Full Disclosure

- I am NOT a honey bee expert.
- I know NOTHING about raising honey bees.
- I got into this because non-native honey bees are by far the most frequent visitors to native plants in SD County. I study POLLINATION.
- I HAVE performed the only systematic study on the range and frequency of Africanized honey bees (AHB) California.

Spread of the Africanized Honey Bee

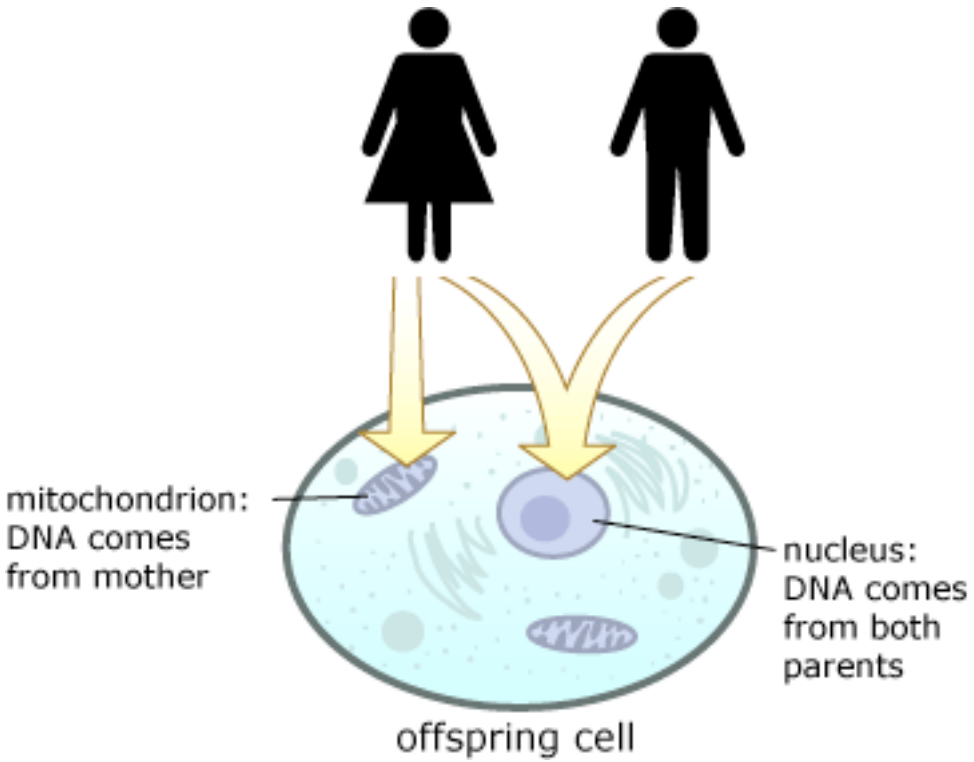
Definition: AHB are hybrids between two honey bee subspecies, *Apis mellifera mellifera* from Europe and *Apis mellifera scutellata* from southern Africa.

Moritz et al. Ecoscience 2005

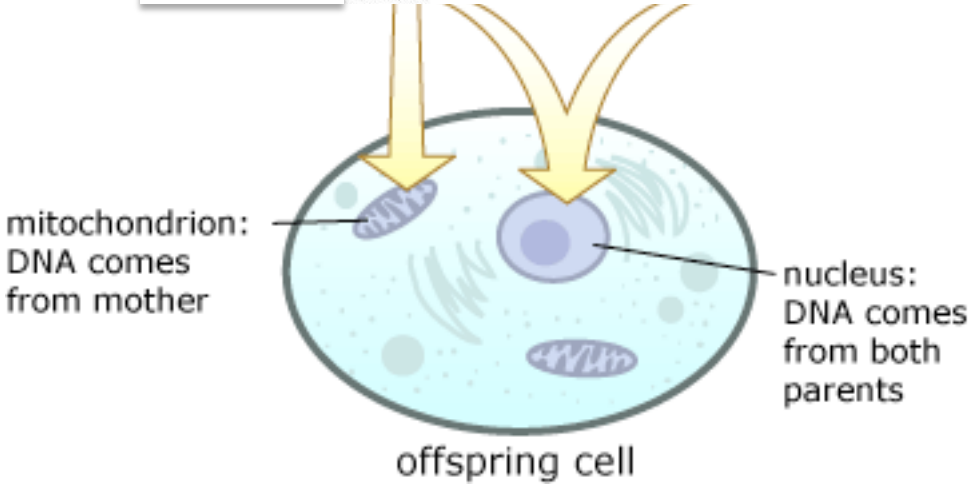
How is the Africanized honey bee invasion tracked?

