Integrated Cranberry Crop Management for Wisconsin

# Cranberry

## Crop Management Newsletter

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## CRANBERRY TISSUE TESTING

Tissue testing is the backbone of any nutrition management plan for cranberry marshes. Taking routine tissue samples for analysis can detect low nutrient concentrations before visible symptoms or yield reduction occurs. Tissue testing can be used to predict the fertilizer needs of your crop, diagnose problems, and to evaluate the effectiveness of your fertilizer program.

Taking tissue samples is easy. Three principles guide collecting tissue samples so that the information from the analysis is interpretable and relevant to the plantings where they were taken. The three principles are:

- Take the sample at the correct time
- Collect the correct tissue
- Take a representative sample

**Sample at the right time.** The correct time to collect cranberry tissue samples is in late summer to early fall, usually August 15 until September 15. Plants must be sampled at the proper point in time in order to correctly interpret the results. Nitrogen, for example, is relatively high in new leaves in the spring, levels off in midseason and then declines in the late summer and fall. Interpretations are based on knowing the relationship between nutrient levels in a particular part of a "standard" tissue in a specific time in the growing season. A tissue sample taken in the spring could show excess nitrogen compared to late summer standards and a sample taken in the late fall could show a deficiency even if it were adequate in late summer.

**Sample the correct plant part.** The correct tissue to collect for cranberries is current season growth on both fruiting and non-fruiting uprights, not including fruit. Sampling a different plant part will also lead to incorrect interpretations of the analysis. For example, the nitrogen content of one-year-old leaves is lower than for current season leaves. If one-year-old leaves are included in a sample nitrogen deficiency may be indicated, while if only current season leaves are sampled an adequate amount or an excess may be shown.

**Take a representative sample.** A representative sample is collected by taking samples across an entire bed, not just in one corner or along one edge. Either begin at one corner and walk diagonally to the other corner, or walk a zig-zag pattern across a bed and collect 10-12 sub-samples as you go. Each sub-sample consists of 5-15 uprights. The sample should be representative of the planting because the results of the test can be no better than the sample sent in for

analysis. The amount of tissue the lab actually tests is less than a teaspoon, so it is very important that the sample be characteristic of the bed. Don't sample diseased, damaged, insect infested or abnormal tissue. If you suspect a nutrient related disorder, sample when you see symptoms. Submit a sample of abnormal appearing tissue along with a sample not showing the symptoms that is collected on the same day. By taking two samples, one from a normal area and one from an affected area you'll be able to compare the two and draw conclusions.

**Interpretation:**
Within 10-14 days you'll receive a report from the laboratory. You can interpret your report by comparing to the values in Table 1. By taking samples from each management unit each year you can follow upward and downward trends while keeping tissue in the sufficiency range. Downward trends can be mitigated with additional fertilizer. Upward trends may signal concerns about excessive vine growth that can be stopped before it occurs. Tissue samples taken this year guide your fertility program next year.

**Table 1.** Cranberry tissue nutrient content guidelines for producing beds.

| Nutrient | Normal range | Nutrient | Normal range |
|---|---|---|---|
| | % | | ppm |
| N | 0.9 – 1.3* | B | 15 – 60 |
| N | 0.9 – 1.1† | Fe | >20 |
| P | 0.1 – 0.2 | Mn | >10 |
| K | 0.4 – 0.75 | Zn | 15 – 30 |
| Ca | 0.3 – 0.8 | Cu | 4 – 10 |
| Mg | 0.15 – 0.25 | | |
| S | 0.08 – 0.25 | | |

* For Stevens and other vigorous hybrids
† For Searles, McFarlin, & other natives

"Practically everything we see about us involved photosynthesis at some stage or other. The gardener often talks about 'feeding' plants when he applies fertilizers and the notion that plants derive their nourishment from the soil is one that is commonly held. They do not. Plants take up minerals from the soil, they derive their nourishment from the air."

Edwards and Walker, 1983

# ROLLOVER PROTECTION STRUCTURES

Tractor rollovers are the single deadliest type of injury incident on farms in the United States. The latest figures from the National Institute of Occupational Safety and Health (NIOSH) suggest there are approximately 250 tractor rollover fatalities per year. NIOSH estimates that there are approximately 4.7 million tractors in use on U.S. farms; one-half of them are without rollover protection for the operator. This article will closely examine tractor rollover protection issues.

## What are ROPS?

Rollover Protection Structures (ROPS) are roll bars or roll cages designed for wheel- and track-type agricultural tractors. ROPS are designed to create a protective zone around the operator when a rollover occurs. When used with a seat belt, the ROPS will prevent the operator from being thrown from the protective zone and crushed from an overturning tractor or from equipment mounted or hooked to the tractor.

Three types of ROPS frames are available: a two-post frame (with solid fold down versions), a four-post frame, and a ROPS with enclosed cab. They all serve the same function: protecting the operator in case of a tractor rollover.

