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# Clothes Moths and Carpet Beetles

How  
to combat  
them

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UNITED STATES DEPARTMENT OF AGRICULTURE

THIS BULLETIN was prepared by  
the Stored-Product Insects Branch,  
Market Quality Research Division,  
Agricultural Marketing Service.

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#### SCIENTIFIC NAMES OF INSECTS DISCUSSED

Webbing clothes moth

*Tineola bisselliella*

Casemaking clothes moth

*Tinea pellionella*

Carpet beetle

*Anthrenus scrophulariae*

Furniture carpet beetle

*Anthrenus flavipes*

Varied carpet beetle

*Anthrenus verbasci*

Black carpet beetle

*Attagenus piceus*

EQ-53 was available commercially for a time but is not available at present (1961). However, instructions in its use are included in this bulletin in the event that it again becomes available.

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# Clothes Moths and Carpet Beetles



*How  
to combat  
them*

Clothes moths are well recognized as fabric pests. Housewives throughout the country are on guard against them. The fact that they cause widespread damage is due more to weaknesses in control measures than to lack of awareness of the need for control.

Not so well known as clothes moths, but just as destructive to fabrics, are carpet beetles, or "buffalo moths." Carpet beetles are more abundant than clothes moths in some localities, and

damage that they do is often blamed on clothes moths.

The larvae of clothes moths and carpet beetles damage fabrics by feeding on them. They feed on anything that contains wool or other animal fibers.

The adult moths and beetles do no damage.

Estimates of the damage caused each year by clothes moths and carpet beetles in the United States range from \$200 million to \$500 million.

## **Description of the Insects**

Two species of clothes moths and four species of carpet beetles commonly infest homes.

The webbing clothes moth and the casemaking clothes moth look much alike. The full-grown larvae are about  $\frac{1}{2}$  inch long, and are practically hairless; they are white, except for the dark heads. The adult moths are yellowish or buff, and have a wingspread of about  $\frac{1}{2}$  inch.

The larvae of the carpet beetle, the furniture carpet beetle, and the varied carpet beetle are elongate-oval in shape, are never more than  $\frac{1}{4}$  inch long, and have brownish or black bristles that give

them a fuzzy appearance. The full-grown larvae change into small beetles mottled with white, yellow, brown, or black.

The black carpet beetle is easily distinguished from the other three species. The larvae are yellowish, golden, or dark brown, they may get to be  $\frac{1}{2}$  inch long; the slender bodies are tapered from the head to the end of the body, where there is a tuft of long brown hairs. The adult beetles have solid black bodies and brownish legs.

The illustrations on page 5, which are in natural color, will help you identify clothes moths and carpet beetles in your home.

## Stages of Development

Clothes moths and carpet beetles pass through four stages of development—egg, larva, pupa, and adult.

The female moths and beetles lay soft, white eggs in clothing, in the pile of upholstery, in cracks, and in other concealed places. A moth lays from 100 to 300 eggs, which hatch in 4 to 8 days in summer. A beetle lays about 100 eggs,

which hatch in 8 to 15 days in summer. Hatching takes longer in cool weather.

Under conditions normally existing in homes, the black carpet beetle has one generation a year; the other carpet beetles and the clothes moths have two, three, or four generations a year.

As the carpet beetle larvae grow, they shed their skins, or molt, several times.

## Food and Habits

As soon as they are hatched, the larvae begin eating. They feed on wool, mohair, hair, bristles, fur, feathers, and down. Thus they attack clothing and a wide range of household furnishings, including blankets, comforters, rugs, carpets, drapes, pillows, hair mattresses, brushes, upholstery, and hair padding in upholstered furniture.

They also feed on organic matter—hair that falls from pets, lint, and dead insects—that collects in places infrequently cleaned.

Besides feeding on all these materials, black carpet beetle larvae feed on grain products.

Clothes moth larvae usually stay on their food material. A webbing clothes moth larva spins a silken webbing to form a feeding tube, which is attached to the food material. A casemaking clothes moth larva spins a protective case, which it drags about.

Carpet beetle larvae, which do not spin webbing, are more active, crawling from place to place. You may find them on cotton goods or other things on which they do not feed. They often live behind baseboards and moldings, in cracks in the floor, in corners, behind radiators, in the air ducts of heating systems, on closet shelves, or in dresser drawers.

