Integrated Cranberry Crop Management for Wisconsin

Cranberry

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RESOURCE LIMITATION

The previous article in this series examined the importance of fruit set and how it might be improved. We concluded that fruit set was likely resource limited, but did not address what the limitation might be. This article will describe what resources might be limiting and when.

One way to determine what resources are limiting and when is to remove the source of the resource to varying degrees and at varying times. Photosynthesis is the source of all carbohydrates used by plants and photosynthesis occurs in green leaves. In one experiment we removed the new growth above the fruit at varying times during the season and the effect on fruit set and berry size was determined at harvest. The results are shown in Figure 1. Percent fruit set and fruit size were reduced the greatest when the new growth was removed on July 14, about when fruit set occurs. This is typically near the end of the flowering period. Fruit size was affected less than fruit set, suggesting that fruit size is conserved. Fruit set was also reduced compared to the control if new growth was removed at either of the June dates. This study showed that fruit set is very sensitive to resource reduction caused by removing leaf area.

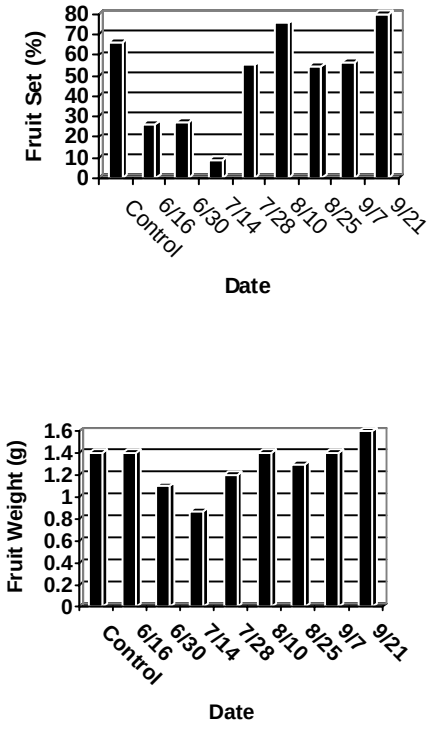

Figure 1. Effect of removing current season growth in 'Crowley' cranberries at different dates during the season on fruit set and berry size. N=10.

Current season growth is not the only potential source of carbohydrates for cranberry growth and development. In a subsequent experiment we removed either the new growth above the fruit, or the one-year-old leaves below the fruit, or both, or neither. From the previous experiment we know that the critical time to remove growth is at fruit set, so it wasn't necessary to remove tissue at all dates. We chose uprights that had at least two fruit beginning to develop and then imposed one of the treatments described above. The results are shown in Figure 2. When the old leaves below the fruit were removed there was little effect on fruit set or fruit size, but when the new growth above the fruit were removed or both the above and below were removed fruit set was reduced. Fruit size was conserved.

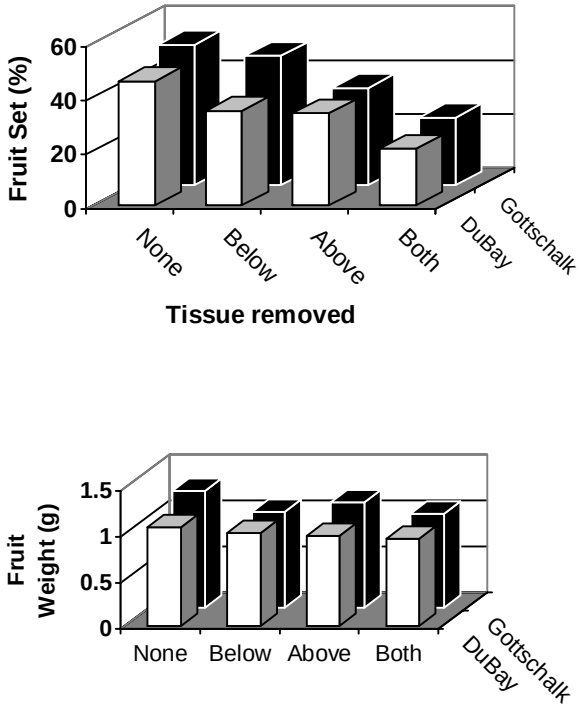

Figure 2. Effect of removing leaves either above, below, both or neither on fruit set and size of Stevens cranberries.

