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LEAF-CUTTING ANT

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The Texas leaf-cutting ant (Fig. 1), *Atta texana*, is a serious pest in recently-planted pine plantations in East Texas and west-central Louisiana, and in the citrus groves of South Texas. Treatments to eliminate nearby colonies are routinely required to successfully establish pine seedlings in areas where leaf-cutting ants are abundant.

Figure 1. Texas leaf-cutting ant worker (forager); about 5x life size

In a 1981 survey of forestry industry within East Texas the Texas leaf-cutting and was rated third in relative pest importance, exceeded only by the southern pine beetle and fusiform rust. In an average year in East Texas, this ant kills pine seedlings on nearly 12,000 acres, and control and seedling replacement costs average $2.3 million. This insect also can be a considerable pest in residential areas within its range by foraging on ornamental shrubs, rose bushes, fruit trees or in gardens. Harvested plant material is used to cultivate a fungus which serves as the ants' principal food source.

The Texas leaf-cutting ant (also called town ant, parasol ant, or cut ant) is the most northern representative of the genus *Atta*, considered among the most destructive insects of plants in the tropical and subtropical Americas. Leaf-cutting ants are generally confined to well-drained, deep sandy soils. Figure 2 shows the 129 Texas counties and 13 Louisiana parishes where Texas leaf-cutting ants are known to occur. This species also is reported in at least two states in northeastern Mexico.

Figure 2. Distribution (green area) of the Texas leaf-cutting ant in Texas and Louisiana

Figure 3. Texas leaf-cutting ant caste system. Workers have multiple size classes that include soldiers (large), foragers (medium) and gardeners (small).

Texas leaf-cutting ant castes are comprised of the winged reproductives, or "alates, (female queens and male drones having wings), and wingless workers (Fig. 3). The queen is the reproductive center of the colony and lives in chambers below the ground. Many colonies have five or more fertilized queens. Most eggs laid by the queens develop into sterile female workers. The workers (2 million or more) vary considerably in form and size; from 1/16 to ½ inch. Generally, large workers (soldiers) serve to protect the nest while medium-sized workers forage for plant material and construct tunnels and chambers, and the small workers maintain fungal gardens and care for brood ants.

Figure 4. Preparation for the nuptial flight involves removing all plant vegetation within the central nest area.

Figure 5. After the nuptial flight, several fertilized queens may join together to start a new colony. The initial mound is often volcano-like in appearance.

During the spring months, some immature ants will develop into winged males and others into winged females. Workers will emerge at this time to widen entrance holes and remove all vegetation hanging over these holes (Fig. 4). Mating flights then occur on clear, moonless nights following a rain of at least ¼ inch, primarily in May and June. Mated females disperse, land, and then congregate with other females to establish a new colony (Fig. 5). Each female carries with her a plug of fungus to begin a new fungal garden.

The nest area of the Texas leaf-cutting ant is marked by characteristic crescent-shaped mounds (Fig. 6). Each mound surrounds an entrance hole. The above-ground portion of the nest consists of a central nest area (mound density > 5 mounds/yd2) and peripheral foraging mounds (Figs. 7 & 8). Nest size varies from that of a single mound (starter colony) to more than 1000 mounds occupying up to 1 acre. Underground, tunnels extend from the entrance holes to other tunnels or chambers that are constructed as deep as 25 feet (Fig. 9).

Figure 6. Characteristic crescent-shaped leaf-cutting ant mound

Figure 7. Texas leaf-cutting ant central nest area

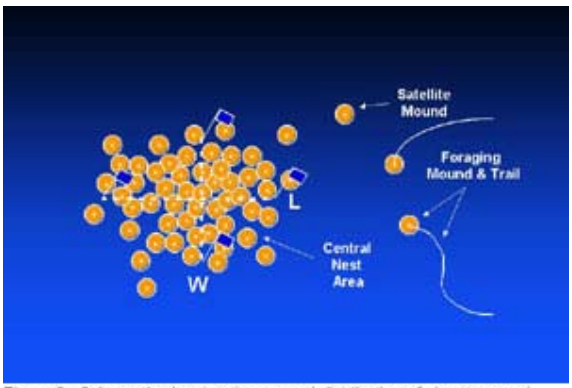


Figure 8. Schematic showing the general distribution of above-ground mounds and foraging trails

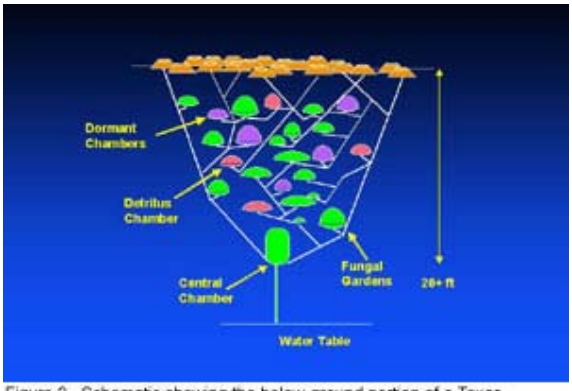


Figure 9. Schematic showing the below-ground portion of a Texas leaf-cutting ant colony

Three types of chambers have been observed: 1) garden chambers-- where plant material is incorporated into fungal mats and where brood ants develop; 2) detritus chambers -- where waste materials are stored; and 3) dormant chambers -- of unknown function. In addition, lateral tunnels extend to foraging mounds as far as 1 ' from the central

nest area. Worker ants, emerging from foraging mound holes, will often construct well-defined foraging trails that extend out an additional 300 feet or more in the search of a suitable plant source.

