Integrated Cranberry Crop Management for Wisconsin

Cranberry
Crop Management Newsletter

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Contents:

MONEY SAVING IDEAS TO REDUCE POTASSIUM FERTILIZER COST FOR CRANBERRY PRODUCTION

Growers used to say that fertilizer was "cheap insurance". The statement is no longer true. Fertilizer, especially potassium and phosphorus, are expensive. Fertilizer prices have risen rapidly in the first six months of 2008, more than doubling since 2003, as shown in Figure 1.

Growers have changed from thinking of fertilizer as cheap insurance to asking, "How can I reduce my fertilizer cost?" No magic or "quick fix" exists even though the answer is simple and straightforward, apply fertilizer where it is needed or will provide an economic benefit. Potassium application on many cranberry beds can be reduced without a reduction in yield. The key to saving on potassium cost is knowing where to reduce.

Knowing when and where fertilizer is needed requires management and monitoring as used for nitrogen. Cranberry growers monitor leaf N to evaluate N status and adjust application rate.

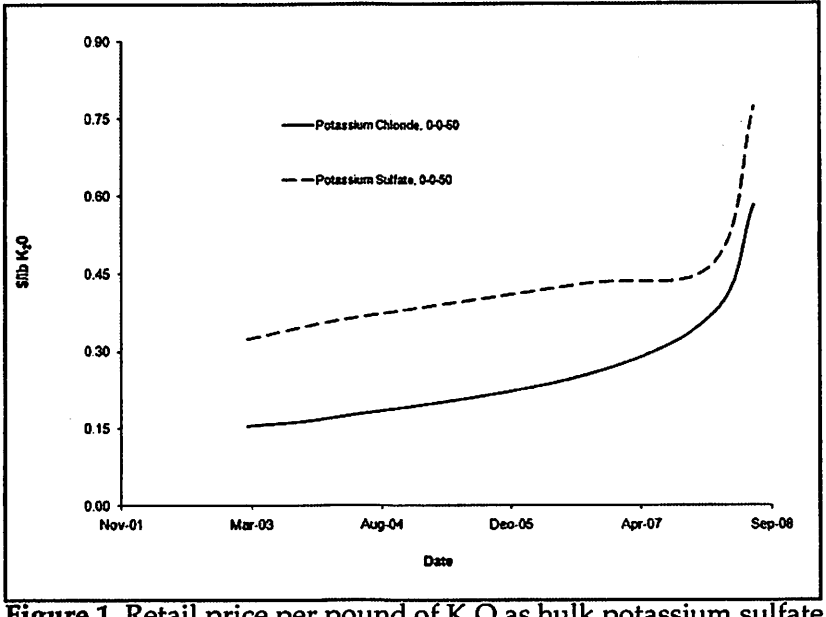

Figure 1. Retail price per pound of K_2O as bulk potassium sulfate (0-0-50) and potassium chloride (0-0-60) in the Willamette Valley from March 2003 through early July 2008.

The same approach can be used to manage potassium. Think of monitoring soil and tissue concentration of potassium as you monitor fuel or oil pressure in an engine or temperature for spring frost control.

A better analogy might be dieting. Approach a reduction in potassium application as you would approach a weight loss program. Don't make large or sudden changes. Change slowly or incrementally while monitoring tissue K and build confidence the reduction is producing desired results.

First, need a goal. We'll use OSU recommendations for soil and tissue K. The target is to have soil test K between 50 and 100 ppm and tissue K should be between 0.40 to 0.75%. Potassium is recommended at 0 to 60 lb K_2O/a if soil and tissue is in this range. Let's look at yield from two cranberry beds where soil and tissue K were in the recommended range and potassium was applied or withheld for three years.

Tale of two beds

Potassium chloride (0-0-60) was applied on two cranberry beds for three years beginning in 1996. The treatments supplied 0, 60, 120, 180 K_2O lb/a. The fertilizer was applied monthly beginning in mid-April at roughneck through full bloom in mid-June. One bed was in Coos County and had 5 year-old Stevens cranberry's growing in it. The second bed was in Curry County and had six year-old Stevens growing in it.

Yield was measured in 1998, after three years of treatments and was not different between treatments receiving potassium for three years and the treatment that did not receive any potassium for three years as shown in Figure 2. Yield from both beds was similar, so a single line is used to represent yield from both beds.

