Kitchen Pests – Beetles, Mites, Moths, Cockroaches, Silverfish, Book Lice, Ants
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Home and Family Series

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A number of different types of insects can infest kitchens. Of these, cockroaches are probably the hardest to control. However, once any insects are found in stored food or in cupboards, it is best to start control measures immediately. Waiting until later will simply make the problem worse.

This bulletin covers control measures for the most common kitchen pests found in Michigan. In addition, some other insects found in other areas of the home have been included. To rid your home of a particular pest, follow the housecleaning instructions given for the various pests before using an insecticide. When using a chemical, read the information about it in this bulletin and on the product label. Names used in this bulletin are common names and are present in the list of ingredients on the label. The product label's directions have the force of law, so follow them carefully. Concentrations and application procedures given are the result of careful research and are the most efficient for the pest concerned. Carefully following instructions is a "must" if good control is to be obtained and the poisonous hazards of insecticides minimized.

Kitchen Pest Control Clean-Up

The best chemicals to use to control kitchen pests may vary; however, the first step is a thorough clean-up. Inspect all foodstuffs that could be infested. It is better to discard infested foodstuffs than to try to kill the insects found in them.

Clean cupboards thoroughly using a vacuum cleaner and a strong soap solution.

Place all foodstuffs in tightly sealed containers. Plastic and paper bags will not prevent infestation.

If after all this, the infestation is found to be widespread, with a good chance that some insects were left undiscovered, use an insecticide as recommended here.

Grain and Flour Beetles

There are three common beetles that infest stored grains, flour, cake mixes and other flour products. These are the saw-toothed grain beetle, the red flour beetle and the confused flour beetle. The saw-toothed grain beetle is about 1/8" (3 mm) long, dark red, and has a number of spines on the side of the prothorax, the body segment behind the head. This beetle feeds on flour, grains, dried nuts, dried fruits, and many other stored products.

Saw-Toothed Grain Beetle

Confused Flour Beetle

The red and confused flour beetles look very similar. They are slightly larger than the saw-toothed grain beetle (4 mm). These mostly infest stored grain and flour products. They can be found in flour, cake mixes, macaroni, spaghetti and cereals.

A fourth grain beetle is found in Michigan homes. This is the foreign grain beetle. This looks very similar to the saw-toothed grain beetle, except it lacks the saw-teeth on the side of the prothorax. Surprisingly, this beetle is not usually found in stored grains. It is more commonly encountered feeding on mold growing on moist grain, and in new houses on new cabinets made of particle board. The particle board, when new, may still be damp and mold may grow on the plant materials used in its construction. These beetles can live on this and are often quite common around bathroom vanities and kitchen cupboards. So far, we have not seen this beetle infesting stored products, but given the proper conditions, it could do so.

To control grain and flour beetles, start with a thorough check of all stored foodstuffs. Once the infested materials are found and discarded and other goods placed in insect-proof containers, thoroughly clean the cupboards. If the infestation was extensive and many beetles were found throughout the kitchen, use an insecticide to control those insects not collected by the clean-up. Malathion, Baygon, or an aerosol containing methoxychlor, piperonyl butoxide plus pyrethrins are recommended. Remove all foodstuffs when spraying and keep all foods in containers after spraying. Use air-tight, plastic containers, ground glass or rubber-sealed canisters, or tightly closing tins for storage. Boxes, plastic bags, or paper bags cannot be sealed tightly enough to exclude these pests.

Weevils

There are two true weevils, as well as a bean weevil, that are encountered in the home. The true weevils are characterized by a long snout on the head. The rice weevil is about 3 mm long, dark red, with four pale spots on the upper surface. The granary weevil is slightly larger (4 mm), the same body shape and entirely dark reddish-brown. Both of these weevils infest whole grain rice, corn, wheat and beans.

The bean weevils are not true weevils, but are members of the closely related bean weevil family. Their body shape is more round than the rice and granary weevils and they do not have the protruding snout of the true weevils. The common bean weevil is about 1/8 inch (3 mm) long with the upper surface mottled shades of gray. These feed on dried beans, leaving perfectly round holes in the beans.

