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Hints on Pesticide Use For Home Gardeners

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Pesticides used safely and effectively can save home gardeners considerable time and labor and can increase the quality and quantity of the plants they grow. The best advice in using pesticides is to **read and follow the label** of the product you are going to apply. All pesticides have a potential for some form of damage if they are not handled and applied with care.

Safety

Reading the pesticide label is the first step toward its safe and effective use. The label will tell you if any special protective clothing is necessary when applying the pesticide, how long to keep children and pets off treated areas and how long to wait before eating treated produce. The label also has valuable information for you in case you spill some on yourself and for your doctor in case someone is accidentally poisoned.

Your greatest potential exposure to a pesticide is when you are loading your sprayer or other applicator. This is especially true when you are handling a concentrated pesticide. When handling pesticides, wear a long sleeved shirt and long pants to reduce the extent of your exposure. A pair of rubber boots and gloves will protect your feet and hands and can be cleaned with a hose. If you use pesticides regularly, have a set of coveralls, cap, gloves and boots set aside to use when you are applying pesticides. Wash this clothing separately from the other wash after each use. Wash your hands and face with soap and water after you work with pesticides and before eating, drinking or smoking.

Storage and Disposal

Pesticides should be stored out of reach of children and isolated from any food or feed, preferably in a locked cabinet. Emulsifiable concentrates (EC), those containing a petroleum solvent or xylene, are flammable. All pesticides should be kept away from heat since this can cause breakdown of the chemical and a loss of effectiveness. On the other hand, freezing can cause separation of ingredients in emulsifiables resulting in uneven distribution and clogging of spray nozzles during application. Ideally, pesticides should be stored in a locked, cool, dry place, safe from freezing temperatures. Because certain organic pesticides, especially some insecticides, have a limited storage life, it is generally advisable not to buy more pesticide than you will use in a growing season.

Disposal of excess pesticides is a problem to be avoided. Buy only as much pesticide as you will use in a year, and mix only as much as you will need for the job. Dispose of rinse water from your sprayer in a safe place where ground water will not be contaminated and people, pets and susceptible plants won't be harmed. Make your empty pesticide container as safe as possible before discarding by filling it one-third full of water, shaking vigorously and then using this rinse water to help dilute your last batch of spray. Repeat this procedure

two more times, and then wrap the container in paper and discard with your garbage.

Empty containers that can't be rinsed such as aerosol cans and bags should be wrapped in paper and discarded with the garbage. Do not put unwanted pesticides in the trash; containers can break and cause injury to the trash collectors. If you have unwanted pesticides, contact your County Health Department for instructions on how to dispose of them.

Selection

Selection of the proper pesticide depends on several factors. The label will tell you if the product is approved for use on the plant or site you want to treat. Don't use a pesticide that is not approved for the use you intend. You may not control the pest but instead may damage desirable plants or leave an excessive residue on produce.

Observe the preharvest interval to avoid excessive pesticide residues. For example the label might state, "Do not apply within 14 days of harvest." You can get an idea of the length of residual action by reading the label. The label might state, "Apply at 10-day intervals."

The label will also list the pests that can be controlled. Some pesticides are more effective than others for certain pests. Knowing a little about the life history of your pest may enable you to control it before great damage is done and while the pest is in a susceptible stage. Consult publications, your University of Idaho Extension county agent or your garden store manager for help identifying the pest, for information on the most effective pesticide and the time to apply it.

Pesticide formulation should also be considered when choosing a pesticide product. Here are the common formulations:

Emulsifiable concentrates (ECs) form a milky emulsion when mixed with water. Emulsifiables contain xylene or a petroleum solvent that can cause foliage burn if applied at temperatures greater than 85° F. These solvents can also cause foliar burn if applied under very cool or moist weather conditions which do not allow the spray to dry rapidly. If applied when a heavy dew is on plants, ECs may run to edge of the leaf where the carrier will evaporate leaving a concentration that will cause edge burn. Advantages of ECs are that they leave no visible residue, require little agitation in the sprayer and give good foliar coverage.

