CHAPTER 12

Beetles, Carpenter Ants, and Carpenter Bees

Learning Objectives

- ✔ Recognize the damage caused by wood-destroying beetles.
- ✔ Identify the principal orders of wood-destroying insects.
- ✔ Understand the types of wood beetles will attack.
- ✔ Know the significance of the term "reinfesting."
- ✔ Know how many species of carpenter ants are in the state.
- ✔ Know the biology of the carpenter bee.

Wood-destroying insects, other than termites, are in the orders: Coleoptera (beetles) and Hymenoptera (wasps, bees, and ants). It is difficult to estimate a loss associated with these insects; however, in the southeast, the beetle group probably accounts for a higher percentage of the loss than the Hymenoptera species. One estimate puts the beetle damage at $12 million for the southeastern states, and this was made in the seventies. Current dollars would be considerably higher. Damage potential is high with these insects, and you should be aware of the damage associated with each species. This chapter is divided between the two orders, with emphasis on the beetles.

BEETLES

Beetles belong to the order: Coleoptera. Insects in this group undergo a complete metamorphosis (egg, larva, pupa, and adult), with the larva being responsible for the damage. The developmental time from egg to adult varies, but it usually takes place in a short period of time. Under optimum conditions, the developmental cycle takes only about 8 to 10 days (some *Diptera*), while in others, the cycle is completed in 20 to 30 days (some *Lepidoptera*). Wood-infesting beetles are unique in that it may take as little as 60 days to complete the developmental cycle or as long as 3 to 5 years (depending on species). Low temperature and reduced nutritive and moisture content of the wood are factors that will increase the length of the cycle. Wood-infesting beetles are very sensitive to these factors.

A number of beetle species (example bark beetles in the family: Scolytidae) will attack green timber. Some of those that attack green timber might be found in finished lumber under certain conditions; however, these beetles will not reinfest the wood after emerging. The key word is *re-infest*. Beetles we should be concerned about are those that will reinfest the finished wood from which they emerge. Beetles that are capable of re-infesting, can be recognized by the acronym ALBOW, which stands for the following families or insects:

- **A**nobiidae
- **L**yctidae
- **B**ostrichidae
- **O**ld House Borer (This insect belongs to the family: Cerambycidae.)
- **W**eevil (Insects in this group are found in the family: Curculionidae.)

You may often see the term "powderpost" used in conjunction with these beetles, and there is a difference of opinion on the exact meaning of the term. Moore (*Wood-Inhabiting Insects in Houses, 1979*) defines the term as "a type of damage in which the inner portion of wood is eventually converted to a mass of powdery or pelleted frass held together by a thin outer shell of surface wood that is itself penetrated by numerous exit holes." Others place more emphasis on the talc-like nature of the frass, which is produced by the feeding larva. For the purposes of this manual, Moore's term will be used.

Most beetles in this group are small. For this reason, sizes will be given in millimeters and a conversion table is provided for your use:

Inches	Decimal Equivalent	Millimeters
1/32	0.03125	0.8
1/16	0.0625	1.6
1/8	0.125	3.2
1/4	0.25	6.4
3/8	0.375	9.5
1/2	0.5	12.8

ANOBIIDAE

Beetles in this family have been collectively referred to as "death-watch beetles" or "furniture beetles," and although there are insects with these common names, the names should not be used to describe the entire family. In fact, two very common insects in the family, the "drugstore

beetle" and the "cigarette beetle," are stored-product pests and have nothing to do with wood-boring damage. Wood-boring species (finished wood) are reddish brown beetles, 3 to 7 millimeters long with the head covered by the pronotum (when viewed from above). Noticeable rows of pits or longitudinal grooves are usually present on the wing covers. Close inspection of a piece of infested wood reveals many small white C-shaped larvae with brown heads and rows of spines on most segments. A large larva might be as long as 11 millimeters.

