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# ORGANIC PEST CONTROL

## Organic Pest Control

One of the foundations of gardening organically, is the total absence of the use of synthetic pesticides in pest and disease control. In this article, pest control will refer to the control of damaging insects, diseases and animals. People using organic methods of pest control can eliminate concerns of dangerous chemicals and their effects on themselves, children and pets. Synthetic chemicals can also impact the beneficial organisms of the soil, which are a critical part of the organic garden. Synthetic chemicals are also found to potentially contaminate groundwater, and their manufacture (mostly from petroleum bases) leaves a large carbon footprint on our earth.

Controlling pests with organic methods and products can be combined with a strategy of pest control called Integrated Pest Management (IPM) to effectively keep pests to a minimum. Let's get started by looking at the various components of IPM and Organic Pest Control.

### Scouting and Evaluation

We tend to put our plants in the ground and forget about them. The more ambitious souls get out to pull some weeds and water. Only when we see a half eaten or wilted plant do we really look at the plant, and then with alarm and indignation. "What happened?" is a common reaction. Scouting involves getting out amongst your gardens on a regular basis to look AT the plants, examine their parts for health and evaluate their growing conditions. Is the plants color good? soil moisture optimum? getting enough/too much sun? and being on the look out for signs of pest activity. If plant damage or pests are discovered, it is time to identify the plant and the pest and decide what to do.

### Threshold limits

What if we found an infestation and did nothing? In an organic garden, the need to blast every insect you see, takes a back seat to preserving a balance between the good and not-so-good. Being tolerant of a few bugs is OK. There is a population of beneficial insects that need the bad guys for their lunch. This is the definition of a threshold limit. It's a point below which no action is needed. Just above which, try hand picking the bugs off into some soapy water, or spraying off with the water hose, or pruning off (if not a critical growing point of the plant). Well above that point, then we move into active control of the pest.

### Cultural Controls

Cultural controls are activities that can be done during planning, planting or growing of the garden to affect the health of the plant. Such as:

- Providing the proper soil environment before planting, as in soil testing, adding the proper amendments and lots of organic matter, checking for excess or insufficient drainage, and controlling weeds.



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Choosing varieties of plants resistant to pest problems. It is not just the new varieties. Many of these new varieties are new today and gone tomorrow. Find out which varieties do well in your local or zone. It might be that old fashioned variety no one but the old timer down the street knows about!

- Crop rotation. Which means don't plant the same plant in the same spot over and over. This tends to attract an increasing number of pests to the plant each succeeding year and can build a nasty soup of disease organisms in the soil. Put those petunias some where else for a couple of years.
- Companion plantings. You'll have to do a little reading and note taking for this, but there is an amazing list of plants that, when planted in close proximity to each other, help each other grow. Most of us have heard of the tip to plant marigolds in the vegetable garden, as they repel certain pests. Others attract beneficial insects, and many look great and delightfully different, paired up.
- Sanitation. This involves getting out there in the garden and cleaning up. Dropped fruit, dead leaves, dead branches, old blooms, weeds. All are fodder for pest problems.
- Pruning. What better way to get rid of that diseased branch tip on the apple tree than to just nip it off with your trusty Felco pruners. It is good for all plants to be properly pruned, and many an infested plant has been saved to grow another day by pruning out the 'bad' parts.
- Fertility. In a rich, loamy, organic soil, getting the proper mix of nutrients to plants is rarely an issue. But sometimes nutrient imbalances or deficiencies occur. Know how to spot these early and correct them.
- Watering. So many problems can be traced back to water. Watering too much, not enough, overhead, wrong time of day, etc. Watering is an art form that you learn by experience, so get out there and get your feet wet!
- Mulching. Want to cut your work in half? Have fewer weeds? Healthier plants? More flowers and fruit production from your plants, trees and shrubs? OK, then mulch. With the right mulch and the right amount, mulch tremendously improves the soil, conserves moisture, so you water less. It also keeps weeds down, requiring less tillage, which is better for the soil. This all adds up to less work. Yea!

## Physical Controls

The easiest controls methods involve no chemical controls at all.

- Pruning the affected part of the plant off, as long as the plant is not seriously harmed by the pruning.
- Picking the pest off and destroying it. Very effective against caterpillars and bugs.



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- Washing off with a water spray can be effective against light mite infestations and aphids.
- The number of products that use attractants to trap insects is increasing, as are their effectiveness. They can also clue you in to when to start looking for them on plants. Do not use the Japanese beetle traps, as university research has shown to actually increase resident population of Japanese beetles.
- Exclusion by use of netting, and fencing materials is a permanent way of ridding yourself of animal pests. For some, like deer, it seems the only sure way to avoid damage.

## Repellants

Ok, let's dip our toe into the "applied controls" category. Repellants can be an effective way of keeping pests away from your plants in the first place. There are several concoctions that can be made at home with garlic and hot peppers and even cinnamon. Or their commercial brethren can be purchased at the garden center. There are several animal derived repellants on the market for repelling rabbits, squirrels, deer and the like. These are variously made from predator urine, dried blood, putrefied egg, and God knows what.

## Minerals, Soaps and Oils

Several products exist that do a good job of pest control and should be considered first before descending down the ladder of more toxic pest controls. Remember, even though they are organic, some organic chemicals are toxic. So let's try these less-toxic options first.

