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Carpenter Ants

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Fig. 1. Front view of a worker carpenter ant head (*Camponotus perthiana*).[1] The arrow indicates the elbowed antennae of ants.

What You Should Know

• Carpenter ants do not eat wood as termites do, but chew through it to construct pathways and nests leaving behind a sawdust-like substance called frass.

• Carpenter ants can have two or more different sizes of workers, and one to many queens within a colony.

• Carpenter ants may have one main nest with many satellite nests around the house and yard. All must be located and treated to prevent reinfestation.

• Infestations of carpenter ants usually indicate moisture problems in the house. Carpenter ants should be treated by a professional, and moisture issues should be corrected to minimize the chance of reinfestation.

Carpenter ants in the genus *Camponotus* (Hymenoptera: Formicidae) are considered some of the most serious pests to wood structures worldwide. There are over 900 species of carpenter ants in the world, 50 in the United States and Canada, and 12 in Utah (Table 1; Figs. 11-20). In nature, carpenter ants are most abundant in forests and can be easily found under loose bark of dead trees, stumps, or fallen logs. Homeowners may bring them into their homes when they transport infested logs from forests to use as firewood. Some species may form nests within wooden structures, causing structural damage to homes and businesses.

Carpenter ants are related to bees and wasps (Order Hymenoptera), and exhibit sociality. For ants, sociality includes having a queen, multiple generations of worker ants, male reproductive ants and sharing of responsibilities in the colony by all castes. Most importantly, the ant social system is dependant upon food sharing (trophallaxis), and the transfer of nutrients through bodily secretions among workers, reproductives (queens and males) and larvae. Carpenter ants have a range of worker sizes from big (majors) to small (minors) and many sizes in between (medias) (Fig. 2). Some carpenter ants have multiple queens, while others have one. The number of ants in a colony varies by species, but can have more than 50,000 to 100,000 workers.

All aspects of carpenter ants are not negative. Most play vital roles in maintaining a healthy environment. Carpenter ants are voracious predators in the forest ecosystem. They often consume large prey including stink bugs, leaf beetles, and spittle bugs. They also scavenge on dead insects, and prefer sweet foods such as honeydew from aphids, or sugars from fruits. Ants help speed the decomposition of wood by perforating wood cells allowing moisture and other wood decaying organisms to invade. Ants are also a food source for many birds and animals.

Fig. 2. Polymorphism (different body types) in carpenter ants.[2] Top left: winged reproductive male; bottom left: winged reproductive queen; right: different sizes of worker ants within the same colony.

Life Cycle

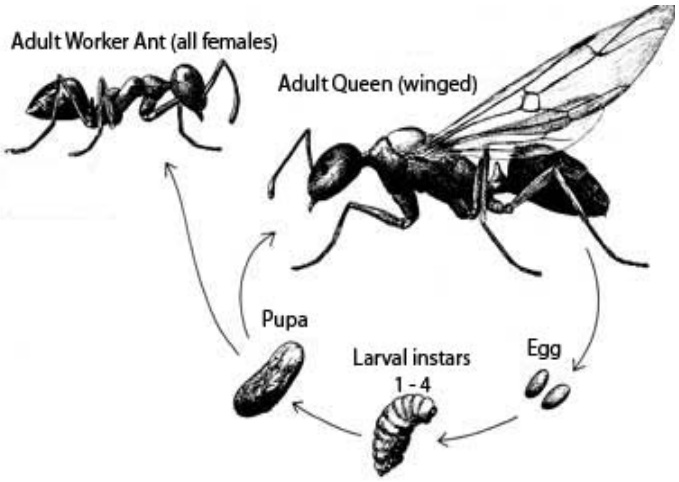

Fig. 3. Carpenter ant life cycle.[3]

Like butterflies and moths, ants have a complete life cycle consisting of an egg, larvae (grub-like), and a pupal stage (cocoon) that develops into an adult. Carpenter ants start new colonies by swarming, or a mass flight of winged male and female ants. Large groups of ants are cued to fly by pheromones released from glands on the male ants. After the female ant has successfully mated, she drops to the ground, breaks off her wings, and begins to search for a suitable site to colonize. Once a site is selected, the queen will lay up to 20 eggs which eventually hatch into legless larvae that the queen will feed from energy reserves stored within her, and from the breakdown of the flight muscles.