Infestations usually take place in seasoned softwoods that are 10 years old or older with a moisture content greater than 15 percent. Gravid females deposit eggs (about 50 per female) on the wood, usually in old emergence holes, behind splinters, or in other available cracks and crevices. After hatching, the larvae bore into the wood for a short distance and then turn at a right angle and feed with the grain. Sapwood (wood tissue developed in the spring) contains a higher concentration of nutrients than the heartwood, and larvae tend to feed more in this zone; however, some feeding may take place in bordering heartwood. It can conceivably take as long as 2 to 3 years to complete development; however, if moisture (approaching 30 percent) and nutrition are high, development can proceed at a faster rate.

As the larvae grow, the size of the tunnel is increased, and if the infestation is high, the inner portion of the wood becomes a mass of intersecting tunnels packed with frass and fecal pellets. The insect pupates after larval development is complete, and the adult beetles soon emerge and work their way to the wood surface. Mating occurs soon after the adults leave the wood, and the females will then start laying eggs - hence the cycle begins anew. These beetles are a re-infesting species, and egg laying can occur in the same wood from which the adult emerged.

Central heating and cooling units have reduced infestations of these beetles in homes over the last 50 years because of a constant source of heated air, and/or dehumidified cool air. These conditions keep wood in the building and, to a less degree, in attic spaces at or below the moisture level (12 to 13 percent) needed for anobiid survival. The problem, however, can still exist in poorly ventilated areas such as crawl spaces or basements. The first indication of an infestation in a crawl space would be the presence of exit holes in floor joists or subflooring. These holes are round with a diameter of 1.6 to 3 millimeters. Further examination would reveal an accumulation of powdery frass under the infested area. This frass has a slight textured feel, due to the presence of fecal pellets, that is quite different from that of the lyctid beetles which produce a frass that is "talc-like" to the touch. The anobiids also will pack the tunnels with frass and fecal pellets.

LYCTIDAE

The wood-infesting beetles in this family attack hardwoods (finished woods) that are relatively new. Preferred hosts are oak, hickory, and ash; however, walnut, pecan, sweetgum, poplar, and wild cherry can also be feeding sites for these beetles. Female beetles use the pore system found in hardwoods as egg-laying sites, and the first three tree species have a very organized pore system, which is extremely attractive to the females. The latter tree species have a diffuse pore system; hence, they are a little less attractive. This group of beetles does not attack softwoods (southern yellow pine) because they lack the pore system which is essential for egg laying.

These beetles are reddish brown to almost black, somewhat flattened, and range in length from 3 to 7 millimeters. The head is prominent on these slender beetles and is a good feature to use in separating these beetles from the anobiids. Immature lyctid beetles are grub-like in appearance with three distinct legs and very few, if any, hairs on the body. The head is slightly pigmented with somewhat darker mandibles.

Female beetles deposit their eggs within the pores of hardwoods that have a starch content greater than 3 percent. After hatching, the larvae feed along the pores (with the grain), enlarging the tunnels as they molt from one stage to the next. Initially, the tunnels are straight; however, as the size of the larva increases, the tunnel pattern becomes irregular. Just before maturity, the larva bores out a pupal chamber just under the wood surface and changes into the pupal stage. As the adults begin to emerge, circular holes 0.8 to 1.6 millimeters appear in the wood. The frass produced by these beetles is extremely fine and has the feel of talcum powder.

Nutrition and moisture are variables that dictate the length of the larval cycle. If these factors are high, the cycle is completed within 9 to 12 months. However, the cycle may be 2 to 3 years long if nutrition and moisture are available in marginal quantities.

BOSTRICHIDAE

Beetles in this family are similar to the anobiids in that the pronotum covers the head, making it invisible when the insect is viewed from above. They are cylindrical in shape and 3 to 6 millimeters long with a reddish brown to black color. The front of the pronotum is usually rough to rasp-like in appearance. Exit holes are circular with a diameter of 2.5 to 7 millimeters.