Adult clothes moths prefer darkness, and do not flit about lights; but they may be seen flying lazily in darkened corners, or at the edge of a circle of illumination. When clothing or other objects on which they are resting are suddenly moved, the moths run or fly to conceal themselves.

Adult carpet beetles fly readily, are attracted to daylight, and are sometimes found on window sills. They like sunlight, and in the spring large numbers are outdoors feeding on the pollen of flowers.

## How Infestations Begin

In urban areas some infestations are started by adult carpet beetles or clothes moths that fly from house to house. An infestation is more likely to be started in this way by beetles than by moths.

The insects are sometimes carried into homes on articles containing wool or other animal fibers. Most commonly these articles are secondhand clothing, upholstered furniture, and house furnishings.

# FABRIC PESTS

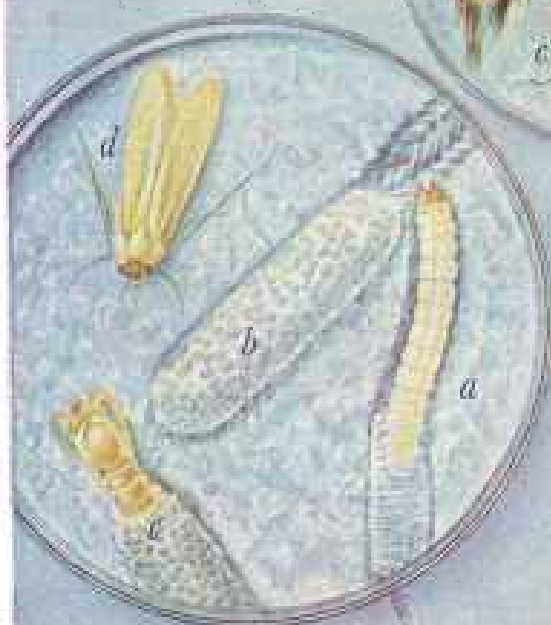
◀ **BLACK CARPET BEETLE** *a*, Larva; *b*, pupa; *c*, adult. Background shows damage to fabric.



**FURNITURE CARPET BEETLE** *a*, Larva; *b*, pupa; *c*, adult. Also showing damage.



◀ **WEBBING CLOTHES MOTH** *a*, Larva and silken feeding tube; *b*, cocoon; *c*, cocoon with cast pupal skin protruding; *d*, adult. Background shows typical clipping of nap.



(All insects about six times natural size.)

Carpet beetles breed and feed not only in homes but also outdoors, in such places as bird and rodent nests, and the adults sometimes enter homes from these places.

Carpet beetle larvae may crawl from one room to another. If a hall carpet in an apartment house becomes infested,

it is almost certain that some of the larvae will crawl from the hall into rooms that open onto it.

The practice of exchanging woolen scraps for use in making rugs accounts for some infestations. When such scraps have lain unprotected for long periods, they may become infested.

## **Prevention and Control**

To prevent clothes moths and carpet beetles from damaging fabrics—

(1) Practice good housekeeping constantly.

(2) Apply protective treatments to susceptible items.

(3) Spray premises with insecticides which effectively kill fabric insects.

If your home is now free of infestation, you can keep it that way by closely

following the first two of these lines of effort; but to eliminate an infestation, you must follow all three.

If you must cope with a heavy or widespread infestation, you will do well to obtain the services of a reputable pest-control firm. Such a firm has the equipment, materials, and experience necessary to handle a difficult control job.

## **Good Housekeeping**

Certain elements of good housekeeping have a specific bearing on control of fabric pests in the home.

In cleaning, do a thorough job of removing organic matter on which larvae feed. Besides depriving larvae of some of their food supply, you may, at the same time, remove insects and their eggs.

Clean often enough to prevent lint and hair from accumulating. Give close attention to—

Rugs and carpets;

Drapes and upholstered furniture;

Closets, especially those in which woolens and furs are kept;

Radiators, and the surfaces behind them;

Corners, cracks, baseboards, moldings, and other hard-to-reach places.

