Integrated Cranberry Crop Management for Wisconsin

Cranberry

Crop Management Newsletter

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Contents:

Cranberry Stem Gall Bulletin Available

Cranberry stem gall (formerly known as canker) is first noticed on vines at about the time of bloom. Bacteria that produce the plant growth hormone IAA are responsible for the stem swelling and gall formation. The precise environmental conditions that contribute to stem gall are not known, but infection by bacteria is believed to happen in early spring and may be related to re-flooding when a cold snap follows warm weather. More information on stem gall is available in a printable, on-line bulletin: http://cecommerce.uwex.edu/pdfs/A3795.PDF or contact Patty McManus (psm@plantpath.wisc.edu, 608-265-2047) for more information.

Orbit—Times Up!

Just a reminder that the 2005 Section 18 for Orbit expired on June 15. The intent of the Section 18 was to allow growers to use it during shoot elongation to protect against primary infection by the cottonball fungus. I realize that in northern Wisconsin shoots are still elongating on this date, but EPA was reluctant to use only the wording "before bloom." Based on Orbit use forms submitted by growers in previous years, it looked like most "before bloom" sprays were done by June 15. Hence, the deadline of June 15. Later this summer you will receive a form for to report your Orbit use.

Abound for Cottonball Control

The bloom period is the most effective time to control cottonball. In fact, most growers who have cottonball have levels low enough that they can spray once or twice during bloom and keep the disease well below economically significant levels. With Orbit no longer permitted during bloom, we have two fungicide choices for controlling cottonball during bloom: Abound (azoxystrobin) and Bravo (chlorothalonil). There are other fungicides (copper, mancozeb), but these are not effective against cottonball. Therefore, the data on Abound and Bravo are limited. However, the data we have say that Abound and Bravo are as good as Orbit *when they are applied at early and full bloom (i.e., about 10-20% in bloom and 50% in bloom)*. There are several anecdotal reports and some research suggesting that Bravo reduces fruit set and yield when applied to flowers, especially during early bloom. The worst cases are where Bravo is applied in low

gallons/acre (e.g., less than 30) and therefore is quite concentrated when it hits the fruit. Given this significant drawback, Abound is the fungicide of choice for cottonball bloom sprays. I do not have good data on the efficacy of lower vs. higher rates. If you are considering just one spray during bloom, lean toward early bloom—those flowers are more likely to produce fruit and therefore are the ones you want to protect. In any case, after fruit are set, you can no longer control cottonball. The fungus is deep within the developing ovary and no spray will eradicate it at that point.

Fruit Rot Considerations

The following are some points to keep in mind when deciding when, if, and with what to treat for fruit rot control.

1. **To spray or not to spray?** If your level of fruit rot at harvest in 2004 was about 5% or less, you're at about par for Wisconsin. Fungicides applied in 2005 are not likely to pay for themselves at that low level of rot. However, if rot was 10-15% or greater in 2004, and especially if you had specific pathogens identified in the fruit, then fungicides are probably justified in 2005.
2. **Fungicides.** The available fungicides have their pros and cons.
   - Bravo (chlorothalonil). This is the most effective fruit rot fungicide, but it can be phytotoxic, especially if applied during bloom.
   - Abound (azoxystrobin). This has been so-so in trials, sometimes doing as well as Bravo, other times not. It is not phytotoxic and is safe to bees, birds, and mammals. However, it is toxic to fish. Read the label carefully.
   - Dithane, Penncozeb, others (mancozeb). Mancozeb has been only fair in controlling fruit rot, and it reduces fruit color if applied during bloom or to young fruit.
   - Kocide, COCS, Champ, other copper compounds. Coppers are among the weakest of the fruit rot fungicides. In the eastern US where fruit rot exceeds 50% in untreated checks, copper certainly helps. But in Wisconsin, where rot in trials has been 3-10%, copper has never done better than the untreated check.
3. **When to spray what?** Bravo has the proven track record *if sprays are started during full to late bloom.* If you wait until after bloom, the efficacy of Bravo drops off quickly. For example, in one trial, applying Bravo once at 50% out of bloom and a second time 10 days later at 80% out of bloom resulted in 8% rot at harvest, whereas applying Bravo at 10 and 20 days after bloom resulted in 42% rot at harvest. Abound is safe during bloom, but it has not been as consistently effective as Bravo. A compromise that would probably work for most situations in Wisconsin would be to use Abound at full bloom (50-60%) and then Bravo about 10 days later. This should protect fruit but minimize phytotoxicity. In general, Bravo has been tested at rates of 4 to 5.5 pints/acre (with higher rates doing slightly better than lower rates) and Abound at 15 to 15.3 fl oz per acre. Because Abound results have been inconsistent even at these high rates, researchers have not included half rates in their trials.

Patty McManus, UW-Madison Extension Plant Pathologist.

