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PB1629-Managing Structure-Invading Ants

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Managing Structure-Invading Ants



Black carpenter ant, $\frac{1}{8}$ - $\frac{1}{2}$ "



Pavement ant, $\frac{1}{8}$ "



Argentine ant, $\frac{1}{8}$ "



Odorous house ant, $\frac{1}{8}$ "



Little black ant, $\frac{1}{16}$ "



Bigheaded ant, $\frac{1}{16}$ - $\frac{1}{4}$ "



Pharaoh ant, $\frac{1}{16}$ "



Large yellow ant, $\frac{3}{16}$ "



Crazy ant, $\frac{1}{16}$ - $\frac{1}{8}$ "



Imported fire ant, $\frac{1}{8}$ - $\frac{1}{4}$ "



Acrobat ant, $\frac{1}{16}$ - $\frac{1}{8}$ "

Managing Structure-Invading Ants

Karen M. Vail, Associate Professor, Entomology and Plant Pathology

As a group, ants are the most difficult household pests to control. In a recent survey, pest control technicians indicated they had more call-backs due to ants than any other insect. Too often our first response to a pest problem is to reach for a can of pesticide. When managing ants, this can lead to disaster. In some cases, such as with Pharaoh ants, spraying ant trails only makes the problem worse. So, learn to identify pest ants, understand their biology and management options and you will be more successful combating them.

Behavior

Ants are social insects. Their nests or colonies can be found indoors and out, although some species have preferred nesting sites. A nest contains one or more queen ants laying eggs and being cared for by worker ants. Worker ants, sterile or non-reproductive female ants, tend the queen and brood (eggs, larvae and pupae) and forage for food. Foraging ants can invade households from colonies outdoors.

Nests often can be located by following "trails" of foraging ants. Indoors, ants nest almost anywhere. For instance, Pharaoh ants readily nest in attics, appliances, linens, heating ducts, wall voids and light switches or fixtures. Killing foraging ants rarely solves an ant problem in the home because the colony remains unaffected.

During certain times of the year, most species produce reproductives, winged male and female ants, that leave the nest to mate and establish new colonies. When winged ants swarm in the home, their colony is likely to be located somewhere inside. Mating

flights often occur on a warm day after a rain. Winged ants can be distinguished from termites by several characteristics (Figure 1).

The presence of winged ants outside, such as around porch lights, should not be a concern, although in high numbers they can be a nuisance. Most winged forms are unsuccessful in establishing a new colony. Turn off porch lights or use yellow "bug" lights to make these locations less attractive to them.

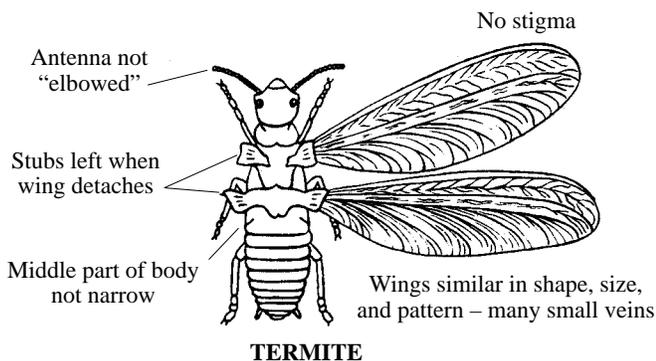
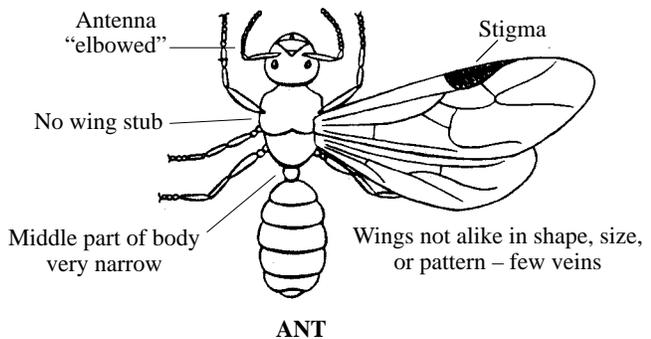
Ants form new colonies in several ways. Most are started by a newly mated winged reproductive, now called the queen ant. After finding a suitable nesting site, the queen loses her wings and begins laying eggs, which hatch into legless, grub-like larvae. The queen feeds the larvae as they develop through several stages. They molt and grow between each stage. Afterward, they form pupae and soon emerge as adult ants. Once worker ants have developed, the queen no longer needs to care for the brood.

