

Cranberry

Crop Management Newsletter

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TISSUE SAMPLING QUIZ

This quiz was produced by John Hart, Extension Soil Scientist at Oregon State University. All answers to the quiz are found in the publication *Cranberry tissue testing for producing beds in North America*. Answers are listed at the end of the quiz.

1) Tissue testing, rather than soil testing, is recommended for assessment of cranberry nutrient status because

- a) Tissue samples are easily obtained compared to soil samples
- b) Soil testing is more expensive than tissue testing
- c) sampling plant tissue provides a more uniform sample that results in a better measurement of cranberry nutrient status
- d) little relationship exists for woody perennial between soil test results and crop nutrient status
- e) all of the above

2) Before a tissue test for any crop can be properly used, which of the following information is needed?

- a) Sampling Time (stage of Development)
- b) Plant part to sample
- c) Normal or sufficient concentration range
- d) All of the above

3) Cranberry tissue samples should be collected during

- a) late August through early September
- b) late September through early October

- c) late May through early August
- d) before flowering
- e) any time during the growing season

4) Which part(s) of a cranberry plant should be sampled?

- a) only current non-fruit bearing uprights
- b) only fruit bearing uprights
- c) both non-fruit bearing and fruit bearing uprights
- d) all uprights and runners
- e) non fruit bearing uprights and runners

5) Which tissue should be sampled?

- a) only old or past season growth
- b) only current season growth
- c) an equal mix of current season and last season's growth
- d) tissue age doesn't matter, a mix of growth age that is easily obtained
- e) the top 2 inches of any growth, fruiting uprights, non-fruit bearing uprights, or runners

6) A cranberry tissue sample should consist of

- a) only leaves
- b) leaves and stems
- c) leaves, stems, and fruit
- d) only washed leaves
- e) washed leaves and stems

7) How much plant material should be collected?

- a) 1 to 1 ½ cups
- b) 1 to 1 ½ pounds
- c) 20 uprights at each of ten locations
- d) 200 leaves
- e) none of the above, no set amount of sample is necessary

- 8) Obtain tissue samples from
- 1 location in a bed
 - 10 locations in a bed
 - 50 locations in a bed
 - 100 locations in a bed
 - 200 locations in a bed
- 9) Tissue samples should be obtained
- annually
 - every other year
 - every third year
 - any of the above sampling period is correct and dependent upon situation
 - any of the above, including non bearing beds
- 10) Tissue analyses should be used with an assessment of vine growth because
- low tissue analyses and abundant vine growth can occur from over application of nitrogen. If only tissue analyses were viewed, nitrogen would be recommended, making the situation worse
 - weak vine growth can result from factors other than nutrient deficiency. If only viewing tissue analyses, other problems might be overlooked.
 - Low tissue values and weak vine growth usually indicates changes in your fertilizer program are warranted (higher rate and/or different application time)
 - all of the above
- 11) Post harvest tissue sampling is not recommended because
- cranberry tissue nitrogen concentration decreases as plants enter dormancy
 - water harvest leaches nitrogen from the leaves
 - water harvest leaches nitrogen from the soil
 - cranberry tissue nitrogen concentration decreases rapidly after fruit is removed from the plant
 - cranberry tissue nitrogen concentration increases after fruit is removed from the plant
- 12) Cranberry tissue should be analyzed for which nutrients?
- N, P, K, Mn, Mo, Cu, Fe, Cd, Zn, and B
 - N, B, S, Ca, Mn, Mo, Fe, Zn, Cu, and Cl
 - N, B, S, Ca, Mn, C, K, Mn, Mg, and Zn
 - N, P, K, B, and Zn only
- e) N, P, K, B, Ca, Mn, Mg, Cu, and Zn
- 13) A cranberry tissue test with high amounts of Manganese (Mn) may be the result of:
- Poor drainage
 - Fungicide application
 - foliar fertilizer application
 - all of the above
 - none of the above
- 14) A cranberry tissue test with high amounts of Copper (Cu) or Zinc (Zn) may be the result of:
- Poor drainage
 - Fungicide application
 - foliar fertilizer application
 - all of the above
 - Fungicide application or foliar fertilizer application
- 15) Cranberry tissue samples should be sent to the analytical laboratory in
- an air tight sealed plastic bag
 - a cardboard box
 - a first in paper bag, then air tight plastic bag
 - a sealed rigid plastic container such as sour cream or cottage cheese container
 - a paper bag
- 16) How should you sample a bed with an area of weedy uneven growth in an otherwise uniform bed?
- no change in sampling procedure, include tissue from weedy area with remainder of the bed
 - take two samples, one from the weedy area and one from the remainder of the bed
 - sample weedy area proportionally to remainder of the bed. For example if the weedy area is 10% of the bed, take 10% of the samples from the weedy area
 - do not take tissue samples from the weedy area
- 17) How should a problem area, one that isn't growing well in otherwise uniform cranberry bed be sampled?
- no change in sampling procedure, include tissue from problem area with remainder of the bed
 - take two samples, one from the problem area and one from the remainder of the bed

- c) sample problem area proportionally to remainder of the bed. For example if the problem area is 10% of the bed, take 10% of the samples from the problem area
- d) do not take tissue samples from the problem area

18) If a bed has been planted with two varieties, one variety on the north and a second variety in the south portion of the bed, how should a tissue sample be obtained?