Very often, beans are harvested from the garden which look perfectly good. However, there can be bean weevil larvae present inside. These larvae can continue to develop while the beans are in storage, with adults emerging during winter. Many a housekeeper has been dismayed to find a good supply of beans ruined by this insect. Heating the beans to 175°F for ½ hour prior to storage will kill any larvae present and arrest any further development. A small number of dried larvae in the beans does not constitute any hazard to health.

If granary or rice weevils are found in the kitchen, a search of all possible food sources should uncover the source of infestation. Disposal of infested grains and a thorough cleanup of the area should eliminate them. If many weevils were found, or if the infestation was extensive, an insecticide such as malathion or Baygon can be used.

For bean weevil control, all that is required is to remove the infested beans and clean up the storage area. This pest does not infest as wide a range of stored goods and an insecticide is not recommended.

Larder and Carpet Beetles

The larder beetle infests stored products that contain a fraction of animal protein. Thus, they are most commonly found in the home infesting bulk-stored dry pet food. The larva of the larder beetle is wormlike, about ¼ inch (6 mm) long, and covered with long hairs. The adult is about the same length, black with an olive brown band running across the base of the wing covers.

A number of carpet beetles also infest stored products. Most common are the black carpet beetle, varied carpet beetle, and the common carpet beetle. These beetles and their larvae are described in Extension Bulletin E-456, Dermestid Beetles, Larder and Carpet Beetles, which is available at your local Cooperative Extension Service Office. Like the other stored-grain pests, control must start with a thorough cleanup of the infested foods. After cleanup, malathion or an aerosol containing pyrethrins can be used to control beetles and larvae not removed in the clean-up.

Cigarette and Drug Store Beetles

Both the cigarette beetle and drug store beetle are small, brownish red beetles that chiefly infest dried plant materials. They can be found in red pepper and other spices, tobacco, and other dried foods. The larvae are whitish C-shaped grubs with the adults being convex beetles about 1/8 inch (3 mm) long.

Control of both of these pests is fairly easy, once the source of infestation is found. Disposal of the infested foodstuff, with a thorough clean-up is usually all that is required for control. However, if many beetles are found throughout the kitchen, insecticides such as malathion, rotenone or Baygon can be used.

Meal Moths

There are two or three types of moths and their larvae that can infest stored grains and other foodstuffs in the kitchen. By far the most common of these is the Indian meal moth. The adult Indian meal moth has a wingspread of about ½ inch (12-14 mm). The wings and body have a beige base color with the wing tips mottled gray and brown. The larvae are cream colored caterpillars often with a pinkish cast

to the skin on the upper surface of the body. When full grown, the larvae measure about 5/8 inch (15 mm). An infestation can usually be suspected when the adults are seen flying to lights in the kitchen. At that time, a search for the larvae is needed to discover the source of infestation. Larvae can infest stored grains such as cornmeal and other ground grains, bird seed, dried fruit, dog food, and many other high protein food sources. The larvae are usually found within webbing over the surface of the food they are infesting. This unsightly, spiderlike silk is a sure indication that a source of the infestation has been found.

Indian Meal Moth

A second meal moth found in the home is the Mediterranean flour moth. This moth appears similar in body shape to the Indian meal moth, with the wings banded gray and dirty white. The habits of this species are similar to those of the Indian meal moth, though it is encountered much less frequently.

Like all other stored food pests, the first step in control is the disposal of all infested foodstuffs. Follow this with a thorough vacuuming and soap and water before use of a chemical. For meal moths, it is usually a good idea to follow the clean-up with an insecticide treatment. This is because the larvae often migrate away from the food source when they are ready to enter the pupal stage. The larvae select a crack or crevice in which to spin a small silky cocoon. The adults then emerge from this place. A light insecticide spray to the cupboards and surrounding areas will help control these emerging adults. Two suitable insecticides for meal moth control are malathion and Baygon. A light spray is all that is needed and care should be taken that no food comes in direct contact with the insecticide-treated surface.

