

MYTHBLISTERS Carpenter Ants in Urban Trees

By Laurel D. Hansen and Christopher J. Luley



LEARNING OBJECTIVES

The arborist will be able to

- identify some morphological and biological traits of carpenter ants
- describe the habitat and habits of carpenter ants and their association with trees
- discuss the myths commonly associated with carpenter ants
- list strategies in the management of carpenter ants

CEUs for this article apply to Certified Arborist, Utility Specialist, Municipal Specialist, Tree/Worker Climber, and the BCMA science category.

Carpenter ants are very common in urban trees of the United States, as are the myths surrounding these relatively secretive insects. Fowler and Parrish (1982) reported that over 75 percent of the shade trees surveyed in central New Jersey were infested! Despite their relatively frequent presence in urban trees, there are still numerous misconceptions about the biology, behavior, and management of carpenter ants.

The abundance of carpenter ants in shade trees has been attributed to the urban forest's past connection with natural forests and the reduction of available nesting sites due to lower tree densities in urban areas as compared to forested locations (Fowler and Parrish 1982). As a result, carpenter ants appear to have chosen the available trees, homes, and wood in service (such as utility poles) as alternative nesting sites. Structural damage to framing in houses has given carpenter ants a bad name they may not deserve (Fig. 1). Some homeowners rank carpenter ant infestations at the same level of termites. Termites, it should be clarified, eat and digest wood, whereas carpenter ants only nest in wood and do not consume it.

Carpenter ants also seem to show a preference for the tree species they infest. Silver maple was documented to be a favored species in the northeast as were a number of other common urban trees such as ash, white and red oak, and Norway maple (Fowler and Parrish 1982). In the northwest,

western red cedar, Douglas-fir, and pine species are preferred. In urban trees, the presence of carpenter ants is a potential indicator of decay in trees (Fig. 2) (Luley 2006). Carpenter ant nesting has also been associated with increased risk of wind breakage of urban trees (Fowler and Roberts 1982).



Figure 2. The presence of carpenter ants in living trees is an indicator of the presence of decay.



Figure 1. Carpenter ant excavation damage to a beam taken from a house.

Myths of Carpenter Ants

Because of their common occurrence in urban trees, and the known potential of carpenter ants to damage houses, arborists are frequently asked to recommend treatment approaches or provide advice on the possible impact of these ants to trees or nearby homes. This article will offer what is known about carpenter ants relative to many common myths about the insect that have been passed along in the trade.

Myth 1: Carpenter ants are big black ants

Most arborists are familiar with the large black soldiers or majors of *Camponotus pennsylvanicus*, the black carpenter ant. In western states, *C. modoc* is more common (Fig. 3). However, carpenter ants exhibit considerable polymorphism, meaning that they exhibit diversity in size and appearance within a species, like *C. pennsylvanicus*. In fact, most of the worker ants are considerably smaller and more numerous than the majors (Sanders 1964). The smaller workers or minors forage for food like the majors, although many of the minors remain in the nest and are never seen (Fig. 4).



Figure 3. Most arborists are familiar with the major workers (or soldiers) of *Camponotus pennsylvanicus* and *C. modoc* (shown here).

There are over 900 species of *Camponotus* worldwide, and they offer a wide range of colors and sizes other than the well known large, black carpenter ant majors we often think of as representing this species. Therefore, carpenter ants are not just large black ants.



Figure 4. Carpenter ants have a diversity of sizes within a single colony. All workers may forage for food but larger workers are most commonly found outside the nest.

Myth 2: Carpenter ants only nest in decayed or moist wood

This statement has been written and passed on so frequently and for so long that it has almost become fact. In reality, it is only partially true because carpenter ants can and do nest in sound wood both in living trees and wood in service.

A carpenter ant colony forms two types of nests. The brood or main nest, which harbors the queen, is typically located in decayed or moist wood. The nest is usually in contact with the ground or near a source of moisture that keeps wood at fiber saturation. The moisture is needed to maintain a suitable environment for hatching eggs.

