



Waiting for Scutellata

Northern California Beekeepers
Study their Odds on the New
World African Bee

Part V of Five Parts

by M.E.A. MCNEIL

The California Plan

As the African bees winged north, according to Mark Winston, “Each of the regulatory levels in government and industry has been passing responsibility on to another level.” The federal Animal and Plant Health Inspection Service (APHIS) program monitors to prevent the importation of foreign pests. But once the African bees were over the Texas border, they gave the job to the states.

With thousands of colonies entering California for the pollination of the almond crop alone, California considered options for a program. When Rob Page was at U.C. Davis, the California Department of Food and Agriculture (CDFA) asked him for a means to identify African bees. Morphometrics were used at the time, and he asked officials what they cared about -- measurements or behavior. He demonstrated that increased hybridization did not change behavior. “At that point, the state went out of the regulatory business,” he said.

State control was passed to individual counties, creating a patchwork quilt of regulation. According to Eric Mussen, apiarist at the University of California at Davis “In some the law is, ‘Thou shalt not knowingly keep Africanized bees in boxes,’” – like San Diego and San Bernardino Counties, and others don’t regulate at all. Even the colonization maps vary by county: some call a 20 mile radius around an AHB find colonized and others declare themselves colonized when a single bee is found.

Recently AHB have been demoted to Schedule C pest – unregulated. According to Roger Cline of the CDFA, there is no way to control the free movement of the bees, although the counties are free to act.

Eric Mussen said, “There are half a million colonies of bees in California. The next day any can be Africanized. There is no plan in California but to allow beekeepers to handle it themselves. The theory is that they would plug up a niche, but there is no proof.”

California queen breeders welcomed the opening of the Canadian border to queen shipments after an 18 year ban. Regulations require the stock to be DNA tested by the State lab and come from more than 100 miles from areas colonized by AHB. We in Marin are not the only ones watching the stalled northern progression of the bees.

Learning from Texas

Paul Jackson's soft accent and Southern courtesy belie his rugged years of experience as an apiary inspector in Texas. "We knew we couldn't stop the bees. Can you stop it from rainin'? You're dealing with Mother Nature. We quarantined colonized areas to restrict the bees to natural movement. Even so, they move in cattle trailers, cars -- and the bees fly anyhow." He had pheromone baited traps laid every mile along a state highway.



Photos courtesy Paul Jackson

Texas State Apiary Inspector Paul Jackson has found AHB colonies in (left to right descending) a giant crane, a small rock crevice, an old tire, a hollow tree, a mattress, a truck scale.

"We are still catching European swarms as well in these traps. It's seasonal. Early spring, a large percentage is European. Africanized bees swarm from February to May, and the absconding season is June to February... When Africanized bees abscond, they may break up into 15 small units, each one with a queen – mated if the weather has been good enough for a mating flight or mating within the absconding bees. Baseball size ones are found in wheel wells of eighteen wheelers.

"We dropped the quarantine. Control is at the beekeeper level now. Backup control is at the state level." Jackson does random morphological samples in bee yards. Texas has three bee inspectors to monitor 450,000 colonies, over half of which are migratory and require certification. "They know I'll be around. Everybody in the state knows me, good, bad or indifferent. There's a lot of trick to the trade.

“Hobby beekeepers remaining are true beekeepers; they check hives every month. They are on top of it. A lady inside the city limits of Houston could probably tell you the name of every bee in her hive.

“A blind guy works bees – five hives. He gets his wife to light his smoker. He works slowly by feel. He’ll pull a frame and run his fingers over it, just like Braille. He could feel the capped cells. It’s a joyful experience to go out with him.

“If you pay attention, you can still keep bees. The good beekeepers have adapted and survived, just like in nature. Commercial beekeepers have been here for over 100 years. They breed for gentle stocks. In Texas, we are replenishing the environment with European bees.”

I spoke with Richard Weaver, whose family has been in the bee business in Texas since 1888. He has 1000 hives, mainly for queens and packages, about 70 miles north of Houston in an isolated area without much forage. “We saturate the area with our drones, use drone comb, and feed colonies. I can’t guarantee an open mating situation, but so far so good. We have been afraid of a general invasion. Ten years ago I thought we’d have to quit raising bees, but it hasn’t happened. Every year I hold my breath.”

Oklahoma

Flowers on the prairie where the June bugs zoom

Oscar Hammerstein II

Any hopeful speculation on the mellowing of AHB was not supported by the visit to Oklahoma in June, 2006 by Orley Taylor, Professor of Ecology and Evolutionary Biology, University of Kansas. He was there to check out suspicious feral bees. “It’s behavior that’s important,” he says. “These were the same bees I’ve worked with, and they don’t appear to be any different from AHBs I’ve seen in South Africa or anywhere in the Americas.



