House Flies and their Relatives
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HOUSE FLIES and their RELATIVES

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LITTLE HOUSE FLY
female, left; male, center; larva, right

Flies present a constant household insect control problem. They annoy us during the summer and some of them overwinter in our homes. Their disease-carrying habits should be well known and we should explore every possibility of ridding our premises and homes of them.

To get rid of these pests, follow the control instructions given below for the particular fly causing your trouble.

*If suggestions are given in addition to the use of insecticides, follow them carefully. They can be equally as important, or even more so than a chemical in solving your problem. In fact, in many cases, good house fly control depends more on effective sanitation than on insecticides.**

HOUSE FLIES

COMMON HOUSE FLY
pupa, left; adult, center; larva, right

Everyone knows the worldwide common house fly when he sees it. Everyone should know that it carries such diseases as typhoid fever, tuberculosis, and dysentery. Its maggots live in the filth of garbage, manures, dead animals, and rotting plants. Adult flies carry this filth to man's food, face, and hands.

Over 30 species of flies belong to the same genus as the house fly and have similar habits. All invade homes but fortunately not all at the same time or with the same intensity. Some may be important only in other parts of the world.

In Michigan, the lesser house fly is present throughout the state. Though slightly smaller than the common house fly, it has the same grayish color. Its habit of hovering in mid-air tends to separate it from the common house fly, which interrupts its flight to rest on ceilings, light bulbs, and many other objects. The lesser house fly is one fly that can propagate in relatively dry conditions. Because of this it is more abundant in some years than the common house fly.

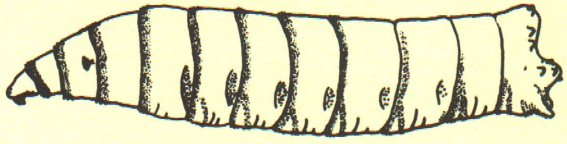
All kinds of flies have the following stages in their life cycle::

1. Egg
2. Maggot (larva)
3. Pupa
4. Adult

*Sanitation in this bulletin means restricting or eliminating natural or man-created habitats (places) in which flies can breed. No insecticide is entirely effective against maggots protected by the organic media in which they live. Consequently, all effort should be made to prevent or eliminate areas in which flies can breed.

The following descriptions are of the common house fly

Its egg is whitish, oblong, and about 1/25 inch long. Eggs are laid singly but grouped in clusters of about 130; as many as 2,500 individual eggs are laid in a month or so. They hatch in 10 to 24 hours.



HOUSE FLY MAGGOT *(enlarged drawing of typical fly maggot)*

The maggot or larva is small and wedge-shaped. The head end is slender and pointed; its body is creamy-white and 1/2 inch long when grown. It matures within 4 to 10 days.

The pupa, or so-called resting stage, is the term for the barrel-shaped case in which the maggot changes into an adult fly. It is yellow to brownish, 3/8 inch long, and found wherever maggots live, usually, however, in the drier areas of the substance it is infesting. The pupal stage lasts 3 to 6 days.

The adult house fly is about 1/4 inch long, grayish, with some yellow coloring on head and abdomen. It may live as long as 2 months during the summer. A few survive the winter.

During periods of rain and warm weather, house flies can develop from egg to adult in about 10 to 18 days. Drought or cool summer conditions normally do not favor their rapid breeding. As a result, there are more in total population and in number of broods in some years than in others.

Control

To help keep flies under control follow these rules:

- Do away with breeding places. This is the first thing that must be done when controlling flies especially when the effort is directed at the maggots (larvae).
- Get rid of all sewage and garbage regularly; in summer at least twice a week. Keep a tight lid on all garbage cans.
- Use screens and automatic door closers to keep flies out of buildings.
- Use flytraps.
- Use insecticides.

Breeding Places

Regular (at least every 3 or 4 days) and careful disposal of all manures, rotting plants, and other organic materials *is a "must" in controlling house flies.* It is almost impossible to control large numbers of them with insecticides. In fact, good house fly control depends more on effective sanitation than on insecticides. In this respect, a garbage disposal unit is very valuable.

