Youth Environment and Health

February 21, 2020 E & PP Info #778 Volume 13 Issue 3

Pests and Pesticides in Child-serving Facilities: An IPM Newsletter

Spring Cleaning for Pest Management

Shaku Nair and Shujuan (Lucy) Li, University of Arizona

Cold days are ending soon! As you begin preparing for warmer temperatures in the coming months, it is good to keep in mind that pests will be doing the same. Spring cleaning is a great practice: being proactive about pests and preventing them before they occur! Pest management is not an additional thing on your to-do list. Just do what you do, but think "pests" (Fig. 1).

Fig. 1. Spring cleaning can easily be combined with pest management.

Connect with Safer Choice for your Spring Cleaning needs

What is Safer Choice? Safer Choice is the US EPA's label for safer chemical-based products. Every chemical, regardless of percentage, in a Safer Choice-labeled product is evaluated through EPA's rigorous scientific process and only the safest ingredients are allowed. For over 15 years, the program has labeled products that are safer families, pets, workplaces, neighborhoods, and the environment. Read more about Safer Choice here https://www.epa.gov/saferchoice. Safer Choice has a number of factsheets that provide information and guidance on the Safer Choice program for consumers, as well as resources for schools, communities and municipalities, and manufacturers. You can also download shareable infographics(see below) from Safer Choice (Figs. 2 and 3).

Special Points of Interest

Are your STEM teachers interested in innovative classroom teaching and learning, facilitating a workforce interested in entomology & geospatial science, and fostering a community aware of vector-borne diseases? If so, teacher applications for the MEGA:BITESS ACADEMY will be accepted through March 27, 2020. Applications can be found at https://www.megabitess.org/how-to-apply

This issue

Fig. 2. Spring cleaning infographic 1 from Safer Choice.

Fig. 3. Spring cleaning infographic 2 from Safer Choice.

Spring cleaning and pest-proofing

Insects and other arthropods such as spiders, as well as rodent pests remain dormant during winter. With warmer temperature, they will become active and you may start seeing more ants, flies, and stinging insects. Some of these are not merely annoying, they can be potential health risks for you and your family. Here are some tips to keep in mind while you undertake spring cleaning projects, to keep pests at bay.

Indoors

1. Door sweeps. Inspect or install door sweeps at the base of all exterior entry doors. Inspect and repair any damage to door thresholds. No outside light should be visible underneath exterior doors when viewed from the inside at floor level. The bottom of garage doors can be fitted with a brush or rubber seal (not vinyl as it performs poorly in cold weather). Sliding glass doors can be sealed by lining the bottom track with foam weather stripping.

2. Door seals. Be sure to inspect all seals of doors including the tops and sides. This is especially important for double doors that lack a central vertical support. See Fig. 4 below, showing door sweeps, thresholds and door seals.

3. Screens. Inspect, install or repair screens (20 mesh) on all doors or windows that can be opened, and on all ventilation openings. Keep screens in good condition and promptly repair tears or loose edges. This stops the entry of many pests. Periodically clean the space between the window and the screen to discourage scavenger insects, such as dermestid beetles from breeding and feeding in the organic matter accumulating in these areas.

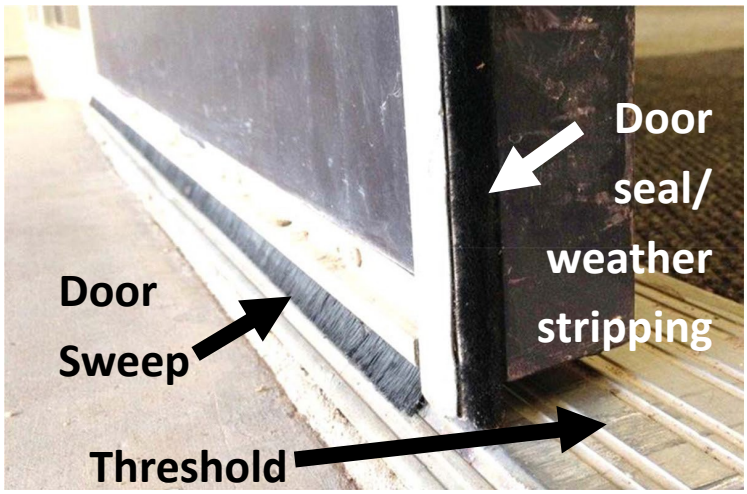

Fig. 4. Exterior door of a building showing a brush door sweep, door seal/ weather stripping and threshold. Ensuring that these are in good condition is one of the first steps in pest-proofing.

