Common Rental Property Pests

Keeping Your Rentals Bug Free

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CUTTING EDGE RESEARCH INC.

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BC REIN Workshop

REIN™
Real Estate Investment Network™

Don't Get Caught with Unexpected “Guests”

Dear Tenant,

Let’s face it, no one really likes “bugs” in their home. The truth is, many of the most common household pests can be completely prevented - some more than others - but prevention starts with You!

Here are some tips to keeping a bug free home for you and your family:

1. **Cleanliness is Critical** – Keeping a clean home is one of the best defenses against a number of the most common, and often nasty, household pests.

   * Take out the trash regularly
   * Keep counters clean and free of uncontained food
   * Store foods in glass jars or heavy gauge plastic with lids (not original containers)
   * Vacuum floors regularly, especially if you have pets (including under furniture, appliances, and along walls/baseboards with crevice attachment once a month)
   * Clean closets and dresser drawers quarterly and inspect clothing for damage

2. **Pests Happen** – Insects are not a social issue. They do not target people, so don’t be embarrassed if you have pests...even high-end hotels get bedbugs and other pests!
3. **Avoid ‘Hand Me Downs’** – Second hand furniture is very risky! Often times mattresses, chairs, sofas, etc are on the side of the road for a reason... leave them there. Bringing second hand furniture into your home is the fastest way to get bedbugs!
4. **Communication is Key** – If you have a pest problem, ignoring it is the single worst option - it will only get worse. Please contact your landlord or property manager immediately.

Taking these simple precautions can help keep you and your family pest free for years to come.

The following handouts are publications from the University of Kentucky Entomology program – Each publication is pest specific and each has tips for both prevention and control. For a list of more household pests, please visit: http://pestcontrolcanada.com/ or you can download more publications from the University of Kentucky website: http://www.ca.uky.edu/entomology/dept/entfacts.asp#home.

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STORED PRODUCT PESTS IN THE PANTRY

Lee Townsend, Extension Entomologist

Stored product or pantry pests include several beetles, moths, and a mite that can infest whole grains or processed foods. Usually, the first sign of a problem is the appearance of small beetles crawling over counter tops, moths flying across rooms, or caterpillars crawling up walls or across ceilings. The solution requires finding and destroying all infested products in which these pests have developed, a general cleanup, and use of sealed storage containers to prevent recurring problems.

Some stored product pests feed inside whole kernels. These include the granary weevil, rice weevil, and the Angoumois grain moth.

RICE WEEVIL
USDA Insect and Plant Disease Slide Set

The weevils are 1/8- to 1/4-inch long, reddish brown to black snout beetles. Adults can live for 6 to 8 months and may be found some distance from infested articles.

The larval stage is a legless grub that develops inside kernels of wheat or corn, or other whole grains or caked materials. Development from egg to adult takes as little as 1 month.

ANGOUMOIS GRAIN MOTH
SDA Insect and Plant Disease Slide Set

The Angoumois grain moth is 1/2 inch long and pale yellow brown. It may be seen fluttering in the house. As with the weevils, the larval stage develops in whole kernels or caked grain. Barley, rye, corn, oats, rice and various other seeds can be infested. Decorative ear corn is a common source of the insect. The life cycle takes about 6 weeks. The adult resembles a clothes moth but can be recognized by the finger-like projection of the hind wing tip.

A much larger number of insects feed on processed grains or broken kernels, or a variety of spices. Common pests include the red and confused flour beetles, sawtoothed grain beetles, drugstore beetle, cigarette beetle and Indian meal moth.

SAWTOOTHED GRAIN BEETLE

Red and confused flour beetles, cigarette beetles, drugstore beetles, and the sawtoothed grain beetles are 1/8 inch long red brown insects. The immature or larval stages usually occur only in infested products and usually are not seen.

Flour beetles and the sawtoothed grain beetle cannot attack whole or undamaged grains but will feed on a wide variety of processed grains (flour, meal), as well as dried fruits, dry dog food, dried meats, candy bars, drugs, tobacco, and a variety of other products. The life cycle of the flour beetles takes about 7 weeks. Adult females can live for several months to more than a year. Confused flour beetles fly and are attracted to lights; red flour beetles crawl toward light but apparently do not fly. Sawtoothed grain beetles neither fly nor are they attracted to light.

DRUGSTORE BEETLE

Drugstore beetles and cigarette beetles attack almost any household food and spice and leather articles. Cigarette beetles are most commonly found in dried dog food and paprika. Drugstore beetles are often in bread, flour, meal, breakfast foods, and spices like red pepper. Adults of both species can fly and are attracted to light.

USDA Insect and Plant Disease Slide Set; inset-University of Florida Entomology

The Indian meal moth is a very common household pest. The distinctive 1/2-inch long adult is easily recognized by the pale gray and coppery brown front wings. The dirty white to pink larval stage is a caterpillar that crawls away from the infested products to find a place in which to transform to the adult. The caterpillars feed on the surface and produce silk webbing throughout the food source. The life cycle can be as short as 25 days.

They can feed in dried fruits, powdered milk, chocolate, flour, meal, dried dog food, bird seed and a variety of food stuffs. They prefer coarse flours and corn meal.

Control

While adults are the signs of an infestation, merely killing them is not the solution. Infested articles must be found and destroyed. Identification of the pest can provide clues on where to look but some of these insects can live on a wide range of materials.

In general, the greater the number of insects seen, the older the infestation. Often the initial source is partially used boxes or bags of products that have been forgotten in the backs of pantries and shelves. The infestation spreads as the active adults search for new food sources. A thorough search is needed to locate all infested items. If they are not found in pantries or cupboards, then begin to look at such things as decorative items or bird seed.

Disposal of infested materials is the best way to eliminate the problem. Also check all items in pantries or on shelves. Often beetles can be found beneath cans and other items. Thoroughly vacuum the shelves, both upper and lower surfaces, and use a crevice attachment to clean cracks and crevices. It is better to do a very thorough job one time than to have to repeat a hasty inspection and cleanup.

After treatment, good sanitation and proper storage are keys to preventing future problems. Place products from cardboard, paper, or plastic containers into jars or other containers that can be sealed tightly. Decorative items such as Indian corn, dried flower arrangements, or bird feed may be treated with heat (155°F for about 20 minutes with the oven door propped open) or in a non-self- defrosting freezer at 0°F for 4 days.