- Morphology. Africanized and European honey bees are very similar. Africanized honey bees usually slightly smaller.
- Mitochondrial DNA. Simple, inexpensive, genetic test to determine maternal lineage.
- Nuclear DNA. Provides information on maternal AND paternal ancestry, but more expensive to assay.

Mitochondrial DNA is a maternally-inherited circular chromosome



Same for honey bees



Genetics of AHB invasion of Texas. First 10 years.

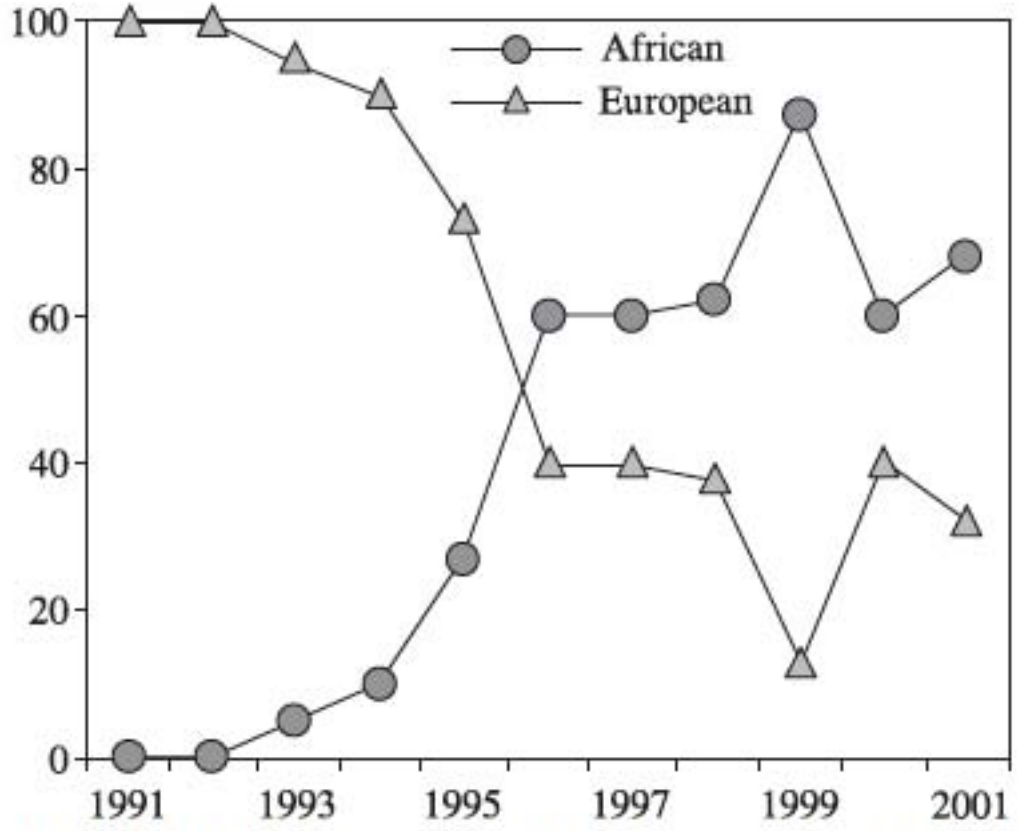


FIGURE 3. Mitotype frequencies (%) in a honeybee population of the Welder Wildlife Refuge (Texas) before and after the invasion of African honeybees in 1993 (from Pinto *et al.*, 2004).

- 65% African mitotypes 10 years after invasion.
- European mitochondria persist in population
- Initially, bees carrying African mitotypes had more African nuclear genes.
- After 10 years, mitochondrial type did not predict African content of nuclear genome.