In some texts, the bostrichids are referred to as the "false powderpost beetles." This may be due to the course nature of the frass. It has a gritty texture rather than the talc-like texture produced by the lyctids. The frass has small pieces of chewed wood and will clump. The bostrichids will feed on hardwoods, and they are often found in implement handles, wooden baskets, and wreaths made from field-collected vines. In some cases, they have been reported in paneling made from hardwoods; however, cases of structural damage are rare with these beetles.

OLD HOUSE BORER

The family: Cerambycidae contains a group of beetles often referred to as the "long-horned beetles" or, in some cases, one may see "long-horned wood boring beetles." The term "long-horned" refers to the length of the antenna, which is usually at least half as long or longer than the insect's body. These beetles, depending on species, attack a variety of trees and shrubs, as well as recently felled timber. Pest control professionals occasionally encounter the latter group of beetles in new construction that is 1 to 5 years old. Homeowners may complain of gnawing sounds at night as the larvae feed in studs or rafters. With one exception, these beetles will not re-infest the wood, and once the adults emerge, the problem is cured. The exception, depending on environmental conditions, is the old house borer *(Hylotrupes bajulus)*.

The adult old house borer is an elongate (16 to 25 millimeters long) beetle with a slightly flattened cylindrical shape, and the antennae are half as long as the body. The pronotum has a series of markings that give the appearance of a nose and a pair of eyes. This "face" is described as a central dark line (slightly raised) in the center of the pronotum bordered by raised half circles on each side. The insect is grayish black with lighter areas of gray that form two faint bands across the wing covers.

Adult females lay their eggs in cracks and crevices on finished softwoods that are generally less than 10 years old. As the larvae hatch, they bore into the wood across the grain but soon turn and feed more or less with the grain. The size of the feeding gallery increases as the larvae molt from one stage to the next, and it becomes packed with frass. Larval feeding occurs in the sapwood because of the higher nutritional content (primarily protein) of this wood layer. If the protein content falls below 0.2 percent, larval survival is doubtful.

Before pupation, the larva bores to the wood surface and cuts an oval exit hole, which measures 6 to 10 millimeters at its widest point. Once the exit hole is finished, the larva retreats to a previously enlarged area, packing the exterior opening with chewed wood as it retreats. Pupation occurs in the enlarged part of the gallery, and if conditions are within normal limits, the adult beetle will emerge in about 20 days. A mature larva is white to yellow white and about 30 millimeters long. The head has three eyespots located to either side of the mouthparts, and this can be used to separate it from other wood-boring larvae from the same family. Other larvae have only one eyespot.

WEEVILS

Weevils are an economic problem in the production of a number of agricultural crops and, in rare instances, some weevils will attack finished wood. The conditions necessary for an infestation in finished wood is rather severe - high moisture content with the presence of decay. The presence of this pest would be indicative of these conditions. The wood conditions should be addressed before worrying about the weevil. Controlling the sources of excess moisture will eliminate the possibility of wood decay fungi and the subsequent infestation by wood-infesting weevils.

General Management Guidelines for Wood-Destroying Beetles

A number of events in the last 50 to 60 years have reduced the damage associated with wood-infesting beetles. Most notable among these have been the use of kiln-dried lumber and the widespread use of central heating and cooling units. Both events reduce the moisture content of the wood that is essential for beetle survival. Kiln drying kills any beetles that might have infested the wood in the harvesting process, greatly reducing the chances of using beetle-infested lumber in the building phase. Once the structure is completed, central heating and cooling units keep the moisture content of the living space at low levels. Moisture is also decreased to some extent in wall voids, reducing the chances of having wood-infesting beetles in this area.

Even though the threat of beetle infestations has been reduced, they have not been eliminated. Infestations still occur, and they are often found when inspections are done for other reasons. You should be able to recognize the damage caused by various beetle species and to prescribe a management plan for the beetle, if needed. Steps in a management plan might include inspection/identification, moisture control, and treatment.

