Volume XIII, Number 5, July 5, 1999

FOLIAR FEEDING

Do plants do better if "fed" through leaves or through roots?"Several popular fertilizer products available to growers promote leaf feeding as superior to soil application of nutrients," explains Sherry Combs, director of the University of Wisconsin-Madison/Extension Soil and Plant Analysis Laboratory and UW-Extension soil specialist.

"Advertised claims include more efficient nutrient uptake, bigger fruits and vegetables, ability to `spoon-feed' plants and better use of nutrients by the whole plant," she explains. "In reality, foliar `feeding' is not superior, but some crops under certain growing conditions do respond better to applying nutrients to leaves," Combs adds.

Soluble liquid fertilizers are used when applying nutrients to leaves. This results in rapid absorption and has the advantage of near-immediate correction of nutrient deficiencies. "However, leaf fertilization is not the best choice when applying large quantities of nutrients because of foliage burn," Combs adds. "Because of the small amount of nutrients applied and remaining on leaves, benefits often are only temporary. Repeated applications may be needed," she says.

Fertilizing leaves of fruit crops and ornamentals can help correct certain deficiency symptoms. "Roses commonly exhibit iron and manganese deficiency—interveinal yellowing—when grown on high pH soils," Combs says. High pH soils lacking in iron and manganese make it difficult for certain plants, such as roses, to get enough micronutrients from the soil to support good growth. "Applying iron or manganese to the leaves of plants supplies these nutrients directly and avoids the problem," Combs adds.

Plants take in nutrients applied to foliage through the leaf stomata, the cell openings of plant leaves. This process occurs most rapidly during the first hour after application.

"For leaf absorption to be most effective, applications should be made when temperatures are cool and humidity is high, such as in the early morning or early evening," Combs says. "Applications during these times are also less likely to cause leaf burn."

"Feeding" leaves should not take the place of traditional soil application of macronutrients such as nitrogen, phosphorus and potassium. "Trying to apply the quantity of macronutrients required by plants can cause severe leaf burn," adds Combs. "In fact, a large portion of the nutrients applied to the leaves of plants falls on the soil surface. These nutrients are then absorbed by plant roots in the same manner as nutrients initially applied to the soil surface."

Sherry Combs, UW-Soil Science

LIQUID FERTILIZERS

"How much nitrogen did I give my vines? I just put out a quart per acre of a 20-20-20 liquid fertilizer." This question was posed to me recently. When I got back to my office I pulled out a specimen label book for a popular liquid fertilizer manufacturer and looked at the products. I found a 20-20-20 liquid fertilizer. I was surprised by a couple of things I found.

This particular product had 25% of its N as nitrate (5% by weight). It is well known that cranberries only utilize ammonium nitrogen so 25% of what was applied was useless. Cranberries will take up nitrate, but they don't have the biochemical equipment to convert nitrate to ammonium. No plants utilize nitrate until it has been converted to ammonium.

I could not find any indication if the analysis was on a weight or volume basis nor what the weight per gallon of the product was. Without that key piece of information it was difficult to calculate how much actual N the grower had applied.

Since I'm not very good at this sort of chemistry & arithmetic, I e-mailed a couple of colleagues of mine (who are much sharper on this sort of stuff) for their opinions & calculations.

Version 1.
Assume product to have the same density as water (8.3 lbs / gallon).
8.3 / 4 = 2.1 * 20% (0.2) = 0.415 lbs N / A

Version 2.
Assume product to have the same density as liquid N (11 lbs / gallon).
11 / 4 = 2.75 * 20% (0.2) = 0.55 lbs N / A

Regardless of which colleague is correct the amounts of N applied in either version are very small, almost to the point of being inconsequential. In either case about ½ pound of actual N had been applied per acre. That isn't very much N.

Considering the current price for cranberries, what makes the most sense economically? I called 2-3 fertilizer suppliers to get some prices on liquid or soluble products and common granular products that are currently used by cranberry growers. The results of the phone calls are in Table 1.

Product	**$/lb**	**$/lb N**
6-24-24	0.138	0.008
21-0-0	0.113	0.023
9-20-19	0.134	0.012
13-13-13	0.126	0.016
10-45-10 (soluble)	1.00	0.10
20-20-20 (soluble)	0.72	0.144

If I were trying to hold the line on costs this would be a pretty easy decision for me. I would not choose either of the soluble products that I priced on the telephone. I did not include any products like fish emulsion or chicken manure, but they would be more expensive still.

I had a call last year from a salesman who hoped to market a low analysis liquid fertilizer. What I found interesting was the four crops he was interested in: turf, potatoes, ginseng and cranberries. These are all considered high value crops. If they wanted to move product I'd target corn, soybeans and cotton.

Is liquid fertilizer available to plants faster than granular fertilizer? We did some tests last year to address that question in an indirect way. We applied labeled (^{15}N) fertilizer to plots and watered them off of the vines and into the

soil. This would be similar to irrigating after a granular fertilizer application.

We found the fertilizer in the uprights within 24 hours after application. It would still take a day or two to get the fertilizer N incorporated into amino acids and then proteins that would be of value to the vines, but since fertilizer gets into the plant via the roots within a day I see no advantage to foliar fertilizers.

