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LEAF SPOTS, SPECKS, FLECKS, ETC.

By mid-summer, most cranberry beds show some sort of leaf spot symptoms, especially those beds in which fungicides are not used. Although leaf spots seldom cause economic losses, it's a good idea to be familiar with the various causes so that you can monitor problems from year to year. I will focus on leaf spots caused by pathogens. However, pesticide phytotoxicity can cause spots and speckling. When this happens, the problem generally shows up shortly after spraying, and you can often detect patterns of damage consistent with your method of application. There is an extension bulletin (No. A3711) on cranberry leaf spots, and many symptoms are pictured in the "Compendium of Blueberry and Cranberry Diseases." I can send you the former; the latter can be purchased for $49 from APS Press (1-800-328-7560).

The most common leaf spots are caused by fungi and include:

Protoventuria (Gibbera) leaf spot. Dark red to purple spots and blotches with irregular margins first show up on current year's leaves in late summer and early fall. By late spring of the following year, the spots enlarge and fade to yellow. By mid summer, entire leaves appear chlorotic and tiny balck fruiting bodies are clustered irregularly across the upper leaf surface. Spores are released from the fruiting bodies and infect the current year's leaves. Protoventuria leaf spot has been associated with premature drop of 1-year-old leaves. However, this probably doesn't harm yield, because almost all of the resources for developing fruit come from the current year's leaves. The fungus also can cause a minor, superficial speckling of fruit that does not affect flavor or storage quality.

Protoventuria early leaf spot. The late Don Boone used to call this the "Pacific Northwest Gibbera." The pathogen was formerly called Gibbera but is different from the one described above, and the disease is supposedly more common in the Pacific Northwest than here. However, I have seen it at several sites in Wisconsin, including some where fungicides are used. In early spring, symptoms are seen on second year leaves as reddish, circular spots on the upper surfaces. However, the spots are not as vibrant red, nor are leaves misshapen as with red leaf spot described below. By late spring, the spots appear dark red to black and sometimes have a bull's-eye appearance, with a red outer ring and a whitish inner ring which might be caused by the fungus pushing up the leaf cuticle.

Red leaf spot. This is a very aptly named disease. The fungus *Exobasidium rostrupii* causes large, circular, bright red spots on the upper surface of the current year's leaves. Sometimes the spots pucker the leaves and are surrounded by a yellowish halo. Affected leaves often are more rounded and stunted compared to elongated healthy leaves. The undersides of leaves eventually become covered with pinkish-white powdery spores. Sometimes

entire shoot tips are red and distorted. The black spot fungus, *Mycosphaerella nigromaculans*, can invade spots and shoots, turning them from red to black. This fungus will also cause large black spots on fruit but is generally not economically important, even in beds with a lot of red leaf spot. Red leaf spot is most common on Ben Lear and Stevens, but any variety is susceptible especially where nitrogen use is high and the weather has been relatively cool. Although the appearance of red leaf spot can be quiet dramatic, the damage to leaves, shoots, and fruit is not economically important except in extreme cases.

Cladosporium leaf spot. Cladosporium leaf spot is not noticed until leaves are at least 1 year old. If you see dead or dying leaves with brown spots with white centers, chances are it's Cladosporium leaf spot. This is fairly common in Wisconsin in beds where fungicides are not used. Although it often appears on old leaves that have dropped in the spring, it is probably not the primary cause of leaf drop.

Despite all the leaf spots that we commonly encounter in Wisconsin, fungicide sprays are almost never justified. Many growers associate winter-spring leaf drop with leaf spots, because the dead leaves often show symptoms. However, spring leaf drop also happens in beds that are relatively free of leaf spots and in beds where fungicides have been used. So there's no good evidence that fungicides will lessen leaf drop. If you believe you have an extreme case, give me a call so that we can do a proper diagnosis and devise a management plan.

Patty McManus, UW-Madison Extension Plant Pathologist

Our individual worth is already divinely established as "great"; it does not fluctuate like the stock market.

Neal Maxwell

STEM GALL (a.k.a., Canker) UPDATE

You call it canker. I call it stem gall. We both call it ugly. In an earlier CCM Newsletter I described this malady and another article will appear in the cranberry field day program booklet. If you missed the CCM article, let me know and I'll send it to you along with photos. This year is turning out to be a bad year for stem gall. Between June 19 and July 1, I learned of six cases, thanks to the hard work of pest scouts and keen grower eyes. I have visited most sites to make observations and collect samples. The common threads that I can detect:

1. Worse where there was freezing/thawing or general difficulty in holding a flood last winter;
2. Worse in the end of the bed where water enters;
3. Worse in Ben Lear, but also seen on Stevens and Pilgrim;
4. Came on suddenly with hot weather in late June/early July; and
5. Galls are still forming on uprights that currently look healthy.

That last point makes me think we haven't seen the worst of this yet. These observations are consistent with the 1998 outbreak, which also followed a mild winter and in which uprights were still dying back as late as September.

