Wisconsin Cranberry Crop Management Newsletter

Volume XVI, Number 10, October 15, 2002

REPORTING STINGER USE

The Section 18 exemption for Stinger will expire on 31 Dec. 2002. As with Orbit, reporting of usage is required under the Section 18 exemption. In this newsletter I have enclosed a copy of the reporting form. If you intend to apply Stinger after harvest please retain the form and send it to me after your last application.

Reporting use also help justify and allow a Section 18 exemption. In this way actual use patterns are seen rather than an estimate of what growers might apply.

If you have questions about reporting Stinger use please contact me.

Teryl Roper, UW-Madison
608-262-9751 Tel.
608-262-4743 Fax
trroper@wisc.edu Email

PESTICIDE RECORDS

The Wisconsin Dept of Agriculture Trade and Consumer Protection has done some spot checking for compliance to the Worker Protection Standards (WPS) this summer. We usually think of WPS in relation to posting, verbal warnings and personal protective equipment. Keeping pesticide application records are also required under UPS. For each application you must record the EPA registration number from the package or label for restricted use materials. You must also record the total amount of active ingredient applied per application.

Besides keeping you within the law, these application records can be helpful to you so you have a good record of what you have done over the past several years. You might compare your application records against scouting reports to see if your timing was accurate and if you got the result you anticipated. Compare them against weather records to see how scouting reports and pesticide applications might have interacted to explain your results.

This is one of those government regulations that can also be a useful tool for you—if you take the time to use it.

Teryl Roper, UW-Madison, Horticulture

QUALITY OF WATER FOR CRANBERRY PRODUCTION

Water quality is particularly critical in cranberry production. This is primariy due to the fact that cranberries have some unusual physiological characteristics. Cranberries, for example, are relatively intolerant of high soil pH. Cranberries grow and produce will in acidic soils (pH 4.0 to 5.5), and pH levels above this may limit nutrient availability and reduce production. Cranberries are also relatively sensitive to high salt levels in the root environment, and they absorb the majority of their nitrogen needs as

ammonium, in contrast to most crop plants that prefer nitrate nitrogen,

Another reason water quality is so critical is that such large amounts of water are used in cranberry production (4-8 acre feet annually). Since so much water is used, alkalinity in the water can raise soil pH above the optimum level. This is particularly true in cranberry soils that contain little organic matter. These soils lack the buffering capacity provided by organic matter, so soil characteristics can change quickly in response to water characteristics. In contrast, changes in chemical characteristics of peat or other organic soils are much more gradual.

Some terms related to water quality are commonly confused and need to be clarified:

Alkalinity: The total concentration of bases in water expressed in ppm calcium carbontate ($CaCO_3$) equivalent. Alkalinity tells how easily water can be neutralized by acids. Water high in alkalinity does not change readily upon acid additions. Total alkalinity includes carbonate, bicarbonate, and hydroxide alkalinity. Labs may report these components separately, or report total alkalinity.

Carbonates: Inorganic carbon may be present in water as free carbon dioxide (CO_2), bicarbonate (HCO_3^-) and carbonate (CO_3^{-2}). Free CO2 is the dominant form when pH is below 6.4, and HCO3- dominates at pH 6.5 to 10. Water contains little CO3-2 unless the pH is greater than 10. The carbonate system (CO_2 HCO_3^- CO_3^{-2}) contributes most of the alkalinity and buffering capacity to water. Buffering capacity is the ability of water to resist a change in pH.

Hardness: The concentration of multi-valent cations in water. The primary contributors are calcium Ca+2) and magnesium (Mg+2). Hardness is not the same as alkalinity, though they are similar in most waters because the carbonates in water originate from calcium and magnesium carbonates.

pH: The concentration of H^+ ions expressed as a negative log. This is a measure of acidity. pH values below 7.0 are acidic, 7.0 is neutral and values above 7.0 are alkaline. A change of one unit (5.0 to 6.0) represents a 10 fold difference in H^+ concentration.

Potential water concerns

Water can stress or injure plants in several ways. Potential hazards associated with irrigation water quality are divided into four categories:

Salinity. Salinity refers to the total concentration of soluble salts. High salinity inhibits water absorption by plants and usually causes nutrient imbalances. Salinity below 0.3 mmho are suitable and levels of 0.4 mmhos or greater may become a problem for cranberries. (In our humid climate salts tend to leach through the root zone quickly.)

