

# MASSACHUSETTS BERRY NOTES

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Summer Issue #1

<http://www.umass.edu/fruitadvisor/berrynotes/index.html>

## Volume 14-- 2002

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### Message from the Editor:

**New Beginning:** This issue marks the beginning of the 2002 summer edition of *Massachusetts Berry Notes*. You should receive this message weekly for the next 10 weeks. It will contain current pest related information as well as other timely topics and announcements.

**Weather concerns:** Assessments are still coming in for damage suffered from cold weather last week (see Environmental Data section below). Many perennial crops were 2 weeks ahead in their development and some were at or approaching bloom. It may be difficult to tell whether or not damage was sustained until the weather warms up and plants begin to grow.

**Drought Information:** We are still facing a significant deficit of precipitation as we enter the 2002 growing season. Please see last week's message for references on the drought advisory and where to get updated information.

**Pesticide Recertification Workshops:** The Pesticide Education office sent out the annual notice of pesticide recertification training workshops to all licensed and certified pesticide applicators last week. You can check out the offerings at our website [www.umass.edu/umext/programs/agro/pesticide\\_education/](http://www.umass.edu/umext/programs/agro/pesticide_education/). Information on the website includes registration form, workshop descriptions and directions to the workshops. Although they no longer have full time office staff you can direct any questions that you have to Natalia Clifton at (413) 545-1044 or to Marilyn Kuzmeskus (413) 577-0712.

**Twilight Meetings:** The UMass Extension Fruit Team has the next set of twilight meetings coming up in mid-May. While these focus mainly on tree fruit issues, the first one (on May 14 at Parlee Farms in Tyngsboro) will feature small fruits. Further details can be found at the Fruit Team website: [www.umass.edu/fruitadvisor](http://www.umass.edu/fruitadvisor) or call me at 413-545-4347.

#### May 14, 5:30 PM

Parlee Farms  
95 Farwell Rd.  
Tyngsboro, MA  
Sonia Schloemann, 413-545-4347

#### May 15, 5:30 PM

West Parish Orchard  
1780 Granville Rd.  
Westfield, MA 01085  
Jon Clements, 413-478-7219

#### May 16, 5:30 PM

Bernie Smith  
359 Sawmill Rd.  
N. Scituate, RI 02857  
Heather Faubert, 401-874-2750

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## CROP CONDITIONS

The hot weather in mid-April pushed crops ahead by about 2 weeks and was followed near record cold from 3/21 - 3/27. Many plants were in bloom ahead of schedule, especially row-covered strawberries, and suffered differing degrees of damage. Currently, **strawberry** flower clusters are expanding with early varieties in some sites at showing early bloom. Plants under row covers are in bloom and covers should be removed. Reports from growers are that many fields suffered frost/freeze damage. The extent of damage is not fully evident yet. We are entering a key period for strawberries. This means 1) be ready for frost protection, 2) apply bloom fungicides for Botrytis gray mold at 10% bloom, and 3) begin scouting for tarnished plant bug, clipper, and two-spotted spider mites. **Highbush blueberries** are nearing bloom in the Connecticut River Valley and in most other areas of the state. Some sites may have suffered frost/freeze damage. Things to look for now include evidence of mummyberry strikes on new foliage. If damage is found, be sure to protect blossom tissue from the blossom blight phase of the disease. As of this writing, we do not know if our growers can use Indar® but should know soon. Indar® can be used to control both shoot blight and blossom blight from mummyberry. **Raspberries** are fully leafed-out and new canes are emerging. Despite the mild winter, many growers are reporting winter injury in some varieties; notably 'Canby', 'Titan', and some 'Killarny' and 'Encore'. The freeze conditions in late April also nipped the foliage of some new primocanes, especially on fall bearing varieties. Growers should be prepared for Anthracnose, Spur blight, and Cane blight management when new canes are 6-8 inches tall and again when they are 12-15 inches tall. **Grape** shoot growth was accelerated during the warm weather and then stalled. Some varieties have several inches of new shoot growth already. Growers should be ready to protect against black rot, phomopsis and downy mildew. Keep an eye out for flea beetle.

