

ANTS

Integrated Pest Management In and Around the Home

Ants are among the most prevalent pests in households. They are also found in restaurants, hospitals, offices, warehouses, and other buildings where they can find food and water. Once ants have established a colony inside or near a building, they may be difficult to control. On outdoor (and sometimes indoor) plants, ants protect and care for honeydew-producing insects such as aphids, soft scales, whiteflies, and mealybugs, increasing damage from these pests. Ants also perform many useful functions in the environment, such as feeding on other pests (e.g., fleas, caterpillars, termites), dead insects, and decomposing tissue from dead animals.

There are over 12,000 species of ants throughout the world. In California, there are about 200 species but fewer than a dozen are important pests. The most common ant occurring in and around the house and garden in California is the Argentine ant, *Linepithema humile* (formerly *Iridomyrmex humilis*) (Fig. 1). Other common ant pests include the pharaoh ant (*Monomorium pharaonis*), the odorous house ant (*Tapinoma sessile*), the thief ant (*Solenopsis molesta*), and the southern fire ant (*Solenopsis xyloni*). Less common, but of great importance, is the red imported fire ant, *Solenopsis invicta*, which has recently gained a foothold in southern California. In some areas, the spread of the fire ant has been slowed by competition from the Argentine ant.

IDENTIFICATION

Ants belong to the insect order Hymenoptera and are close relatives of bees and wasps. They are familiar insects that are easily recognized, especially in their common wingless adult

forms, known as workers. However, winged forms of ants, which leave the nest in large numbers in warm weather to mate and establish new colonies, are often mistaken for winged termites, which also leave their nests to mate. Ants and termites can be distinguished by three main characteristics illustrated in Figure 2.

- The ant's abdomen is constricted where it joins the thorax, giving it the appearance of having a thin waist; the termite's abdomen is broad where it joins the thorax.
- The ant's hind wings are smaller than its front wings; the termite's front and hind wings are about the same size. (Shortly after their flights, both ants and termites remove their wings, so wings may not always be present.)
- Winged female ants and worker ants have elbowed antennae; the termite's antennae are never elbowed.

Ants undergo complete metamorphosis, passing through egg, larval, pupal,

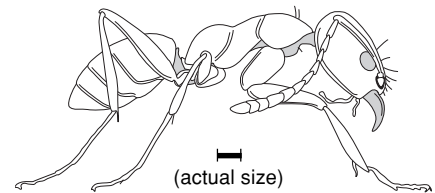


Figure 1. Argentine ant.

and adult stages. Larvae are immobile and wormlike and do not resemble adults. Ants, like many other hymenopterans, are social insects with duties divided among different types, or castes, of adult individuals. Queens conduct the reproductive functions of a colony and are larger than other ants; they lay eggs and sometimes participate in the feeding and grooming of larvae. Female workers, who are sterile, gather food, feed and care for the larvae, build tunnels, and defend the colony; these workers make up the bulk of the colony. Males do not participate in colony activities; their only apparent purpose is to mate with the queens. Few in number, males are fed and cared for by workers.

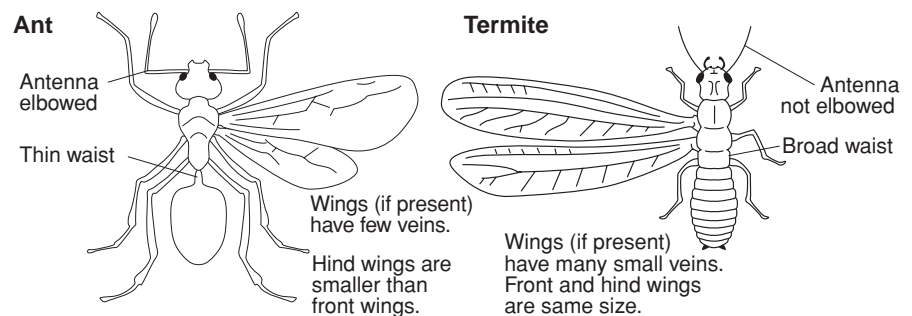


Figure 2. Distinguishing features of ants and termites.

Adult workers of the Argentine and odorous house ant are about $\frac{1}{8}$ inch long and range from light to dark brown in color; those of the pharaoh and thief ant are smaller, measuring about $\frac{1}{25}$ inch long. The workers of the southern fire ant vary in size and have a red head and thorax with a black abdomen. Carpenter ants, *Camponotus* spp., also invade buildings in California. Although they do not eat wood as termites do, they hollow it out to nest and may cause considerable damage. These ants vary greatly in size from $\frac{1}{4}$ to $\frac{3}{4}$ inch long (for more information on carpenter ants, see *Pest Notes: Carpenter Ants*, listed in "Suggested Reading"). For color photographs and additional information on identifying the different ant species, see *A Key to the Most Common and/or Economically Important Ants of California*, listed in "Suggested Reading."