Grain Mite

Mites

Mites are very small insect relatives that sometimes infest stored foods. Both the grain mite and cheese mite are about .3 mm to .66 mm (1/64 inch to 1/8 inch) long with a pearly white body. These can infest flour, stored cereal products, cheese and dried foods. Home cured meat can also become infested by mites. If large numbers of mites are present, a dermatitis condition can develop from handling infested food. Control with a thorough clean-up followed by a spray of malathion to the storage area.

Cockroaches

Cockroaches are among the most difficult household pests to control. Except for periods of warm weather when they may migrate from house to house, domestic cockroaches in Michigan spend their entire life inside buildings. Usually they are found in basements, bathrooms and kitchens where they feed upon a wide variety of foods, including cereals, sugar-containing foods, meats, cheese, even beer and leather.

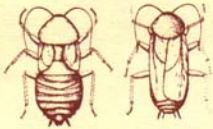
Cockroaches have long been companions of man. The old Romans called them "lucifuga" because of their habit of running away from light. The Latin word "Blatta" means cockroach. Likewise, the word cockroach no doubt can be traced to the Spanish word "cucaracha." The exact origin of our domestic species is disputed, but many are tropical forms and now are widely distributed throughout the world by commerce.

In our area, we are commonly bothered by five different species of roaches. Four of these are domestic cockroaches, while the fifth is at home outdoors, and only occasionally gets into the house.

American Cockroach

The American cockroach, our largest, may grow to 1½ inches (35 mm), is reddish-brown to brownish with light markings on top of the thorax (the body division that bears the wings and legs) and matures in about seven months. It prefers damp areas such as basements, and may be found around pipes, sewage systems, and drainage systems.

The Oriental cockroach is black, 1¼ inches (30 mm) long when full-grown and has short wings, the wings of the female being only rudimentary. It may



Oriental Cockroach ♀

Oriental Cockroach ♂

take as long as 12 months to mature, and is a relatively sluggish insect. Living on filth, it travels along sewage systems into homes. It also enters buildings readily through ventilators, broken foundations, and under poor fitting doors. It prefers damp and cool areas, especially basements and damp crawl spaces. In kitchens, it can be found under sinks and refrigerators if those areas are damp.

The German cockroach is smaller, slightly over ½ inch (12-15 mm) long, brownish-tan with two black parallel lines just behind the head. This species prefers high relative humidity and warmth. It is

German Cockroach

quite active and can easily migrate throughout buildings. Thus, it is a major pest in apartment buildings. It prefers a kitchen where it can thrive on poor housekeeping. It can mature within 40 days and in most heated buildings, can develop throughout the year.

The brown-banded cockroach is a fairly recent introduction, first found in the U.S. in Florida in 1903. It has since spread throughout the South and into some areas of the northern U.S., being fairly common in Michigan. While it normally congregates, individuals can wander throughout the house, hiding in furniture, television sets, radios, behind pictures hung on the wall, or other secluded locations, especially those high off the floor. It is slightly under ½ inch (10-12 mm) when mature, and is colored a straw brown. Two brownish bands are located on the wings of the adult, one where the wings join the body, and one a little further back toward the wing tips. The term "brown-banded," however, describes the immature form more accurately than the adult, since the bands are conspicuous on the abdomens of the nymphs. This species prefers temperatures over 80°F, and takes up to 150 days to mature at this temperature.

Brown-Banded Cockroach

Pennsylvania Wood Roach

Another roach often found invading the home in the spring is the Pennsylvania wood roach. This species lives outdoors and is not as fast nor wary as its house-dwelling relatives. However, if brought into the house under the bark of fireplace wood, it can exist in the home, living on food in the kitchen. The males of this species have long wings and may fly for short distances. The females have short wings and are usually found around houses only in wooded situations. The adults are about ¾ to 1 inch (20-25 mm) long and are colored a drab brown. They require one year to mature, however, as they do not breed indoors; they are more a nuisance than a pest.

