

CARPET BEETLES

Integrated Pest Management in the Home

Carpet beetles, which belong to the family of beetles known as dermestids, are pests in warehouses, homes, museums, and other locations where suitable food exists. In California, three species of carpet beetle cause serious damage to fabrics, carpets, furs, stored food, and preserved specimens—the varied carpet beetle, the furniture carpet beetle, and the black carpet beetle.

IDENTIFICATION AND LIFE CYCLE

All three carpet beetle species have similar life cycles (Table 1). Adults lay eggs on a larval food source such as woolen fabric or carpets or furs. Eggs hatch in about two weeks, and the larvae feed for varying periods, depending upon the species and environmental conditions; they prefer dark, secluded places. When ready to pupate, the larvae might burrow further into the food or wander and burrow elsewhere. They might also pupate within

their last larval skin if no other shelter is available. Although larvae don't make webs as clothes moths do, their shed skins and fecal pellets, which are about the size of a grain of salt, make it obvious where they have been feeding.

Carpet beetle adults don't feed on fabrics but seek out pollen and nectar. They are attracted to sunlight, and you'll often find them feeding on the flowers of crape myrtle, spiraea, buckwheat, and other plants that produce abundant pollen. However, you can accidentally bring these pests inside on items such as cut flowers. With their rounded bodies and short antennae, carpet beetles somewhat resemble lady beetles in shape.

Varied Carpet Beetle

The adult varied carpet beetle, *Anthrenus verbasci*, is about 1/10 inch long and black with an irregular pattern of white, brown, and dark yellow scales



Figure 1. Varied carpet beetle final-instar larval cast skin (left) and adults (center and right).

on its wing covers, or elytra (Figure 1). In older adults the scales that form this pattern wear off, so the beetles appear solid brown or black. Outdoors, female beetles search out spider webs or bee, wasp, or bird nests as places to lay their eggs. The nests and webs contain dead insects, beeswax, pollen, feathers, or other debris that can serve as larval food. Indoors, beetles deposit eggs on or near wool carpets and rugs, woolen

Table 1. Life Cycle of Three Species of Carpet Beetles.

	Varied carpet beetle		Furniture carpet beetle		Black carpet beetle	
	adult	larva	adult	larva	adult	larva
number of eggs laid	40		60		90	
days before eggs hatch	10–20		9–16		6–16	
days for the larval stage	220–630		70–94		166–330	
days for pupation	10–13		14–17		8–14	
weeks as an adult	female 2–6; male 2–4		4–8		4–8	

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goods, animal skins, furs, stuffed animals, leather book bindings, feathers, animal horns, whalebone, hair, silk, dried plant products, and other materials that can serve as larval food. Adults usually appear in spring or early summer; indoors, you'll often find them near windows.

Mature larvae are slightly longer than adults and are covered with dense tufts of hair they extend upright to form a round plume if disturbed. They have alternating light and dark brown stripes and are distinguishable from other carpet beetle larvae because they are broader in the rear and narrower in front.

Furniture Carpet Beetle

When viewed from above, adults of the furniture carpet beetle, *A. flavipes*, (Figure 2) are slightly larger and rounder than the varied carpet beetle. Coloration and markings vary, but the furniture carpet beetle generally has a mottled appearance due to the black spots that intersperse the white and dark yellow to orange scales on its wing covers. If these scales have worn off, the adults can appear solid black. Their undersides are white.

Larvae are white at first but darken to dark red or chestnut brown as they mature (Figure 2). In contrast to larvae of the varied carpet beetle, these larvae are broader in front and narrower at the rear. Larvae of the furniture carpet beetle feed on the same types of items as varied carpet beetle larvae.

Black Carpet Beetle

Adults and larvae of the black carpet beetle, *Attagenus unicolor*, (Figure 3) are distinctly different from the carpet beetles described above. Adult black carpet beetles range from $\frac{1}{8}$ to $\frac{3}{16}$ inch long. They are shiny black and dark brown with brownish legs. Full-sized larvae can be as long as $\frac{5}{16}$ inch and range from light brown to almost black. Larvae are shiny, smooth, and hard, while short, stiff hairs cover their body. Their body tapers toward the rear and ends in a tuft of long hairs. In Cali-

fornia and other arid areas, the black carpet beetle is a more serious stored-product pest than a fabric pest.

DAMAGE

Damage occurs during the larval stage of carpet beetles. Larvae feed in dark, undisturbed locations on a variety of dead animals and animal products such as wool, silk, leather, fur, hair brushes with natural bristles, pet hair, and feathers; occasionally they feed on stored products such as certain spices and grains. They don't feed on synthetic fibers.