Fig. 4. Examples of petiole and thorax variation in ants. Top left: smooth, rounded thorax (*Camponotus laevigatus*); bottom left: two-node petiole (*Solenopsis invicta*, imported red fire ant); top right: uneven thorax (*Formica fusca*); bottom right: single node petiole and constriction between thorax and abdomen (*C. modoc*).[1]

Ant larvae go through four developmental stages (instars) and then form a cocoon in which they pupate (transform from a larvae into an adult). Once development is complete the queen assists new adults in exiting the pupal cases. The queen ant will then lay more eggs, and eventually the new workers will take over raising the new larvae. At this stage the queen ant takes on a role of strict egg laying. It can take 3 to 4 years before an ant colony can build large numbers to be readily noticed.

In Utah, homeowners are most likely to see carpenter ants swarming in spring. Often, swarms occur in the late afternoon and early evening on sunny, warm days preceded by rain. If a swarm occurs inside the house, it is likely that a nest is located inside. Winged ants are often mistaken for termites. If suspected ants or termites are on your property, multiple samples should be collected and submitted to the Utah Plant Pest Diagnostic Lab for proper identification.

Description

Winged and Unwinged Castes: Because carpenter ants are social insects, they have various forms that may be seen around the house or yard, including the reproductive/winged caste and the worker caste. Carpenter ants may be recognized from other structure-infesting ants by the following traits:

- single node between thorax and abdomen (Fig. 4)
- 1/8 to 5/8 inch in length and are usually blackish, or bicolored: red/yellowish and black depending on the species (Fig. 5)
- have an evenly rounded thorax when viewed from the side (Fig. 4)
- elbow-shaped antenna with 12 segments (Fig. 1)
- circle of hairs around the tip of the abdomen

Fig. 5. Examples of color variation among carpenter ants (*Camponotus spp.*). Top left: (*C. noveboracensis*)[1]; bottom left (*C. balzani*)[1]; top right (*C. laevigatus*)[1]; bottom right (*C. shaefferi*)[1].

Ants vs. Termites: Reproductive/winged ants look similar to winged termites. To distinguish between the two groups there are a few major identifying characters to look for (Fig. 6):

Ants
- clubbed antennae
- constricted waist (between front and back of insect)
- front wings larger than the hind wings
- worker caste with compound eyes

Termites
- straight "bead-like" antennae
- broad waist (between front and back of insect)
- front and hind wings are the same length
- worker caste without compound eyes

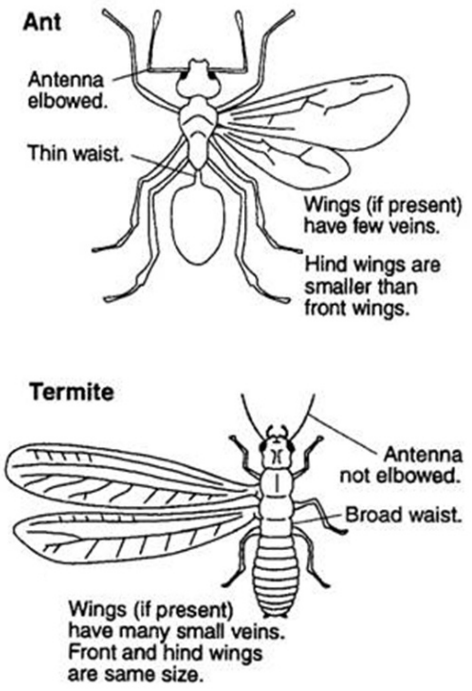

Fig. 6. Comparison of ant and termite body parts.[4]