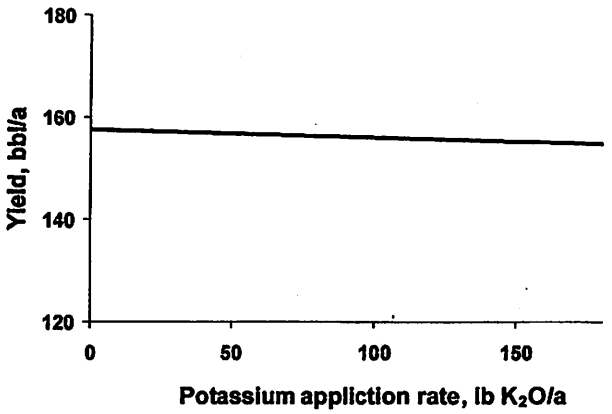

Figure 2. Cranberry yield influenced by potassium application from both sites in 1998, after three years of potassium treatments.

Let's look at soil and tissue data for an explanation to the unchanged yield. The initial potassium application did not change soil test K in the fall of the first year as shown in Table 1. This result was expected since soil test K was adequate and the fertilizer was top dressed..

Table 1. Potassium application rate and cranberry bed potassium soil test value in September 1996.

K_2O	Coos	Curry
lb /a	ppm	
0	80	55
60	75	53
120	79	52
180	79	63

After three years of application, tissue K increased slightly with increasing K application at the Coos County site. All tissue values, even those receiving no K fertilizer for three years, were within OSU's recommended range. Since tissue K was adequate without K application, addition of K fertilizer should not increase yield.

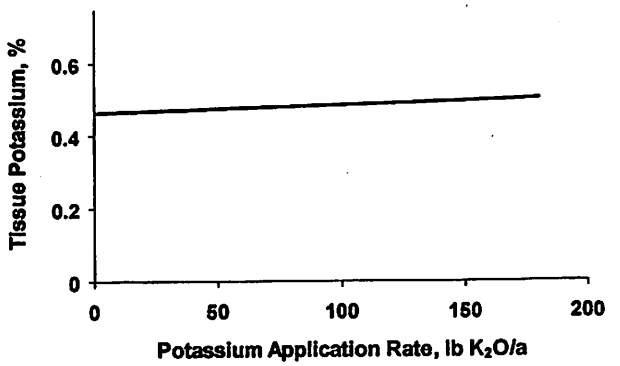

Figure 3. Cranberry leaf potassium concentration change with potassium fertilizer application rate at the Coos County site. Tissue concentration is from 1998, the third year of fertilizer treatment.

Cranberry yield did not increase with an increase in leaf or tissue K concentration as shown in Figure 4. Adding potassium when tissue potassium is sufficient, may increase leaf potassium concentration, but does not alter yield.

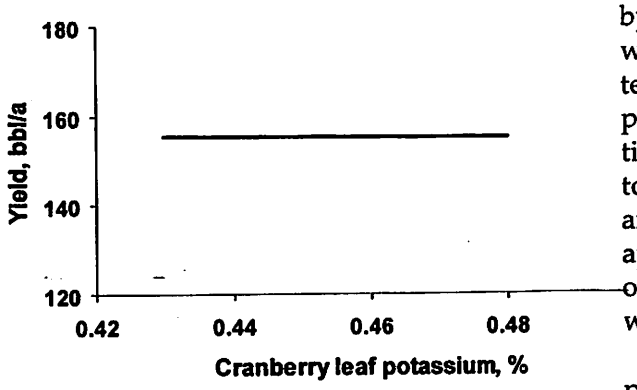

Figure 4. The relationship of cranberry yield and leaf potassium concentration at both sites in 1998.

Cranberry color as measured by Total anthocyanin content or TACY was not changed by leaf K concentration as shown in Figure 5 (Curry County site). All TACY measurements at the Coos county site were above 72 mg/g, the maximum measured by the test. Leaf potassium was within OSU's "sufficient" range and should not have changed with the small change in leaf K concentration measured in the two beds.

