Nature's Right-Angle Drill: Carpenter Bees

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In the early spring and summer, Tennessee comes alive with the sounds of bees and birds as they awaken from the cold months of winter and return from warmer places farther south. In particular, many people find themselves shadowed by a carpenter bee that looks very much like a bumble bee, though it acts more like a hummingbird. Carpenter bees are members of the order Hymenoptera and are related to bumble bees and honey bees. While these large bees can seem aggressive, they are more interested in collecting pollen and nectar than interacting with people. These insects are attracted to fast-moving objects and often fly near a person's head or chest, and will sometimes hover and "stare," which can be misinterpreted as threatening behavior.

Actually, carpenter bees are not much of a threat even to people who have an allergy to bee or wasp stings. Female carpenter bees can sting but are relatively docile, and generally will not sting unless handled or crushed. Even then, they are more likely to deliver a bite with their sharp mandibles than to sting. Male carpenter bees, like other male bees, are harmless and cannot sting, and indeed may be handled in relative safety.

Identification. Carpenter bees can be distinguished from other bees by their large size (3/4 inch or more), shiny, black upper surface of the abdomen, wing venation and color pattern (Figure 1); however, there are also small carpenter bees (in the genus *Ceratina*) that are usually a quarter of an inch. A general rule of thumb to distinguish large carpenter bees from bumble bees is to look for the black "shiny hiney" of the carpenter bee. While there are several species of carpenter bees in the world, two species are present in Tennessee, with *Xylocopa virginica* (L.) being much more common than the other species, *Xylocopa micans* (L.). *X. virginica* is also the only large carpenter bee known to nest in structural timbers of buildings in the eastern U.S. Males of *X. virginica* and *X. micans* have a large light-colored patch on the front of their heads, while females do not (Figure 2). This distinctive character and large size make male carpenter bees a good choice for demonstrating insects to children, as they are not dangerous.

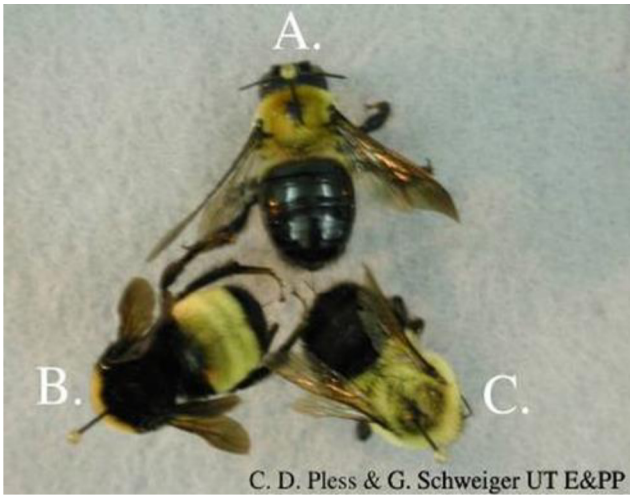

Figure 1. *Carpenter bee (A) with shiny upper surface of abdomen ("shiny hiney") and bumble bees (B and C) with hairy abdomen.* Photo credit: *C.D. Pless and G. Schweiger, UT Entomology and Plant Pathology*

Figure 2. *Male carpenter bee (right) with light patch on the front of its head.* Photo credit: *C.D. Pless and G. Schweiger, UT Entomology and Plant Pathology*

Figure 3. *Carpenter bee visiting a maypop or passionflower.* Photo credit: *J. Tsuruda, UT Entomology and Plant Pathology*

Figure 4. *Splatterings of feces are often found beneath the entry hole.* Photo credit: *UT Entomology and Plant Pathology*

Native pollinators and pests. Carpenter bees are important native pollinators and can often be found around flowering plants including blueberry, maypop (passionflower, Figure 3), wisteria, hollies and others. Thus, a large number of flowering plants and humans benefit from their pollination services. However, the large carpenter bees are also an important pest because of their reproductive cycle.

Female carpenter bees nest in wood and prefer unpainted or weathered softwood like pine, cypress or redwood. They will nest in almost any variety of wood when their favorites are not available. Cedar will not deter them. Wood treatments are also not completely effective, as these insects can bore into pressure-treated, painted or varnished wood if other options are limited. This nesting behavior creates unsightly holes in exposed wood siding, pillars and paneling, and can leave yellow-brown streaks of excrement and sawdust below the nest (Figure 4). Residents often report noise from wood excavation during nest building or expansion in following years.