## Why Bother?

- National data suggests that 1 of every 10 tractor operators overturns a tractor in his or her lifetime.
- Tractors in the Northeast states have the highest rate of overturn deaths and the lowest percentage of tractors with ROPS.
- The one time effort in installing a ROPS will protect whoever drives the tractor for the life of the tractor.
- The use of ROPS and a seat belt is estimated to be 99% effective in preventing death or serious injury in the event of a tractor rollover.
- The Occupational Safety and Health Act (OSHA) requires an approved ROPS for all agricultural tractors over 20 horsepower that were manufactured after October 25, 1976, and which are operated by a hired employee.
- A ROPS normally limits the degree of rollover thereby reducing damage to the tractor.
- A ROPS with enclosed cab also prevents tractor operators from being knocked out of their tractor seat from rough ground and low hanging tree limbs, provides protection from the sun and other weather hazards, and reduces risk for the unsafe practice of extra riders on tractors.

## ROPS History

Between 1967 and 1985 U.S. farm tractor manufacturers provided ROPS as optional equipment on most tractor models. This meant that new tractor purchasers had to add the cost of a ROPS onto the base price of a tractor. Because most farmers are cost conscious, few added ROPS as an option. Even fewer pre-1967 tractors have ROPS, yet many of these tractors are still in use. Beginning in 1986, American tractor manufacturers began voluntarily adding ROPS on all farm tractors sold in the United States over 20 horsepower.

The percentage of tractors in use and manufactured before the voluntary ROPS agreement is high because farm tractors are often in use for 30 to 40 or more years. Many newer tractors originally sold with ROPS have been stripped of the protective roll bar or roll cage because some farmers claim the ROPS structure blocks their view during normal tractor operations. Another reason often given for removing a factory-installed ROPS is that the tractor won't fit into smaller spaces with a bulky roll bar.

## ROPS Construction

ROPS are engineered to mount on specific tractor models and designed to operate with the tractors mounting brackets and frame. This provides a structure that is flexible, yet rigid enough to withstand the loads produced during a tractor overturn. Prototype ROPS must pass engineered, crush, static, and dynamic tests to assure adequate performance before they are produced for the public. These prototype ROPS must meet the standards set by the Society of Automotive Engineers (SAE) (SAE J167, J2194), and the American Society of Agricultural Engineers (ASAE) (ASAE-S383.1).

The dynamic test involves hitting the tractor ROPS in a prescribed manner with a 4,410 pound pendulum weight from behind and from both sides. In order for a ROPS to pass the dynamic test, the ROPS protec-

tive zone must remain intact and maintain the specified distances from the operator. The ROPS can be made of any material as long as the material meets temperature requirements and passes the tests set forth by the standards. Typical ROPS provided by manufacturers are made of steel that will not fracture in cold temperatures and are precision welded. The goal of the ROPS is to absorb the impact energy without excessive deformation to create a zone of protection for the operator.

### Overhead Protection

Some ROPS frames and enclosed cabs are equipped with overhead canopies to protect the operator from falling objects. Canopies that protect against falling objects ñ called FOPS (falling object protective structures) ñ must be properly designed and certified. Such canopies are recommended when using front-end loaders, working in the woods, or in other circumstances where falling objects may be a hazard. FOPS must be designed according to SAE and ASAE standards. To be sure that a canopy is a FOPS, check with the ROPS supplier or the equipment dealer.

### Factory Installed ROPS

Farm tractors (including some lawn and garden models) should have a factory installed ROPS with a seat belt. These ROPS are certified to meet maximum rollover impact and dynamic forces. Modification of the factory installed ROPS (cutting, grinding, drilling or welding) is unauthorized and unwise. Modification of the ROPS design can impair the ROPS ability to carry out its function (i.e. providing a protective zone to save a human life) in the event of a tractor overturn. Factory installed ROPS will have a certification label attached to the roll bar stating that the roll bar meets SAE/ ASAE/ OSHA standards. It is important to check for this label on imported tractors.

### ROPS Maintenance and Misuse

It is necessary to inspect and service a ROPS and seat belt periodically to check for extreme rust, cracks, or other sign of wear. Any of these could cause a failure of the ROPS during a rollover. If there are signs of wear, the manufacturer or dealer should be consulted to determine the suitable course of action.

ROPS can also be abused or misused. Holes should never be drilled into the ROPS frame, nor should a piece of steel be welded onto the frame. If lighting or other light attachments are needed, they should be clamped onto the ROPS. A ROPS should not be used as a point of attachment for a chain, hook or cable. Pulling with the ROPS could damage it and result in a rear overturn. If a tractor with ROPS does overturn, the ROPS should be replaced because it is specifically designed to bend to absorb the energy generated by the tractor contacting the ground. ROPS are only designed and certified to withstand a single overturn.

### Retrofit ROPS

Many farm tractors manufactured since 1967 can be retrofitted with a ROPS. Tractor companies and aftermarket manufacturers have designed and developed ROPS for most tractor models. Manufacturers such as AGCO, Case-IH, Kubota, New Holland and Deere and Company offer low cost retrofit ROPS kits for tractors manufactured from the mid 1960ís to 1985. ROPS for many older and smaller tractors can be purchased for $600 or less. Agricultural equipment dealers are approved to install a retrofit ROPS and seat belt. Installation charges are normally in addition to the cost of the ROPS.