Sewage and Garbage

Sewage and garbage are prime breeding grounds for flies. Prevent breeding by proper disposal of them. Water-soaked areas around garbage cans are favorite fly breeding places! If you do not have city collected garbage, *obtain sanitary garbage disposal plans from your county health department.* But as stated above, a good garbage disposal unit connected to a sewage system is the most effective means of disposing garbage.

Flies will breed around septic tanks if seepage comes to the soil surface, or if the drainage is discharged directly on top of the ground. Install all sewage disposal systems correctly. Remember the majority of flies breed only in moist places rich in protein-type organic matter; they do not develop in dry situations. For an exception to this, see the Section on the little house fly.

Screens

To keep flies out of buildings, screen all doors and windows. Use automatic closers on all outside doors and keep them properly adjusted. Paint or spray the screens with malathion, 2 percent, or naled (Dibrom), 1 percent, or ronnel (Korlan), 1 or 2 percent, or DDT or methoxychlor, 5 percent — any material in refined (white) kerosene. You can also use five percent methoxychlor containing 2/10 percent pyrethrum plus 2 percent piperonyl butoxide. This material and methoxychlor must be applied more often than DDT. Note: The above insecticides are usually mixed with a special household grade of kerosene or similar oil product. For more information on these products, read the special warning section at the end of this bulletin.

Spray from the inside of the room out through the screens. You may also apply the kerosene mixture with a brush.

Protect children from treated screens by placing a board or other material over the part of the screen that they can touch with their hands.

Flytraps

Traps will catch live house flies and are especially effective when there are large numbers. Place them out of the wind on the sunny side of buildings, (except in hot weather when a south exposure is not the best). Plans are available from your county agricul-

tural agent or from Michigan State University and several commercial types are on the market.

Make a flytrap bait from any of the following:

1. A mixture of one part blackstrap molasses (or any sweetening material) and three parts water.
2. Milk (skimmed or powdered will do).
3. Fruit waste, such as apple peelings.

Kill the trapped flies before removal with hot water alone or malathion, 2 percent, or naled (Dibrom), 1 percent, or ronnel (Korlan), 1 or 2 percent, or pyrethrum, 1/10 percent plus piperonyl butoxide, 1 percent — any material in refined (white) kerosene. Bury or burn the dead flies.

Electric Grids

An electric grid placed in the open or fastened to window screens (and containing bait) will aid in control. Specifications vary, but a grid made of parallel wires spaced 1/4 inch apart and having a high voltage, low amperage circuit is ample for house flies. Use one of the baits above to attract flies into the grid.

NOTE: Follow manufacturer's operating instructions carefully when using electric grids. Protect children from them at all times.

Chemical Control Indoors

For use around windows and to other areas visited by flies, apply malathion, 2 percent or naled (Dibrom), 1 percent, or ronnel (Korlan), 1 or 2 percent — any material in refined (white) kerosene.

For spraying (or misting) into the air for adult flies, use dichlorvos (DDVP), 1/2 percent, or malathion, 2 percent, or ronnel (Korlan), 1/2 percent, or DDT, 5 percent, or pyrethrum, 1/10 percent plus piperonyl butoxide, 1 percent, or methoxychlor, 5 percent plus pyrethrum, 1/10 percent plus piperonyl butoxide, 1 percent — any material in refined (white) kerosene. Or use aerosols of the same ingredients.

USE ONLY household sprays or aerosols especially manufactured for flying insects.

Note: Read the Section about the warnings on how to use these fly control materials safely; also the information of the package label.

Dichlorvos is also available in a "hang-up" resin strip for adult flies.

Flypaper and Flyswatters

In the long run, flypaper and flyswatters may work as well for some fly control problems as other methods.

Chemical Fly Control Outdoors

Read over the section on breeding places and follow the instructions for eliminating the areas.

To help prevent maggot development, spray wet places around garbage cans with any one of the following materials:

Diazinon, 8 tablespoons (1/2 cupful) of 50 percent wettable powder or 8 teaspoons of an emulsifiable concentrate containing 4 pounds of Diazinon per gallon, or malathion, 1/3 pound of 25 percent wettable powder, or chlordane, 1/5 pound (3 ounces) of 40 percent wettable powder — any one of these three materials to 1 gallon of water.