Wettable powders (WPs) consist of the dry pesticide with agents to suspend the pesticide particles in water. WPs do not present the foliar burn problems of ECs. However, sprays are subject to evaporation of the pesticide and resultant loss of effectiveness when sprayed at temperatures greater than 85° F. WPs often leave a visible residue, need more agitation in the sprayer than ECs and also give good coverage.

Flowables are similar to WPs except the solid pesticide is already suspended in a liquid so it will mix more readily in water.

Dusts are generally more expensive per pound of active ingredient but are usually more convenient to apply than sprays because they come ready to use. However, dusts deposit pesticide less uniformly on foliage. You get the best dust coverage when plants are wet from dew or rain. Dusts drift more easily than sprays.

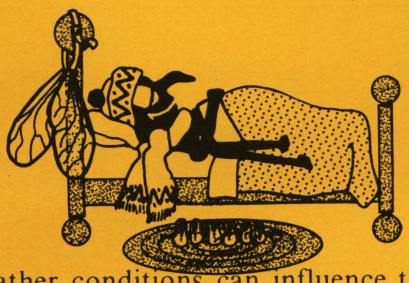
Soluble powders and **miscible liquids** form true solutions, and do not require repeated agitation in the sprayer. However, few pesticides can be formulated this way.

Aerosols are convenient but expensive. Check the label for xylene or petroleum solvents to avoid the foliage burn problem.

Granular pesticides and **pesticides impregnated on fertilizers** are often convenient to apply and effectively eliminate problems of drift of the pesticide onto desirable plants.

Insecticides

Insecticides are generally the most acutely toxic class of pesticide. However, most highly toxic insecticides are not available to home gardeners. Botanical insecticides such as pyrethrins, rotenone and nicotine are not necessarily safe because they are "natural." Nicotine is one of the most acutely toxic pesticides available to home gardeners, and it is especially dangerous because it is easily absorbed through the skin. Rotenone is of low toxicity to humans, but it is extremely toxic to fish.



Weather conditions can influence the effectiveness of your insecticide application. Many insects are not very active at low temperatures so they don't contact as much of the spray. A light rain will wash most of an insecticide application off foliage if the spray has not dried. Many pesticides are held by the wax layer of the leaves and fruit. Once the spray has dried, it becomes more resistant to washing off.

Unless you are using protectant materials in your pest control programs, the decision to reapply an insecticide will depend on the degree of control observed. However, most insecticides are not extremely fast acting, so give them a day or two before you decide that they haven't worked.

Systemic insecticides are absorbed by the plant and move within it. Soil applied systemics such as Di-Syston® are taken up by the plant roots and move to the foliage. When treating shrubs with such a product, it is important to apply it evenly around the plant to get maximum insect control on all the foliage. Foliar systemics such as Cygon®, Orthene® and Metasystox-R® are absorbed but usually do not move within the plant to any great extent. Do not expect a foliar systemic to control insects on unsprayed leaves. Once they are absorbed by the plant, systemics give longer residual control and are safer for beneficial insects than many nonsystemics. Although there are exceptions, systemics are most effective on sucking insects such as aphids.

Fungicides

Most fungicides available to home gardeners are protectants. They prevent infection from taking place but will not control the fungus once it has entered the plant. Therefore, proper timing and thorough spray coverage are important if you expect to get good disease control. The proper timing of spray applications will depend on the biology of the disease organism and the properties of the pesticide used to control it. Thorough coverage includes spraying the underside of leaves. During periods of rapid plant growth, more frequent applications may be necessary to protect newly formed tissues.

A few systemic fungicides are available to home gardeners. They are benomyl, triforine (Funginex®) and thiophanate methyl (Banrot®). Except for several benomyl products registered on certain fruits and vegetables, these fungicides are only approved for use by home gardeners on ornamentals. These systemics enter the plant and provide both protective and limited curative action. However, they do not repair disease damage that has already been done. Usually, these fungicides move very little within the plant. Little of the fungicide will move from treated leaves to protect untreated leaves. You will get the best disease control with thorough foliar coverage.