Vacuum-cleaning is the best way to remove lint and hair from hard-to-reach places. Use the radiator-cleaning attachment of the cleaner.

To clean rugs, carpets, drapes, and upholstered furniture, use the vacuum cleaner or a brush.

Clean rugs and carpets thoroughly and frequently, and rotate them occasionally. Rotation is important because insects usually feed under heavy pieces of furniture, where cleaning is inconvenient, rather than in the open, where regular cleaning, light, and movement of people keep down infestation.

After vacuum-cleaning, dispose of the sweepings promptly. They may contain larvae, eggs, or adult insects. If you leave sweepings in the cleaner, you may trans-

fer an infestation from one place in the home to another.

Woolen scraps or garments that lie for long periods on shelves, or in corners,

boxes, or drawers, are often a source of infestation. Store these things properly or, if you do not want them, get rid of them.

## Protective Treatments

There are a number of things you can do to protect fabrics and furs against insect-feeding damage. Some measures, such as dry-cleaning and the use of crystals and flakes, kill the insects. Others do not; they keep the insects away or cause fabrics to be resistant to insect feeding.

### Clothing and Blankets

#### Insecticide Oil Solutions

Spray woolens with DDT, dieldrin, methoxychlor, chlordane, lindane, Strobane, or Perthane to protect them from feeding damage by clothes moths and carpet beetles. These insecticides are sold as liquid oil solutions to be applied with a sprayer, or in pressurized spray containers ready to use. Follow the directions and observe the cautions given on the container label.

A simple way to prepare woolens for spraying is to hang them on a clothesline. Spray lightly and uniformly until the surface is moist. Do not soak or saturate the woolens. Excessive spray may cause a white deposit after the fabric dries. A slight excess deposit can be removed by light brushing. A heavier deposit may require dry-cleaning; the protection is lost when the insecticide is thus removed.

Allow treated woolens to dry before storing them.

#### Fluoride Solutions

Spraying woolens with a commercial fabric-treatment solution containing fluo-

ride is another way to protect them against the feeding of the larvae of clothes moths.

Before spraying, be sure the woolen articles are clean and free from stains. Apply the spray freely until the surface is uniformly moist. When the articles are dry they are ready for use or for storage.

Fluoride solutions are for treating woolens, not for spraying on walls or floors. Their purpose is to protect the woolens against feeding damage, not to kill insects.

Treated woolens in storage will be protected a year or more; those in use a year, unless washed. The fluorides are removed from the fabric by washing but will withstand several dry-cleanings before they are reduced to an ineffective level.

#### EQ-53 For Washable Woolens<sup>1</sup>

Washable woolens are protected from insect damage when washed or rinsed in water containing a few spoonfuls of EQ-53, a product developed at the Savannah, Ga., laboratory of the U.S. Department of Agriculture.

EQ-53, which is sold under different trade names, is an emulsifiable concentrate in which the active ingredient is the insecticide DDT. There are two other ingredients—a solvent and an emulsifying agent. Wool immersed in water containing EQ-53 picks up DDT, which remains after the wool dries and gives protection against insect feeding.

<sup>1</sup> See note on page 2.

With this product the housewife can pestproof washable woolens, such as blankets, sweaters, scarves, or socks, at the same time that she washes them. The procedure is especially convenient in the spring, when woolens are being prepared for summer storage, but it can be used any time.

Stored washable woolens treated the EQ-53 way are protected against the feeding of the larvae of clothes moths and carpet beetles for a year or more. Where woolens are put in use after a treatment, rather than stored, they are protected for a season unless they are washed or dry-cleaned. Washing may reduce the insecticide below an effective level, and dry-cleaning removes it.

The unique advantage of EQ-53 is that it permits pestproofing to be combined with washing, but it can also be used to pestproof clean woolens, if they are washable. To apply it to soiled woolens, follow these directions:

*If you wash woolens by hand—*

- (1) Weigh dry woolens or estimate weight.

- (2) Wash woolens in the usual way.

- (3) Pour EQ-53 into the first rinse water at the rate of 1 tablespoonful for each pound of dry woolens.

- (4) Soak woolens a few minutes, then stir 3 to 5 minutes with a paddle.

- (5) Follow with the normal rinsing and drying.