Some ant colonies have more than one queen, and mating may occur within the nest without swarming. These ants form new colonies when one or more queen ants, along with some workers and brood, leave the nest and move to a new location. Frequently, entire colonies move from one nesting site to another almost overnight. Particularly during very wet or abnormally hot and dry weather, ant colonies whose nesting areas are flooded or those that lack food and water often migrate indoors.

Foraging workers of some ants establish temporary chemical (pheromone) trails that help other ants find food and water. These species can "recruit" other ants to a resource quickly and in high numbers. Food is brought back to the colony and fed communally among the other members of the colony, including the queen(s) and brood, a process called trophallaxis. Baiting to control ants takes advantage of these foragers to bring the toxin-laced food to often inaccessible colonies.

Ants can be a nuisance as well as a health threat. Worker ants foraging for food and water become a concern when they infest food or other items in the home. Although most ants consume a wide variety of foods (they are omnivorous), certain species prefer some types of foods and some even change their preferences over time. Species of ants that sting, such as red imported fire ants, can endanger young children, confined pets and bedridden people. Pharaoh ants can carry disease-causing organisms on their exoskeleton and therefore are a problem in hospitals and healthcare facilities. Identification of the ant is important to determine its pest status and the control procedures needed.

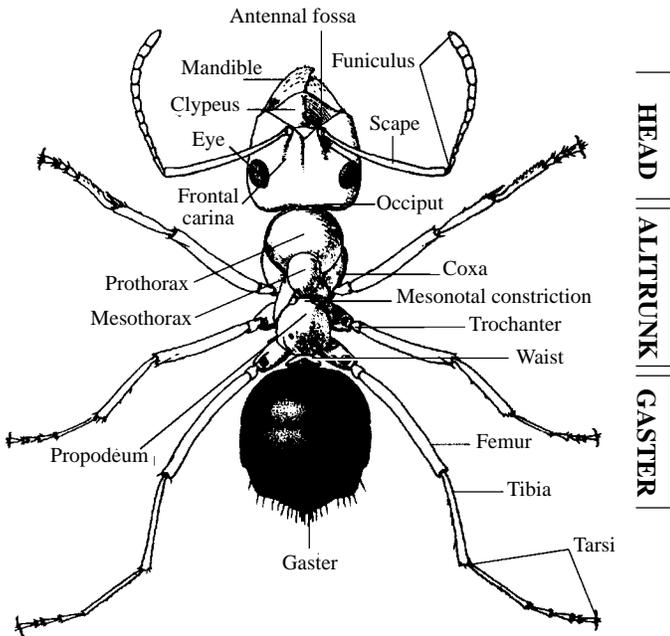
Figure 1. Comparison of a winged ant and winged termite



Common indoor ant species

Several ant species are common household pests in Tennessee, with carpenter ants, odorous house ants and Pharaoh ants topping the list. Identification characteristics, nesting and foraging habits and life cycles will be provided for the three most common ants. Identification characteristics and some habits of the other pests are provided. To understand the words used to identify pest ants, see Figure 2.

Figure 2. External morphology of the Allegheny mound ant (Vail et al. 1994)



Carpenter ants, *Camponotus sp.*

Identification: Approximately 10 species of carpenter ants live in Tennessee. The largest, the black carpenter ant, *Camponotus pennsylvanicus*, is found primarily outdoors in wooded areas and is responsible for many structural infestations. Most other species are red and black, although some are golden. Worker ants range from 1/8 to 1/2 inch long. They can be distinguished from most other large ant species by an evenly convex thorax or alitrunk that bears no spines (Figure 3). Also, the waist has a single node or bump. Although these ants bite, they do not sting.



Figure 3. Black carpenter ant

NOTE:
The black line at the bottom of photos indicates actual size of ant.

