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ENY-145

UF UNIVERSITY of FLORIDA
IFAS Extension

Removal of Swarms and Colonies for Pest Control Operators[1]

Michael K. O'Malley, Jamie D. Ellis and P. G. Koehler[2]

Introduction

As Africanized honey bees (AHBs) establish a stronger presence in Florida, it is imperative for public safety reasons that any swarms or feral (wild) honey bee colonies be removed by trained personnel. Therefore, the need has arisen for pest control operators (PCOs*) who can provide honey bee removal services. Currently state and county officials refer all non-emergency honey bee swarm/colony issues to PCOs; however, less than 10% of PCOs in Florida currently handle bee removals. This document will outline the standard operating procedures for removing swarms and colonies.

*PCO may be interchanged with PMP (Pest Management Professional); however, for consistency purposes, this document will use PCO throughout.

Personal Protective Equipment (PPE)

It is imperative that PCOs wear appropriate PPE when dealing with any type of stinging insects. Effective PPE for honey bees consists of a veil, sting suit or bee suit, gloves, and boots or foot protection. The goal of this apparel is to cover all exposed skin and to secure any openings in clothing; for example, if pants have wide cuffs that bees may crawl or fly into, we recommend that you tape pants to boots to prevent any bees from entering. Even though appropriate PPE will protect from most stings, an occasional bee may sting through the suit, and some stinging insects (bumble bees, yellow jackets, etc.) have been known to sting through PPE more often; as a result, *if a PCO is allergic to bee stings, he or she should not conduct honey bee removals of any kind*. It is important that all PCOs working with honey bees know if they are allergic to honey bee stings.

Veils

A veil should offer complete protection of the head and face area. It should also provide ample space for peripheral vision. There are many types of veils on the market. Veils that attach with a zipper to the sting suit are the recommended type because they allow no possible entry location for rogue bees. Detachable veils may be helpful if head protection (hard hat, pith helmet, etc.) needs to be interchanged.

1. This document is ENY-145 (IN778), one of a series of the Entomology & Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. First published: November 2008. For more publications related to horticulture/agriculture, please visit the EDIS Website at **http://edis.ifas.ufl.edu/**.
2. M. K. O'Malley, extension assistant, J. D. Ellis, assistant professor, and P. G. Koehler, professor, Entomology and Nematology Department, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.

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Figure 1. Two types of veils that zip to the sting suit; these types of veils provide the best protection because they do not allow any bees to enter if zipped properly. Credits: M. K. O'Malley, University of Florida

Figure 2. PCOs wearing full PPE. These veils are detachable and do not provide as good protection as veils that zip to the sting suit; however, detachable veils are beneficial if a PCO needs to wear a hard hat or interchange head protection. Credits: AllFloridaBeeRemoval.com

Gloves

Gloves provide complete hand protection for the PCO. They should have a gauntlet that extends onto the forearm and cinches there with elastic over the sting suit. Gloves should also be taped to the jacket/suit using duct tape to prevent bees from entering. Usually leather gloves with an extended gauntlet are used to enhance protection; gauntlet-extended rubber gloves may also be appropriate for use with pesticides.

Figure 3. Leather gloves with an extended gauntlet; rubber gloves may also be appropriate for use with pesticides. Credits: M. K. O'Malley, University of Florida

Suit

The sting suit or bee suit should cover the full length of arms and legs as well as the complete torso. Elastic should cinch around ankles and wrists to prevent bees from entering the suit; also, PCOs should tape gloves and boots to the suit for additional protection. It may be helpful to order bee suits one or two sizes larger than usual in order to increase the distance between the skin and the bee suit; this precaution may protect a PCO from being stung through the bee suit.

Boots

Boots should provide foot and ankle protection for the PCO. Many PCOs use leather boots, but rubber boots may be better protection when using pesticides.