*If you use a washing machine—*

- (1) Weigh dry woolens or estimate weight.

- (2) Put woolens, water, and soap in the tub, as if preparing for washing in the usual way.

- (3) Pour in EQ-53 at the rate of 1 tablespoonful for each pound of dry woolens.

- (4) Wash, rinse, and dry in the usual way.

To apply EQ-53 to clean woolens, follow the same directions but, instead of washing the woolens, merely rinse them; do not use soap.

Your woolens will be free of any odor of EQ-53 after they are dried.

Woolens shrink and become matted if improperly washed. When treating woolens with EQ-53, follow proper washing procedures. Use lukewarm water and a mild soap or detergent. EQ-53 itself does not affect shrinking or matting.

#### **Paradichlorobenzene and Naphthalene**

You can protect stored woolens by putting paradichlorobenzene crystals, or naphthalene flakes or balls, in the container or closet in which they are stored.

As these chemicals evaporate, they produce a vapor. To be effective, the vapor must be in a concentration sufficient to kill insects. The proper concentration kills both clothes moths and carpet beetles. The mere odor of paradichlorobenzene or naphthalene does not repel insects and is no indication that there is enough vapor to kill them.

Much depends on whether the container or closet will hold the vapor. The container, which may be a trunk, chest, box, or garment bag, should be airtight. If you store the woolens in a closet without first placing them in individual containers, see that the closet is tightly closed. If there are cracks around the door, seal them with tape or fit the door with gaskets; if there are cracks in the interior walls, floor, or ceiling, close them with putty or plastic wood. Protection is lost if the closet door is opened frequently. Even in a tight closet that is kept closed, it takes several days for the



vapor to build up to an effective level. Effectiveness is greatly increased if a closet is used for storage only.

In a trunk-size container use 1 pound of crystals, flakes, or balls. Scatter them between layers of garments or blankets.

In a closet use 1 pound to each 100 cubic feet of space. The vapors are heavier than air. The crystals, flakes, or balls should therefore be placed in a shallow container on a shelf, or suspended from a clothes rod or hook in a thin cloth bag or perforated container.

Clothes moths or carpet beetles in a closet can be quickly killed by vaporizing paradichlorobenzene crystals with a vacuum cleaner. A special attachment is provided for this purpose.

#### **Cedar Chests**

Cedar chests make good pestproof containers primarily because of their tight construction. They should be made of red cedar (*Juniperus virginiana*). At least 70 percent of the chest proper should be made with  $\frac{3}{4}$ -inch heartwood. They may be veneered on the outside with hardwoods, such as walnut or mahogany, without affecting the pestproofing value. The cedar-oil vapor kills small larvae but is not effective against larger ones. Therefore make sure that woolens are free of larvae when stored.

Treat cedar chests that are several years old as you would any other container in which you store articles susceptible to insect damage. Scatter crystals, flakes, or balls between layers of the stored articles.

#### **Other Practices**

Woolens can be protected from feeding damage by wrapping them in paper or sealing them in a cardboard box. Before wrapping or sealing, be sure the woolens are not infested. In making a

paper bundle, carefully fold back and seal the edges of the paper.

Dry-cleaning kills all stages of clothes moths and carpet beetles but gives no protection against reinfestation. Protective treatments are applied by many cleaning establishments and pest-control firms.

You can rid woolen articles of insects, and their eggs and larvae, by brushing and sunning them. Brush thoroughly, especially in seams, folds, and pockets. If they cannot find protection from the light, larvae missed in the brushing will fall to the ground from clothing left hanging in the sun.

#### **Rugs and Carpets**

Spray a 5-percent DDT oil solution on rugs and carpets every 12 to 18 months. Use  $1\frac{1}{2}$  to 2 quarts of spray on a 9-by-12 rug of average weight, if you spray the entire rug.

Fluoride solutions are also satisfactory for protecting rugs and carpets. Follow the manufacturer's directions for applying.

Give special attention to parts of the rug that will be under a piano, sofa, bookcase, or other heavy furniture, and to parts that will be under radiators or around heat registers. If there is a rug pad containing animal hair or wool, and it has not been treated by the manufacturer, spray it on both sides.

