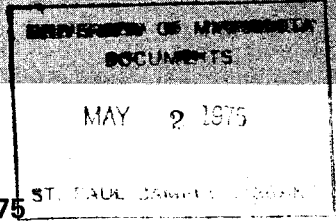


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Fungicides for the Home Garden

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Fungicides are chemicals that control fungus diseases. Similarly, bactericides control bacterial diseases, and nematocides control nematodes. Fungicides may be very specific and control only a few fungi or general and control a wide range of fungi. Fungicides do not kill insects or weeds, and they do not alleviate plant nutrient deficiencies.

No one fungicide will control all diseases. Thus in the catalog of diverse fungicides, each is capable of preventing only certain diseases.

Fungicide selection

Obtain an expert's advice on your plant disease problem. Check with your county agricultural agent, the University Agricultural Extension Service, the man who sells pesticides, or any other knowledgeable person (not necessarily your neighbor) to see if a fungicide is available for your purpose.

When you select a fungicide to safely control disease, be sure to answer the following questions: (1) Has the cause of the disease been identified? (2) Does it cause a serious plant disease? (3) Are nonchemical control measures available? (4) How toxic (poisonous) are the suggested chemicals to humans and the environment? (5) Will the chemical leave a toxic residue? (6) Are there any special health hazards to the applicator?

Read the label

After buying the proper fungicide and before using it, read everything on the label. When the container states "more detailed information is available inside," open the container and read everything on the label. This is the best source of information on how to use that product. The label generally lists the plants on which the material can be used safely, the dosage required, and precautions while handling the fungicide. Pay particular attention to these items on the label: (1) warnings such as POISON, DANGER, KEEP OUT OF REACH OF CHILDREN, (2) specific directions on use, dosage, time and methods of application, (3) crops that can be treated, (4) how to mix it, and (5) where and how to store or dispose of any left over material.

Instructions on when the chemical cannot be used on food producing plants will be listed on the label also. If it states "no later than 14 days before harvest," do not pick the fruit or vegetable until at least 14 days after the last spray application. This is to insure that chemical residues will not be on the food when consumed.

Handling fungicides

Follow certain procedures when handling fungicides (or insecticides and herbicides) to use them properly and safely. Most fungicides are poisonous to humans and animals as well as to plant disease-causing micro-organisms. Others are not as poisonous, but they should all be handled as potentially harmful chemicals.

Fungicide handling hints:

1. Wear protective clothing (rubber gloves, apron, and face mask) when the label requires them.
2. Don't inhale the dust when measuring or mixing.
3. Don't smoke when mixing or applying fungicides.
4. After equipment and fungicides are safely stored, wash yourself thoroughly with soap and water.
5. If you accidentally spill any fungicides on exposed skin, wash immediately.

Formulations of fungicides

Fungicides are formulated as wettable powders, dusts, emulsifiable concentrates, granules, and aerosols.

Wettable powders—Most fungicides are formulated as wettable powders. They are easily wetted and disperse well in water. They also contain a wetting agent that allows for uniform spread and distribution of the fungicide on the plants. Since wettable powders do not form a solution, agitate the mixture frequently.

Emulsifiable concentrates—These are liquid fungicides with the active ingredient dissolved in a solvent. When added to water the emulsifiable materials form a milky mixture that is a suspension of active ingredient plus emulsified solvent in water.

Dusts—These are fungicides that have been ground into fine dust particles. They usually contain from 4 to 10 percent active ingredient. The fungicide is applied in the form of a dust.

Flowables—These are closely related to wettable powders. A flowable contains technical fungicide and flowable material, both of which have been ground to very fine dimensions and suspended in a small amount of liquid.

Aerosols—The fungicide is stored in a container under pressure. A propellant forces the mixture into the air as tiny droplets that are dispersed in the air and on the plants. Aerosols are used mostly in greenhouses.

Applying fungicides

Various types of sprayers are available, but the hand compression sprayer is inexpensive and suitable for general lawn and garden use. It is not suitable for spraying trees more than 10 feet tall. Powerful sprayers are needed to spray larger trees, and it may be wise to hire someone to do this work for you. Whatever type of sprayer you use, follow the label instructions for the proper dosage of fungicide. Do not exceed this amount to "do a better job." Wash out the sprayer after each use, and let it dry thoroughly so it does not rust.

Do not use a garden hose sprayer for applying wettable powder fungicides. Do not use a weed sprayer for any other purpose no matter how thoroughly you try to clean it out.

