



# Organic Gardening–Natural Insecticides

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Despite our best efforts, nonchemical methods sometimes fail to prevent excessive insect damage in the garden. At such times, the use of insecticides may be the only alternative left to save the crop. When damage becomes great enough to warrant emergency measures, organic gardeners often will want to use natural insecticides and various homemade botanical sprays, instead of synthetic organic chemicals.

The insecticide used should have low toxicity to man and to other warm-blooded animals. Insecticides should be used only when needed and in strict accordance with label directions. A good understanding of insecticides allows these materials to be used effectively without harming you or the environment.

The following information may help New Mexico gardeners select a natural insecticide for their specific needs:

**Pyrethrum**—Botanical insecticide. This slightly toxic insecticide is derived from the flowers of a species of chrysanthemum imported mainly from Kenya and Ecuador. The material causes rapid paralysis of most insects, but the insects usually recover unless the pyrethrum is combined with a synergist or other poison. Pyrethrum mixed with synergists such as piperonyl butoxide or piperonyl cyclonene increases toxicity and produces longer, residual action, and is used extensively in space sprays, household sprays, crop sprays and dusts. This chemical is registered for use on most vegetables and fruits at any time during the growing season.

**Nicotine**—Botanical insecticide. Pure nicotine is a tobacco extract highly toxic to warm-blooded animals. The insecticide usually is marketed as a 40% liquid concentrate of nicotine sulfate, which is diluted in water and applied as a spray. Dusts can irritate the skin and are not normally available for garden use. Nicotine is used primarily for piercing-sucking insects such as aphids, whiteflies, leafhoppers and thrips. Nicotine is more effective when applied during warm weather. It degrades quickly, so it can be used on many food plants nearing harvest. It is registered for use on a wide range of vegetable and fruit crops.

**Sabadilla**—Botanical insecticide. Sabadilla is obtained from the seeds of a lily-like plant and acts as both a contact and stomach poison for insects. It is not particularly toxic to mammals, but it does cause irritation of the eyes and respiratory tract. A mask should be worn when working with this insecticide. This material deteriorates rapidly when exposed to light and can be used safely on food crops shortly before harvest. Generally Sabadilla is used as a 5 to 20% dust or as a spray.

**Rotenone**—Botanical insecticide. Rotenone is extracted from the roots of derris plants in Asia and cube plants in South America. This general garden insecticide is harmless to plants, highly toxic to fish and many insects, moderately toxic to mammals, and leaves no harmful residue on vegetable crops. It acts as both a contact and stomach poison to insects. It is slow acting and, in the presence of sun and air, its effectiveness is lost within a week after application. Wear a mask during application because rotenone can irritate the respiratory tract. Rotenone dusts and sprays have been used for years to control aphids, certain beetles and caterpillars on plants, as well as fleas and lice on animals.

**Neem**—Botanical insecticide. Neem oil is an extract from the Neem tree, *Azadirachta indica* (Meliaceae). The neem tree is native to Southeast Asia and grows in many countries throughout the world. It is a close relative to the common Chinaberry tree. This tree propagates readily from cuttings, stumps, tissue culture or seeds. It is widely used as a shade tree in many areas because it tolerates a wide range of conditions. The neem tree has many medicinal uses. It has been used as an antiseptic and diuretic. It has been used to cure disease from diabetes to syphilis, and widely relied upon by herbalists in its native habitat. The uses of the neem tree as a source of natural insecticides was discovered over 40 years ago.

The seeds of the neem tree contain the highest concentration of azadirachtin and other biologically active compounds. Because they contain the highest concentration of these compounds, most experimental and commercial preparations of neem are seed extracts.

Some of the commercial insecticides registered by EPA are: Turplex, Neemguard, Margosan-0, Wellgro, Repe-lin, Neemis, NeemazaL and Neemark.

These products generally are well known for their anti-feedant activity. The Lepidoptera (moths and butterflies and their larvae) are the most affected order of insects. These compounds also act as growth regulators, which causes some larvae to remain in a permanent larval stage.

Registered pesticide labels may vary, and you should carefully study the label before use.

### Other Pesticides

Gardeners have been using soap to control insects since the early 1800s. During the first half of the 19th century, whale oil soap and, more commonly, fish oil soaps were an important part of insect control. Recent tests indicate Ivory Liquid dishwashing detergent, when diluted with water to a 1 to 2% solution, provides the most consistent control and is easy to mix. There are also soaps available that are specifically formulated to control insects on plants. Thorough coverage of the plant and repeated applications may be necessary to bring insect populations under control. High rates of soaps and detergents may damage some varieties of plants. The most effective soaps have carbon chains of C-12 or C-18. Laurate (C-12) is the main component of most dishwashing liquids and various other products in common usage. The richest natural source of this is coconut oil.

Organic gardeners have been using a spray mixture of onions, garlic and pepper to control insects for many years. Recent scientific research indicates using this mixture has been erratic and, in many cases, ineffective for insect control. Sprays of food-derived substances may have no or sporadic success.

Spraying several times a week may help to bring infestations under control. Expecting control with one application is unrealistic.

### Safe Use of Pesticides

When it is necessary to use insecticides to protect the garden, use them wisely and safely. The following tips will help you make better use of insecticides.

- Inspect the entire garden at least weekly to monitor insect numbers and activity. Pay particular attention to underside of leaves where mites, whiteflies, aphids and insect eggs occur. If treatments are applied when an infestation first starts, insect numbers can be maintained at lower levels much more easily, and with smaller amounts of chemicals.

- Apply insecticides to all plants surfaces so an insect anywhere on the plant will be exposed to a lethal amount of the chemical. Do not apply insecticides to wilted plants or during the hottest part of the day. Apply dusts only when the wind is calm and plants are dry. Sprays should be applied when the wind is no more than 5 to 10 miles per hour. Repeated treatment may be necessary after a rain.
- Apply insecticides only at recommended dosages. Increased amounts can be dangerous, cause plant damage and leave harmful residues without improving insect control.
- The length of effective control with insecticides varies widely. The longevity of toxic properties varies primarily with the product, formulation, water, pH and environmental conditions. Temperature, humidity, wind and sunlight affect insecticides. The greater the extremes, the sooner the insecticides are detoxified.
- The time interval required by the Environmental Protection Agency between treating a crop and harvesting that crop varies with the insecticide and the crop. This information is printed on the pesticide label to ensure that any residues will be within established tolerances at harvest time.
- Always read and follow mixing and application instructions on the insecticide label for safe and effective insect control.
- Some synthetic organic materials are actually less toxic and more efficient than some natural insecticides. Because a material is a natural pesticide, it does not necessarily follow that it is not toxic to man or harmful to the environment if used improperly.

In most situations it is helpful to use several control techniques to reduce insect pest populations to low enough levels that insecticides are not required, or are needed only sparingly. With reduced insecticide use, biological control agents can become more effective, insecticide costs will be saved, and you will have the satisfaction of knowing that few, if any, poisons were applied to edible crops.

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