Integrated Cranberry Crop Management for Wisconsin

Cranberry

Crop Management Newsletter

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Your county extension office

This Issue:

SPRING 2012...STAYING FLEXIBLE

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Record breaking, summer-like heat in March 2012 marked the start of spring and had growers scrambling to keep up with rapid fruit development and anxious about the impact on the 2012 crop. Statewide, the monthly average temperature for March was 45.3°F, the warmest since record keeping began in Wisconsin in 1895, toppling the previous record of 40.7°F set in 1910. The high spring temperatures come on the heels of a mild winter and below average precipitation for the northern and western parts of the state. In recent weeks, the temperatures have been more in line with normal seasonal temperatures and growers around the state have devoted substantial time and resources to protect the developing buds from freeze and frost damage. These environmental conditions present significant challenges to the fruit industry for the 2012 growing season.

Rate of bud development is directly correlated with temperature. In most years, the cranberry vines will slowly come out of dormancy and go through bud development throughout March and April. With the summer-like temperatures in March this year, this process was sped up dramatically. As this is an unprecedented spring, it is difficult know and predict what impact it will have on our crop. In absence of being able to predict the future, we can at least consider the possible implications on the crop based on what has happened.

Many growers flooded their beds during the first week of April, holding the flood for an extended period. When the cranberry plant begins to deacclimate (come out of dormancy) the metabolic processes (energy requiring processes) such as cell division, respiration, protein synthesis, etc. begin to ramp up. As all of these processes and require carbohydrates, there is an increased demand for carbohydrates. While submerged, the vine uses the carbohydrates that are stored in the vine, (non-structural carbohydrates). Research on late water floods has shown that regardless of the dissolved oxygen levels, there is a decline in total non-structural carbohydrates in the upright (roots are not depleted) that is correlated with length of flood. Interestingly, the research suggests that high DO levels (above 8.5 mg/L) can result in even higher rates of carbohydrate loss as the higher amount of oxygen provides substrate for respiration (Botelho and VandenHeuvel, 2005). It is possible that the depleted carbohydrates, can impact fruit set; however, it is unknown how much carbohydrate loss can occur before there is an impact on vine productivity as we do not know how quickly those reserves are replenished.

Managing nutrients with the 'spoon feeding' approach is highly recommended this year. By feeding the crop in small increments rather than applying nutrients in large volumes, you are better able to adjust to unexpected environmental conditions and higher or lower than expected fruit set.

As mentioned in a previous newsletter article, the early warm spring temperatures may increase the potential for higher disease pressure. Insects are also directly impacted by temperature and may emerge at times that are outside of 'normal' emergence. Given the earlier accumulation of growing degree days, it is critical to monitor the beds for pests to ensure that pests are identified, even if they are emerging at a much earlier time.

It seems that the motto of cranberry growing in these unusual years is 'expect the unexpected'! Implementing your management plans in as flexible way as possible will provide you with the ability to adjust based on observations in the field and current conditions which can change from one month to the next.

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BIO-RICH BOG Series

Suzanne Arendt
RedForest Crop Consulting, LLC

The "Bio-rich bog" series will focus on the unique and/ or obscure flora and fauna that are part of the rich biodiversity found on our Wisconsin cranberry marshes by Suzanne Arendt and RedForest Crop Consulting, LLC.

THE CADDISFLY

I've received some calls from growers applying granular herbicides that there is a ton of moths with long antennae flying around their marshes. These moth-like insects are called Caddisflies and are closely related to Lepidoptera but are not cranberry pests. Caddisflies are definitely interesting critters that reflect part of the rich biodiversity found on our marshes. Caddisflies are usually found in very wet areas such as streams, rivers, and ponds but with all our flooding and frost watching we've provided a great habitat for the caddisfly. When found in large numbers, the caddisflies are good indicators that there is clean water nearby, which is another great testament to the fact that cranberry growers are stewards of the land. And if you are an avid fisherman, angler shops sell artificial flies that look similar to the caddis fly when fishing salmon or trout- who like to eat this insect. There is usually one generation per year and they are currently in their adult stage which will last from 2 weeks to 2 months. Adult caddis flies exist only to mate and lay eggs; they do not eat. The larvae feed in the fall and winter probably eating algae and other particles in the watercolumn. Enjoy the sight of the caddis fly early this year, in 2011 we saw the adults in early June on some marshes. For more interesting facts about caddisflies check them out on the internet.

