

Fertilized eggs produce female bees, including queens and workers. Future queens receive a highly nutritious diet that future workers do not. A queen, the egg-layer in the colony, may live more than a year while workers (sterile females) live only a few weeks or months. Hatching from unfertilized eggs, short-lived drones (males) die after mating or when workers force them out of the colony.

If EHB colonies are large enough to divide and swarm, this generally occurs once annually in the spring. From then until fall, the ever increasing population of workers provisions the colony with honey, their overwintering food. AHB colonies also may divide and establish new colonies when resources are abundant, but they may do so more than once annually, increasing the probability that new problem colonies will be detected in any given area. AHBs also are very responsive to their environment and may swarm several additional times during the year when food or water sources fail or when their colony is disturbed. Such survivor swarms can contain as few as 20-30 bees; smaller numbers of bees may establish new colonies in much smaller spaces where they are less likely to be noticed and least expected, such as water meter/utility boxes, old cars, bird houses, lawn decorations, firewood piles and junk.

### **Description of Life Stages for Both EHB and AHB:**

**Egg**---tiny, hot-dog shaped, white.

**Larva**---Larvae are cylindrical to tear-drop shaped, legless, white, segmented, soft-bodied with poorly defined head capsule. They will be less than ½ inch long at maturity.

**Pupa**---transitional stage between larva and adult; resembles quiescent adult, but whitish and lacking dense “hair” covering on body. A pupa is only found inside the 6-sided cell in the comb, capped with wax. Worker pupae are most common in the combs but are also the smallest in size; drone pupae are slightly larger and caps on their cells may be slightly raised. Though few, future queen pupae are larger yet, with significantly raised caps on their cells.



Example of a queen cell which is considerably larger than adjacent cells built for workers and drones. Photo: Carl Dennis, Auburn University, [www.forestryimages.org](http://www.forestryimages.org)

**Adults**---Worker adults are the most numerous caste in the colony but also the smallest at about 3/8 inch long. Although there is some variability in color and pattern among different strains of honey bees, the head and thorax are dark brown and covered with short, dense “hair.” Two pairs of colorless, interlocking wings attach to the thorax. The abdomen is usually yellowish orange with dark brown to black banding. Legs are dark brown to black. The lower hind legs are flattened

and bristly and are adapted for carrying balls of collected pollen. The worker's non-functional reproductive system is modified into its stinging apparatus. The stinger is barbed and cannot be removed by the bee from human skin; when the struggling bee tries to escape its victim, the stinging apparatus is torn from the end of the bee's body, killing it but also releasing odors that incite other bees to sting. Adult workers perform almost all essential tasks for the colony. Beginning inside the colony, new workers care for brood, evaporate water from nectar, circulate air around the combs, clean and guard the colony entrance. Older workers forage for nectar, pollen and water, often traveling several miles per collecting trip. Adult workers use elaborate communication methods to recruit other workers to newly discovered food sources. Adult workers may live about six weeks during peak nectar flows or for several months when clustered around the queen during the winter.

Queens are similar in shape, color and patterning to adult worker, only queen bees are slightly larger with longer abdomens. Generally, only beekeepers and researchers see the queens. Queens usually remain deep inside the colony and are totally surrounded and protected by worker bees.

Drones are similar in shape, color and patterning to adult worker but slightly larger with head nearly covered by enlarged, compound eyes.

**Habitat and Hosts:** All honey bees require sources of food, water and shelter. Honey bees forage for nectar and pollen in blooming flowers, but also will frequent honeydew deposits left on foliage by aphids and other plant feeding insects as

well as sugary drinks and food scraps in garbage containers. Bee colonies managed by beekeepers usually are maintained in wooden box-like hives, while feral (wild) EHB and AHB colonies can be found in a variety of habitats ranging from junk or tire piles, hollow trees, mine shafts, rock shelters, abandoned buildings and automobiles, irrigation or utility boxes, wall, ceiling or floor voids in buildings and even among the sheltering limbs of live trees, shrubs and cacti. Worker bees produce wax that is molded into the characteristic 6-sided cells that comprise both sides of a bee comb. Combs are plate-like initially but may be greatly elongated in mature colonies. They are suspended vertically from a structural support; there is enough space between combs to permit egg-laying by the queen and cell servicing by worker bees. Brood is produced in part of the combs during the growing season but ceases during winter. Nectar, honey and pollen are stored in many of the remaining comb cells. Water is required for bee survival as well as to regulate colony temperature, especially in enclosed colonies. European honey bees, the more docile of the two, have been bred and selected by beekeepers for thousands of years for docility, honey production, colony maintenance characteristics and over-wintering success whereas Africanized honey bees have been selected by harsh environmental conditions for adaptability and mobility and by various predators for ferocity.