A listing of ROPS retrofits for farm tractors manufactured since 1967 has been compiled by the National Farm Medicine Center, Marshfield, Wisconsin, in a publication called, A Guide to Agricultural Tractor Rollover Protection. This guidebook is available on the web at http://www.marshfieldclinic.org/nfmc/pages/default.aspx?page=nfmc_rops_guide/. Local equipment dealers should also have information on ROPS retrofitting for their brands of

tractor.

ROPS for some older models of tractors may not be available even though one is listed by a ROPS manufacturer. This is because a ROPS manufacturer often will not produce a specific ROPS for an older tractor until an order has been placed. An order for just one ROPS may mean the cost will be prohibitive to the tractor owner.

### Homemade ROPS

Because of the severe impact and dynamic forces present during a rollover, it is important that a ROPS be properly designed, manufactured, and installed. If the ROPS is too rigid or too flexible, injury could occur to the operator during a rollover. Homemade ROPS are not recommended because they may not be properly designed, built, or installed. Poor welds and undersized bolts could fail under the impact and stress of a tractor overturn. Farmers, local hardware stores and welding shops do not have the special steels, bolts or welding supplies required for an approved ROPS. Nor do they have the testing equipment that is needed to certify that a ROPS meets design standards. A homemade ROPS also exposes the owner and builder of the ROPS to liability damages should a tractor overturn and the homemade ROPS fail.

### ROPS and Seat Belts

A seat belt is an integral part of the tractor rollover protective system as it keeps the operator within the protective zone created by the roll bar or roll cage. The seat belt assembly must also conform to engineering standards.

A ROPS alone will not provide full protection to the operator when there is a tractor overturn. A seat belt must be used in combination with the ROPS to provide the highest degree of safety. Without a seat belt, the operator will not be confined to the protective zone, and may be crushed by the tractor or even the ROPS itself.

Many farmers give the excuse that because they won't wear the seat belt, they won't bother to install a ROPS. While a ROPS alone won't completely protect the operator, it will provide considerable protection. Precise statistics are not available but what is known is that:

- Few tractor operators buckle their seat belts while operating a tractor;
- There are an estimated 2,000 ROPS equipped tractor overturns each year;
- There is no data at the national, state, or local level to suggest these ROPS equipped tractor overturns are fatal to the tractor operators.

While roll bars and seat belts together are the most effective system for operator protection from a tractor that is overturned, the ROPS portion of the system provides the bulk of the protection. Installation of a ROPS on all tractors is an important step toward agricultural injury prevention.

*Adapted from:*
*Dennis J. Murphy and Dennis R. Buckmaster, Pennsylvania State University*

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Into the closed mouth the fly does not get.
*Philippine Proverb*

There are words the point of which sting the heart through the course of a whole life.
*Frederika Bremer*

Vice is a monster of so frightful mien,
As to be hated needs but to be seen;
Yet seen too oft, familiar with her face,
We first endure, then pity, then embrace.
*Alexander Pope*

Profanity never did any man the least good. No man is the richer, or happier, or wiser, for it. In commends no one to any society. It is disgusting to the refined; abominable to the good; insulting to those with whom we associate; degrading to the mind; unprofitable, needless, and injurious to society.
*Author Unknown*

## WISCONSIN CRANBERRY SCHOOL

Planning is already underway for the 2008 Wisconsin Cranberry School. The school will once again be held at the new Holiday Inn Convention Center in Stevens Point. The dates are January 15-16, 2008. Please put these dates on your calendar.

A major theme of the school in 2008 will be water conservation. The use of water in Wisconsin is under increasing scrutiny. State committees are looking at the impacts of ground water pumping (wells) c waters. Other committees are looki surface water drainage into the Great L and their recommendations will likely apply to the entire state and not just to the Great Lakes drainage area.

Presentations at the school will include understanding water movement in soils, equipment for monitoring soil moisture, obtaining better uniformity of irrigation, and water retention in soils. We'll have a grower panel on Callisto so we can gain a better understanding of this tool that was newly available in 2007 for limited use.

Registration materials will be sent to all known cranberry growers in November. This is a great opportunity to learn more about how to grow cranberries profitably.

## CORRECTION

In the last newsletter the article regarding pre-harvest intervals has an error in the pre-harvest interval for the products Select and SelectMax. The correct pre-harvest intervals for these products with the active ingredient of Clethodim is 30 days. I regret the error. Please make note of this.

This error also underscores the importance of reading the product label prior to making an application. The package label is the final word on all aspects of using a pesticide, including the re-entry interval, personal protective equipment required for mixers/loaders/applicators, use rates, and pre-harvest intervals.

*Teryl Roper, UW-Madison Extension Horticulturist*

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If you don't want it printed in the paper, don't do it. If you don't want to be quoted, if you don't want it repeated, don't say it. And we might add also: If you don't want it on your conscience, don't do it. If you don't want it in your life, don't do it. We still live in a world of causes and consequences. Our record is with us. If you don't want it printed or repeated or to become part of your record, of your life, don't do it, don't say it.

*Richard L. Evans*


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