Management/Control

Locating Ant Nests: Carpenter ants may be located by the dust (frass) they deposit when chewing through wood, which can be found below nests or tunnels (Figs. 7-8). Another indication of nest presence is seeing ants in the house. Nests can be located by observing ant activity and following lines of ants (ant trails) back to their source. Often, ant trails are located beneath baseboards or carpets and are not obvious. Difficulty tracking ants occurs when trails enter wall voids usually along plumbing or electrical pathways. Ant nests can be difficult to locate, and may occur outside the house, even in your neighbor's yard. It is also important to note that some carpenter ants forage only at night. If ants are found, it is best to call a professional pest inspector so that all nests are located before treatment. Below is a list of places where carpenter ant nests may be found[12]:

- firewood
- landscape timbers
- tree stumps
- dead tree limbs
- fence posts and rails
- under hot tubs
- decking materials
- voids above porches
- voids above bay windows
- under attic insulation
- roofing boards
- wall voids
- tree holes
- hollow wooden doors
- hollow curtain rods
- hollow shower rods
- hollow ceiling beams
- under bathtubs
- sill plates and floor joists
- styrofoam sheating
- the eaves of attics
- under insulation in crawl spaces

Fig. 7. Carpenter ant tunnels.[5]

Fig. 8. Comparison of ant and termite frass. Left: carpenter ant frass (sawdust-like)[6]; right: drywood termite pellets (6-sided, hard, woodlike pellets, ~1mm long) [7].

Cultural Control Options: All control options must start with proper identification of the pest ant; it is very likely that the ants in your home are not carpenter ants. While insecticidal treatments may provide a temporary solution, treating conditions favorable to carpenter ant colonization is paramount to long-term control. Carpenter ants prefer wood with high moisture content, especially when the wood is infested with mold and/or fungi.

Some suggestions on reducing moisture in ant-prone areas include:

- increase ventilation in crawl spaces, basements and attics
- use a poly-sheet to cover 75 to 80% of exposed soil in crawl spaces
- fix all leaks in the foundation, roof, or any part of the house, including leaky plumbing fixtures
- use a dehumidifier in the house
- in extreme cases a sump pump may be needed in areas where there is a high water table

Other cultural controls critical for long-term carpenter ant control are:

- seal all cracks (inside and out) in the walls, roof and foundation
- using weather stripping on the bottoms of windows and doors
- trim trees and shrubs so that they are not in contact with the house (potential pathways for ants)
- create seals where cable, electrical, or plumbing hardware enter the house

Carpenter ants tend various insects (e.g., aphids and scales) for their sugar-rich honeydew excretions (Fig. 9). Treating soft-bodied insects like aphids with a horticultural oil, dust or insecticidal soap will eliminate a favorite food source of carpenter ants. In addition, vacuuming and regular cleaning will help keep ants from scavenging for food in the house and will reduce the temptation to colonize in wall voids.

Fig. 9. Carpenter ants often tend aphids for honeydew.[8]

Insecticide Options: When cultural controls alone will not eliminate infestations, chemical treatment may be needed. Once nests are located, there are various treatment options depending on ant location. Homeowners should expect one of the following recommendations from their pest control specialist if ants colonies are located on the property:

- inside structural wood, wall voids, ceilings, eaves, etc.: drilling into the nest and injecting insecticidal dust or aerosol formulations
- fire wood: remove infested wood from the property
- insulation: insulation may need to be removed before insecticides are used, and/or an aerosol formulation might be used
- outside the house/yard: insecticidal barrier treatments may be employed around the perimeter of the foundation to keep ants from coming in. If mounds are found outside a complete insecticidal soil drench of the mound can provide effective control
- ant baits may only be partially effective at controlling carpenter ants given their diverse eating habits, and should be used in conjunction with other methods for increased control
- spraying worker ants outside the nest will not get rid of ants; nests and satellite colonies must all be treated to eliminate the threat of infestation, preferably by a professional

Fig.10. Examples of insecticide baits.[9]

In Utah there are 427 products registered to treat carpenter ants, available as aerosols, baits, dusts, granules, and sprays (mixable and ready-to-use). Use the one most appropriate for your needs. Active ingredients in products labeled for this purpose include: abamectin, acephate, bendiocarb, bifenthrin, boric acid, chlorpyrifos, cyfluthrin, cypermethrin, D-phenothrin plus tetramethrin, deltamethrin, diazinon, esfenvalerate, fipronil, hydramethylnon, imidacloprid, permethrin, propetamphos, propoxur, sulfluramid, synergized pytethrins, and tralomethrin. Again, it is strongly recommended that homeowners contact a professional pest control company to treat all colonies. For home use, baits are a great way to reduce carpenter ant populations, but may not completely eliminate the whole colony (Fig. 10). Baits are slow-acting allowing ants to take the chemical back to the nest and feed other ants--give it time--and do not kill ants feeding on baits.

