

Project No. 87-G1 - Tree and Crop Research
Africanized Honey Bee Management

Project Leader: To be named Page

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Objectives: Accelerate research on the genetics of Africanized and European honey bees with special emphasis on genetic management of both races to minimize the overall impact of the pest bee in California.

Interpretive Summary: The Africanized bee potentially will have a severe negative impact on California agriculture and on public health and safety. In California, more than 600,000 commercially managed beehives pollinate 40 crops, valued at 4.0 billion dollars annually, including fruits, melons, berries, almonds, citrus, seed crops for vegetables, and forage crops such as alfalfa.

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The discovery of an isolated introduction of Africanized bees and the successful eradication in Kern County near Bakersfield in 1985 served as early warning of the anticipated mass introduction of the bees into the U.S., from Florida to California, later in this decade. Africanized bees which quickly supplant European stock in areas of introduction have been expanding their range 200 to 300 miles a year from the original epicenter in Brazil, and have now been found 88 miles south of Vera Cruz in southern Mexico.

USDA/APHIS has instituted a barrier in Mexico against northward spread of Africanized bees, but admits that at best this will delay rather than stop the northward spread of this pest bee. The presumed similarity of European and Africanized bees in their susceptibility to pesticide, disease and natural enemies indicates that repeated attempts to suppress the Africanized bees by conventional pest management methods will probably affect European bees adversely.

The precise Africanization process of the European bees and their potential range in the U.S. is somewhat controversial, but the most important issue agreed upon by workers in all regulatory agencies and research institutions is that more experimental work is urgently needed. Although applied research is necessary and being conducted, many basic questions need to be addressed before meaningful applied research can be fully implemented. For example, without understanding the genetic mechanism of the overwintering attributes of the Africanized bees and the basic comparative reproductive biology of both the Africanized and European bees, it is impossible to provide full recommendation for controlling the Africanization process until these principles are understood.

The goal of this research is to allow the continued use of European bees by commercial beekeepers in the presence of invading feral Africanized bees.

Research on European bees is necessary to develop strains with desirable traits, which include an ability to compete with Africanized bees. Genetic research on Africanized bees will have a longer term goal of eliminating or decreasing the undesirable traits of the pest bee by purposely modifying its genetic makeup. These traits include those for stinging, swarming, absconding, low honey production, management problems, hybridization with European stocks; and to understand the desirable traits (e.g., the inability to overwinter in temperate areas). Results of the studies will not only provide a data base to implement management measures, but will permit a more accurate impact model on human health, agriculture, beekeeping and honey production in temperate areas of the U.S.

To make satisfactory progress and reach useful conclusions, this research program must be continuous, coordinated and comprehensive. Sufficient fiscal resources by agricultural groups should be committed for the next five years to match the Federal, State and University commitment. The University of California has made a commitment to provide a full time researcher for at least five years to address this problem. The best qualified individual for

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this would be a population geneticist who would be spending time in Mexico and Central and South American countries, working with Africanized bee populations as they move northward toward the United States. Money from the Almond Board and other sources will provide support funds for this person (e.g., support research personnel, supplies, travel and equipment). All told, the first fiscal year support will come from CDFA, USDA, beekeepers, Farm Bureau and twelve commodity groups including almonds.

At this time, the UC Davis Entomology Department is interviewing bee population geneticist candidates for the research position. Representatives including agricultural groups financially supporting this effort are involved in the interview process.

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