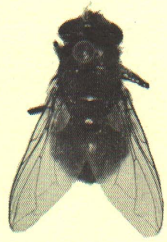
Dusts of 2 percent Diazinon or 5 percent malathion are also effective. Repeat treatments as needed.

Treat garbage and the inside of garbage cans with the same materials, *provided the garbage is not fed to hogs.* Check with your officials as to disposal of city collected garbage. NOTE:

A state law of Michigan requires that *all* garbage fed to swine be cooked to prevent hog cholera and other highly contagious diseases.

Since cooking will kill fly eggs and maggots, it is usually unnecessary to spray, provided, of course, the garbage is fed immediately.

BLOW FLIES



ADULT BLOW FLY
5/6 inch long

Occasionally blow flies cause annoyance indoors in much the same way as house and cluster flies. They are larger and more robust than house flies. Their abdomens are either blue or green, or in some cases, violet or copper. They fly with a "buzzing" sound.

Blow fly maggots develop in protein-type materials such as cheese, eggs, meat, fish, dead animals and droppings of dogs and other animals. Different maggot foods often encourage the presence of different species. In certain neighborhoods it is not uncommon to find blow flies associated only with dogs.

Normally blow flies originate outdoors, but infestations can arise from dead rodents and birds inside houses, or from maggot breeding places in bird's nests in eaves troughs or above windows, or even in soiled carpets and rugs.

Control

Destroy all sources of infestation. Bury excrement of dogs each week and spray pens with malathion,

1/3 pound of 25 percent wettable powder in one gallon of water. Be sure the malathion spray is dry before allowing dogs on treated surfaces.

Keep screens on windows and storm doors. Use automatic closers on all outside doors.

Dispose garbage at least once a week in the summer — every 3 or 4 days is better. Use tight-fitting lids on garbage cans. Treat garbage and the inside of garbage cans with Diazinon, 8 teaspoons of an emulsifiable concentrate containing 4 pounds of actual Diazinon per gallon or 8 tablespoons (1/2 cupful) of 50 percent wettable powder, or malathion, 1/3 pound of 25 percent wettable powder, or chlordane, 2 tablespoons of 40 percent wettable powder — any material in 1 gallon of water, *provided the garbage is not fed to hogs.* Check with your officials as to disposal of city-collected garbage. Also follow the directions on "chemical fly control outdoors" in the section on house flies.

For control indoors, use suggestions given for house flies.

CLUSTER OR CHAMBER FLIES

ADULT CLUSTER FLY
5/6 inch long

The cluster fly is slightly larger and slower in flight than the house fly. It can be recognized by the short golden-colored hairs on the sides of the body below where the wings are attached.

The maggots, or immature forms of the cluster fly, live within earthworms. Hence, soils high in organic matter may contribute to the cluster fly problem, by harboring earthworms. Adult flies emerging from the soil are seen on flowers and fruits of plants. In the fall they find their way into houses, apparently seeking shelter. They cluster in large numbers in the attic, basement, between storm sashes and windows, between inside and outside walls, or between screens and windows.

They usually do very little damage but may stain curtains and wallpaper, particularly when flying around windows. These large sluggish flies are often more annoying to householders than the common house fly.

Control

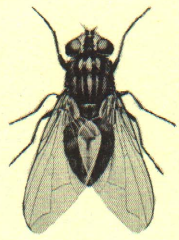
1. Calk all outside openings to attics, walls, and basements. Keeping the insects out of the house is better than controlling them later.

2. For chemical treatment in attics, use deodorized kerosene solutions of either naled (Dibrom), 1 percent, or ronnel, 1 or 2 percent, or methoxychlor, 5 percent plus pyrethrum, 2/10 percent plus piperonyl butoxide, 2 percent, or chlordane, 2 percent, or malathion, 2 percent. If possible, apply directly on the masses of cluster flies. Spot spray around windows and into crevices and sash cord channels or other places where they can hide.

