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REPORTING ORBIT USE

All cranberry growers in Wisconsin will soon receive a form for reporting use of the fungicide Orbit in 2000. If you used Orbit in 2000, you must complete the form and send it to me by September 18. The EPA will not grant future Section 18 or regular labels for Orbit unless this information is reported. If you do not receive the form by the end of August, please contact the WSCGA office at (715) 423-2070 or me (phone 608-265-2047; fax 608-263-2626; or e-mail psm@plantpath.wisc.edu). If you did not use Orbit in 2000, then you do not need to return the form.

UNHARVESTED BEDS—TROUBLE AHEAD?

For the long-term health of your cranberry plants, fruit should be harvested as usual in 2000, even though you won't be able to sell all the fruit. WSCGA and UW-Extension are working on guidelines to help growers deal with disposing of excess fruit this fall—these will be distributed soon. But what would happen if a bed were left unharvested? Although, I don't recommend this practice, I suspect it will happen this year, as labor crews are small and harvest budgets are tight. I have zero research data on unharvested beds and equally zero practical experience, but nonetheless, I'll ramble on about it. This is only from a disease perspective—obviously there are a lot of other things to think about.

Cottonball. DO NOT LEAVE A BED WITH SEVERE COTTONBALL UNHARVESTED. The reason is that the fungus overwinters completely and entirely in old, mummified, cottonball fruit. When you harvest a bed and remove fruit, you also remove most of the cottonball inoculum for the following year. If you leave the inoculum in the bed, expect big problems in 2001 and for years to come. Nobody knows how long the mummifed fruit survive in a bed, but if the cottonball fungus is like a related fungus that causes white mold on bean, it could be DECADES. Any money or time you save by leaving a cottonball bed unharvested in 2000, you'll pay for later (big-time).

Fruit rot diseases. This has me much less concerned than cottonball. Here's why. Our research in the Cranmoor area shows that in most beds, fruit rot at harvest is around 5% or less. So, if you left the bed unharvested, you'd be leaving behind 5% rotten fruit and 95% healthy fruit. Healthy fruit can have fungal pathogens inside, but it's predominantly non-pathogens or the "iffy" berry speckle pathogen *Phyllosticta elongata* that inhabit healthy fruit (maybe that's why they're healthy!). So, healthy fruit probably don't carry a lot of pathogen inoculum through the winter.

Also important is the fact that most fungal pathogens sporulate profusely on old or dead leaves, but not so much on fruit. And leaves outnumber fruit by far. So, even if pathogens **did** overwinter in unharvested fruit, the amount would be negligible compared to the amount overwintering in all those leaves. Yes, harvest removes leaves as well as fruit. But a LOT more leaves get left behind than get harvested, and they don't cause big problems in Wisconsin in most years.

In summary—I don't think leaving beds unharvested is a good strategy for dealing with the 15% holdback. But, if it becomes the only option, then think hard about cottonball and all the other complications (such as, how are you going to harvest in 2001 if 2000 berries are still hanging on the vine?). But don't let fruit rot contribute to your list of worries.

Patty McManus, UW-Madison Extension Plant Pathologist

TIDBITS FROM THE LADY BUG REGION

Our team was out and about gathering square foot samples of fruit last week and we were surprised at how much of a top crop we have here in Wisconsin. We can change those berry weights a great deal in August and September, but we cannot change the number of fruit we have per square foot area.

Why is there a top crop? We are seeing much more abortion this year than we have in a number of years. Many uprights have the potential for 4 to 6 berries and only 1 or 2 have actually set. Some growers feel that the pollinators are the biggest influential factor—this year many of us did not get bees, others feel that the cool weather and prolonged bloom was the greatest cause. Some felt that for their properties is was herbicides or lower levels of nutrients during the growing season. Before this past heat wave, our growing degree days have been quite shy of "normal", thus our fruit is smaller.

What do you think on your property? Are you seeing a top crop?

Pesticide Reporting.

The pesticide season is about done. I just want to remind you of accurate record keeping and timely reporting. You need to keep your records on file in your own offices for at least 3 years. I encourage you to put an exhibit A map with your records. This will refresh your memory on renovated beds or mowed areas or areas that you did not have to address this year. Pictures speak louder than words (highlight your exhibit A's putting emphasis on which beds were treated).

Each receiving station has their own time table for these reports to be submitted. Please comply with those requests for it makes everyone's job so much easier. You can call the person in charge of the receiving station with questions. If they don't have the answer they can direct you to someone who does.

