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Pest Control Strategies for the Lawn, Landscape & Edible Plants

A common response, when finding an insect or disease symptoms on a plant, is the question “What should I spray”? This typical response suggests that many gardeners think that insects and diseases are normal and expected when gardening. If that was always the case, then how do plants survive in nature where there is no human to run to the garden center to purchase and then apply a pesticide? The simple answer is that plants that have access to all of the nutrients, without any extreme imbalances, and the correct light and water conditions are able to thrive without suffering from insects and diseases. So, when it comes to the discovery of an insect pest or a disease, the first question should be “How can I reduce the stress that my plant is experiencing”? because native pests are typically attracted to plants experiencing some type of stress.

Examples of stressful situations for plants

Too much or too little water (this could be tied to improper watering, poor drainage, etc.)

Too much or too little sunlight (wrong location for the plant)

Too much or too little of a nutrient or a number of nutrients (this includes insufficient amounts, high levels or an imbalance of a number of nutrients)

Incorrect pH of the soil which affects the availability of the nutrients. (could be the wrong location for the plant or the application of lime without soil testing first)

Insufficient rooting area for a tree (typically occurs with large trees planted in small areas)

Step #1 - Identify the cause of the stress for the affected plant(s)

It is possible that the plant is stressed because it was planted in the wrong location. Check the plant’s preferences for the light conditions, soil moisture, and pH levels. If the conditions at that location are not a good match for the plants preferences, then transplant it to a better location and/or replace it with a plant that would be better suited for that location.

The first cultural practice to eliminate from the list of possible stress factors would be watering. Turf should receive $\frac{3}{4}$ of an inch of water at each watering. Trees and shrubs require one inch of water at each watering, every 3-4 weeks during prolonged dry spells. If the stress doesn’t appear to be cultural or due to the wrong location then it is most likely tied to a nutritional issue. Nutritional issues will be covered in Step #5.

Step #2 – Attempt non-chemical control if a pest is identified

If a leaf spot disease is suspected, a simple way to slow it down, and possibly stop it, would be to remove all of the foliage that has visible spots. Simply cut them off and throw them away.

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For insect problems, the first step is **correct identification** to make sure it is a pest and not a beneficial insect.

For insects attacking trees, shrubs, perennials, & edibles it may be possible to;

- prune them off the plant if they are localized on the plant
- spray aphids or spider mites off the plant with a high stream of water
- pick & squish (typically for caterpillars or moths)
- use sticky traps (yellow for whiteflies)

Step #3 – If control is needed, use the least toxic first

If control is needed because the insects already have a high population, choose the least toxic first. Here are some options to choose from:

Home-made soap & oil spray for **insect** control

MIX: 2 TBSP cooking oil + 2 TBSP baby shampoo in 1 gallon of water.

NOTE: Water the plant well the day before you spray.

Shake well before **and during** application.

Do not spray during the heat of the day in full sun.

Thorough coverage of the pest is necessary so spray both sides of the foliage.

Spray every 5-7 days as needed.

(OR you can purchase Insecticidal Soap or Ultra-fine Year Round Pesticidal Oil)

If a **fungus** is also present than **add to the above formula:**

2 TBSP baking soda

NOTE: Shake well before **and during** application.

If the weather is humid or the threat of disease is high, spray every 5-7 days.

Spray both sides of the leaves thoroughly.

Always **test** any spray on a small area of the plant.

Can be used against blackspot & mildew on roses, powdery mildew on summer squash, early blight on tomatoes and *Alternaria* leaf blight on melons, and who knows what else!

Another control for the **fungus** Powdery Mildew

Spray a milk solution (a minimum of a 10% concentration which is 1 C. of milk in 9 C. of water) sprayed twice a week.

The milk was shown to be as effective if not better than conventional fungicides.

(Research conducted in Brazil and published in the journal Crop Protection vol. 18, 1999, pp. 489-92)

For a **root rot fungus** in the soil: (*Pythium*, *Rhizoctonia*, *Phytophthora* & *Fusarium*)

Broadcast some corn meal (right off of the grocery store shelf) over the soil and around any plant(s) you think might be suffering from a root disease. The corn meal will stimulate the good soil micro-organisms which can assist in keeping the harmful microbes under control.

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(This research was carried out by the Texas A&M Research Station in Stephenville where they are growing peanuts organically.)

Corn Earworm Control

Mix vegetable oil and some *Btk* (*Bacillus thuringiensis* var. *kurstaki*) together.

Using an eye dropper, apply 5 drops of the oil- *Btk* mix per ear just as the corn silks begin to turn brown.

(This recommendation is backed by research conducted at the University of Massachusetts and Hampshire College.)

