RED IMPORTED FIRE ANTS (RIFA) ARE A THREAT TO ARRIVE IN MISSOURI DUE TO RECENT DROUGHT

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INTRODUCTION

Recent drought conditions in many areas of Missouri have resulted in a greater demand for hay and the need to purchase this hay from areas outside the state. *Solenopsis invicta*, the red imported fire ant (RIFA), is a serious economic and ecological pest which can easily be transported in hay bales from RIFA quarantined areas in the southern U.S. to areas further north where the ant is not established (FIGURE 1). The economic impact of RIFA in Texas alone has been estimated to be $1.2 billion each year and similar impacts are measureable in other states in the Southeastern U.S. Recently, a landowner in Ozark County, Missouri purchased hay from Florida which contained an active RIFA nest. The RIFA colony was treated and ongoing monitoring shows no established colony, but the threat of other RIFA colonies going undiscovered in hay shipments and becoming established in Missouri is a serious risk that would have long-term economic and ecological impacts on both rural and urban populations.

The negative economic and ecological impacts of RIFA on agriculture producers and the general population of Missouri would be extremely detrimental if brought here from currently infested RIFA areas. RIFA are very aggressive ants that possess a painful sting. They respond rapidly and aggressively bite and repeatedly sting their victims if disturbed even slightly. They inject an alkaloid-based venom each time they sting, which causes a burning sensation and results in a small, white, itchy pustule that persists for several days. RIFA sting an estimated 14 million people each year in the southern U.S. These stings are especially dangerous to humans, newborn livestock, ground-nesting birds, and small animals. Therefore, to avoid the establishment of RIFA in Missouri, producers are encouraged to purchase hay from non-RIFA infested areas of the U.S. whenever possible.

SPREAD OF RIFA AND QUARANTINE

RIFA can spread through the flight of winged queen ants, budding of active colonies in the ground, and through movement of infested materials. RIFA were introduced from South America in the early 1900's on shipping materials to Mobile, AL where they spread slowly at first via swarming, but during the post WWII housing boom, they spread rapidly throughout the Southeastern U.S. in shipments of landscaping plants. This pattern of rapid spread via transport by humans, followed by gradual spreading via swarming that saturates small areas, has led to the complete infestation of more than 320 million acres across 14 states in the Southern U.S. (FIGURE 1).

USDA-APHIS works to prevent further spread of RIFA by enforcing a Federal quarantine and by cooperating with RIFA-infested states to regulate the movement of certain items to non-RIFA infested states. These regulated items include: baled hay and stray that has been stored on the ground, soil, sod, plants with soil attached to the roots, used soil-moving equipment, or any other items that pose a risk of spreading RIFA. The movement of nursery stock, sod, and hay from RIFA areas to non-RIFA areas is the primary method of spread. RIFA colonies do not infest bales during cutting or baling, but as the bales sit in the field. They migrate to bales within the first day after baling and reach peak infestation levels within the first week. Eventually, a mound is formed at the base of the bale and when the bale is later loaded for shipment, part of the mound is torn away from the ground and travels with the bale. If a queen is present in the torn away portion of the mound, RIFA can become established where the bale is unloaded. Those who purchase hay from areas where RIFA is known to occur, or where it is possible that RIFA may occur, must understand and follow important guidelines to prevent accidental introduction of RIFA to Missouri.

Hay bales inside a quarantined area can be shipped anywhere else inside the quarantined area, but bales that are not removed from fields immediately after baling and stored in an off-ground location cannot be shipped out of quarantined areas. All hay shipped out of quarantine areas must be certified in order for it to be legally received at its destination. Certification is essential and requires that hay be free of RIFA and that it not have been stored in contact with the ground prior to shipment. Even if hay bales had been stored properly, the shipment could be turned back if there is no certification. Certification may take the form of a compliance agreement with a USDA seal or a limited permit signed by either a USDA or an appropriate state regulatory official from the state of origin. Producers should maintain a copy of the RIFA quarantine certificate for their records and a copy needs to accompany the shipment to the buyer.

IDENTIFYING RIFA

RIFA live in relatively large, distinctive soil mounds. These mounds have no recognizable central nest opening from which ants enter and leave. Mounds vary in size, but a mature soil mound can be up to one foot in diameter and in height, and may contain 300,000 individual ants. When a RIFA mound is even slightly disturbed, large numbers of ants emerge rapidly and climb aggressively onto their victim to sting. Large RIFA mounds may impact workers and livestock in the field, cause damage to farm equipment used for cultivation and harvesting, and reduce harvest yields.

