UPDATE ON STEM GALL/CANKER

My research group is continuing to study stem gall, otherwise known as canker. Symptoms from the dike appear as patches of unthrifty or dead uprights. Upon closer examination, runners and/or uprights are swollen with bumps and galls erupting through the bark. The current year's growth is stunted or dead. Symptoms have been noticed in June and July, but extensive damage is usually not detected until late July through September. When galls first emerge they are soft, green, and moist. Later they shrink, and become hard and brown to black. Within a few weeks an upright can go from looking healthy with large fruit starting to color, to completely withered with brown leaves and dried-up fruit. Stem tissue below the galled area is green and often sends out new shoots. Thus, even where stem gall has been severe, it has not killed cranberry plantings outright. However, growers suffer significant yield losses as it takes a few years for the new growth to regain full productivity.

We think that two different species of bacteria are causing these symptoms. One bacterium, *Agrobacterium*, causes galls and swellings on many different woody plants. Interestingly, the *Agrobacterium* that we find on cranberry seems to be more similar to *Agrobacterium* found on raspberry and other brambles than to *Agrobacterium* on blueberry. The other possible pathogen is *Pantoea agglomerans*, which is very common in soils, but usually not pathogenic.

We are always interested in learning about more cases of stem gall here in Wisconsin or elsewhere. We are trying to figure out which environmental conditions are most conducive to stem gall. Pesticides are generally useless for bacterial gall diseases, so we need to figure out which cultural practices influence disease. If you see symptoms this year, I'd be interested in hearing from you, and possibly getting a sample for analysis. My phone: 608-265-2047; email: psm@plantpath.wisc.edu

Patty McManus, UW-Madison Extension Plant Pathologist

ANSWERS TO COMMON NUTRITION QUESTIONS

Phosphorus

A. *What is the role of P in cranberry plants?* P is very important to plant metabolism. P is a primary constituent of the genetic material of plants and animals (DNA). It is also critical in energy transfer (ATP→ADP). It is critical to transferring three carbon sugars from the chloroplast into the cytoplasm where it can be used for metabolism or growth or can be exported to other organs.
B. *Do we have guidelines about P timing?* There are some guidelines, but the research behind them is tenuous. The recommendation is no P until late spring, and then apply 20 lbs in 2-3 doses (I'd prefer 3). We also know that $H_2PO_4^-$ reacts readily with iron, aluminum and manganese ions in soils to form insoluble compounds and that these reactions occur rather quickly. Frequent light application of P is better than one or two large doses.
C. *About how much P should be applied during a year?* Research shows no response to added P fertilizer beyond 20 lbs P/a/yr. This is about 45 lbs P_2O_5/a/yr. Sandy soils may need more

P. I believe we are over-applying P by using fertilizers like 6-24-24. Materials like 14-14-14 would be preferable in my opinion.

D. *Are there cultivar differences in P requirements or timing?* Not that I know of. There is no research in this area.

E. *Do sandy soils require more P than organic soils?* Because phosphorus is an anion (negatively charged) soil type is less critical. The current thinking is that sand beds will need more P than peat beds. The amount and availability of iron, aluminum and manganese are more important in my opinion. (But I also don't know of any way to alter the availability of these cations.)

F. *Should I worry about leaching or runoff?* Phosphorus does not leach and would not be any more likely to go through a sandy than a mineral or organic soil. Runoff is a concern if a significant rain event quickly followed a fertilizer application. There is some evidence (although not strong) that there is less P in outflow than inflow water. There is also some evidence that P can leach from uprights when a bed is flooded (as for harvest).

G. *Should P fertilizer be added after spring frost season?* Yes, that is the right timing, but irrigation for frost protection is only peripherally involved. P is released as soils begin to dry out but are still cool after the winter flood melts. Once the soils warm P is not released as quickly. It is coincidental that frost protection ending and soils warming occur at the same time.

H. *Do large levels of natural iron disrupt P uptake?* They don't directly disrupt P uptake, but rather the iron forms insoluble compounds with the P and makes it unavailable for uptake by cranberry roots.

I. *What available fertilizers contain P?* See the table below. Phosphoric acid can be used as a foliar P source, but should not be applied during flowering or on fresh fruit plantings. Rock phosphate is almost insoluble and, in my opinion, is not a good P source.

Fertilizer	Chemical formula	Analysis	Solubility
Triple superphosphate	$Ca(H_2PO_4)_2$	0-46-0	87%
Diammonium phosphate	$(NH_4)_2HPO_4$	18-46-0	100
Monoammonium phospate	$NH_4H_2PO_4$	11-48-0	100
Ammonium polyphosphate (dry)	$NH_4H_2PO_4+(NH_4)_3HP_2O_7$	10-34-0	100
Ammonium polyphosphate (liquid)	$NH_4H_2PO_4+(NH_4)_3HP_2O_7$	15-62-0	100
Ordinary superphosphate	$Ca(H_2PO_4)_3 + CaSO_4$	0-20-0	85
Phosphoric acid	HPO_4		
Rock phosphate			

Teryl R. Roper, UW-Madison Extension Horticulturist

PHOSMET INSECTICIDE GETS CRANBERRY REGISTRATION

Sometimes it takes awhile. Close to 20 years ago I discussed with representatives of Stauffer Chemical Company the possibility of getting their insecticide Imidan (common name phosmet) registered for use on cranberry. At that time, I was told that residue research had already been conducted and that a residue tolerance had been established by EPA. Finally, cranberry registration is a reality, though Stauffer Chemical Company no longer exists as a pesticide manufacturer.

Phosmet is a broad-spectrum organophosphate insecticide, putting it in the same chemical group as several long-term cranberry insecticides such as azinphosmethyl (Guthion), chlorpyrifos (Lorsban), diazinon, and acephate (Orthene). Its primary usage is on deciduous tree fruits and nut crops; it has been one of the most common insecticides used by Wisconsin apple growers for decades. It is also registered for use on other small fruits, including grape and blueberry; on blueberry it is registered for controlling spanworms and cranberry fruitworm, amongst other pests.

Here is a mini-profile on Imidan and its cranberry registration.

Brand name: Imidan
Common name: phosmet
Chemical group: organophosphate
Formulation: 70-W (70% wettable powder) (available in water soluble bags)
Manufacturer: Gowan Company -- www.gowanco.com
Usage rates: 1.33-4 lbs formulated product per acre
Maximum usage per year: 15.6 lbs formulated product per acre
Target pests: cranberry fruitworm (2-3 lbs / acre)
fireworms (1.33-2 lbs / acre)
spanworms (2-3 lbs / acre)
Application methods: ground, in a minimum of 20 gallons water per acre
air, in a minimum of 2 gallons of water per acre
chemigation allowed
Minimum interval between sprays: 10 days
Minimum preharvest interval (PHI): 14 days
Cautionary signal word: Warning
Restricted entry interval (REI): 24 hours
Mammalian toxicity: oral: 120-700 mg / kg; **dermal:** >2000 (moderate toxicity category)
Restricted use? No

Dan Mahr, UW-Madison Extension Entomologist

PEST SURVEY

Dr. Don Weber of Ocean Spray has received external funding to conduct a second survey of pesticide priorities in all cranberry growing regions. This survey will focus on industry needs and goals with new environmental regulations, new products and much lower prices. With the lower prices pest management priorities will surely change.

Please take a few minutes when your survey arrives to fill out the form and return them in the postage paid envelope. The results will be made available to the industry.