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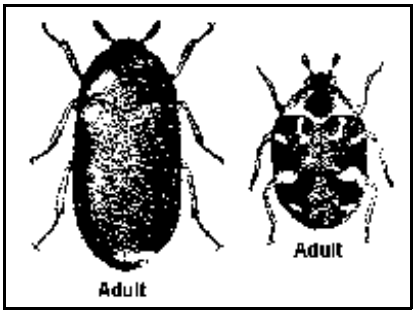
CARPET BEETLES

Michael F. Potter, Extension Entomologist

USDA INSECT & PLANT DISEASE SLIDE SET

Carpet beetles, as their name implies, are capable of damaging carpets. These pests will also feed upon many other materials besides carpets and will attack any item composed of animal fibers such as wool, furs, silk, feathers, felt and leather. Serious infestations of carpet beetles can develop undetected in a home, causing significant damage to clothing, bedding, floor coverings and other articles.

Identification and Habits



Although there are many different species of carpet beetles, the adults of all species are small, oval-shaped beetles about 1/8 inch long. The black carpet beetle (the most common species) is shiny black. Adults of other common species are brightly colored in various patterns of white, brown, yellow and orange.

The **larvae** or immature stages of carpet beetles are about 1/4 inch long and densely covered with hairs or bristles. Only the larval stage feeds on fabric and causes damage. The adults feed on flowers, but are often seen indoors around light fixtures and windows, indicating that a larval infestation is present somewhere within the home.

Carpet beetles feed on a variety of animal-based materials including wool, fur, silk, feathers and leather. Items commonly infested include wool sweaters, coats, blankets, carpets, down pillows and comforters, and upholstered furniture. Synthetic fabrics such as polyester and rayon are rarely attacked unless they are heavily soiled with food stains or body oils.

They prefer to feed in dark, undisturbed areas such as closets, attics, within boxes where woolens and furs are stored, along and under the edges of carpeting, underneath upholstered furniture, and in air ducts where they feed on lint, pet hair and other bits of debris.

USDA INSECT & PLANT DISEASE SLIDE SET

Carpet beetle infestations may also originate from bird or animal nests or an animal carcass present in an attic, chimney or wall void. They also occasionally feed on seeds, pet food or cereal products in the kitchen or pantry.

Control

The best way to avoid carpet beetle problems is through prevention. Woolens and other susceptible fabrics should be dry cleaned or laundered before being stored for long periods. Cleaning not only removes perspiration odors that are attractive to the beetles, but also kills any eggs or larvae that may be present. Articles to be stored should then be packed with moth balls or flakes in tight-fitting containers. Insecticides should not be used to treat clothing. However, mothproofing solutions may be applied to susceptible clothing by professional dry cleaners.

Routine vacuuming effectively removes carpet beetles which are already present, as well as hair and lint which could support future infestations. Particular attention while vacuuming should be paid to the edges of carpets, along baseboards, underneath furniture and similar "quiet" areas where carpet beetles prefer to feed.

Insecticide applications directed into infested areas are often useful as a supplement to good housekeeping. Products containing active ingredients such as chlorpyrifos, permethrin, bendiocarb and allethrin are effective against carpet beetles. Sprays may be applied to carpets (especially beneath and along the edge adjacent to the baseboard), underneath furniture and

other likely areas of infestation where prolonged contact with humans is unlikely. Clothing and bedding should not be sprayed and should be removed before treatment.

Control of carpet beetles requires patience and a thorough inspection to locate all sources of infestation. Elimination of widespread, ongoing infestations may require the services of a professional pest control operator.

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CLOTHES MOTHS

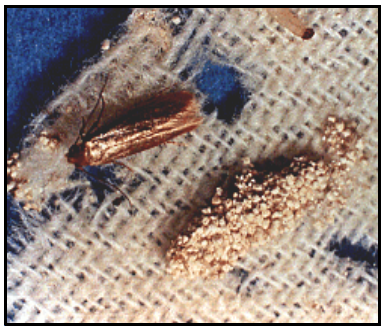
Michael F. Potter, Extension Entomologist

L. Townsend, Univ of Kentucky Entomology

Clothes moths are well-known as pests of stored woolens, but they will eat a wide range of other fibers including hair, fur, silk, felt and feathers. Serious infestations of clothes moths can develope undetected in a home, causing significant damage to clothing, bedding, floor coverings and other articles.

Identification and Habits

Clothes moths are small (about 1/2-inch), buff-colored moths. Two different species are common in Kentucky, the webbing clothes moth and the casemaking clothes moth. The webbing clothes moth is uniformly buff-colored, whereas the casemaking clothes moth is similar in appearance but has indistinct dark specks on the wings.



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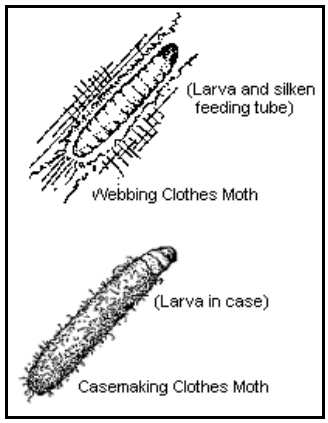
Clothes moths are seldom seen because they avoid light. They prefer dark, undisturbed areas such as closets, basements and attics, and tend to live in corners or in folds of fabric. If you do see tiny moths flying about in the kitchen and other open areas, they are probably grain moths originating from some infested cereal, flour or stored food item. Clothes moth adults do not feed so they cause no injury to fabrics. However, the adults produce eggs which hatch into the fabric-eating larvae.

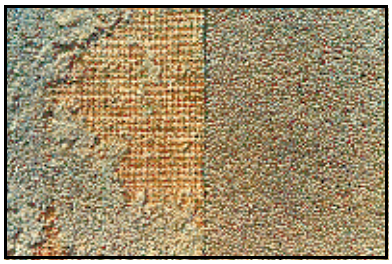
The larval stage of clothes moths are creamy-white caterpillars up to 1/2-inch long. Webbing clothes moth larvae spin silken feeding tunnels or patches of webbing as they move about on the surface of fabrics. The casemaking clothes moth encloses itself in a portable case that it drags about wherever it goes.

Damage to articles may consist of irregular surface feeding or holes eaten completely through the fabric. Oftentimes, the larvae leave the material they developed on and can be seen crawling slowly over walls or ceilings. The casemaking clothes moth, in particular, may travel considerable distances from the infested article to spin its cocoon in a protected crack, or along the juncture of a wall and ceiling.



As mentioned earlier, clothes moths feed on a variety of animal-based materials, including wool, fur, silk, feathers and leather. Items commonly infested include wool sweaters, coats, blankets, carpets, decorative items, down pillows and comforters, toys and animal trophies. Synthetic fabrics such as polyester and rayon are rarely attacked unless blended with wool, or if they are heavily soiled with food stains or body oils. The larvae prefer to feed in dark, undisturbed areas such as closets, attics, and within boxes where woolens and furs are stored for long periods.