- a) no change in sampling procedure, tissue from both varieties can be mixed
- b) take two samples, one for each variety
- c) sample varieties proportionally. For example if one variety is half of the bed, take 50% of the samples from the area
- d) do not take tissue samples from both varieties, only sample the higher yielding variety

19) After cranberry tissue sampling and analyses, the values obtained should be compared to expected or standard values for each nutrient.

- a) Use only tissue standards from Wisconsin as they have been developed for our climate and cultivars
- b) Tissue standards were developed for all of north America and a single standard can be used anywhere in North America
- c) Use only PNW standards, those for Oregon and Washington.
- d) Standards in Canada aren't applicable as most of the cranberries are grown on peat soil, a very different situation than in Wisconsin.
- e) Both A and D are correct.

20) A single tissue sample should be taken from or represent no more than

- a) 1 acre
- b) 2 acres
- c) 5 acres
- d) 10 acres
- e) no size limit

21) Which is the correct reason a specific time (month) or crop development stage is specified for cranberry tissue sampling?

- a) Fits work schedule and is more likely to be used if not during busy season for growers

- b) Amend current season fertilizer if results are low
- c) Time when tissue concentration is stable and reproducible measurements can be obtained

22) Which comment is correct about using tissue tests to assess nutrient or fertilizer needs of a perennial crop?

- a) Tissue testing can be used to monitor and adjust fertilizer use during early growth of perennial crops
- b) Tissue testing can be used to anticipate current season fertilizer need
- c) Tissue testing is especially useful for new cranberry plantings and works adequately for bearing beds
- d) Tissue testing is best used in bearing beds for an end of season evaluation of the current year fertilizer program and planning for the next season

23) What is appropriate use of tissue testing when a cranberry crop is in fruit set stage?

- a) since samples can be taken at anytime, the use is appropriate
- b) sample only as a comparison of an area of "good" vs "poor" growth
- c) insufficient fruit is present at fruit set stage so no sample should be taken
- d) insufficient new growth is present, so no sample should be taken
- e) none of the above are correct about tissue sampling at the fruit set stage

24) Which statement is correct about cranberry tissue sampling?

- a) collect 20 upright pieces from each of 10 locations per bed between August 15 and September 15
- b) collect 20 upright pieces from 10 locations
- c) collect 200 fruit bearing upright pieces from 10 locations per bed between August 15 and September 15
- d) collect only the upper two inches of non fruit bearing upright pieces from 10 locations per bed between May 15 and August 15

Answers: 1) e, 2) d, 3) a, 4) c, 5) b, 6) b, 7) c, 8) b, 9) a, 10) d, 11) b, 12) e, 13) a, 14) e, 15) e, 16) d, 17) b, 18) b, 19) b, 20) d, 21) c, 22) d, 23) b, 24) a.

ON RANDOMNESS

One criticism that has been made about small plot research on cranberries is that beds are highly variable and that conclusions made based on treatments and samples of small areas are not valid since they represent only a small fraction of the surface of a typical bed. This is a valid concern. However, researchers seek to minimize the effect of within bed variability by having several replications within a bed and often by repeating experiments on two properties. Statistical analysis can also help sort out variability over space.

These same variability issues are at play when growers collect tissue samples for mineral analysis. Since beds are variable if a grower collects a sample from only a single location in a bed the results will reflect only the conditions at that point where you have sampled. Such a sample will not reflect the conditions that prevail across the entire bed. Thus conclusions drawn from the resulting data may be erroneous.

There are good statistical reasons to sample widely across a bed for taking tissue samples. In an ideal world we might collect a single upright on a 10 x 10 foot grid across a bed. Obviously the time it would take to collect that many samples and the damage from walking in the bed make this practice prohibitive. Sampling across a bed will provide tissue that represents subtle differences in soil type, drainage, irrigation patterns, fertilizer application patterns, etc. When you take sweep samples for monitoring insect populations you take them across some area of the bed, you don't stand in only one place and take multiple sweeps. Walking while sweeping gives you information about a larger area of the bed. The same principles apply to taking tissue samples.

I urge you to take tissue samples this year and every year from each management

unit (collection of similar beds). In order to be able to interpret the results that you have the samples have to be taken correctly. Samples taken otherwise are marginally interpretable.