However, many carpenter ants species also form satellite nests in locations that are drier and warmer than the brood nest. The satellite nest is created by workers moving mature larvae to a location that is more favorable for them to develop. Satellite nests do not contain a queen and are therefore unable to reproduce. The satellite nests maintain contact with the parent nest during the active season of the year. The workers excavate the wood for the satellite nest in the same manner as they would for the brood nest; this nest may be established in sound, dry wood, in houses, and other locations. Many times, satellite nests develop in foam insulation, or other less dense materials that are easy to excavate and provide conditions similar to dry wood.

Carpenter ants are also known to damage non-decayed or sound wood in living trees. Most brood nesting begins in decayed wood but the potential for expansion to undecayed wood exists. The question is often raised whether this can increase decay by breaching barrier zones established by the tree to contain decay fungi. Conversely, some have hypothesized that excavation of decayed wood in the tree may help reduce spread of the decay fungus by removing it from the tree. These questions will surely be continued to be debated until better research can provide an answer.

Myth 3: Carpenter ants in houses or other structures can usually be traced back to a moisture problem

Manion (1981) suggested that water leaks or other moisture sources were necessary for carpenter ants to develop in a house or other structure. However, satellite nests are often established in dry and warm locations within a house that hasn't any moisture problems, while the brood or parent nest can usually be found near the house in a decayed tree, old stump or in buried wood.

Of importance to arborists is that the ants may gain access to houses from brood nests using tree branches that contact or overhang a house (Fig. 5). Carpenter ants can also gain access to structures in a variety of other ways. Carpenter ants are good tightrope walkers, and can reach a house by walking utility lines that pass through trees.



Figure 5. Branches overhanging and touching homes can provide carpenter ants access to houses.

The utility line becomes an ant highway or the connection between their food source and nest.

Myth 4: Carpenter ants nests are only found near ground level in trees

The brood nest of carpenter ants is usually established close to the ground where contact with the soil or other source of moisture provides conditions necessary for the colony to develop. However, satellite nests can be found considerably higher in a tree as they are not dependant on moisture for the colony to thrive. Satellite nests higher in trees may also be found in decayed wood that developed after a tree has been wounded. Carpenter ants may use several trees or sites adjacent to the brood nest as they expand the size of their colony, using satellite nests as rearing sites.

Myth 5: Only a few ants on a tree do not mean there is an infestation

Carpenter ants are foraging insects that feed on a variety of food sources—such as aphid honeydew and other insects. Their presence on a tree does not necessarily mean an infestation exists, as the tree may only be on the trail to a food source. However, relatively few of the ants in a colony forage for food even though a colony can have thousands of workers. The majority remain in the nest performing other duties to maintain the colony.

Carpenter ants are fairly secretive and do the majority of their foraging at night or via a series of underground tunnels that are lined with wood excavated from the nest. Few actual ants may be seen on the ground. Typically the ants will follow a network of well-traveled trails to forage and return to the nest with food (Fig. 6). These trails may be seen in the grass where they cross open areas.

Therefore, the presence of a few ants is adequate to suggest a tree is infested, or it may mean that an infestation is nearby and workers are using that tree as part of their trail network.