In spraying wall-to-wall carpeting, give special attention to the edges, all the way around.

If you have expensive broadlooms or oriental rugs, and fear that lack of experience in spraying may cause you to mar their appearance or otherwise injure them, it is advisable to call on a pest-control or carpet-cleaning firm that is experienced in treating rugs and carpets.

Commercial rug cleaning destroys larvae, eggs, and adult insects in rugs and carpets but prevents reinfestation only if a special treatment is given for this purpose.

Rugs and carpets are protected against insect feeding when placed in commercial storage. In home storage they may be protected by spraying with DDT oil solutions or fluoride solutions or by using paradichlorobenzene crystals or naphthalene flakes.

### **Household Furnishings**

To protect furniture upholstery and drapes containing wool or mohair, spray them with any of the solutions discussed on page 7, except do not use dieldrin, lindane, or chlordane on furniture.

These sprays applied to the outside of furniture, mattresses, or pillows help prevent infestation of the down or hair

inside, but do not control an existing infestation.

Felts and hammers in pianos often become infested and so badly damaged by clothes moths and carpet beetles that the tone and action of the instrument are seriously affected. The solutions discussed on page 7 will protect the felts and hammers, but the treatment may damage other parts of the piano if applied incorrectly. To avoid this, you may wish to call a piano technician to do the job.

### **Furs**

If you store furs at home through the summer, protect them with crystals, flakes, or balls in a tight container.

We do not recommend applying protective sprays on furs.

Furs in commercial storage receive professional care and can be insured against damage.

## **Control Measures**

### **Surface Sprays**

Surface spraying is the chief means by which insects living in the structure of the home are eliminated. It also has protective value.

The insecticide is applied to surfaces where larvae and adult insects are likely to crawl. When the spray dries, a thin deposit of insecticide remains. For several weeks or months the deposit kills insects that crawl over it. Thus it may kill insects before they have a chance to damage fabrics, and may prevent them from becoming established in your home. For continuous control and prevention, spray surfaces once or twice a year.

Contact spraying, the purpose of which is to kill insects by direct application, does not always give full control. Moths and beetles hit by the spray

are killed, but they may be only a small part of the total infestation. Many may be in protected places where you cannot reach them with a spray.

### **Selecting an Insecticide**

Select an insecticide that is effective in killing fabric insects.

A 3- to 6-percent DDT oil solution kills both clothes moths and carpet beetles when it hits them directly, but the dry deposit is effective against moths only.

A spray containing 2 percent of chlordane, 3 to 5 percent of premium grade malathion or ronnel, or 1/2 percent of lindane, heptachlor, dieldrin, or Diazinon is effective against both clothes moths and carpet beetles, whether it hits the insects directly or whether they come in contact with the treated surface.

These should be applied only in accordance with the precautions listed on page 12.

Hence, use DDT only if you are sure your problem is the control of clothes moths alone. If you have an infestation of carpet beetles, or are not sure which insect it is that requires control, use chlordane, malathion, lindane, dieldrin, heptachlor, ronnel, or Diazinon.

### **Applying the Spray**

Apply the insecticide with a household sprayer that produces a continuous coarse mist.

Satisfactory surface treatments can be applied with pressure sprayers that look like aerosol dispensers but produce a coarse spray. These liquefied-gas surface sprayers are distinguished from aerosol dispensers by their labels, which show that they are for use in spraying surfaces.

Places to spray: Along the edge of wall-to-wall carpets; closets; behind radiators; and corners, cracks, baseboards, moldings, and other hard-to-clean places. These are places where insects may be living. If you cannot reach some of them, apply the insecticide as close to them as possible, so that carpet beetles (larvae or adults) will crawl over it as they emerge from hiding.

Take clothing out of closets and apply the insecticide to corners, to cracks in the floor and walls, along baseboards, around shelves, and at ends of clothes rods.

### **Aerosols**

An aerosol is a spray in the form of a fine mist that floats in the air for a time. It is applied by releasing it from the metal dispenser in which it is purchased.

An aerosol in a clothes closet kills flying clothes moths; it also kills clothes moth larvae that happen to be exposed to the mist. It does not moisten surfaces as coarse mist sprays do; hence it does not give lasting protection.