Activity of the ants above ground depends largely on temperature, as foraging ants are highly sensitive to temperatures encountered along feeding trails. During the summer, the ants remain underground during the heat of the day, often plugging the central nest holes with soil and vegetative debris, apparently to regulate temperature and/or humidity within the nest. At dusk, when temperatures drop below 86^{o}F, ants emerge to forage throughout the night.

In the winter, ants forage during the day primarily from entrance holes above the central nest, but sometimes remain underground for extended periods when temperatures remain below 50^{o}F. Early spring and late fall are transitional periods when ants may be active both during the day and night.

The worker ants forage on a wide range of plant species. However, damage to pine seedlings occurs primarily during winter months (December through March) when grasses and weeds have died back and hardwood leaves have fallen. The ants forage on all species of southern pine, but given a choice the ants appear to prefer loblolly and shortleaf pines over longleaf and slash pines, perhaps in response to differences in resin production.

When foraging on pine seedlings, the ants will completely strip the seedlings of foliage and buds and often clip off the stem at ground level and carry small plant fragments back to their nest (Fig. 10). All seedlings within five acres or more around a central nest area can be killed within a month after seedlings are planted (Fig.11).

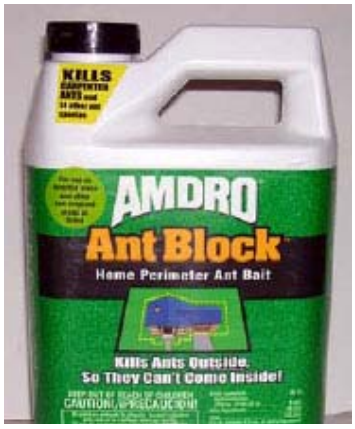

Figure 10. Texas leaf-cutting ants damage and kill pine seedlings by clipping off the needles and buds.

Control options are few for the Texas leaf-cutting ant; they have few natural enemies and no forest management (silvicultural) prescriptions are known to affect their behavior. As a result, landowners have had to rely on several chemical insecticides and application techniques to control leaf-cutting ants, including: 1) organochlorines (aldrin, chlorodane, dieldrin, heptachlor) applied as liquids, dusts, or fogs; 2) fumigants (carbon disulfide, methyl bromide, and resmethrin); and 3) baits containing slow-acting toxicants (aldrin, mirex, hydramethylnon, and sulfluramid), which are retrieved and carried by the ants into their underground nests.


Figure 11. Impact of the Texas leaf-cutting ant in a young pine plantation in East Texas

Methyl bromide had been used effective for 50+ years to halt ant activity. However, because of its potential contribution to ozone depletion, the Environmental Protection Agency (EPA) recently phased out most uses. The use of methyl bromide for control of leaf-cutting ants was discontinued in 2005. Due to environmental concerns, EPA had also prohibited the use of other chemicals (sulfuriamid in Volcano, Griffin) by the early 2000s, leaving, Amdro® Ant Block (hydramethylnon, Ambrands) as the only registered option to control *Atta texana*. Amdro® Ant Block is distributed in 1.5 pound containers (Fig. 12) by Red River Specialties (contact George Bieber at 409-384-7965), and most retail stores (Lowe's, Home Depot, Ace, Wal-Mart, etc.).

Amdro® was originally designed for fire ants, but with the addition of sugars, has become somewhat attractive to leaf-cutting ants. The bait is easily applied by mechanical spreader or by hand (wearing gloves) to the central nest area. Applications can be made in all seasons, but treatments should be postponed during periods of prolonged rain or freezing weather. Once the bait is applied, foraging ants search out the pellets and carry them underground. The first signs of control will be a reduction in foraging and excavation activity usually within 5 - 7 days after bait application. These activities will gradually stop and the colony will become inactive within 2 to 3 weeks.



Amdro® Ant Block is very safe to use. However, it has not proven to be as effective as methyl bromide or other baits in completely halting activity in leaf-cutting ant colonies. Only 3 of 10 colonies were killed with a single Amdro® bait application in a recent study by the Forest Pest Management Cooperative (D. Grosman, unpublished data). On the other hand, the activity of nearly all treated colonies was markedly reduced for several weeks. Although the worker ant activity of many colonies often recovers to a certain extent after 6 – 8 weeks, the activity almost never recovers to pretreatment levels. This suggests that the bait was effective in killing one or more queens and reduced the potential impact of colonies on crops or ornamentals.

When planting pine seedlings on deep, sandy soils within the geographical range of this insect, efforts should be made to find and treat all leaf-cutting ant colonies located in or near areas to be planted. Untreated colonies will remain a source of reinfestation and future losses. Colonies can be located most readily during the late fall and early winter

Figure 12. Amdro® Ant Block (1.5 lb. package) (photo by Don Grosman)

when the ants are active and their mounds are not hidden by vegetation.

For more information on Texas leaf-cutting ants or control methods, contact Melissa Fischer, Forest Health, Texas A&M Forest Service, Lufkin, Texas (Phone: 936-639-8170;email: mfischer@tfs.tamu.edu).