Carpenter ants are major players in ecological systems throughout the world and should only be viewed negative when they are causing damage to personal property. If ants, or signs of ants are noticed on your property, samples should be collected and identified; many household ants are not carpenter ants. A professional pest inspector should be contracted to locate ant nests and implement the proper control procedures. In addition to insecticide use, long-term control must include cultural methods which can usually be done by the homeowner at little or no cost.

Examples of Carpenter Ants *(Camponotus species)* in Utah


Fig. 11. *C. essigi*.[1]


Fig. 12. *C. hurculeanus*.[1]


Fig. 13. *C. hyatti*.[1]


Fig. 14. *C. laevigatus*.[1]


Fig. 15. *C. modoc*.[1]


Fig. 16. *C. semitestaceous*.[1]


Fig. 17. *C. noveboracensis*.[1]


Fig. 18. *C. sayi*.[1]

Table 1. Ten Common Utah Carpenter Ant Species *(Camponotus)*

Scientific name	Major structural pest	Colony size (workers)	Nesting habits
C. herculeanus	yes	3,000-12,000	standing trees and stumps; satellite colonies in structures
C. laevigatus	no	NA	railroad ties, decorative driftwood; rarely in structures
C. modoc	yes	up to 50,000	moist stumps, trees or landscaping timbers; satellite colonies in structures
C. noveboracensis	no	about 3,000	under rocks, dung and in dead or dying trees--usually in species of **Populus** (aspen, cottonwood, etc.); nuisance/minor pest in structures
C. essigi	yes	about 400	usually in structural voids; minor pest/damage
C. hyatti	no	NA	wood; minor pest/damage
C. nearcticus	yes	about 300	dead twigs and branches, under bark, plant stems, galls and in structures, especially roofing and voids
C. sayi	no	NA	mainly a nuisance pest
C. semitestaceus	no	small	under rocks (usually associated with sagebrush); rarely in structures
C. vicinus	yes	> 100,000	under rocks, in rotting trees and stumps, live trees in heartwood; major pest in structures


Fig. 19. *C. nearcticus*.[1]


Fig. 20. *C. vicinus*.[10]

References

[1] Images courtesy of April Nobile, California Academy of Sciences (www.antweb.org).
[2] Image courtesy of Prevail Pest Control (www.prevailpestcontrol.com/ants.nxg).
[3] Image courtesy of All Pest Solutions (www.allpesetsolutions.com).
[4] Image courtesy of Illinois Department of Public Health, "Prevention and Control of Ants" (www.idph.state.il.us/envhealth/pc_ants.htm).
[5] Image courtesy of University of Minnesota, "Yard and Garden News," Vol. 3, Num. 2. (www.extension.umn.edu/yardandgarden/YGLNews/YGLN-Feb00101.html).
[6] Image courtesy of Edward H. Holsten, USDA Foreset Service, Bugwood.org (www.insectimages.org).
[7] Image courtesy of Arizona Cooperative Extension, Yavapai Co. (http://ag.arizona.edu/yavapai/diagnostics/insectsntoz.htm).
[8] Image courtesy of John Pickering (www.discoverlife.org).
[9] Image courtesy of University of Kentucky, EntFact-619 (www.ca.uky.edu).
[10] Image courtesy of Jen Fogerty, California Academy of Sciences (www.antweb.org)
[11] Stoy A. Hedges, "Field Guide for the Management of Structure-Infesting Ants." Pest Control Technology, 1992.
*Some information in this factsheet was taken from Laurel D. Hansen and John H. Klotz, "Carpenter Ants of the United States and Canada," Cornell University Press, 2005.