The earliest European settlers imported numerous strains of EHBs into the U.S. along with their crops, livestock and landscape plants. AHBs were imported into Brazil from southern Africa in 1956 to breed a bee better suited to the tropics. Shortly thereafter, the AHBs escaped their experimental apiary and began dispersing

through South and Central America. They entered Mexico in the early 1980s and south Texas in October, 1990. AHBs were discovered in New Mexico in 1993. Since then, they have been confirmed in at least half of the state's counties and are very likely to occur statewide. Best known for their unpredictable, potentially life threatening behavior, they also swarm frequently and year 'round.

**Damage:** Both European and Africanized honey bees can be threatening and dangerous stinging pests around homes, businesses and recreational areas, particularly when their swarms or colonies have not been detected previously. While stinging victims may disagree, AHBs are considered highly defensive rather than aggressive. Flying individual bees are easily overlooked and bee warning behavior is easily overlooked by naïve people. Venom chemistry for both bees is similar; AHBs produce slightly less venom/bee than EHBs, but AHBs are credited with recruiting more workers into a defensive response and also chasing their antagonists farther (perhaps half a mile vs. a hundred feet) than EHBs.

Bee stings cause localized pain, swelling and itching in most people, but they can cause severe and life threatening responses in sensitive individuals, a condition called anaphylaxis. Individual responses to bee stings can intensify over time as well. As little as one bee sting can cause death in some highly sensitive people.

Hypersensitive responses to bee venom include: drop in blood pressure, dizziness, itchy palms and soles of the feet, blotchy skin ("hives"), unconsciousness, muscle tension, airway restrictions and death. Anyone experiencing any of these symptoms after being stung by bees should receive emergency medical care

immediately. In other cases, the sheer numbers of stings sustained by a victim result in venom toxicity, overwhelming body defenses, causing organ failure and even death.



Example of a small swarm of honey bees on a pecan tree limb. Photo: G. Keith Douce, University of Georgia, [www.forestryimages.org](http://www.forestryimages.org)

Bee colonies established in or near high traffic areas pose the greatest threat to human health and safety. This includes residences as well as commercial structures and recreational areas. Those who grow or manage turf, nursery stock or recreational areas for any purpose are at immediate risk of disturbing these colonies and being stung. Maintenance and utility workers risk severe stinging from bee colonies established in water meter or utility control boxes, storage tanks, utility buildings, and equipment yards. Tree pruning crews and utility linemen can be at increased risk for serious injuries from

stinging bees when they are working from elevated platforms (“cherry pickers”).

AHBs are especially well known for their ability to quickly relocate and reestablish their colonies, requiring constant vigilance around homes, businesses and recreational areas. Visitors and passersby also may be stung, presenting a potential legal liability situation for property owners and managers. In addition, pets, livestock and wild animals may be stung and, if confined or restrained, killed by an overwhelming numbers of bee stings.



Africanized honey bee queen surrounded by her workers, *Apis mellifera scutellata*. Photo: Scott Bauer, USDA Agricultural Research Service, [www.forestryimages.org](http://www.forestryimages.org)

Neither type of bee should be allowed to establish a colony in the walls of an occupied building. People can be stung by bees entering or leaving the colony. While some believe that plugging a colony entrance will control the situation or kill the invasive colony, the bees soon use their chewing jaws to remove the plug or open a new entrance/exit; sometimes these new entrance/exits are in occupied rooms, creating new problems as well as stinging situations and risks. Steadily accumulating wax combs, brood, and food stores also

present risks for proper functioning and maintenance of electrical and electronic devices. While the heat produced by a successful colony in a wall may be difficult to feel, the sound produced by thousands of active worker bees may be difficult to ignore. Such an established colony represents a major health, safety and liability risk to homeowners, business occupants, employees, customers and visitors to recreational or commercial facilities.