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## ENVIRONMENTAL DATA

This information is intended to be used as a guide for monitoring the developmental stages and planning management strategies of pests in your location. Growing degree day (GDD) and precipitation data was collected for the one-week period, April 25 through May 1, 2002. Soil temperature and phenological indicators were observed on May 1, 2002.

Region/Location	Growing Degree Days		Soil Temp (4" depth)	Accum. Precip
	1 Month Gain	Total		
<b>Cape Cod:</b> Barnstable	6	116	55° F	2.00"
<b>Eastern:</b> Hanson	6	154	60° F	1.75"
Waltham	18	220	50° F	1.57"
<b>Central:</b> Boylston	11	121	39° F	1.60"
<b>Western:</b> Amherst	4	183	44° F	1.65"
Great Barrington	5	176	44° F	1.84"

(Source: UMass Extension Landscape Message #9, May 3, 2002)

## STATE WEATHER SUMMARY For the Week Ending Sunday, May 5, 2002

Prepared by AWIS, Inc. (available at <http://www.nass.usda.gov/weather/cpcurr/new-eng-crop-weather>)

STATE	AIR TEMPERATURES				PRECIPITATION	
	LO	HI	AVG	DFN	LO	HI
ME	19	67	40	-7	0.00	1.74
NH	11	72	40	-9	0.96	3.28
VT	22	66	40	-9	0.76	2.28
MA	27	72	46	-6	0.95	1.92
RI	36	69	48	-4	0.73	2.28
CT	30	70	47	-7	1.24	2.67

(Source: New England Ag. Statistics Service, Weekly Crop Weather Report, Volume 22, No. 2, May 6, 2002:)

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### Noninsured Disaster Assistance Program

*Debi Stephens, USDA Farm Service Agency (Michigan)*

Many crops grown in Michigan are not eligible for crop insurance policies written by private insurance providers. For those crops USDA has a legislated program referred to as the Noninsured Disaster Assistance Program (NAP).

Once a client has a valid CCC-471/Application for Coverage, additional responsibilities for producers include:

- Timely and accurately report the acreage and shares for all crops for which CCC-471 is filed.
- Certify crop production history for approved yield calculations.
- Complete CCC-502 "Person Determination/Payment Limitation" and supporting forms.
- Provide a certification for the \$2 million gross revenue limitation for each "person" in an operation.
- Certify conservation compliance on AD-1026.
- File a Notice of Loss and application for payment, if applicable.
- Request a crop appraisal, as applicable.

Recent events have caused damage to some crops and not to other crops. The regulations state a producer shall file a Notice of Loss (CCC-576) within 15 calendar days after the date of the disaster condition occurred or when damage to the crop became apparent to the producer. This requirement is on an individual basis. Each grower is responsible to monitor crops they are growing and report loss conditions to USDA/FSA.

#### **Notice of Loss forms should be filed whenever a weather event negatively affects the crop.**

The local FSA County Committee must determine the damaging weather, adverse natural occurrence, or related condition must occur before or during harvest and directly cause, accelerated, or exacerbate destruction or deterioration of the eligible crop.

USDA/Farm Service Agency forms may be accessed from the USDA/FSA web-site at: [www.fsa.usda.gov](http://www.fsa.usda.gov) or at any USDA Service Center location.

**As a side note;** if producers have a crop insurance policy with a private insurance company and their insured crops have experienced a weather-related event causing crop damage, they too should be filing a

timely notice of loss with their private insurance company. (*Source: MSU Fruit CAT Alert, ol. 17, No. 4, April 30, 2002*)

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## Strawberries

### Using Fungicides to Control Strawberry Fruit Rots in Ohio; Part I

*Mike Ellis, Ohio State University*

The most common fruit rots on strawberry in Ohio are: Botrytis fruit rot (gray mold), caused by *Botrytis cinerea*; anthracnose fruit rot, caused by *Colletotrichum acutatum*; and leather rot caused by *Phytophthora cactorum*. Especially in wet growing seasons, successful strawberry production may depend on the simultaneous control of all of these diseases. Generally, all three diseases do not occur simultaneously in the same planting, but this can occur. Botrytis fruit rot or gray mold is the most common disease and generally requires some level of fungicide for control each year. Anthracnose is a problem in years with warm to hot temperatures combined with prolonged rainfall prior to and during harvest. Anthracnose is generally not a problem in most plantings; however, when it does develop, it can be devastating. New fungicide chemistry with good to excellent activity against anthracnose has recently been registered for use on strawberry and should be helpful in providing effective control. Leather rot is a problem in years with excessive rainfall or in fields with poor drainage that have standing water (all of these diseases are a problem in situations such as this). Many growers do a good job of controlling leather rot by planting on sites with good soil drainage and maintaining a layer of straw mulch to prevent contact of berries with soil. In years with excessively wet weather or on sites with problem soil drainage, fungicides may be beneficial for leather rot control.