Clothing and blankets in constant use are seldom damaged by clothes moths, nor are rugs that get a normal amount of traffic or are routinely vacuumed. Edges of carpeting next to walls or underneath furniture are often attacked.



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Clothes moths may also be found infesting upholstered furniture (both inside and out), and in air ducts where the larvae may be feeding on lint, shed pet hair and other bits of debris. Infestations may also originate from bird or animal nests, or an animal carcass present in an attic, chimney or wall void.

Control

The best way to avoid problems with clothes moths is through prevention. Woolens and other susceptible fabrics should be dry cleaned or laundered before being stored for long periods. **Cleaning kills any eggs or larvae that may be present and**

also removes perspiration odors tha t are attractive to the pests.

Articles to be stored should then be packed in tight-fitting containers with moth balls or flakes containing paradichlorobenzene (PDB) or napthalene. Neither PDB or napthalene will repel clothes moths or prevent them from laying eggs -- the vapors from these materials are lethal to clothes moths, but *only when maintained at sufficient concentrations.* In order to achieve these levels, the vapors must be tightly confined with the items you wish to protect. Effective concentrations can best be achieved by first sealing susceptible items (with the manufacturers' recommended dosage of moth crystals) in large plastic bags, and then storing the bagged articles in tight-fitting trunks, boxes or chests. Contrary to popular belief, cedar closets or chests are seldom effective by themselves, because the seal is insufficient to maintain a lethal or repellent concentration of the volatile oil of cedar.

Standard household insecticides should not be used to treat clothing; however, mothproofing solutions may be applied to susceptible clothing by professional dry cleaners. Valuable garments such as furs can also be protected from clothes moths by storing them in cold vaults (a service offered by some furriers and department stores).

Controlling existing infestations of clothes moths requires patience and a thorough inspection to locate all potential sources of infestation. The source may be an old woolen scarf in the back of a closet, a fur hat in a box, or a remnant of wool carpeting up in the attic. Even piano or organ felts may be the source. Infested items should be thrown out, laundered or dry cleaned.

Vacuuming effectively removes larvae which are already present as well as hair and lint which could support future infestations. Be sure to vacuum the edges of carpets, along baseboards, underneath furniture, inside closets and other "quiet" areas where clothes moths prefer to feed.

Insecticide applications directed into infested areas are often useful as a supplement to good housekeeping. Products containing active ingredients such as pyrethrum, allethrin, chlorpyrifos and permethrin are effective. Sprays may be applied to carpets (especially along and beneath the edge adjacent to the baseboard), underneath furniture and other likely areas of infestation where prolonged contact with humans is unlikely. Clothing and bedding should not be sprayed with household insecticides and should be removed before treatment.

Elimination of widespread, serious infestations of clothes moths may require the services of a professional pest control operator.

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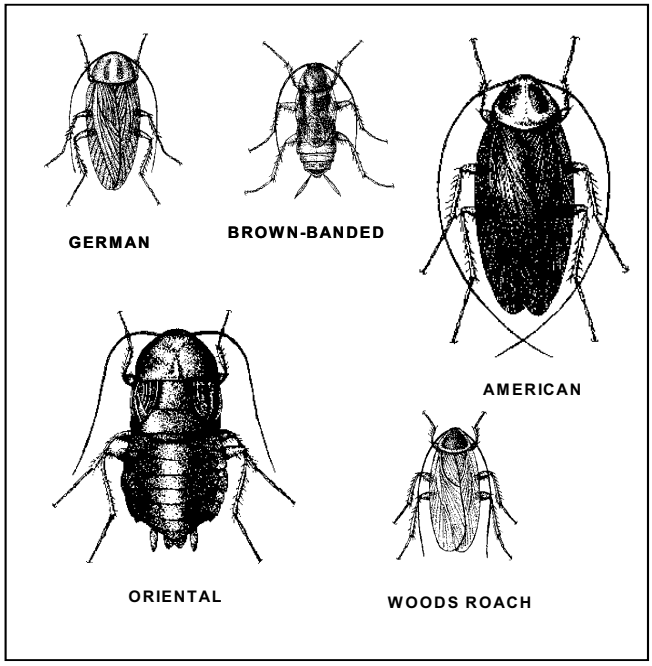
COCKROACH ELIMINATION

Michael F. Potter, Extension Entomologist

Cockroaches, are the most common insect pests infesting homes, food service establishments and other structures in Kentucky. Cockroaches are replusive and objectionable to most people simply by their presence. They are also capable of mechanically transmitting disease organisms such as the bacteria which cause food poisoning. Recently, cockroaches have been found to be an important source of allergy in people, second only to house dust.



COMMON HOUSE-INFESTING COCKROACHES

Oriental and American cockroaches usually prefer dark, damp areas such as basements, floor drains, crawl spaces, and utility closets.

Cockroaches typically become established in homes after being introduced in grocery bags, with laundry or, in some cases, wandering in from outdoors. Once cockroaches become established they are prolific breeders capable of producing several thousand offspring in a year.

Cockroaches prefer to live where there is food, warmth and moisture. Since cockroaches flourish where food and moisture are readily available, sanitation is an important step in prevention and control. Empty soft drink bottles, cardboard boxes and paper bags should not be allowed to accumulate. Food containers should be sealed and any crumbs or spillage cleaned up.

Unlike many household pests, cockroaches are prevalent year-round, causing homeowners and businesses to eventually seek some form of control.

Homeowners attempting to control cockroaches themselves will find **insecticidal baits and boric acid** effective and relatively easy to use. This factsheet will explain how to use baits and boric acid to eliminate your cockroach problem.

University of Florida Entomology

Cockroach Baits

Cockroach baits contain a slow-acting insecticide incorporated into a food attractant. Roaches locate and feed on the bait, typically contained in small, plastic bait trays, and crawl away to die. Bait carried back to the nesting area also kills other roaches after being expelled in the sputum and feces.

In contrast to liquid sprays or aerosols, cockroach baits require no mixing and it is not necessary to empty kitchen cabinets or cover food preparation surfaces prior to treatment. People and pets are not exposed to the toxicant since the insecticide is enclosed within a plastic, child-resistant container. Another advantage of cockroach baits is that they have essentially no volatility or odor. Various types of cockroach bait products are sold over the counter. Three of the most effective are Combat®, Raid® Max Roach Bait, and Roach Ender® Roach Bait (Black Flag). All three products are packaged 12 stations to a box and are available in most grocery and hardware stores.

How to Use Cockroach Baits

The key to successful cockroach control with baits is proper placement. Bait trays should be placed in all areas where cockroaches are seen, especially in kitchens and bathrooms. Prime locations include under sinks and toilets, beneath refrigerators, dishwashers and stoves, next to trash containers and inside cabinets and storage areas. It's critical that the stations be positioned flush into corners or up against edges (e.g., where walls meet ceilings and floors), since these are the paths commonly

traveled by roaches.