Alkalinity. This is a measure of the liming effect of water. Water with high alkalinity can increase soil pH above the desired range for cranberries, causing nutrient deficiencies. Water with high alkalinity is generally also high in salinity. Alkalinity greater than 100 ppm CaCO3 is a potential problem for cranberries.

Toxicity. Levels of some elements may be sufficiently high to become toxic to cranberries. Water containing more than 100 ppm or 1 ppm boron may be toxic to cranberries. *Ed. note. We have exposed cranberries to 500 ppm chloride in aeroponics chambers with no apparent effect.*

Sodium. High sodium levels reduce the permeability of soil to water and impede drainage. Sodium levels above 50 ppm are of concern, particularly if water calcium and magnesium levels are low. *Sodic waters and soils are usually only a concern in arid areas such as the western United States.*

Working with Alkaline water

Alkalinity is a measure of the ability of water to resist pH changes when acid is added. Water sources with the same pH may have very different alkalinity. In evaluating water sources for cranberries alkalinity may be a more important criterion than pH. Application of large volumes of very alkaline water would introduce considerable lime to soils, and increase soil pH if acidifying materials were not used to counteract the effect. The soil pH increase caused by alkaline water was responsible for the decline of the cranberry industry in the Berlin area around the turn of the last century.

Alkalinity tests provide a measure of the amount of acid required to reduce water pH to a desired level. We treated several Michigan water samples that varied in alkalinity with increments of sulfuric acid and plotted the resulting pH levels in the figure below. Water that was low in alkalinity was acidified by small quantities of acid, whereas high alkalinity water required much more acid to reduce pH appreciably. Acid additions resulted initially in small to moderate pH reductions. After pH 5.5 is reached additional acid dropped pH rapidly. When pH is reduced to about 4.5, all alkalinity has been neutralized. Once pH of 4.0 is reached additional acid results in a more gradual pH decline.

Excerpted from material by Eric Hanson, Dept. of Horticulture, Michigan State Univ.

FALL TO WINTER CRANBERRY HARDINESS

Protecting cranberry plants and fruit from freezing temperatures is a concern throughout the year. As temperatures fall as winter approaches growers need to pay particular attention to temperatures. However, as fruit mature, ripen and color develops their inherent hardiness increases.

Dr. Palta's lab at UW-Madison has researched the hardiness of cranberry fruit in the late summer and fall. They determined the lowest survival temperature (LST) for fruit at various stages of development. Their results are shown below.

Development stage	LST°F
Green (<0.5")	32
Green (>0.5")	30.2
Green-full size	26.6
<25% red	26.6
25-50% red	26.6
>75% red	26.6

These results suggest that cranberry fruit can tolerate temperatures approaching 27°F before significant injury occurs. 28°F is the typical critical temperature for other crops such as apples.

Once fruit are harvested the need to frost protect vines continues. From harvest through early December the ability of cranberry buds to withstand cold injury increases. Buds may withstand temperatures as low as -12°F in early December, but only 11°F in September. After the sprinklers are out of the beds it may still be necessary to watch frost and protect as necessary.

WISCONSIN CRANBERRY SCHOOL

The annual Wisconsin Cranberry School is scheduled for January 14-15 at The Mead in Wisconsin Rapids. The program will consist of presentations by University faculty, outside experts, and growers through panel discussions.

Registration materials will be sent out in early December so watch your mail for additional information. Please put these dates on your calendar and plan to attend.

CRANBERRIES ON THE INTERNET

Have you been looking for some obscure piece of information that you remember having heard or read someplace? You may be able to find it on the Internet through the Steenbock Library (Ag library at UW-Madison) cranberry web page.

Recently the entire proceedings of the Wisconsin cranberry School were placed on the site. These files are searchable by key words.

In 2001 the site had about 20,000 hits. In 2002 the site has had about 44,000 hits. 86 reference questions have been researched and answered by library staff.

Creation of this page was supported in part by funds allocated by the Wisconsin Cranberry Board, Inc.

http://www.library.wisc.edu/guides/agnic/cranberry/cranhome.html