Except for their smaller size and undeveloped wings, immature forms of cockroaches resemble the adults.

Roaches lay their eggs in large numbers within a single capsule which contains from 12 to 32 eggs, depending on the species. The egg compartments within the capsule are indicated by grooves on the outside. The egg capsules range in color from dark brown to tannish brown and are somewhat bean-shaped. They are usually deposited in out-of-the-way places such as on the underside of shelves, inside cupboard corners, bottoms of drawers, and similar hard-to-see areas. Egg capsules from which the eggs have hatched will float, while those that have unhatched eggs will usually sink in water.

Cockroach Control Clean-up

Cockroach control requires a two-pronged attack. Chemical control alone will not control the pests. Only when cleanliness and other preventative measures are used along with chemicals can one eliminate these insects from a dwelling. The following steps will help protect against infestations of cockroaches.

1. Keep food cleaned up in cupboards, and behind stoves, refrigerators and other places. Kitchens must be immaculately clean and free of dampness. THIS IS A MUST. Cockroaches multiply fastest where there is ample food accessible and suitable moisture.

2. Eliminate all cracks behind baseboards by caulking with plastic wood, putty, or other suitable materials. Repair cracks and holes in plaster. Caulk openings around pipes and furnace flues. Your aim is to eliminate as many hiding places as you can and to keep roaches from travelling from the basement to upper floors or from one room to another.

3. Keep foundations, foundation sills, cracks in outside walls and areas around windows and doors well caulked or tight fitting and in good repair. This is absolutely necessary if you are to keep cockroaches out of your house.

Chemical Control—Indoors

Spray or dust where cockroaches hide or locate their runways. Enter dark rooms with a flashlight to locate infested areas. Likely hiding places are around pipes or conduits, behind poorly fitting baseboards and moldings, on the undersides of tables and chairs, on all kinds of shelves, inside equipment motors, inside television sets and radios, behind mirrors and around kitchen sinks and cupboards. Remember that cockroaches prefer to hide where they can have three sides of their body touching a surface. Thus, the tighter the crack, the more likely it will have cockroaches hiding in it.

For spraying indoors, use diazinon, malathion, Baygon or rotenone. Diazinon can be purchased premixed in an oil solution and is an effective chemical. Malathion mixed in oil or in water is also commonly used.

Important limitations of these materials include: 1) Do not treat entire walls or floors, only small areas of baseboards, cabinets and other places where cockroaches occur; 2) Do not contaminate water, food, dishes or utensils with them; 3) Dry all treated surfaces before allowing children or pets on or near them; and 4) See page 8 for general warnings concerning the use of insecticides.

In addition to applying a residual spray to runway surfaces, a pyrethrum spray may be used. This spray should be used to flush out cockroaches from hiding places after the residual spray has been applied. This helps assure that the cockroaches will contact the active residual insecticide. The use of pyrethrins alone, however, seldom gives effective control.

See **WARNING** section for the degree of toxicity of each type of material. When treating dresser drawers, clean the insides thoroughly. Apply sprays or dusts only to the outside surfaces, except the front, where exposure to light limits effective control.

Boric acid powder may also be used to supplement insecticide treatments. When applied to cockroach runways in cupboards and other out-of-the-way places, boric acid powder abrades the waxy outer layer of the cockroach's body. This causes the roach to lose body fluids by evaporation, causing death. This method is effectively used where human activity will not disturb the dusting of boric acid powder. For this reason, this method is not useful throughout the entire kitchen, but can supplement other methods.

NOTE: Before using chemicals, remove all types of food, dishes and utensils. Do not replace until treatments have dried. If desired, cover shelves with shelf paper to protect food and dishes. This, however, tends to reduce the area of active insecticide, and should be done with that consideration in mind.

Chemical Control—Outdoors

When cockroaches are known to enter from the outside, spray foundations thoroughly with an insecticide such as diazinon or malathion. Take special care to spray the sides and base of steps thoroughly. With the same materials, spray the area surrounding the house up to ten feet away from the foundation. Keep children and pets away from sprayed areas or do not apply such chemicals. Repeat treatments as needed.