Placement of baits in the middle of exposed surfaces, i.e., away from edges or corners, will be far less effective. In most cases, a minimum of 12 bait stations should be used at one time, placing 10 baits in the kitchen and two in the bathroom. If cockroaches are seen in other areas such as bedrooms or utility rooms, use 2-4 additional baits. Do not spray around bait stations with other insecticides or cleaning
agents as this could deter roaches from feeding on the bait.

Substantial reductions in cockroach numbers should occur within 1-3 weeks of treatment. As with any pesticide, read the product label prior to use.

Boric Acid
People have been fighting cockroaches with boric acid for nearly a century. **Boric acid is one of the most effective cockroach control agents ever developed provided that it is used correctly.** Unfortunately, most people use it incorrectly, and in the process waste their money and effort. Boric acid may be used alone or in combination with the baiting techniques previously discussed.

Properties and Advantages
Boric acid is a wonderful tool for controlling cockroaches in homes, restaurants and other buildings. It is effective in extremely small amounts and retains its potency almost indefinitely provided the deposit remains dry. Unlike many insecticides, boric acid has no repellency to insects and, consequently, roaches return to treated areas repeatedly until they die. Boric acid is deadly to cockroaches, but is low in toxicity to people, pets and other nontarget animals. It is also odorless and contains no volatile solvents.

Boric acid is a white, inorganic powder chemically derived from boron and water. Boron is mined from vast mineral deposits in the ground and is used in countless consumer products, including laundry additives, toothpaste and mouthwash. Boric acid insecticide formulations can be purchased at hardware and grocery stores. The powder comes ready-to-use, i.e., no mixing or dilution is required. Formulations sold in plastic, squeeze-type bottles with narrow applicator tips are the easiest to use. (These containers are similar in appearance to the squeezable mustard and ketchup bottles found in restaurants).

Cockroaches succumb to boric acid when they crawl over treated areas. The tiny particles of powder adhere to the cockroaches' body, and the material is ingested as the roach preens the powder from its legs and antennae. Some boric acid is also absorbed through the greasy outer covering of the insect's body. All species of cockroaches are susceptible to boric acid provided the powder is applied into areas where the roaches are living.

Using Boric Acid Like a Pro
The key to success with boric acid is proper application. For best results, **the powder should be applied in a very thin layer barely visible to the naked eye.** Piles or heavy accumulations will be avoided by foraging cockroaches much as we would avoid walking through a snow drift. To apply a fine layer, shake the container and puff a small quantity of the powder into the target area. Manufacturers of boric acid often fill their containers too full of powder -- by using a container which is no more than two-thirds full, an airspace is created at the top which allows the dust to be puffed more easily (A few pennies or pebbles placed inside the container helps prevent the powder from caking). The trick is to give the container a shake, then puff a very light dusting of the powder into the area you wish to treat.

Avoid applying a heavy layer, and **never apply the material with a spoon.**

Where the powder is applied is just as important as how it's applied. Cockroaches prefer to live in cracks, crevices and secluded areas close to food, moisture and warmth. Kitchens and bathrooms are the most common areas to find cockroaches, although any area of a home may become infested if the infestation is severe, or if species other than the German cockroach are involved. Key areas for treatment include under/behind the refrigerator, stove and dishwasher, into the opening where plumbing pipes enter walls (such as under sinks and behind the commode, shower and washing machine), and into cracks along edges and corners inside cabinets and pantries. Oftentimes, there is a void (hollow space) under kitchen and bathroom cabinets which becomes a hiding place for cockroaches. This area can be accessed and treated by injecting powder through any existing gap at the top of the kickplate, or if none is present, by drilling a few small holes.

NEVER apply boric acid onto countertops or other exposed surfaces, especially those used to prepare food. Any visible residues should be wiped off with a damp cloth. Boric acid can be used alone or in combination with other cockroach control products. An effective way to augment the activity of boric acid is to place containerized cockroach baits such as Combat®, Raid Max® or Roach Ender® brands, as discussed earlier. Avoid dusting over, or in the immediate vicinty of your bait stations, as this may reduce the attractancy of the bait. Used correctly, this dual approach will produce results comparable to a professional exterminator.

BED BUGS

By Michael F. Potter, Professor & Urban Entomologist

Most householders of this generation have never seen a bed bug. Until recently, they also were a rarity among pest control professionals. Bed bug infestations were common in the United States before World War II. But with improvements in hygiene, and especially the widespread use of DDT during the 1940s and '50s, the bugs all but vanished. The pests remained fairly prevalent, however, in other regions of the world including Asia, Africa, and Eastern Europe. In recent years, bed bugs have also made a comeback in the U.S. They are increasingly being encountered in homes, apartments, hotels, motels, health care facilities, dormitories, shelters, schools, and modes of transport. Other places where bed bugs sometimes appear include movie theaters, laundries/dry cleaners, furniture rental outlets and office buildings. Immigration and international travel have undoubtedly contributed to the resurgence of bed bugs in the U.S. Changes in modern pest control practice — and less effective bed bug pesticides — are other factors suspected for the recurrence.

DESCRIPTION AND HABITS.

Adult bed bug feeding on human

Bed bugs are small, brownish, flattened insects that feed solely on the blood of animals. The common bed bug, *Cimex lectularius*, is the species most adapted to living with humans. It has done so since ancient times. Bed bugs are mentioned in medieval European texts and in classical Greek writings back to the time of Aristotle. Other bed bug species prefer to feed on wild hosts, especially bats and birds.

Adult bed bugs are about 3/16-inch long and reddish-brown, with oval, flattened bodies. They are sometimes mistaken for ticks or cockroaches. The immatures (nymphs) resemble the adults, but are smaller and lighter in color. Bed bugs do not fly, but can move rapidly over floors, walls, ceilings and other surfaces. Female bed bugs lay their eggs in secluded areas, depositing 1, 2 or more eggs per day and hundreds during a lifetime. The eggs are tiny, whitish, and hard to see on most surfaces without magnification (individual eggs are about the size of a dust speck). When first laid, the eggs are sticky, causing them to adhere to surfaces. Newly hatched nymphs are straw-colored and no bigger than a pinhead. As they grow, they molt (shed their skin) five times before reaching maturity. A blood meal is needed between each successive molt. Under favorable conditions (70-80°F), the bugs can complete development in as little as a month, producing three or more generations per year. Cooler temperatures or limited access to blood extends the development time. Bed bugs are resilient. Nymphs can survive months without feeding and the adults for more than a year. Infestations therefore are unlikely to diminish by leaving premises unoccupied. Although *C. lectularius* prefers feeding on humans, it will also bite other warm-blooded animals, including dogs, cats, birds and rodents.