We repeated this experiment about 2 weeks after fruit set and there was very little effect on fruit set or fruit size.

Yet another way to look at limiting resources is to shade portions of a bed for various periods of time. We shaded portions of a bed by stretching shade cloth over a cage. The cages covered ½ square meter of bed surface. We used shade cloth that provided either 93% or 72% shade. We imposed the shade treatments for a month at either pre-bloom, post-bloom, or pre-harvest; corresponding to May 15-June 15, July 15-August 15, and August 15 to September 15, respectively (Figure 3).

Fruit set and yield responded similarly to shading (not surprising since fruit set is a primary determinant of yield). The pre-bloom shading was variable from year to year, but was usually not different from the unshaded control. The post-bloom shading of either intensity reduced fruit set and yield except for the 72% shade in the first year. Pre-harvest shading reduced fruit set and yield in the first two years, but not the third year. Through limiting light the concentration of carbohydrates in the tissue was also reduced (Figure 4). This suggests that shading reduced fruit set and yield by reducing the carbohydrate concentration in the uprights. Obviously, removing leaves, thus reducing the photosynthetic area of the leaves would also serve to reduce the carbohydrate concentration in uprights.

You'd scarce expect one of my age
To speak in public on the stage;
And if I chance to fall below
Demosthenes or Cicero,
Don't view me with a critic's eye,
But pass my imperfections by.
Large streams from little fountains flow,
Tall oaks from little acorns grow.

David Everett

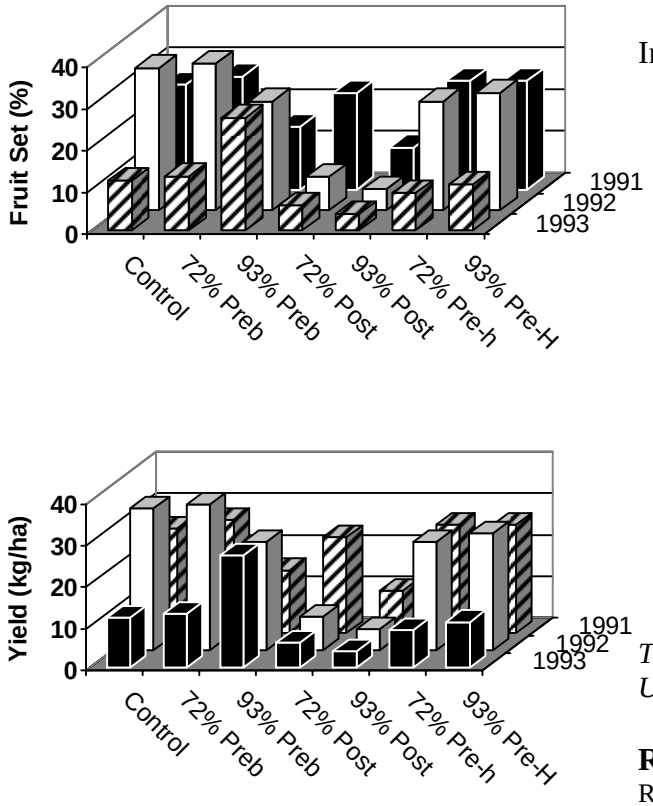

Figure 3. The effect of shading prebloom, post-bloom, or just before harvest on fruit set and yield of Searles cranberries over three years in Wisconsin.