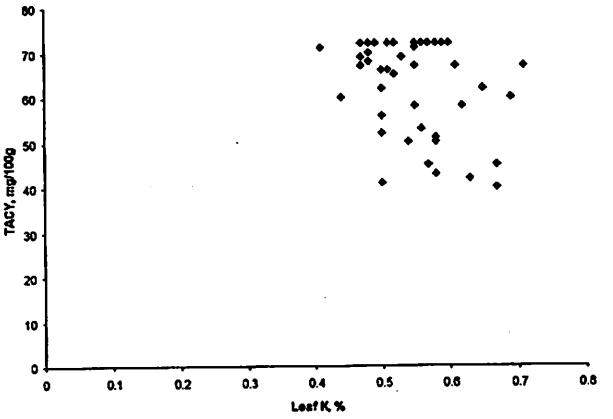

Figure 5. The change in TACY and leaf potassium concentration for the Curry County site in 1998.

Summary

Yield or berry color were not changed by potassium application when tissue K was between 0.4 and 0.75% and the soil test potassium was between 50 and 100 ppm. These results show that the soil and tissue measures of potassium can be used to monitor potassium need. When tissue and soil values in this range, potassium application is optional and can be reduced or eliminated for at least a year to two without reducing cranberry yield.

Remember the comparison of reducing potassium application to save money and dieting? Don't make large or sudden changes. Reduce slowly and monitor tissue potassium annually.

If you have tissue K in the upper end of the adequate range and have been applying potassium regularly, then you could reduce your fertilizer cost by reducing potassium rate.

Grower results from a low potassium "diet"

In 2003 a south coast Oregon cranberry grower was using about 130 lbs K_2O in various blends starting in the spring and finishing after fruit set. The potassium application was gradually reduced until only 70 lb K_2O/a, 20 lbs in the spring and 50 during fruit set, were used in 2007 and 2008. The grower said, "This bed consistently produces 300 barrels/acre. The range is from 295-330 b/acre through those years, even with the reduction in potassium application."

The grower added, "The potassium tissue concentration did not change and was within the normal K range for cranberries, 0.40 to 0.75%, during the time K application was reduced." Tissue potassium concentration is given in Table 2.

Year	Tissue potassium
	%
2004	0.56
2005	0.61
2006	0.54
2007	0.53

Annual testing of cranberry uprights is necessary when potassium fertilizer is reduced. Changes in tissue concentration probably will not be noted for at least three years if potassium was sufficient in soil and tissue and more than 80 lb K_2O/a was applied annually.

Similar Results from Wisconsin Potassium Application

University of Wisconsin-Madison established plots in two 'Stevens' beds. They applied consistent rates of nitrogen and phosphorus to the plots and varied only potassium application, between 0 and 800 pounds of K_2O per acre. Treatments also compared potassium sulfate and potassium chloride at 200 and 400 pounds per acre. They applied fertilizer at roughneck, bloom, fruit set, and in early August.

Potassium application increased both tissue K and soil K, but not always significantly. The results were more pronounced in 2006 than in 2007. They also found that increasing the application rate of potassium did not increase yield or fruit size in either year. Because some of the treatments were potassium sulfate and some were potassium chloride, they were able to determine if chloride was detrimental to cranberries. No effect of chloride as opposed to sulfate forms of potassium fertilizer was measured within the range tested.

Some growers believe that large late season applications of potassium will result in better fruit color. To test this hypothesis fruit was analyzed for color. No effect of potassium fertilizer rate on fruit color was measured in either 2006 or 2007.

The research in Wisconsin did not measure an effect of potassium fertilizer rate on yield, fruit size, or fruit color. Also, both the sulfate and chloride forms are acceptable fertilizers for cranberry at the rates tested.

An earlier trial in Wisconsin performed by industry researchers showed a 5% yield reduction when a single mid-July application of 180 lb K_2O/a was made. The yield decreased 10% when 270 lb/a K_2O was applied in a single mid-July application. In addition to yield, growth reduction and hardening were measured. No reduction in tissue N, hardening, or other growth reducing properties of potassium were measured until 1440 lb K_2O /a was applied. This amount of potassium burned and killed vines.

Other ideas for saving $ by reducing potassium

Don't apply potassium fertilizer to harden vines or counteract over growth. Research has not documented potassium

providing any benefit for retarding growth or hardening plants.

Reduce or remove foliar application. If tissue K is adequate, potassium is not needed from a soil or foliar application. Foliar products are usually more expensive per pound of nutrient than dry fertilizer materials.

Compare the cost of potassium chloride and potassium sulfate. Usually, potassium chloride or muriate of potash (0-0-60) is less expensive per pound of K than is potassium sulfate. Application of 2o to 30 lb/a K_2O as potassium chloride three to four times a year allows leaching of chloride between applications.