Dark spots of bed bug excrement on a mattress

Bed bugs are active mainly at night. During the daytime, they prefer to hide close to where people sleep. Their flattened bodies enable them to fit into tiny crevices — especially those associated with mattresses, box springs, bed frames and headboards. Bed bugs do not have nests like ants or bees, but do tend to congregate in habitual hiding places. Characteristically, these areas are marked by dark spotting and staining, which is the dried excrement of the bugs. Also present will be eggs and eggshells, the brownish molted skins of maturing nymphs and the bugs themselves. Another telltale though less frequent sign is rusty or reddish blood smears on bed sheets or mattresses from crushing an engorged bed bug. Heavy infestations

Bed bugs often congregate along seams of mattresses and box springs. Blackish spots are excrement.

may have a “buggy” smell, but the odor is seldom apparent and should not be relied upon for detection.

Bed bugs prefer to hide close to where they feed. However, if necessary, they will crawl several feet to obtain a blood meal. Initial infestations tend to be around beds, but the bugs eventually may become scattered throughout the bedroom, occupying any crevice or protected location. They also may spread to adjacent rooms or apartments.

BITES & CONCERNS.
Bed bugs usually bite people at night while they are sleeping. They feed by piercing the skin with an elongated beak through which they withdraw blood. Engorgement takes about three to 10 minutes, yet the person seldom knows they are being bitten. Bed bugs normally do not reside on people like head or body lice — immediately after feeding they crawl off and reside elsewhere to digest their meal. Symptoms after being bitten vary with the individual. Many develop an itchy red welt or localized swelling within a day or so of the bite. Others have little or no reaction, and in some people the reaction is delayed. Unlike flea bites that occur mainly around the ankles, bed bugs feed on any skin exposed while sleeping (face, neck, shoulders, back, arms, legs, etc.). The welts and itching are often wrongly attributed to other causes, such as mosquitoes. For these reasons, infestations may go a long time unnoticed, and can become quite large before being detected. The likelihood of bed bugs increases if the affected individual has been traveling, or had acquired used beds or furnishings before symptoms started to appear. Bed bugs also are suspect if you wake up with itchy bites you did not have when you went to sleep. Conversely, it is important to recognize that not all bites or bite-like reactions are due to bed bugs. Confirmation requires finding and identifying the bugs themselves, which often requires the help of a professional. (Other possible sources of irritation are discussed in University of Kentucky entomology fact sheet ENT-58; *Invisible Itches: Insect and Non-Insect Causes*).

A common concern with bed bugs is whether they transmit diseases. Although bed bugs can harbor pathogens in and on their bodies, transmission to humans is considered unlikely. Their medical significance is chiefly limited to the itching and inflammation from their bites. Antihistamines and corticosteroids may be prescribed to reduce allergic reactions, and antiseptic or antibiotic ointments to prevent infection. Though not known to carry diseases, bed bugs can severely reduce quality of life by causing discomfort, sleeplessness, anxiety, and embarrassment.

Conventional insect repellents, like those used to deter ticks and mosquitoes, do not appear to be effective against bed bugs. Attempting to avoid being bitten by applying insect repellent at bedtime is not recommended. Sleeping with the lights on is not likely to deter hungry bed bugs either.

HOW INFESTATIONS BEGIN.
It often seems that bed bugs arise from nowhere. The bugs are efficient hitchhikers and are usually transported in on luggage, clothing, beds, furniture, and other items. This is a particular problem for hotels, motels and apartments, where turnover of occupants is constant. Bed bugs are small, cryptic and agile, escaping detection after crawling into suitcases, boxes and belongings. The eggs are especially tiny and are usually overlooked. Acquiring secondhand beds, couches and furniture is another way that the bugs are transported into previously non-infested dwellings. Bed bugs also can be carried in on a person’s clothing or shoes, resulting in an infestation.

Once bed bugs are introduced, they often spread throughout a building. The bugs can travel from room to room or floor to floor either by crawling or via a person. Unlike cockroaches that feed on filth, the level of cleanliness has little to do with most bed bug infestations. Pristine homes, hotels and apartments have plenty of hiding places and an abundance of warm-blooded hosts. Thus, they are almost as vulnerable to infestation as are places of squalor.

When bed bug-like insects are found, it’s important to consider whether bats, swallows, chimney swifts, pigeons or other wild hosts are involved. Although similar in appearance, species of bed bugs that normally feed on bats and birds can be differentiated from those that prefer humans. Entomologists and knowledgeable pest control firms can make this determination.

Bed bugs often congregate along seams of mattresses and box springs. Blackish spots are excrement.

WHERE THEY HIDE.
Bed bugs can live in almost any crevice or protected location. The most common place to find them is the bed. Bed bugs often hide within seams, tufts and crevices of the mattress, box spring, bed frame and headboard. A thorough inspection requires dismantling the bed, and standing the components on edge so that upper and lower surfaces can be examined. Things to look for are the bugs themselves, and the light-brown, molted skins of the nymphs. Dark spots of dried bed bug excrement are often present along mattress seams or wherever the bugs have resided. Box springs afford many places for bed bugs to hide, especially underneath where the fabric is stapled to the wooden frame. Oftentimes the underlying gauze dust cover must be removed to gain access for inspection and possible treatment. Successful treatment of mattresses and box

springs is difficult, however, and infested ones may need to be discarded or encased in a protective cover. Cracks and crevices of bed frames should be examined, especially if the frame is wood. (Bed bugs have an affinity for wood and fabric more so than metal or plastic). Headboards secured to walls should also be removed and inspected. In hotels and motels, the area behind the headboard is often the first place that the bugs become established. Bed bugs also hide among items stored under beds.

Bed bugs are frequently found on the undersides of box springs.

During the early stages of a bed bug problem, the pests tend to congregate mostly in beds and other sleeping areas. As infestations grow larger, they tend to move beyond beds into other locations making control more difficult. Upholstered chairs and sofas should be examined above and beneath, especially seams, tufts, skirts and crevices. Sofas can be major bed bug hotspots, especially when used for sleeping. Like beds, they can be difficult to treat and may need to be discarded. Nightstands and dressers should be emptied and examined inside and out, then tipped over to inspect the woodwork underneath. Oftentimes the bugs will be hiding in cracks, corners, and recesses. Other common places to find bed bugs include: along and under the edge of wall-to-wall carpeting (especially behind beds and furniture); cracks in wood molding; ceiling-wall junctures; behind wall-mounted picture frames, mirrors, switch plates and outlets; under loose wallpaper; amongst clothing and clutter stored in closets; and inside clocks, phones, televisions and smoke detectors.