It takes two to speak truth,—one to speak and another to hear.

Henry David Thoreau

FERTILIZER SALT INDEX

All common non-organic fertilizers are salts. A salt is simply a combination of a positively charged ion (cation) and a negatively charged ion (anion) creating a compound with no net electrical charge. ($Na^+ + Cl^- \rightarrow NaCl$) Salts generally dissolve into their charged ions quickly when placed in water or when put in a wet environment (like soil). When fertilizers dissolve in the soil they increase the salt concentration of the soil solution. An increase in salt concentration increases the osmotic potential of the soil solution making it more difficult for plants to extract soil water they need to grow.

Common table salt (Sodium chloride) has been used since ancient times to preserve food. Wars have been fought over access to salt. Salt works as a food preservative by drawing moisture away from the food, thus making it impossible for fungi or bacteria to live on it.

When the salt concentration of the soil is too high water can actually be drawn away from the plants. While this might only be fleeting in time, the results can be far reaching. Roots are damaged and the further ability of roots to take up water and nutrients can be compromised.

Salt burn occurs when excessive concentrations of soluble salts come in contact with roots. Salts have a high attraction for water and can draw water out of root tissue causing plant injury and drought like symptoms, particularly on sandy soils. This salt effect could also injure beneficial soil microbes such as mycorrhizae.

The potential for 'fertilizer burn' is determined by the material's salt index. Salt index is a measure of a fertilizers effect on the salt level in the soil solution and is calculated by placing the fertilizer material in soil and measuring the osmotic pressure (suction) of the soil solution. As the salt index increases so does the osmotic pressure. Fertilizers with a high salt index are more likely to injure roots than fertilizers with a low salt index. In general, N and K fertilizers have a higher salt index than P fertilizers.

Table 1 shows the salt index of common fertilizer materials for cranberry. I have also included ordinary road or table salt as a comparison. Sodium chloride has the highest salt index on the list at 154, but potassium chloride is not far behind at 116, which was the highest value of any of the fertilizers. This suggests that potassium chloride has a high potential to cause salt injury. High doses of potassium chloride (muriate of potash) would have a high potential to cause vine injury.

Blended and manufactured fertilizers begin with materials that are on this list and then blend them to the analysis you wish. Sometimes blended fertilizers can be formulated in different ways. If you are concerned about the salt index of the fertilizer you use, ask your fertilizer vendor what base materials were used in their various blends.

Using care in choosing and dosing fertilizer will minimize the opportunity for salt injury to your beds.

Table 1. Salt index of common fertilizer materials used in cranberry production.

Salt	Salt index
Ammonium sulfate (21-0-0)	69
Calcium sulfate (gypsum)	8
Monoammonium phosphate (11-52-0)	34
Diammonium phosphate	30
Urea (46-0-0)	75
Potassium chloride (0-0-60)	116
Potassium sulfate (0-0-50)	46
Triple superphosphate (0-45-0)	10
Sodium chloride	154

NEW PESTICIDE RESEARCHER AT UW

Robert "Jack" Perry has joined the UW fruit team, with the specific charge to screen pesticides on fruit crops and conduct the IR-4 tests necessary to get candidate products through the registration process. In 2005 this position is being funded by Wisconsin Cranberry Board, Cranberry Institute, and USDA. Jack is conducting herbicide, insecticide, and fungicide trials in collaboration with UW fruit specialists Dan Mahr, Patty McManus, and Teryl Roper. His work on cranberry this year will include two pre-emergence herbicide trials, three post-emergence herbicide trials, five insecticide trials, and three cottonball trials. Jack is eager for input from growers and crop consultants/scouts, so that his research stays on track and meets the demands of the industry. He can be reached at 608-513-3234 (cell); 608-890-0495 (office—not there much, but leave a message); or rsperry@chorus.net.

Jack is a native of central Illinois where he was farm-raised among corn, soybeans, pigs, and John Deere (how Illinois can you get?!). He earned his B.S. degree in Biology and Chemistry at Eastern Illinois University followed by M.S. and Ph.D. degrees in Plant Health Sciences and Plant Pathology at University of Illinois at Urbana-Champaign. He worked in field research, marketing, sales, and product registration for many years in the ag chemical industry with Gowan Corp., Mycogen Corp., and most recently FMC Corp. Jack has field research experience with a wide range of field crops, fruits, vegetables, and even forest trees, although he admits prior to his current job, his only exposure to cranberries was many years ago in New England. He sees cranberries as "horizontal miniature trees" and is intrigued by the unique production practices and special challenges cranberry growers face.

In his free time Jack amuses himself with American-made sports cars (e.g., Corvettes, Fieros) and antique tractors (you can take the boy out of the country, but you can't take the country out of the boy). Jack is happy to be on board and looks forward to learning more about cranberries and the folks that grow them.