**IPM Notes: Honey bees, especially AHBs, will be the most dangerous insect pests encountered by pest control operators. Underestimation of colony size and damage potential can be fatal not only to those attempting to control these insects but also result in law suits for personal injury and property loss. While exposed swarms may be easier to access with insecticidal treatments, there still is a potential for the insects to sting and seriously injure the unwary. CONTROL SHOULD BE ATTEMPTED ONLY BY PEST MANAGEMENT PROFESSIONALS WITH ADEQUATE TRAINING AND APPLICATION TOOLS, A FULL BEE SUIT, AND APPROPRIATELY LABELED INSECTICIDES. THE AVERAGE INDIVIDUAL SHOULD NEVER ATTEMPT TO CONTROL HONEY BEE SWARMS OR ESTABLISHED COLONIES especially with an aerosol spray formulated for wasps; in most cases, the active ingredients in these sprays antagonize bees and can incite attack. In general, respect ALL honey bees; never antagonize them. Foraging honey bees are generally harmless since they are focused on gathering nectar and pollen; do not impede their movement. Exercise extreme care in any situation**

where honey bees seem particularly numerous or noisy. Avoid swarms and do not approach colonies too closely, especially around the entry/exit. If you feel threatened by honey bees or sustain one or more “warning stings” **RUN AS QUICKLY AS YOU CAN TO SAFETY.** If possible, pull up the collar of your jacket or shirt to shield your neck as you run. A building or house with windows and doors that can be closed securely behind you is a good choice. For outdoor workers with a vehicle, keep it reasonably close to the work site with windows rolled up but the doors unlocked; keep an extra set of keys hidden in the vehicle so that if you are attacked by bees and seek protection in your vehicle, you can drive away safely and without delay. Never jump into water to avoid a bee attack; the bees will be waiting to sting as soon as you surface to breathe.

If you are stung, particularly multiple times, emergency medical treatment is preventative and advisable. Adverse reactions to bee venom can occur suddenly and intensely. If you experience symptoms of allergic reaction, have a companion or co-worker take you to emergency medical treatment. If you know you are highly allergic to bee venom, discuss a “bee sting kit” available by prescription only with your physician and keep it handy when you are outdoors. The sting kit may give you a little extra time to seek emergency medical treatment.

Be aware that fire fighters, paramedics and law enforcement officers may not respond or respond efficiently to emergency calls involving bee sting incidents for various reasons. They may be resigned to securing the area and

keeping onlookers out of the way. When bees are already excited in a stinging incident and are flying and stinging wildly, even the best pest control operator with the best equipment and insecticides may have poor control results at the outset; persistence can be key. Also, when the sun sets, this may help settle down disturbed bees. Keep onlookers away and safely inside buildings or vehicles in these situations.

Pest control operators should expect to deal with two very different honey bee problems when clients call: swarms and established colonies. The risks of personal injury and property damage are different for each, as well as the approaches to control.

Swarms can be very intimidating to those unfamiliar with honey bee behavior. They may appear suddenly, settle temporarily in a prominent place on the property and buzz loudly. Sheer numbers of “nervous acting” insects can be seen as aggressive although swarming bees are rarely so if they are not molested. Swarms probably will be most numerous and active on sunny, warm, calm days, especially following a rain. In flight, bees in a swarm move in a swirling, dynamic, noisy mass of golden insects usually flying at tree top or house top level. When bees in the swarm tire, the queen settles on a branch, fence post, sign, eaves of a home or other solid perch and all of the workers settle on top of her in a protective ball. When skies are cloudy or temperatures too low, swarms remain temporarily inactive. Homeowners, especially, may request physical removal of a bee swarm rather than killing it. While some beekeepers may have provided bee removal services in the past, no one may want to do this now because of liability problems and