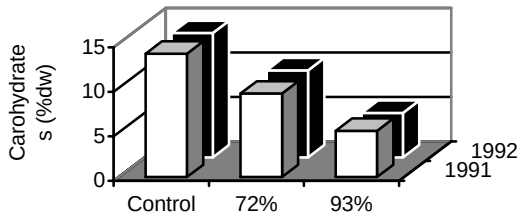

Figure 4. The effect of different levels of prebloom shading on carbohydrate concentrations in Searles cranberries in Wisconsin.

Summary

In this article we learned that:

- Fruit set is the most critical timing for resource limitation.
- The pre-bloom period is more critical than post fruit set.
- The new growth above the fruit is more critical in providing resources than old leaves below the fruit.
- Shading postbloom reduces fruit set more than shading either at prebloom or preharvest.
- Shading reduces the carbohydrate concentration in uprights.
- Fruit set and yield can be reduced by reducing resources

Teryl Roper
UW-Madison Extension Horticulturist

References:

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Roper, T.R., J. Klueh, and M. Hagidimitriou. 1995. Shading timing and intensity influences fruit set and yield in cranberry. HortScience 30:525-527.

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MILLION DOLLAR QUESTIONS

Now that the cranberry season is really taking off with this warm Wisconsin weather many questions are arising from growers. Do these "million dollar" questions have black and white answers? You be the judge.

1) How long will my insecticide continue to work for me?

Let's take a closer look at Lorsban. We have used Lorsban for the 1st

generation of insects because it has a broad spectrum of target pests.

It's mode of action is contact, stomach, and breathing. Contact is NOW, and you will not get any long term control with that single mode of action. Stomach means that the insect must eat the chemical thus you will have a longer control measure if the chemical is where the insect pest is feeding. Breathing means that the product forms a gas like atmosphere which will control the insect, but just how long that remains active is difficult to judge. In the cranberry beds in 2006 we have had Very HOT conditions which reduces chemical performance, but because it was HOT we irrigated the beds more often than "normal" which again may have washed the chemical down to where the insects were NOT feeding.

Consider how your cranberry vines grew in that pesticide application time. In four days of heat and moisture we saw some dramatic changes in growth, could the pests be working on tissue that was not treated?

So, just HOW long does Lorsban continue to work for me?

The Label reads that the REI (Restricted entry interval) is 24 hours. Does that mean that in 24 hours we will see total control of the pests? Is any insecticide 100% effective?

2) Are all the side shoots that we see this spring caused by tip worm?

Once again we MUST take a good look at each upright when you are determining what is actually happening. The upright that has been feed upon with a tip worm will still have the old cupping and the side shoot will be very obvious. Frost damage will NOT have tip worm cupping on it, but the side shooting occurs. Take a good look at the bud and if it doesn't start to elongate then you should surmise that something happened to that bud. If you did a dissection, you may find that the bud is black within the cross cut, typically a sign of FROST. We're already seeing umbrella growth, or umbrella hooking at this point. Harvest damage also can strip the tip and cause a lot of vegetative growth in the form of side shooting.

3) When did my winter damage occur?

Some growers were not able to make ice until February and some didn't make ice at all. When we come in and look at the vines this spring we can not specifically tell you WHEN the damage happened.

What we see on some marshes are actually bronzed uprights, like wind sheer or exposure to the elements for it is in tufted areas. On other marshes we see a mottled look with no pattern at all. For example: Two feet away from a circular area of stress the vines are green and thriving. In all the areas that we have checked the root structure is healthy so the vines will recover but there will not be a crop in those areas this year. Don't confuse winter damage with the areas of excessive trash – harvest corners with the berry pump, or corralled areas with an elevator are showing similar stress symptoms as those areas with winter damage. These symptoms are dull dingy vines, behind the rest of the bed, and the look of stripped leaves and only a woody upright showing.

4) At what point is too much or too little water detrimental to the quality of my crop?