Nesting and Foraging Habits: Foraging worker ants in the home can be a nuisance. Carpenter ants usually nest in dead wood, either outdoors in old stumps and dead parts of trees and around homes (in fences, firewood, etc.) or in moist wood indoors (around sinks, bathtubs, poorly sealed windows and door frames, roofs, gutters, etc.). Flying carpenter ants indoors do not always indicate the presence of the parent or main colony. One study indicated that the black carpenter ant had two to six nest sites. Ant colonies may also be located in cracks and crevices between structural timbers, but the ants can also tunnel into structural wood to form nesting galleries. However, damage is often limited, because the ants tunnel into wood only to form nests and do not eat wood. Galleries excavated in wood to produce nesting sites can weaken structures. When produced by carpenter ants, nesting tunnels usually follow the grain of the wood around the annual rings. Tunnel walls are clean and smooth. Nests can be located by searching for piles of sawdust-like wood scrapings (frass) under exit holes. These piles accumulate as the nests are excavated and usually also contain parts of dead colony members. Foraging worker ants leave the nest and seek sweets and other foods such as decaying fruit, insects and sweet exudates from aphids or other sucking insects.

Life cycle: Mating flights of the black carpenter ant usually occur from May to July; however, winged forms of the smaller carpenter ants have been collected from homes as early as February. The newly mated queen starts her colony without the aid of workers. Development time from egg to adult takes about two months. It usually takes 3-6 years or a colony population of 2000 workers before the colony will produce winged males and females. Carpenter ants usually have more than one nest site. The parent colony may contain the egg-laying queen, workers, eggs and small larvae, while the satellite carpenter ants may form satellite colonies in the home that do not contain the queen. It is necessary to locate and treat the parent colony to prevent further infestation from that colony from occurring in the home. See PB 1599, Carpenter Ants: Those Big Ants in Your Kitchen and Bathroom, available from your county Extension agent, for further information about carpenter ants. Allegheny mound ants are often confused with carpenter ants. Refer to PB1599.

Odorous house ants, *Tapinoma sessile*

Odorous house ants are the second most common insect identified at the Urban IPM Lab in Knoxville. "In the mid-South region of the U.S. in northern Mississippi, West Tennessee, and Arkansas, it (Odorous House Ant) is the primary pest ant invading buildings." (Hedges 1998).

Identification: This small black ant, about 1/8 inch long, is easily distinguished from other dark ants by its one-segmented waist with a very flat, barely noticeable node or bump hidden by the abdomen. There is another way to distinguish this ant. Crush an ant between the fingers and if it smells of a "disagreeable, rotten-coconut-like" or a banana-like odor mixed with pine, then it's the odorous house ant.



Figure 4. Odorous house ant



Nesting and Foraging Habits: Odorous house ants forage day and night between the temperatures of 42.8 and 95F. They can usually be seen actively foraging from March through November, although foraging can occur in December and January. They use guidelines to move from place to place. Guidelines can result from natural objects such as vines, limbs and trunks of trees and shrubs or from artificial objects such as edges of buildings, baseboards, edge of counters/carpets, etc.

Outdoors, odorous house ants feed on live and dead insects and excrement (honeydew) from aphids, scales and mealybugs. They prefer to feed on small objects that are between 0.1 - 2 mm. In one study they showed a preference for ants and flies. Indoors, they can be found feeding on sweets and other household foods and are often found trailing to water. Unlike Argentine ants that usually dominate an area, *T. sessile* has been described as submissive. It avoids other species at a bait even if it was the first ant present; however, it will be more dominant when it outnumbers the other ants.

These ants are opportunistic nesters and can be found outdoors in shallow nests in shady, moist areas such as stones, logs, patios, debris, siding, loose bark, tree cavities, animal nests and bee hives. Indoors, they are usually associated with accessible moisture such as wall voids near pipes and heaters, bathtraps, termite-damaged wood, beneath carpets and toilets.

This ant does not spend much time in one place. The average number of days that a colony remained at a nest site before moving was 23 days. These ants can often be seen moving brood from one nest to another. Why do they move so often? Some speculate it's to avoid shading, or to find greater soil moisture, to avoid buildup of wastes in the nest, to decrease discovery by natural enemies, because nest sites are short-lived, to decrease competition or to respond to changes in the weather (rain, drought). We have observed that odorous house ants often move indoors during periods of heavy rain.

