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Dept. DD2



Sex life of fire ant may be one key to eventual control

A Texas scientist has discovered an oddity in the sex life of the fire ant that may be the very weakness needed for control of this fast-spreading pest.

Dr. Akey C. F. Hung, entomologist with the Texas Agricultural Experiment Station has found some naturally occurring sterile male fire ants. “These sterile males are associated with colonies which contain a large number of queens,” he says.

“This in itself is unusual since most colonies of fire ants have only one queen, which may live for years.

“If we can identify the cause of this naturally-occurring male sterility, the production of sterile males could then be encouraged in natural populations, or they could be artificially produced for release.

“Sterile males would be of real help in reducing reinfestation of treated areas or halting the spread of the imported fire ant. A mature fire ant colony can release as many as 700 queens during mating flights, and a queen can fly as far as ten miles.

“After mating, the queen will in turn establish her own colony and produce more queens in a year or so. Since the queen only mates with one male, if that male was sterile, her eggs would be infertile and fail to hatch, thus she cannot establish a new colony,” Hung says.

This potential control method is of major significance because of 1) growing concern about the development of resistance to insecticides in pest species, and 2) pollution of the environment with persistent toxic chemicals.

Sterile males of the red imported fire ant were first discovered by Hung in 1974 in three counties in East Texas. Since then he has sought the cause and its potential in fire ant control.

Like honeybee drones, normal male fire ants have only one set of chromosomes. However, Hung finds sterile males have two sets of chromosomes as do normal queen and worker ants.

His research had been complicated by the fact that the queen and male fire ants only mate in the air at an altitude of 200 to 500 feet.

By using a genetic marker, Hung has determined that queens of the red imported fire ant mate with only one male.

Since fire ant queens and males won't mate in captivity, Hung has developed an artificial insemination technique for fire ants. He has used this method and other biochemical techniques to verify one case of natural crosses between the southern fire ant and the tropical fire ant.

This research is aimed at developing genetic control methods in the near future to supplement the large-scale insecticide-based control programs already in operation.

Hung is a member of an Experiment Station team, working on fire ant control, directed by Dr. Bradleigh Vinson. This group is working on a broad variety of different control methods that include 1) research to discover chemicals that won't pollute the environment but will kill fire ants, 2) juvenile hormones to prevent normal development of young ants, 3) pheromones which are the chemical “smells” used for communication by insects, 4) attractants, which will help ants locate baits and increase usage and 5) environment which discourages or prohibits the spread of these ants.

Vinson stresses the importance of developing alternative methods of control since so many of the chemicals previously used are now unavailable. □