

Agrichemicals for apple disease and insect control

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Fungicides for apple disease control

Diseases and insects in home gardens at times may need agrichemical applications to maintain acceptable plant health and protect fruit from damage. The purpose of this summary is to provide examples of fungicides and insecticides that may be available for backyard use.

Fungicides are used to kill and/or prevent the growth of fungi and their spores, such as powdery mildew and apple scab, on plants. There are also different specificities of fungicides, which include site-specific fungicides and multi-site fungicides. Site-specifics react with one specific biochemical process, such as cell division, multi-sites interfere with multiple metabolic processes at once.

There is potential for phytotoxicity when using fungicides on plants. Phytotoxicity is damage to plants when using a chemical spray and can happen for a variety of reasons, including spraying when temperatures are high, under slow drying conditions, and on plants that are already under stress. Some fungicides are more prone to phytotoxicity than others and some are designed to work only on certain plants. Always make sure to read the label of the fungicide and follow the directions exactly to have the safest application. Fruit tree spray mixes, so-called general purpose mix, sold for back yard use may contain both an insecticide and a fungicide.

Partial list of materials for backyard disease control for apples (check label)

Material	Active ingredient	Diseases managed	Notes
Copper	Copper*	Scab, fire blight	Short duration, can cause burning of plant tissue under some conditions, can build up in soil with repeated use.
Captan*	Captan	Scab, sooty blotch, and fly speck	Not compatible two weeks either side of an oil application
Mancozeb	Mancozeb	Scab, sooty blotch, and fly speck	Long days to harvest restriction
Sulfur	Sulfur*	Scab, powdery mildew	Short duration, not compatible with oil
Lime sulfur	Sulfur	Scab, powdery mildew	Caustic, more effective and persistent than sulfur

Spectracide Immunox Multi-Purpose Fungicide Concentrate	Myclobutanil	Scab, powdery mildew	Narrow spectrum action and thus may be prone to pathogen resistance problems
Neem Oil	Azadirachtin*	Powdery mildew and rust	Not compatible with sulfur products, do not use when plants are wet or during extreme temperatures
Monterey Agri-Fos	Phosphorus acid	Downy mildew, root rots, and other water-mold diseases	Not compatible with copper
Bonide Infuse Concentrate, Ferti-lome Liquid Systemic Fungicide II	Propiconazole	Powdery mildew, rust, and scab	Non-bearing apples
Ferti-lome Fire Blight Spray	Streptomycin sulfate	Bacterial leaf spots	Not recommended past bloom

*Some products with this active ingredient may be certified for organic production. See label

Additional comments on fungicide types

Copper fungicides. Regardless of the type of copper compounds, the active ingredient are the copper ions that become available in water on the plant surface. Copper sulfate / bluestone is a type of copper that is totally soluble in water and is traditionally used in a slurry with spray lime as a Bordeaux mixture. The lime helps tie up the copper ions, helps stick them to the plant surface, and promotes a slower release. Specific steps are used to prepare Bordeaux mixtures properly. Some low concentration copper sulfate solution products are available on the market. A third type is fixed copper products which are formulated as copper oxides, basic copper sulfate, basic copper chloride, copper hydroxides, and copper resins to have the copper ions tied up and gradually released on the plant surface. Copper compounds have the potential for damage to plants and so labels should be consulted for instructions for their safe use. Copper is a heavy metal—repeated and heavy use can cause buildup in soils, with negative effects on earthworms and other soil-borne organisms.

Sulfur compounds are available as dusts and suspensions. Sulfur compounds will acidify soils, which may be beneficial for some situations where the pH is too high. Sulfur can burn plant tissue under hot weather conditions. Lime sulfur is a more effective sulfur formulations, but also has potential for damage to green plant tissue under slow drying conditions and hot periods when plants are under stress..

Captan is used for many fungal diseases and is not prone to the development of resistance by fungal pathogens. Captan can cause burning damage on tender young leaves and fruit under slow drying conditions that promote penetration into plant tissue, and under hot conditions that put plants under stress. The potential for damage is greater when captan is applied in combination with oil and wetting agents that

promote chemical penetration into plant tissue. Some varieties of sweet cherries and plums are particularly sensitive to captan injury.

Myclobutanil (sold for backyard use as Immunox and Eagle) is a relatively effective fungicide for multiple diseases. It is somewhat prone to fungal resistance problems if used many times in a season.

Insecticides for Insect Management

Insecticides are used to kill pests that could harm your plants. Similar to fungicides, insecticides may be effective against only certain insects. Insecticides should be used carefully to minimize the risk of harming organisms other than your target pest, such as bees, butterflies, and other beneficial insects. In general, avoid use of insecticides during bloom.

Check pesticide products to see if they are labeled for apples and the insects controlled.

Material	Active ingredient	Insects managed	Notes
Sevin#	Carbaryl	Beetles, larvae	Short duration of protection, can thin apple fruit if used when fruit are small
Malathion	Malathion	Aphids, leafhoppers, beetles,	Short duration of protection
Imidan	Phosmet	Leafrollers, codling moth, oriental fruit moth, beetles	Longer duration of protection than malathion
Neem oil	Azadirachtin*	Aphids, mealybugs, mites, thrips, whiteflies	Can be somewhat phytotoxic under hot conditions
BT (Bacillus thuringiensis)	Bacillus thuringiensis*	Larvae of leafrollers, and other internal feeders	More effective under warm temperatures
SpinTor, Entrust*	Spinosad	Larvae, thrips	Toxic to bees until dried
Surround	Kaolin clay*	Plant bugs, curculio, larvae	Acts by irritating the insect
Permethrin	Permethrin	Beetles, larvae	Short duration of protection
	piperonyl butoxide		Often sold in a mix with other pesticides to enhance their activity
Horticultural oil		Scale, aphids, mites	Kills by smothering, potential for phytotoxicity,

			incompatible with sulfur and copper
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*Organic insecticide

Additional Comments on Insecticides

Malathion is a broad spectrum insecticide is most useful for insects that can be sprayed directly, due to its short duration of coverage.

Horticultural oils. Active ingredients for oil include mineral (petroleum), fish, and plant oils. Petroleum oils are the most commonly used type for insect management in fruit orchards. Petroleum oils range from heavier 100-sec oils used when buds are dormant, midweight 70-sec oil used when green tissue is starting to show, to lightweight ultra-fine oils used in summer.

Surround is non-toxic material that is applied with water to coat plant surfaces with a fine white powder irritating to insects. Repeated applications are needed to maintain an effective barrier.

Pyrethrin is a short-lived insecticide that is most effective when insects are directly sprayed. The organic control options include BT (*Bacillus thuringiensis*) sold as Dipel and permethrin / piperonyl butoxide sold under various product names,

Entrust / Spinosad is made from byproduct of a bacterium. Needs to be ingested by the larvae to be effective.

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