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Revisiting the Insecticide Avaunt

By Christelle Guédot

Avaunt is a not a new insecticide to cranberry but one that is seldom used by cranberry growers in Wisconsin. With the loss of Lorsban previously discussed here, Avaunt is one alternative insecticide that is used early season in other cranberry growing regions such as Massachusetts for spring insects. Avaunt was registered with the Environmental Protection Agency (EPA) in 2000 and designated as a "reduced risk" insecticide and as an organophosphate replacement. The EPA defines a reduced risk pesticide as having at least one of the following advantages over conventional products: low impact on human health, low toxicity to non-target organisms (birds, fish and plants), low potential for groundwater contamination, lower use rates, low pest resistance potential and compatibility with Integrated Pest Management practices.

Insecticide: Avaunt

- Available as 30 WDG (30% of AI by weight, Water Dispersible Granule)
- Restricted-entry interval (**REI**): 12hrs
- Pre-harvest interval (**PHI**): 30 days*
- No more than 3 applications per year
- Do not exceed a total of 24 oz. AI per acre per year
- Rate of use per acre: 6 oz.
- Minimum interval between applications is 7 days

Avaunt is registered for use in Wisconsin on several fruit crops including pome fruit, pear, stone fruit, grape, bushberries, and cranberry. It is marketed by FMC under the formulation 30 WDG (30% of active ingredient by weight as Water Dispersible Granules). Avaunt is in the class of the voltage-dependent sodium channel blockers (IRAC group 22), known as oxadiazines which have a mode of action that targets the sodium channels in the neurons. Avaunt causes large hyperpolarization of the neuron and a reduction in action potential amplitude, blocking the movement of sodium ions in neurons and resulting in paralysis and death. The active ingredient in Avaunt is Indoxacarb. Avaunt is an insecticide with foliar activity that is most effective though ingestion of treated plant surfaces with some absorption through the cuticle. Affected insects will rapidly stop feeding, become paralyzed, and eventually die. Avaunt is primarily used as a larvicide and also has activity on eggs and adults of some insect species.

Avaunt has broad spectrum activity on many insect species, especially Lepidopteran pests. Under cranberry, Avaunt is registered to control cranberry weevil, blackheaded fireworm, and spanworm and under bushberries it also lists cranberry fruitworm. We have not used Avaunt in recent trials due to the low use pattern in WI but previous trials ran by Jack Perry suggested that it was a good product for fireworms, spanworms, and fruitworms. It is also known to have good efficacy against cranberry weevil in other growing regions. We will be conducting trials to identify alternatives to Lorsban for our early season pests and will include Avaunt in these trials next year.

Avaunt is a unique insecticide as it is the only one in IRAC 22 and is thus an important tool in IPM to prevent insecticide resistance to other more commonly used insecticides. For example, cranberry weevil, which is an important pest in Massachusetts cranberry, has become resistant to organophosphates and growers have switched to Avaunt for the past 15 years with success.

Avaunt may be applied as a foliar spray by ground equipment, by overhead sprinkler chemigation equipment, or by air. Directions on the minimum amount of water per acre for the different modes of application are specifically stated in the label. Specific directions for chemigation for cranberry and other crops are detailed in the label on pages 4-5. In cranberry specifically, Avaunt cannot be applied to flow through bogs and the release of irrigation water from bogs is not allowed for at least 1 day following application. For more information on mixing and spraying, and all other considerations, please see the product label.

Avaunt is highly toxic to bees exposed to direct treatment or exposed to residues on blooming plants. Do not apply Avaunt when bees are foraging and until flowering is complete. Avaunt is toxic to fish and aquatic organisms and must not be applied directly to water. Avaunt is also toxic to mammals and birds. Avaunt has minimal impact on beneficial insects and mites.

Please check with your handlers before using a new product as handlers may not allow certain products for domestic and/or foreign markets. *Handlers may extend PHIs from the one stated on the label to reduce residues so please always check with your handlers. As always, make sure to read the label before using any pesticide. You can find the label of Avaunt at the following link: https://www.cdms.net/ldat/ldFQT000.pdf

Happy harvest!