4. Fill cracks. To exclude rodents, lizards and insects, look for cracks/gaps around windows, doors and in fascia boards. For small cracks, use good-quality silicone sealant. Silicone lasts longer than latex caulking materials, as it expands and contracts more effectively with changing temperatures. For larger openings, fill with a strong material that matches the structure such as wood, cement, sheet rock or mortar.

5. Utility openings. Seal all utility openings, including penetration points of pipes and wires, outdoor faucets, gas meters, and laundry vents. Cracks should be cleaned, and any peeling material removed. The hole can then be filled with a suitable sealant. Wider openings should be filled with copper mesh before sealants are applied. Check to make sure escutcheon plates are well seated around plumbing in bathrooms and kitchen (Fig. 5).

6. Leaks. Inspect and repair plumbing and roof leaks regularly to reduce water availability to pests. Check ceiling tiles and the false floor under sinks, as a problem may not be apparent. Water damage can weaken walls and ceilings creating additional entryways and be a water source for mold to develop.

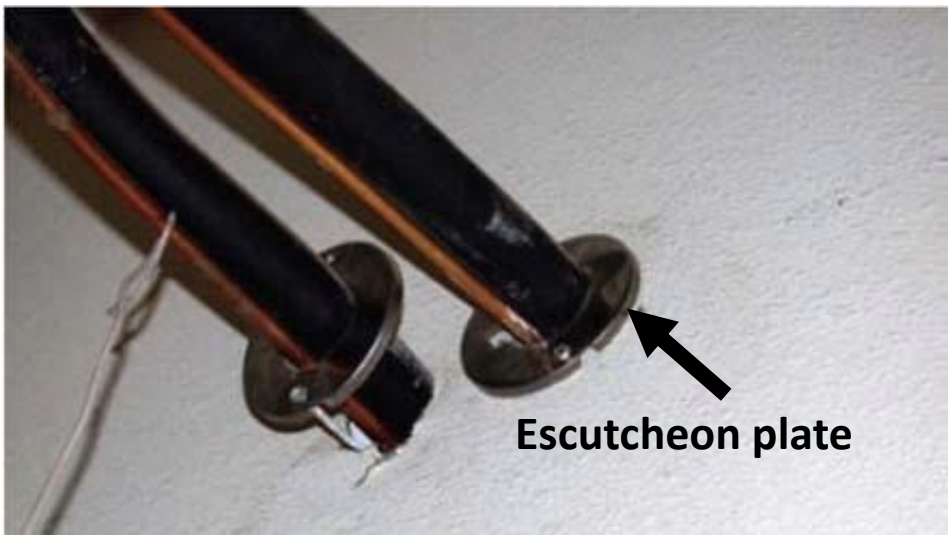

Fig. 5. Loose escutcheon plate revealing pipe entry

7. Storage. Go through your cabinets and pantry. Discard any old or expired food materials, especially those that show signs of stored product pests. Wipe down or vacuum shelves and floors. Use airtight storage containers. This applies not only to human food items but also to pet foods. Most pantry pests can be kept away by using airtight containers. Food in other containers should be stored in the refrigerator or freezer.

8. Cleaning and sanitation. Employ good cleaning procedures. Vacuum up all food crumbs. Promptly clean up spills. Do not let soiled dishes or containers sit out overnight. Clean under kitchen appliances as frequently as possible. Keep pet feeding dishes off the floor and clean them regularly.

9. Waste disposal. Make sure trash is disposed properly and not accumulating. In schools and offices, employees often assume that one of their coworkers is going to take out the trash, but sometimes no one does. If there is no designated person, create a schedule so that everyone takes a turn. Trash containing food remains should be placed in sealable containers that pests such as mice and rats cannot get into.