Caddisfly adult Order: Trichoptera

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Dissolved Oxygen

Suzanne Arendt
RedForest Crop Consulting, LLC

Many growers flooded to protect their vines from the heat as well as the frost this last month. What a crazy spring! Many growers had a flood on their beds longer than they ever had before (besides winter flood, of course). Concerns of vine injury lingered in the minds of everyone but many growers maintained their floods for a good week. A historical cranberry researcher, Bergman, stated that injury occurs only when the oxygen content of the water researches a level at which the oxygen requirement of the more active parts of the cranberry vines cannot be supplied. The threshold in his research showed that at 5.7 parts per million for one to two days injured the vines. Bergman's research was on cranberry in relation to winter flooding, but I think we can draw a parallel to what we just experienced here in Wisconsin. We were fortunate to have wind which mixes the water to help maintain the oxygen content. I talked with a few growers who monitored their D.O. levels throughout the flood and oxygen levels never went below 7 ppm. The water has receded and the vines are showing us what they look like now. In many cases, the vine development was stalled (which was part of our goal) and so far the health of the vines looks unimpaired. We'll see what the future holds as we continue to monitor our crops. There are several different options for D.O. test kits that can be purchased for under $100. They are very easy to use. Most have an ampoule filled with a reagent that you snap off into a vial of water. The water is drawn into the ampoule, causing a color change that is compared with the included color charts to determine the concentration of dissolved oxygen. One example is Chemets Water Test Kit with R7512 refills from Ben Meadows. A kit will allow you to monitor your flood waters all winter too. A good buy for some peace of mind.

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What You Already Knew About Pesticide Tank Mixing, but were Afraid to Remember

Daniel J. Heider

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Pesticide Formulation

The essential part of development of a new pesticide is establishing a good, dependable formulation. Expectations are that the products active ingredient and physical properties should remain acceptable for up to two years or more, often under less than favorable storage conditions. Once sold, the applicator expects the concentrated formula to dilute easily and freely pass through the spray equipment. Formulations that are commonly diluted and applied by means of spray equipment are water soluble liquids, emulsifiable concentrates, wettable powders, flowable suspensions and dry flowables. The choice of the formulation developed by the registrant normally depends upon the solubility of the active ingredient, although manufacturing costs, field efficacy and product toxicity also must be considered. A water soluble liquid is prepared from pesticides that are soluble in water and is by far the most desirable type of formulation. One distinct advantage is that in-field dilutions in the spray tank are infinitely stable as true solutions. Water, being one of the main ingredients, lowers raw material costs and avoids the use of difficult to handle and sometimes toxic, organic solvents. Unfortunately, only a small percentage of pesticides are adequately soluble in water. An emulsifiable concentrate is prepared from pesticides that are freely soluble in an organic solvent such as xylene. With the aid of emulsifiers, field dilutions of this formulation in a spray tank forms dispersions of small particles and only mild agitation is required to prevent coalescence of the emulsified oil particles.

Pesticides that are not soluble or have only limited solubility in common solvents are formulated as wettable powders, flowable suspensions or dispersable granules. These formulations require constant agitation after being diluted in the spray tank. Wettable powders are often highly active (usually greater than 50% by weight) and easy to manufacture, but applicator dust inhalation and the need to measure by weight rather than volume in the field make wettable powders very inconvenient. For some pesticides, this problem can be overcome by formulating the pesticide into a flowable suspension. Water and other minor ingredients are added to the composition to suspend and disperse the particles into a liquid form. These suspensions are however prone to settling in the packaging and may require substantial agitation to disperse settled particles.

The water dispersible granule was developed to avoid some of the stability problems associated with flowables and at the same time maintain a low exposure level for the applicator. Although water dispersible granules are a dry formulation, they are normally measured out in the field on a volume rather than a weight basis. A dispersible granule consists largely of pure pesticide that is bound together in small particles with binding agents that quickly disintegrate once it is diluted in the spray tank.

In addition to the active ingredient, the pesticide registrant must carefully select inert ingredients as part of the formulation. These ingredients have no biological activity of their own, but combined they function as the delivery system for the pesticide. These ingredients may include emulsifying, wetting and dispersing surfactants, glycol and alcohol anti-freezing agents, organic acids, stabilizers, thickeners and silicone de-foaming compounds to name a few.

Tank Mixing and Incompatibility Problems

Legally, a pesticide applicator is only allowed to deviate from a pesticide label in the following ways:

1) *Applying a pesticide at a lower rate, concentration, or frequency than specified on the label.*
2) *Applying a pesticide against any target pest not specified on the label if the application to the site is specified on the label.*
3) *Using any method of application not prohibited by the label.*
4) *Mixing two or more pesticides, or mixing a pesticide with a fertilizer when such mixture is not mentioned by the label.*

Tank mixing pesticides is therefore allowed unless specifically prohibited on one of the tank mix labels. The fact that it is allowed does not however necessarily deem it as safe and you alone are liable for any problems that result from one of these deviations.

Continued on pg. 4

What You Already Knew About Pesticide Tank Mixing, but were Afraid to Remember

Continued from p. 3

Although a significant amount of research is devoted to developing a pesticide formulation, it is impossible to predict all the possible conditions and combinations with other products that will occur in the field. The practice of tank mixing makes it necessary to determine whether the mixtures are both chemically and physically compatible. The economics behind tank mixing are substantial. Advantages include: fuel conservation, reduced equipment wear, reduce mechanical damage to crops and soil, reduced labor and in some cases improved efficacy. These advantages however can be quickly lost by one incident of severe incompatibility in which the applicator is faced with spending valuable time to clean equipment and dispose of what has now become hazardous waste.