3. For chemical treatment of outside walls, use one of the insecticides suggested in 2 above, although treatment is ineffective unless you can get the material *between* the inside and outside walls. Tight construction of outside walls, roof, window casings, foundations and foundation sills to keep them out will be more satisfactory than later attempts at chemical control once they get inside.

4. To control cluster flies in living quarters, use suggestions given for house flies.

FACE FLIES



FACE FLY, ADULT FEMALE
She is about 1/3 inch long and has a grayish-green abdomen. A silver stripe surrounds the eyes (the house fly has a golden stripe around the eyes).

The face fly resembles the house fly very closely but is darker and larger.

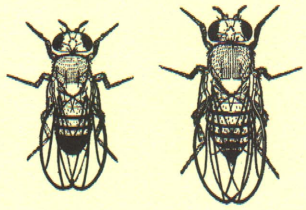
Females have a grayish-green abdomen and are hard to distinguish from the house fly. (With a magnifying glass one sees that the female house fly has a golden stripe around the eyes while the female face fly has a silver colored one.) Females feed on secretions about the face of livestock, lapping animal secretions from under and around the eyes, from the lips, and in and around the nostrils, hence the name. Larvae feed in fresh cow dung.

Males have a yellow abdomen with a black line down the center, and eyes that almost touch. They feed in summer on nectar and pollen; they are not found on animals.

By seeking shelter in the fall, face flies cause bother in houses much as do cluster flies. For control, fol-

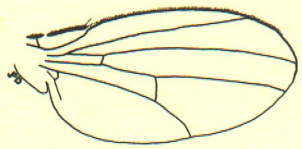
low suggestions for cluster fly (or house fly information where suitable).

FRUIT, POMACE, OR VINEGAR FLIES



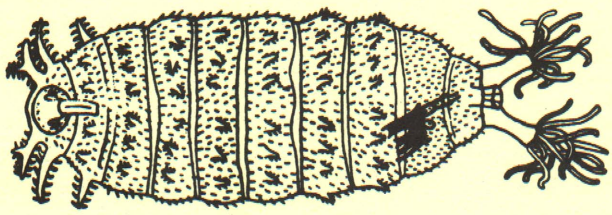
ADULT FRUIT FLY (Drosophila)
male, left; female, right

Fruit flies are small — about 1/9 inch long. They are generally yellowish, although some kinds tend to be brown, or have a yellowish head and brownish body. At least one species has red eyes. The large oval-shaped wings on a small body give the impression that they are powerful but clumsy fliers. One species is a favorite for genetics experiments where it is known as the Drosophila fly.



ADULT FRUIT FLY WING
Note the veins (lines) inside the outline of the wing. These are typical of fruit fly wings. With the aid of a hand lense, they can be used to identify these insects.

The maggots look somewhat like those of the house fly but are smaller. The head of the maggot is more blunt than pointed, with small finger-like breathing tubes on the sides of the body just behind the mouth. The tail end of the body is thick-set and blunt with two yellowish breathing tubes projecting backward.



FRUIT FLY PUPA

Fruit flies infest all kinds of fruit and vegetables, also vinegar, cider, and other plant products, especially if they are fermented by fungi. In fact, it is believed that in most cases the maggots feed upon the fungi rather than the spoiling plant tissues. This habit of feeding on fungi would also account for their presence in damp areas around plumbing and in wet-woods such as fire wood. Leaking roofs can create damp situations in which fungi grow, making suitable living places for the fruit fly maggots. The pupae have two long filaments at the head end (see illustration).

Fruit flies have short life cycles, passing through the same phases as the house fly: generally, no more than 10 to 12 days elapse from egg to adult.

Control

1. Dispose of all fruit and vegetable peelings immediately. (A garbage disposal unit is ideal for this purpose.) Peelings of banana, apple, potato, and other foods will attract fruit flies and furnish breeding places. Also, if skin of the produce was cut or cracked when purchased, eggs might already have been laid, with the adult fly ready to emerge, in days or hours. (Incidentally, this is the reason why fruit flies often appear suddenly around recently purchased fruit or vegetables.)