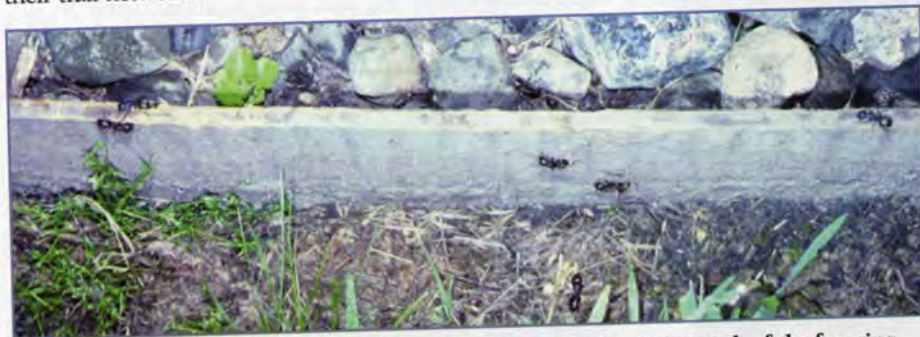


Figure 6. Carpenter ants follow well defined foraging trails; however, much of the foraging occurs at night, and trails are often partially underground or obscured by vegetation.

Myth 6: Swarming of carpenter ants with winged forms mean the colony is moving

Swarming of carpenter ants occurs in the spring of the year after a colony has reached an adequate size to produce winged reproductives (Fig. 7). The winged males and females that make up the swarm mate, and each fertilized queen seeks a new location in an attempt to establish a new colony. The new colony will be established with its own queen who will produce a brood to sustain



Figure 7. Winged males, females, and workers before a swarm. Swarms are used by carpenter ants to establish new colonies.

the new colony without any connection to the original nest. The original colony will continue to produce additional swarms in subsequent years if conditions are right. Carpenter ant wars, or physical battles between colonies from different queens, may occur if competing colonies encounter each other.

Myth 7: Treated wood will prevent carpenter ants

Treated wood is less likely to have decay because the preservatives inhibit decay fungi; as a result, the treatments may indirectly reduce carpenter ant damage. However, carpenter ants do not eat wood, therefore the various wood preservatives will not stop carpenter ant damage. Damage from carpenter ants develops as a result of their excavation of wood with their strong mandibles to create a nest for the colony to develop. The sawdust from these excavations is often what attracts our attention to the presence of an

infestation. The material excavated from wood is technically not frass, since it has not passed through the digestive system of the ant.

Carpenter Ant Identification

Carpenter ants are in the family Formicidae under the order Hymenoptera (bees, wasps). The largest genus is *Camponotus* or carpenter ants. Worldwide

there are over 900 species of *Camponotus* of which 50 are found in North America (Hansen and Klotz 2005). Of the species in the United States and Canada, about 24 are commonly found infesting living trees. Some of these species are variously colored, like *C. chromaiodes*, the red carpenter ant and *C. americanus*, and *C. novaeboracensis* (Fig. 8). Carpenter ant species that are most common in living trees and would most likely be encountered by arborists in eastern North America are *C. pennsylvanicus*, *C. novaeboracensis*,

C. herculeanus, and *C. nearcticus*, the black carpenter ant, *C. pennsylvanicus*, is found in the east, while *C. modoc*, *C. vicinus*, and *C. essigi* are most common in the west. Several species have transcontinental ranges such as *C. novaeboracensis* and *C. herculeanus*, while others have a more limited range, such as *C. floridanus*, which is primarily found in the southeastern states. *C. herculeanus* and *C. ligniperdus* are the most common in Europe.

Camponotus species are identified by having an evenly convex dorsum. All the species of *Camponotus* exhibit polymorphism, and the major workers are typically 8 millimeters or larger in size. Workers are needed to identify any particular ant to the species level. "Carpenter Ants of North America" (Hansen and Klotz 2005) is a good reference guide to the species and their biology if an arborist wishes to attempt identification on their own.



Figure 8. There are over 900 species of carpenter ants around the world. There are a variety of colors and sizes as shown here by *C. novaeboracensis*, the New York carpenter ant.

Carpenter Ant Biology

Carpenter ants are social insects that develop a colony around a single queen. The colony is comprised of a range of ants of different sizes and roles to play in the maintenance and growth of the colony. Minors, medias, and majors (or soldiers) work to feed the queen, tend eggs and larvae, excavate wood for the nest, and forage for food.

