



## **Considerations For Developing and Applying Individual Red Imported Fire Ant Mound Drenches**

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All too often, individual fire ant mound treatments are ineffective, causing people to chase fire ant colonies around their yards instead of killing them. Individual mound treatments often kill large numbers of worker ants close to the surface of the mound. However, in order to successfully eliminate a colony, all of the egg-laying queen ants must also be eliminated. The queen ants may be deeper in the mound and are quickly moved away from danger by worker ants. Understanding factors that affect the success or failure of individual mound treatments can lead to more success when using these treatments.

**Season/Temperature.** Red imported fire ants move up and down within their mounds depending upon temperature, a behavior called thermoregulation. On cool mornings, they will nest just under the mound's surface on the sunny, east side. In very hot or cool weather, they nest deeper in the mounds, six or more inches below the surface. Application of mound drenches during periods when the ants are nesting closer to the mound surface are more effective.

**Soil type.** Clay-type soils retain the structure of the mound as developed by the ants. They can be up to 18 inches tall and contain many tunnels and galleries, extending deep into the soil. In areas where ants have no access to surface water, tunnels can be several yards deep for accessing soil moisture at the water table. In sandy soils, the mounds are less structured, because sand does not hold the mound structure. The mounds are generally not as tall and are much wider. Application of solution to mounds in clay soil can be effective, provided that the galleries are flooded and the solution does not run off the sides of the mound and away from the colony. In sandy soils, treatments flush more quickly through the soil, possibly reducing exposure of ants to the treatment material.

**Soil moisture.** Mound drenches are most effective when all ants in a mound come into contact with the solution. The best time to apply a mound drench is when the soil is neither too wet or too dry. If soils are already saturated with rain, the solution may not penetrate into the soil profile. Conversely, when ants are forced up to the soil surface by saturated soils, they will be easier to contact. When soil moisture is very dry, the solution is quickly absorbed by the soil, and may reduce the period of time ants are soaked in (exposed to) the dilute insecticide.

**Concentration and dose.** Registered insecticide products have been tested to be effective using the concentration (use rate) described on the product label. Generally, higher concentrations are more toxic to the ants. They are usually applied with some type of watering can as a "gentle rain" over the colony. This method is least disruptive to the mound, and extends the period of time ants are soaked in the dilute insecticide solution, thereby increasing the exposure period. Use of a bucket to apply the solution floods the mound more quickly and often causes the surface to

collapse to flush the solution into the tunnels and galleries. Although this may provide more thorough “coverage” by flooding galleries, exposure time may be reduced.

**Agitation.** Some insecticides like dust-formulated products or emulsifiable concentrate insecticides need to be mixed with water before application. It is critical to mix the materials thoroughly in water. This can be achieved by putting some water in the tank first, then adding the insecticide material before filling the tank with the remaining amount of water required. If using oil-containing ingredients which tend to separate from water, agitate the mixture periodically to assure thorough mixing prior to application, particularly if the mixture has been allowed to sit for a period of time.

**Volume.** Most fire ant mound treatment product labels direct the user to apply one gallon of diluted insecticide to each ant mound. There are exceptions, such as Exxant, which requires four gallons of solution to be applied. Other products allow the user to use less material based on the size of the mound to be treated. For contact insecticides, all ants in the mound must come into contact with the insecticide in order to achieve control of the colony. Some products have residual action that will kill ants walking on the treated surface for some time after the material has been applied to the soil. However, other treatments, like use of very hot water, have short or no residual action requiring direct contact of ants with the solution to be effective.

**Drench temperature.** Most fire ant drench products do not specify temperature of water in which to dilute the concentrate material, and use of water at temperatures from the source is acceptable. However, temperature can make a difference. Very hot, almost boiling, water is known to be effective in killing about 60 percent of the mounds on which two gallons of water has been applied (during periods when ants are nesting close to the mound surface). One product, Exxant, suggests using cold water (“The colder the better”), but the rationale behind this statement has not been evaluated. Ingredients move into ant bodies when temperatures are higher, since the metabolic rate of these cold-blooded animals will be increased. Conversely, cooler temperatures slow the ants down and presumably could increase the exposure period of the ants to the insecticide solution.

**Disturbing mounds.** Most ant mound treatment products direct the user NOT to disturb the mound prior to treatment, thereby keeping ants concentrated close to the mound surface where they will more likely be contacted with the solution than when they scatter to defend the mound. Also, the queen ants reportedly move deeper into the mound upon disturbance, reducing the possibility of contact with the solution. Some products instruct the user to use a stick to poke a hole into the tops of the mound. This action provides a point of entry to allow the solution poured into the hole to flood through the tunnels and galleries in the mound, but also causes a mound disturbance.

**Monogyne (large) versus polygyne (small) ants.** Polygyne (multiple queen) ants are more difficult to control with individual mound treatments because infested areas have dramatically higher numbers of ant mounds per acre (200 or more queens) than areas infested with the monogyne (single queen) form (40-150 queens). However, worker ants in polygyne colonies have smaller bodies on average, making them more susceptible to contact insecticides than larger ants. In addition, all queen ants in multiple queen ant colonies must be killed in order to eliminate the colony. Elimination of all of the colony’s queens is generally not a problem when using conventional nerve-active contact insecticides as directed because of the relatively longer residual activity of these products. However, it may be more of a factor in the effectiveness of

soap and oil based insecticides that kill by physical or cytotoxic means (i.e., drowning, desiccating, suffocating, etc.).

**Treatment diameter around mounds.** Most ant mound treatments instruct the user to drench the actual mound and also the soil in a three to four foot diameter circle around the mound. This is because mounds have subsurface tunnels radiating away from the mound proper which can harbor ants and queens. Occasionally, the entire colony is not actually nesting under the pile of soil thought of as the mound. This is often the case with colonies nesting next to curbs and other objects where the nest is actually under the object but the mounds is build next to the object. In these situations, mound drench treatments may be ineffective because not all of the ants in the colony come into contact with the insecticide.

**Injection and other treatment devices.** Numerous attempts have been made to develop devices to inject insecticide solutions into ant mounds to reduce surface insecticide residues. These devices often take more time for a given volume of solution (i.e., one gallon) to be applied. In addition, ants nesting close to the mound surface are often bypassed by the injector rod, sparing them from contact with the solution. These devices are less reliable for treating ant mounds in sandy soils, where there are fewer or no tunnels or galleries associated with the shallow mounds the ants form there. Few insecticide product labels provide directions for application through injector devices. Hose-on applicators are difficult to calibrate. The amount to concentrate to add to the jar is not provided on most product labels and more time is required to apply a given amount (i.e., one gallon) of solution to the mound. The spray nozzle may not allow enough of the dilute solution to penetrate into the mound sufficiently. Nurse tanks can be used to mix up larger volumes of dilute solutions. However, proper agitation of the solution is required to thoroughly mix the material in the larger tank and the spray nozzle may only provide a stream of solution unless a breaker or injection rod is attached to the hose end.

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For more information regarding fire ant management, see Extension publications [B-6043](#), *Managing Red Imported Fire Ants in Urban Areas*; [B-6076](#), *Managing Red Imported Fire Ants in Agriculture*; [B-6099](#), *Broadcast Baits for Fire Ant Control*; or [L-5070](#) *The Texas Two-Step Method Do-It-Yourself Fire Ant Control for Homes and Neighborhoods*. Also visit our web site at <http://fireant.tamu.edu>.

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