Bed bugs tend to congregate in certain areas, but it is common to find a single bug or some eggs scattered here and there. Persistence and a bright flashlight are requisites for success. A thorough inspection and treatment may take up to several hours. Some companies are beginning to use canines for detecting hard-to-find infestations. When properly trained, the dogs can be very effective. However at this time very few companies are using them due to the expense of training and maintaining such animals.

CONTROLLING INFESTATIONS.

Bed bugs are challenging pests to control. Since they can hide in so many places, treatments must be thorough and elimination is not always a certainty. In most cases, it will be prudent to enlist the services of a professional. Experienced pest control firms know where to look for bed bugs, and have an assortment of management tools at their disposal.

Bed Bugs hidden beside a recessed screw under a nightstand.

Owners and occupants have an important role and will need to assist the professional. Affording access for inspection and treatment is crucial, and excess clutter will have to be removed. Belongings strewn about rooms afford many places for bed bugs to hide, and impedes inspection and treatment. Some pest control firms want furniture moved away from walls and mattresses and box springs stood on edge before they arrive; others prefer to inspect first and move these items themselves. Since bed bugs can disperse throughout a building, it often will be necessary to inspect adjoining rooms and apartments.

Treatment Procedures.

Inspections and treatments must be very thorough

Infested and infestation-prone bedding and garments will need to be bagged and laundered (120°F minimum) since these items cannot be treated with insecticides. Another effective and efficient option is to place clothing, toys, shoes, backpacks, etc., in a clothes dryer set at medium to high heat for 10 to 20 minutes. This will kill all bed bug life stages and can be done alone or in conjunction with laundering. According to textile experts at the Drycleaning & Laundry Institute (Laurel, MD), most garments designated as 'dry-clean only' (e.g., cotton, wool, silk, linen, rayon, nylon, poly blends) will not be harmed provided they are dry before being placed in a clothes dryer at moderate (less than 160°F) settings. While dry cleaning procedures also kill bed bugs, there is risk of infesting the establishment when buggy items are de-bagged, tagged and sorted.

Items which cannot be put in a washer or dryer can sometimes be de-infested by wrapping in plastic and placing them outdoors in a hot, sunny location, closed vehicle, etc. for at least a day. If this method is attempted, packing fewer items per bag makes it harder for the bugs to find cooler places to hide. Monitoring with a thermometer is prudent, with a target internal temperature of at least 120°F. Bed bugs also will succumb to cold temperatures below 32°F, but the freezing temperatures must be maintained for several days. Consequently, throughout much of the country, heating tends to be a faster, more reliable option than chilling. Attempts to rid an entire dwelling of bed bugs by raising or lowering the thermostat will be unsuccessful, although some companies are having success using supplemental heaters.

Bed bugs often reside along baseboards. Photo show eggs, nymphs, and adults beneath carpet edge.

General housecleaning measures, such as vacuuming floors and surfaces, seldom reaches the places where bed bugs hide. Targeted vacuuming of infested harborages, however, can help remove some of the bugs before treatment with insecticides. Bed bugs and especially the eggs can be difficult to dislodge. Optimum results will be achieved by moving and scraping the end of the suction wand along infested areas such as seams and fabric folds of beds and sofas, and the perimeter edge of wall-to-wall carpets. Afterward, dispose of the vacuum contents in a sealed trash bag. Some pest control firms also employ commercial steamers or rapid freezing equipment to treat areas where bed bugs are found or suspected. Used correctly, they kill both bugs and eggs on contact. Neither method, however, affords residual protection against bed bugs which may have been missed.

At times it may be necessary to throw out infested items, especially beds and upholstered furniture. Knowledgeable pest control firms are able to advise clients on what can stay and what should go. When infested items are discarded, bagging or wrapping them prevents dislodgement of bugs en route to the Dumpster®.

While the aforementioned measures are helpful, insecticides are important for bed bug elimination. Professionals treat using a variety of low-odor sprays, dusts and aerosols. Baits designed to control ants and cockroaches are ineffective. Application entails treating all areas where the bugs are discovered or tend to crawl or hide. This may take hours of effort and follow-up visits are usually required.

Some bed bug species are parasites of bats or birds, and may bite people if the wild hosts are no longer available. If bat bugs or bird bugs are involved, roosting and nesting sites should be the primary focus of treatment and the animals excluded from the building.

Do I Have to Throw Out the Bed? Eliminating bed bugs from beds can be challenging. If there are holes or tears in the fabric, the bugs and eggs may be inside, as well as outside. There also are restrictions on how beds can be treated with pesticides. For these reasons, companies sometimes recommend that beds be discarded, especially when heavily infested or in poor condition. Another option is to encase both the mattress and box spring in a protective cover like those used for allergy relief. Encasements specifically designed to help protect against bed bugs are available through retail outlets or pest control firms. Once the cover is installed and zipped shut, any bugs which happen to be inside are entombed and eventually will die. Encasements also help protect newly purchased beds, and make it easier to spot and destroy any bugs residing on the outer surface during subsequent examination. Encasements will not, however, keep bed bugs from crawling onto a bed and biting a sleeping person.

Some companies treat seams, tufts, and crevices of bed components with insecticides, but they usually will not spray the entire mattress surface. They also should not spray bed sheets, blankets or clothing, which should be laundered. Vacuuming and steaming further help to eliminate bugs and eggs from beds, but afford no residual protection and may not kill bed bugs hidden inside the box spring or mattress. Fumigation is another way to de-infest beds and hard-to-treat items, but the procedure is not always available. In extreme cases, entire buildings have been fumigated for bed bugs. The service can be quite costly though, and involves covering the building in a tarp and injecting a lethal gas. Some companies also de-infest such items with specialized heating equipment.

PREVENTING INFESTATIONS. As difficult as it can be to eradicate bed bugs, it makes great sense to take precautions to avoid them in the first place. Householders should be vigilant when acquiring used furnishings, especially beds and couches. Curbside items should be avoided, and secondhand articles should be examined closely before being brought into the home, and perhaps laundered or placed in a dryer. Avoiding problems with bed bugs is most challenging in apartments, hotels and other places where there are ongoing opportunities for the bugs to be introduced. Preventative inspection by tenants, housekeeping staff, or pest control firms is the best way to uncover infestations in their initial stages when they are easiest to control.

Discarded beds and couches might be infested and should be left alone.