DAMAGE

Inside a building, household ants feed on sugars, syrups, honey, fruit juice, fats, and meat. Long trails of thousands of ants may lead from nests to food sources, causing considerable concern among building occupants. Outdoors

they are attracted to sweet, sticky secretions, or honeydew, produced by soft scales and aphids. Frequently outbreaks of scales and aphids occur when ants tend them to obtain their sweet secretions because the ants protect scales and aphids from their natural enemies. Ants can bite with their pincerlike jaws, although most species rarely do. A few ants sting; the southern fire ant, which is primarily an outdoor species, is the most common and aggressive stinging ant in California. Another very aggressive stinging ant, the red imported fire ant (*S. invicta*), has recently been found in various southern California counties. Contact your county Cooperative Extension office for information on this new pest.

LIFE CYCLE AND HABITS

Ants usually nest in soil; nests are often found next to buildings, along sidewalks, or in close proximity to food sources such as trees or plants that harbor honeydew-producing insects. They also construct nests under boards, stones, tree stumps or plants, and sometimes under buildings or other protected places. Pharaoh ants like warmth and make nests inside

buildings, often in wall voids, under flooring, or near hot water pipes or heating systems. Ant food includes fruits, seeds, nuts, fatty substances, dead or live insects, dead animals, and sweets. Food preferences vary somewhat between ant species.

Ants enter buildings seeking food and water, warmth and shelter, or a refuge from dry, hot weather or flooded conditions. They may appear suddenly in buildings if other food sources become unavailable or weather conditions change.

A new colony is typically established by a single newly mated queen. After weeks or months of confinement underground, she lays her first eggs (Fig. 3). After the eggs hatch, she feeds the white, legless larvae with her own metabolized wing muscles and fat bodies until they pupate. Several weeks later, the pupae transform into sterile female adult workers, and the first workers dig their way out of the nest to collect food for themselves, for the queen (who continues to lay eggs), and for subsequent broods of larvae. As numbers increase, new chambers and galleries are added to the nest. After a few years, the colony begins to produce winged male and female ants, which leave the nest to mate and form new colonies.

Argentine ants differ from most other ant species in California in that they have multiple queens within a nest, they move their nests if disturbed, and in the winter several colonies will nest together. Moreover, when newly mated queens disperse to found new colonies, instead of doing it by themselves they are accompanied by workers.

MANAGEMENT

Ant management requires diligent efforts and the combined use of mechanical, cultural, sanitation, and often chemical methods of control. It is unrealistic and impractical to attempt to totally eliminate ants from an outdoor area. Focus your management efforts on excluding ants from buildings or valuable plants and eliminating their food and water sources. Remember

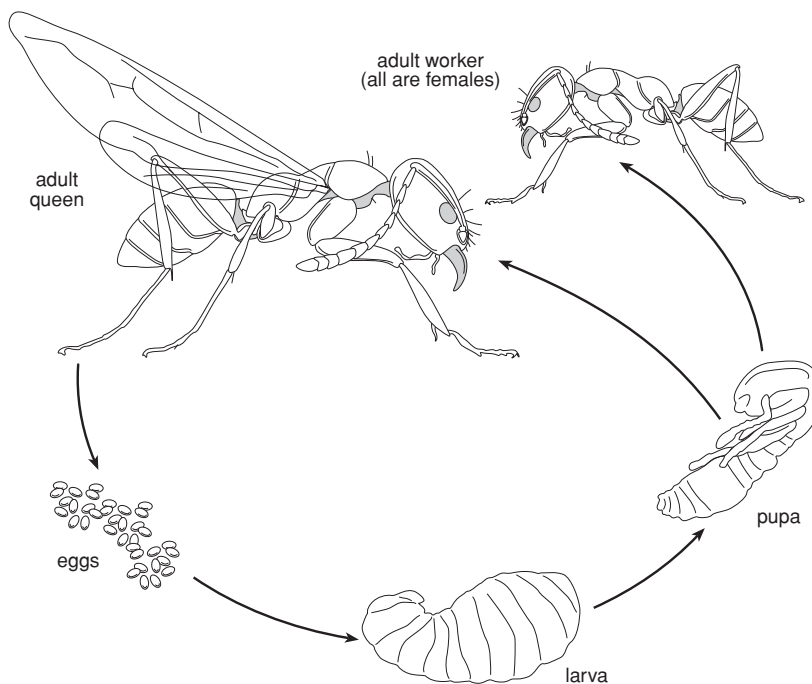


Figure 3. Life cycle of the Argentine ant.

that ants play a beneficial role in the garden in some cases. Become aware of the seasonal cycle of ants in your area and be prepared for annual invasions by caulking and baiting before the influx.

Exclusion and Sanitation

To keep ants out of buildings, caulk cracks and crevices around foundations that provide entry from outside. Ants prefer to make trails along structural elements, such as wires and pipes, and frequently use them to enter and travel within a structure to their destination. Indoors, eliminate cracks and crevices wherever possible, especially in kitchens and other food preparation and storage areas. Store attractive food items such as sugar, syrup, honey, and other sweets in closed containers that have been washed to remove residues from outer surfaces. Rinse out empty soft drink containers or remove them from the building. Thoroughly clean up grease and spills. Do not store garbage indoors. Look for indoor nesting sites, such as potted plants. If ants are found, remove the containers from the building, then submerge the pots for 20 minutes in standing water that contains a few drops of liquid soap. Ant nests may be associated with plants that support large populations of honeydew-producing insects. Avoid planting such trees and shrubs next to buildings.