2. Store raw vegetables and fruits in a relatively cool place (about 40 degrees Fahrenheit) to prevent rapid and continuous spoiling. Avoid heated basements. Inspect at regular intervals and remove all spoiled produce.

3. To control adult fruit flies, use a kerosene fly spray of either 1/10 or 2/10 percent pyrethrum plus 1 or 2 percent piperonyl butoxide, *or* 5 percent methoxychlor containing 1/10 percent pyrethrum and 1 percent piperonyl butoxide. Or use aerosols containing these same materials. (Note: The insecticides suggested for house fly control are satisfactory for adult fruit flies. But some of these materials are generally more poisonous than the ones suggested above. Then, too, it is doubtful that many fruit flies are eliminated by spraying produce in the home. *Hence, no suggestion is given for the treating of foods with insecticides in the home.* The most satisfactory method is to quickly dispose of all fruit and vegetable waste.)

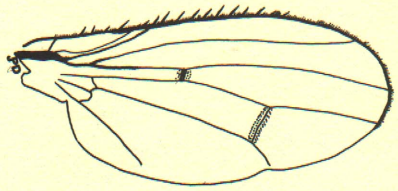
WET-WOOD FLIES*

A number of different flies infest water-soaked wood around kitchen sinks, bathtubs and laundry rooms. The maggots of drain or sewage flies, hump-backed flies, borborids, and fruit flies have been collected from these places.

Adults are commonly found in windows. The largest are about 1/4 inch long. Their color varies greatly. Our most common drain fly is light-tan-colored with faint mottlings of black and white. The hump-backed flies (phorids) are dark-colored, usually black. The

*This title is arbitrarily selected for flies that have the common habit of normally or accidently infesting damp wood. Many of course, like the fungus-gnat discussed above, have other, quite different habits as well.

borborids are either black, brown, or faintly yellow. Some species of the helomyzid flies are quite common in Michigan homes. These have been collected from wet areas and from fire wood, especially if the bark is rotting. Of the flies normally making up the wet-wood group, only the helomyzids have well defined spines or bristles on the front margin of the wings.



ADULT HELOMYZID FLY WING
Note the veins (forked or curved lines) inside the outline of the wing. These veins plus the prominent spines on the front margin of the wing, are typical of helomyzid fly wings. With the aid of a hand lense, these characteristic features can be used to identify these flies.

Fungus-gnat maggots are found in flower pot soil, especially if it is high in organic material. Some of these maggots also feed on the roots of potted flowers and can occur in wet wood, particularly if it is rotting. The adults range in color from sooty-gray to nearly black. At night they fly toward lights.

Control

1. Repair all leaking water pipes and roofs to prevent frequent soaking of wood. Avoid continuous water-soaking of areas around sinks, bathtubs, and showers. If possible, install or replace woods around these fixtures with tiling, concrete or other water-resistant materials.

2. Clean scum from all sink, wash-basin and bathtub down drains. Either remove the pipe or use a swab to throughly clean the unit without removing it.

3. Dry wet wood to prevent maggot infestations. If this cannot be done, spray the water-soaked areas with a kerosene solution of either Diazinon, 1/2 percent, or malathion, 2 percent, or pyrethrum, 2/10 percent plus piperonyl butoxide, 2 percent plus methoxychlor, 5 percent. An application of 5 percent DDT or methoxychlor will also help but may not completely control the maggots. Normally, it is not advisable to treat firewood; it is best to store it in places where the flies cannot invade the home.

4. To control the adults, use methods and materials suggested for control of house flies in buildings.

5. To control fungus-gnat maggots in flower pots, drench the soil with a water-mixture of 1 teaspoon of 40 percent nicotine-sulfate or 57 percent malathion emulsion to 1 quart of water. NOTE: These suggestions are not for commercial or greenhouse growers.

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.

Emulsions

Emulsions are liquids. They must be mixed with water, turning it milky. They are generally not used inside buildings. Apply them only outdoors to both plants and foundations. Be careful when applying to tender flowers and shrubs as they may injure these plants. In concentrated form, emulsions are dangerous if spilled on clothing and skin. If spilled, change clothing at once and wash skin areas with soap and water. Use masks and protective clothing while spraying, especially if applying dangerous materials over a long period of time.