While my graduate student and I think that IAA (a plant growth hormone) produced by bacteria plays a role, clearly there's a huge environmental influence. In fact, our best guess is that these are nonpathogenic bacteria that are common in all marshes, but as a plant tries to recover from winter injury, the vascular cambium (tissues that generate new water and food conducting tubes) is sensitive to IAA which causes the abnormal growth. The winter injury might have resulted not only from the warm winter but also from the long, mild fall; perhaps

vines didn't harden off as well as they normally do. The research is in progress, so I dare not go farther out on a limb for now.

From previous experience, we know that a bed can be devastated one year, but new symptoms are absent the following year. A few years later, after new uprights have filled in the dead spots, you can't even tell where the problem was. So, if we have some good, cold, ice-making weather next winter, I suspect stem gall will be rare in 2003, although it will take a few years to regain full productivity. I do not know what you can do this year to alleviate the problem. My best guess is that you just have to treat the bed for the healthy uprights that remain. Some questions have arisen about nutrition. For that, I defer to Teryl Roper in the following article.

Patty McManus UW-Madison Extension Plant Pathologist

FRETTING FERTILIZER

In my fourteen years of working with fruit growers, and with Wisconsin cranberry growers in particular, I have seen a pattern in thinking that I don't think is supported by research data or experience. The thought pattern is this: A grower notices an abnormality in a bed. Further investigation shows that the abnormality is not caused by insects or disease; therefore the problem must be related to fertility or mineral nutrition.

In actuality the problem may be environmental or physiological or genetic and not a fertility problem at all. Vine yellowing is a good example. My experience is that vine yellowing usually follows stress, typically heat stress in the summer. Yellowing usually goes away when 1) temperatures moderate, and 2) the vines are given a small amount of nitrogen. Some growers have suggested potassium as a remedy to vine yellowing. Plants use potassium as an osmoticant; a fancy way of saying that potassium is involved in moving water from one location to another in plants. As I write this article (and without looking at a book) I can't think of any component of chlorophyll that contains potassium. Thus, it is unclear to me why potassium would reduce vine yellowing.

Designing a fertility program to solve or mitigate stem gall presumes that the problem is nutrition related. Yet Patty's research shows that IAA producing bacteria are likely the cause. Providing required mineral nutrients through fertilizer is an essential management practice. It is not a magic bullet that will solve all problems.

Thinking that all otherwise unexplained problems with vines is related to fertility is like thinking that changing the brand or weight of oil you use will solve problems with an engine that may be caused by the fuel delivery or electrical systems. They are sort of related, but not cause and effect.

Patty makes an excellent point in her article. The best approach is to treat the bed for the healthy uprights that remain. In my opinion that is always the best approach. Stay with your program. In general, healthy vines are most resistant to pests of any sort.

Teryl Roper, UW-Madison Extension Horticulturist

HEAT STRESS

There are numerous precautions that employers can take against heat stress. Some of them are summarized here:

Training. Train workers and supervisors in how to control heat stress and to recognize symptoms of heat illness.

Monitoring and Adjusting Workloads. Take into account the weather, workload, and condition of the workers, and adjust work practices accordingly. Higher temperatures, high humidity, direct sun, heavy workloads, older workers, and workers unaccustomed to heat are more likely to become ill from heat. Here are things to do:

- Monitor temperature and humidity, and workers' responses at least hourly in hot environments
- Schedule heavy work and PPE-related tasks for the cooler hours of the day
- Acclimatize workers gradually to hot temperatures
- Shorten the length of work periods and increase the length of rest periods
- Give workers shade or cooling during breaks
- Halt work altogether under extreme conditions.

Drinking. Make sure employees drink at least the minimum required amounts of water to replace body fluid lost through sweating. Thirst does not give a good indication of how much water a person needs to drink.

From the EPA website.

BASIC PRINCIPLES OF THE WORKER PROTECTION STANDARD

The 1992 Worker Protection Standard protects over three and a half million people who work with pesticides at over 560,000 workplaces. The Worker Protection Standard represents a major strengthening of national efforts to safeguard the health of agricultural workers and pesticide handlers. Effective implementation of the WPS will substantially lower the risk of pesticide poisonings among agricultural workers and pesticide handlers.

Summary of WPS Requirements

Protection during applications. Applicators are prohibited from applying a pesticide in a way that will expose workers or other persons. Workers are excluded from areas while pesticides are being applied.

Restricted-entry intervals. Restricted-entry intervals must be specified on all agricultural plant pesticide product labels. Workers are excluded from entering a pesticide treated area during the restricted entry interval, with only narrow exceptions.

Personal protective equipment. Personal protective equipment must be provided and maintained for handlers and early-entry workers.

Notification of workers. Workers must be notified about treated areas so they may avoid inadvertent exposures.

Decontamination supplies. Handlers and workers must have an ample supply of water, soap, and towels for routine washing and emergency decontamination.

Emergency assistance. Transportation must be made available to a medical care facility if a worker or handler may have been poisoned or injured. Information must be provided about the pesticide to which the person may have been exposed.

Pesticide safety training and safety posters. Training is required for all workers and handlers, and a pesticide safety poster must be displayed.

