

Natural Pest Management

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Figure 1 Beneficial lady beetle is a natural predator of aphids

Pest management extends far beyond just using products to eliminate pests. Integrated pest management, or IPM, is a comprehensive approach that utilizes cultural, physical, and chemical controls to prevent, minimize, and treat pests starting with the least toxic methods.

Prevention begins with plant selection, using the Florida-Friendly Landscaping™ principle of “right plant, right place”, which means selecting plants that will naturally thrive in your landscapes given conditions with minimal inputs of irrigation, fertilizer and pesticides. Select plants that are pest and disease resistant when possible. Examine plants carefully at the nursery or garden center before purchasing to ensure you start off with a healthy plant; avoid introducing new pests to your landscape.

Keeping your plants healthy through proper cultural methods, such as appropriate application of irrigation and fertilizer, is key. Healthy plants can fend off insect and disease pests easier than a plant that is already struggling. Keep in mind that overwatering and overfertilizing are more damaging to plants than underwatering and underfertilizing.

Regular scouting, or monitoring, for insects is another important step in IPM. This enables you to catch pest problems early before they expand. This can be a fun way to learn about beneficial insects versus insect pests. Many insects are considered “beneficial” because they eat or attack pests, thereby providing natural insect control. Be careful not to kill the beneficials off in a misguided attempt to control pests. Some examples of common beneficial insects include lacewings and their larvae, ladybugs and larvae, spiders, assassin bugs, parasitic flies (syrphid and tachinid flies) and parasitic wasps. You can encourage beneficial insects to visit your garden by planting a diversity of plants, especially native plants that provide pollen and nectar.

Common pests in our Florida landscapes include scales, mealybugs, aphids, thrips, whiteflies, mites, caterpillars and chinch bugs. Often you will notice the damage caused by a pest before you notice the pest itself. Since many pests are tiny, a trick to detecting them is to hold a sheet of white paper under the leaves and flick them onto the paper. Insects will fall onto the paper, enabling you to more easily observe with a magnifying lens.

When you discover a pest problem, the first course of action should be to remove the insect or affected part of the plant and put in the trash (not compost bin). You can crush or freeze insects overnight before disposing of them in the trash. If the pest issue is large enough to warrant use of a pesticide, start with the least environmentally toxic products, such as horticultural oils, insecticidal soaps, or microbials. Spot treat the affected area rather than broadcasting to the entire landscape. Be sure to read and follow the instructions carefully and remember that the label is the law. Use only on plants labeled for usage.

Horticultural Oils

Horticultural oils are highly refined and derived from petroleum. They work best on small, soft-bodied piercing, sucking insects and mites that are slow moving or immobile. They must be sprayed directly onto and thoroughly cover the pest. Horticultural oils work in a variety of ways: by blocking the insect's spiracles (breathing holes) and suffocating them; interfering with metabolism by disrupting cell membranes; or by blocking gas exchange in the egg membrane. Some may act as a repellent or have anti-feeding properties. Examples of pests that respond well to treatment are scales, aphids, leaf hopper nymphs, and whiteflies.

Neem oil, which is derived from oil extracted from the neem tree seeds, has both insecticidal and antifungal properties. It works best on actively growing, immature insects and can act as a repellent, growth regulator, or feeding deterrent, depending on the formulation. It can also be used to manage powdery mildew.

Insecticidal Soaps

Insecticidal soaps are also effective against soft bodied insects and mites. As with horticultural oils, they must be sprayed directly on the pest and have no residual effects once dried. Insecticidal soaps contain potassium salts of fatty acids, which are naturally found in fats and oils of plants (coconut, olive, palm and cottonseed oils) and animals (fish oil and lard), and are made by saponification with potassium hydroxide.

It is important to understand the difference between insecticidal soaps and other soaps and detergents that are not labeled for pesticide use on plants. While they may all be effective at killing soft-bodied insects, most modern soaps and detergents can be damaging to the waxy protective layer on many plants, causing them to dry out. The plants waxy cuticle is also its primary defense against microbial, fungal, and viral invasion. Detergents can also be harmful to beneficial insects. Because other soaps and detergents can cause damage to plants and are not labeled for use as a pesticide, they are not recommended for use as a pesticide. Instead, look for insecticidal soaps that are formulated and labeled for use on plants.

It is best to apply horticultural oils and insecticidal soaps during the cooler parts of the day as they can injure plants when combined with heat (especially over 90 degrees F). It is advisable to test insecticidal soaps and horticultural oils on a few leaves of your plant before treating the entire plant.

Microbials

Microbial insecticides contain microorganisms such as viruses, fungi, bacteria, protozoa or nematodes, or the natural toxins they produce. They are available in a variety of formulations such as dusts, sprays, liquid concentrates, drenches, granules, or wettable powders. Two of the most common microbials are Bt (*Bacillus thuringiensis*) and spinosad.

Bt is a bacterium that naturally occurs in soil, fresh water or on plant surfaces. Various types of Bt are available and are effective against different insects. For example, Bt. Var. *kurstaki* is toxic to certain caterpillars but not adult moths; Bt. Ssp. *israelensis* (Bti) is effective on fly larvae (including fungus gnats, black flies, and mosquitos).

Spinosad is derived from a species of soil bacteria called *Saccharopolyspora spinosa* that attacks the nervous system of various insects, causing them to stop eating and die with two days. Spinosad is more broad spectrum

than other microbials and is effective against leafminers, beetles, flies, thrips, caterpillars, and spider mites. Because it is toxic to bees, it should be applied in the early morning or evening when they are not actively foraging.

For a more comprehensive exploration of natural pest management methods, refer to the publication *Natural Products for Managing Landscape and Garden Pests in Florida*: <https://edis.ifas.ufl.edu/pdffiles/IN/IN19700.pdf>.

References:

Integrated Pest Management: <https://gardeningolutions.ifas.ufl.edu/care/pests-and-diseases/pests/management/integrated-pest-management.html>

Managing Plant Pests with Soaps: <https://edis.ifas.ufl.edu/in1248>

Natural Pest Control with Oils: <https://gardeningolutions.ifas.ufl.edu/care/pests-and-diseases/pests/management/natural-pest-control-with-oils.html>

Natural Products for Managing Landscape and Garden Pests in Florida:
<https://edis.ifas.ufl.edu/pdffiles/IN/IN19700.pdf>.