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### Fire Ants On The March

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*Red imported fire ants are on the move across the United States and no one knows where (or when) they're going to stop.*

My first "real life" experience with fire ants came at my future wife's Wilmington, N.C., home back in the late 1970s. At that time fire ants were found in North Carolina in only the southeastern coastal area. In her parents' yard there were several active fire ant mounds and, of course, I had to find out what the big deal was about these ants. When I disturbed the first mound I was impressed by the reaction of the colony to the disturbance and fortunately had enough sense to watch my feet and step back as they came pouring out. I was actually a little disappointed by the small size of the ants. I figured something that had such a bad reputation would be bigger and I remember thinking, "I just can't believe that something that little could really have a sting that could hurt that bad." Well you guessed it — like an idiot I stuck my finger down there to find out. I quickly discovered that what they lacked in size they made up for in punch. With that, I developed a respect for this new permanent resident, *Solenopsis invecta*, commonly known as the red imported fire ant (RIFA).

**HISTORICAL OVERVIEW.** This South American native was first introduced into the United States somewhere between 1918 and 1930 near Mobile, Ala. One source speculated that the ants were transported in soil that was used as ballast for ships or in potted plants. Throughout the 1940s and '50s, the RIFA spread through Alabama as well as into parts of Arkansas, Florida, Georgia, Louisiana, Mississippi, South Carolina and Texas. The rapid spread of these ants was largely attributed to colonies being relocated with movement of infested nursery stock, equipment, sod, hay and potted plants. By 1958 it was reported that more than 60 million acres were infested with RIFAs. By the early 1980s, populations of RIFAs were also firmly established in areas of North Carolina, Oklahoma and Puerto Rico.

The black imported fire ant, which is also a South American native, was also introduced into Alabama a short time prior to the introduction of RIFAs. This species has not gained the widespread notoriety as the RIFA due to the limited expansion of its range. The black imported fire ant, *Solenopsis richteri*, or a red/black hybrid form of this species, is found in a much-limited range extending from northern Alabama, northern Mississippi and parts of Tennessee. Today, infestations of imported fire ants are known to infest more than 300 million acres in 13 states and Puerto Rico.

**BIOLOGY.** In the United States, there are several native species of fire ants. These native fire ants typically are not considered major pest species and may in fact slow the encroachment of the imported fire ant species. Native fire ants are capable of stinging however their sting does not

cause the pustulate reaction like the imported fire ant's sting.

Characteristics that can be used to identify the RIFA include a 10-segmented antenna, a two-segmented club, a two-node pedicel, no spines, a stinger and polymorphic workers (multiple sizes). An established colony of these ants may consist of 80,000 to 500,000 or more individuals. A colony may have a single queen (monogyne) or multiple queens (polygyne). Once a colony becomes established, a mature queen can produce 1,500 to 2,000 eggs per day. Development from egg to adult can take from 20 to 40 days (30-day average). New colonies are established by reproductive flights (nuptial flights) and/or colony expansion, known as budding. Infested pastureland may have 20 to 50 mounds per acre. In more extreme infestations, more than 250 mounds per acre have been documented.

RIFAs are aggressive foragers and will out-compete and displace the native ants species. They feed on native wildlife, decrease insect diversity where present and can pose serious problems in agricultural operations. In and around homes, schools and businesses, their defensive sting, mound building and attraction to power sources all pose a threat.

**WHERE WILL THEY STOP?** What started as an introduction into Alabama (and other southern areas) has now continued both a western and northern tract. Tennessee, Virginia, Maryland, New Mexico, California and Nevada have (or are currently) facing the challenge of managing these insects.

According to a California Department of Food and Agriculture (CDFA) news release, RIFA infestations were first discovered in California in October, 1998. Surveys have since found infestations at varying levels in 26 cities in Orange County, portions of southern Los Angeles County and Riverside County. The CDFA has enacted an action plan that is creating an infrastructure by providing assistance, coordination, technical support and public education efforts. The CDFA is also continuing plant quarantine enforcement and detection activity in an effort to stop the spread of this introduced pest.

