

# The Red Imported Fire Ant

## INTRODUCTION

Red Imported Fire Ant, *Solenopsis invicta* Buren is native to South America. The pest ranges from northern Mato Grosso, Brazil, west to Peru and Bolivia, to Santiago del Estero and Santa Fe provinces in Argentina, and northeast through Uruguay to Sao Paulo state in southern Brazil (Trager, 1991). The introduction of this species into the southeastern United States took place sometime between 1930 and 1940. It now occupies all the southeastern states including eastern Texas and has been established in southern California and New Mexico. Buren reported this ant in Puerto Rico in 1982. It has since been found in the Bahamas Islands, the Turks and Caicos islands, the British and US Virgin Islands, Antigua, and Trinidad (Davis *et al.*, 2001).

### IDENTITY

Authority : Buren, (1972)

#### Classification

Kingdom : Animalia  
Phylum : Arthropoda  
Class : Insecta  
Order : Hymenoptera  
Suborder : Apocrita  
Family : Formicidae  
Genus : *Solenopsis*  
Species : *invicta*  
Common names : red imported fire ant, fire ant

Role : Pest

### MORPHOLOGY

The red imported fire ant is a member of the genus *Solenopsis*, which is characterized by 10 segmented antennae, with a 2 segmented terminal club, clypeus with a pair of anteriorly divergent carinae ending in small, tooth-like projections and the propodeum unarmed (Bolton, 1994). The species *S. invicta* is distinguished primarily by the combination of three characters: the presence of a third (medial) clypeal tooth, the lack of a jagged edge to the mesopleural fold; and the lack of strong carinae on the propodeum (Wojcik *et al.* 1966).



Fig. 1 Fire ant queen surrounded by workers, brood, and eggs

Photo Courtesy Drs. Karen Vail and Roberto Pereira

The red imported fire ant is dark-red in colour. Their nests are dome-shaped mounds of soil that are usually not greater than 45 cm in height and diameter. ( Fig 2).

## BIOLOGY & ECOLOGY

### Biology

This ant is capable of relatively modest range extensions of a few miles per year on its own through mating flights. Mating occurs high in the air - perhaps at 350 feet above the ground (Markin *et al.*, 1971). During a mating flight, which typically occurs on a calm sunny day following a rain, thousands of males form swarms into which queen ants fly to be mated. The male then die. The female drops to the ground and pulls off her wings. She starts her new colony claustrally (does not leave the nest chamber after digging it) either by haplometrosis (singly) or pleometrosis (in groups). She digs a small nest chamber and lays 30-35 eggs that she tends (Tschinkel, 1993). When these eggs hatch she feeds the larvae with liquids that she regurgitates. The nutrients contained in this food are from her fat bodies and her now defunct wing muscles. Founding queens lose weight in relation to the number of progeny produced (Tschinkel, 1993). During this stage in the life history, the colony is not detectable. The queen remains underground and there is no obvious sign of her presence (fig. 1). After her first brood, (called minims), become adults, they leave the nest and search for food, primarily arthropods or sources of sugar. This stage is critical to the survival of the colony. The queen must be fed by these workers in order to have enough energy to continue to lay eggs. If something happens to these workers, the colony fails. In approximately six months, the colony will grow to a size that will produce a visible mound of soil. This growth will continue until a maximum size of up to 250,000 workers is attained (Tschinkel, 1988). Queens may live 10 years (Glancey and Lofgren, 1985) and potentially produce several million eggs. Once the colony reaches a certain minimum size, sexuals are produced. These sexuals are produced throughout the year with peak mating flights being observed when rains are frequent and weather is warm. In the US this is generally April through August (Markin *et al.* 1971). This is an insect of disturbed habitats - roadsides, pastures, lawns, sports fields, lake and stream margins, and beaches. It is adapted to sudden flooding and can survive during periods of flooding when temperatures become cold enough to produce ice on the water's surface.

### Ecology

The red imported fire ant is a rapid colonizer of open disturbed sites. It avoids densely shaded or heavily wooded areas where sunlight does not reach the soil surface. Colonization of dry habitats is slow. Along with nesting around the bases of trees, shrubs or grass clumps, newly mated queens may move into potted plants or palettes of sod to start new colonies. After mating, queens often aggregate in cracks in sidewalks or under debris near buildings. Colonies usually construct conspicuous mounds in pastures and



along roadsides (fig. 2).

The colony grows rapidly in size and after about 3 years it contains about 100,000 workers (a fully mature colony may contain 250,000 individuals after 4-6 years)(Tschinkel, 1988).