It's not always possible to tell from the damage whether clothes moths or carpet beetles caused it, but in general carpet beetles are more likely to damage a large area on one portion of a garment or carpet while moth damage more often appears as scattered holes. Also carpet beetle larvae leave brown, shelllike, bristly-looking cast skins when they molt. These skins and a lack of webbing are usually good clues that carpet beetles are the culprits.

MANAGEMENT

Carpet beetles are among the most difficult indoor pests to control because of their ability to find food in obscure places and to disperse widely throughout a building. Successful control depends on a combination of sanitation and exclusion. If exclusion and sanitation are successful, insecticide treatments aren't required.

Dermestids frequently fly into homes from flowers in the landscape. A few adult beetles in the house shouldn't be cause for alarm. A management program needs to be implemented only if you find larvae developing in fabrics in your home.

When carpet beetles threaten products in commercial warehouses or storage areas, a monitoring program using sticky traps baited with an appropriate pheromone (a chemical attractant an organism produces to attract others of the same species) is recommended. Sticky traps can also be used in homes



Figure 2. Furniture carpet beetle larva (left) and adults (center and right).



Figure 3. Black carpet beetle larva (left) and adult (right).

where infestations are serious. Traps placed throughout a building can show where beetles are coming from; the traps are also useful for monitoring the effectiveness of control practices. Check traps once or twice a week. You can also use pheromone traps to augment other control methods if you use them to attract adult males in small confined areas. Sticky traps are also available without a pheromone; you can place these traps on windowsills to trap adults that fly to windows. Plain sticky traps are available in retail stores, while sticky traps baited with a pheromone are available from local pest control operators, pesticide supply distributors, and on the Internet. Pheromone traps are species-specific, so it is important to use one that attracts the species causing your problems.

Eliminate the Source

Eliminate accumulations of lint, hair, dead insects, and other debris that serve as food for carpet beetles. Throw out badly infested items. Remove old spider webs and bird, rodent, bee, and wasp nests, which can harbor infestations. Examine cut flowers for adult

beetles before bringing the flowers inside. And be sure that window screens, doors, and vents are secure to keep carpet beetles from flying in from outdoor sources.

Regular and thorough cleaning of rugs, draperies, upholstered furniture, closets, and other locations where carpet beetles congregate is an important preventive and control technique. Frequent, thorough vacuuming is an effective way of removing food sources as well as carpet beetle eggs, larvae, and adults. After vacuuming infested areas, dispose of the bag promptly, because it can contain eggs, larvae, or adult insects.

Protect fabrics by keeping them clean; food and perspiration stains on fabrics attract carpet beetles. Thoroughly laundering washable items in hot water or dry-cleaning them will kill all stages of these insects. This is the most important method for controlling fabric pests in clothing, blankets, and other washable articles.

Regularly clean mounted animal specimens such as museum pieces or game trophies, or periodically place them in a freezer for 10 to 14 days. Inspect stored woolens, linens, and furs, and air these items annually in the sun, brushing them thoroughly. If you find an infestation, launder or dry-clean these items before returning them to storage. Be sure to seal cleaned items in a protective plastic bag or other suitable container.

Some furniture, mattresses, and pillows are stuffed with hair or feathers. When carpet beetles get into the stuffing, you can't control these insects simply by spraying the outside surface of the item. The best way to eliminate the pests is to look for a pest control, dry cleaning, or storage firm that can treat the infested item with lethal gas in a fumigation vault. Because of the potential hazards to the person applying fumigants, only licensed pest control operators can buy and use them. Proper fumigation gives quick, satisfactory control and kills all stages of fabric pests. It doesn't prevent reinfestation, however.

Protecting Items in Storage

To properly store items that are susceptible to carpet beetles, first make sure the items are pest-free and clean, then place them in an airtight container, inserting a layer of paper every few inches. On these paper layers you can place insecticide-impregnated resin strips that are labeled for control of carpet beetles on fabrics, or you can use moth balls, flakes, or crystals, which contain paradichlorobenzene (PDB), also called 1,4-dichlorobenzene. Don't let these materials come in direct contact with plastic buttons, hangers, or garment bags, since the active ingredients can cause the plastic to soften and melt into the fabric. Also be sure to keep these materials out of reach of children and pets, and don't use these materials where you store unwrapped food or allow them to come into contact with food or cooking utensils.