A colony is initiated when a fertilized queen is dispersed from an established colony to a new site. The queen loses her wings, lays eggs, and produces workers that begin to forage for food and excavate the nest. The queen's sole duty



Figure 9. Foraging workers returning to the nest with their whole insect prey.

is to lay eggs to expand the colony. Death of the queen means eventual death of the colony as workers do not have the ability to reproduce and sustain the nest.

The brood colony, or the main colony where eggs are laid and hatched, is usually initiated in decayed wood near the ground. Trees with butt rot or decay, old stumps, houses or structures with moisture problems, un-protected firewood piles, or buried wood make ideal locations for a brood colony. As the colony expands in size satellite colonies may develop. These colonies are formed by workers moving larvae to a new location where warmer, drier conditions promote rapid development of the larvae. Many people mistake the larvae for eggs when they observe workers carrying them to a new location.

Satellite colonies can be found in a wider range of locations, constructed from a wider range of materials than brood colonies. They are often seen in the plastic foam insulation of houses, or inside attics with poor quality plywood. Satellite colonies can also develop higher in trees or in sound wood in houses. Satellite colonies are typically abandoned at the end of the season and the ants return to the brood colony.

Carpenter ants are foraging insects that feed on other insects and are well known to tend aphid colonies for their production of honeydew. Foraging carpenter ants are often seen heading back to their nest carrying other insects (Fig. 9), or with their abdomen extended as a sign they are gorged with food (Fig. 10). Carpenter ants may show strong resource fidelity, or dedication to a known food source, in their foraging. This can be a barrier to the taking of baits placed out for their control.

In temperate regions, carpenter ants enter dormancy in the winter. Many people are concerned about the possibility of introducing an infestation into their homes with firewood. This would be a rare occurrence because the ants are dormant and a queen would be required to establish a colony. Stray carpenter ants that escaped from firewood would not pose a threat to a structure without a queen. Using only seasoned firewood and not storing it around the house during the growing season is a sound recommendation to avoid any chance of it contributing to the establishment of carpenter ants in a home.



Figure 10. Workers with non-engorged gaster (left) and with an engorged gaster (right).

Carpenter Ant Management

Carpenter ant management in living trees has always been a debated question amongst arborists. Ants have been viewed as beneficial as they are an indicator of decay in trees. However, their presence in trees close to houses is a source of a potential infestation from either the dispersal of a colony or by formation of a satellite nest.

Carpenter ants have a beneficial side because they can be important predators during outbreaks of defoliating caterpillars. They are also important in recycling wood in the forest as they break wood down into smaller pieces and accelerate the deterioration of dead and down trees and are a food source for birds and other animals. For example, Pileated Woodpeckers (*Dryocopus pileatus*) use carpenter ants as a primary source of food and the presence of these woodpeckers excavating large, oblong holes in trees is a good symptom of a carpenter ant infestation.

There are a number of integrated management strategies for carpenter ants. Elimination of the conditions appropriate for brood colonies is the most obvious. For example, removing severely decayed trees, grinding stumps after removal, removing buried wood, or fixing leaks in structures are easy to apply examples that reduce the potential for carpenter ants infestation.

Limiting access to structures is a good means to avoid potential infestations. Clearing branches that touch houses and preventing shrubs from encroaching on foundations are also recommended.

Newer chemical treatments have made treating infestations easier and more effective. Arborists who are licensed to apply pesticides to trees are typically not legally licensed

to make treatments to houses or structures without additional pesticide application requirements. However, a number of insecticides are labeled that allow arborists to make treatments around the base and on the trunks of infested trees as a means to control carpenter ants.

Baits are often selected as a more environmentally friendly strategy to treat carpenter ant infestations. A number of very effective baits have been developed recently. The baits are typically placed near the brood colony or along a foraging trail. They are successful only if foraging workers take the bait back to the brood colony.