Life cycle: This species establishes multiple queen colonies that often reproduce by splitting off from the mother colony; however, some flights do occur. Over the past three years, male odorous house ants collected from lights have been sent to the Urban IPM lab from the end of May through the end of June. Development times for each stage are: 11-26 days for eggs, 13-29 days for larvae and 10-28 days for pupae. Overall, time for egg to adult will range from 5-9 weeks in the summer to 6-7 months through the winter.

Pharaoh ant, *Monomorium pharaonis*

The Pharaoh ant is another common indoor ant in Tennessee. They are also called "sugar ants" or "piss ants." Pharaoh ants are considered pests because they:

- 1) are a nuisance by their mere presence;
- 2) can enter sterile packages, wound dressings, intravenous solutions and tubing;
- 3) have the potential to carry disease-causing organisms such as *Salmonella*, *Streptococcus*, *Staphylococcus*, *Clostridium* and *Pseudomonas*; and
- 4) can short electrical equipment such as computers.

As you can see, Pharaoh ants pose a significant health risk when found in hospitals and similar institutions. Pharaoh ants do not sting and usually do not bite, but when large numbers of these ants are handled, such as in sheets of a bedridden person, they can inflict pain with their bite. The pain is not as severe as a fire ant sting.

Identification: A small ant, the Pharaoh ant is 1/16 inch long and is yellow or orange with the end of the abdomen darkened. It has a two-segmented waist and a 12-segmented antennae with a

three-segmented club. Newly-emerged adult Pharaoh ants are very light-colored. Often these ants are confused with thief ants, which are light in appearance, but thief ants have a 10-segmented antenna with a two-segmented club.



Photo by: Jim Castner, Univ. of Fla.

Figure 5. Pharaoh ant

Nesting and Foraging Habits: Pharaoh ants are omnivorous, feeding on sweets, jelly (particularly mint apple jelly), sugar, honey, cakes and breads, and greasy or fatty foods (peanut butter, pies, butter, liver and bacon). Nests are rarely found outdoors; however, almost any crack and crevice found indoors (interior wall voids, between the paper of the insulation and the interior surface [walls, ceiling and attics], areas under or behind window sills, toilets, sinks, switch plates, lights and voids in aluminum window and door frames, etc.), particularly close to sources of warmth and water, are subject to nesting by Pharaoh ants.

Life cycle: A worker ant develops from an egg (5 to 6 days) through several larval stages (22 to 24 days), a prepupal stage (2 to 3 days), a pupal stage (9 to 12 days) to an adult ant. Development from egg to adult takes from 38 to 45 days (4 days longer for sexual forms). Colonies consist of one to several hundred queen ants, sterile female worker ants, periodically produced winged male and female reproductive ants (sexuals) and brood (immature stages including eggs, larvae and pupae).

These ants do not swarm. Colonies multiply by "budding," in which a large part of an existing colony migrates, carrying brood to a new nesting site. As few as five workers and 50 pieces of brood can result in greater than 10,000 workers within a little more than a year. This means that workers and brood transported between folds of linens, cardboard boxes, notebooks, name tags, etc. can easily initiate a new colony. A mature colony can contain from 10,000 to many hundreds of thousands of workers. Because Pharaoh ant colonies are hidden and can occur in virtually any crack or crevice, baiting is the best way to get an insecticide back to the colony.

Imported fire ant, *Solenopsis spp.*

Imported fire ants infest 29 southern counties in Tennessee. They build hills or mounds in open areas where the colonies live, although colonies occasionally occur indoors and in such structures as utility housings and tree trunks. When a mound is disturbed, worker ants mount a rapid defense, quickly running up vertical surfaces. Worker ants range from 1/8 to 1/4 inch long and are dark brown. Queen ants are larger (3/8 inch) and lose their wings after mating.

Sterile female fire ant workers can sting repeatedly. First they bite; then, while holding onto the skin with their jaws, they inject venom with stingers at the end of their abdomens. The unique venom produces a fire-like burning sensation. Most people react by developing a whitish pustule or fluid-filled blister at the sting site after a day or two. Those hypersensitive to the stings should be prepared for a medical emergency if stung. Most people can tolerate multiple stings, but may have problems with secondary infections at the sting sites.



photo by: Jim Castner, Univ. of Fla.