Swarms

Honey bee colonies do not reproduce only in numbers of bees per colony, but also in numbers of colonies. Bee reproduction on the colony level is called *swarming.* Most people use the term “swarming” to refer to dangerous bee activity or just bees flying around, but this is not accurate. A swarm is a large number of bees concentrated in a specific area or splitting from its previous colony to that holding area. The process begins when a bee colony begins to rear new queens. Before the new

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Figure 4. A full suit includes elastic around pant cuffs and sleeve cuffs; some veils, as pictured here, are attached to the suit; rubber boots are a good option for full protection, and gloves' gauntlet should extend onto forearm. Arrows indicate areas where duct tape should be used to seal goves and boots to suit. Credits: M. K. O'Malley, University of Florida

queens emerge, the old queen in the colony will leave the hive with about 60% of the adult bee population. The original colony will remain, rear a new queen, and continue as a functioning colony. The act of the bees leaving the hive is referred to as *swarming*.

Upon leaving the colony, the queen will settle on a nearby structure (often a tree branch, the side of a house, etc.). At this time, the bees that left the colony with her (which are circling in the air looking for the queen), land on/around the queen, thus forming a cluster of bees. This cluster can range from the size

Figure 5. Rubber boots can be used for protection against pesticides. Credits: M. K. O'Malley, University of Florida

of an orange to the size of a 5 gallon bucket. The swarm cluster is a type of holding pattern for the bees. At this point, scout bees will leave the cluster in search of a new cavity in which to build a home. Once the scout bees locate a new home, they will leave the structure and move *en masse* to their new home. Bees can remain clustered from a few minutes to many days. As such, PCOs may receive phone calls from concerned homeowners about a “bee cluster the side of a basketball” that is no longer there once the PCO arrives on location. The reason for this is simple: the swarm finally found a place to build a nest and they have moved to occupy it.

A *swarm* of bees can be found almost anywhere (the side of a wall, a tree branch, a light post, etc.); swarms are usually described as a ball or clump of bees. Swarms that have settled on an object (wall, palm frond, bicycle seat, etc.) should be removed before they move to a more suitable location, or before they start building comb and exhibiting defensive behavior. They are easiest to remove at this point. In most cases, swarming bees are remarkably docile. They have no nest to protect.

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Figure 6. Swarm settled on playground equipment. Credits: Willie the Bee Man, Inc.

Figure 7. Swarm settled on refuse dumpster. Credits: AllFloridaBeeRemoval.com

Swarm Removal

Whether a swarm has settled in a trap or has landed on a structure, it should be eradicated. Spraying with soapy water is the preferred method for safely eradicating swarms.

To eradicate a swarm, mix about 3/4 cup liquid dishwashing detergent with one gallon of water in a sprayer. Then place a garbage bag, can, or bucket under the swarm. Next, wet the surface of the swarm with the soapy water until the first layer of bees becomes soaked and falls in to the bag or bucket.

Figure 8. Swarm settled on underside of an aircraft wing. Credits: AllFloridaBeeRemoval.com

Figure 9. Swarm settled on a tree branch. Credits: M. K. O'Malley, University of Florida

Finally, continue spraying the inner layers of bees until the entire swarm has fallen. Be sure to spray gently as the bees should not recognize a threat, but will react as if it were raining.

If a swarm has settled in a location where it is difficult to place a bag or bucket under the bees, or if the location is simply difficult to reach, a PCO can use a cardboard box or swarm trap. If using a box, wrap it in plastic, secure the plastic using duct tape, and cut a hole (about 2 inches in diameter) in the side of the box. Place the box or trap near the swarm, and angle the hole towards the bees. Secure a pheromone lure (which can be purchased through beekeeping supply companies) into the box or trap using wiring and a staple gun (see Resources section, Swarm Trapping EDIS for specific details), and simply wait for bees to move into the container. This process could take anywhere from 20 minutes to several

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Figure 10. Spraying a swarm with soapy water. Credits: M. K. O'Malley, University of Florida

hours. Once bees have been caught, place container/swarm trap in a garbage bag, seal with duct tape, and use soapy water or insecticide to kill the bees. Additional options for eradication include placing the bag in full sun for several hours to solarize the bees, or freezing the bag. If pesticides or soap is not used, the swarm trap may be reused.