- **Soaps:** Technically called potassium salts of fatty acids, these soap products work against soft bodied insects and some diseases. They dissolve the skin of insects and disrupt cell membranes in disease organisms, Non toxic and easily made at home or bought in the garden center, this product is easy to use. The soap must cover the insect to work.
- **Horticultural Oils:** A refined petroleum oil, this product smothers the insect with a oily covering and is very effective against soft bodied insects, their eggs, and some diseases. There are a couple of "grades" of oil and choosing the right grade is important. Dormant oil is used on many plants during dormancy to control the eggs and dormant insects over-wintering on the plants. Horticultural oil is a lighter oil used during the growing season on a wide variety of plants for active insects, mites and some diseases. Very important to read the label.
- **Botanical oils:** A relative newcomer to the commercial market, oils from plants have been used by old time gardeners for a long time. But commercial formulations of cinnamon, rosemary, canola and other botanical oils are starting to show up with good reviews on there effectiveness.



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**Diatomaceous Earth:** The fossil remains of diatoms, a form of sea algae, this fine abrasive powder disrupts the exoskeleton of insects, slowly killing them.

- **Kaolin Clay:** Currently marketed to commercial apple grower as Surround WP®, this product is a edible mineral, long used as an anti-caking agent in foods. In a spray it seems especially promising on fruit trees of plum and apple against insects.
- **Potassium bicarbonate:** Found to be a effective fungicide, it appears to damage the cell walls of fungal organisms. The effect is immediate, lasts 2-3 weeks and can be used up to harvest on fruiting plants.
- **Sulfur and Lime-Sulfur:** Sulfur has been long used against many diseases and mites on many plants. Only lasts 7-10 days. There are a lot of cautions when using Sulfur. Read the Label! Lime-Sulfur is more powerful at killing disease spores than sulfur, but can damage plants easier. Best used on dormant plants at full strength. Again, read the label.
- **Bordeaux Mix:** A copper fungicide, highly toxic to fungus diseases and some plants. Safest time to use is just before bud break in spring.

## Biological controls

Biological controls include predators, parasites and pathogens of insect and disease pests. They are either introduced into the area or soil of the host plant or can be attracted to the area by habitat creation. They can be highly effective in control pests, especially those organisms introduced into the soil. The drawback of predatory insects is that they can leave the area and may have to be re-introduced. Most of these can be purchased at the garden enter or online for quick shipping. Many are offered only during certain times of the year (when it is warm).

**Predators** include: Lady Bugs, Lacewing Larvae, Praying Mantis egg casings, Pirate bugs and a few others. All do a fair to good job of controlling insects in the gardens.

**Parasites:** Nematodes are soil borne roundworms that carry a bacterium lethal to insects. Several strains available. Introduce by making a slurry with water and pouring it around the host plant of concern. Good for control of grubs and fungus gnats. Harmless to humans.

There are also several species of parasitic wasps that prey on mostly destructive caterpillars.

## Microbials

**Bacillus Thuringiensis**, or Bt, is a microorganism that produces a toxins in the insect that eats it and eventually kill the insects. Bt is very specific to the kind of insect it kills. There are many subspecies of Bt tailored to various pest insects. Most work best on early larval stages of the insect. Fairly safe to people, animals, birds and fish.



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**Bacillus Subtilis:** Sold under Serenade® and other names, this microbial does a good job of control various fungal and bacterial diseases on many plants. Non toxic and easy to spray on, good coverage is essential and should be applied before disease pressure

is high. Another Bacillus, variety **pumila** is also effective against several fungal diseases.

**Pathogens:** Included in this are Beauveria bassiana, or Milky spore disease. This fungal spore is used to control grubs in a lawn. Very specific in its action, and should be applied several times over a three year period to build population. Read the label as always.

## Botanical Pesticides

The most pesticide-like of all pest controls, they are organic in that they occur naturally or are derived from a natural source, a plant. They can be quite toxic to humans and wildlife, but are short-lived in their effect. I believe we are in the infancy of research in these kinds of products. We know very little of the complex chemicals found in plants around the world. The materials listed below are most commonly found in garden centers under various commercial names.

**Pyrethrins:** Derived from the Chrysanthemum flowers, this extract is quick acting against a wide variety of insects has low toxicity to animals and degrades within a day, especially in sunlight.

**Neem Oil:** An extract of the Neem tree seed in the tropics, this chemical compound has found itself in a variety of products touting insecticidal and fungicidal control properties. The oil interferes with the growth of the insect. It is commonly mix with insecticidal soap to enhance the activity of both. The effect is short lived. Chemically breaks down in one day. Non toxic to humans.

**Rotenone:** From the roots of tropical legumes, most often purchased as a dust. Suffocates insects by interfering with cellular processes. Quite toxic, broad spectrum activity against a variety of insects. Low residual and breaks down quickly.

## Specialty Microbials

**Spinosad:** Produced from aerobic fermentation of a tropical bacteria. Applied as a spray, it is a fast acting, broad spectrum insecticide. Insect must ingest the spinosad, which then acts on the nervous system to kill insect. On foliage, it is quickly degraded in sunlight, but can persist for a long time in water or soil without sunlight. Binds tightly to soil particles. Safe for mammals and bees after drying on foliage. Quite toxic to shellfish and aquatic organisms. Works best against caterpillars, thrips, flies and beetles. Do not use more than two or three times a year.



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## Resources

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Integrated Pest Management for Home Vegetable Growers, OSU Extension Fact Sheet HYG-2205-09, 2009. [www.ohioline.osu.edu](http://www.ohioline.osu.edu).

[www.cleanairgardening.com](http://www.cleanairgardening.com). Clean Air Gardening, Good list of garden pest control products.

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