Figure 6. Imported fire ant

Fire ants are considered to be medically important pests of people, pets, livestock and wildlife. Although omnivorous, fire ants primarily eat insects and other invertebrates. Their predatory activities suppress populations of ticks, chiggers, caterpillars and other insects. See Extension PB 6043, Managing Red Imported Fire Ants in Urban Areas, available from your county Extension agent, for more information on managing fire ants.

Pavement ants, *Tetramorium caespitum*

These ants are 1/8 inch long, with a brown to black body. The waist has two nodes or bumps. Pavement ants are most easily identified by the narrow, parallel furrows in the head and thorax. Nesting sites include soil beneath stones, pavement or slabs. Nests can also be located in walls, under floors or in insulation. Meat, grease, dead insects, seeds and sweets all make up the diet of the pavement ant. Baiting is effective for this ant. Swarms from outside nests occur in the spring, but may occur continuously if the nest is located indoors. If repeated swarming occurs indoors, it may be necessary to inject an insecticidal dust into the wall void from where the winged forms emerge. The winged forms may not feed before a flight, so baits would not be effective for them. Pest control professionals are experienced in drilling and dusting.



photo by: Karen Vail, Univ. of Tenn.

Figure 7. Pavement ant

Little black ants, *Monomorium minimum*

These are small (1/16 inch), slow-moving, shiny black ants and are similar to Pharaoh ants except for their color. Nests are located in soil, rotten wood, woodwork or masonry of houses. Workers feed on insects, honeydew produced by sucking insects such as aphids, sweets, meats, bread, grease, oils, vegetables and fruits.



photo by: Karen Vail, Univ. of Tenn.

Figure 8. Little black ant

Yellow ants, *Acanthomyops interjectus* or *Acanthomyops claviger*

“Citronella ants,” as they are often called, smell of lemon when crushed. They are relatively large, about 3/16 inch and are yellow to yellow-red. A single node or bump is found on the waist. Yellow ants may swarm in early spring, but when a colony is under heated slab, winter swarms may occur. “Termite scares” are often caused when they push soil out of basement cracks. Cracks should be sealed to prevent future entry. Honeydew from subterranean sucking insects makes up the majority of their diet.



photo by: Karen Vail, Univ. of Tenn.

Figure 9. Large yellow ant

Acrobat ants, *Crematogaster* sp.

Acrobat ants have spines on the thorax and a two-segmented waist that is attached to the top of the abdomen. Outdoors, acrobat ants nest under stones, in stumps or dead wood, and occasionally invade the home. Indoors, nests may be found in insulation board, roofing or other damp wood. These ants are named after their ability to hold their heart-shaped abdomen up over their bodies. They feed primarily on honeydew produced by aphids. Nest location is especially important if the nest is indoors. Check moist areas. If necessary, a dust can be injected into the nest. Pest-proofing will keep outdoor nesting individuals from entering.



photo by: Jim Castner, Univ. of Fla.

Figure 10. Acrobat ant



Argentine ants, *Linepithema humile*

Workers of this species are light to dark brown and generally nest outdoors under mulch, along pine tree roots, rocks, etc. They behave very similarly to odorous house ants. They have an enormous number of individuals in a colony, because nearby budded colonies are not aggressive toward one another. Argentine ants are not as widespread in Tennessee as they are in other southeastern states, although pockets occur in Knoxville and other locations. They are uncommon in areas infested by fire ants.



photo by: Jim Casiner, Univ. of Fla.

Figure 11 Argentine ant

Bigheaded ants, *Pheidole species*

Major worker ants have a relatively large head compared to their bodies. Two sizes (major and minor) of workers will be found in a colony. They have 12-segmented antennae with a three-segmented club. Similar in habits to fire ants, they feed on live and dead insects, seeds and honeydew outdoors and greasy food sources and sweets indoors.



photo by: Jim Casiner, Univ. of Fla.

Figure 12. Bigheaded ants

Crazy ants, *Paratrechina longicornis*

These fast-moving, black worker ants have long legs and antennae. Although they nest primarily outdoors, they will forage in homes. They are omnivorous, but difficult to attract to ant baits.



photo by: Jim Casiner, Univ. of Fla.