NOTE: Outside treatment is suggested only to help control and possibly prevent migration from one building to another. For satisfactory control of any roach, it is absolutely necessary to use good cleaning methods and apply the inside treatments.

European Earwig

Earwigs

The European earwig is most commonly an outdoor pest, frequently defoliating flowers and vegetable garden seedlings. However, since it often enters homes, its control is included here. The earwigs are instantly recognized by the forceps-like appendages at the tail end of the body. The European earwig is ¾ inch (18-20 mm) long when full-grown and colored dark reddish-brown. The hind flying wings are folded up under a leathery forewing so the adults appear very similar to the unwinged nymphs.

Earwigs can enter homes in summer and can also be brought in concealed in fresh produce. Once indoors, they assume habits similar to cockroaches except that they cannot breed indoors. In the home, they remain near the kitchen feeding on garbage and food scraps. Like cockroaches, they are active at night.

Control of earwigs should be conducted both indoors and out. Outside, earwigs can be controlled where numerous, by leaving burlap bags or newspapers on the ground where they are known to occur. They will hide under these by day and can be destroyed fairly easily. Possible entry ways into dwellings around doors, basement windows and foundation sills should be made tight fitting or caulked. Foundations and outside areas can be sprayed with an insecticide such as Sevin (carbaryl). Inside the house, diazinon or malathion can be used much as in cockroach control to eliminate them.

Silverfish

Silverfish

The silverfish and firebrats are present-day members of a very primitive group of insects. The very first insects no doubt looked very similar to these. The adults are wingless, about ½ inch (10-12 mm) long and have three long bristles on the tail end of the body. The silverfish is pearly white. It prefers damp places in basements and porches. The firebrat is mottled with brownish and black scales and prefers much higher temperatures, multiplying rapidly at temperatures around 100°F.

Both silverfish and firebrats feed on vegetable matter high in carbohydrate content. Thus, they cause most damage to book bindings, starched

clothing, rayon fabrics, wallpaper paste and stocks of paper on which paste or glue is present. New houses may become infested with them before the plaster and woodwork are thoroughly dry. Basement food incinerators attract them and act as a constant source of food, often making their control more difficult. They take from 3 to 24 months to mature, depending on conditions, and may live as long as 3½ years.

Control requires preventative measures similar to those listed under cockroaches. After possible food sources are eliminated, an insecticide treatment using diazinon, Baygon or Ronnel can be applied. Follow the precautions on page 8 and spray only where silverfish are found.

Book Louse

Book Lice

The common book louse is wingless, light straw colored, and only 1/25 to 1/12 inch (1-2 mm) long. It looks similar to aphids (plant lice) but is smaller and has chewing instead of sucking mouth parts.

Book lice may be found in all parts of the home; frequently on furniture, clothing, beds, walls, in kitchen cupboards, and in or near books. They also infest stored foods such as flour and ground grains. They require warm, damp conditions and may be numerous in new houses.

Book lice do little damage to household furnishings, but feed on molds, which are probably their most important food source, and on dead vegetable and animal matter. They damage the paste on book bindings and wallpaper, and may be found on stored cereals.

For best control, dry out the infested area. Book lice are seldom found in a heated and fairly dry building. Insecticides are seldom needed, but if required, a pyrethrin or diazinon spray can be used. Use a pyrethrin aerosol on items such as books. To treat items such as beds and furniture, diazinon can be used. However, remember that the insecticide can stain fabric and should be used with caution.

Flies

Two types of small flies occasionally appear in the kitchen area. The first are the various species of fruit or pomace flies. These are from 1/16 to 1/8 inch (1-3 mm) long, straw yellow with black markings, and fairly bristly. The larvae or maggots develop in decaying vegetable matter, feeding on the yeast growing on the over-ripe fruit or vegetable. In the home, they are found near decaying potatoes, fruits or flower bulbs. Disposal of the decaying item is sufficient to eliminate them. A pyrethrin spray is all that is required to eliminate the adults.