AGRICULTURAL HEARING LOSS

Hearing loss is not just a consequence of old age. Noise induced hearing loss ranks among the top 10 work-related conditions outlined by the National Institute for Occupational Safety and Health (NIOSH). Agricultural workers experience one of the highest rates of hearing loss caused by loud noises on the farm. Studies have shown that farmers and other agricultural workers may experience substantial hearing loss by the age of 30. Prolonged exposure to agricultural noises could result in permanent hearing loss unless noise control measures are taken.

COMPONENTS OF THE HUMAN EAR: THE EXTERNAL EAR, MIDDLE EAR, AND INNER EAR

The middle ear is made up of three tiny bones or ossicles that transmit noise vibration to the inner ear. Noise will not affect the middle ear unless the sound impact or pressure is so great as to cause the bones to dislodge or fracture.

The inner ear is highly susceptible to damage from overall exposure to loud noise. It is composed of hair-like structures that transmit noise messages to the brain by changing mechanical energy to electrical energy. With repeated noise exposure, hair cells are destroyed, causing substantial hearing loss.

WHAT IS SOUND?

Sound is energy transmitted through the air. It has two qualities--loudness and tone.

Sound is measured in units of decibels, ranging from the softest sounds heard by humans to the most detrimental sounds that will cause hearing loss (See Table 1). There are recommended exposure levels that everyone should follow (See Table 2).

LOUD NOISE

Noise is potentially too loud when you have to raise your voice in order to communicate over the sound or you experience one of the following warning signs:

1. Your ears ring after prolonged exposure to noise.
2. Speech and other sounds seem muffled after exposure.
3. You lose the ability to tell musical tones apart.
4. You fail to hear high pitched sound.
5. You feel a fullness in your ears.

According to a 1981 EPA estimate, 10 percent of the 3.6 million United States farm workers are exposed to average daily noise levels in excess of the 85 decibels. An unknown portion of the additional 11.8 million farm family members, part-time farmers, and hired workers may also be exposed to potentially hazardous noise.

NOISE AFFECTS THE WHOLE BODY

Noise exposure has several effects that can alter your everyday routine.

- Psychological effects—Over a long period of time, noise can cause fatigue, irritability, and communication problems.
- Physical problems—Noise can cause constriction of small arteries in the fingers, toes, skin, and abdominal organs. The heart pumps less blood with every beat in noisy environments. It can weaken our natural resistance to disease, affect our nervous system, and cause headaches.

Hearing loss can be prevented. There are a variety of ways to reduce agricultural noise.

Engineering Controls

- Replace worn, loose, or unbalanced machine parts.
- Make sure that machine parts are well lubricated.
- Install a good, high-quality muffler to all engine-powered equipment.
- Isolate yourself from noise sources with an acoustic tractor cab.

Work Schedules Arrange work schedules so that workers don't exceed the noise exposure limit.

Ear Protection If you are continually working in hazardous noise areas, you should wear some sort of hearing protection. There are two types of protectors that work effectively if worn properly.

- **Ear muffs**--This type of protection is the most effective. The noise reduction will vary greatly, depending on the size, shape, seal material, shell mass, and type of suspension.
- **Ear plugs**--Plugs are another form of ear protection. They are usually made from rubber, plastic, or foam. When buying ear plugs, follow the directions so that a snug, tight fit is obtained in the ear canal when the plug is inserted.

Ear plugs and ear muffs do not affect your ability to communicate with others. People around you cannot give verbal warning over the loud noise anyway. Ear plugs do not alter or interfere with a co-worker "getting your attention."

Never use cotton for the purpose of reducing noise exposure; it does not block out high frequency sounds and does not provide protection!

Agricultural work is one of the most dangerous occupations in the United States. Whenever possible, safety precautions should be taken.

Though many people are unaware of it, over exposure to loud noises can gradually damage your hearing. Noise induced hearing loss is not like other types of hearing loss--it can be reduced or prevented. **Once the damage has occurred, no treatment can correct your hearing**.

***Note*:** If you suspect you have some sort of hearing loss, contact your physician or local health department for more information. If you are continually exposed to noise, take all appropriate precautions.

Judy Oskam and Julie Mitchell, Texas Tech University

When people will not weed their own minds, they are apt to be overrun with nettles.

Horace Walpole

Table 1. Decibel levels of everyday sounds.

Decibel Level	**Common Sounds**
0	Faintest sounds heard by ear.
30	Whisper, quiet library.
60	Normal conversation, typewriter
90	Lawn mower, shop tools, truck traffic; eight hours per day maximum exposure.
100	Chain saw, pneumatic drill, snowmobile; two hours per day maximum exposure without protection.
115	Sandblasting, loud rock concert, auto horn; 15 minutes per day maximum exposure without protection.
140	Gun muzzle blast, jet engine; noise causes pain and brief exposure injures unprotected ears. **Hearing Protection is a Must.**