REPORTING SECTION 18 USE OF ORBIT

By now all cranberry growers in Wisconsin should have received a form for reporting their 1996 use of the fungicide Orbit. If you have not received the form, please contact the WSCGA office at (715) 423-2070. The EPA will not grant future Section 18 or regular labels for Orbit unless this information is reported. Completed forms should be returned **TODAY** to Patty McManus, Department of Plant Pathology, 1630 Linden Drive, Madison, WI 53706. Any questions regarding Orbit or the reporting form should also be directed to her by phone (608) 265-2047; fax (608) 263-2626; or e-mail psm@plantpath.wisc.edu.

We human beings do have some genuine freedom of choice and therefore some effective control over our own destinies. I am not a determinist. But I also believe that the decisive choice is seldom the latest choice in the series. More often than not, it will turn out to be some choice made relatively far back in the past.

A. J. Toynbee

WHAT WILL GYPSUM REALLY DO?

I'm hearing reports from many areas about using calcium sulfate (Gypsum) on fruit crops. The reasons for applying this salt range from opening pores in plants to let nutrients in to changing plant or soil pH. Indeed, gypsum has been promoted to provide almost mythical benefits to those who will apply it. This article will examine gypsum and what research shows it will actually do.

Gypsum is a simple salt composed of Calcium and sulfate ions in equal quantities as: $CaSO_4$. Most of us are reasonably familiar with gypsum as a major component of sheetrock wallboard used in our homes. Gypsum is slightly soluble in water.

The most common use for gypsum in soils is reclamation of sodic soils. Sodic soils usually have very high pH and high sodium content. Sodic soils are rare in Wisconsin, but can be found widely in western states. Soils with high sodium content won't aggregate when wet and moisture won't work through them. These soils are very difficult to work. Application of gypsum to sodic soils replaces some of the sodium Na^+ ions with calcium Ca^{++} ions and allows the soil to be reclaimed. This action is very similar to the action in your water softener where calcium ions in the water displace sodium ions placed in the tank when the system recharges, thus keeping the calcium (but not the sodium) out of the plumbing.

The other use for calcium sulfate is to remedy calcium or sulfate deficiencies in soils. Other than these uses gypsum has no value as a soil additive.

Some advocate applying calcium sulfate directly to plants to achieve benefits. I know of no reports in the literature indicating a reproducible positive response under controlled conditions to applications of calcium sulfate. I can think of no biological mechanism where calcium sulfate would enhance uptake of other nutrients. Again, application of calcium sulfate directly to plants would help remedy either calcium or sulfate deficiencies (determined by a tissue test).

A couple of years ago a report was published in a reputable scientific journal about yields increasing significantly following an application of ethyl alcohol to plants. There was a lot of excitement about these findings and because these are easy experiments to do many people attempted treating different crops with ethyl alcohol. The subsequent reports I have read indicate **NO** yield response to applications of ethyl alcohol to plants. A few years ago someone was recommending peroxide and molasses applications to plants as a yield enhancer. Subsequent controlled research showed no effect. Others have recommended wetting agents or surfactants to enhance nutrient uptake, again, subsequent controlled research showed no effect on yield.

There are no magic bullets short of good sites and great management that will consistently produce good crop yields. My fifth grade teacher put it well: "Taking the easy route is what makes rivers and men crooked."

Teryl Roper, UW-Madison, Extension Horticulturist

SPILL PREPAREDNESS

With harvest approaching now is the time to prevent oil spills and to have a plan for dealing with any mishaps that might occur. Except for crankcase oil in engines, all lubricants on harvesters should be food grade oils that are approved by the Food and Drug Administration. These are designated as H-1. Food grade oils have a residue tolerance of 10 ppm, non-food grade oil and fuel have a zero tolerance.

Have a spill kit handy to the harvest and cleaning operations. Make sure your spill kit contains: floating booms to contain the spill, absorbent materials to sop up the spill, worker protection supplies such as gloves and coveralls to protect workers, and containers to receive the spent absorbents and booms. Make sure you have a plan to deal with spills and that your employees and supervisors each know what their responsibilities are within the plan.