Figure 13. Crazy ant

How to manage pest ants

Outlined below is a general strategy for managing ants that nest indoors or occasionally enter indoors from outside. A control program is based on accurate identification, sanitation, pest proofing, monitoring and inspection. If the ants are entering from the outdoors, pest-proofing may be all that is needed. If the nest is easily located, then you may choose to directly treat the nest. If the nest cannot be found, which is most often the case, use a bait. Although pest-proofing provides a more permanent barrier, outdoor pesticidal barriers may be used as a supplement when nests are only found outdoors. Because carpenter ants (Extension PB 1599) and fire ants (Extension PB 6043) require in-depth management, they are not covered in this section.

Also it should be pointed out that odorous house ants are currently very difficult to control, although research results are very promising.

Identification:

Make sure you properly identify a pest ant before starting a control program. Ants have different food preferences and different behaviors that will directly impact the efficiency of an ant pest control program.

Ants are small and can be difficult to identify. A hand lens is often needed and a microscope with at least 30x magnification is preferred. Specimens can be brought to your local Extension agent for identification. Most identification keys are written for the major workers, so please bring specimens of the wingless workers. Also, ants often have different odors associated with them. Before a specimen is submitted for identification, give it a squeeze (as long as it does not have a stinger!), and add the description of the emitted odor to the specimen form.

Collecting Ants for Identification

Place a small dab of honey or jelly in the center of an index card. Place the card where ant activity has been seen recently. Always place the monitoring cards against edges and never in the middle of a surface. Allow ants to find the food source and recruit other workers. If index cards are placed outdoors, it is best to check the cards within 30 to 45 minutes. Cards left outdoors for a longer period of time may allow other ants to displace the pest ant. Try a natural peanut butter if ants are not attracted to sugars.

Once ants are present on the index card, put the card into a plastic bag and place in the freezer. The cold temperatures will slow the ants down so they can be tapped into a vial containing alcohol and submitted for identification. Don't forget to squeeze a few frozen ants before adding them to the alcohol.

Sanitation:

Ant problems occur in homes and structures primarily because food, water and favorable nesting sites are available there. Meticulous housekeeping eliminates significant ant problems by removing needed resources. Furthermore, ant bait treatments are more effective if alternative food sources for the ants are eliminated as much as possible.

Eliminate sources of moisture and food:

- Fix leaky faucets, remove standing water, etc.
- Replace wet or rotten wood.
- Clean window sills of dead insects that serve as food for ants.
- Remove the food source if ants are trailing to food. Use a mild detergent to wipe ant trails and remove the trail pheromone. (Do not interfere with foraging trails when ants are trailing to baits.)



Pest-Proofing — Removing access to nesting sites and conditions conducive to nesting and entry:

Most ants prefer to nest in soil or wood outdoors, but homes offer many favorable nest sites for certain ants. Cracks and holes in brick veneer, wall voids and structural wood close to heat and moisture sources are commonly used. Locate the entry point into the structure, such as a hole in the foundation around plumbing or poorly-sealed windows and doors, and seal these areas to prevent future occurrences. Check potted plants and firewood for ants before bringing them indoors. Keep branches, vines and other vegetation from coming in contact with your house, because ants use them to gain access to the home. Pull mulch, a common nest site, 12 -18 inches away from the foundation of the structure. See Extension PB 1303, Managing Pests Around the Home, available from your county Extension agent, for more information on pest proofing (exclusion and sanitation practices).

Monitoring, Inspection and Nest Location:

Because many nests can occur in one home or other structure, it is important to locate all nests or areas of foraging activity. Monitoring will find small, isolated colonies that otherwise might be overlooked and that could cause re-infestation in the future. Once all areas of foraging activity are located, they can be baited. If the nest can be located, it can be treated directly.

Make a map of the house or other structure. Place index cards containing honey, jelly or unprocessed peanut butter on window sills, sinks and other possible food, water (drains, sinks, counter tops and toilets) and nest sites throughout the structure. In warm weather, placing monitoring index cards outdoors against the structure on window sills, around entrances and exits, water spigots, pipes, AC/heat units, attic vents, etc. may attract the most ants. After placing baits, wait at least 30-45 minutes and return to the monitoring cards.

Follow the ants back to the nest, if possible. Cards may be left in place longer if you need to locate an outdoor nest, but be aware that the food may need replenishing or other ants may displace the ant of interest. If baits are to be used, place a bait station next to the monitoring card prior to disturbing the ants, and gently tap the ants onto the bait station.