Colonies

A honey bee colony consists of bees on one or multiple combs. Colonies usually are defensive only when they have resources (honey, brood, pollen, etc.) to protect and defend. Often what appears to be a swarm is actually the beginning of a colony (comb is being built inside the cluster of bees); therefore, it is important to be cautious at all times as bees in an established colony can be very defensive. It is important to note that, in general, European races of honey bees prefer to nest inside cavities so it is not common to see an open-nesting cluster of bees (bees that are constructing comb on an exposed surface such as a tree limb). This is, however, a common trait among African races of honey bees. As such, all clusters of bees should be approached cautiously since it can be difficult to tell the difference between a docile swarm and an established, open-nesting colony.

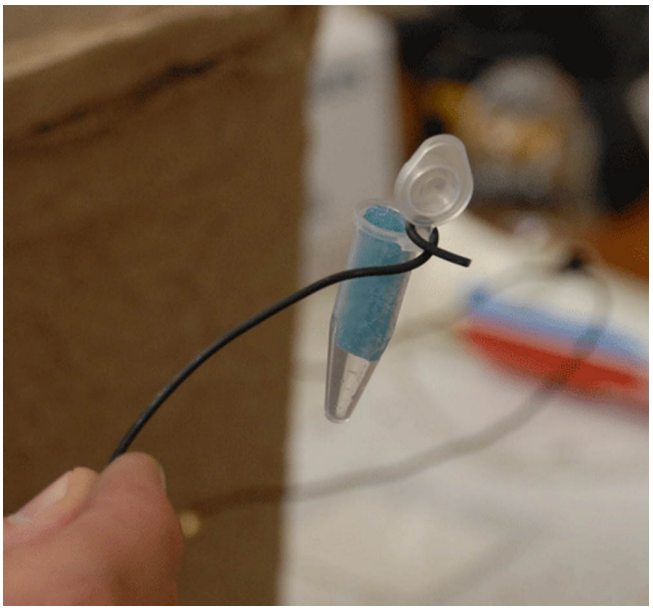

Figure 11. A pheromone lure can be placed into the swarm trap or cardboard box to lure swarms that have settled in hard to reach locations. Credits: M. K. O'Malley, University of Florida

Colony location can vary depending upon many variables (type of honey bee, other available nesting sites, etc.). AHBs, especially, have been known to nest almost anywhere, yet all honey bees favor certain sites over others. Sites that are potentially attractive to honey bee colonies consist of a small opening that accesses a shaded, enclosed area. However, African honey bees are likely to nest in open, exposed areas. Examples include eaves under roofs, water meters, manholes, electrical boxes, holes in a structure that lead to a void inside a wall, gutter down-spouts, etc. Examine these photos as references:

Colony Removal

When an established colony is found, it must be removed as soon as possible by a PCO. *It is essential that clients or untrained personnel do not attempt to remove a colony as the job may pose a risk to the community and surrounding areas if not handled properly*.

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Figure 12. Colony established between exposed buttress trunk. Credits: W. H. Kern, Jr. University of Florida

Figure 13. Newly formed colony on palm frond. Notice that has been are beginning to construct comb. Credits: W. H. Kern, Jr., University of Florida

Figure 14. Newly formed colony on palm frond. Notice that the bees are beginning to construct comb. Credits: W. H. Kern, Jr., University of Florida

Figure 15. Gutter downspout -- a likely colony location. Credits: M. K. O'Malley, University of Florida

Figure 16. Colony removed from inside a wall under the eave of building. Credits: AllFloridaBeeRemoval.com

Figure 17. Colony removed from electrical box. Credits: AllFloridaBeeRemoval.com

Equipment Needed

The following list details all of the equipment needed for removing honey bee colonies. Every piece may not be necessary for every job, yet it is

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Figure 18. Colony removed from a water meter box. Credits: AllFloridaBeeRemoval.com

Figure 19. Colony removed from the underside of building. Credits: AllFloridaBeeRemoval.com

Figure 20. Colony established within a wall using a hole behind a light fixture. Credits: AllFloridaBeeRemoval.com

recommended that PCOs carry all the items in order to be prepared for any possible circumstance. It is very important to use the correct tools to be sure that the colony is removed without the potential for dangerous mistakes. A generator, 400 ft extension cord, and flashlight are needed to provide light during job as the best time to remove a colony is at night.