Inspect your crankcase housings for oil residues and evidence of leaks and clean them, and if necessary, install a pan to collect leaks. Inspect all hydraulic hoses, connections and power units for cracks, leaks and weak spots and replace those that may not survive the harvest season.

CRANBERRY CARBOHYDRATES

Cranberry growers are always interested in securing the maximum crop from their planted acres. One way to do this is to make sure the source of carbohydrates that supports fruit growth is not compromised. This article reports on some research we have completed that identifies the source of carbohydrates for fruit growth.

The source of carbohydrates for developing cranberry fruit can be spatially divided between new growth above fruit, one-year-old leaves below the fruit or adjacent uprights along the same runner. We have done leaf removal experiments where we removed new leaves, one-year-old leaves or all the leaves on a fruiting upright. We discovered that removing the new growth above the developing fruit was the most detrimental to fruit set and yield and that the most detrimental time to remove the new growth was immediately following flowering. Removing one-year-old leaves had little effect on fruit set or yield.

We also did shading experiments where we shaded small sections of a bed for four weeks either just prior to flowering (May 15-June 15), just after flowering (July 15-August 15), or before harvest (August 15-September 15). We had two shade levels, blocking either 72 or 93% of available sunlight. The most detrimental time to shade vines was just after flowering. The late shading period had no effect.

The shading and leaf removal experiments provided indirect evidence that the important source of carbohydrates for fruit

growth was the new growth. To obtain direct evidence we fed radioactive carbon (^{14}C) (labeled) to cranberry uprights and followed its movement. We fed ^{14}C to new growth above fruit, to one-year-old leaves below fruit, and to a non-fruiting upright that was adjacent to a fruiting upright. We labeled at two different stages of development, first when the first flowers were open and second when the largest fruit were almost full sized, but still green.

When we labeled during flowering the new growth above the fruit provided most of the carbon that went to the flowers (Table 1). New growth provided 16 times more carbon to the flowers than the one-year-old leaves and 100 times more carbon than an adjacent upright.

When we labeled as the fruit were full sized the current season growth was still the primary source of carbon for developing fruit. New growth provided 10 times as much carbon as one-year-old leaves and 100 times as much carbon as an adjacent upright. Indeed, the radioactive carbon provided by adjacent uprights was almost undetectable and I consider it to be "background".

It is clear from this work that the new growth above the developing flowers and fruit is the primary source of carbohydrate for fruit development. One-year-old leaves exported very little carbon to developing fruit and adjacent uprights export virtually no carbon to developing fruit.

This is important because it shows that managing new leaves is most important. Growers are concerned about leaf drop after a winter, but I know of no data showing that leaf drop leads to reduced yields (we hope to do this research soon). Also, pests like Black headed Fireworm that damage new growth pose a significant threat of yield reduction because they damage the new growth.

One-year-old leaves may be important if they provide carbohydrates to developing uprights just after budbreak. We have not yet done these experiments.

Teryl R. Roper, UW-Madison, Extension Horticulturist

Table 1. Radioactivity counted in leaves above flower/fruit, in flowers/fruit or leaves below flowers/fruit following assimilation of $^{14}CO_2$ by leaves either above or below fruit on the same upright or on an adjacent nonfruiting but connected upright. (n=5). z

^{14}C labeling		Tissue sampled and ^{14}C count (dpm)		
Tissue location	Timing	Above	Flowers/ Fruit	Below
Above	Flowering	7,709 a *	5,592 a*	222 b
Above	Fruiting	4,824 b	10,527 a	118 c
Below	Flowering	27 b	342 b	4,308 a
Below	Fruiting	180 b	957 b	3,827 a
Adjacent	Flowering	20 *	54	32
Adjacent	Fruiting	14 b	126 a	27 b

z. Within rows, mean separation by Duncan's New Multiple Range Test (p = 0.05).

* Significant differences between timings of ^{14}C labeling of the same tissue. Mean separation by Duncan's New Multiple Range Test (p = 0.05).

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