- Fowler, H.G. and M.D. Parrish. 1982. Urban shade trees and carpenter ants. *Journal of Arboriculture* 8:281-284.
- Fowler, N.G. and R. B. Roberts. 1982. Carpenter ant (Hymenoptera: Formicidae) induced breakage in New Jersey shade trees. *Canadian Entomologist* 114:649-650.
- Hansen, Laurel D., and John H. Klotz. 2005. *Carpenter ants of the United States and Canada*. Cornell University Press. Ithaca, NY. 204 pp.
- Luley, Christopher J. 2006. Identifying wood decay and wood decay fungi. *Arborist News* 15(2):12-19.
- Manion, P. D. 1981. *Tree disease concepts*. Prentice-Hall, Englewood Cliffs, NJ. 399 pp.
- Sanders, C.J. 1964. The biology of carpenter ants in New Brunswick. *Canadian Entomologist* 96:894-909.

Laurel D. Hansen is a professor at Spokane Falls Community College and is a frequent speaker for the structural pest control professionals.

Christopher J. Luley is a forest pathologist and consultant with Urban Forestry LLC in Naples, New York.



CEU TEST QUESTIONS

Take your quiz online! Go to www.isa-arbor.com/certification/ceus.aspx and click on "Arborist News Quizzes Online." If you need a login and password, send an e-mail to cert@isa-arbor.com.

To receive continuing education unit (CEU) credit (1.0 CEU) for home study of this article, after you have read it, darken the appropriate circles on the answer form of the insert card in this issue of *Arborist News*. (A photocopy of the answer form is **not** acceptable.) A passing score for this test is 16 correct answers.

Next, complete the registration information, **including your certification number**, on the answer form and send it to ISA, P.O. Box 3129, Champaign, IL 61826-3129. Answer forms for this test, **Myth Busters: Carpenter Ants in Urban Trees**, may be sent for the next 12 months.

If you do not pass the quiz, ISA will send you a retake answer sheet. You may take the quiz as often as necessary to pass. If you pass, you will **not** be notified; rather, you will see the credit on your CEU report (available online). Processing CEUs takes 4 to 6 weeks.

CEUs for this article apply to Certified Arborist, Utility Specialist, Municipal Specialist, Tree/Worker Climber, and the BCMA science category.

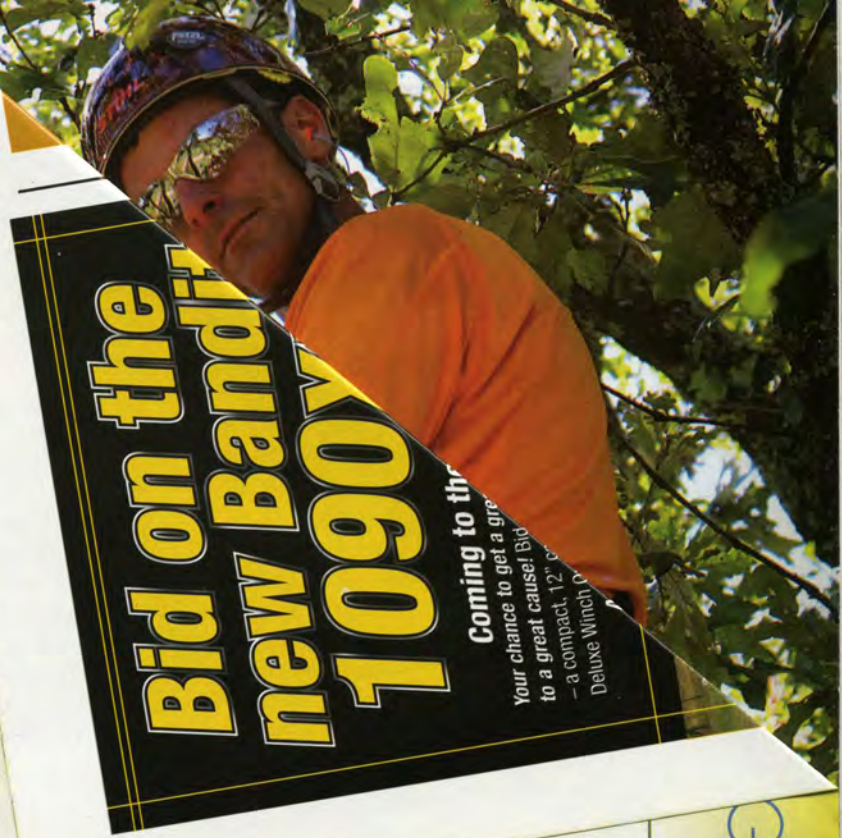
- Carpenter ants excavate wood but do not eat it while termites eat and digest wood.
 - true
 - false