Inspection. The inspection is limited to exposed wood in the crawl space, attic, or living space of the building. In most cases, it is not feasible to remove wall coverings and insulation unless some factor warrants it. First generation beetles are rarely found before emergence holes are cut; however, if beetles are suspected, the wood could be probed and/or sounded for evidence of internal damage. A hammer or screwdriver may be used for these procedures. If internal damage is present, sounding will produce a hollow sound. If emergence holes have not been cut, internal damage may be limited, and sounding will not produce a hollow sound.

The most obvious sign of a beetle infestation is the presence of emergence holes; however, the "presence" of holes may or may not indicate an active infestation. The emergence may have happened years before and the population could have died out due to some factor such as environmental change, disease, parasites, etc. To determine if the infestation is active, look for frass (sawdust) that has the color of recently sawed wood. Also check the inside lip of the hole, which should have the color of fresh wood. Old emergence holes will have a very dark inner lip.

On the other hand, the inspector may paint an area with a light colored paint, count or mark the holes in the painted area, and check the painted area in 30 to 40 days. If additional holes are present, then the inspector will know for sure that the infestation is active.

Another factor to consider is the species of beetles. If a beetle that will not re-infest the wood makes the emergence

holes, then the present holes are the only ones that will occur. Use the following points as an aid to identification:

- Collection of beetles, either adults or larvae, for identification
- Type of wood infested (hardwood vs. softwood)
- Diameter of emergence holes
- Condition of wood (seasoned, recently seasoned, etc.)
- Area of wood infested (sapwood vs. heartwood)
- Shape of emergence hole

Moisture. Wood moisture content above 15 percent is conducive to beetle infestation and reproduction, and it should be determined during the inspection process (especially in crawl spaces). Moisture meters are much more "user-friendly" than they were at one time, making this procedure easier. If moisture is at 15 percent or higher, you should determine the source or sources of moisture. Possible moisture sources include these:

- Grade problems that force water into the crawl space.
- Insufficient ventilation for the surface area covered by the house.
- Plumbing leaks and wall or roof leaks (for areas other than the crawl space).

Correcting these problems can be as simple as fixing leaks, or they could be more complicated, such as the installation of additional ventilation vents and or the addition of fans in the current vents.

Another alternative to moisture is to place a poly barrier between the soil and the crawl space. This barrier should only cover about 80 to 90 percent of the soil surface in the crawl space. If the entire soil surface is covered, rapid drying may cause floors to buckle and crack. This latter method may not give the desired results if grade problems are channeling water into the crawl space and causing it to pool in this area. The placement of additional ventilation vents in foundation walls and or the addition of fans in existing vents may be outside the expertise of most companies; however, if these are viable options, they should be reported to the building owner. Some companies will put down the poly barrier.

Surface Treatment. Treatments may be classified as either (1) surface treatment or (2) fumigation. If the inspection shows the presence of an active infestation, the wood surfaces can be sprayed or "painted" with an insecticidal solution. Most compounds cleared for the control of subterranean termite can be used as surface treatments (check the label of the product of choice) for beetle control, as well as borate. This latter compound is disodium octaborate tetrahydrate (DOT) and is not the common boric acid used for cockroach control.

Apply with a compressed air sprayer using either a flat fan spray tip or a crack and crevice tip with a pressure of about 25psi to prevent contamination of the surrounding area. Low pressure also prevents splash back onto the applicator. Spray the wood surface only to the point of run-off and no more. Applications that exceed this point are wasteful and increase the possibility for contamination. Make any application within the living or workspace carefully and in strict accordance with label instructions.

The use of a surface application is an effective way to achieve control; however, control is not immediate. It may take as much as 6 months or more before beetle populations are reduced. Factors that are responsible include shallow penetration (one to two millimeters) and a low diffusion rate (for some products) of the material into the wood. In most cases, the larvae are feeding below this shallow "zone of penetration" and will not reach it until they they are ready to emerge as adult beetles. Another factor that prolongs control is the movement of adult beetles from inaccessible areas or poorly covered areas. These beetles are eventually killed as they move onto treated surfaces. Do not attempt to treat wood from a finished side. Sprays that are applied to a finish (wood covered with paint, sealer, stain, etc.) will "bead-up" and will not penetrate the wood.