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.

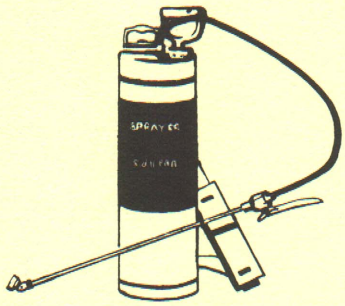
Use them indoors to control household insects. Do not apply to plants since they cause severe injury. Like emulsions, solutions are dangerous if spilled on clothing and skin. Immediately wash off with soap and water. Change clothing. For other instructions, see emulsions above and the last page for a special warning.

Wettable Powders

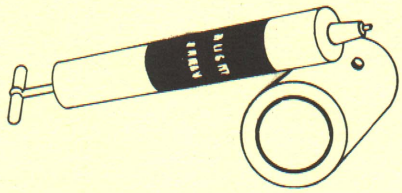
These are similar to dusts. (See below) They contain a high percentage of chemical, however. For some purposes they are used as bought in place of dusts. However, wettable powders are usually mixed with water and applied as sprays. The spray is seldom used indoors, but is useful when applied outdoors. 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

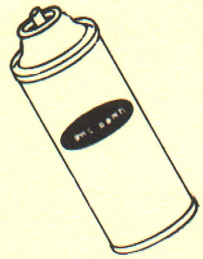
Dusts are dry powders which normally contain a lower percentage of insecticide than wettable powders. They are used as bought and ARE NOT MIXED WITH WATER. Use them both indoors and outdoors where effective.



Compressed Air Sprayer



Quart-Sized Sprayer



Aerosol

Aerosols

Aerosols are liquids held under pressure in a container. When released, usually by pressing a button, some kinds form a gas, others a spray. Gas-producing types are for control of flying insects (such as flies), liquid for those that crawl or run on floors (such as ants). Choose to fit your needs, keeping in mind that gas forming aerosols are not normally satisfactory for hard to control non-flying type insects.

EQUIPMENT

The compressed air sprayer, the quart-sized sprayer, the aerosol, and the paint brush are probably the best kinds of equipment for the home owner to use for household insects.

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

Compressed Air Sprayer

The water capacity of a compressed air sprayer is usually 1 to 4 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 indoors is limited if a lot of water is applied with the insecticide. Shake the sprayer when you use wettable powder.

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 higher pressure is needed for good application, it has limited use.)

Aerosol

Aerosols (canned liquid under pressure) are discussed earlier under the section on insecticides and can usually be bought to fit your need. For a general rule, buy as either gas producing for flying insects, or liquid types for crawling pests.

Paintbrush

Use an inexpensive paintbrush to apply insecticide solutions to baseboards, screens, and similar areas inside buildings. A light film is usually sufficient. Read the section on solutions under the heading "Insecticides" for information about this type of pesticide formulations.

WARNINGS

1. Inside buildings, use household insecticides with caution for fly control. Do not apply to entire rooms or buildings, unless the package label says that it is safe to do so. Weak preparations of a given insecticide normally can be applied more safely over a larger area than stronger ones, but different insecticides vary widely even in this respect. Also some insecticides are more dangerous to use than others. So read the label on the container before using any pesticide.

2. Avoid using any material suggested in this folder around food or where children can get into them. Do not allow children on insecticide treated grass until 3 days after applying.

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

4. If emulsions 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, 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, never solutions. Read labels to avoid using any material specified as damaging to certain plants.

7. Do not apply any insecticide listed in this folder to vegetables and 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. *Read the label for each insecticide used. Follow directions.*

SPECIAL WARNING: For indoors, apply those insecticides manufactured especially for the 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 preparations, 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 quarter round or any other like situation, or where there may be excessive heat, odor from the chemicals may be more noticeable and consequently more objectionable.

Pesticide Storage and 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 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 Pesticides Containers and Surplus Pesticides."

DO 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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