(Left) Glenn Hall of the University of Florida doing field work on AHB at Cerro Gordo, Mexico.

(Right) One of Hall’s bait hives from the project.

“These wild colonies were collecting lots of pollen when (European) bees in an apiary half a mile away were collecting little pollen... But cell size and comb width is all you need -- if you can get it.”

FABIS, the morphometric test, is not accurate enough, Taylor says. “We will have to see what the genetic tests show, but I’m unable to see any differences in morphology or behavior in these bees that suggest hybridization. After 49 years of contact with EHBs, it doesn’t look to me like the wild un-boxed AHBs have been significantly modified.”

The Florida Classroom

Jerry Hayes makes a point. Since AHB has entered Florida through the ports, what the non-beekeeping public thinks is vital to beekeeping as a whole. We have all been tracking the odds on what the arrival of AHB will mean for our apiaries, but what if it is not the bee but a simple local ordinance that ends our lives as beekeepers? Hayes is Chief of the Apiary Inspection Section, Florida Department of Agriculture. He is a busy man, getting a swarm call from almost every ship from Guatemala and monitoring over 500 baited pheromone traps.

The Florida strategy is simple: Sixteen inspectors will certify colonies in a voluntary program designed to make the public aware that some bees are valuable. All colonies are required to be registered. There are separate compliance agreements for breeders.

Hayes said, "I don't believe in my heart that these genetics can be stopped. This is more of an educational component so the public can be protected and won't look at the white boxes as the enemy, will understand that the bees in the water meter or tire can be the AHB. Beekeepers are a component of stability with their management practices. They can slow down and mitigate. Without bees to do pollination, we all have problems."

"Large populations of European honey bees managed by beekeepers are probably our best defense against African bees." Dr. Glenn Hall of the University of Florida was quoted as saying in the Florida Beekeepers Quarterly. That got my attention.



The product of a contest in Brazil when the bees first spread, Joao Campos' large smoker is designed for work with AHB. Note the neck protection.

Beekeepers as Barriers

California is banking on beekeepers as the best defense, so I contacted Hall, who has researched AHB, about his quote. "We don't have a better defense. It's hard to know how effective it will be. Whether it's an adequate defense, I don't know. The Africanized bees will outcompete in tropical climates. But American beekeepers have sources for European queens and requeen more routinely."

Genetics researcher Deborah Smith of The University of Kansas says of the AHB, "The question is not only can they survive? It's can they survive if they have to compete?"

De Grandi Hoffman says, "Beekeepers are where the solution lies for mitigating the impact of AHB... Only time will tell where this is going; there may be enough density in California."



Beekeepers hope to act as barriers to the African bee, and they may well be in parts of California.

Page was willing to predict: “The California beekeepers are the best in the world. They take it seriously, work hard and requeen, do what they have to do. The Northern California queen producers will continue.” Mussen says, “No one is betting against the California beekeepers.”

Migratory Beekeepers

The internet is alive with alarm that Africanized bees are being moved by migratory beekeepers. California borders are open. Carla Markmann of the Pest Exclusion Branch of the CDFA explained that the 16 state border stations do not test for AHB.

“The idea that beekeepers (primarily) move African bees, nothing could be further from the truth. Ships and trucks are coming in with cargo from Africanized areas regularly – 24 hours a day, seven days a week,” said De Grandi Hoffman. “Beekeepers are the buffers.”

Page agreed: “Migratory beekeepers are not the problem.”

Management in the African Era

To keep bees in an Africanized area, “Most beekeepers would quit in the face of the required skill level and persistence. It’s not an easy thing, requeening; they often don’t accept queens, which makes the job an expensive, tough, tough job,” said Steve Sheppard of Washington State University.



Photos: Joao Campos.

Brazilian beekeeper Joao Campos keeps an apiary of African bees. He places the pictured inverted escapes (IEs) before the entrances of his AHB hives if he needs to mow or work around aggressive colonies. The screened cones allow arriving foragers, who won’t sting, to enter while keeping the bees contained. He uses the IE, which is called a “spraying screen” in the UK, to move hives as well.

Mussen says “a near perfect program of exclusion,” which he does not suggest following, requires “requeening beginning every year with marked queens. Even at that, 15% of colonies can go bad, four of 25. It could get to that -- permanent importation or artificial insemination of European stock and control of queens.” And, “Requeening is uphill; they don’t persist.” In addition, finding the old queen is not easy in Africanized colonies because the bees are runny.

Beekeepers need to be suspicious that swarms occurring late in the season and occupying odd cavities might be Africanized.