Entry holes to carpenter bee nests are about half an inch in diameter, and are almost circular (Figure 5). They are mostly found facing straight out, and are rarely at an angle up or down, but may occasionally be at an angle to the left or right. Carpenter bees will generally burrow directly into the wood and then make a sharp turn in most siding, taking advantage of the wood grain. The nest is made up of many cells, often arranged in several different branches off the main tunnel, called a gallery.

Life Cycle. Carpenter bees have a multi-calendar year life cycle (Figure 6). In the late spring to midsummer, each cell contains a single egg, is stocked with a ball of collected pollen and nectar (bee bread), and is sealed off from one another with a flat plug or wall made up of chewed, compressed wood pulp. Larvae hatch from the eggs and consume the bee bread, which allows them to grow and develop before pupating into an adult. These adults emerge during the summer months, forage for sustenance, and overwinter in galleries in groups of six or more. Males emerge before females in the spring to establish territories. When the females emerge, they mate with males, forage for nectar and pollen, and start nest building. They continue nest building and egg laying into midsummer. Male bees tend to die after the mating season in late spring, while females that had laid eggs previously tend to die after the nesting period.

Management. Galleries are often between 4 and 7 inches long, although much longer galleries have been recorded (18 inches or more!). When galleries are added or extended year after year, extensive wood damage may occur. Noninsecticidal control of immature carpenter bee may be applied relatively

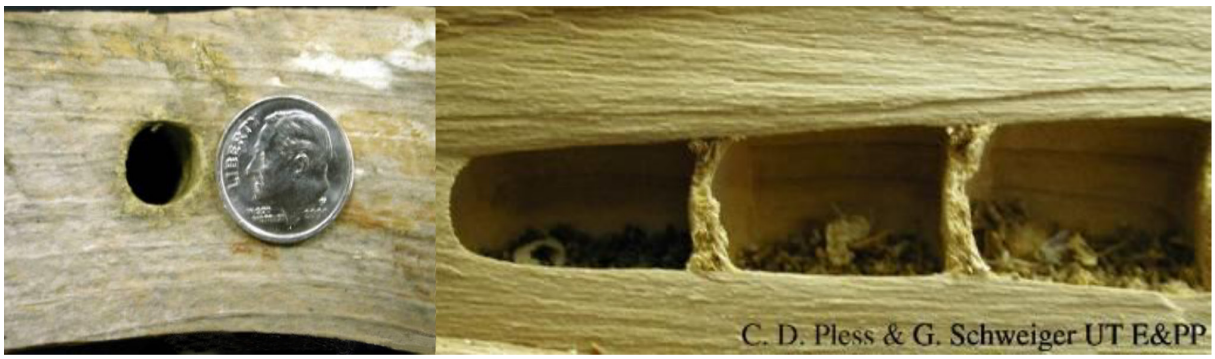

Figure 5. *Carpenter bees chew a ½-inch diameter hole into wood that leads to the longitudinal gallery. Each longitudinal branch consists of a series of cells. Each cell will have one egg that will be provisioned with "bee bread," a mixture of pollen and nectar collected.* Photo credit: *C.D. Pless and G. Schweiger, UT Entomology and Pant Pathology*