Borates have a number of advantages over other materials: They are less toxic to nontarget organisms, have better residual activity, have activity against decay organisms, and have better penetrating and diffusing properties than the other classes of compounds. Borates are very soluble in water and if used in exposed areas, the wood should be sealed after the application.

Aerosol-formulated products are another treatment tool that can be used to control wood-infesting beetles. These materials can be injected into emergence holes, or the infested wood can be drilled (drill on 8- to 12-inch intervals with a ⅛-inch bite) and then treated. Once the aerosol is injected, it tends to follow the galleries and will kill any beetles that it encounters. This method is slow but effective.

Fumigation. If beetle infestations are widespread within a structure, the only alternative may be fumigation. Methyl bromide (which may eventually be removed from the market) and sulfuryl fluoride are available as structural fumigants; however, this is a very expensive application, and the products are extremely toxic. A fumigation procedure does not give any long-term control to the structure. The procedure is very efficient; however, once the seal is broken and the structure is "aired out," it is again susceptible to an infestation. This points out the necessity of repairing or removing "conducive" conditions before doing the fumigation.

In general, fumigants are toxic to all insect stages; however, when using sulfuryl fluoride for powderpost beetle control, the recommended concentration is 10 times higher than, for example, drywood termites. If the old house borer is the target pest, the concentration is four times higher than for drywood termites. Identification of the pest is very important when determining the appropriate concentration. For more information on fumigation, please refer to the certification manual on fumigation.

CARPENTER ANTS AND CARPENTER BEES

There are only two structural insects of significance in the Order: Hymentoptera. These are (1) carpenter ants and (2) carpenter bees. The carpenter ant, by far, is potentially the most destructive. In fact, the carpenter ant has to be reported as a structural pest when treatments are applied for its control. Both insects undergo a complete metamorphosis, egg, larva, pupa, and the adult insect, with the adult causing the damage. It is important to note that while the term "carpenter" is in both names, neither insect will eat wood like termites. In other words, they do not gain any nutritional benefit from the wood. Adult insects create the damage when they excavate the wood to create harborage and egg-laying sites. The following discussion focuses on the carpenter ant.

At least five species of carpenter ants are found in Mississippi. The black carpenter ant (BCP), *Camponotus pennsylvanicus*, is the most widespread. Other species are *Camponotus caryae discolor, Camponotus rasilis, Camponotus castaneus and Camponotus ferrugineus*. The BCP and C. ferrugineus are the largest ants in the group and their size will vary from 8 to 13 millimeters long. The other ants will vary from 3 to 8 millimeters long, depending on species. The BCP is an example of this group of ants.

BLACK CARPENTER ANT—*Camponotus pennsylvanicus*

Carpenter ants are social insects that nest in colonies. A colony is usually composed of one egg-laying queen and worker ants of various sizes. Black carpenter ants have at least three different sizes of worker ants; therefore, they are referred to as "polymorphic." Worker ant numbers can vary depending on the colony stage. Very young colonies may have 50 or fewer workers, while more mature colonies might have several hundred to thousands of workers. The queen is wingless and is by far the largest ant in the colony. She will measure about ¾ of an inch in length. As a colony nears maturity (one with several hundred workers), a generation of winged virgin males and females will be produced. These winged forms will "swarm" from the colony in the spring and mate in the air. After mating, the male dies and the female will drift to earth at some point. Once she is on the ground, she seeks out a sheltered site in a hollow tree or stump and starts a new colony.

Figure 12-1. Black Carpenter Ant (BCP)—*Camponotus pennsylvanicus*

Carpenter ants feed mostly on insects and other small invertebrates; however, at times sweets in the form of plant secretions, honeydew, and seeds are used as food materials. During the early spring, They may be seen foraging during the day, but as summer temperatures increase, most foraging is done at night. Workers use the same trail to and from a constant food source (a tree that contains a source of honeydew). This constant use will wear a noticeable trail in lawn grasses.