A sting suit, veil, hat, leather gloves, duct tape, foot and ankle protection (boots) should always be used for protection from defensive colonies. A hive tool, respirator, garbage bags, broom, dustpan, vacuum, hose extension, and water are needed for clean-up and comb removal purposes. Colonies are often found within the walls of a structure, so a drywall saw, reciprocating saw, circular saw and blades, a drill with 1/16” bit, and a stethoscope are required to access such colonies. A ladder is needed to access elevated colonies while a shovel may be used for underground nests. Insect screen, caulk, wood/concrete filler, 1/8” hardware cloth, and a staple gun are used for bee-proofing an area after the colony has been removed. Wooden stakes and colored tape should be used to block off the area prior to removal.

Figure 21. A hive tool can greatly assist PCOs when removing comb from a colony. Credits: M. K. O'Malley, University of Florida

Figure 22. Equipment needed for bee-proofing. Credits: M. K. O'Malley, University of Florida

Insecticides Needed

There are four types of insecticides that may be used for colony removal.

Foam is the optimal choice for honey bees because it quickly blocks colony exits so bees cannot attack. It is efficient for eradicating colonies

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established inside a void because it fills the entire void and usually penetrates to all parts of the colony. Foam also works well to knock defensive bees out of the air. Several commercial foaming agents are available, and insecticide can be added for a quicker kill. Foam should not be used near exposed electrical wires; in these cases, dust is suitable.

Dust insecticide can be blown into nest after exit is blocked. Dust is slower acting, but bee movement distributes it well through the colony; also, dust insecticide is best used when a colony is located near exposed electrical equipment or wires.

Liquid sprays do not work as well for the initial response to nesting bees. Spraying liquid insecticide into the entrance will not sufficiently eradicate a honey bee colony. However, liquids are the recommended medium for residual treatments to be applied to an area after nest has been removed.

Aerosols can be directed into nest openings and used for a fast knockdown kill, yet they do not provide residual protection.

Figure 23. Colony eradicated from wall behind AC unit. Foam was used to block the entrance. Credits: AllFloridaBeeRemoval.com

Procedure

Work at Night

While removing a colony, it is best to work at night to ensure that most of the bees will be present within the nest. During daylight hours, a significant percentage of the honey bee colony will be away from the colony foraging on flowers. If the colony is removed during the day, the foraging bees will return to the area of the removed nest and congregate there; this may not be pleasing to the customer/property owner. If nighttime removal is not an option, it may be helpful to place a swarm trap and pheromone lure on or near the location of the removed colony to attract the returning foragers (see Resources section for Bee-Proofing for PCOs document).

Figure 24. Foam used to subdue colony established in tree. Credits: AllFloridaBeeRemoval.com

Suit-up

Any time a PCO is dealing with stinging insects of any kind, he or she should be completely suited in PPE (see PPE section above).

Locate the Colony

First, find the colony's exact location (approach with caution). Listen for buzzing and look for honey bee activity, especially bees entering and exiting a specific area. If the colony is located within the walls of a structure, it may be difficult to locate the comb as it may be some distance from the entrance used by bees. To locate comb within a wall or structure, feel sheet rock for warmth, tap sheet rock for solid sound vs. hollow sound, and use stethoscope to listen for buzzing when tapping. In order to confirm that the comb has been located, drill a hole using a 1/16” bit (if the hole is much larger, bees will fit through)

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close to the top of the wall as bees often hang combs from the top of voids, and insert a stiff wire. If honey or wax is on the wire, the comb has been successfully located.