RIFA have a big reputation because of their painful sting, not because of their size. Individual RIFA are smaller than most people imagine them to be and there is a wide range of different sized ants in each colony, ranging from only 1/16 to 1/4 of an inch in length. All sizes can sting

with equally painful results. All RIFA share some physical characteristics that are used to readily identify them (FIGURE 2). They have a dark reddish-brown body with a dark brown-black abdomen. The narrow waist (pedicel) between the body and abdomen has two large segments (nodes) and the end of the abdomen has a prominent stinger. Other distinguishing features of RIFA are found on the head. Their antennae have 10 total segments, the last two of which are enlarged greatly (clubbed), and their mandibles have four large teeth (FIGURE 2).

RIFA DETECTION IN HAY BALES

Hay buyers can reduce the likelihood of RIFA infestation on their own land by vigilantly inspecting and monitoring all shipments of hay from RIFA infested areas, even if the shipment is certified. Always ask if the hay you buy is known to contain ants. Visually inspect each hay bale upon delivery and place an attractive food source on each bale for one hour to see if any hidden colonies present within the bale come to the food. A dab of peanut butter, piece of hot dog, or card soaked in peanut oil and placed on each hay bale will attract RIFA from inside the hay within the hour. If you find ants in a shipment of hay, collect several specimens immediately, place them in alcohol, and notify University of Missouri Extension, Missouri Department of Agriculture, or USDA-APHIS immediately. They can help you take proper steps to identify the ants and eliminate them if needed.

RESPONSE AND CONTROL OF RIFA

Eliminating introduced RIFA colonies requires two kinds of strategies: 1) applying specially-formulated RIFA bait to the area surrounding a colony, and 2) treating individual colonies directly with a contact insecticide.

Specific fire ant baits have been formulated which consist of processed corn grits coated with soybean oil that contains insecticide. These baits are spread across an area surrounding the colony using a broadcast spreader. Baits contain low amounts of toxin and are slow-acting so they may require weeks or months to achieve control. For best results, fresh bait should be applied when temperatures are high during mid-afternoon on dry ground with no expectation of rain during the first 24-48 hours after application. Since RIFA is not established in Missouri, baits specifically formulated for them are not readily available over-the-counter and some products sold in RIFA areas of the southern U.S. may not yet be labeled for use in Missouri. Those that are labeled for Missouri may need to be purchased online or by traveling to regions where RIFA are established to purchase them over-the-counter. All RIFA bait products registered for use in Missouri can be found in Table 1.

Direct treatment of RIFA colonies is accomplished using a contact insecticide that applied directly to the colony. Colonies may be found in hay bales or in soil nearby. Currently no contact insecticides are labeled to directly treat hay bales. Contact treatments eliminate the

main portion of the colony in soil within a few hours and leave little residual activity later on. Pour liquid insecticides slowly onto RIFA colonies in order to soak them thoroughly. Place granular contact insecticides on top of the mound and soak with water. Treatment to mounds is best done when temperatures are mild—in either morning or evening—when many of the ants are close to the surface. Several products are available over-the-counter for direct treatment of various kinds of ants and can also be used for RIFA. The trade names, formulations, and active ingredients vary. Some of the insecticides labeled for direct treatment are found in Table 1.

CONTACT INFORMATION

Contact your local University of Missouri Extension Office for assistance and help identifying ants associated with hay bales. For additional information, contact Dr. Richard M. Houseman at the University of Missouri: housemanr@missouri.edu or 573-882-7181. To reach the Missouri Department of Agriculture, contact Dr. Collin Wamsley at: colllin.wamsley@mda.mo.gov or 573-751-5505. The USDA-APHIS point of contact is Mike Brown at michael.e.brown@aphis.usda.gov or 573-893-6833.

OTHER RESOURCES

General Information about Fire Ants:

http://www.extension.org/fire_ants

Baled Hay Producers brochure:

http://www.aphis.usda.gov/plant_health/plant_pest_info/fireants/downloads/BaledHayProducers.pdf

General information about the USDA Imported Fire Ant Quarantine:
http://www.aphis.usda.gov/plant_health/plant_pest_info/fireants/index.shtml

Identify quarantine areas by zip code:
http://www.aphis.usda.gov/plant_health/plant_pest_info/fireants/zipcode.shtml

FIGURE 1: Red imported fire ant quarantined counties in the United States as of December 2011.

