Today's GardenCenter
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A Guide To How

Organic Active Ingredients Work

Organic products are more popular than ever with your customers, but their active ingredients and the way they work may be different than the conventional products you and your staff are familiar with. Use this quick reference to understand how organic products work.

Insecticides

Bacillus thuringiensis (Bt) Bt attacks leaf- and needle-eating caterpillars through ingesting the bacterium. Feeding stops within hours, although death may not occur for a few days. There is some controversy due to Bt genes being used in genetically modifying certain crops to make them more pest resistant.

Citrus oils Citric oil from citrus peels destroys the waxy coating in 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 DE, an abrasive powder, cuts the exoskeleton of crawling insects. Also, insects that ingest DE die within 48 hours. It may cause lung irritation in humans, so a mask is recommended for applicators.

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

Insecticidal soaps Insecticidal soaps are salts of fats and oils found in animals and plants. They work by dehydrating soft-bodied insects and require application every seven to 10 days to infested areas.

Horticultural oils and sprays Horticultural oils coat insects' airways, as well as their eggs, and suffocate them. Be aware there are both organic- and petroleum-based versions, so double check which is used before promoting as an organic product. These can damage plants in high temperature and low humidity conditions. Do not combine with sulfur. There are two primary types of horticultural oils: summer and dormant.

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

Pyrethrins/ pyrethrum Pyrethrins, made of the ground up flower head of *Chrysanthemum cinerariifolium*, disrupt insects' nervous systems. Most pyrethrins are toxic to cold-blooded animals. The similar sounding pyrethoids are synthetic compounds based on pyrethrins.

Spinosad Spinosad is derived from a bacteria species discovered in 1982. It affects the nervous system and kills insects within a day or two of ingestion. It's touted as a Bt replacement.

Fungicides

Bordeaux mixes Bordeaux mixes are a combo of copper sulfate and hydrated lime and should be applied in early spring. Leaf burn can occur when temperatures dip below 50°F and in high humidity. Overuse can create copper build up in the soil.

Copper sulfate Apply copper, a preventative, when leaves can dry quickly. It's toxic to aquatic creatures, so do not use near streams and ponds. It will build up 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 and prevents foliar disease. Do not apply to plants treated with horticultural oil within the past four weeks. Sulfur corrodes metal, so a plastic applicator is best.

Herbicides

Systemic There are currently no proven systemic organic herbicides which enters the plant through its vascular system.

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

Suppressant Mulch/compost, corn gluten and landscape cloth/mats prevent weeds from reaching sunlight. Corn gluten works by dehydrating tender shoots as they emerge from the soil. It breaks down quickly and may need to be reapplied. For mulch or compost to work as a weed control, it needs to be a thick layer of about 4 inches.

Fertilizers

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

Plant derived Common forms are composts, seaweed/kelp, dry molasses, ash, whey, alfalfa, cornmeal, corn gluten and cottonseed meal.

Animal derived The most common forms are manure, bone meal, blood meal, hoof and horn, fish meal, fish emulsion, shellfish meal and worm castings.

Minerals Popular minerals for organic fertilizers are green sand (from ancient sea beds), lava sand, mine rock phosphate, sulfate of potash and limestone.