**Disease Management for Organic Vegetables**
by Patryk Battle, May 2014
Living Web Farms

**Cultural practices**:

1. Maximize fertility and other soil conditions.
* Test soil, and balance minerals (Boron and beets are a perfect example!)
* emphasize active carbon through cover crops and strategic use of compost.
* When appropriate and sustainable, design for drainage. Often, this simply means using raised beds. Air and Water!
* Grow “subsoiling” cover crops such as Sudex, Rye, Phacilia Tanacetafoilium, Oil seed Radish

2) Pay attention to sunlight (nature's most powerful fungicide)

- try to get maximum sunlight to all crops do not plant your susceptible varieties in your shadier areas (example Brandywine tomato in the shadow of the only tree that shades you garden like we did a few years ago.

3) Don't crowd plants. Look up spacings in catalogs and if you have a crop that you struggle with disease wise increase spacing by a minimum of 25%, or even up to 100% depending on how badly you want the crop and how much space you have.

- Note: If space is an issue, try intercropping. This is especially effective if one of the crops finishes much more quickly.

- Always offset plantings so that the second row is lined up to start a distance that is equal to half of the spacing between each plant in your first row. For example broccoli plants, we space 15 inches apart will start not where the first plant was planted in the second row but rather seven a half inches set in from where the first row started. This creates greater air movement.

4) Mulch. For diseases such as Alternaria, which are soil borne, mulching denies the pathogen one of its major means of locomotion (splashing up onto soil.)

5) Sanitation and Disease Vector Control: Stay out of the garden when it is wet, and especially when it is wet and warm. You are another potential disease vector.

- Do not go to other gardens and then use machinery/tools from other gardens/farms and then carry their soil with its potential diseases back to your operation. You could bring some of the worst diseases that we struggle with onto your farm/ garden this way. Clean thoroughly those shoes and equipment or change them out!

- practice thoughtful garden\farm sanitation and vector control. Examples: dock, volunteer potatoes, asters. Rogue out isolated diseased plants, and somehow sterilize your infrastructure if it harbors diseases such as alternaria (Storax oxidate)

7) Grow the plant when it wants to grow not when it's too hot and humid, for example.

**Cultivar selection**: Pay attention to disease-resistant varieties for those crops you have disease issues. We struggle with Cercospora on beets and chard, so we grow Ace and Kestral beet because they are resistant to Cercospora . Likewise, carrots are prone to infection by Alternaria and Cercospora when it is hot and humid so we grow Bolero through the summer and quick carrots like Nelson early and late. For tomatoes, we always grow the heirlooms which tend to be disease prone, although admittedly some such as Cherokee purple are less disease prone. However, we also grow hybrids that are more disease-resistant. Standard examples are Mountain Fresh Plus, which is a good overall disease-resistant package, Defiant, Plum Regal, and Mountain Magic, all which have noted resistance to Alternaria and late blight.(Read catalogues carefully, paying close attention to the disease resistance codes! )

**Sprays:** We use them as we must, but we prefer sprays such as Double Nickel (see below) and Regalia, compost tea and Actinovate. All function against disease by increasing the ability of the plant to resist disease.

**New Double Nickel**: A naturally occurring strain of Bacillus amyloliquefaciens. A broad spectrum preventative biofungicide for control or suppression of fungus and bacterial plant diseases. The bacteria will colonize roots, leaves and other plant surfaces preventing establishment of disease-causing fungi and bacteria. Can be applied up to and including the day of harvest. There are varying rates of application so refer to our web site for a detailed product label. For use on all growing plants. **OMRI Listed,**

**Compost tea** also helps the plant to maximize its ability to absorb nutrients and places life on plant surfaces, which then outcompetes pathogens and indeed can use the pathogens as a food source. Finally it can help to kick in a crop’s “Acquired Systemic Immune Response”

 Anybody can afford to make compost tea (rough cost: $50 to $100 for a small homemade brewer)

You Need:

Proper aeration, Good compost or worm castings, a heater if ambient temperatures are below 72 degrees, a paint strainer bag, Foods rock dust, seaweed, molasses (no preservatives!), humates , fish emulsion or hydrolysate.

Recipes can be found in the *Compost Tea Manual* By Elaine Ingham

First off, bubble your water if it is chlorinated

Sample recipe

5gallon bucket, 2#s good compost, 3 tablespoons molasses, 1.51 tablespoon fish emulsion, 1.5 Tablespoons kelp, 1 oz humic acids, two tablespoons emulsion, ¼ cup micronized AZOMITE

**Resources for Compost Tea:**

On Farm Compost Handbook, Compost Tea Brewing Manual

soilfoodweb.com

livingwebfarms.org

- Always try to use the sprays that leave things as much as they were as possible. So after the previously described sprays next choose sprays like Serenade, or Sonata, which are microbial antagonists to various diseases. Continuing to use Regalia and compost tea, Double Nickel with these sprays you can tank mix them. However, we need to always act decisively when dealing with diseases which we struggle with greatly, such as late blight, downy mildew, powdery mildew, and bacterial spot when they are in the outbreak stage. At this point it is appropriate to do Tank mixes with a microbial and something like copper sulfate or Oxidate (our “big Guns”). Note: if it is mostly raining, Oxidate is the best bet, since its *action window* (amount of time it needs to be effective) before more rain washes it away is shortest .

- Remember to use a surfactant such as Thermix 70 so your sprays adhere well if you have the time (as in you think you can wait that long!). It is always better to spray when the sun is not as strong. I like to also add a foliar feed when spraying, using something like fish emulsion and seaweed. These also act as extra spreader stickers. Try to get the highest PSI you can when you spray (note: you can go too high with compost tea and some of the other life- based sprays, so keep those below 200psi or spray from a great enough distance that they decelerate before colliding with the plant surfaces) . This ensures small droplet size, which also aids with adhesion of your fungicides.

**Minerals:** Another mode of disease control is the use of minerals such as potassium bicarbonate. Some people use sodium bicarbonate, but the potassium bicarbonate is more effective. Commercially it comes in the form of Milstop, with a surfactant already included. This is very effective against powdery mildew but needs to be mixed up with other fungicides. For any disease, and particularly downy mildew, late blight and other water molds such as phytopthera capscici and phytopthera cinamonae it always best to start spring Regalia and the other immune system targeting controls. For sure be using them at least by the time the plants have begun to flower!

Soil diseases are best controlled by the vector considerations described earlier and by maximizing soil health and diversity. (Mycorrhizae rock!) Also, compost tea, Tricaderma, and Actinovate.

**Scouting and ID**: Spend peripheral vision time in your garden/farm. Walk around, look closely at things, but also allow the whole picture to come into focus. You may notice variations in color and form which can be early warning signs of diseases. Or, if plants suddenly don't look as full, have less shine, crumpled leaves, of course brown or black and leaves, etc. Learn to spot these diseases early if you cannot identify them at the with the aid of the Internet, take them into your extension office, remembering to take the entire plant and keeping it in as good a shape as possible. Pretend you are trying to transplant it you want them to be able to still identify the disease. You will have to pay a fee to send the plant on a trip to Raleigh if they cannot identify at the local office where you go. Also, know your plant-some varieties have genetic markings, purposeful ruffling, or other unusual structures, which can appear like disease, but actually are intentional.

Good luck, and bless the sun and the wind whenever you remember!