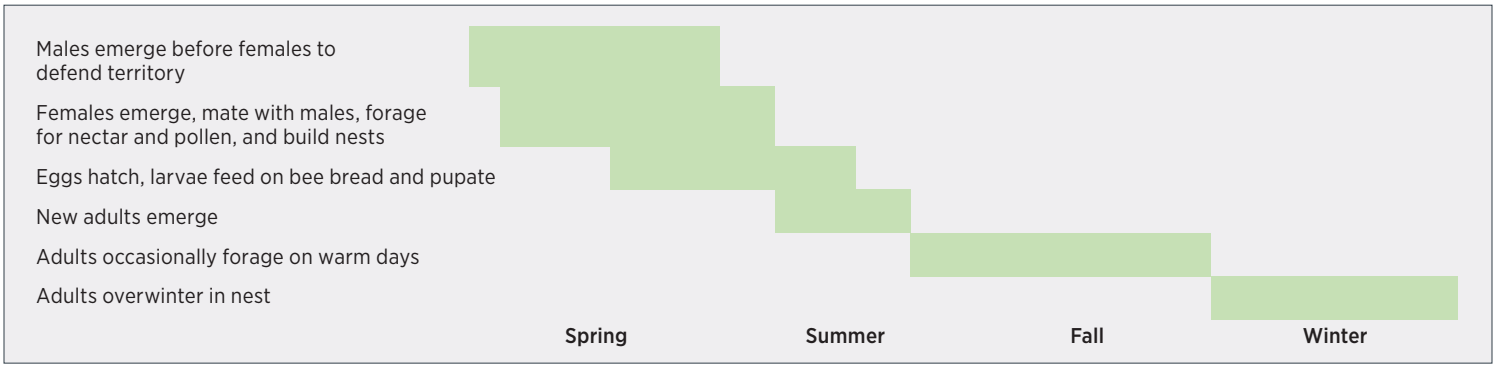

Figure 6. *Life cycle of the carpenter bee,* Xylocopa virginica.

easily if the gallery is short. Observe the nest entrance until any foraging females have left. More than one female may share a gallery, so it is important to remain cautious when dealing with carpenter bee nests; even if one leaves, a bee may still be inside. Once the bees have left, insert a strong, flexible wire into the entrance. Unless the grain of the siding is in line with the entrance of the gallery, it's likely that the wire will need to be strong enough to punch through cell dividers, but flexible enough to make a right-angle turn. Once inside the gallery entrance, simply break through the cells to the end of the gallery and rotate the wire while pulling it out slowly. This could destroy any developing bees in the cells.

If you want to be rid of adult bees, they may be captured with a net and killed. A badminton racket may also be used, though if you land a glancing blow, the bee may become agitated and defensive. Persistence is required to eliminate bees with this method. Carpenter bee traps of several designs are available as another nonchemical control measure. These traps rely on the behavior of the bees, providing an obvious entry hole and then only one obvious exit that leads to a jar from which the insect cannot escape. For maximum effectiveness, these traps could be placed on the sunny side of a house, as carpenter bees tend to favor warmer temperatures. Reports from some blogs imply these traps may catch many carpenter bees and provide protection to wood, but others indicate these devices may just trap male carpenter bees, thus reducing the flying nuisance, but doing little to protect the wood from being excavated. More research is needed before the effectiveness of these traps can be determined.

One of the most effective methods for preventing carpenter bee damage is to avoid having exposed wood where they can nest. Wooden siding is a great place for carpenter bees to raise their young, but bees are unlikely to nest in vinyl, asphalt and aluminum. Thus, where practical, wood can be replaced with one of these surfaces.

For those with wooden houses, decks or siding with nesting carpenter bees, the application of pesticides is an option, especially when repeated colonization results in structural damage. Insecticidal dusts containing a pyrethroid or carbaryl may be blown into gallery entrances in the evening when bees are at rest. Take care not to inhale these materials.

These dusts readily fill voids and do not soak into wood as liquid insecticides might. For the best results with dusts, the bees should have access to the gallery for at least 24 hours, which allows them to spread the dust throughout the nest. If unable to use or purchase insecticidal dusts, a spray or foam insecticide labeled for carpenter bee control may be used inside the nest opening; however, the efficacy of sprays can be short lived and reapplication is usually needed for extended control. Entrance holes are then sealed with a wooden dowel and attached with appropriate sealants, such as carpenter's glue or wood putty, to prevent re-entry. If the surrounding area is painted, matching the paint on this dowel may help to prevent damage from woodpeckers looking for bees, although woodpeckers may locate the bee larvae by their sounds. Because carpenter bees spend the winter hibernating in previously used galleries, structures should be inspected in the fall and the holes treated and sealed. If a nest is active, simply plugging the entrance to the nest without insecticide use can result in the trapped bees chewing and excavating new openings in the wood.

Insecticides suggested for carpenter bee control can be found in the UT Extension publications, "PB 1303 Managing Pests Around the Home" (extension.tennessee.edu/publications/Documents/pb1303.pdf) and "W 658-A Quick Reference Guide to Pesticides for Pest Management Professionals Working in and Around Structures" (extension.tennessee.edu/publications/Documents/W658.pdf).

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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 buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

Disclaimer

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication.

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