The Public Eye

From the beginning, there has been a “pathological categorization of these bees.”

Rob Page

The danger of Africanized bee attack is not downplayed by experts. Mussen says that agitated bees can fly up to 22 miles per hour, while world class sprinters run 100 yards at 20 mph. Yet placed in context, predictions of hundreds of deaths have not come to be: There have been 15 U.S. fatalities over as many years, with none reported since April 2005. Many involved elderly people. Malcolm Sanford reports, “There are that many deaths per year in Florida from diamond back rattlesnake bites.”

“Anaphylaxis (from other causes) kills many more people than Africanized bee attacks,” according to Scott Kinnee of the CDFA.

Contrary to public perception, a study in Tucson on the cause of attacks on pets found bees ranking seventh in responsibility – below dogs, cats, snakes, coyotes and javelinas. Adrian Wenner of the University of California at Santa Barbara considers that the use of swarm traps could be a factor in the low incidence of problems in Tucson. A score of companies have been formed to install and check traps weekly. In California, private companies can contract to place traps in public places like golf courses and parks.

There is wisdom in publicizing such safety measures, as Florida is effectively doing. De Grandi Hoffman says, “A small group of beekeepers can be over-run, overwhelmed by an ignorant public. You will be ordinances and zoned out of existence. Instruct the public on the importance of beekeepers and honey bees as key components of agriculture.”

Hold or Fold?

*You got to know when to hold em, know when to fold em,
Know when to walk away and know when to run.*

Kenny Rogers

“You’re not forced to quit until they show up,” said Mussen. “If you are persistent and it’s no problem with your neighbors, you can keep bees.” Southern California bee clubs report that more members quit from frustration with *Varroa*, but liability is a concern.

One California queen producer in an Africanized area, Glenn Apiaries in San Diego County, stopped open mating and now breeds all artificially inseminated queens. “We didn’t want to be the people spreading AHB,” said Sukie Glenn.

Spencer and Helene Marshall have apiaries from just east of San Francisco Bay as far north as the Napa Valley. Marshall says he expects to lose locations; “They are coming here. When the Africanized bees come, I’ll retire.”

The option of keeping Africanized bees is not one that many North Americans consider, but João Campos, an articulate Brazilian engineer who keeps a bee website, has been keeping them on his small farm for 18 years. Defensive behavior, which “varies a lot,” he says “is just a thing we learn to cope with, and not an obstacle to beekeeping.”

His house is less than 200 yards from the apiary: “I have a five year old girl, three dogs and some chickens there, and never had a single accident with any of them.” But, he says, “Urban beekeeping is not possible.”



Joao Campos keeps African bees near his house in Brazil. He shows typical AHB festooning behavior off the pulled frame.

The Future

This expansion has provided an unprecedented laboratory for entomologists. De Grandi Hoffman has studied the invasion for 20 years, contributing to what is now a vast body of scientific literature that has become “one of the most detailed descriptions known of the mechanisms that influence invasion success.”

“Now that we have the complete bee genome, we are looking at the influence of the environment on gene expression. It is incredible; we can do things we could never do before -- ask how social environment influences gene expression. We’re going to find genes for particular behaviors. This has taken the study of bee biology and genetics into new areas – gene expression, inheritance of genetic behavior.”

What We Know Now

Next month when the Marin Beekeepers are hanging out around the big table in the barn, we'll weigh our chances again. It's not that most of us who have been at this awhile are afraid to continue managing small oases of European bees if the Africans come. It's the pervasive misunderstanding of honey bees, even in a well educated county. Without the presence of African bees to worry about, The Master Gardener column in our local newspaper warned against attacking bees coming after the meat in a picnic and dive bombing floral clothing prints. We'd be laughing if it wasn't so sad.

If I had to call it -- and I suppose I'd better, after months of research and interviewing -- I'd say it looks as though we will see them here, whether African or Africanized, whether they drop in and out. There is little on the list of what AHB love that we don't have bountifully here; our bees fly almost all year around. In the meantime, we'll take it as it comes, looking at hot hives with a jaded eye, requeening with marked queens, learning FABIS to identify suspects to send on to the DNA lab, and taking a more active role in teaching the public the precious role of pollinators. If we are to look for hopeful signs, the chances are good that saturation by commercial beekeepers in Central California will allow European bees to stay more competitive. And, although it won't happen for our generation, there is also a chance that human selection for behavior will eventually help ameliorate aggressiveness.

With all we have learned, our discussions will have more depth, but our question remains the same: Can we continue to keep bees in Marin? All things considered, my own answer has evolved from maybe: Perhaps we can. And if they don't come, we will be left better beekeepers.

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