If you do choose to use a liquid or a soluble fertilizer for a foliar feed, make sure that all of the N is in the ammonium form. If you buy a product with N in the nitrate form you are wasting money and since nitrate will leach you may add nitrate to the environment.

In my opinion, these high cost products offer no biological advantages to lower cost products with similar analyses.

Teryl Roper, UW-Madison Extension Horticulturist

The Return of the Red Shoot

The word on the street is that red shoot disease has made an appearance at several marshes and in various cultivars. Red shoot is a disease of cranberry caused by a fungus in the genus Exobasidium. Affected shoots are spindly with red or yellow leaves that are slightly rounder than typical oval-shaped cranberry leaves. Diseased shoots occur singly or as a cluster arising from a node on a buried runner. Red shoot has been reported from all major cranberry-growing regions, but it generally has not been economically important and does not call for fungicide use. There is a full-color fact sheet on red shoot. Give me a call if you want one.

When red shoot showed up in 1997, some growers thought it was a weed and wanted to kill it with an herbicide. This disease distorts cranberry shoots and leaves so much that cranberry doesn't look like itself anymore!

Some of the confusion is because you can easily pull the affected red shoots out of the ground, and they appear to have their own root system.

In fact, however, the shoots are attached to the cranberry runner; you have to dig carefully in order to not rip them off.

Very little research has been done on red shoot, but the fact that it is a disease was confirmed by taking fungal spores from infected plants and inoculating them onto healthy plants. The inoculated plants came down with red shoot symptoms.

Other Exobasidium diseases of cranberry include red leaf spot (common in over-fertilized Ben Lear) and rose bloom (leaves appear thick, fleshy, and pink; rose bloom is rare outside the Pacific Northwest). In general Exobasidium diseases are favored by cool, moist conditions. I'm a bit surprised that it's showed up with the warm weather we've had. But that's not the first time (nor will it be the last) that I've been fooled by the weather.

Patty McManus, Extension Plant Pathologist, UW-Madison

A person's life isn't measured by the abundance of things he possesses. It's not what we have, but what we enjoy, that constitutes our abundance. ~ Unknown

Tidbits from the Lady Bug IPM Team

It is our hope that amid all the responsibilities that you take a moment of two to really enjoy the beautiful environment that you have been so instrumental in nurturing. Take time to appreciate the bloom and the setting fruit. These are the benefits that a true farmer lives for.

Let's talk about the timing for Cranberry fruitworm sprays. Even though many of us have or will have the new product confirm in place we must remember that Cranberry Fruitworm is not easily controlled. You see the female has laid her egg right on the berry and when the egg hatches it goes right into the fruit. Our team is still using the % out of bloom technique and also we search for eggs. The %OOB is calculated by observing 10 uprights from at least 4 different areas of a bed (stay away from the edge for that is always more advanced). Hooks and flowers are counted as one group and pinheads and fruit are counted as a separate group. The total number of floral stages is summed and the hooks and flowers are divided by the total number.

Hooks and flowers_____
Pinheads and fruit_____
Total_____
Pinheads & fruit divided by the total____
Multiply this by 100 = our % out of bloom (%OOB) and remain

Now this procedure is completed on each and every variety. Some varieties are far more advanced so when do we spray? Know that all of our contact/residue products are very toxic to the pollinators. One must weigh the pros and cons as to whole marsh insecticide application verses keeping the bees longer for pollination purposes. It is not advisable to treat a bed or two of Ben Lear Cultivar when you have a Bative, Searles or even Stevens right next to it, because the bees are surely working that variety yet and may take something back to the hives and wipe out whole colonies of bees. If you feel that the insect pressure is uncomfortable yet the bloom is very obvious, you need to ask yourself if you can afford to lose fruit to pests of lose bloom to chemical. We usually have time to treat fruitworm because they work more than one berry. The decision is entirely up to you, because each marsh is very different, pest pressure varies from bed to bed.

Mid July is our "normal" time to be searching for Cranberry Flea Beetle adults. The feeding habits of the cranberry flea beetle is that they prefer Joe Pye weed, hardhack, beggar-ticks, Smarweed, jewel weed, Marsh St. John's wart, and when these weeds are not present we have observed them feeding on Cranberry.

The flea beetle has one generation per year. Adult beetles are shiny black with reddish heads and are about 1/8to ¼ inch in length. When placed in the hand, beetles actually jump and can easily fly. The adults can be observed mid July and remain visible through August and sometimes into September. Adults feed on both upper and lower leaf surfaces in a skeletonizing manner. Feeding on some epidermal layers of the leaf causes the leaf to turn brown, and may result in upright dieback. August and early September the beetles are laying their eggs in the soil. The eggs are pale yellow, irregularly shaped, about ¾ mm long.

The eggs over winter. In the spring larvae are very difficult to find because they are very tiny full-grown they are but 1/3 inch long). They are creamy white in color with a brownish head. A fleshy projection or “tubercle” extends from the back. High larval infestations results in girdled roots and vin death, similar to the damage caused by cranberry girdler.
While scouting from this pest we can sweep them, but making observations are equally important.

Jayne Sojka

Wisconsin Cranberry Crop Management Newsletter
Dept. of Horticulture
1575 Linden Drive
Madison, WI 53706-1590

Nonprofit Org.
U.S. Postage
PAID
Madison, WI
Permit No. 658