Teryl Roper, UW-Madison Extension Horticulturist

REPORTING ORBIT USE

The Section 18 exemption for the fungicide ORBIT (propiconazole) expired on July 31 and now is the time to report use of this product in Wisconsin. All cranberry growers in Wisconsin will soon receive a form to record their use of Orbit. If you used ORBIT, you **MUST** provide the information requested on the form and return it to me no later than October 31, 2005. Reporting ORBIT use is required by the EPA, and future Section 18 or regular labels for ORBIT will not happen unless we provide them with these data.

If you have questions about reporting fungicide use, call me at 608-265-2041, or e-mail me at psm@plantpath.wisc.edu.

Patty McManus, UW-Madison Extension Plant Pathologist

CRANBERRY NUTRIENT GUIDELINES

Over the past couple of years USDA-NRCS, UW-Extension, and WSCGA have been working together to develop guidelines for nutrient management for cranberries. This project is part of reducing non-point pollution in soil, water, and air. The good news is that cranberry production is considered a non-point source of pollutants. The bad news is that non-point sources of pollution are under increasing scrutiny from regulatory agencies and watch-dog groups.

This spring DRAFT copies of the guidelines were made available to growers for comment and two sets of listening

sessions were held across the growing regions. The listening sessions were to 1) hear grower comments and input regarding the proposed DRAFT guidelines and 2) to educate growers about how the guidelines would be used. The listening sessions were informative to those of us who have been working on the guidelines for some time. We hope that growers came away from the listening sessions with a better idea of what would be expected of them and how the draft guidelines can be a beginning point for them to begin to build nutrient management plans.

There has been a lot of confusion in the cranberry growing community regarding the nutrient management standards and how they will be used. I believe that misinformation has spread and that there is a great spirit of mistrust. This is unfortunate. I believe the situation is not nearly as dire as some might suggest. While it is wonderful that growers are talking to one another, sometimes it is better to talk to those who are more familiar with the process and who can provide accurate information rather than emotionally charged commentary.

The really key thing to understand is that these are guidelines, they are not absolute maximums. Some have suggested that the guidelines be written at several times what growers might ever apply. If these were intended to maximum allowable limits that might make sense, but these are guidelines, not maximums. Further, doing so would reduce our credibility with environmental and regulatory agencies.

It is important to realize that significant battles have already been won in the process. Most other agriculture will have to write nutrient management plans based on soil test data. Cranberry growers will have the privilege of using tissue test data as the basis for writing nutrient management plans. If cranberry growers had been obliged to use soil test data very few if any growers would

have ever been able to apply phosphorus fertilizer to their beds.

Please be assured that the large DRAFT that is splayed across every page of the guidelines will not be removed until the majority of the grower community is comfortable with the guidelines. There will continue to be opportunities for growers to provide input. However, where good science exists, science will take precedence.

Two activities are planned for this fall that hopefully will provide a greater level of comfort for growers. The first is that two to five nutrient management plans will be written with some key growers. These plans will use the DRAFT guidelines as a starting place—as a basis for beginning to plan. The desired outcome is that these growers will feel comfortable with the plans and that these plans can become templates for other growers to use to develop their own nutrient management plans.

The second activity planned is to collect grower data including soil and tissue test data along with yield and fertilizer application records for the past 5 years. These data can then be summarized and relationships between yield, tissue test results and fertilizer application can be established, if any exist. Also, by having a snapshot of actual fertilizer application practices we can see how much change might need to occur to approach the cranberry fertilizer guidelines.

Please don't give up on the process of nutrient management planning yet. Please participate in the process in constructive ways that can find common ground. The end result should provide us with the ability to grow cranberries with minimal environmental impacts and with the support of environmental activists and regulatory and advisory agencies.

Teryl Roper, UW-Madison Extension Horticulturist

He who feels his own opinion is his law is not a safe citizen

Richard L. Evans

COOPERATORS NEEDED!

In the last article I outlined basics of study we hope to undertake to document and evaluate current grower practice as it relates to fertilizer applications, tissue test results and yields. We are seeking 20-30 cooperating marshes that will be willing to share anonymous data that could be included in this project. The exact approach to data to be collected and how it will be evaluated is not yet finalized. Following is a rough idea of what will be needed.

The study will include only beds planted to 'Stevens'. This is the dominant cultivar, it is high yielding, and it is genetically consistent. Beds should be mature bearing beds. Data to be collected includes:

- Year the bed was planted
- Soil type
- Sanding years
- Tissue test results
- Fertilizer application records (dates, amounts, and materials)
- Yields

For those marshes that choose to participate we will ask growers to provide data from all 'Stevens' blocks, not just their best ones. We will need a range of results, not just the results from the very best beds.

If you are interested in participating please contact either Teryl Roper (trroper@wisc.edu, 608-262-9751) or Tom Lochner (tlochner@wctc.net, 715-423-2070). We will contact individual growers and provide them with a data template that can be used to organize the data.