10. Pest-Vulnerable Areas (PVAs). Certain areas of a building, such as kitchens and bathrooms, are particularly suitable for pest populations to develop because food, warmth, and moisture are present. Take extra time to look for pest-conducive conditions and signs of pests (e.g., shed skins, excrement, sawdust) in these areas.

Outdoors

After you finish your indoor cleaning, conduct an inspection of your building perimeter, and look for any damage done over the winter months. Here are some tips for spring cleaning outdoors:

1. General yard clean up. Encourage everyone to participate in yard clean up, including children. Remove accumulated landscape debris (Fig. 6), such as leaves and grass clippings from the yard and around the building foundation.

2. Landscape plants. Vines, shrubs and tree limbs growing close to walls provide pests with access to the building. Prune shrubs and tree limbs at least 18-24 inches away from the building exterior walls to eliminate pest entry points.

3. Weak wood. Remove any rotted tree stumps or other weak wood in the yard, which could attract structural pests such as termites and carpenter ants. Organic landscaping mulch should be placed so it does not come into contact with structural wood (siding, posts, etc.).

Fig. 6. Fallen leaves and other debris around the building provides harborage for pests and also holds moisture which can weaken the foundation.

4. Trash disposal. Use pest-resistant trash receptacles with lids. Lids should be kept closed, especially at night. Trash receptacles, including dumpsters, should be steam cleaned regularly. Damaged containers should be replaced with new ones.

5. Roof. Repair damaged fascia and rotted shingles, as some insects are attracted to deteriorating wood. Use wire netting to cover gaps under and between rooflines or ¼- inch hardware cloth over the attic, roof, chimney and crawl space vents in order to prevent entry of birds, bats, squirrels, and rodents (Fig. 7). Wear gloves when installing hardware cloth, as the wire edges are extremely sharp.

Fig. 7. Wire netting helps to keep birds and rodents out, but needs to be monitored and maintained.

6. Gutters and window wells. Clean out window wells, clogged drainage gutters and downspouts to ensure they are properly functioning.

7. Crawl spaces. These spaces under houses are attractive to many pests such as widow spiders, scorpions, feral cats, and rodents. These larger animals may create further insect and health problems (e.g., fleas, ticks, etc.).

Read more about many of the above listed techniques, collectively referred to as “pest-proofing” in the University of Arizona Cooperative Extension publication “Pest-proofing your home”, available here: https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1677-2015.pdf

This article was Reprinted from the Arizona School & Home Integrated Pest Management (IPM) Newsletter – February 2020 .

Save the Date

The **6th Annual Tennessee Bed Bug and Cockroach Management Meeting** will be held August 5, 2020 at the UT Conference Center in downtown Knoxville. Details to come. Check https://ag.tennessee.edu/bedbugs/Pages/TNSpecificInfo.aspx for updates.

MEGA:BITESS ACADEMY, https://www.megabitess.org/

The MEGA:BITESS Academy is designed to stimulate innovative classroom teaching and learning, facilitate a workforce interested in entomology and geospatial sciences, and foster a community aware of La Crosse encephalitis.

Goal: Our long-term goal is to participate and help to develop a STEM teaching community and workforce.

Objective: Create an integrated medical entomology and geospatial analysis (MEGA) Academy for educators (grades 6-12) by engaging them in learning medical entomology and geographic information sciences (GIS) for classroom implementation while simultaneously developing a community-driven mosquito surveillance and education program.

The development of the MEGA:BITESS Academy will stimulate innovative classroom teaching and learning, facilitate a workforce interested in entomology and geospatial sciences, and foster a community aware of vector-borne diseases.

Academy Goals

Workforce Development. Prepare educators in medical entomology, geospatial technologies, and innovative, inquiry-driven pedagogy.

Research Engagement & Enhanced Community Awareness. Develop a community-driven mosquito surveillance program that simultaneously enhances awareness of medical entomology and geospatial technologies while providing temporal and spatial information on *Aedes* mosquito populations.

Extension Communication. Create informational materials for the community (e.g., local health departments and school systems) that simultaneously informs the community about mosquitoes and La Crosse encephalitis and promotes student communication and leadership skills.