because captured swarms may be Africanized or parasitized by mites. While novices can sometimes successfully treat and eliminate a pest swarm of honey bees without special training or protective gear, the practice is potentially life threatening and is not encouraged. Professional pest control operators can easily take care of problem bee swarms with high volume, low pressure sprays of soapy water or labeled insecticides if the swarms are safely accessible. Be especially aware of live electrical lines, utility boxes and similar potentially life threatening situations in the vicinity of the swarm, having them shut off or disconnected prior to beginning pest control work. Since the queen bee typically is in the middle of many layers of physically protective but fairly calm worker bees, the applicator (wearing a protective bee suit) can approach the swarm slowly and saturate the mass of bees with a persistent spray mist. After several minutes, the outer layers of bees will begin to fall off the swarm, their fuzzy bodies saturated with the liquid. Misting the inner layers of the swarm continues until all of the bees are on the ground. When the last of the fallen bees has stopped spinning on its back, the dead bees should be gathered into a trash bag and disposed of where the insects cannot be contacted by curious people or animals. Follow label directions carefully on these pest control products to prevent phytotoxicity if the swarm has landed on or above live plants.

Established colonies should be approached and treated quite differently. Frequently, colonies are well hidden; openings to the colony may not be obvious and foraging bees leaving or returning to the colony may not be easily noticed. Control may take more than one application of labeled insecticide and require more than a day to

verify that a colony is dead. Honey bees will vigorously defend established colonies, that is, those with brood and food stores. The transition time from swarm to established colony may take only a day or two; assume that a colony is established, especially if large numbers of honey bees are not readily visible or if a client states that the bees have been on the premises for any period of time. Treatment of established colonies should only be attempted by professional pest control operators wearing protective gear and using appropriately labeled insecticides. The defense mounted by AHBs may be especially intense with several to many thousands of angry bees responding to the slightest perceived threat. Insecticidal control of a colony in a building's walls can be difficult since the combs and brood can be protected by intervening bee combs, insulation and utility lines. Prior to beginning a control project on an established colony, the pest control operator should "suit up" and study the area where the bee colony may be located. In addition to live utility lines and other hazards, the pest control operator should identify actual or potential entry/exit points for the bees; treatments aimed at one of these points invariably results in angry bees pouring out of other exit points, with potentially disastrous results for any person or animal in the vicinity. Before attempting to treat the colony, make sure the clients, their pets and livestock are in safe, bee-tight locations; in high density housing areas, extend these advisories and precautions to the neighbors as well. Do not attempt to control established bee colonies with soapy water; this treatment can be very damaging to structures as well as hazardous around electrical wiring and equipment. Most pest control operators experienced in bee control opt to use

power applicators and dust formulations of certain pyrethroids that can be blown into wall voids and similar areas. Once the treatment has been planned, the pest control operator should complete it quickly and thoroughly, securing the treated colony before leaving the premises. Retreat the colony area as needed over the next few hours or days, as needed, until it appears the bees are dead and no longer a threat.

Advise clients that they should immediately remove the remains of the bee colony or have a remodeling service remove them. Once a bee colony has been killed in a residence, business or other occupied facility, the comb and bee bodies should be removed as soon as possible to prevent establishment of new colonies of bees, ants, wasps, flies, rodents and other pests. Following any pesticidal treatment of a bee colony, the honey will NOT be safe to extract and consume. Any honey left behind may ferment as well as leak from the melting comb, saturating carpets, flooring, wall boards and trim. Elimination of wax comb will prevent annoying infestations of wax moth as well as the stench of rotting larvae and decomposing bees. Dead bee colonies can harbor large numbers of dermestid beetles, their larvae and other scavengers.



Honey bee colony and four wax combs on a tree limb. The combs are about one foot across and 1.5 feet deep. Photo: Timothy Haley, USDA Forest Service, [www.forestryimages.org](http://www.forestryimages.org)



Honey bee colony established under the eaves of a shed. Photo: Timothy Haley, USDA Forest Service, [www.forestryimages.org](http://www.forestryimages.org)



Example of a one-piece bee suit used in a bee removal call. Photo: Timothy Haley, USDA Forest Service, [www.forestryimages.org](http://www.forestryimages.org)

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