

CARPET BEETLES

Integrated Pest Management in the Home

Carpet beetles belong to the family of beetles known as dermestids. These insects are pests in warehouses, homes, museums, and other locations where suitable food exists. In California, three species of carpet beetles cause serious damage to fabrics, carpets, furs, stored foods, and preserved specimens. Their life histories are summarized Figure 1.

IDENTIFICATION AND LIFE CYCLE

All three carpet beetle species have a similar life history. Adults lay eggs on the larval food source, such as furs and woolen fabric or carpets. Eggs hatch in about 2 weeks and the larvae feed for varying periods, depending upon species and environmental conditions. They prefer dark, secluded places. When ready to pupate, the larvae may burrow further into the food or wander and burrow elsewhere. They may also pupate within the last larval skin if no other shelter is available. Larvae do not

make webs as clothes moths do, but they 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 do not feed on fabrics but seek out pollen and nectar. They are attracted to sunlight and are commonly found feeding on the flowers of crape myrtle, spiraea, buckwheat, and other plants that produce abundant pollen. Be careful not to bring these pests into the home on cut flowers—with their rounded bodies and short antennae, carpet beetles somewhat resemble lady beetles in shape.

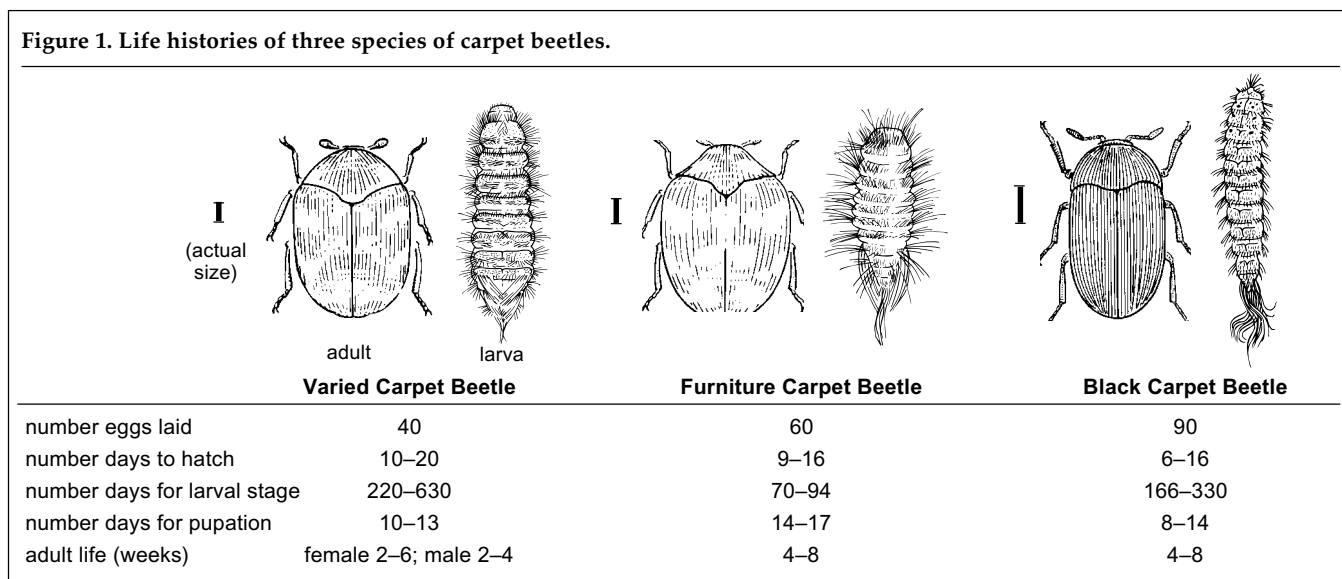
Varied Carpet Beetle

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

elytra (wing covers). 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 and nests of bees, wasps, and birds in which to lay their eggs. The nests 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 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.

Mature larvae are about the same length as adults and are covered with dense tufts of hair that they extend upright to form a round plume if disturbed. They have alternating light and dark brown transverse stripes and are distinguishable from other carpet beetle larvae because they are broader

Figure 1. Life histories of three species of carpet beetles.



in the rear and narrower in front. Adults usually appear in spring or early summer; indoors, they are often seen near windows.

Furniture Carpet Beetle

When viewed from above, adults of the furniture carpet beetle, *Anthrenus flavipes*, are slightly larger and rounder than the varied carpet beetle adult. Coloration and markings of the adult are highly variable, but they generally have a mottled appearance due to white and dark yellow to orange scales interspersed with black spots on their elytra; if these scales have been worn off, they may appear solid black. Their undersides are white.

Larvae are white at first but darken to dark red or chestnut brown as they mature. 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 larvae of the varied carpet beetle.

Black Carpet Beetle

Larvae and adults of the black carpet beetle, *Attagenus megatoma*, are distinctly different from the carpet beetles described above. Adult black carpet beetles range from $\frac{1}{8}$ to $\frac{3}{16}$ inch in length. They are shiny black and dark brown with brownish legs. Full-sized larvae may be as long as $\frac{5}{16}$ inch. They range in color from light brown to almost black. Larvae are shiny, smooth, hard, and are covered with short, stiff hairs. Their body tapers toward the rear and ends in a tuft of long hairs.

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

DAMAGE

Damage is caused by the larval stage of dermestid 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 do not feed on synthetic fibers.

It is not always possible to tell from the damage whether it was caused by clothes moths or carpet beetles, but in general, the 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, shell-like, bristly looking cast skins when they molt. These skins and the lack of webbing are usually good clues that the culprits are carpet beetles.

