The Imported Fire Ant, A General Review and Its Impact on The Highway System of Texas

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There is a small ant that invaded the United States over 60 years ago that has become a serious problem for people in southeastern United States. This ant problem is continuing to spread westward and now is moving through Texas. However, this ant problem is also becoming a problem in two new ways, one of these being due to its interaction with highway facilities of the infested states and the other is due to an increased density of the fire ant population. The ant is called Solenopsis invicta and is affectionately known as the "IMPORTED FIRE ANT".

The imported fire ant, as the name implies, was introduced into the United States around 1918 with a possible second introduction from South America in the 1930's. These introductions were not intentional and how fire ants were brought to the United States may never be known, but we do know that both times the ant entered through the busy trade seaport at Mobile, Alabama. The ants were probably brought in on soil used as ballast on ships bringing products such as coconuts from South America where the ant is from. However, they could have been brought in on the coconuts themselves.

The original home of the fire ant is not clearly established because in South America there are more than a dozen types of fire ants, several of which are very similar to the type that has spread throughout the southeastern United States. It is presently thought that the ant that has reached the United States may have come from the Mato Grosso region of Brazil, but there

is also evidence that the ant may be from the northern area of Argentina.

Once in the United States, the ant spread rapidly into the adjoining states during the late 1940's. This spread was mainly due to the transport of ants hidden in nursery stock that was produced in the Alabama area. The ants were also inadvertently spread by people as they traveled from place to place. In the 1950's the government restricted the movement of nursery stock from infested to uninfested areas. While this action helped to slow the spread, it came much to late to contain the ant.

Fire ants also naturally spread during their mating flights. Fire ants, like most ants, produce large numbers of winged male and female ants during the spring and summer. On any clear and warm day following a rain these winged ants fly from the mound, mate in the sky and often land miles from where they started. The mated females seem to be attracted to shiny surfaces and sometimes land in water where they easily float downstream to infest new areas. They also may land on cars and trucks on which they maybe carried hundreds of miles before they fall to the ground to start a new colony. The males die after mating, but the mated females remove their wings, dig a small hole in the ground and lay eggs. In a couple of months a small mound of fire ants appear. The production of many hundreds of winged females by each mature mound, most all of which are mated before they come back to the ground, is important to the success of these ants and is the cause of many of the problems we have in control of the ants.

The biology of the imported fire ant is similar to most other ground nesting ants. The newly mated queen lays about a dozen eggs which she feeds with secretions derived from the break-down of her wing muscles (which after the mating flight are no longer needed). Once the eggs hatch, the larvae

develop and transform into adult ants, and the colony rapidly begins to grow. All the workers are females, but are incapable of reproduction. They begin as nurse ants feeding the developing larvae and the queen which produces several hundred eggs per day. As workers age they help dig and maintain the mound and are recruited to food by the successful foraging (hunting) workers, which are the oldest. Workers vary in size (Fig. 1), with the largest living over a year. A queen may live over 5 years. As the year progresses the colony grows to contain several thousand ants with a single queen, in a mound about a foot in diamter (Fig. 2). There may be 20-40 mounds per acre, each being independent. In fact, one mound will fight with ants form another. After about 6 months some larvae develop into winged and fertile females along with a few winged males, which fly following summer rains to reinfest new area. A mature colony contains several hundred thousands ants.

The name "fire ant" comes from the experience one gets when encountering these insects. The ants live in mounds of soil in honeycombs of small tunnels and chambers where hundreds of thousands of ants reside. These ants, known as workers, swarm out of their nest when disturbed and attack the animal or human that disturbed them. The ants are small, generally about the size of a capital "H" in general news print, but their size is misleading. Once on your skin they bite to get a firm grip on the skin and then they sting (Fig. 3). The sting is painful, but not as bad as a bee or wasp. The difference is that there are usually 20 or more ants doing the same thing on your leg at the same time. So a person gets the feeling that their leg is "on fire".

These ants can sting over and over so one ant can walk up your leg and sting several times. While some people's lives are threatened by the sting of the fire ant due to their sensitivity to certain insect stings (a phenomenon

known as anaphylactic shock), for most people the burning sensation dissipates in a few minutes. However, the next day a small pustule develops at the sting site (Fig. 4), which itches and can become infected. While the pustule usually drys up within a week or so, for some people it leaves a brown scar that may last for many months (Fig. 5).

Because of their painful stings, these ants deter outside recreational activities. For example, it is difficult to lay on a blanket on the ground and have a picnic, go bare footed around a lake, sit on a stump in the woods, or play a game of tag in a backyard when fire ants are around.

While fire ants can result in the death of sensitive people, they can also kill pets, livestock and wildlife for the same reason--sensitivity. Fire ants are very hard on any kind of ground nesting animal. Consequently, areas that are heavily infested with fire ants have a less diverse ground dwelling fauna.