Update from the Wisconsin Cranberry Research Station

By Wade Brockman

Vines are starting to turn purple as harvest is fast approaching. Planning on starting harvest on the hybrids the week of September 27th.

“Why Leaves Turn Red”—and Cranberries, Too?

By Allison Jonjak and Jyostna Devi Mura

Since joining USDA-ARS and Horticulture, UW-Madison last year, Jyostna Mura has been researching, absorbing, and sharing published work on cranberries, and in adjacent fields that might relate to cranberries. Many times in the last 18 months, she’s offered me a paper I hadn’t seen before. Though this one (Why Leaves Turn Red by Lee & Gould) is from the field of forestry, and it tells some of the backstory and some of the physiology of anthocyanins in leaves. This paper has helped me understand what kind of questions to ask as we deepen our research into fruit color and cold tolerance. Lee and Gould’s subtitle tells the story: “pigments called anthocyanins probably protect leaves from light damage by direct shielding and by scavenging free radicals.”

Colorful fall leaves have been studied for more than 200 years, but until the late 1990s, researchers had only been able to scratch the surface. What we learned in elementary school, “leaves change colors because green chlorophyll breaks down, unmasking the base color of the leaf—but the base color isn’t very important,” turns out to be only a small part of the true story. The authors did a study of the prevalence of several types of pigments (rhodoxanthin, betalain, and many more), and found anthocyanin is the most widespread red pigment—it occurs in about 70% of the plants in their research forest.

Autumn leaves of the Asian species Cornus kousa (a) and the North-American Vaccinium corymbosum (b) showing that anthocyanin production is sun-induced. Shaded parts of leaves remained yellow due to the lack of anthocyanin, whereas sun-exposed parts turned red. Photos: E. I. Arndt.

Anthocyanins have received lots of research attention—but lots of it came up with wrong answers. For example in the 1830s it was “discovered” that anthocyanin was produced as a byproduct of chlorophyll breaking down—oops! Lots of other wrong trees were barked up: “we see anthocyanins in fruit and in flowers—so their main function is to attract pollinators and seed dispersers.” Because color is easily tracked in genetics experiments, geneticists after Mendel used anthocyanins as a marker without understanding them deeply; and molecular biologists measured anthocyanins as a means of tracking which genes were activated by light exposure.

So “what do anthocyanins do? Why do leaves produce anthocyanins?”

Anthocyanins are water-soluble bright red, mauve, crimson, purple, and blue color pigments found in many plants’ fruit, flowers, and leaves. Anthocyanins are intensely colored under acidic conditions. Many researchers believe that the accumulation of anthocyanins is a way for plants to soften the negative effects of stress. Plants produce anthocyanins when they are faced with stresses: drought stress, high-temperature stress, high metal, high-light stress, low-temperature stress, as well as herbivore and pathogen attacks. Anthocyanin accumulation is one of the effective photoprotective strategies for plants. But why do plants need protection against light?
In winter, low temperatures can inhibit the electron transfer necessary for photosynthesis. It can also inhibit the production and translocation of carbohydrates. Low temperatures do not affect the capture

of light energy by leaves, but they do affect the activity of enzymes involved in the photosynthesis cycle. When leaves receive more light energy than can be used by photosynthetic organs, they reduce quantum (photosynthesis) efficiency due to excess energy. Under low temperatures and intense light, the chloroplasts of plants are overexcited, and the excess light energy spurs the plant to form free radicals. Free radicals destabilize otherwise stable molecules, and the result is photo-oxidative damage to the photosynthetic mechanism. Photoinhibition damage occurs when plants receive more light than they can use—so anthocyanins often function as “photoprotective pigments”, reducing the amount of light penetrating the leaf, and preventing damage caused by excessive incident light.

