

Botanical Insecticides

Some insecticides are derived from plants or plant products and are safer to use. However, they **may kill beneficial bugs as well as pests.**

Pyrethrins (Pyrethrum) are extracted from flower petals of *Chrysanthemum (Tanacetum)* species (pyrethrum daisies). They act as nerve poisons, knocking insects down on contact, but often don't kill them. These products usually contain another active ingredient that gets rid of insects. Pyrethrins break down rapidly in sunlight and should be applied in the evening or on overcast days, to avoid temperatures above 32°C. Exposure to pyrethrins may result in skin allergies, sneezing, and/or a runny nose. While this product is normally not toxic to plants, maidenhair fern may be adversely affected. Pyrethrins are extremely toxic to fish.

Rotenone is extracted from roots of tropical legumes. It must be ingested by the target pests to be effective. Rotenone is toxic to non-target insects and mites and extremely toxic to fish and pigs. Exposure to Rotenone may cause mild skin or eye irritation in some individuals.

Bacillus thuringiensis var. kurstaki, (B.t.k.) can be used by homeowners for control of caterpillars (Lepidopteran larvae) that feed on plants. It only affects butterfly and moth larvae, although other strains of this bacteria are available for controlling other insects. *B.t.k.* is a naturally occurring soil bacterium. It must be eaten by the target pest in order to be effective. *B.t.k.* breaks down in the environment after approximately 2 days. Inhalation of this product can result in allergic reactions in sensitive individuals. **Do not use *B.t.k.* if you are trying to establish a butterfly garden.**

Diatomaceous Earth is composed of fossilized diatoms (microscopic sea creatures). It acts by scratching the outer waterproofing layer of the insect's body, which leads to dehydration. In order to be effective, pests must come into contact with this product (e.g. crawl through it). It should be applied to areas where pests feed (e.g. leaf surfaces), or to areas where pests live (e.g. cracks and crevices for earwigs, around ant hills etc.) It must be reapplied after heavy rain. A dust mask and goggles are recommended when applying this product, to keep diatomaceous earth out of your eyes and lungs.

Dormant Oils and **Superior Oils** act by plugging the holes that insects and mites, as well as their eggs, use to obtain oxygen from the environment. They may also prevent disease spores from germinating. Dormant oils must be applied after leaves of deciduous trees and shrubs drop in the fall or before growth begins in the spring. Superior oils are more highly refined, and can be applied when deciduous plants have foliage or to conifers (they evaporate quickly, before damage to plants occurs). Both are sold as liquid concentrates that are mixed with water for application. They can be used to manage scale insects or insect and mite eggs. They should not be applied when freezing weather is predicted or while foliage is wet. Oils must have time to dry before rain or heavy dew is predicted. Some plants are damaged by oils - read the label carefully to make sure that the plants you are spraying will not be harmed (e.g. Blue spruce, maple, ferns, etc.). Oils should not be applied to plants that are stressed by disease or drought, or when the temperature is above 30°C. If in doubt, spray a small test area, and wait for 48 hours to see if the plant is damaged (you will see discolouration or burning of foliage) before treating the entire plant. Superior oils are non-selective, killing any insects and mites contacting the spray.

Insecticidal Soaps contain unsaturated long-chain fatty acids similar to those in household soaps. They kill insects by dissolving the outer, waterproofing layer of an insect's external skeleton (cuticle), causing death by dehydration. They are most effective against small, soft-bodied insects such as aphids, whitefly, mites, and other small, soft insects (e.g. small caterpillars). They are also very effective against earwigs. Applications must be repeated to kill any newly hatched eggs, usually every seven to 10 days, until pest numbers are reduced. Insecticidal soap must come into contact with an insect to work, so all plant surfaces must be thoroughly sprayed. It has no effect once it dries on the plant. Soaps should not be sprayed onto plants during hot sunny periods as plants may be harmed. If in doubt, rinse soap off of treated plants after a few hours.

Soap **can damage** some plants (especially bleeding heart, crown of thorns, gardenia, horse chestnut, japanese maple, maidenhair fern, mountain ash, poinsettias, and sweet peas).

Insecticidal Soaps will kill beneficial insects and mites that come into contact with the spray.

Boric Acid is manufactured from Borax and kills pests that ingest it. It is available as dusts, baits, or as a liquid. Boric acid is used primarily as a bait for control of ants. It should be kept out of reach of pets and children, and may kill plants that are exposed to it. It is extremely persistent in the environment.

Nematodes

- Parasitic nematodes are widely available for use on lawns to manage white grub populations. These are microscopic worms, which kill both June Beetle and European Chafer larvae. They are living organisms and must be handled with care when being applied to lawns. They must be kept cool before application (keep refrigerated) they must not be exposed to light
- They are mixed with water, and applied to lawns using a hose-end or back-pack sprayer. This must be done at dusk or on an overcast day to avoid exposure to light. Do not let the nematodes sit for more than 2 hours after they have been mixed with water.
- Place the nematodes where there are grubs. Water the lawn area thoroughly after applying the nematodes. Nematodes must be applied to moist soil, with a soil temperature of at least 15°C.
- Nematodes will stay in the soil for 60 to 90 days. It is best to apply nematodes just after eggs have hatched if conditions are not too hot and dry.