Fire ants also damage certain crops often attacking seeds such as corn, sorghum, and beans as they germinate killing them, or the ants attack the buds and newly developing fruit of beans, okra and peppers, as examples.

However, the imported fire ant is posing a threat to peoples lives in another way. The ants seem to like to move into containers that house sensitive electrical equipment. For example, they move into heat pumps and air conditioners where they chew through wire insulation, pack themselves into circuit breakers (Fig. 6), and bridge various electrical contact points, all of which lead to short circuits, fires, and failure of equipment. While inhibiting the function of a heat pump may not be serious, the ants also invade telephone junction boxes and chew through communications cable insulation which leads to short circuits and loss of telephone service, invade airport landing lights causing the loss of these lights, and invade

traffic control cabinets. They even build mounds in electrical transformers (Fig. 7). In traffic control cabinets (Fig. 8), the ants have been reported to chew holes in the insulation which may lead to a short circuit and the malfunction of traffic lights, particularly during wet weather. The loss of traffic control not only results in confusion of the motoring public, but the accompaning bad weather conditions increase the likelihood of serious automobile accidents. Fire ants have also been found to enter and short circuit traffic signal flasher control units, which can also lead to serious accidents.

So, the imported fire ant not only threatens the lives of those people allergic to their stings, but through their infestation of electrical equipment, such as the traffic control cabinets and highway signal flasher units, can place peoples' lives at risk.

Fire ants cause another problem for the Texas highway system. When their nests are built under a highway pavement and later the ants move, the areas above the mound subside (Fig. 9). This action forms a pot hole and a danger to the motorist. The repair of these pot holes is an added expense to the highway department.

If one fire ant problem was not enough, there is another. A few years ago, some colonies of fire ants were found to have several hundred mated queens per mound rather than just one. We referred to these new colonies as "multiple queen colonies" and they are of considerable concern because they are rapidly spreading across the southern United States (in the last few years, multiple queen colonies have been reported from Florida, Georgia and Mississippi, in addition to Texas). One concern is that multiple queen colonies do not fight with their neighbors. In fact, the neighboring colonies are all part of a

"super colony." These multiple queen colonies not only have hundreds of queens in a mound, but the number of mounds may reach 300 - 400 per acre. This new development means that more people and animals are more likely to encounter fire ants, more damage may be caused, and the multiple queen colonies are harder to control as all queens must be killed to eliminate the colony.

Fire ant queens by themselves are not very good at defending themselves against other ants, so when they land in an area having lots of native ants they are usually killed. However, our native ants are easily disturbed, chased away or killed by the activities of people. These activities include mowing, overgrazing, use of fertilizers and, of course, pesticides. These activities create holes in the environment that lack ants on the hunt, and the fire ant queens can land and start a new colony in safety.

This same thing also happens in single queen fire ant infested areas. A fire ant mound has hundreds of workers out hunting food and any fire ant queen that is unfortunate enough to land in the hunting area is quickly found and killed. However, if a few existing fire ant mounds in an area are destroyed by treatment newly mated queens that land in that area will not be killed by existing ants and many small new mounds will be formed.

The imported fire ant continues to spread in spite of our best efforts at control. Early attempts at control in 1958 used a material called Heptachlor, which was spread over the ground killing ants on contact. However, Heptachlor was found to accumulate in the food chain and was not only killing ants but also fish, birds and other wildlife. In addition, Heptachlor was only giving temporary control of fire ants. Heptachlor was banned from use as a broadcast

granular insecticide for fire ant control (even though this product is presently marketed for control of fire ants in electrical equipment).

Heptachlor was rapidly replaced (starting about 1962) with a food bait containing a poison referred to as Mirex. The poisoned food bait is collected by fire ants and fed to nest mates. But Mirex only worked because it was slow; a fast acting poison kills ants before they can feed nest mates and the queen. But even Mirex didn't kill all the colonies. A well fed colony did not eat the bait, which lost its attractiveness to the ants within a day. Also, it was impossible to treat hundreds of thousands of acres at one time and cover the area uniformly. Many mounds escaped to reinfest all the land again. In the 1970's Mirex was banned due to environmental problems, but even during its years of use the fire ants continued to spread.

Mirex has been replaced by several other pesticide containing baits that are subject to some of the same problems, and when they provide control, it is temporary. In addition to baits, there are a number of mound drenches available. For those interested in control products and ways to use them, write your Texas County Extension Office and ask for the bulletin B 1538 "Fire Ants and Their Control."

The Texas Agricultural Experiment Station and Texas Transportation Institute of Texas A&M University are presently conducting research in cooperation with Texas State Department of Highways and Public Transportation to address the fire ant infestation problem observed in traffic signal systems. We are presently testing several insecticides and procedures for control of fire ants in traffic signal cabinets and flasher boxes. We hope to provide techniques which are safe and effective in reducing the impact of this insect on the highway system of Texas. Until we have more specific

recommendations, we can suggest frequent monitoring and removal of fire ants and the use of granular pesticides containing chlorpyrifos.