Fruit Fly

A second type of fly found in the kitchen is the drain or moth fly. These flies are 4-5 mm (1/6 to ¼ inch) long, densely hairy, and hold their oval wings rooflike over their abdomen. Their flight is weak, but they are very agile runners. The larvae of these flies develop in sink traps, mostly in drains with stagnant water, much of the time. Thus, they are common in laundry tub and basement floor drains, as well as in kitchen sinks. The larvae feed on sewage and filth. Control is quite easily accomplished for this insect. To kill the larvae, pour boiling water into the offending drain. A pyrethrin spray can be used to control adults if needed. **DO NOT** put any insecticide into drains.

Ants

Many different types of ants cause problems to homeowners in Michigan. Most ants, except the large black carpenter ants, are very small (1/16 to ½ inch long). They may be brown, red or black or combinations of these colors. Field ant mating cycles are such that most species invade homes in the spring and fall rather than in the middle of summer. These invasions of winged mating forms are called swarms.

Ant Swarmer

To control ants, first discover where the ants enter the kitchen or at least from what direction or by which path they finally reach the kitchen cabinet. Usually, this can be determined by placing honey or bacon on the counter and allowing the ants to find it. The ants will set up a trail to the food, and judicious spot treatments with a pesticide will reduce the nuisance considerably.

Most nuisance ant species nest outdoors and only occasionally enter the home in search of food. Thus, a chemical barrier outside is effective in keeping ants from entering the dwelling. Use diazinon, Sevin (carbaryl) or malathion sprays to the foundation and the immediately surrounding area to eliminate ant entry in the home. Indoors, spot treatments of pyrethrins or malathion are effective.

Kinds of Insecticides

For good insect control, learn how to use insecticides (chemicals) effectively. Most are available in several formulations, each with its own use for control in and around houses.

Those discussed are the more common formulations. For others, read the label on the container for instructions on use.

Emulsifiable Concentrates

Emulsifiable concentrates are liquids. They must be mixed with water, turning it milky (see emulsion). They are generally not used inside buildings. Apply them outdoors both to plants and around foundations. Be careful when applying to tender flowers and shrubs for they may injure these plants. In concentrated form, emulsifiable concentrates are dangerous if spilled on clothing and skin. Change clothing. Check the insecticide label to determine whether protective clothing should be worn during application.

Solutions

Solutions are also liquids. They differ from emulsions in that they are used as bought and ARE NOT MIXED WITH WATER. They are made with refined (deodorized) kerosene or similar materials, plus an insecticide. Use them indoors to control household insects. Do not apply to plants since they will cause severe injury. Like emulsifiable concentrates, solutions are dangerous if spilled on clothing and skin. Immediately wash off with soap and water and change clothing. For other instructions, see Emulsifiable Concentrates above.

Wettable Powders

These are similar to dusts (below) but they contain a higher percentage of chemical. For some purposes, they are used as bought in place of dusts. However, wettable powders are usually mixed with water and applied as sprays. The spray is seldom used indoors, but is useful when applied outdoors. Avoid breathing or getting powder (or spray) on the skin. Use masks and protective clothing, especially if applying dangerous materials over a long period of time.

Dusts

Dusts are dry powders which normally contain a lower percentage of insecticide than wettable powders. They are used as bought and ARE NOT MIXED WITH WATER. Use them both indoors and outdoors as previously specified.

Aerosols

Aerosols are liquids held under pressure in a container. When released, usually by pressing a button, some form a gas, others form a spray. "Gas-producing" types are used for control of flying insects (such as flies) and liquid types for those that crawl or run on floors (such as ants). Choose to fit your needs.

Available Equipment

The compressed air sprayer, the quart-sized sprayer, the aerosol, and the paintbrush are probably the best kinds of equipment for the homeowner to use against household insects.

Each type of equipment listed below has good features and disadvantages. Careful study of your insect control jobs will help you buy and use the best type.