Trying Times

Having been a dairy farmer, I know first hand what you are going through. I learned a long time ago that one must be part of the solution. Once again I challenge each of you to promote your own product, tap a market that hasn't been tapped yet. Give your juice, sauce, relish, and whole berries away to encourage people to try something new. Copy your favorite recipe and share it

with the good folks you associate with. Should someone ask you to help serve juice as a promotional advertisement at a local grocery, enthusiastically volunteer. Share with anyone who will listen the benefits cranberries have on our health. Pure, natural and healthy; gosh who wouldn't want to eat cranberries?

2000 Crop Forecast—Berry Counts

Four square foot samples have been harvested from beds of each cultivar. The fruit were counted and weighed on a gram scale.

Results of 500 square foot samples in Wisconsin for 2000.

Cultivar	1999 berries/sq ft	2000 berries/sq ft
Stevens	200	155
LeMunyon	210	165
Pilgrim	250	180
Ben Lear	303	203
Searles	231	144
McFarlin	192	173
Howes	183	153
Natives	156	161
Crowley	262	129

Berry size results

Cultivar	2000	1999	1998	1997
Stevens	1.03	1.23	1.29	0.97
LeMunyon	1.09	1.12	1.22	0.86
Pilgrim	1.07	1.12	1.32	0.89
Ben Lear	0.97	1.08	1.14	0.82
Searles	0.83	0.99	0.99	0.76
McFarlin	0.73	0.94	0.92	0.66
Howes	0.66	1.07	0.91	0.57
Natives	0.7	0.82	0.69	0.59
Crowley	0.66	0.84	0.82	0.57

Jayne Sojka, Lady Bug IPM

This is the true nature of home—it is the place of Peace; the shelter, not only from all injury, but from all terror, doubt and division.

John Ruskin

CRANBERRY TISSUE TESTING

The only reliable means of assessing the efficacy of a fertilizer program is tissue testing. The correct time to collect tissue and soil samples for analysis is late August through early September. Cranberries require proper amounts of 13 mineral elements in addition to carbon dioxide, water and sunlight. When any of these items are in short supply growth and yield will be reduced. However, if they are in adequate supply, adding additional amounts will not increase growth or yields. Tissue testing is the single reliable means of determining if adequate amounts of the 13 required mineral elements have been supplied and to gauge if your fertility program has been effective.

Good tissue testing requires consideration of three factors:

- Sample at the correct time
- Sample the correct part
- Normal nutrient ranges

Taking a sample

Collect tissue samples during the last two weeks of August through the first week or two of September. The reason to take samples during this time is that the concentrations of the 13 required minerals are stable during this period so the exact date you take the sample is less critical. Also, the standard values against which the results are compared are based on sampling in this time frame. Samples taken at other times are not interpretable based on these standards.

Sample the correct part

A good cranberry sample consists of current season growth from both fruiting and non-fruiting uprights. Clip the uprights just above the fruit and be sure to get only current season growth. Collect about 20 tips from about 10 different locations within a bed. Don't collect all the samples from one corner or along one edge. Walk a zigzag pattern throughout the bed, or walk from one corner to the opposite corner collecting samples along the way. Collect from about 10 separate locations within a bed. The total sample will consist of about 200 uprights or about 1 to 1 ½ cups of tissue.

Do not wash or rinse the uprights. Washing will remove soluble nutrients and give you an inaccurate test. Allow the sample to dry overnight before mailing. Use paper bags or envelopes to mail the samples. Please don't use plastic bags or cellophane (except vented Ziploc brand vegetable bags). Be sure to label each bag with a bed number or other identification code. Submit the samples promptly to a reputable laboratory. Your county Extension office can help you locate a suitable lab. If the lab is ASCS certified you can be sure of reliable results.

Soil Testing

Take a soil test at the same time you collect tissue samples. Use a trowel or soil probe to sample to six inches. Collect the soil samples in the same area where you collected tissue samples. The UWEX lab will run a routine soil test accompanying a tissue test at no additional fee ($18.00).

Interpreting the results

Once the results come back from the lab you should compare the results against the nutrients standards for North America and against previous results for the bed or section.

In addition to the lab results you should pay attention to vine growth. Vigorous growth or weak growth may be explained by your test results and will help you alter your fertility program for the following year.

The report will **not** tell you how much fertilizer to apply next season, but will allow you to monitor the efficacy of your current program and point out potential concerns to watch out for later. If you plot the results of tissue testing over time you can begin to see patterns of nutrient changes over time and work to prevent deficiencies.