In the Las Vegas, Nev., area, the Division of Agriculture found two plant nurseries that were infested with RIFAs in the fall of 1998. A third nursery was also found to be infested with fire ants in the spring of 1999. All of these infested sites were treated and the Nevada Division of Agriculture is continuing its inspection and monitoring program.

According to the Maryland Plant Protection and Weed Management section's 1998 annual report, "the RIFA has demonstrated an ability to survive the cold winter temperatures in Maryland. Since 1998, nine infestations have been eradicated." It was reported that "the insecticide treatments appear to have been very effective, as no additional activity has been detected."

Where the infestation of red imported fire ants will stop is extremely hard to say. Introductions as those detected in Nevada and Maryland have also occurred in other states that have had to rapidly react and enact eradication and quarantine efforts. In many cases where these ants are now firmly established, these introductions were not detected until the colonies had multiplied and spread beyond their point of original introduction. Despite extensive quarantine efforts, their spread continues.

**CONTINUING RESEARCH.** According to Dr. Ed Vargo in his study of pheromone based biopesticides, "Attempts to control the imported fire ant by traditional chemical means have been unsuccessful despite massive federal and state control programs involving broad-spectrum pesticides. The total fire ant population has progressively increased. The main reason for the failure of these control efforts is that the complex ecology of the ant is poorly understood." He also states that it is necessary to develop and use natural controls that compete with, kill or reduce the ability of the fire ants to thrive and not adversely affect the natural suppression of fire ant populations through competition, naturally occurring organisms and predation.

Current research concerning the RIFA is being conducted in many states involving both university and government scientists. Many of the research projects are investigating naturally occurring insect predators, parasites and other organisms that occur in the native areas where fire ants occur in South America. In Brazil and Argentina, RIFA problems are not nearly as widespread due to many naturally occurring predators and parasitic organisms found in these areas. Unfortunately, when a non-native species of plant or animal is introduced into a new area without any natural predators and/or parasites being present, there is a greater chance that the introduced pest will flourish. This has definitely been the case with the imported fire ant in the United States.

According to a publication from Texas A&M University, "since the 1950s, the red imported fire ant had been spreading northward, westward and southward in Texas. They now infest the eastern two-thirds of the state and some urban area in western Texas." In response, there is a tremendous amount of research being conducted on fire ants in the "Lone Star State."

According to a Texas research project summary, at Texas Tech University researchers are investigating the possible use of a fungi, *Beauveria bassiana*, which causes RIFA mortality in both laboratory and field trial settings. They are investigating effective delivery systems and augmented fungal activity.

At the University of Texas, researcher Dr. Lawrence E. Gilbert is investigating comparative biology and rearing technology for the parasitic phorid flies (genus *Pseudacteon*) specific to the RIFA. Apparently, there are 16 individual species of phorid flies that are known to be associated with the fire ant in South America. Observations made in South America report that there may be four to five different species of phorid flies coexisting and attacking an individual fire ant colony at any given time. Certain species of these flies will attack ants at disturbed mounds while other species of these flies will attack fire ants along foraging trails. This work is being conducted both in the United States and through field observations in Brazil and Argentina.

Another group of researchers at Texas A&M University are investigating the control of the RIFA using genetic manipulation. Dr. Spencer J. Johnson and Dr. S. Bradleigh Vinson are conducting research on the disruption of sex determination, mating success and male fertility as it can impact control of the RIFA. Dr. Vinson is also leading a group of investigators in developing methods to mass produce and release natural enemies focused on native species. He is also studying fire ant foraging and competition dynamics.

According to an Agriculture Research Station publication titled "Off With Their Heads," researcher Sanford Porter, USDA/ARS, Gainesville, Fla., has also been involved with mass rearing and release of phorid flies. One species of phorid fly has been successfully established in five sites in Florida, and through November of 1999 the flies have also been released in selected areas of Alabama, Arkansas, Louisiana, Oklahoma, South Carolina and Texas. Other researchers at the USDA ARS in Gainesville are working on a wide range of biological control options for the imported fire ants. Some areas of current research being conducted by David H. Oi and David Williams include a fire ant disease-causing organism, *Thelohonia solenopsae*, and another called *Varimorpha*. According to David Williams, they are also currently evaluating a parasitic ant called *Solenopsis daguerri* that invades fire ant mounds. Once this parasitic ant infests a fire ant colony "the queen becomes debilitated and lays fewer eggs, weakening the colony." Entomologist Daniel P. Wojcik is studying the ecological impact of fire ants on endangered vertebrates and invertebrates and Dana A. Flocks is studying computer modeling of fire ant movement.