When plants produce anthocyanins, they store them mainly in vacuoles in the upper layer of the leaf epidermis, but also in the cell wall, chloroplast envelope, and cell nucleus. Anthocyanins form a light-shielding layer on the plant foliar surface, actively filtering a portion of the light energy by absorbing radiation between 270um and 280um. This light does not reach the photosynthetic mechanism to spur free radical formation. In addition to this “sunscreen” effect, anthocyanins also scavenge free radicals. Free radicals may be produced by an excess of light in other wavelengths, and these free radicals can be safely stabilized by the anthocyanin so damage is not done to the delicate photosynthetic mechanism.

So plants produce anthocyanins specifically when light intensity is high, but temperatures are low enough to slow photosynthesis. They produce anthocyanins to protect themselves against the damaging effects of collecting more energy than they can use. After centuries of study, it is exciting to develop this understanding of our favorite shade of red. There may be more mechanisms at work, and there may be more uses for anthocyanin still to be uncovered—but this helps us to understand the cranberry’s strategy as we move into and through harvest.

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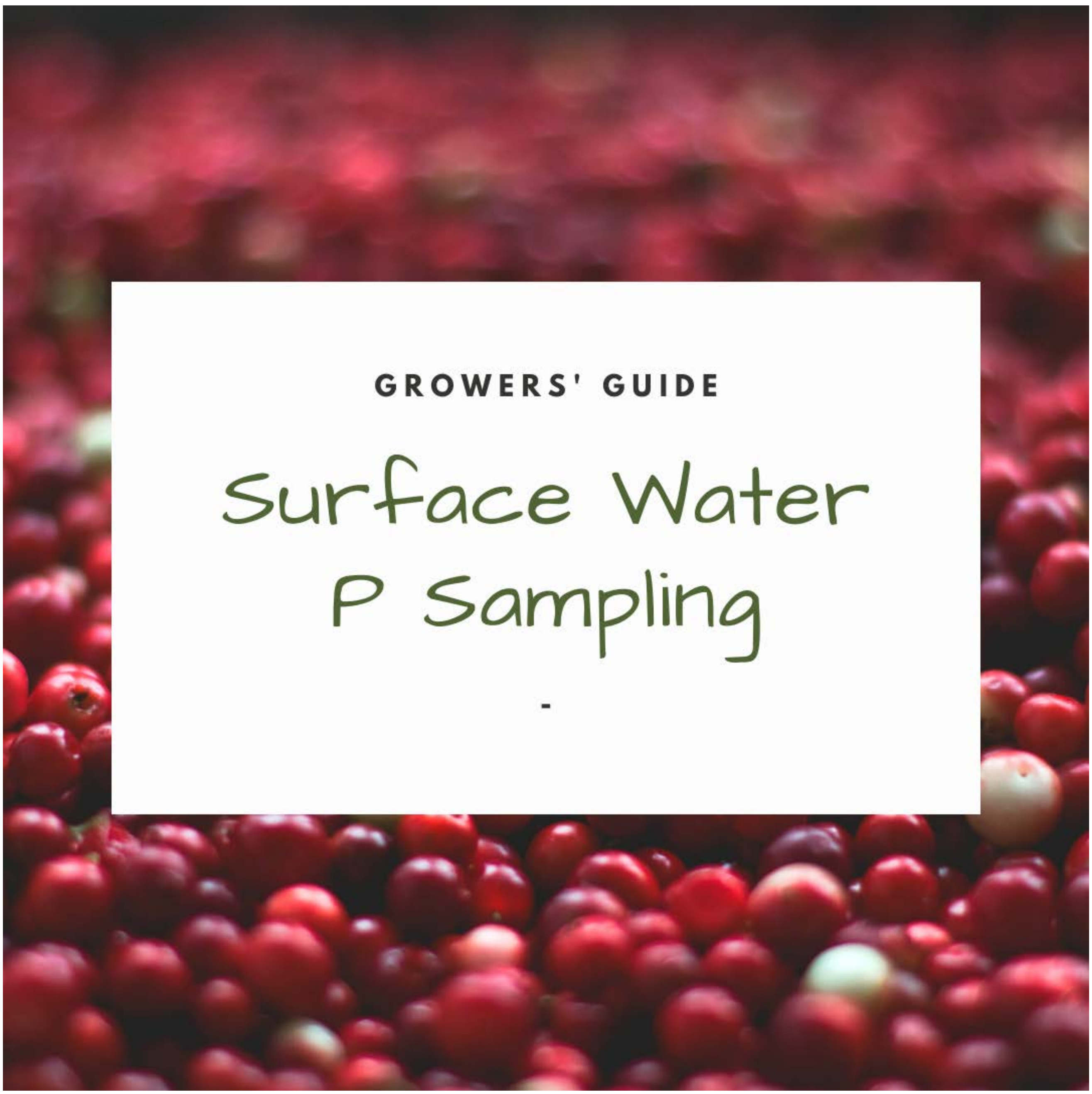
“Why Leaves Turn Red”—and Cranberries, Too?