Although monitoring, inspection, sanitation and exclusion practices take time and effort, they eliminate undirected, ineffective insecticide spraying indoors. Baiting and ant elimination by nest treatment is more efficient if these practices are used.

Baits:

Effective bait formulations contain slow-acting pesticides that are collected by foraging worker ants and brought back to the colony, where the pesticide is fed to the other ants, queen(s) and brood. Slow-acting toxicants must remain active after several dilutions. This allows the bait to be transported back to the colony and distributed among all the members. Remember, especially with Pharaoh ants, all the feeding stages of the brood must be affected, as well as the queens and workers. Pupae are not affected by baits since they don't feed, and may be responsible for a small number of workers present after baiting. Baits exploit the forager caste, causing them to introduce the toxicant into a previously inaccessible nest. Because the toxicant works slowly, it is not associated with death in the colony and therefore is continually fed upon. This delayed-action toxicant is usually a fairly safe compound (caution is the signal word) that is present in a low concentration.

Bait acceptance is of the utmost importance. If the ants will not feed on the bait, it is useless. Some ants are fickle, especially Pharaoh ants. They are reported to switch feeding preferences. Prior to placing bait stations, offer several different baits and see which is most attractive to the pest ant. Use information about sweet or grease preferences to select bait candidates. Some of the baits for ant control are listed below by active ingredient (attractant type and trade name): abamectin (oil attractant PT® Ascend™ Fire Ant Stopper Bait and PT® Advance™), hydramethylnon (silk worm attractant Combat®, Superbait® and Maxforce® Ant Killer Bait Stations, Maxforce Insect Killing Granules, Combat ant killing system or soybean oil attractant Amdro®), sulfonamide or sulfuramid (Procontrol, FluorGuard, DualChoice, Raid®, Max Ant Bait and Johnson Wax Raid® Ant Baits Plus), borax, borates or other types of boric acids (sweet attractant Terro Ant Killer II) and others. Professionals have access to liquid baiting systems, gels and other granular baits.

Research has shown that insect growth regulators methoprene, fenoxycarb and pyriproxyfen are effective against Pharaoh ants. Workers are usually not affected and therefore the bait is well distributed throughout the colony. Queens fed these baits fail to produce viable eggs and larval development is terminated. Insect growth regulators take longer to gain control, but are most effective when dealing with large structures, such as hospitals, with extensive infestations. Methoprene, an insect growth regulator, is the active ingredient in Pharorid ® for Pharaoh ant control.

Reasons not to use sprays for Pharaoh ant control:

- Sprays will be repellent and will affect bait acceptance.
- Sprays may kill the foraging population and the bait will not be brought back to the nest.
- As mentioned earlier, sprays may cause colony budding which will further aggravate the problem
- Sprays will kill only a small percentage of the ant colony. In a mature Pharaoh ant colony, only 0.7 - 5.6% of the colony forage (Vail 1996).
- Also, sprays applied to the exterior of a structure such as in a barrier or perimeter treatment may force the ants to forage only indoors making them more visible.
- "I need quick relief — I can't wait for the baits to work!" said one client. The client sprayed for Pharaoh ants and was still spraying 6-8 months later. So put away the aerosol can of insecticide and exploit the foraging ants to bring the baits back to inaccessible nests.

Homeowners have been reported to make a 1 (or 2) percent boric acid bait by using the following recipe: Choose the most attractive food material for the ant species present, such as peanut butter, mint apple jelly, corn syrup, etc. Mix 1 part boric acid powder (available from most pharmacies) per 100 (or 50) parts bait material, e.g., 1 teaspoon per 2 (or 1) cups food material.

Do not make the bait concentration of boric acid too strong, as this reduces its effectiveness. The 1 percent bait is better than higher concentrations because it is less repellent to ants and kills them as efficiently. Keep the bait fresh and moist. Small amounts of bait can be placed in bottle caps or on pieces of aluminum foil, or injected into short (2-inch long) sections of soda straws using a squeeze bottle. Secure these objects, as they can be a choking hazard, and do not place stations in areas accessible to small children or pets. Place 20 to 30 small bait stations where ants have been seen or were attracted to monitoring cards as described in the previous section. If proper food is used and bait kept fresh, ants should be controlled after three to eight weeks.