Ten year increase in African mitochondiral (black) and nuclear (grey) genetic content

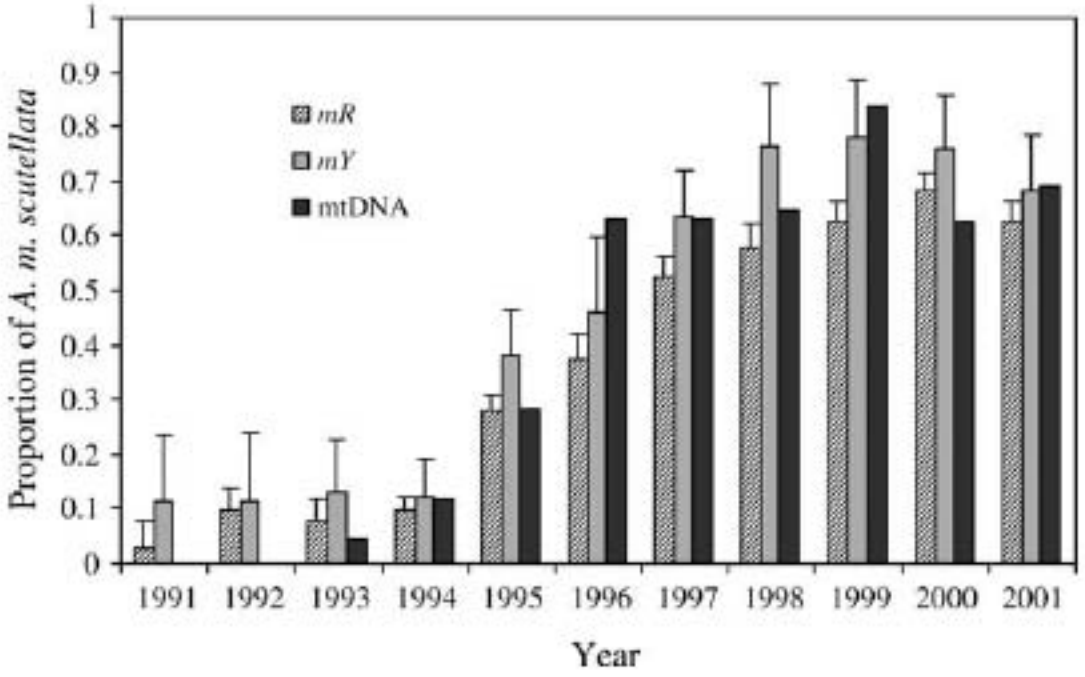


FIGURE 4.—Proportions of the *A. m. scutellata* mitotype and nuclear alleles in the WWR population over time. Nuclear admixture bootstrap average and standard deviation were computed for 1000 iterations using the gene-frequency-based estimator m_R and the gene-frequency and molecular-based estimator m_Y.