Incompatibility may result from either chemical or physical reaction within the mixture. Chemical reactions can take place between mixtures of active ingredients, inert ingredients and the dilution medium (usually water or fertilizer), forming compounds that alter the biological activity of the spray mixture. Often such reactions go un-noticed because the mixtures appear visibly normal. It is not until a lack of pest control in the field that suspicion of chemical incompatibility is raised. One example is the reduced efficacy of organophosphate insecticides such as malathion and dimethoate in alkaline water. These insecticides become extremely unstable above pH 7.0, quickly losing much of their insecticidal properties.

Physical incompatibility is far more common than chemical incompatibility. It is also much easier to detect since visually their will appear to be problems in the spray tank with the pesticide solution. The formulation of flakes, crystals, oily agglomerates and severe separations are all signs of physical incompatibility. Mixing pesticide formulations (described earlier) of the same type, rarely causes a physical compatibility problem due to the similarity of the inert ingredients found in each formula. For example, most of the emulsifiable concentrates utilize xylene as the main solvent and therefore mixing two emulsifiable concentrates in a spray tank rarely causes a problem. However, mixing wettable powders and emulsifiable concentrates in the spray tank often results in an oily scum or sediment that is difficult to clean from the tank.

Fertilizer/Pesticide Incompatibility

Many pesticides are not compatible in liquid fertilizers (the stability of the resultant mixture is short lived and in many cases results in separation in as little as 15 minutes. This incompatibility can result in the formation of substances resembling gels, thick creams or oily scum that floats, settles or coats the inside of application equipment. Although liquid fertilizers very greatly in their physical and chemical attributes, often surfactants used in pesticide formulations are deactivated by strong salt solutions in liquid fertilizers. Pesticides formulated as emulsifiable concentrates tend to cause the most problems in liquid fertilizer. Compatibility agents are commercially available to help produce uniform fertilizer/pesticide solutions and should be added to the tanks prior to the addition of any pesticides.

Re-work options:

When incompatibility does occur, the following steps may be helpful in rejuvenating a spray mix.

1) *Remove large aggregates or attempt to break them up with a high pressure steam. Re-circulate until a uniform mixture is achieved. However, if you are beginning with a mix that resembles cottage cheese, it is unlikely you will be able to rejuvenate the mix.*
2) *Add a compatibility agent with mild, but constant agitation.*
3) *Dilute the tank mix with water, especially for pesticide-liquid fertilizer combinations. This drives the salt concentration down which can thereby improve mixing ability.*
4) *Filter off large particles by recirculating the mix through a screening device.*
5) *Blend off an unacceptable mix in small proportions with a good mix.*

Remember that with any of the above options, you are likely ending with an unknown pesticide concentration in the tank and therefore may need to use the mix as something other than a primary field treatment.

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OBSERVATIONS FROM THE FIELD

Jayne Sojka

Lady Bug IPM, LLC

1st week in May

The spring of 2012 is certainly one to document. With the growing degree days way ahead of the 30-year norm, we see spring weeds emerging earlier than typical plus our plant stage progressed rather strangely. Some of us flooded up in March during the 80 degree temperatures to hold the vines back and some growers did not flood up. We have buds that are all across the board; as a matter of fact on May 3rd I saw my first early hook!!!!!

The biggest "BUZZ" word on the cranberry vine is the timing of our herbicides with emphasis on Casoron. We have been taught to apply Casoron early in the spring while perennial weeds are still dormant and annual weeds have not started to germinate. Frost events/flooding up to protect our vines or sprinkling for 4 to 5 nights straight prevented us from the PERFECT time to apply. So now we are struggling with what to do. When is it too late? What stage of our Cranberry plant development can we apply and not slow things down— understanding that this herbicide is a root inhibitor? To answer some of these questions I tell all my growers." Follow your Gut feelings, YOU know best." If later in the season you see that the herbicide has slowed down the plant, can you apply a fertilizer to assist? Some growers feel that a small amount of NPK brings things around. Some believe in Cal Sol applications. - This season we have a willing grower that is going to conduct a study to prove or disprove such a theory, so stay tuned to the ongoing research for answers.

AHEAD OR BEHIND- GOOD OR BAD?

Across Wisconsin, we are seeing a significant difference between marshes that were flooded in March to hold vines back and marshes that were NOT flooded. The non-flooded marshes appear to be 7 to 10 days ahead of others. The question is, "Is this good or bad?" Those advanced marshes are talking about when to get bees as we already found our 1st hook!

EARLY INSECTS

My team and I were simply amazed at what we saw in the field after these weeks' warm nights and HOT HUMID days. The insect hatch has begun. Green Spanworm, Blueberry Looper/Black Spanworm, ½ wing looper – Pittsville Looper, cutworm, an occasional BHFW were found across our scouting region. For the most part economic thresholds have NOT been reached. We expect more activity next week.

White grub traps are in place and a few June beetles have already been captured—typically, we just place them out the 1st day of May! We are contemplating the timing of rose chafer traps to be earlier than normal as well.

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