

AN ORGANIC PRIMER

CHALLENGE: How sustainable pesticides & fertilizers are used differs from synthetics because it is vital to keep beneficials healthy. That places a brake on both categories, since a too broad or intense pesticide or fertilizer kills beneficials.

Insecticides:

Bacillus thuringiensis (Bt). Bt, the most common microbial control, attacks leaf- and needle-eating caterpillars once in the stomach. Feeding stops within hours, although death may not occur for a few days. Safe for wildlife and food crops. However, it is controversial due to labs using Bt genes to genetically modify plants.

Citrus oils. Citric oil from peels destroys the waxy coating of insects' respiratory systems and is one of the more effective organic controls. It can harm aquatic invertebrates, however, so it should not be used near streams, ponds, etc.

Diatomaceous earth. Diatomaceous earth, an abrasive powder, cuts the exoskeleton of crawling insects. Insects that ingest DE die within 48 hours. It can cause lung irritation in humans so a mask is recommended for application.

Hot pepper wax. Hot pepper wax repels aphids, cabbage loopers, beet armyworms, spider mites and whiteflies. It lasts up to 30 days and doesn't wash off easily. Avoid use on variegated African violets, sweet basil, parsley, *Dicentra eximia* and fruit trees in bud.

Insecticidal soaps. Insecticidal soaps, salts of fats and oils found in animals & plants, dehydrate soft-bodied insects. Insecticidal soaps require application every 7-10 days to infested areas.

Horticultural oils & sprays. Horticultural oils coat insects' airways, as well as eggs, and suffocate them. Look for products made with organic oils like sesame seed, neem seed, rosemary & fish oil, as opposed to petroleum-based. They can be used on food crops, but some plants can be damaged in high temperatures or low humidity. Do not combine with sulfur. There are 2 primary types of oils, named for when they are used: summer oils & dormant oils.

Other oils. Extracts from plant material, including garlic, clove, cedar, lavender, eucalyptus, pennyroyal and citronella, should not be confused with horticultural oils. They work both by repelling insects and by smothering insects.

Pyrethrins/pyrethrum. Pyrethrins, made of the ground-up flower head of *Chrysanthemum cinerariaefolium*, disrupts insects' nervous systems. Most pyrethrins are toxic to cold-blooded animals. Don't confuse pyrethrins with pyrethroids, which are synthetic compounds based on pyrethrins.

Spinosad. Spinosad, derived from a new bacteria species discovered in 1982, affects the nervous system and results in death within a day or 2 when ingested. It's touted as a Bt replacement.

Fungicides:

Bordeaux mixes. Apply Bordeaux mixes (copper sulfate & hydrated lime) in early spring. Burning can occur at below 50 degrees and in high humidity. Excessive use can build up copper in the soil.

Copper sulfate. Apply copper, a preventative, when leaves can dry quickly. It's toxic to fish and aquatic invertebrates, so don't use near streams or ponds. Copper will not break down in the soil.

Lime sulfur. Lime sulfur controls foliar disease as well as mites, psyllas and some sap-eating insects. Do not overlap with horticultural oils.

Sulfur. Sulfur controls mites & prevents foliar disease. Do not apply to plants treated with horticultural oil within the last 4 weeks. Sulfur corrodes metal, so apply with a plastic sprayer.

Herbicides:

Systemic. There are currently no proven systemic organic herbicides that work in a similar manner to Roundup, where a pesticide enters the vascular system.

Contact. Contact herbicides like citric acid, acetic acid (from vinegar), clove oil and cinnamon oil need repeat application. Concentration levels are important. Table vinegar, for example, is about 5% acetic acid, whereas herbicide levels are at least double that level.

Suppressant. Mulch/compost, corn gluten and landscape cloth/mats prevent weeds from reaching sunlight. Corn gluten works by dehydrating tender shoots as a weed control, most experts recommend a 4" layer. Corn gluten breaks down fairly rapidly.

Fertilizers:

Organic fertilizers do not emphasize nitrogen, phosphorus and potassium (N-P-K). While those elements are included, they are in much lower percentages. The remaining material is made up of many of the trace ingredients also needed by plants. Organic fertilizers come in 3 main forms.

Plant derived. Composts, seaweed/kelp, dry molasses, ash, whey, alfalfa, cornmeal and cottonseed meal.

Animal derived. Manure, bone meal, hoof & horn, fish meal, fish emulsion, shellfish meal and worm castings.

Minerals. Green sand (from ancient sea beds), lava sand, mine rock phosphate, sulfate of potash and limestone.

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