Concerned travelers may want to get in the habit of checking their bed for signs of bed bugs, a common practice in the past. This would entail examining the bed sheets and upper and lower seams of the mattress and box spring, especially along the head of the bed. Some professionals also suggest removal and examination behind the headboard, a frequent hiding place for the bugs in hotel rooms. Headboards are heavy and cumbersome, however, and untrained persons should not attempt removal themselves. If bed bugs are discovered, travelers can request another room, preferably in another area of the building. Vigilant travelers may also want to elevate suitcases off the floor on a luggage stand, tabletop or other hard surface. Should travelers experience itchy welts suggestive of bed bug bites during their stay, it would be prudent upon returning home (before unpacking) to place all clothing in disposable plastic bags and directly into the washer and/or dryer. Inspecting or vacuuming luggage upon arrival home is less useful since it's hard to spot bed bugs inside a suitcase. The suitcase itself can either be treated or discarded.

The incidence of bed bugs in the United States is increasing to the point where vigilance by all is a prudent practice. Familiarity can help to avoid infestation, or at least prompt earlier intervention by a professional.

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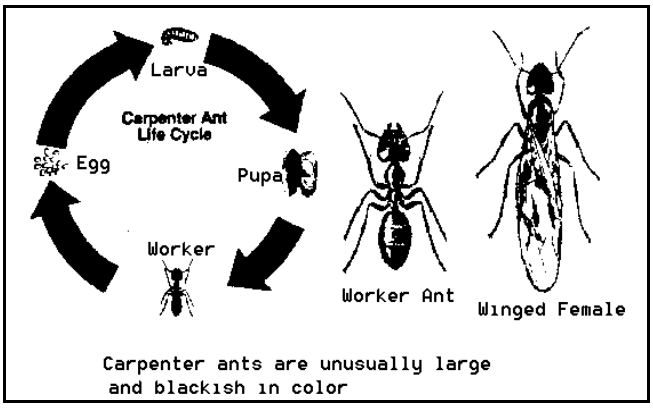
UK COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY — COLLEGE OF AGRICULTURE

CARPENTER ANTS

Michael F. Potter, Extension Entomologist

"I keep seeing big, black ants in my house, especially in the kitchen and bathroom. I spray the ones I see, but they keep coming back. What kind of ants are these, where do they come from, and how do I get rid of them?"

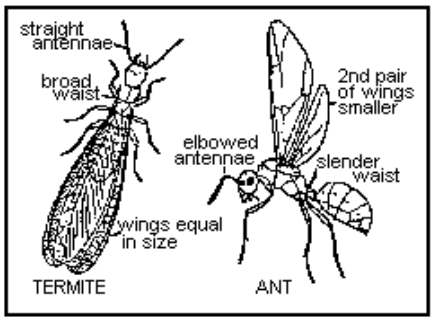
These are the questions typically asked by homeowners who have carpenter ants. Carpenter ants are one of the most common ants found in Kentucky. They are also one of the most difficult to control. This publication will help you determine if you have carpenter ants, and provide tips on how to control them.



Carpenter ants, vary in size and color but are usually large (1/4-1/2 inch) and blackish. Occasionally, swarms of winged carpenter ant reproductives will emerge inside a home. Carpenter ant swarms usually occur in the spring and are a sure sign that a colony is nesting somewhere inside the structure.

Winged carpenter ants can be distinguished from termites by their larger size and shape of their antennae, waist and wings.

Besides being objectionable by their presence, carpenter ants damage wood by hollowing it out for nesting. They excavate galleries in wood which have a smooth, sandpapered appearance. Wood which has been damaged by carpenter ants contains no mud-like material, as is the case with termites. Shredded fragments of wood, similar in appearance to coarse sawdust, are ejected from the galleries through preexisting cracks or slits made by the ants. When such accumulations are found (typically containing dead ants and bits of insects which the carpenter ants have eaten), it's a good indication that a carpenter ant nest is nearby. Oftentimes, however, the excavated sawdust remains hidden behind a wall or in some other concealed area.



How to tell winged termites from ants

Carpenter ants nest in both moist and dry wood, but prefer wood which is moist. Consequently, the nests are more likely to be found in wood dampened by water leaks, such as around sinks, bathtubs, poorly sealed windows/ door frames, roof leaks and poorly flashed chimneys. Nests are especially common in moist, hollow spaces such as the wall void behind a dishwasher, or in a hollow porch column. Since there often will be no external signs of damage, probing the wood with a screwdriver helps reveal the excavated galleries. Another technique for locating hidden nests is to tap along baseboards and other wood surfaces with the blunt end of a screwdriver, listening for the hollow sound of damaged wood. If a nest is nearby, carpenter ants often will respond by making a " rustling" sound within the nest, similar to the crinkling of cellophane.

Carpenter ants may establish nests in a number of different locations. It is important to realize that these locations can be either *inside or outside the structure*. Carpenter ants actually construct two different kinds of nests: **parent colonies** which, when mature, contain an egg-laying queen, brood and 2000 or more worker ants, and satellite colonies which may have large numbers of worker ants but no queen, eggs or young larvae. The

carpenter ants inside a home may have originated from the parent colony or from one or more satellite nests. For example, the ants may be coming from the parent nest located outdoors in a tree stump, landscape timber or woodpile, or from one or more satellite nests hidden behind a wall in the kitchen or bathroom, or perhaps from wood dampened by a roof leak in the attic.

The extent and potential damage to a home depends on how many nests are actually present within the structure, and how long the infestation has been active. Although large carpenter ant colonies are capable of causing structural damage, the damage is not normally as serious as that from termites. In some cases, the damage may be relatively insignificant, but this can only be determined by locating and exposing the nest area.

Control

The best way to control carpenter ants is to find and destroy the nests. This is often easier said than done. Recent studies have shown that carpenter ants follow distinct scent trails between the satellite colonies and the parent nest. Carpenter ants also rely on scent trails to recruit their nestmates to food. With patience and a little effort, homeowners can use this trailing behavior displayed by carpenter ants to locate and eliminate the nests.

When carpenter ants are observed, **don't spray them**; instead, feed the ants small dabs of diluted honey placed onto the back (nonsticky side) of pieces of masking tape. The best time to do this is late at night since this is when carpenter ants are most active. After the ants have fed on the honey, follow them on their journey back to their nest. **Be patient**-- eventually the ants will disappear behind a baseboard, cabinet, or into some other concealed location such as the hollow space (void) within a wall, door casing, or porch column.