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 integrating the use of sanitation and exclusion, and, where necessary, insecticides.

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 produced by an organism to attract others of the same species) is recommended. Traps placed throughout a building can show where beetles are coming from; the traps are also useful for monitoring the effectiveness of control applications. Check traps once or twice a week. Pheromone traps can also be used to augment other control methods when used to attract adult males in small, confined areas. Sticky traps are also available without a pheromone; these traps can be placed on window sills to trap adults that fly to windows. Plain sticky traps are available in retail stores; sticky traps with a pheromone can often be purchased from local pest control operators or from distributors of pesticide supplies.

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 bird, rodent, bee and wasp nests, and old spider webs, which may harbor infestations. Examine cut flowers for adult beetles.

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 may contain eggs, larvae, or adult insects.

Protect fabrics by keeping them clean: food and perspiration stains on fabrics attract carpet beetles. Dry cleaning or thoroughly laundering items in hot water kills all stages of these insects. This is the most common method used to control fabric pests in clothing, blankets, and other washable articles.

Mounted animal specimens, such as museum specimens or game trophies, should be regularly cleaned or periodically placed in a freezer for 10 to 14 days. Inspect stored woolens, linens, and furs; air, brush, and hang them in the light on a yearly basis. If infestations are found, launder or dry clean these items to destroy carpet beetle adults, larvae, and eggs before returning them to storage. Be sure cleaned items are sealed in a protective plastic bag or other suitable container.

Some furniture, mattresses, and pillows are stuffed with hair or feathers. When carpet beetles or clothes moths get into the stuffing, they cannot be controlled simply by spraying the outside surface of the item. The best way to eliminate them is to have the infested item treated with lethal gas in a fumigation vault. This service is provided by some pest control and storage firms. Because of the potential hazards to the applicator of the fumigant, only licensed pest control operators can buy and use them. Proper fumigation gives quick, satisfactory control, and kills all stages of fabric pests. It does not prevent reinfestation, however.

Protecting Items in Storage

To properly store items that are susceptible to carpet beetles, first make sure they are pest-free and clean. Place

them in an airtight container, using paper to make a layer every few inches. On the 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 naphthalene or paradichlorobenzene (PDB). Do not place these materials in direct contact with plastic buttons, hangers, or garment bags as the plastic may soften and melt into the fabric. Also, be sure to keep these materials out of reach of children and pets; do not use them where unwrapped food is stored or allow them to come into contact with food or cooking utensils.

Resin strips, which contain dichlorvos as the active ingredient, are generally more effective in protecting susceptible objects in enclosed containers and provide longer control than naphthalene or PDB. As these chemicals evaporate they produce vapors which, in sufficient concentration, will slowly kill insects. The vapors build up to the required concentration only in an airtight container—if not in an airtight container, the chemicals only repel adults; larvae already on clothes continue to feed. (Because some of the resin strips contain oil, be careful to keep them from coming in contact with the stored item.)

Generally, closets are not airtight and are opened too frequently to hold in vapors. However, seldom-used closets can be made 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 makes a good storage container. Seal any holes or cracks. If the lid does not fit tightly, seal it with tape or wrap the entire container in heavy paper and seal it with tape.

Alternative methods of controlling dermestid beetles are either to freeze

an infested object by placing it in a freezer (enclosed in a plastic bag) for 2 weeks at temperatures below 18°F or heating it in an oven for at least 30 minutes to temperatures above 120°F. (Before using either of these methods, consider if the object will be damaged by cold or heat.)

Questions are often raised as to the effectiveness of cedar chests and closet floors made of cedar. Some cedar contains an oil that does not affect large larvae but is able to kill small larvae. However, cedar loses this oil as it ages. Having the chest tightly constructed is more important in the long run than the type of wood used to make it.

Insecticides

Cleaning is always the best strategy; however, areas or articles that cannot be dry cleaned or laundered can be sprayed 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 edges of floor coverings, under rugs and furniture, floors and walls of closets, shelving where susceptible fabrics are stored, cracks and crevices, and in other lint-accumulating areas. Be sure not to spray clothing and bedding.

When treating attics, wall voids, and other inaccessible places, use dust formulations. Do not let borates come in contact with objects containing natural dyes (e.g., some Oriental rugs, sheepskins, bearskins). Also, some dust formulations may adversely affect people with respiratory problems; read and follow label precautions carefully. Fumigation may be needed when infestations are extensive, although success can be limited by the ability of the fumigant to penetrate all the areas where carpet beetles hide.

On rugs and carpets, closely inspect areas beneath heavy furniture and along carpet edges for infestation.

Spray both sides of infested carpet if at all possible. Apply a lighter spray to the upper surface so that the possibility of staining is reduced. If the rug pad contains animal hair or wool and has not been treated by the manufacturer, spray it also. It is preferable to wait until the rug has dried before putting any weight on it. If you are worried that expensive broadlooms or Oriental rugs may be damaged by sprays, employ an experienced pest control operator or carpet-cleaning firm.

Do not use insecticides around open flames, sparks, or electrical circuits. Do not spray them on asphalt or tile floors. Use only lightly 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 is not recommended. If you store furs at home throughout 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 can be insured against damage.

Sometimes felts and hammers in pianos become infested and so badly damaged that the tone and action of the instrument are seriously affected. The services of a piano technician are then recommended. Synthetic felts are also available.

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REFERENCES

Mallis, A. 1990. *Handbook of Pest Control*, 7th ed. Cleveland: Franzak and Foster Co.

For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your phone book for addresses and phone numbers.

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To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned.

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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.

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 nor pour pesticides down 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 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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