Academy

The MEGA:BITESS Academy will consist of a variety of platforms for educators to increase their understanding of entomology and geospatial analyses shared over 3 sequential workshops.

Workshops are designed so educators can use the developed curriculum with their students upon return to their classrooms. Each day of the workshop will include lectures, inquiry-driven learning opportunities, field or laboratory training, and a lunch and learn session.

Lunch and learn sessions include a combination of lectures by professionals from different sectors (e.g., academia, government, industry) and leadership training opportunities. The lunch and learn sessions will be accompanied by a Wednesday evening dinner symposium that includes a lecture given by a prominent invited speaker that integrates medical entomology and geospatial analyses.

Materials will be live-streamed and recorded to provide access to those not participating in-person and for Academy participants to use either in class, to review, or for curriculum development.

Previous Academy participants will be invited to share their experiences with the new academy in subsequent workshops and may serve as mentors for new participants.

Participants

Three cohorts of 15 educators, totaling 45, will complete a yearlong academy in Medical Entomology and Geospatial Analyses (MEGA) Academy. The timeline for the academy includes seven in-service workshops days held at the University of Tennessee and year-round engagement with team members. Educators who complete the MEGA:BITESS Academy will receive a certificate, continuing education units, and be invited to participate in the following's years evening symposium. Participants will be encouraged to serve as mentors for future cohorts.

Applications for the academy can be found at https://www.megabitess.org/how-to-apply

Carpenter Bees

Lucas Hietala, Graduate Student; Karen Vail, Professor; John Skinner, Professor; Adam Taylor, Professor; Laura Russo, Assistant Professor; Jennifer Tsuruda, Assistant Professor; Paul Rhoades, Graduate Student , University of Tennessee Entomology and Plant Pathology

While many schools are brick and mortar and will have limited damage from carpenter bees, some of our older schools are of wood construction or have wooden gazebos or playground equipment. What follows is a new UT Extension publication, W876 *Nature's Right-Angle Drill: Carpenter Bees.* This publication can also be found online at https://extension.tennessee.edu/publications/Documents/W876.pdf.

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.

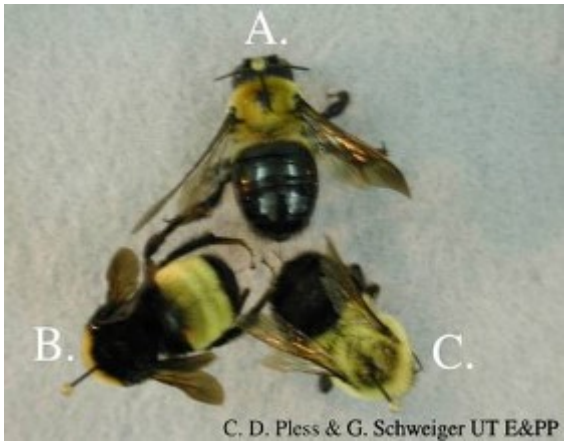

Figure 8. Carpenter bee (A) with shiny upper surface of abdomen ("shiny hiney") and bumble bees (B and C) with hairy abdomen.

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.

Figure 9. Male carpenter bee (right) with light patch on the front of its head.

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 8); 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 9). This distinctive character and large size make male carpenter bees a good choice for demonstrating insects to children, as they are not dangerous

Figure 10. Carpenter bee visiting a maypop or passionflower. Photo credit: J. Tsuruda, UT Entomology and Plant Pathology

Figure 11. 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 10), 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 11). 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 12). 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.