All homemade mixtures of two or more pesticides should be tested. Spray a small portion of a plant and look for damage in a day or two.

Herbicides

Herbicides can save the home gardener much labor when compared to hand weeding. Because of their nature, however, they have the greatest potential for damage to desirable plants. Damage usually results from spray drift or movement of the herbicide with rain or irrigation water. Spray drift can be reduced by spraying when the air is still and using coarse spray droplets at relatively low pressure. Be especially careful when spraying 2,4-D products (the label will specify 2,4-dichlorophenoxyacetic acid) near tomatoes or grapes; these plants are extremely susceptible to 2,4-D.

If you do get some herbicide spray on a desirable plant, thoroughly wash the plant off with a garden hose before the spray dries. If the spray has already dried, your chance of preventing damage is decreased. You might reduce the injury, though, by spraying the plant until wet with 2 tablespoons of dishwashing detergent per gallon of water in a **clean** sprayer. Then rinse the plant with a garden hose.

Damage can occur if a herbicide moves from the application site with rain or irrigation water. Table 1 lists herbicides capable of easy movement with soil water. If a herbicide has this ability but only affects seed germination, then you only have to be concerned about adjacent seedbeds, not established plants. However, if it affects growing plants, you should check the label to find out which plants are susceptible. Consider the possibility of plant injury before application. Nonselective herbicides will kill

Table 1. Herbicide characteristics.

Herbicide	Residual control of certain germinating seeds or seedlings	Controls certain growing weeds	Nonselective	Soil sterilant	Use**
amitrole		X	X		L
ammonium sulfamate*		X	X		I
Balan®	X				L
Betasan® (Halts®)	X				LO
borates and chlorates*	X	X	X	X	I
bromoxynil		X			L
cacodylic acid		X	X		LI
Casoron®*	X				O
chloramben*	X				OV
2,4-D		X			LI
Dacthal®	X				LOV
dalapon*	X	X			I
Devrinol®	X				O
dicamba*		X			LI
diquat (Con-Kill®)		X	X		LI
Enide®	X				O
Eptam®	X				O
glyphosate (Kleenup®)		X	X		LI
MCPP		X			LI
methanearsonates		X			L
paraquat		X	X		LI
prometon*	X	X	X	X	I
siduron	X				L
trifluralin	X				O

*Moves easily with soil water. Care should be taken when applying near desirable vegetation.

**L = lawns; O = ornamentals; V = vegetable gardens; I = incidental areas such as driveways, sidewalks and similar areas.

most plants they contact. Soil sterilants can prevent plants from growing in treated areas for long periods of time. Remember, any herbicide can be carried along by a heavy flush of water before it has been leached into the soil and adsorbed to soil particles.

In general, herbicides effective on emerged weeds work best on young, actively growing weeds. Weeds suffering from moisture stress may not readily absorb the herbicide or move it to the roots or growing points. Excessively high application rates of herbicides for perennial weeds can kill the top growth before the herbicide can move to the roots, thus allowing the weed to resprout. The idea that if a little herbicide is good, more is better is not true; stick with the rate on the label. The same is true for all pesticides.

Herbicide residue left in a sprayer can damage sensitive plants when you use the sprayer for an insecticide or fungicide spray. Commercial products (Nutra-Sol®) are available at agricultural chemical dealers that will neutralize the residue, or you can let a strong phosphate detergent solution sit in the sprayer overnight and then rinse thoroughly.

It is more convenient to use a second sprayer for all your herbicide applications. In fact, a plastic or stainless steel sprayer should be used if you use glyphosate (Kleenup® or Roundup®). Glyphosate reacts with the galvanized surface of some sprayers to form hydrogen which is very explosive.

Pesticide Residues

These outlines for use are based on the best information currently available for each chemical listed. If followed carefully, residues should not exceed the tolerance established for any particular chemical. To avoid excessive residues, follow suggestions carefully with respect to dosage levels, number of applications and minimum interval between application and reentry or harvest.

Trade Names

Trade names are used to simplify the information presented. Use of these names neither implies endorsement of products nor criticism of similar products not mentioned.

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