Disease control on orchids: Single plants with fungus problems can often be treated with **ground cinnamon** rather than a chemical fungicide. The orchid leaves must be damp enough for the cinnamon to stick to the leaves and just sprinkle the cinnamon on the affected area. Allow the leaves to dry for approximately one week and the area will dry out. *(Information from the American Orchid Society)*

Step #4 – Boost the plants defense mechanism

Use an **aspirin** spray to boost the plants defense mechanism which is called SAR (Systemic Acquired Resistance)! Dissolve $\frac{3}{4}$ of an aspirin in a gallon of water and spray the foliage every two to three weeks.

(Testing done at the University of Rhode Island showed that tomato and other plants tested also yielded more fruit than those treated with commercial fertilizers.)

Step #5 - Assist the plant nutritionally

This is a crucial step that is rarely ever taken because the thought of controlling pests typically ends with the use of a pesticide. A pesticide will only control the insects or diseases but will do nothing to correct the condition (stress) that is making the plant susceptible to the pest in the first place. Pesticides are more like a Band-Aid and not a cure.

Using **foliar applications of liquid seaweed (or kelp)** may help create healthier plants and reduce the occurrence of insects and disease. Liquid seaweed has been found to help plants through stresses like flood, drought and cold temperatures. It also helps plants that are producing fruit like vegetable plants and fruit producing trees, shrubs, vines, etc. Liquid seaweed has over 60 trace elements plus growth hormones.

To use liquid seaweed, mix it with water in a hand pump-up bottle and then spray the foliage, both sides with a fine mist, on a regular basis. For vegetable plants, citrus, and avocado trees, aim to spray them once a week. For other woody plants that produce a crop – try to spray it at least every other week but aiming to spray every week would be great since life can get in the way of our schedules! For ornamental plants that are suffering from a minor element nutritional deficiency, insects or diseases, spray the foliage on a weekly basis for at least a couple of months and then maybe once a month for a few months, as long as the plants are pest free and doing well.

Here are some of the stores that carry liquid seaweed or kelp.

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Ace Hardware Stores in Titusville; Cocoa (US 1); Merritt Island (SR 3); Cocoa Beach; Melbourne (Wickham Rd north of Pineda Cswy & SR 192); Malabar Rd & Minton Rd.; and Babcock Rd. south of Malabar Rd.

Home Depot sells liquid kelp (hopefully all of the stores carry the same products)

Rockledge Gardens on US 1

Sun Harbor Nursery on Eau Gallie Blvd out near A1A

Liquid seaweed (kelp) is an efficient way to supply minor/trace elements but it will not help if there is a deficiency of the macronutrients. Those nutrients must be supplied as a granular fertilizer. To determine if a macronutrient is lacking, a soil test should be performed. The soil test form can be found at the following link <http://edis.ifas.ufl.edu/pdffiles/SS/SS18700.pdf>. Be sure to pay for the \$7 test B and there is also a \$5 micronutrient test that may be helpful.

An easy way to determine if your plants are suffering from a trace element deficiency is to foliar feed that substance to the plant. After the foliar application, just wait to see if there is any visual improvement within the next few days. If the element wasn't deficient then there will be no response and no damage done either.

- For most of these salts the general maximum amount to mix, and not cause damage to the foliage, is 1 TBSP (or three tsp.) per gallon.
- More than one sulfate salt can be dissolved in the same gallon as long as more than a total of 1 tablespoon per gallon is mixed. So, only a maximum of three elements (or two if copper is one of them) can be mixed and sprayed at one time. The downside to mixing and applying three trace element salts at the same time is if there is a positive response you won't know if it was just one of them that corrected the deficiency.
- The exception to the above rule is for **copper (Cu) sulfate** which should be applied at a rate of one heaping teaspoonful per gallon. Cu is not very mobile in the plant but some copper can be translocated from older to younger leaves. Cu deficiency in young leaves will cause chlorosis (yellowing) and an elongation of the leaves.
- If a **magnesium (Mg)** deficiency is suspected then dissolve a tablespoon of Epsom salts in one gallon of water and spray the solution on the foliage and then drench the soil around the plant with the rest of the solution. If the next set of leaves that are produced have a good green color then magnesium was deficient. In that case, continue the foliar sprays of Epsom salts two more times, at two week intervals, and continue with weekly applications of liquid seaweed to the foliage. To apply magnesium to the soil, a less expensive source would be magnesium oxide (MgO). Check feed & seed stores as it is sold as an animal feed supplement. It needs to be finely ground to have a rapid effect. MgO is 50-55% elemental Mg so a light application around the deficient plants may be all that is needed. Advanced magnesium deficiency on tomato leaves leads to a mild purpling of the affected areas.
- **Zinc (Zn)** deficiency in Cucurbits can appear as slow growth and the leaf margins will cup under. Zinc deficiencies can occur in cold, wet soils, or in soils with very high pH levels. Zinc sulfate can be dissolved at 1 heaping tsp. in 1 gallon of water. If diseases such as powdery mildew begin to

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affect cucumbers, zucchini and squash then try a foliar spray of zinc sulfate! If powdery mildew is present then you may even want to double the dose to 2 teaspoons per gallon.