Secure the Area

Inspect surrounding area and clear any onlookers or penned/tied animals. Alert nearby homeowners/ business employees to stay inside while colony removal takes place. Block off area using wooden stakes and colored tape. Park vehicle a safe distance from colony.

Approach and Eradicate

Next, run extension cord from generator to nest for light, and position insecticides about 10ft from nest. Locate entrances and exits of nest and any comb (if visible). Apply foam into all nest entrances to subdue the bees' attack. Once the colony is disturbed it only takes between 3-5 seconds before bees exhibit defensive behavior; therefore, it is crucial to work quickly so the surrounding area is not disturbed.

After foaming all entrances, apply pesticides into the nest cavity by either filling the cavity with a dense foam spray, or injecting dust into the cavity. Once insecticide has been applied, wait for bees to die; this may happen in less than a minute or up to several minutes depending upon the colony size and type of pesticide being applied. Remove the dead bees (place dead bees in garbage bag). Next, cut out the comb, and place in garbage bag along with dead bees. Remove bag from premises, and apply residual insecticides (liquid is best for this purpose), bee-proof area if applicable, and/or recommend that client have area structurally repaired (see *Resources* section for *Bee Proofing EDIS*).

A note on comb removal: removing all comb from the site is important because unattended beeswax, honey, brood, or pollen will attract other insects and animals. Wax moths may consume the wax, and decaying brood and fermenting honey will cause undesirable odors. If comb is inside a wall it will melt into the structure, and the wall will be stained and nearly impossible to paint or wallpaper. Colony eradication is not complete until the entire nest is removed.

Standard Operating Procedure Summary

Swarm Removal—*for removal of swarms that have already settled on an object*

1. Spraying with soapy water is a preferred means for controlling swarms (mix a 5% solution using 3/4 cup liquid dishwashing detergent with one gallon of water)
2. Place open garbage bag, can, or bucket under swarm to catch bees as they fall
3. Wet the surface of the swarm until the first layer of bees becomes soaked and falls
4. Continue spraying inner layers until entire swarm has fallen
5. Seal container/ bag of bees and eradicate

Alternate method—*cardboard box or swarm trap*

1. If using a box, wrap it in plastic
2. Secure the plastic using duct tape
3. Cut a hole (about 2 inches in diameter) in the side of the box
4. Secure box or trap near swarm
5. Angle hole in container towards bees
6. Insert pheromone lure
7. Wait for bees to enter container
8. Place container in garbage bag and seal with duct tape
9. Proceed to use soapy water or insecticide to kill bees.

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Swarm removal equipment list*:* --

- garbage bags
- garbage can
- soapy water
- sprayer
- cardboard box
- plastic wrapping
- water
- duct tape
- swarm trap
- pheromone lure
- insecticide
- rubber gloves
- beekeepers protective gear

Colony Removal — *for removal of established colonies*

1. Best removal time is at night (if eradication is done during the day, have a plan to trap foraging bees returning to the hive location)
2. Put on personal protective equipment
3. Find colony's exact location
4. Inspect surrounding area and clear onlookers and penned/tied animals
5. Make sure people in nearby homes or businesses know to stay inside while removal is taking place
6. Block-off area using wooden stakes and colored tape
7. Park vehicle safely away from colony
8. Run extension cord from generator to nest for light (red light is best – you can cover the lens with a red film) —set light at desired angle
9. Position insecticides about 10 ft. from nest
10. Locate and block nest entrances/ exits using insecticides (foam is best)
11. Remove dead bees
12. Cut out comb
13. Place comb and bees in a garbage bag and remove from premises
14. Apply residual insecticides
15. Bee-proof area and recommend that client have area structurally repaired

Colony removal equipment list:

- Generator AC/DC converter,
- 400 ft extension cord,
- flashlight (150 watt halogen bulb),
- sting suit,
- veil,
- hat,
- leather gloves,
- duct tape,
- foot and ankle protection (boots),
- hive tool,
- respirator,
- garbage bags,
- broom,
- dustpan,
- vacuum,
- hose extension,
- water,
- drywall saw,