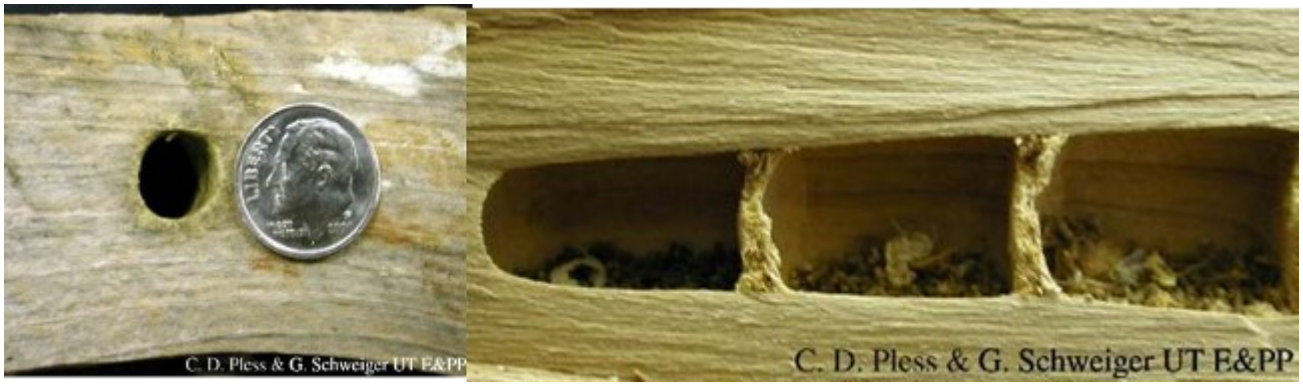

Figure 12. Carpenter bees chew a ½-inch diameter hole into wood that leads to the longitudinal gallery. Each longitudinal branch consists of a series of cells. Each cell will have one egg that will be provisioned with “bee bread,” a mixture of pollen and nectar collected.

Life Cycle. Carpenter bees have a multi-calendar year life cycle (Figure 13). 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.

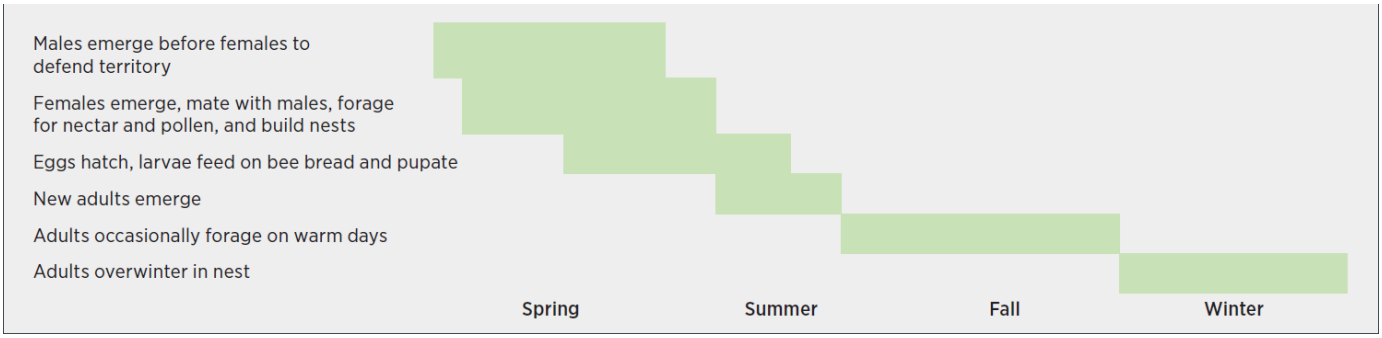

Figure 13. Life cycle of the carpenter, *Xylocopa virginica.*

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 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).

References

Modified and excerpted from:

Alpert, G. and M. Frye. 2015. Get rid of carpenter bees? Yes, please! Cornell University Cooperative Extension and New York State Integrated Pest Management Program. Feb 2015. https://ecommons.cornell.edu/bitstream/handle/1813/43827/carpenter-bees-FS-NYSIPM.pdf?sequence=1

Cornell Lab of Ornithology. 2002. Woodpeckers: Which insects are they looking for? Carpenter bees https://www.birds.cornell.edu/wp_about/insects.html

Dowdy, S. 2014. Carpenter bees drill holes, lay eggs in structures. University of Georgia Department of Agricultural and Natural Resources. CAES News. 5/14/14. http://www.caes.uga.edu/newswire/story.html?storyid=5136

Gerling, D. and H.R. Hermann. 1978. Biology and mating behavior of *Xylocopa virginica* L. (Hymenoptera, Anthophoridae). Behavioral Ecology and Sociobiology 3(2):99-111. doi:10.1007/BF00294984

