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The Berry Good News

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On the Horizon:

- **Leaf samples**
- **Post-harvest fertility program**
- **Drip irrigation line cleanout**
- **Cleanup fungicide/insecticide sprays for raspberries & blueberries**
- **Scout for aphids, weevils, mites, and rust in rasp's**
- **Scout for leaf-rollers. aphids, weevils, tip (gall) midges, and viruses in blue's**
- **Apply Resist through drip or basal spray for root rot**
- **Weed control**

(Please see your crop advisor for specific recommendations for your situation. No guarantee is written or implied in this newsletter. Always follow manufacturer's label.)

Our next issue will be in October!

Hot Weather, Overwatering, and Root Rot

Though currently in a cooling trend, we just saw some of the hottest July weather in history. Keeping plants adequately supplied with water when evapo-transpiration rates were extremely high was a challenge, especially for those on sandy/high-draining soils, and those with water distribution problems.

During this type of weather, fruit quality can be greatly diminished, as water will leave the fruit and go into the plant (think: survival mechanism). Under-watering can also cause small, shriveled fruit. Many growers were diligent to keep the water on, and some even more so than was needed.

In the past two weeks I have seen several blueberry fields in Whatcom County that were on heavy soil with symptoms of root rot. It appeared to me that this is an issue worthy of discussing. Here are some things that are important to know about blueberries, overwatering, and root rot:

- Most blueberry varieties are intolerant of heavy or saturated soils.
- Any time you have a heavy soil or a poor draining soil, you need to be extremely careful not to over-irrigate.
- Some growers watered only 2-4 hours a day during the 90°+ weather, but still over-saturated the soil because of the soil type.
- There is no rule that says blueberries need 2 hours of water every day! One grower hasn't watered for 14 days and still has a saturated soil, because it is heavy clay and he had previously over-watered.
- Root rot can set-in even on peat soils when over-irrigated, and I have seen some peat fields with root rot this summer.
- To check for root rot, dig around the roots and inspect the soil/roots. If the soil smells like sewer and is black, or if the roots are brown/black and slimy, you have an anaerobic soil and probably root rot.
- If you can squeeze water out of the soil 8 hours after irrigating, you are highly susceptible to root rot.
- The most important management tool is proper irrigation. Always check moisture daily with a shovel, probe, or your hands.
- Un-composted sawdust can make root rot worse, as well as high nitrogen applications. Phosphate will stimulate root growth.
- Resist™ has been very effective in treating early cases of root rot at high rates over several applications. Some strains of phytophthora are showing resistance to Ridomyl.
- Some labs and universities will test for various kinds of root rot for a fee.

Please call us if you suspect you have root rot, and we will be happy to diagnose it or send samples to a lab for you.

What looks like nutrient deficiency or high soil pH is actually a lack of healthy roots due to root rot. It almost always starts off by looking like a nutrient deficiency. Source: OSU, Wei Yang

When root rot gets advanced in the summer, the leaves start to turn red as seen here. Eventually the leaves will fall off and the plant may die. Source: MSU

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Focus on Fertility: Copper (Cu)

Copper is necessary for chlorophyll formation in plants and catalyzes several other plant reactions. Organic soils are most likely to be copper deficient, since copper is fixed in unavailable forms in these soils. High soil pH also decreases copper availability. Acidic sandy soils can also have copper deficiencies. J.E. Bowen (1961) reported that zinc and copper compete for the same absorption sites on roots, therefore if you have a copper deficiency be careful with your zinc applications. Copper can be found in all tissues of plants, but is concentrated in leaves and new growth areas. Once copper is deposited somewhere in the plant it is largely immobile. Copper deficiency symptoms look like typical chlorosis of the leaves and is usually found in the younger tissue. Copper-deficient leaves may be misshapen, narrow, and slightly elongated with wavy margins and may have a blue-green or yellow tint. There may also be some terminal dieback. Copper deficiency can be corrected through soil applications of copper sulfate with dry fertilizer blends, or by adding Actagro 5% Copper to your drip fertility program. Foliar applications of copper have been successful also, especially early season pre-bloom or bloom. I have noticed copper levels drop significantly in blueberries during June, so building levels before then is critical. (Source: Fertilizers and Soil Amendments, 1981)

Drip Line Cleanout

Many of us who use or work with drip irrigation systems in this area are aware of the challenges of maintaining clean, plug-free drip tape. Most of our water around here contains high levels of iron, and many who use pond water have algae problems. Also, buried drip lines in raspberries presents its own challenges, namely root intrusion for one.

Two products that Elenbaas has been trialing over the past two years is Sanidate 12.0, and TerraClean, manufactured by BioSafe Systems LLC in Connecticut. BioSafe also manufactures StorOx and OxiDate fungicides. We have been very pleased with the results of these line-cleaners so far, and so have the growers who have tried it.

Sanidate 12.0 is a high strength chlorine-alternative that may be chemigated into agricultural irrigation systems for the control of a broad range of harmful microorganisms. The main active ingredients are Hydrogen Peroxide and Peroxyacetic Acid. Unlike chlorine-based products, SaniDate 12.0 is effective under a wide variety of pH and water conditions and may be applied during all phases of plant development. SaniDate 12.0 can be used for irrigation waters, process waters, recycled waters, and cooling systems.

Field Trial: Crop was treated with TerraClean except one row.

Some of the benefits include: EPA registration; liquefies organic deposits and build-up in drip lines; no off-gas; effective on algae, bacteria, fungi and organisms; and is OMRI listed for organic production.

TerraClean, like Sanidate 12.0, is a line cleaner, but TerraClean also controls a wide variety of soilborne pathogens. It can be used at any stage of plant growth to control *Pythium, Phytophthora, Rhizoctonia*, and *Fusarium*. It releases oxygen in the soil, which can stimulate plant growth, root development, and nutrient uptake. It has a zero-hour REI and PHI, making it very user-friendly, especially during harvest if needed. (It is not OMRI approved, however). It is compatible with many other common pesticides, insecticides, and fertilizers, except products containing copper, magnesium/zinc, magnesium/copper, and aluminum.

One thing we like about these products is their ease of use, and from an agronomic perspective, they have no chlorine. Chlorine can be a major problem in blueberries, which are sensitive to the anion salt of chlorine, chloride. Chloride salts damage the sensitive root hairs on the blueberry plant, as well as other plants at high doses.