Most fungicides are protectants that prevent diseases from starting or spreading. They do not cure diseased plants. Apply fungicides early enough to prevent diseases from starting or to halt the further spread of existing diseases. Apply sprays uniformly in a fine mist just until the spray begins to run off plant surfaces.

Shelf life of fungicides

If fungicides are stored under dry, above-freezing conditions with the container properly closed, they will retain their effectiveness for 2 years. Purchase only the amount of fungicides that can be used readily in a couple of growing seasons, thus eliminating the need for long term storage. Listed below are a few hints which may indicate the ineffectiveness of a fungicide kept under storage.

Formulation	Symptoms of ineffectiveness
Emulsifiable Concentrates	Milky formation does not occur when water is added or if separation layer is noted.
Wettable Powder	The fungicide will not suspend in water but rather lumps together.
Dusts	Reaction same as wettable powder.
Aerosols	Generally quite effective unless can opening is damaged or obstructed in some way.

Fungicide storage and disposal

Fungicides should be stored in the original package with the label preserved. The label will (or should) indicate how long that material can be stored, so write the purchase date on the package. Keep fungicides in a locked cabinet where only responsible persons have access to them. The cabinet should be high enough so children cannot get into it in case you forget to lock it. Keep fungicides dry and away from stored weed killers, whose fumes may contaminate the fungicide. Follow the label instructions for disposal. Never re-use pesticide containers for any purpose.

Chemicals used in plant disease control practices are listed by common name and trade name followed by a few examples of ornamental and vegetable crops. This indicates that the fungicide is registered for use on those crops. In most cases, many of the specific fungicides can be used on several additional crops. This information can be obtained by **CAREFULLY READING THE LABEL** to determine fungicide use on other crops.

Trade name	Common name	Host and disease
Benlate	benomyl	Rose, chrysanthemums, geraniums, beans, melons, cucumbers, turf. Control of various soil and foliar fungi.
Karathane Mildex Arathane	capryl	Roses, lilacs, shrubs, cucumbers, squash, pumpkins. Control of powdery mildew.
Captan Orthocide 50 Stauffer Captan 50	captan	Roses, chrysanthemums, begonia, beans, carrots, cucumbers and turf. Control of various soil and foliage fungi.
Bordeaux mixture Tribasic copper sulfate	copper	Begonia, tulips, glads, potatoes, cucumbers, tomatoes. Control of many fungal and bacterial diseases.
Botran	dicloran	Chrysanthemums, geraniums, roses, lettuce, beans. Control of Botrytis and other foliar fungi.
Phaltan Ortho Rose & Garden	folpet	Asters, chrysanthemums, zinnias, cucumbers, onions, tomatoes. Control of various foliar fungi.
Dithane M-45 Fore Manzate	maneb	Peony, dahlia, geranium, sweet corn, squash, potatoes and turf. Control of various foliar fungi.
Terraclor	PCNB	Preplant soil application. Begonia, snapdragon, bedding plants, potatoes, beans, cabbage. Control of soil-borne Rhizoctonia.
Vapam V.P.M.	SMDC	Oak, elm—soil sterilant.
Agrimycin Agri-Strep Phytomycin	streptomycin	Tropical foliage plants, orchids, geranium, peppers, tomatoes, potatoes. Control of bacterial diseases.
Dusting sulfur Wettable sulfur	sulfur	Aster, daffodils, iris, beans, cucumber, melons. Control of powdery mildew.
Arasan Tersan Thiram Thylate	thiram—seed treatment	Fungicide used to coat seed and thus protect it from various seed rot fungi.
Dithan Z-78 Zineb Parzate	zineb	Chrysanthemums, delphiniums, geraniums, beets, carrots, radish. Control of various foliage diseases.
Dexon		Bedding plants, outdoor flowers. Control of various soil-borne fungi. Beets, peas, spinach as seed treatment.
Dyrene	scope	Glads, cucumbers, onions, squash, turf. Control of various foliar fungi.
Difolatan	none	Cucumber, potatoes, onions.
Daconil 2787 Bravo Termil	chlorothalonil	Rose, begonia, geranium, beans, carrots, squash, turf. Control of various foliar fungi.
Actidione-thiram		Begonia, phlox, roses, zinnias, turf. Control of powdery mildew.

The information given in this publication is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Minnesota Agricultural Extension Service is implied.

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