Jones, S.C. 2000. Carpenter bees. HYG-2074-06. The University of Ohio Extension Service http://ohioline.osu.edu/hyg-fact/2000/2074.html

Potter, M. 2006. Carpenter bees are flying. KENTUCKY PEST NEWS. Number 1088, Kentucky Cooperative Extension Service. 0 4/ 17/0 6 . http://www.uky.edu/Ag/kpn/kpn_06/pi060417.htm

Potter, M. 2003. Managing carpenter bees. KENTUCKY PEST NEWS. Number 982, Kentucky Cooperative Extension Service. 04/21/03 http://www.uky.edu/Ag/kpn/kpn_03/pi030421.htm

Sheridan, A. 2014. Honey bees and beekeeping blog: Carpenter bees. Mississippi State University Extension. 08/05/14. https://blogs.msucares.com/honeybees/2014/08/05/carpenter-bees/

Vail, K., E.E. Burgess, and C. Pless. 2002. PB 1703 Wood-destroying organisms pesticide applicator training manual licensing category: WDO. University of Tennessee Extension. http://psep.utk.edu/secondlevel/materials.htm

Vail, K., J. Skinner, A. Taylor and P. Rhoades. 2011. Carpenter bees — "hummingbirds" of the Hymenoptera. EPP Info #60 What's Happening Newsletter, 27(4):3-6

UTEXTENSION INSTITUTE OF AGRICULTURE THE UNIVERSITY OF TENNESSEE

This newsletter produced by :

Karen Vail, Ph.D., Professor,
Extension Urban Entomologist
Entomology and Plant Pathology
370 Plant Biotechnology Bldg.
2505 E J Chapman Drive
Knoxville, TN 37996-4560
ph: (865) 974-7138
fax: (865) 974-8868
email: kvail@utk.edu
web: http://schoolipm.utk.edu
http://epp.tennessee.edu/people/directory/dr-karen-vail/

Jennifer Chandler,
Research Specialist III
Entomology and Plant Pathology
370 Plant Biotechnology Bldg.
2505 E J Chapman Drive
Knoxville, TN 37996-4560
ph: (865) 974-7138
fax: (865) 974-8868
Email: jchand11@utk.edu

Comments or questions on this newsletter?

Contact kvail@utk.edu

Follow us on Facebook at http://tinyurl.com/UrbanIPMTN

Partial support for this newsletter provided by the USDA NIFA CPPM EIP grant (# 2017-70006-27287) awarded to the University of Tennessee.

The University of Tennessee is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA institution in the provision of its education and employment programs and services. All qualified applicants will receive equal consideration for employment without regard to race, color, national origin, religion, sex, pregnancy, marital status, sexual orientation, gender identity, age, physical or mental disability, or covered veteran status.

For more information about IPM in Tennessee schools and other facilities, or to view past issues of *Pests and Pesticides in Child-serving Facilities*, please visit http://schoolipm.utk.edu

NATIONAL IPM INFORMATION

eXtension's Pest Management In and Around Structures: Urban Integrated Pest Management http://www.extension.org/urban_integrated_pest_management

National School IPM
schoolipm.ifas.ufl.edu/

IPM in Schools Texas
http://schoolipm.tamu.edu/

IPM Institute of North America
www.ipminstitute.org/

School IPM PMSP—all schools IPM by 2020 https://ipminstitute.org/projects/school-ipm-2020/

National Pest Management Association IPM
www.whatisipm.org/

EPA schools
http://www2.epa.gov/managing-pests-schools

For further information about the IPM program at your school or in your county, contact your county Extension Agent or the school IPM Coordinator. For county agent contact information, please visit https://extension.tennessee.edu/Pages/Office-Locations.aspx

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.

Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product. The author(s), the University of Tennessee Institute of Agriculture and University of Tennessee Extension assume no liability resulting from the use of these recommendations.

Programs in agriculture and natural resources, 4-H youth development, family and consumer sciences, and resource development. University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating. UT Extension provides equal opportunities in programs and employment.