- Most carpenter ants colonies are found in trees with wood decay.
 - true
 - false

- Carpenter ants are represented by
 - a limited number of species which are usually seen as large black ants on trees
 - over 50 species in North America and 900 worldwide
 - ants that have a wide range of sizes and colors and b
 - b and c
- Carpenter ants require moist wood or wood in contact with the soil in order to damage structures such as house framing.
 - true
 - false
- Satellite colonies
 - have their own queen
 - develop only in moist or damp wood
 - are used by carpenter ants to raise eggs
 - may develop in dry wood

6. Foraging carpenter ants may
 - a. use utility lines as a part of their foraging trails
 - b. usually follow well-defined trails
 - c. often forage at night
 - d. all of the above
7. Carpenter ants nests
 - a. may be found up to 30 feet high in a tree
 - b. are only found near the ground
 - c. are always found in wood
 - d. can be detected by buzzing noises made by workers
8. Swarming of carpenter ants means
 - a. the nest is being abandon and moved
 - b. the colony is expanding and the queen is moving to a new location
 - c. a new colony is being formed with its own queen
 - d. the infestation is over and exhausted the site
9. An effective treatment for carpenter ants is to use pressure treated wood in any construction where wood touches the ground
 - a. true
 - b. false
10. The brood colony contains
 - a. a single queen
 - b. workers of one size
 - c. several queens working cooperatively
 - d. large workers that tend eggs
11. Carpenter ant workers
 - a. have a range of sizes
 - b. are mostly outside the nest foraging for food
 - c. lay eggs if they are majors
 - d. are always black
12. An important food source for carpenter ants is
 - a. bee honey
 - b. wood
 - c. foliage
 - d. aphid honeydew
13. Carpenter ants often become established in houses from
 - a. ants that drop from infested firewood
 - b. ants from nearby infested trees
 - c. oviposition of eggs by majors
 - d. foraging queens

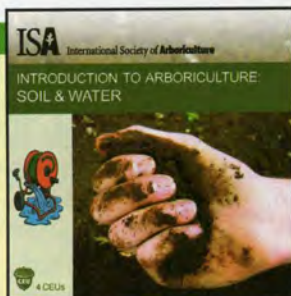
14. Different b... cooperate i...
 - a. true
 - b. false
15. Carpenter an... ecological role...
 - a. as a food fo...
 - b. as predators
 - c. by spreading
 - d. a and b
16. Baits may not be... ants because
 - a. they show resc...
 - b. they feed on su...
 - c. baits have limite...
 - d. baits degrade quic...
17. Clearing branches from... wires can help reduce access to a house
 - a. true
 - b. false



Need more CEUs?



See the insert card in this
issue of *Arborist News*.



Now Available!
The latest in ISA's
interactive CD series

Introduction to Arboriculture: Soil & Water

Soil & Water is the newest CD in ISA's innovative, interactive training series—an essential overview of the key roles soil and water play in the development and continued health of trees.



This training CD explains the relationship between tree root systems and soils as the single greatest influence on tree health; provides valuable insight into the effects of water availability in the root zone; and discusses conscientious irrigation practices.



Retail Price: \$69.95
ISA Member Price: \$59.95