**IMPACT ON THE PCO.** The first organized control program for the RIFA was started in Baldwin County, Ala., in 1937. By the late 1940s, widescale eradication programs were in place in Alabama, Mississippi and Florida using myrex and heptachlor baits. Due to the persistence of these compounds in the environment and their affects on non-target native wildlife, these programs were discontinued. Fortunately, through extensive research efforts, the development of a number of educational materials, effective products and treatment techniques have all been

developed. One useful publication titled "The Two-Step Method" for fire ant control from the Texas Agricultural Extension Service can be found on the web at <http://entowww.tamu.edu/extension/bulletins/L-5070.html>.

Despite all of the extensive research that has been conducted on the biology and control of the imported fire ant species these ants have become permanent residents in the United States. It is likely that we will continue to see RIFA populations spread. There is promise that in the future, biological control efforts and other developing technologies will slow the spread and severity of fire ant infestations; however, it is doubtful that total eradication of the imported fire ant species will be possible.

We need to be informed on the biology and habits of fire ants and proper treatment techniques. We also need to be prepared to educate our customers. Because fire ants are highly mobile and likely infest the surrounding areas where we may have control programs in place, it's often just a matter of time before fire ants will reinfest areas that have been treated in the past. These facts provide an excellent opportunity for pest control operators to implement ongoing inspection and treatment programs at accounts with a history or potential for fire ant concerns.

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#### **Sidebar:**

##### **Fire Ants "Extinguished" on Florida Campus**

Telephone lines down. Traffic lights out.

Thoroughbred colts under attack. Sounds like the setup for a science fiction thriller? It's not quite that outlandish, but the source is nothing to laugh about.

Fire ants have caused all of these problems and more at the University of Florida, Gainesville. "We've had numerous instances of people being bitten or stung by fire ants when visiting the campus," said Ken Glover, pest control manager for the Environmental Health and Safety Division at the university.

The campus covers about 2,000 acres of open areas, buildings, woods, wetlands and a wildlife sanctuary — a perfect habitat for fire ants. The fire ants invaded areas of the university's on-campus hospital and also damaged equipment in the electrical substations. Fire ants in campus buildings were traced to mounds adjacent to untreated shrubs and lawns.

"Fire ants are a health- and safety-related pest. Eighty thousand people tailgate during football games," Glover said. "We do everything we can to provide a healthy and safe outdoor environment for visitors."

The University of Florida's Environmental Health and Safety division provides many services, including pest control, and helps other campus divisions conform to state and federal health and safety regulations. The pest control auxiliary operates as a business within the university system to provide in-house pest management for campus facilities and grounds.

The on-campus pest control division was established to respond more quickly than a commercial company, the university says. Consisting of eight technicians, Glover's division provides control for household pests, stored product pests, termites and lawn and ornamental insects. Valued at \$550

million, university facilities comprise more than 800 buildings.

"Once we assumed responsibility for grounds pest control, we were able to put together a comprehensive program to impact the fire ant population," Glover said. "Given the diversity of the treatment environment, I considered all the fire ant products available before choosing Extinguish (Professional Fire Ant Bait) to eliminate the fire ant colonies."

Glover was familiar with methoprene, the active ingredient in other insect growth regulator products by Zoëcon Professional Products. "The ability to use Extinguish in areas without having to evacuate the animals was a major selling point for me, as well as the no re-entry restriction interval after broadcast baiting," Glover said.

Extinguish Professional Fire Ant Bait by Zoëcon Professional Products contains an IGR in a bait that foraging fire ant workers take back to the mound to feed to the queen. The IGR affects the queen's reproduction. When existing workers die, replacement workers aren't produced, resulting in starvation and elimination of the queen and colony. —*Ann Wells*

*The author is an account executive for Nelson & Schmidt, Milwaukee, Wis.*

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