

FIRE ANT CONTROL IN NURSERY STOCK

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Fire ants are a unique pest, causing a variety of problems depending upon the ecosystem involved. Before we consider specifically about how to control fire ants in nursery stock, I would like to review briefly the history of fire ants in the United States.

EARLY HISTORY

The first collections of the imported fire ant (IFA) in the United States were made by W. S. Creighton in 1928. Creighton identified these ants as *Solenopsis saevissima* var. *richteri*. H. P. Loding, a USDA employee and amateur entomologist, estimated they were introduced into the port of Mobile, Alabama, around 1918, possibly as ballast or dunnage discarded from ships (4). Dunnage is matting constructed from vegetative matter in South America and used on coffee ships. Until the enactment of the Plant Quarantine Act of 1912 it was a common practice to discard dunnage once the ship was unloaded and there was no further need for the mats (1). For a number of years after its introduction into the United States, very little spread of *S. richteri* occurred. By 1931 these ants were found in three other small communities in Mobile County, Alabama, in Fairhope, Alabama, and in neighboring Baldwin County, Alabama (6). Between 1933 and 1945, a second fire ant species, later to be named *S. invicta* (2), invaded the Mobile area. The new invader proved to be more adaptive and rapidly displaced *S. saevissima* var. *richteri*. By 1949 it was by far the dominant species of imported fire ant (7).

Spread or range expansion by the ant was accomplished in two different ways:

1. Steady expansion of the main population outward from its center at Mobile through mating flights (natural dispersal) and,
2. Establishment of isolated secondary infestations through movement of infested nursery stock (5).

Infestation maps from 1950, 1960, 1970, and 1980 dramatically illustrate the rapid spread of the IFA in the United States. As of 1987, the IFA occurred in 11 states, plus the Island of Puerto Rico. We can only speculate upon the ultimate range, but most experts agree that spread throughout irrigated areas of the U.S. Southwest will occur and, if introduced into the West Coast, favorable conditions will be encountered, with parts of California, Oregon,

and Washington subject to infestation. Throughout its current range, the prime habitat of the IFA is pastures, fields, and recreation areas. However, the abundance of favorable microhabitats within cities and towns north and west of the current infestation may mean that the IFA will become more of an urban pest in these areas.

FEDERAL QUARANTINE PROGRAM

As we have seen, the fire ant is a very successful hitchhiker, and artificial or accidental spread by man accounts for most long-distance transport to new areas. However, a direct link between plant nurseries and IFA spread was not established until 1953 (5). At that time, the artificial spread of IFA through commercial shipments of infested items such as grass sod and nursery stock was well documented.

In response to mounting public concern, the U S. Congress appropriated \$2.4 million for IFA control and eradication on August 28, 1957. As part of the plans for control and eradication, a quarantine to slow or prevent artificial spread was proposed. On May 6, 1958, Federal Quarantine 301.81 was invoked (3) and regulations governing the movement of the following articles were issued:

1. Soil and unprocessed sand and gravel
2. Forest, field, or nursery-grown woody or herbaceous plants with soil attached
3. Plants in pots or containers
4. Grass sod
5. Unmanufactured forest products such as stump wood or timber if soil is attached
6. Any other article or product capable of harboring ants

Prior to shipment outside the fire-ant infested area, certificates authorizing movement of these articles must be issued by quarantine officers when it has been determined that the articles are free of infestation. In general, this means the article will have been treated with an approved insecticide. Uncertified articles transported into non-infested areas are subject to confiscation and possible legal action by State and Federal regulatory officials.

Today almost all nursery-stock treatments are based upon the insecticide chlorpyrifos (Dursban®). Dose rates and formulations used are varied according to the use pattern.

Sod. For grass sod, a 10% granular formulation of Dursban® is applied at 6 lb. a.i./acre. Only a single formulation is registered at this time. When applied at this rate, 10 weeks of certification is achieved. A lower rate of application (4 lb. a.i./acre) provides a four week certification. It is important to note that this treatment may

not eliminate mature colonies. On grass sod, we assume that the greatest pest risk is associated with newly inseminated queens rather than mature colonies, and therefore, the Dursban® treatment is primarily for new queens.

Potting media. Potting media in which containerized plants are grown can either be drenched with a Dursban® solution, or a 2.5% granular formulation can be blended or incorporated into the potting medium. Several EC formulations are labelled for the drench, but only one granular formulation is labelled. Incorporation of granular Dursban® into potting media is undoubtedly the most commonly used fire-ant treatment for nursery stock. In order to be effective, thorough incorporation of 1.0 lb. of 2.5G/cu.yd. of a potting medium is necessary. This rate of application is considered effective for 24 months.

Field-grown stock. Field-grown nursery stock can be certified in two ways: 1) It can be root-dipped in a chlorpyrifos solution (4 fl. oz. 4EC/100 gal. water), or 2) A combination treatment employing both a bait and granular chlorpyrifos can be used in the field prior to harvest.

The combination treatment is based on the concept that the bait application (either Logic® or Amdro®) will eliminate colonies existing at the time of treatment while the granular Dursban® (applied broadcast at 6.0 lb a.i./acre) will protect against reinfestation by new queens for at least 12 weeks.

In addition to these approved quarantine treatments, we strongly advise that all nursery environs be treated with a registered bait material to minimize IFA populations in the nursery. Bait treatments are not required as part of the quarantine but will definitely augment and support quarantine treatments. Both Amdro® and Logic® are registered for use in nurseries. Both materials should be applied broadcast at 1.0 to 1.5 lb. bait/acre. Application equipment suitable for use with fire-ant baits is very specialized and not commonly used for any other purpose. The very low labelled rates of application can be difficult to achieve with conventional granular applicators. One type of commercially available equipment that can be calibrated to deliver 1 to 1.5 lbs. bait per acre is the Herd Seeder®, Model GT-77A.

Proper timing is critical with any bait application. In order to be effective, the bait must be fed upon by foraging workers and the active ingredient in the bait passed on to other colony members. Ants do not forage when the soil surface temperature is less than 68°F, or when it is very hot and dry. We recommend that twice yearly applications be made as follows: The first applications should be as early in spring as possible (generally February/March), with a follow-up treatment between August 15 and September 15.

By design, baits are very slow in activity. It normally takes 6 to 12 weeks for colony mortality to occur following a spring application.

RECENT CHANGES IN THE QUARANTINE PROGRAM

For the past 30 years, the U. S. Department of Agriculture has been responsible for administering and enforcing the Federal Fire Ant Quarantine Program, which regulates the interstate movement of regulated articles. However, in 1987 a major change occurred. Through a series of cooperative agreements with the affected states, USDA authorized state cooperators to perform most enforcement activities of the quarantine and to provide funding to the states to support this effort. This means that closer scrutiny by recipient states to the north and west of the present affected areas has definitely increased in recent months.

The effectiveness of quarantine programs is sometimes questioned because of the rampant spread of the IFA. Recent infestations in plant nurseries near Phoenix, Arizona; Santa Barbara, California; Oklahoma City, Oklahoma; Laredo, Texas; Charlotte, North Carolina; and St. Croix, U.S. Virgin Islands, are known to be due to importation of infested nursery stock. State regulatory officials detected these small infestations and quickly eliminated them. Therefore, we must also wonder where the IFA would be today if there had never been a quarantine program. Due to the uncertainty of the ultimate range of the IFA, it seems appropriate that we continue with the enforcement of a strong program to slow or prevent further spread of this pest.

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