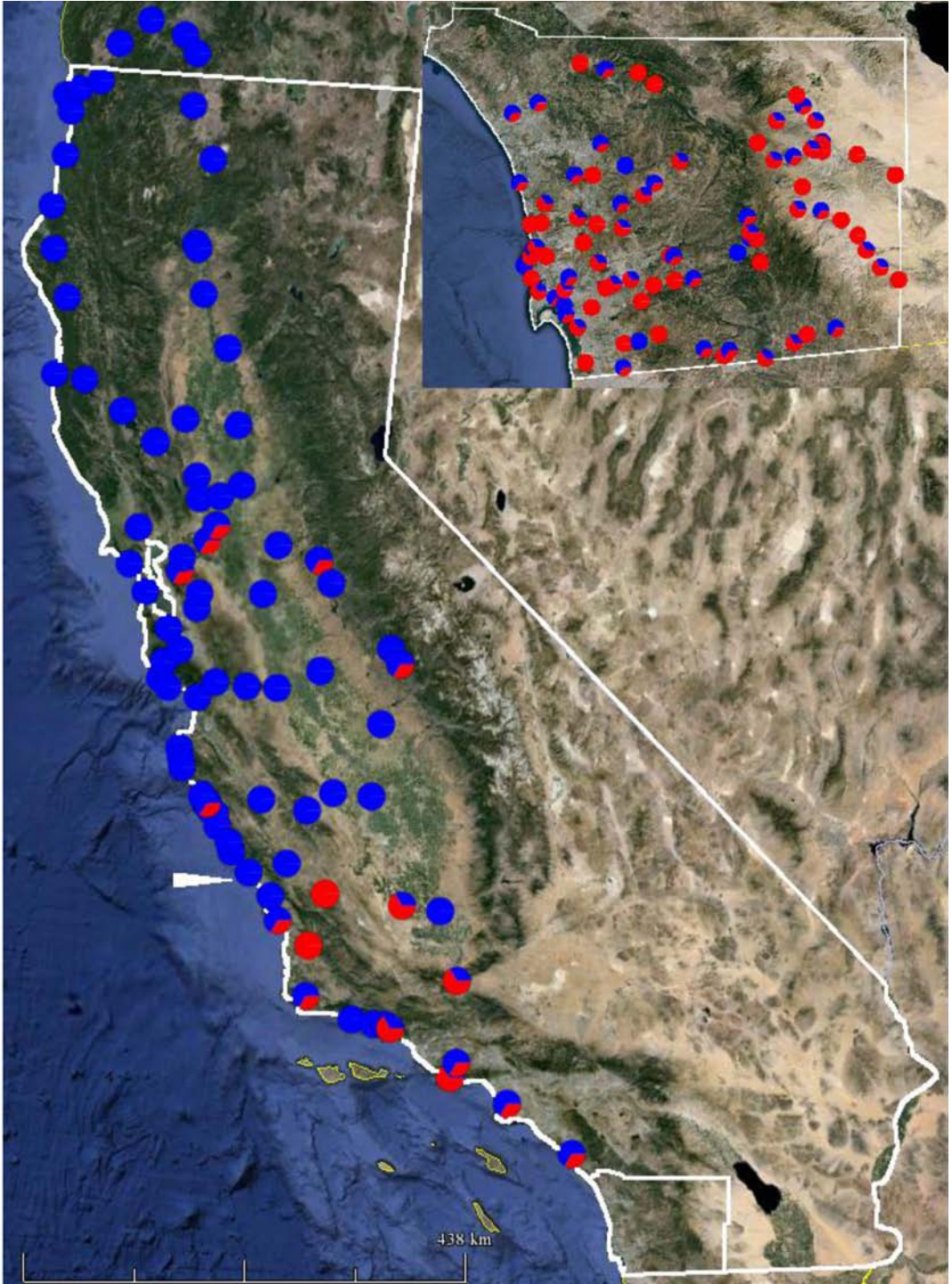
Pinto et al. Genetics 2005

Distribution of Africanized Honey Bees in California

Affected counties include:
San Diego, Imperial, Riverside, Orange, San Bernadino, Los Angeles, Ventura, Santa Barbara, Kern, San Luis Obispo, Kings, Tulare, Inyo, Madera and Mariposa.

UC RIVERSIDE University of California | Center for Invasive Species Research

Updated November 2011



Invasion of the Africanized honey bee

Method: Three worker bees per site.
Red – African mitochondria
Blue – European mitochondria

Conclusions

- Africanized honey bees extend north to 40km south of Sacramento
- 65% of honey bees in SD have African mitochondria
- Most honey bees in SD County are Africanized and feral.

Kono and Kohn, PLoS One, 2015

Why you should care about AHB

- They can be more aggressive than EHB.
- They can attack even when only indirectly threatened such as when a neighbor is using a power tool or mower, etc.
- You probably have neighbors.
- This is a litigious society.
- You don't want to be responsible for the death of a neighbor, their child, or their pet.

Recent headlines

WORKER DEATH: Bees can be easily provoked
(Riverside County, Aug. 2015

Puppy In La Habra Heights Lucky To Be Alive After Being Stung 155 Times By Africanized Bees
LA County, May, 2016

Hiker dies in bee attack at Usery Mountain Park in Arizona
Phoenix, May, 2016

House hunter hospitalized after bee attack
Phoenix, May, 2016

Killer *bees* probably are in the Bay Area to stay
San Francisco Chronicle-May 16, 2016

Insects in Concord attack were regular honeybees, not killer *bees*
SFGate-May 24, 2016

What to do if attacked by Africanized honey bees (from USDA)

- Run away and keep running. Do NOT stop and drop.
- If you can, get inside a building or car. A few bees may follow, but far more will remain outside.
- Do not jump in a swimming pool.
- When safe, scrape off stingers with credit card, thumbnail or knife blade, do not use tweezers.
- Seek medical help if allergic or if stung more than 15 times (non-allergic adult can survive 1000 stings).

How can my hive become Africanized?

- Queen gets old and dies, workers raise new queen who mates with Africanized drones.
- Hive is taken over by AHB directly (usurpation).

How can I prevent Africanization?

- Follow the rules.
- Re-queen yearly, preferably from a dealer who lives outside the range of the AHB. That queen arrives already inseminated.

Is there a good side of the AHB?

- AHB invasion increases the genetic diversity of honey bees.
- AHB have replaced EHB from Brazil to the US, clearly they have ecological advantages.
  - Increased rates of colony growth and swarm production
  - Increased honey production?
  - Increased disease resistance
  - Increased aggression
- If positive traits can be bred into EHB without aggression, a better bee might result.


AHB
Home Protection by
Africanized Honey Bees