By Allison Jonjak, Casey Kennedy, Nicole Hansen, Jyostna Devi Mura

A comprehensive nutrient management plan for cranberry marshes rests on the foundation of taking soil and tissue samples on an annual basis. Some growers may choose to monitor water analysis levels for supplemental information. For growers who choose to take water samples, it is important to collect a sample that avoids “edge effects:” good samples can be taken from water flowing at a control structure, or from water that is neither at the surface nor at the bottom of a reservoir.

Based on the research protocols used by Casey Kennedy’s lab, we prepared a grower protocol which will help you collect representative samples. The protocol is one side of one page, so that you can print it for reference.

Protocol available here

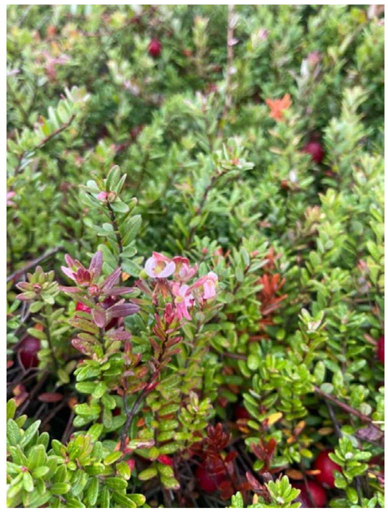


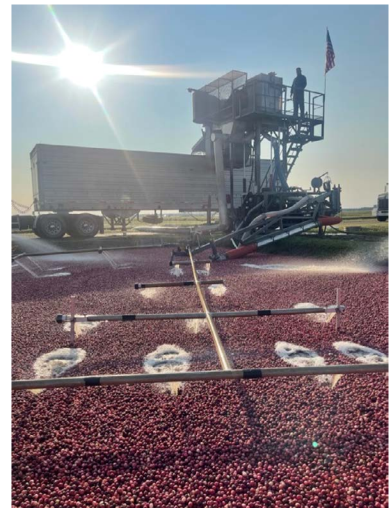
Grower Updates

Flying Dollar Cranberry

By Seth Rice

Harvest time is upon is! All things considered we have had a good and safe year. We want to wish everybody a safe and happy harvest. Good luck everybody and we will see you next year!





Cranberry Lake

By Karl Pippenger

Most growers in the northern region are full speed into harvesting. Ben Lear that were shipped last week averaged 35 TAcy. Stevens, GH1 and other mid-ripening fruit are being harvested this week.

As busy as everyone is, it’s important to remember to keep open lines of communication with your handler, your cleaning station, your truckers, and your employees. Keep in mind that you are not the receiving stations only customer. It has been my experience that most people will work with you if you communicate with them frequently and politely.

So with that, I wish everyone a safe and abundant harvest. Feel free to drop me an email or stop me at a cranberry gathering, I love to talk to the many good people in the industry.