Few aerosols are strong enough to be effective against carpet beetles.

Aerosol dispensers should not be confused with the liquefied-gas sprayers mentioned in the discussion of surface spraying.

### **Insecticidal Dusts**

You may find carpet beetle larvae in floor cracks, especially under rugs. The blocks of parquet floors tend to separate slightly, leaving a checkerboard of cracks. Black carpet beetle larvae can thrive in the lint, dust, and bits of hair that accumulate in these cracks.

Getting spray into numerous floor cracks is a tedious task. You may prefer to use a 10-percent DDT dust. If there is a rug, take it up; then sprinkle the dust on the floor, brush or sweep it into the cracks, and put the rug back in place.

You may use a dust gun to blow DDT dust into cracks behind moldings or baseboards and into other places that are difficult or impossible to reach with a surface spray.

You may use a 5-percent chlordane or 1-percent lindane or dieldrin dust, but apply it only to cracks around the edge of a room, behind baseboards, or under rugs. There are indications that chlordane, dieldrin, and lindane are more effective against carpet beetle larvae than is DDT, but they should not be applied throughout a room (see Precautions, p. 12).

Applying a dust is an easy way to treat attics or basements where there are numerous cracks in which carpet beetle larvae can live.

### **Fumigation**

Before present control methods were developed, fumigation of an entire house was a common method of controlling carpet beetles. Clothing and furnishings

were left in the house during the fumigation. This method, which is expensive and requires vacating the house, is seldom used today to meet ordinary control problems. Moreover fumigation is dangerous. In some localities it is subject to legal restrictions. Only professional pest-control operators should fumigate.

Fumigation gives quick and satisfactory control, but there is no assurance that it will kill all the beetles in a house, and it does not prevent reinfestation.

## Precautions

**IN GENERAL.**—Most insecticides are poisonous to people and to animals. . . . Keep insecticides where children and pets cannot reach them. . . . When applying them, do not contaminate food, dishes, or kitchen utensils. Do not store them with food. . . . Do not breathe too much of the spray mist or the dust. . . . If insecticide is spilled on the skin, wash it off promptly. . . . Change your clothes if you spill insecticide on them. . . . Keep children and pets off sprayed surfaces that have not dried. . . . When you have finished applying an insecticide, empty unused material into the original container, clean the sprayer or duster, and wash all exposed surfaces of the body with soap and water.

**INFANTS' APPAREL.**—Apply insecticides to infants' sweaters, blankets, or other woolen articles only if they are to be stored. Launder or dry-clean them before returning to use.

**DIAZINON, DIELDRIN, CHLORDANE, HEPTACHLOR, LINDANE, MALATHION, AND RONNEL.**—Do not use on furniture; on rugs and carpets, use only for spot treatments. Dry-clean clothing and bedding treated with dieldrin, lindane, or chlordane before using them. Do

Although fumigation of an entire house is seldom necessary, the best action to take against clothes moths or carpet beetles living in the down in pillows, or in the hair padding of furniture or mattresses, is to have the infested article treated with hydrocyanic acid gas in a fumigation vault. This fumigation service is provided by many pest-control and storage firms. The treatment kills the insects, but it does not prevent reinfestation.

not use any of these insecticides in the concentrations recommended in this bulletin for overall spraying or dusting of the interior of rooms.

**OIL-BASE INSECTICIDES.**—Do not spray oil-base insecticides near open flames, sparks, or electrical circuits. . . . Do not spray them on silk, rayon, or other fabrics that stain easily. . . . Do not spray them on asphalt-tile floors, because they will dissolve the asphalt. . . . They will also soften and discolor some linoleums and certain plastic materials; if in doubt about spraying such a surface, test the spray on a small inconspicuous place. . . . If you apply one of these insecticides to the cracks in a parquet floor, apply it lightly; an excessive amount will dissolve the underlying black cement, and the dissolved cement will stain the floor.

**WEIGHT ON DAMP FURNISHINGS.**—Do not put any weight or pressure on sprayed rugs, carpets, or upholstered furniture (as by walking, sitting, or pressing with the hand) until the spray has dried. Doing so gives the damp pile a mashed-down appearance, which persists for several days.