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## Colony Defense by the Africanized Honey Bee in Venezuela

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### Introduction

In recent years, the media has carried a number of stories and interviews dealing with the Africanized honey bee, or "Killer Bee," including conflicting reports on the value of this bee type for honey production and pollination, the level of its colony defense, especially stinging, and the introduction of this bee to the United States and its probable spread within our borders.

The term Africanized bee refers to the hybrid population of honey bees (*Apis mellifera* L.) which currently exists in South America. This population of bees is the result of mating between offspring of twenty-six *A. m. scutella* queens which were imported from South Africa to Brazil in 1957 and the various European varieties that had been imported to South America over the years. This importation from Africa was originally made to improve the quality of honey production by honey bees in Brazil through the introduction of a genotype adapted to a tropical environment. The imported bees also introduced a genotype that was much more defensive than the temperately-adapted European varieties already in use in Brazil.

The rapid spread of these Africanized bees throughout South and Central America does pose a threat to the beekeeping industry, related agriculture, and the general public in the United States because of the undesirable behavioral characteristics they express. The Honey-Bee Breeding, Genetics and Physiology Laboratory, Baton Rouge, Louisiana, was directed to carry out research to reduce the effects of this bee on the U.S. beekeeping industry. The results of a part of this research involving defensive behavior are presented here, as well as a discussion of the impact of such behavior on the beekeeper and the general public.

### Behavior Model

Honey bee defensive behavior is a complex sequence of actions by a group of honey bees. In order to study such a complex behavior it is first necessary to divide the behavioral sequence into its component parts. We have constructed a model (Collins et al. 1980) as shown in Figure 1 to identify units of defensive behavior which would be subject to genetic analysis and manipulation by selective breeding. This figure shows the basic four-step sequence of stimulus and response that we have proposed. These responses are variable, both in quality and quantity. The stimuli involved in eliciting this behavior at each step may be the same or different aspects of the bee's environment.

The first step in the sequence is alerting. A stimulus from the environment is perceived by a worker honey bee who then responds in one of three ways: she becomes alert, she recruits other bees, or she withdraws. An alerted worker has a characteristic posture with her body raised, the abdomen cocked upward, wings extended and sometimes fanning. In this position the mandibles are held open and the antennae are waved. Occasionally the sting may be protracted. This posture is nondirectional and reflects a level of excitation that is receptive to a second stimulus from the environment.

A recruiting bee opens her sting chamber with her sting protracted and runs into the colony. The protracted sting position allows for the release of alarm pheromone which communicates to other bees in the colony. These other bees in turn become alert.

The third possible response, withdrawal or fleeing, may be seen during hive manipulations. Bees not in a