- **Manganese (Mn)** is immobile in the plant and will become deficient in the new growth. The new foliage will show speckled, interveinal chlorosis. Manganese sulfate can be dissolved at 1 heaping tsp. in 1 gallon of water.
- **Sulfur (S)** deficiency symptoms are mostly found on the upper leaves and consist of a general yellowing of the leaves. This can be confused with a nitrogen deficiency with the difference being that nitrogen deficiency occurs on the lower leaves. Sulfur sulfate can be dissolved at 1 heaping tsp. in 1 gallon of water.
- **Iron (Fe)** is not mobile in the plant so symptoms appear in the new leaves first. The symptom is interveinal chlorosis (yellowing), on the lower part of the leaflets and not at the tips, may progress to necrosis (death of the tissue) of the affected leaves. Iron sulfate can be dissolved at 1 heaping tsp. in 1 gallon of water.
- **Boron (B)** deficiency first affects the young growing points such as the buds, leaf tips and margins and the root tips. Buds will develop dead tissue and leaf tips can become chlorotic, eventually dying. In tomatoes, the leaves and stems can become brittle. Cole crops, beets and celery have high B requirements than other vegetables which usually only require small amounts of B. Boric acid can be dissolved at 1 tsp. in 1 gallon of water.

One last important step for creating healthy plants is to **re-mineralize the soil** with sea minerals and rock powders. This is extremely beneficial for plants in areas where the soil has been leached of all nutrients or been used to grow crops for years. Florida's soil is very poor both in the amounts of organic matter and nutrient levels. The addition of sea minerals (i.e. SEA-90) and rock powders (i.e. Azomite) can reintroduce vital minerals that have been lost due to high levels of rain for centuries. SEA-90 is a product that can be broadcast over lawns, fruit trees, etc. to not only improve the health of the plants but also their nutrient density. Azomite, a rock powder product, is of volcanic origin and also adds important nutrients back to the soil. A fully mineralized garden soil can become a closed system in terms of organic matter which is able to create organic matter all by itself.

The application rates for **SEA-90** (company representative said "a little goes a long way"):

- Small fruits and tree fruits – 2.5 pounds per acre, apply two weeks after germination and every 21 days until harvest;
- Lawns – application can be done through a hose end sprayer (suggested model is the Miracle Gro hose end sprayer) by filling the reservoir $\frac{3}{4}$ full of SEA-90 and spray the grass blades every 2 weeks. The rate for broadcasting is 1 pound per 1,000 square feet (or 50 pounds per acre if you have a large yard). This can be applied in spring. If lime is needed due to low pH levels, the foliar product of SEA-90 can be mixed with lime (or dolomitic limestone if Mg is low) and broadcast in spring also. If broadcasting SEA-90 you may not need to use the foliar applications as often, possibly just once a month.
- All garden soil – before planting, evenly broadcast and mix into soil $\frac{3}{4}$ pounds per 100 square feet or $\frac{1}{4}$ pounds per 32 square feet.
- Potting soil – use 1 tsp. mixed into 24 pounds of potting mix.

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- Compost pile – make a spray solution of 1 pound in 5 gallons of water and spray the mixture on each layer of mulch as the pile is built or turned;
- Compost tea – mix 1 tsp. per gallon during the brewing process to improve microbial populations;
- Nutrient solution, foliar spray, & liquid fertilizer applications – (for garden, hydroponics, wheat grass, nursery stock, sprouting, houseplants) mix 1 tsp. per gallon. Liquid fish emulsion and humate can also be added for additional nutrients and to buffer pH. This same solution can be misted or sprayed on plant leaves once each day. Add a surfactant like molasses to improve sticking and absorption.

The application rates for **Azomite**:

- Lawns – a 10 pound bag will cover 2,500 to 3,500 square feet. Apply up to 4 times per year. If establishing a new lawn till into the soil before planting seed or laying sod.
- Flowers & Vegetables – apply 1 pound per 10 square feet; Houseplants – mix 1 tsp per 2 inch pot diameter with potting mix before planting. Apply 1 tsp. quarterly thereafter.
- Roses – apply ½-1 pound to the soil around each plant and lightly till into the soil. Subsequent application rates can be cut in half.
- Ornamental trees & shrubs – apply annually to trees broadcasting over the area underneath the branches at a rate of 1-5 pounds for a tree measuring less than 10 inches in tree trunk diameter, 5-15 pounds for 10-20 inches in trunk diameter, and 15-40 pounds for greater than 20 inches in tree trunk diameter.
- Citrus/fruit/vines – apply annually to all fruit trees following the previous tree trunk diameter amounts. For grapes apply ½-1 pound to the soil around each plant and lightly till into the soil.

Suggested Reading

Plant Tissue Analysis and Interpretation for Vegetable Crops in Florida

<https://edis.ifas.ufl.edu/pdffiles/EP/EP08100.pdf>

The Intelligent Gardener: Growing Nutrient-Dense Food by Steve Solomon