Carpenter ant damage is hard to quantify. People may notice a few black carpenter ants within a structure; however, this does not mean that damage is present or even that the colony is located within the structure. The colony may be located in old landscape timbers or in tree hollows, and the ants enter the home at various points as they forage for food. If this is the case, the ant is only a nuisance. On the other hand, the colony may be located within wall voids or attic spaces within in the structure. Again, this does not mean that damage is present; however, the odds start to increase. In some cases, the ants may nest only in wall voids and not excavate the wood for brood rearing. However, given the right conditions, black carpenter ants will excavate wood for brood rearing, and they may start the colony in moist wood that has begun to decay. In fact, research has shown that these ants cannot successfully establish a colony in wood below 15 percent moisture. Therefore, roof leaks or leaks around windows are potential nesting sites. In general, the carpenter ant species located in Mississippi do not seem to cause the damage associated with other species in the northwest part of the U. S.

Several factors may indicate that the ants are actually nesting within the home. One is the consistent presence of ants within the building. The occasional ant may inadvertently wander into the building; however, if ants are seen on a consistent basis, especially at night, then this is more indicative of a structurally located colony. Another factor would be the occurrence of winged reproductives within the building. These ants may occur within a room or rooms, or they may emerge into the space between the screen and windows. Add to this the occurrence of small piles of frass located at various points within the building. Carpenter ants will remove excavated wood, dead ants and or pupa, seeds, and the remains of insects that were caught as food from the colony area. This material is often deposited at the same point as the frass and may be several feet from the colony area. In fact, inhabitants of the building may notice that small piles of material reoccur within 2 or 3 days after being cleaned up. This habit of cleaning the galleries can be used to differentiate between termite damage and carpenter ant damage. Termite galleries are full of soil, whereas, the black carpenter ant's nest is clean with smooth walls.

The presence or absence of wood in the frass piles would be an indicator of whether or not the ants are actually excavating wood or only using a wall void as a nesting site. The color of excavated wood also indicates if the ants

are removing sound wood or damaged wood. Dark wood may indicate the presence of some decay; however, if the wood is the color of freshly sawn wood, then it is more likely that the ants are excavating solid wood.

Management Guidelines for Black Carpenter Ant. The hardest thing to determine in most cases is the source of the infestation. One of the first things to do is interview the client about where the ants have been seen within the structure, how many ants are seen, and the frequency of the sightings. If the answer is an occasional ant somewhere in the house over a period of 1 or 2 weeks, then the nest may be located outside. If the answer is a number of ants seen frequently in either the kitchen or bathroom over a period of 1 to 2 weeks, there is a good chance that the nest is located within the walls of the structure.

If there is a good probability that the nest is outside, you should inspect the perimeter of the house and look for such things as these:

- Limbs hanging over and touching the roof
- Rank ornamental growth close to walls of structure. Leave 10 to 18 inches of clear air space between ornamentals and building.
- Material stacked against walls (firewood)
- Gutters filled with debris
- The presence of landscape timbers that are full of checks (old cross ties)
- The presence of trees with cavities or hollows within 30 to 40 yards of the house

During the inspection, note any water-damaged areas on the eaves, around window and doorframes, on porch supports, around decks, or at other crucial areas. This information might provide a reason for a future problem. If any of the above problems are noted, they should be fixed. If ants are using landscape timbers or tree cavities as nesting sites, treat the sites with an approved insecticide, using either sprays or granular materials.

If the colony seems to be located within the structure, locate any moisture-related conditions that might be conducive to the ants. Repair any moisture sources found. It is entirely possible that the ants might be found in a dry environment. If this is the case, nest location might be difficult to find. Frass piles will give a clue as to the general location of the colony. If frass piles are not present, then closely inspect around windows, doors, chimney, and the wall area adjacent to soffit vents. A listening device such as a stethoscope may help locate the colony. A nighttime inspection may also be helpful in determining the colony location.