Treat wall voids and other hidden spaces where ants are entering by carefully drilling a series of small (1/8 inch) holes and puffing boric acid (available at most hardware stores) into the suspected nest areas. The boric acid powder will disperse in the hidden void and contact and kill the ants. If you suspect the nest is in a wall, drill and treat at least 3-6 feet on either side of where ants are entering so as to maximize the chances of contacting the nest. Carpenter ants prefer to travel along wires, pipes and edges. If you suspect the nest location is in a wall, also treat behind pipe collars and behind --**not in**-- the junction box for electrical switch plates/receptacles. **NEVER SPRAY LIQUIDS OR INSERT METAL-TIPPED DEVICES AROUND ELECTRICAL OUTLETS!**

As noted earlier, carpenter ants seen in the home may actually be nesting outdoors, foraging indoors for food and/or moisture. Consequently, the homeowner may end up following the ants they have baited with honey out of the house and into the yard, possibly to a nest located in a stump, or under a log or railroad tie. Once the outdoor nest is discovered, treatment can be performed by spraying or drenching the nest with an insecticide such as carbaryl (Sevin), diazinon, or chlorpyrifos (Dursban). If outdoor nests are suspected, the homeowner should also inspect around the foundation of the building at night with a flashlight, especially around doors, weep holes and openings such as where utility pipes and wires enter the structure. The baiting approach using honey can also be used to trace carpenter ants which are foraging outdoors back to their nest.

Tips When Calling a Professional

Oftentimes, it will be difficult or impossible to locate and destroy the carpenter ant nest(s). In this case, the homeowner may wish to call a professional pest control operator. Pest control companies approach carpenter ant problems differently. Some attempt to locate the nest and selectively treat only in specific areas. Other companies take more of a "shot-gun" approach, drilling and dusting as many potential wall voids and nesting sites as possible. Most companies also apply a perimeter spray treatment around the outside foundation of the home in an effort to temporarily prevent reinvasion. The approach which should not be used is simply to spray each month where carpenter ants are seen. If no effort is made to locate the nest(s) or probable nest areas, the problem will most likely continue.

Typically, there will be wide differences in price depending on the company and amount of effort expended. Since carpenter ant problems are not always solved on the first attempt, the type of guarantee and reputation of the company should be factored into the purchasing decision.

Carpenter Ant Prevention

A number of steps can be taken by homeowners to reduce the potential for future carpenter ant problems.

1. Correct roof leaks, plumbing leaks and other moisture problems which will attract carpenter ants.

2. Eliminate wood-to-ground contact such as where landscaping has moved soil or mulch up against the wood siding of a home.

3. Clip back tree limbs and vegetation touching the roof or siding of the house. Limbs and branches serve as

"bridges" between carpenter ants nesting in a dead tree limb and the structure.

4. Seal cracks and openings in the foundation, especially where utility pipes and wires enter from the outside.

5. Stack firewood away from the foundation and elevate it off the ground. Never store firewood in the garage or other areas of the home, as firewood is a prime nesting area for carpenter ants.

ENTFACT-640

THERMAL DEINFESTATION OF HOUSEHOLD ITEMS

Michael F. Potter, Urban Extension Entomologist

The Entomology Department often receives calls from clientele asking if anything can be done to eliminate insects living within foods, furnishings, and other household items. In many cases, the culprits are wood-boring powderpost beetles, distinguishable by the fine, flour-like powder streaming from their small, round emergence holes. Other cases involve insect infestation of fabrics, crafts, animal trophies, or stored food items.

In some areas of the country, especially further south, professional pest control firms commonly fumigate such infestations using lethal gases. Not so, here in Kentucky, where there simply is not enough demand to justify the cost of maintaining the necessary fumigation equipment, licenses, and insurance. Insecticide sprays typically are of little use, since the insects are often living deep within the infested item where sprays cannot penetrate. Risk of staining and/or contamination further negates the use of insecticides on some fabrics, not to mention, food items. So what can the homeowner do, other than discard the item or tolerate the infestation?

One alternative is to chill or heat the item to a temperature lethal to the pests living within. Insects are unable to tolerate sudden, unanticipated extremes of hot and cold. In fact, most insects, being cold-blooded, have rather narrow temperature ranges within which they can survive. Heating and chilling deinfestation methods have been used by museums, furriers, and the food processing industry for years. By following the steps outlined below, homeowners will be able to salvage that piece of furniture, picture frame, or bamboo basket riddled with powderpost beetle holes, or that delicate wool craft item or animal trophy infested with clothes moths or carpet beetles. The techniques can even be used to kill grain beetles and meal moths in those 50 pound bags of bird seed or pet food some folks cannot bear to throw out.

Cold Treatment

This method is especially useful for deinfesting chairs, dressers, picture frames, and other wood items infested with powderpost or other wood-boring beetles. It requires the use of a freezer cold enough to maintain the infested item at minus 4 degrees Fahrenheit (minus 20 degrees Centigrade). Many home freezers attain such temperatures. Items too large to fit in a household freezer can be placed in a commercial freezer or "meat locker." (Check the yellow pages under "cold storage," or with your local supermarket.)

Chilling Procedure

1. Wrap the infested item in a cloth bed sheet.
2. Place sheet-covered items in a large polyethylene bag (e.g., trash or dry-cleaning bag), or simply wrap them in polyethylene and tape the seams. Force as much air out of the bag as possible.
3. Place bagged item in freezer (- 4 degrees F / - 20 degrees C) for seven days.
4. After seven days, carefully remove item from freezer.
5. Before removing item from polyethylene bag, allow it to gradually warm up again to room temperature. This may take up to 24 hours for larger items. This step ensures that any condensation forming will occur on the outside of the polyethylene bag, rather than on the item itself.

The above chilling procedure generally is effective in killing all pest life stages, including eggs. Adverse effects seldom occur to furniture or their veneers and finishes. Wood inlays or 'mother-of-pearl', however, may be affected. Infested rugs, woolens, fabrics pet food and animal trophies can also be treated in this manner, again with negligible adverse effects. However, extra care should be taken when handling crafts and other fragile items immediately after freezing and before they have returned to room temperature.

Heat Treatment

This method is especially useful for rapid deinfestation of small wooden objects (e.g., wood carvings, bamboo baskets) infested with powderpost beetles. It can also be used to kill grain beetles and other stored product pests in loose or packaged foods. Heating is not

recommended for fabrics, glued items, or oil paintings. Lethal temperatures can conveniently be attained using a standard household oven, but heated items should be carefully monitored.

Heating Procedure

1. Place infested item directly on center rack inside of oven.
2. Insert a pan (e.g., cookie pan) filled with water on the rack below. The purpose of the water is to maintain high relative humidity and minimize drying of the item during heating.
3. Set oven control to lowest temperature setting (warm). In most ovens this produces a temperature of about 150 - 170 degrees F. A meat thermometer or temperature probe, placed inside the oven, can help ensure that the temperature does not exceed this range. To keep the oven from getting too hot, it may be necessary to prop the oven door open a bit.
4. Forty-five minutes to one hour of heating is sufficient for most infested items. Wooden objects several inches thick may need to be heated a bit longer. Turn off the heating element and allow items to remain inside the heated oven for one additional hour or until cool enough to handle.

Microwaving is not recommended since it is impossible to know how much time is needed to achieve lethal temperatures and poses a greater risk of damage to the item.