Table 1. Cranberry tissue standards for producing beds in North America

Nutrient	Normal Concentration[1]
Nitrogen (N)	0.90-1-10%
Phosphorus (P)	0.10-0.20%
Potassium (K)	0.40-0.75%
Calcium (Ca)	0.30-0.80%
Magnesium (Mg)	0.15-0.25%
Sulfur (S)	0.08-0.25%
Boron (B)	15-60 ppm
Iron (Fe)[2]	>20 ppm
Manganese (Mn)[2]	>10 ppm
Zinc (Zn)	15-30 ppm
Copper	4-10 ppm

1. *Normal levels are based on samples taken between August 15 and Sept. 15.*
2. *Cranberry researchers have not found a normal range for Fe and Mn.*

More information about tissue sampling is found in the bulletin A3642 "Cranberry tissue testing for producing beds in North America". Copies are available at your county Extension office or via the web: http://www.hort.wisc.edu/cran/Publications/a3642.pdf

Teryl Roper, UW-Madison Extension Horticulturist

PESTICIDES AND WATER

Everyone who uses water from a well uses groundwater. Two-thirds of the state's residents drink groundwater. Virtually all of rural Wisconsin is dependent on groundwater for its day-to-day activities.

Protecting groundwater from pesticide contamination is a major concern in Wisconsin. While most of the attention has focused on agricultural pesticides, the fact is that any chemical we use can contaminate groundwater.

Groundwater is water that is contained in the cracks and pores of rocks and the space between sand grains and mineral particles below ground. It is part of the water cycle. Water filtering through the soil moves into the unsaturated zone where pores contain both air and water. Some of this water is taken up by plants. The rest continues downward to the saturated ground water zone. The top of the saturated zone is called the water table.

Groundwater does not remain in the ground. It is always moving and sooner or later it surfaces at low spots such as springs, lakes, or wetlands or is pumped to the surface from wells. Groundwater is continuously being replenished by rain or snow that has seeped into the soil and moved through unsaturated sediments and cracks to the water table. Areas where water is seeping down to the water table are called recharge areas. Areas where groundwater flows to the surface are called discharge areas. In humid climates like Wisconsin, streams, lakes, and wetlands are usually fed by groundwater.

Groundwater moves relatively slowly through most aquifers, flowing at rates from a few inches per year through shale or rock to a few inches per day through some sands. In areas with highly fractured or with many caves and sinkholes, water can flow very quickly through the cracks and caves as if they were pipes.

A well is a pipe through which groundwater is pumped. The groundwater pumped from a well close to the water table is likely to have entered the ground relatively nearby, while water from deeper wells is more likely to have traveled some distance before being withdrawn. In Wisconsin, it is likely the water pumped from a private well was rain or snow melt that seeped into the ground with a mile or two of the well.

Wisconsin has established a coordinated multi-agency approach to groundwater protection. ATCP 31 establishes the WDATCP's regulatory program for the prevention and control of groundwater contamination. The rule creates two guidelines to limit the presence of pesticides in groundwater: *enforcement standards* (ES; the maximum levels allowed in groundwater) and *preventive action limits* (PAL; set as a percentage of the enforcement standard). When contamination approaches the PAL, the party responsible must implement corrective measures to prevent further contamination. Groundwater in which an ES is exceeded is unsafe for human consumption.

The DNR also has rules to govern groundwater protection. Chapter NR 140 establishes groundwater quality standards for substances detected in or having a reasonable probability of entering the state's groundwater. Many of the substances for which the DNR has established public health groundwater standards are pesticides.

Substances spilled on or applied to the surface of the land can be carried or leached down to groundwater by water moving through the soil. Once a contaminant reaches the water table, it will flow with the groundwater, although not necessarily at the same rate because some compounds interact with the geologic materials.

Wisconsin well water sampling programs sponsored by the DNR and the WDATCP have detected pesticide active ingredients at levels exceeding their PAL;

most of these have been detected at levels above their ES in some wells.

In many cases, pesticide contamination of groundwater in an area has been traced to a point source; that is a place where a spill or mishap has allowed abnormally large amounts of pesticide to reach the water table. Other instances of contamination in an aquifer are known to be from non-point sources: regular pesticide applications. Often it is difficult or impossible to identify the source of a pesticide in groundwater. It is also extremely difficult to determine how long ago the pesticide was applied or spilled and how long it has been in groundwater.

Spills or sloppy pesticide handling practices can contaminate soil and lead to groundwater contamination. To prevent this from happening, follow the label and good applicator practices. Some key steps include:

- Securing pesticide containers in the back of a truck to prevent spills during transport.
- Storing pesticides over an impermeable floor and checking for damaged containers.
- Storing bulk pesticides in secondary containment
- Not mixing or loading within 8 feet of a well, and mixing or loading within 100 feet of a well only over an impenetrable pad
- Using an air gap or backflow device to protect your water supply when you mix pesticides
- Disposing of pesticide waster properly

Because of the close interaction of cranberry production and water, it is critical to use good agricultural practices to prevent water pollution. Clean water is important for cranberry production today and for generations to come.

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