Once the colony location is determined within certain limits, a variety of formulations are available. These include dusts, silica gels, aerosols, or liquid sprays. Place the material as close to the main colony as possible for total control. Follow a crack and crevice treatment technique and inject the material as deeply as possible into wall voids around the suspect colony location. If possible, use existing spaces through which to inject the material, including any openings or spaces that might be available. If the suspected area is very tight, then small holes (⅛ inch) may have to be drilled into the wall void. Be sure to discuss this with the client before drilling.

CARPENTER BEE—*Xylocopa virginica*

The carpenter bee (CB) is sometimes confused with some of the larger bumblebees. The body of the bumblebee is covered with yellow and black hair, and it is typically a ground-nesting bee. On the other hand, the carpenter bee has less yellow coloration. The nesting habit of the carpenter bee is also quite different from that of the bumblebee. Carpenter bees build nests in unfinished structural wood that comes from a variety of tree species, including southern yellow pine, magnolia, willow, cedar, white pine, and cypress. Cypress and cedar siding seem to be particularly hard hit. Wood with a protected covering may be attacked if the finish is thin or if it has weathered for several years.

The carpenter bee, *Xylocopa virginica*, is the most common wood-nesting bee in Mississippi and is 3/4 to 1 inch long. Males and nonmated females spend the winter in old nest tunnels and emerge in April. The bees feed on pollen and nectar for a period of time before mating, and soon after mating, females begin nest construction. The female may start a new tunnel, or she may choose to clean out and lengthen an existing tunnel. A new tunnel is usually made on the lateral face of a piece of wood in a sheltered location. The entry hole runs cross grain for about ½ inch then turns left or right and runs with the grain. Tunnels may be 6 to 10 inches.

Once the tunnel is finished, the female provides an area at the end with food (nectar and pollen) and deposits an egg on the food mass. A cell is formed by blocking this area with a partition made from chewed wood pulp and secretions from glands located within the bee. This procedure is repeated until there are five to ten aligned cells within the tunnel. If you approach the nest during construction, the males may buzz around or hover in front of you; however, they do not have a stinger so they cannot sting. The front of the male's face is white, while that of the female is black. Although the female has a stinger, it rarely stings. Once egg laying is completed, the adults decline and die within a short period of time.

Developmental time varies with temperature, but it usually takes about 40 to 45 days from the time the egg is deposited until the adult bee emerges. These adults do not attempt nest building, nor will they mate until the following spring. The bees remain close to the nest tunnels feeding on various nectar and pollen sources. They probably rest in these tunnels during the night or on cloudy days. As the temperature cools in the fall, the bees will use the tunnels as overwintering sites.

Management Guidelines for Carpenter Bees. Wood that is used year after year as a nest site will eventually become weak, and damage may result if the wood is a support timber. Although structural weakness is a possibility, it is an exception. Carpenter bees do not usually occur in large populations, and it would take years of neglect for damage to occur. Bees attempting to use cedar or cypress siding as nest sites often completely penetrate the wood. This penetration increases water absorption into and behind the siding, which leads to slower drying and an increased risk of wood decay.

Long-term controls are based on the application and maintenance of a good wood finish. Paint is the best method of covering susceptible woods, although preservatives with metallic salts (copper naphthanate) will repel carpenter bees. Stains and other protectants give varying degrees of control; more than one coat tends to increase the protective nature of these products.

Insecticide applications give erratic results. It is best to use a wettable or soluble powder rather than an emulsifiable concentrate. The powders tend to stand up on the wood and are more likely to adhere to the body of the bee as they are working the wood. If holes are present, the direct application of the material into the hole will give good results. The use of powders on wood siding may leave a whitish residue, especially if the siding has a dark color. When spraying elevated areas, take precautions to protect against splash back or drip that might occur from the target area.