



Molecular Pathogen and Pest Detection Lab
Department of Plant Industry
511 Westinghouse Rd., Pendleton, SC 29670
864-646-2133
www.clemson.edu/public/mppdlab

The Bee Services section of the Molecular Pathogen and Pest Detection Lab (MPPD Lab) utilizes molecular techniques to identify Africanized honey bees (AHB), colloquially known as the “killer bees”. AHB are hybrid bees that are morphologically similar to other honey bees, so we use polymerase chain reaction (PCR) to identify them. DNA is extracted from suspect bees and prepared for PCR. The PCR process allows us to amplify a trace amount of DNA into a larger, detectable amount of DNA. This technique identifies much faster and more accurate than traditional techniques. The purpose of this service is to support South Carolina beekeepers in the early detection of AHB.

For more information regarding the MPPD Lab, call (864) 646-2133 and ask for Curt Colburn, or email gcolbur@clemson.edu.

Africanized Honey Bee Sample Collection Guidelines

Africanized Honey Bee General Information

AHB cannot be distinguished from European honey bees easily, although they are slightly smaller than the European races. A more rigorous identification is achieved by genetic analysis and often is necessary when the suspect bees are a hybrid between the Africanized and European subspecies.

Other differences between Africanized and European bees manifest themselves behaviorally. To the casual bystander, the primary identifying behavioral characteristic of AHB is their heightened defensiveness compared to that of European subspecies.

All honey bees readily defend their nests, and an attack usually means that the victim is too close to the nest. While European races of bees may attack a nest intruder with a few bees (usually no more than 10–20 bees), AHB may attack the same intruder with hundreds of bees. Further, AHB generally defend a larger radius around their nest and require lower levels of stimuli to initiate an attack.

Another behavioral difference between Africanized and European bees concerns colony level reproduction and nest abandonment. AHB swarm and abscond in greater frequencies than their European counterparts. Swarming, bee reproduction at the colony level, occurs when a single colony splits into two colonies, thus helping to ensure survival of the species. European colonies commonly swarm one to three times per year. Africanized colonies may swarm more than 10 times per year. Africanized swarms tend to be smaller than European ones, but the swarming bees are docile in both races. Regardless, Africanized colonies reproduce in greater numbers than European colonies, quickly saturating an area. Further, AHB abscond frequently (completely abandon the nest) during times of dearth or repeated nest disturbance while this behavior is atypical in European bees.

Another common difference between Africanized and European honey bees is their choice of nest locations. AHB are less selective when considering a potential nesting site than are European bees. They will nest in a much smaller volume than European honey bees and have been found in water meter boxes, cement blocks, old tires, house eaves, barbecue grills, cavities in the ground, and hanging exposed from tree limbs, to name

just a few places. One rarely finds European colonies in any of these locations because they prefer to nest in larger cavities like those provided by tree hollows, chimneys, etc. As one can imagine, humans inadvertently provide multiple nesting sites for AHB. Therein lies the primary reason AHB are encountered frequently by humans.

A final behavioral curiosity of AHB concerns nest usurpation (or colony takeover) of European colonies. Small Africanized swarms containing a queen often land on the outside infrastructure of a European colony (a wall, beekeeper-managed hive, etc.). As time passes, the worker bees in the Africanized swarm begin to exchange food/pheromones with the European workers from the colony. This gradually ensures the adoption of the AHB into the European colony. Somewhere during this process, the European queen is lost (perhaps killed by AHB as her fate remains uncertain at this point) and the Africanized queen is introduced into the colony, thus becoming the reigning matriarch. European bees do not display this behavior but often fall victim to it, thus creating an Africanized colony from a preexisting European one.

Africanized Honey Bee Sample Collection

Materials Needed:

- Leakproof container
- Alcohol
- Sample submission form (Bee Testing Form)
- Collection tub
- Scoop
- Funnel
- 10 honey bees

Sampling Guidelines:

- Please collect only one sample per colony. If multiple colonies need to be tested, then multiple samples are required.
- Select a frame of honey bees from the colony.
- Make sure the queen is not present on the frame.
- Shake the frame of honey bees into a collection tub, scoop out 10 honey bees, use the funnel to introduce the honey bees into a leakproof container, cover honey bees with alcohol, and secure the lid tightly.
- Complete a sample submission form, include all information.
- Ship the sample, sample submission form, and payment of test fee to the laboratory at:

Clemson University, MPPD Lab, 511 Westinghouse Rd., Pendleton, SC 29670

Avoid potential stings, and protect yourself and other from serious injuries: wear protective clothing, approach with caution, use a smoker, and know your hive. Obtain professional service as needed.

BEE TESTING FORM

- Commercial
 Residential

Name _____ Company Name _____
LAST FIRST MI (IF APPLICABLE)

Mailing Address _____
STREET CITY STATE ZIP

Phones () (HOME • WORK • CELL?) () (HOME • WORK • CELL?)

EMAIL (reports are emailed – print clearly)

Copy report to Clemson staff: _____ @clermson.edu @clermson.edu

Sample Collection Site: <i>(if different from above)</i>	Name/Company _____
	Address _____
	Phone _____ Email _____ County _____

SELECT ONE: <input type="checkbox"/> \$40.00 South Carolina collection site <input type="checkbox"/> \$50.00 out-of-state collection site	BILLING ACCOUNT: _____ If none, submit payment with sample material. Make checks payable to Clemson University .	Check # _____
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SELECT ONE TEST:

FOR AMERICAN AND EUROPEAN FOULBROOD SAMPLES:

Apiary Location: <input type="checkbox"/> Residential <input type="checkbox"/> Rural <input type="checkbox"/> Agricultural	Appearance of Brood Comb: <input type="checkbox"/> Sealed <input type="checkbox"/> Sunken <input type="checkbox"/> Punctured Cappings	Odor: <input type="checkbox"/> Normal <input type="checkbox"/> Foul <input type="checkbox"/> Sour	Color of Brood: <input type="checkbox"/> Pearly White (Healthy) <input type="checkbox"/> Dull White <input type="checkbox"/> Brown
Equipment Condition: <input type="checkbox"/> New <input type="checkbox"/> Used <input type="checkbox"/> Old	Brood Pattern: <input type="checkbox"/> Solid and Uniform <input type="checkbox"/> Spotty	Consistency of Dead Brood: <input type="checkbox"/> Soft <input type="checkbox"/> Ropy	Brood Larvae Scale: <input type="checkbox"/> Yes <input type="checkbox"/> No

Comments for Foulbrood sample: _____

FOR AFRICANIZED HONEY BEE SAMPLES:

Apiary Location: <input type="checkbox"/> Residential <input type="checkbox"/> Rural <input type="checkbox"/> Agricultural	Colony Temperament: <input type="checkbox"/> Calm <input type="checkbox"/> Nervous <input type="checkbox"/> Very Defensive	Origin of Colony: <input type="checkbox"/> Feral <input type="checkbox"/> Split Colony <input type="checkbox"/> Swarm <input type="checkbox"/> Purchased Package <input type="checkbox"/> Purchased Nuc <input type="checkbox"/> Purchased Colony	Queen Condition: <input type="checkbox"/> Queen Right <input type="checkbox"/> Queen-less <input type="checkbox"/> Drone Layer
Colony location comments: _____ _____			

Comments for Africanized Honey Bee sample: _____