Some things regarding irrigating are obvious; we know we haven't watered enough when we start to see drought stress along edges or pies. We know that we watered too much when there is standing

water in our sandy soiled beds. But the real question that comes to mind is just how much water is necessary? Last year, at the receiving stations I heard reports of excess field rot. Growers want to know how much water can remain on their vines, on warm summer days, before they are creating a susceptible environment for pathogens to thrive. The age old question is, do I water at night or do I water in the morning? Some growers believe that by irrigation at night they wet environment for that prolonged period of time creates a susceptible environment for pathogens. While other growers believe that watering in the morning induces berry scald throughout the hot day.

These "million dollar" questions have many different answers and viewpoints. We can talk generalizations for ever. Soil types, drainage, Ph, irrigation uniformity, and a ton of other influential factors play havoc with general "Black and White" answers to these questions. One must look at each marsh individually and understand its own strengths and weaknesses. What do you think?

Jayne and Pamela Sojka, LADY BUG IPM

THE BENEFITS OF A DAMSELFLY

Picture Provided By: Wikipedia

An example of a Common Blue damselfly in adult form

Damselflies are amazing and interesting creatures. Humans see them every year, but most of us probably don't know their real purpose, or how they live. Over 4,700 species of dragonflies and damselflies have been identified across the world today (Koday, 1998). Even in Wisconsin, there are over 160 different species of damselflies and dragonflies (Wisconsin Department of Natural Resources.) They are very distinct creatures if seen by the human eye and stir a person's curiosity when seen.

Damselflies start out as larva or nymphs. They hatch from eggs that are placed underwater by the adult female (Koday, 1998). The female lays the eggs in a portion of a plant that is located under water (Newman, 2006). Depending on the species, the female may lay hundreds to thousands of eggs (Chew, 2002). Usually she lays her eggs in the early summer months. The nymphs then breathe through their three gills, feeding on live material in the water (Koday, 1998). Their gills are leaf-like and are located at the bottom of the abdomen (Montgomery County Public Schools, 2001). The length of time they are in nymph form varies by species. Some damselflies may be a nymph for a couple of months, but some large dragonflies can be a nymph for a couple of years (Koday, 1998).

When the time is right for a nymph to turn into an adult damselfly, it crawls out of the water onto a sturdy surface. Here the nymph's outer skin starts to crack causing it to molt, and a damselfly results. Damselflies usually only live one season, but some only live a few weeks as an adult (Koday, 1998).

A damselfly is distinguished from a dragonfly by its long, slender abdomen. It also sits with the tips of its wings touching over its back when in a stationary position while a dragonfly's wings remain to the side (Koday, 1998).

Picture Provided By: Montgomery County Public Schools

An example of a Damselfly in its nymph form

Damselflies are beneficial insects. They eat insects and other pests. They have very good eyesight because they have compound eyes. They can pick up the tiniest detail. They can see their prey from up to 40 yards away and can also fly up to 30 miles per hour (Koday, 1998). Adults eat mainly flying insects such as mosquitoes and flies, but they also eat many other small insects as well. The nymphs eat mosquito larva and other insects that live in the water (Wikipedia, 2006).

This is why damselflies are so influential and beneficial to plants, humans, and growers.

Jill Hinrichsen, Lady Bug IPM Intern

MICRONUTRIENTS

I have recently been made aware of growers being advised to apply fertilizers containing micronutrients to "remedy" winter injury to vines. These recommendations are being made either without tissue test data showing a deficiency in micronutrients or in spite of tissue tests showing no micronutrient deficiency. I have asked myself how a grower can justify applying micronutrients without data showing that these elements are in short supply to vines. Perhaps I'm daft, but I don't understand how applying a nutrient that is **NOT** in short supply in cranberry vines will improve growth. I question if decisions are made based on trusted data, or on unsubstantiated claims from people you otherwise trust. Perhaps decisions are made on the basis of "it only costs ½ a barrel per acre for the insurance". Nutrients should be applied to achieve and maintain tissue sufficiency. Planning and applying nutrients on this basis will save both time and money.

Teryl Roper, UW-Madison Extension Horticulturist