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- drill with 1/16” bit,
- stethoscope,
- ladder,
- shovel,
- insect screen or 1/8” hardware cloth,
- staple gun,
- wooden stakes,
- colored tape

Conclusion

Pest control operators play an important role in maintaining public safety. If PCOs offer a comprehensive AHB removal, monitoring, and prevention service, they will have the opportunity not only to acquire additional customers but to offer a valuable public service: colony and swarm removal benefits the entire community. A comprehensive program should consist of a professional monitoring service that prevents establishment of dangerous colonies and a professional bee removal service that

- utilizes proper equipment and procedures
- provides safe areas for work and play
- eliminates bees without the hazard of neighbors and bystanders being attacked
- protects at-risk animals and people from stings.

The University of Florida Honey Bee Research and Extension Lab recommends that homeowners and property owners contact PCOs from the list maintained by the Florida or Florida Department of Agriculture and Consumer Services (found online at http://www.doacs.state.fl.us/pi/plantinsp/ahb.html). Any PCOs licensed in the state of Florida are eligible to receive training given by University of Florida or Florida Department of Agriculture and Consumer Services personnel for removal of African honey bees. After completion of a training program, participants will receive a certificate and will be qualified for addition to the PCO list.

Additional Resources

Bee-Proofing for PCOs

University of Florida EDIS document that outlines details/procedures of bee-proofing property and provides a business model for PCO bee-proofing services

Bee-Proofing for Florida Citizens

http://edis.ifas.ufl.edu/IN741

University of Florida EDIS document that gives recommendations to homeowners and property owners on how to bee-proof homes and property; may be useful for PCOs to distribute to clients.

Swarm Trapping

University of Florida EDIS document that details the procedures for trapping swarms as they move into an area; this document works well in conjunction with *Bee-Proofing for PCOs*

Frequently Asked Questions about the Africanized honey bee in Florida

http://edis.ifas.ufl.edu/IN738

University of Florida EDIS document that gives general information about the African bee in Florida.

AFBEE Program

http://entnemdept.ifas.ufl.edu/afbee/

The African honey bee Extension and Education Program was established by the Florida Department of Agriculture and Consumer Services and the University of Florida, and it serves to educate all Floridians about the presence of African bees in Florida. The AFBEE Program website is a clearing house of information on African bees. In the resources section, PCOs can find fact sheets,

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presentations, videos, and educational documents catered specifically to their needs. The downloadable list of trained PCOs is available under the Bee Removal tab.

Florida Department of Agriculture and Consumer Services Division of Plant Industry

Bureau of Plant and Apiary Inspection, African Honey Bee Page

http://www.doacs.state.fl.us/pi/plantinsp/ahb.html

This website includes links to videos, fact sheets, press releases, and more. It also includes a list of trained PCOs.

Inquiries may be directed to the following individuals:

Michael O'Malley

Extension Program Coordinator

University of Florida, Entomology and Nematology Department

Honey Bee Research and Extension Laboratory

Department of Entomology and Nematology

University of Florida

Bldg 970 Natural Area Drive

PO Box 110620

Gainesville, FL 32611-0620

omalleym@ufl.edu

(352) 392-1901 Ext.189

Fax (352) 392-0190

Dr. Jamie Ellis

Assistant Professor of Entomology

Honey Bee Research and Extension Laboratory

Department of Entomology and Nematology

University of Florida

Bldg 970 Natural Area Drive

PO Box 110620

Gainesville, FL 32611-0620

jdellis@ufl.edu

Phone (352) 392-1901 Ext: 130

Fax (352) 392-0190

Jerry Hayes

Assistant Chief

Bureau of Plant and Apiary Inspection

Apiary Inspection Section

Division of Plant Industry

Florida Department of Agriculture and Consumer Services

PO Box 147100

Gainesville, FL 32614-7100

hayesg@doacs.state.fl.us

Phone (352) 372-3505 Ext: 128

Fax (352) 334-0715