Baits

One way to control ants in and around structures is to use toxic baits. Baits are formulated as solids or liquids and applied in stations or in the case of granules by broadcasting them. Ants are attracted to the bait and carry small portions of it back to the nest where it is given to other workers, larvae, and reproductive forms. To achieve wide distribution of the bait so the entire colony will be killed, the bait toxicant must be slow-acting. Some examples of toxicants used in ant baits are hydramethylnon, boric acid, and fipronil. Hydramethylnon is photodegradable, so if it is broadcasted in granular form it should be applied in the evening. Boric acid is most effective

at concentrations of 1% or lower. Fipronil is a new class of toxicant that is effective against ants at ultra-low doses.

Ants will not eat bait if more desirable food is nearby, so be sure to remove any particles of food or other attractive material from cracks around sinks, pantries, and other ant-infested areas of the home. Place bait stations in places where the ants can easily find them, but avoid placing them in areas that are accessible to small children and pets. Place baits where there are ant trails or along edges where ants travel. In addition to placing ant bait stations indoors, space them every 10 to 20 feet outside around the foundation and at nest openings if they can be found. Control with baits is not immediate and may take several weeks or more to be complete. Effectiveness of baits will vary with ant species, bait material, and availability of alternative food. In the case of Argentine ants, sweet baits (e.g., Grant's Ant Stakes, Dr. Moss's Liquid Bait System) are attractive year-round. Protein baits (e.g., Combat ant baits) are more attractive in spring when the colony is producing brood. Offering a small quantity of each kind of bait and observing which is preferred by the ants is a good way to determine what to use.

Indoor Sprays

An insecticide labeled for ant control can provide immediate knockdown of foraging ants if necessary while sanitation and exclusion measures are being taken. However, if ants can be thoroughly washed away and excluded from an area, an insecticide is probably not necessary. Sponging or mopping with soapy water, as an alternative to insecticides, may be as effective in temporarily removing foraging ants in a building because it removes the ant's scent trail.

Outdoor Treatments

To prevent ants from entering buildings, small spot applications can be made at entrance points into the buildings. Pyrethroids (such as bifenthrin and cyfluthrin) are effective for this

kind of application. Botanical pyrethrins will kill ants that they contact directly, but do not provide any residual control. Preliminary research on mint-oil products as repellents indicates that they are not effective.

A common method used to prevent ants from coming indoors is to apply a perimeter treatment of residual sprays around the foundation. Perimeter treatments pose more risk of environmental upset than baits in bait stations, don't provide long-term control, and should be used cautiously. Commonly used insecticides include the pyrethroids bifenthrin and lambda-cyhalothrin. Bifenthrin is available in retail products, but lambda-cyhalothrin may only be applied by a licensed pest control professional. Products available to professionals provide a longer residual control than home-use products. Avoid the use of chlorpyrifos and diazinon; landscape and residential use of these materials in urban areas has been identified as a source of pollution for California's creeks and rivers. Apply all pesticides in a manner that prevents runoff into storm drains.

Perimeter treatments by themselves are unlikely to provide long-term control because they kill only foraging workers. For this reason, some companies offer monthly perimeter spray programs. However, for long-term control and environmental safety, rely on exclusion, baits, and other methods that control the colony rather than monthly perimeter treatments.

If colonies need to be controlled outdoors, focus treatment on queens and larvae inside nests; killing foraging workers does little to control the colony because as few as 1% of the workers are able to provide sufficient food for nestbound queens and larvae. Toxic baits provide the easiest way to kill a colony (see "Baits").

Control on Trees and Shrubs

When numerous ants are found on plants, they are probably attracted to the sweet honeydew deposited on the plants by certain sucking insects. These ants can be kept out of trees by band-

ing tree trunks with sticky substances such as Tanglefoot. Trim branches to keep them from touching structures or plants so that ants are forced to climb up the trunk to reach the foliage. Protect young or sensitive trees from possible injury by wrapping the trunk with a collar of heavy paper, duct tape, or fabric tree wrap and coating this with the sticky material. Check the sticky material every 1 or 2 weeks and stir it with a stick to prevent the material from getting clogged with debris and dead ants that allows ants to cross.

Enclosed pesticide baits such as ant stakes may be placed near nests or on ant trails beneath plants. For the most

effective and economical control, treat in late spring and early summer when ant populations are low.

COMPILED FROM:

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SUGGESTED READING

Haney, P., P. Phillips, and R. Wagner. 1993. *A Key to the Most Common and/or*

For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your phone book for addresses and phone numbers.

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Fig. 2: Adapted from UC DANR Leaflet 2532, *Termites and Other Wood-Infesting Insects*.

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WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash nor pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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