Resin strips, which contain dichlorvos (DDVP) as the active ingredient, are generally more effective in protecting susceptible objects in enclosed containers and provide longer control than PDB. If you use these products, be sure they are labeled for use inside homes. As these chemicals evaporate, they produce vapors that, in sufficient concentration, will slowly kill insects. The vapors build up to the required concentration only in an airtight container. If the items aren't in an airtight container, the chemicals will repel only the adults; larvae already on the items will continue to feed. Because some resin strips contain oil, don't let them come into contact with the stored item. Also don't use the resin strips in any area where people will be present for extended periods of time.

Generally, closets aren't airtight and are opened too frequently to hold in vapors. However, you can turn a seldom-used closet into a suitable storage space by sealing cracks around the door with tape or fitting the door with weather stripping. Seal cracks in walls and ceilings with putty or plastic wood.

A trunk, chest, box, or garment bag also makes a good storage container.

Seal any holes or cracks, and if the lid doesn't fit tightly, seal it with tape, or wrap the entire container in heavy paper and seal it with tape.

Alternative methods for controlling carpet beetles include heating the infested object in an oven for at least 30 minutes at 120°F or higher or enclosing the object in a plastic bag and placing it in a freezer for 2 weeks at temperatures below 18°F. Before using either of these methods, consider if cold or heat will damage the object.

The effectiveness of cedar chests and closet floors made of cedar is debatable. Some cedar contains an oil that doesn't affect large larvae but can kill small ones. However, cedar loses this oil as it ages. Having a tightly constructed chest is more important in the long run than the type of wood used to make it.

Chemical Control

Cleaning is always the best strategy; however, if you have an area or article that is infested that you can't dry clean or launder, you can spray it with an insecticide. Find a product that lists carpet beetles on its label, and closely follow the directions. Apply insecticides as spot treatments, and limit sprays to the edges of floor coverings, beneath rugs and furniture, on the floors and walls of closets, on shelving where susceptible fabrics are stored, in cracks and crevices, and in other areas that accumulate lint. Don't spray clothing or bedding.

When treating attics, wall voids, and other inaccessible places, use dust formulations such as boric acid (e.g., Eatons Answer Boric Acid Insecticidal Dust). Don't let borates come in contact with objects containing natural dyes such as some Oriental rugs, sheepskins, and bearskins. Also some dust formulations can adversely affect people who have respiratory problems; read and follow label precautions carefully. Professional fumigation might be needed when infestations are extensive, although the success rate will be lower if the fumigant can't penetrate all areas where the carpet beetles are hiding.

Closely inspect carpeted areas beneath heavy furniture and along carpet edges for infestation. If live larvae are found, spray both sides of infested carpet if at all possible, applying a lighter spray to the upper surface to reduce the possibility of staining. If the rug pad contains animal hair or wool and hasn't been treated by the manufacturer, spray it as well. It is better to wait until the rug has dried before putting any weight on it. If you are concerned that sprays might damage expensive broadloom or Oriental rugs, hire an experienced pest control operator or carpet-cleaning firm. Instead of insecticide treatment, area rugs can also be taken to dry cleaners who handle rugs.

Don't use insecticides around open flames, sparks, or electrical circuits or spray them on asphalt or tile floors. Use only a light application on parquet floors. On linoleums, first spray a small inconspicuous area and let it dry to see if staining occurs.

Applying protective sprays to furs isn't recommended. If you store furs at home during the summer, either protect them with moth crystals, flakes, or balls, or periodically shake and air them. Furs in commercial storage receive professional care, and you can insure them against damage.

Sometimes felts and hammers in pianos become infested and so badly damaged that it affects the tone and action of the instrument. Contact a piano technician, who might recommend synthetic felt replacements.

REFERENCES

- Mallis, A., D. Moreland, and S. A. Hedges. 2011. *The Mallis Handbook of Pest Control*, 10th ed. Cleveland: GIE Publications.
- Moore, W. S., C. S. Koehler, and C. S. Davis. 1979. *Carpet Beetles and Clothes Moths*. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 2524.
- O'Connor-Marar, P. 2006. *Residential, Industrial, and Institutional Pest Control*, 2nd ed. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 3334. ♦

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This and other Pest Notes are available at www.ipm.ucdavis.edu.

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WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original, labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Pesticides applied in your home and landscape can move and contaminate creeks, rivers, and oceans. Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash or pour pesticides down the sink or toilet. Either use the pesticide according to the label, or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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