Compressed Air Sprayer

The water capacity of a compressed air sprayer is usually one to four gallons. Air is pumped into the tank, forcing the spray out when the nozzle is opened. It is ideal for outdoor application of wettable powders and emulsions. Its use outdoors is limited if a lot of water is applied with the insecticide. Shake the sprayer often when you use wettable powder.

Aerosol

Aerosols (canned liquid under pressure) are discussed earlier and can usually be bought to fit your need. Buy as either "gas-producing" for flying insects or liquid types for crawling pests.

Quart-Sized Sprayer

The quart-sized sprayer is also a compressed air type, but air must be pumped into it continuously while in use. It can be used satisfactorily with emulsions and solutions, but not wettable powders. Use it both indoors and outdoors for treating small areas. NOTE: Where high pressure is needed for good application, it has limited use.

Paintbrush

Use an inexpensive paintbrush to apply insecticide solutions to baseboards, screens and similar areas inside buildings. A light film is usually sufficient.

Check Extension Bulletins E-751, Pesticides Manual, and E-789, Pesticides, How They Work, Treatments for Human Poisonings, for further information concerning pesticides.

Warnings

1. Inside buildings, apply Baygon, diazinon, and most malathion formulations to small areas only (such as baseboards). Do not apply to entire rooms or buildings. Rotenone and pyrethrum preparations are even safer provided they do not contain materials more poisonous than methoxychlor and piperonyl butoxide.

2. Avoid using any material suggested in this bulletin around food or where children can get into it. Do not allow children on insecticide-treated grass until three days after application.

3. Avoid breathing sprays or dusts. A handkerchief fitted to the face will help prevent excessive inhalation of these materials. If there is a chance of breathing highly poisonous materials, special masks should be used. While some insecticides such as pyrethrum or rotenone may be harmful to persons with asthma, the chemicals are generally quite safe otherwise.

4. If emulsifiable concentrates or concentrated wettable powders are spilled on the skin, wash immediately with soap and water.

5. Do not use insecticides in oil (kerosene) around open flames (pilot lights), electrical wiring, or on asphalt floor coverings. Avoid the use of insecticides which may stain or spot fabrics.

6. Outdoors, avoid heavy applications to tender flowers and shrubs, especially emulsions. Read labels to avoid using any material specified as damaging to certain plants.

7. Do not apply any insecticide listed in this bulletin to vegetables or fruits, or to garden soils unless the label or up-to-date Michigan State University Cooperative Extension literature says you can safely do so.

8. Never puncture an aerosol can. This can cause injury.

9. Read the label for each insecticide used. Then, follow directions.

Special Warning

For indoors, apply only insecticides manufactured especially for that purpose. Formulations suitable for treating livestock and plants of all kinds outdoors **ARE NOT GENERALLY** the best types for use in buildings (homes). For example: formulations for indoor application should contain only the purified grade of the chemical, not the commercial agricultural product. There is less objectionable odor to purified grades than to the agricultural grade. In addition to the kind of insecticide used in household preparation, the carrier (often an oil) should be specifically processed (refined) to reduce or eliminate objectionable odors.

Another point to consider: When a household pesticide is applied behind trim or any similar situation, or where there may be excessive heat, odor from the chemicals may be more noticeable and consequently more objectionable than the pest itself.

Pesticide Storage, Container Disposal

Store all pesticide chemicals away from the reach of children—preferably locked up. A separate storage area, well marked with an appropriate sign, is recommended.

Carefully dispose of empty containers. The label for each pesticide can be a source of directions for proper and safe disposal of pesticide chemicals. Your county agricultural agent also has literature concerning this problem. For still further information, get United States Department of Agriculture's publication entitled "Safe Disposal of Empty Pesticide Containers and Surplus Pesticides:"

DID YOU READ THE PACKAGE LABEL FOR INSTRUCTIONS ON HOW TO USE INSECTICIDES SAFELY? IT IS BETTER TO READ THIS INFORMATION TODAY THAN TO WORRY ABOUT MISTAKES TOMORROW.

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