*Solenopsis invicta* is an aggressive, pugnacious species that stings painfully and often when disturbed. It can be dangerous to small children. Such encounters can be lethal to humans especially if the individual is allergic to the stings. People in motels and nursing homes have been seriously injured and even killed by fire ants stinging them in their beds. This ant will enter homes. It will sting pets, livestock, and native wildlife, especially ground nesting species of birds and reptiles. Egg laying species are often vulnerable to fire ants immediately after the eggs are ruptured by the emerging young, which usually are not able to escape before being found by fire ant foragers. Vegetable crops are damaged primarily by attacks on seedlings and germinating seeds (Lofgren *et al.*, 1975). Glancey *et al.*, (1979) observed a loss of 63.4% of corn seedlings in ten half acre plots in Mississippi. Fire ants often killed young citrus trees by girdling the tree just above the graft line (Adams 1986). Contact with fire ant mounds often causes damage to farm equipment (Lofgren *et al.* 1975) and lawn mowers, and electrical equipment is commonly damaged. Air conditioners and traffic signal control boxes often have damaged components that must be replaced due to fire ants chewing off the insulation on the wires and shorting out the circuits (Drees *et al.*, 2000). Even highways have been fire ant damaged by gnawing through expansion joints and allowing water to enter (Adams, 1986).

Fire ants are central place foragers, traveling from the mound via underground passages that radiate in all directions from the nest. Foragers are the oldest workers and usually make up about 10-15% of the colony. When food is located by a scout, this ant walks back to the nest while dragging its stinger on the ground. A trail of compounds from the Dufour's gland (Wilson, 1959) makes a strong but ephemeral trail that is reinforced by other ants until the food source has been depleted. These ants will tend aphids and scale insects, which may be important vectors of plant diseases (Lofgren *et al.*, 1975).

### **NATURAL ENEMIES**

Red imported fire ants have been reported as predators of the sugar cane borer, the rice stinkbug, the striped earwig, aphids, the boll weevil, the soybean looper, the cotton leaf worm, the hornfly and other pests. Although they can be used as biological agents attention must be paid to their harmful effects.

A number of biological agents including bacteria, nematodes, fungi and viruses and microsporidia have been evaluated as natural enemies of the red fire ant. The most effective was the nematode *Neoaplectana carpocapsae*. The straw itch mite, *Pymotes tritici* has also been reported as a natural enemy, however, it is also a pest of humans and animals.

<b>DISPERSAL</b>
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The red fire imported fire ant is spread by the movement of infested soil, nursery stock, potted plants, grass sod, hay and used soil – moving equipment to uninfested areas.

## MANAGEMENT

Since *S. invicta* can nest almost anywhere, crates and containers that are used in international/regional trade must be thoroughly inspected for the fire ant.

Control of the red fire ant has been mainly chemical products in the form of mound drench, mound injection, baits, dusts, fumigation, or spot treatments. Non-chemical means include the use of hot water application to mounds or digging up and destroying mounds. Biological control by use of a nematode and the straw itch mite has been mentioned above. Management of the pest through an Integrated Pest Management approach is now a more recognized approach to control (Texas Agricultural Extension Service, 1998).

## HOST NOTES

In addition to stinging through which venom is introduced into the victim, fire ants are pests of a number of crops. They cause damage by directly feeding on plants such as soybeans, eggplant, corn, okra, strawberries and potatoes or indirectly protecting insects that damage these crops. They feed on the bark and growing tips of citrus trees and forage on the fruit. The size of the mounds causes recreational fields to be disfigured. It also interferes with farming and mowing operations causing damage to equipment (Lofgren *et al.*, 1925).

Fire ants have been found invading outdoor electrical equipment and plumbing. They also nest in wall voids and under carpeting. Electric meters, traffic signal control boxes and airport runway lights have been infested. Sections of roadway have also collapsed when fire ants remove soil from below road surfaces. Fire ants cause problems in agriculture, households and industry – It is a general pest.

## DISTRIBUTION

Red Fire Ant originated in Brazil and Northern Argentina in South America. The ants were accidentally introduced in the United States in the 1920s and have been spreading since then. Recently, they have been reported in Antigua (Gore *et al.*, 2001) and Trinidad, British and US Virgin Islands, the Bahamas Islands, the Turks and Caicos Islands (Davis *et al.*, 2001). It was also found in New Zealand and Australia in 2001. It has been eliminated from New Zealand.

## PEST SIGNIFICANCE AND PHYTOSANITARY RISK

*S. invicta* is considered to be a pest of considerable economic importance. Although it has been reported as a predator of a number of other insect pests it has been troublesome to farmers since the 1940s. The species can disfigure the landscape in both agricultural fields and recreational areas. It is a direct threat to human health, pets and small animals.

The species is a pest of quarantine importance because it can be easily carried in nursery stock and soil. Quarantine therefore should be designed to slow the spread by proper inspection and treatment of all nursery stock, turf grass, hay and other items transported out of quarantine areas.

## Bibliography

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### Web Resource: -

[http://www.antcolony.org/news/red\\_imported\\_fire\\_ant.htm](http://www.antcolony.org/news/red_imported_fire_ant.htm)