

Alternative Pesticides

Compiled by Jane Morse, UF/IFAS Extension, Pinellas County

Many gardeners mourn the loss of Cygon, Diazinon (Spectracide) and Dursban, but there are many old and new materials which are much better and safer to use. These alternative products:

- Have little to no toxicity to us, our pets and wildlife.
- Break down quickly in the environment and do not pollute resources,
- Are fast acting – insects may take a few days to die, but they quit feeding immediately;
- ...and they are often more effective since many insects had become resistant to the chemicals used in the past.

Remember – before you spray: Integrated Pest Management uses pesticides as a last resort. For each plant species under attack always check cultural practices (proper site conditions, proper watering, fertilizing, etc.). Most problems start with incorrect cultural practices, so address these first. Next effort would be to try soap, oil or *Bacillus thuringiensis* (Bt). If these do not provide sufficient control, you may want to replace the plants with something that is hardier and better adapted. Only spray affected plants (spot treat).

1. Insecticidal Soap

Target Insects: Soft-bodied insects like aphids, some scales, psyllids, whiteflies, mealybugs, thrips, and spider mites

Source: Salts of animal and plant fatty acids

Mode of Action: Disrupts insect cuticle (outer skin); kills on contact

Notes: Must be sprayed on insects to be effective; test on a small area of the plant first to check for potential damaging effect.

2. Horticultural and Plant Oils

Target Insects: Aphids, mites, thrips, scales, mealybugs, and their eggs

Source: Petroleum, vegetable or plant oils (ultra-refined, sesame, canola, citrus, etc.)

Mode of Action: Suffocates insects.

Notes: Thorough coverage of the insect is important. The temperature should be below 90°F and plants should not be water stressed.

Home-made Soap & Oil Sprays

Home-made soap and oil brew. 2-3 tablespoons of mild liquid dishwashing detergent + 2-3 tablespoons of

cooking oil (vegetable, canola, olive, etc.) added to 1 gallon of water. Thorough coverage of the insect is important. Test on a portion of the plant before spraying it entirely.

3. Botanicals

Neem

Target Insects: A variety of chewing and sucking insects

Source: Extracted from the seeds of the neem tree

Mode of Action: Repellent, insect growth regulator; some systemic affect

Notes: Use on actively growing, immature insects. Is also affective against powdery mildew fungus disease.

Pyrethrum/Pyrethrins

Target Insects: Broad range of pests including ants, aphids, roaches, fleas, flies, and ticks

Source: Powders and concentrated extracts of an African flower (*Chrysanthemum cinerariaefolium*)

Mode of Action: Attcks insect's nervous system causing immediate knockdown or paralysis

Notes: Available in dusts, sprays and "bombs". Powder form called pyrethrum; extracts called pyrethrins. Flea powders containing pyrethrum are extremely toxic to cats. Pyrethrins are toxic to aquatic organisms.

4. Slug and Snail Baits

Target Insects: Slugs and snails.

Source: Iron phosphate (occurs naturally in soil)

Mode of Action: Stomach poison

Notes: Lasts about two weeks even through rain and watering. Feeding ceases immediately although it may take a couple of days for the slugs and snails to die.

Home-made Remedies: Coffee and coffee grounds. Coffee concentrations as low as 0.01 percent are effective. A cup of instant coffee contains about 0.05 percent caffeine, and brewed coffee has more. Grounds repel slugs. Beer traps attract slugs but need to be buried at ground level (so they fall in) and deep enough that the slugs can't crawl out before they drown (a yogurt cup is good). It is the fermented product that attracts them and a sugar-water and yeast mixture can be used in place of beer.

5. Biopesticides

Bacillus thuringiensis (Bt)

Target Insects: Only caterpillars and worms (Lepidoptera larvae)

Source: The bacteria *Bacillus thuringiensis*

Mode of Action: Toxin produced by bacteria paralyzes gut of caterpillar

Notes: Must be ingested to be effective. Insects quit feeding immediately but may remain on the plant for 2-3 days. Bt is deactivated quickly by sun and rain; most effective against small, immature worms.

Spinosad

Target Insects: Caterpillars, thrips, leafminers, borers, fruit flies, and fire ants

Source: The soil bacteria *Saccharopolyspora spinosa*

Mode of Action: Contact and stomach poison.

Notes: Insects quit feeding immediately but may remain on the plant for 1-2 days. Effective up to 4 weeks. Highly toxic to bees when wet – use at dusk when bees are not active.

Nematodes

Steinernema scapterisci

Target Insects: Large mole cricket nymphs and adults

Notes: Long-term suppression (>12 years)

Distributors: Prosource One, Lesco, Gardens Alive

6. Molt Accelerating Compounds

Halofenozide (Mach 2)

Target Insects: lawn caterpillars, white grubs

Mode of Action: Ingestion forces a premature, lethal molt

Note: Low vertebrate toxicity (Caution)

7. Baking Soda

As a fungicide:

Target Diseases: Powdery mildew, black spot, leaf spot, anthracnose, phoma, phytophthora, scab, botrytis, and many other diseases. “Remedy” is a commercial product. Thought to disrupt the cell walls of fungal spores.

Home-made fungicide: Sodium bicarbonate (baking soda) in combination with horticultural oils has been shown to control powdery mildew and blackspot of roses when used in a solution of about 4 teaspoons of baking soda per gallon of water with a 1% solution (or about 1 oz) of horticulture oil. Spray weekly to prevent disease.

As a control for ball moss – Ball moss is not a parasite of trees, but can look unsightly. Mix 1/2 pound of baking soda to 1 gallon of water. Spray on ball moss – when trees are dormant or deciduous. Moss dies in a few days, but it takes wind and rain to eventually knock it out of the tree.

Caution: Always read the label of any pesticide before mixing or applying it. Test products (and home-made sprays) on a small portion of the plant; wait a day or two; and inspect for plant damage before spraying the entire plant. Mix up only what you need and dispose of pesticides according to the label. The label is Federal Law and must be followed exactly.

This information was compiled from a fact sheet provided by Hillsborough County and a PowerPoint provided by Eileen Buss, Ph.D.