John Hart and Art Poole, Oregon State University, Cooperative Extension
(We thank John and Art for use of this article)

Not a day passes over the earth but men and women of no note do great deeds, speak great words, and suffer noble sorrows. Of these obscure heroes, . . . the greater part will never be known till that great hour when many that were great shall be small, and the small great.

Charles Reade

OBSERVATIONS FROM THE FIELD

Stem Gall/Canker:
I know that I mentioned this early in the season but I believe that we need to revisit this issue. The Lady Bug IPM Team has found more stem gall in 2008 than we have seen in the past 5 years. Why is that? By the process of elimination we feel that the gall is secondary – something happened first to encourage this type of stress. The common denominator is the good old Wisconsin Winter. Growers have shared that in some cases it is on the inlet ends, so perhaps the actual process of bringing in the winter flood hurt the vines and then as spring continued the vines developed Stem Galls. Some growers felt that a newer means of harvest may have hurt the vines and now stem gall as slipped in, other growers feel that the pattern is that of blown snow or packed snow areas (we all know that we had SNOW this past winter) in nearly every case we can find some kind of injury that happened 1st.

Ok, we've got stem gall/canker, so now what? I would encourage growers to sand this winter. The idea behind sanding is to create an environment favorable for our injured uprights to reroot and continue to thrive instead of dying back and become less dense.

Insects:
Toward the end of our scouting season we are still finding Cranberry Flea Beetle, some fall cutworm, Tipworm and now signs of Girdler. Flea Beetle are quite easy to control but remember they keep hatching right up until Harvest if the weather is favorable. Fall Cutworm, in the Lady Bug IPM region has not been a pest that we have solely had to take control measures against. Tim Dittl has shared information about Girdler in a previous newsletter so I will not dwell on this pest, but I would encourage you to think about control measures for it. This is the last year we can use Diazinon 14G. We can flood for this pest but I would caution you to wait until the berry has a waxy coating on it to protect it from the flood.

Pre-harvest Intervals
Word of caution....remember your PHI's especially at this time of the year
I see a great deal of wiping going on out there.
30 day PHI on roundup-
Some of you are still trying to control clover and I see spot treatment with Stinger.
Stinger has a 50 day PHI -
All those grass control measures have even longer PHI's for example Poast has 60 days but Select has 30 day PHI
Callisto has a 45 day PHI

Jayne Sojka and the Buggetts
(Lady Bug IPM, LLC)

SOIL MOISTURE MONITORING TECHNOLOGY WORKSHOP

Ed Grygleski of Valley Corporation and Kurt Rutlin of Rutlin Cranberry Company, both located in Monroe County, have graciously offered to be the first growers to host a meeting for other cranberry growers to share what they have learned about their new soil moisture monitoring systems that were installed this past June. The meeting will be in the shop at the Rutlin marsh 30693 Exodus Ave, Warrens/Tomah area. Directions: From 173 So., make a left onto Copper Rd, go 2+ miles and make a left onto Exodus Ave, look for the Rutlin marsh sign. Date and time for the gathering will be Sept 17th at 10:00 am.

The Wisconsin State Cranberry Growers Association provided cost-share funding through the Whole Farm Planning Incentives Program (WFPIP) for the installation of the soil moisture monitoring systems at both marshes, along with systems on other marshes throughout the state. Those that had applied and received the cost incentive for this new technology agreed to share the information with other growers. As the new systems are installed and functioning up to par, there will be more meetings scheduled in other parts of the state. So if this date and time does not work for you please keep an eye out for another meeting that will. The format for the meeting will be casual with open conversation between Ed, Kurt and attendees. Please feel free to ask questions. Ed and Kurt will describe the soil moisture monitoring technology and explain how they use the information gathered to schedule irrigation.

If you wish to attend please RSVP to me by email at julie.ammel@wi.usda.gov or leave a voice message at 715-423-2070 x 6. You may also leave a message with Jane Anderson at the WSCGA office. Please say how many will be attending.

FYI...Those of you who have contracts for Nutrient Management and/or Pest Management through either EQIP or WFPIP cost share programs, please remember that you must submit your "end-of-season" information in order to receive your cost incentive payment and be in compliance with your contract. Please call me if you have any questions.

Julie Ammel
Resource Conservationist, USDA - NRCS

The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty, and we must arise with the occasion. As our case is new, so we must think anew and act anew.

Abraham Lincoln

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