If ants are still present several weeks after the initial baiting, monitoring and subsequent baiting should be performed again. In storage areas, several bait stations should be placed where they are likely to be encountered by ants introduced from stored materials.

Tips for using baits to control house-infesting ants include:

- Use fresh product and follow directions carefully with the correct number of bait stations or material to treat the infestation.
- Make bait more effective by removing or covering other food sources that compete with the bait's attractiveness.
- Baits can be contaminated during handling. Never let hands that have touched cigarettes touch bait stations because the odor is repellent. Wear gloves when applying baits.
- Before and during baiting efforts, avoid using surface applications of long-acting contact insecticides (often applied to control cockroaches or to ant trails) that would prevent foraging worker ants from being able to reach the bait station.
- Be patient for the baits to work. It may take three to four weeks or more to eliminate some colonies.

Direct nest treatment:

If nests are indoors and can be located, treat them with an insecticide registered for this use. Be careful; many times the homeowner just locates a foraging trail disappearing into the wall and not the nest. Dust (boric acid, silica gels and others) formulations are preferred for treating nests indoors because they do not stain and generally give longer residual control than sprays. Apply dusts sparingly in thin, even layers in the ant nest area. Pest management professionals have equipment to drill holes into colonies nesting in wood and wall voids and for injecting insecticides directly into the nests. Professionals also have access to many other dusts and residual liquids.

If nests are located outdoors, see Extension B 6043 for information on individual mound treatments (baits, drenches, granules, dusts, aerosols or excavation), broadcast baiting and surface applications.

Barrier treatments around the home:

When ants invade from the outdoors, pest-proofing is a more permanent solution to prevent outdoor-nesting ants from entering the home. Pest-proofing can be supplemented with a chemical barrier if the physical exclusion methods are not as effective as needed. Recall that this may aggravate the indoor-nesting ants, because they may no longer forage outdoors.

Spray a 3- to 4-foot-wide bank or swath of soil around the perimeter of the home and the lower 3 to 4 feet of the house. In the warmer times of the year, spray again (possibly at two- to three-week intervals) if ants are seen in the treated areas. Barrier treatments can greatly reduce or eliminate ant invasion into the home. Bifenthrin (Ortho Home Defense products), tralomethrin (Spectracide Bug Stop) and cyfluthrin (Bayer Advanced Home Indoor and Outdoor Insect Killer) are synthetic pyrethroids that can be used as barrier treatments. Many other pesticides are labeled for perimeter treatments. Wettable powder or micro-encapsulated

formulations are generally more effective on brick veneer homes. Granular insecticide formulations can be used instead of sprays to treat the soil. Water the treated area lightly after applications to release the insecticide from the granules.

Do not routinely treat the entire premises for ants. Ants are generally beneficial in our landscapes as they scavenge for food and prey on other potential pests such as various caterpillars and chinch bugs. Some ants collect and feed on weed seeds.

This material was modified from the following sources:

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- Oi, F. and D. Oi. 1997. IPM Tactics for Argentine Ant Control. Circular ANR-999. Alabama Cooperative Extension System.
- Smith, M.R. 1965. House-infesting Ants of the Eastern United States: Their Recognition, biology and Economic Importance. USDA, ARS Bull. # 1326. (source of figures 3-13).
- Vail, K., L. Davis, D. Wojcik, P. Koehler and D. Williams. 1994. Structure-Invasive Ants of Florida. SP 164 Cooperative Extension Service, UF, IFAS.
- Vail, K.M. 1996. Foraging, Spatial Distribution, and Control of the Pharaoh Ant, *Monomorium pharaonis* (L.). Ph. D. Dissertation, University of Florida, pp.111.
- Williams, H. and F. Hale. 1995. Ants, Their Habits and Control. University of Tennessee Agricultural Extension Service SP 290-G.

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Disclaimer Statement

Pesticides recommended in this publication were registered for the prescribed uses when printed. Pesticide regulations are continuously reviewed. Should registration or a recommended pesticide be canceled, it would no longer be recommended by The University of Tennessee.

Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product.

Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you mix, apply store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label. Persons who do not obey the law will be subject to penalties.

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