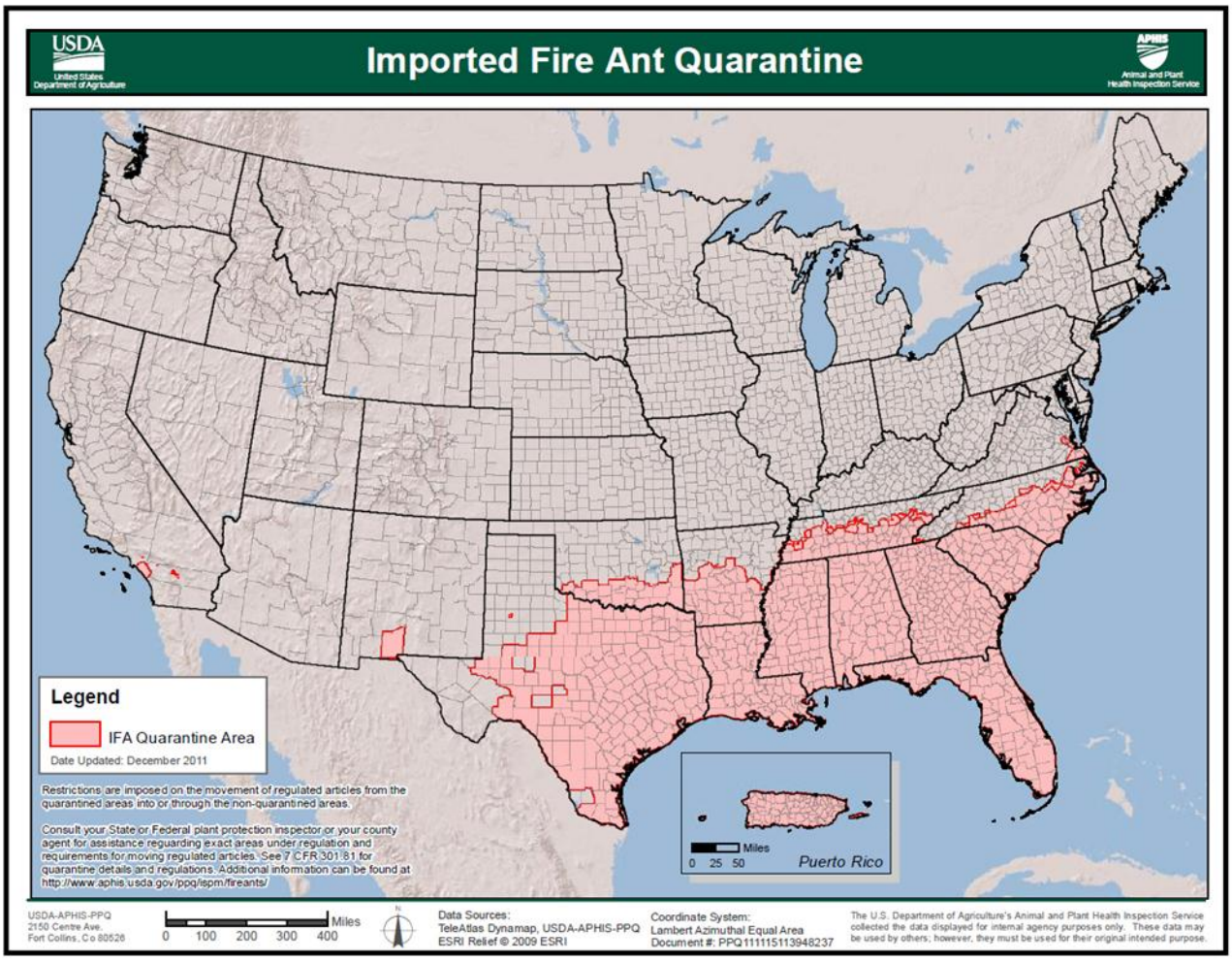

FIGURE 2: Characteristics used to identify *Solenopsis invicta*, the red imported fire ant.

TABLE 1: The following pesticides are registered and can be used for treating red imported fire ants in Missouri. They are recommended for use only in accordance with the directions specific to each label. Keep in mind that the desired pest (ants) and the specific site of application must be included in the directions for use. Use on any other site would be considered a misuse of pesticide.

Baits		
Name	Active Ingredient	Notes
Extinguish	0.5% methoprene	Takes 3-6 months. May be applied to pastures where livestock are grazed.
Esteem	0.5% pyriproxifen	Takes 3-6 months. May be applied to pastures where livestock are grazed.
Extinguish Plus	0.25% s-methoprene + 0.36% hydramethylnon	May NOT be applied to pastures where livestock can be grazed.
Amdro Pro	0.73% hydramethylnon	Takes 3-6 weeks. May NOT be applied pastures where livestock can be grazed.
Contact Insecticides		
Name	Active Ingredient	Notes
Ortho, Orthene	acephate	Follow label instructions.
Sevin	carbaryl	Formulations, trade names, and concentrations may vary. Follow label instructions.
Pyrethroids (various names)	bifenthrin, cyfluthrin, cypermethrin, deltamethrin, fenvalerate, lambda-cyhalothrin, tralomethrin	Formulations, trade names, and concentrations may vary. Follow label instructions.
Botanicals (various names)	d-limonene, pyrethrin, pine oil	Formulations, trade names, and concentrations may vary. Follow label instructions.
Pyrethrin derivatives (various names)	Allethrin, resmethrin, sumithrin, tetramethrin	Formulations, trade names, and concentrations may vary. Follow label instructions.