Access to labeling and site specific information. Handlers and workers must be informed of pesticide label requirements. Central posting of recent pesticide applications is required.

Recent spot checks for compliance suggest that growers need to check to ensure they are in compliance with the Worker Protection Standard.

FARM SAFETY

This week in Sauk County a 14 year-old boy was killed while he and his brother were demolishing a 30 foot high concrete stave silo.

The boy apparently fled the falling silo into a nearby barn that was also being dismantled. The falling silo dislodged a beam that killed the boy.

This is a tragedy that didn't need to happen. We empathize with the family who will feel the loss for years to come. Demolition work of this sort is best done by contractors with experience or at least by adults who have thought through the process and made plans for doing the work safely. This is not the kind of work to assign to teenagers who inherently lack experience and judgment.

I believe that children need to be taught how to work. Work assignments need to be made that are appropriate to their ages. Information about appropriate tasks and problems are available on the Internet at farm safety sites.

For help in decision-making, parents can consult such resources as:

Penn State University's "Children and Safety on the Farm", http://pubs.cas.psu.edu/FreePubs/ub030.html; University of Minnesota's farm safety web site, section on children http://www.bae.umn.edu/~fs/children.html; and Marshfield Clinic's North American Guidelines for Children's Agricultural Tasks, http://www.nagcat.org/.

Burn Barrels: Unhealthy, Unneighborly, Unnecessary, and Illegal

Open burning causes air pollution, and in most cases it's illegal, according to David S. Liebl of the University of Wisconsin-Extension Center for Environment and Energy. That's why the Department of Natural Resources (DNR) prohibits burning household trash in burn barrels or open fires. UW-Extension has created a new fact sheet to inform the public, fire marshals, volunteer fire departments, and local officials about the problems related to burning trash.

"Burn barrels are unhealthy, unnecessary, unneighborly and many times used illegally," says Jerry Waters, DNR air engineer based at Horicon. "Smoke from burning garbage often contains dioxin, acid gases, heavy metal vapors, carbon monoxide and other sorts of nasty toxins," emphasizes Waters.

"Today, Wisconsin has just two licensed municipal waste incinerators that are able to meet federal air pollution standards. But, according to recent estimates, we've got more than a half-million miniature incinerators (burn barrels) operating in people's back yards," Waters notes.

Burn barrels operate at relatively low temperatures, typically at 400 to 500 degrees Fahrenheit (F) and have poor combustion efficiency. As a result, toxic pollutants are created and emitted directly into the air. Backyard trash and leaf burning can release high levels of toxic compounds that cause cancer, birth defects and contribute to asthma and emphysema.

The open burning of household solid wastes, whether in a burn barrel or not, is prohibited by law. This prohibition includes all plastic materials, petroleum-based material such as asphalt shingles, kitchen wastes, dirty or wet paper wastes, treated or painted wood, furniture and demolition material.

Households (not businesses) are permitted to burn small amounts of lawn and garden debris; clear, untreated, unpainted wood, and clean paper waste that cannot be recycled. Burning permits are required in many unincorporated parts of the state and during particular times of the year (as a wildfire prevention measure), while many towns, cities and counties forbid all debris burning.

Waters says, "a big part of the problem is what people burn illegally. Anything plastic, coated papers, stuff that's oily or soggy, chemicals, treated or painted wood. That's where a lot of the toxic compounds and heavy metals come from." The DNR air engineer maintains that open trash burning is largely unnecessary because all Wisconsin communities are required to offer effective recycling and refuse collection programs. Today, even in very rural areas, many waste hauling companies offer wheeled-carts for end-of-driveway waste collection and recycling.

"There's very little reason to burn today," Waters says. "Every responsible unit of local government provides either curbside pick up service, a drop-off point, or both."

"You can also do a lot by reusing products and packaging, reducing waste and by composting organic material," continues Waters. "Garbage belongs in a landfill, not in your lungs or your kid's lungs."

For more information on open burning, you can obtain a copy of the new UW-Extension Burn Barrel fact sheet from your county Extension office. The Wisconsin DNR also maintains a web site devoted to information about open burning, at http://www.dnr.state.wi.us/org/caer/ce/ob/index.htm.

IMAGE PROBLEMS

How does your marsh reflect on the industry as a whole? If a policy maker toured your marsh would they perceive the industry as careful stewards of the environment as an integral part of producing a crop or as reckless profiteers leaving a wake of destruction in the path?

We can do much to help our image by simply cleaning up around our properties. Do you have an equipment "bone-yard" along the road or prominently visible as you enter the property? Do you have "junk" piled up that you might use sometime? Do you have outbuildings that are structurally unsound and are being allowed to rot away over time? Are the buildings painted and well maintained. Is vegetation mowed to give a tidy appearance to the marsh (not maintained like a golf course—heaven forbid—but not a thicket either)?

The general public who observe our properties from roadways will begin to draw conclusions about the industry on their first impressions. Clean and tidy still portray progressiveness—regardless of what teenagers say about their bedrooms!

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