As previously mentioned, Botrytis or gray mold is the most common disease and is probably the easiest to control with effective fungicide use. Most fruit infections by Botrytis occur only during bloom. Therefore, most growers that apply fungicide during bloom generally do a good job of controlling Botrytis and do not need to apply fungicides pre-bloom or during harvest. If anthracnose and leather rot are not a problem, fungicide sprays during bloom only are generally all that is required. Obviously this is an ideal situation in relation to reducing costs and overall fungicide use.

In plantings and in growing seasons (warm and wet) where anthracnose or leather rot are problems, the need for a more intensive fungicide program is greatly increased. The following information provides guidelines for developing an effective fungicide program for control of the major fruit rots in Ohio.

#### **Prebloom**

In most years, there is generally little or no need for fungicides prior to bloom. If weather is exceptionally wet from rain or overhead irrigation from frost protection, some early season fungicide may be required prior to bloom. Applications of Captan or Thiram alone at the highest rate (Captan 50WP, 6 lb/A; Captec 4L, 3 qts/A, Thiram 75WDG, 4.4 lb/A) should be effective in reducing inoculum buildup of all three diseases. A seven day application interval should be sufficient. --To be continued next week.-- (*Source: Ohio Fruit ICM News, Volume 6, Issue 12, May 2, 2002*)

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## Brambles

### Timely Topics

*Sonia Schloemann, UMass Extension*

As mentioned in the beginning of this message, raspberries are fully leafed-out and new canes are emerging. Reports are of some significant winter injury in some areas in some varieties in some locations (e.g., 'Canby', 'Titan', 'Killarny', 'Encore').

Growers should be prepared for Anthracnose, Spur blight, and Cane blight management with when new canes are 6-8 inches tall and again when they are 12-15 inches tall. Also, growers should be scouting for tarnished plant bug (TPB),

and two-spotted spider mites (TSSM). Raspberry fruitworm, cane borers, and clipper may also be seen soon. Keep an eye out for these insects.

#### **Additional considerations:**

- fertilizers and preemergent herbicides should be applied according to label directions.
- irrigation and trellises should be in place.
- apply post emergence grass herbicides if necessary.

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## Blueberries

### Protecting Blueberries From Frost: How Low Can You Go?

*Eric Hanson, Michigan State University*

Recent freezes raised questions about the capacity of sprinkler systems to protect blueberry flowers (and other crops) from cold injury. Here are some facts that may help.

#### **Critical temperatures**

Swelled but closed buds tolerate 15-20° F. At "tight cluster" (individual flowers visible but still tight in bud), injury will occur between 18° and 25° F. Once flowers have separated but the corollas (petals) are still closed, 25-28° F is lethal. Fully open flowers are killed between 28° and 31° F. The most sensitive stage is just after the corollas drop, when 31° F will cause damage. These temperature ranges are general and will vary depending on the duration of exposure, wind, humidity, and possibly temperatures immediately preceding the freeze. Varieties at the same stage of development differ little in tolerance.

#### **Protection with sprinklers**

The freeze protection from sprinkler systems is limited by the irrigation rate. More water is needed to protect at lower temperatures and

higher wind speeds, as summarized in the accompanying table.

**Table 1.** Irrigation rate (inches/hour) to protect buds under different wind and temperature conditions (from U. of Florida Exten. Circ. 287)

Temp ( F)	Wind speed (mph)		
	0-1	2-4	5-8
27	.10	.10	.10
26	.10	.10	.14
24	.10	.16	.30
22	.12	.24	.50
20	.16	.30	.60
18	.20	.40	.70
15	.26	.50	.90

Many sprinkler systems in Michigan blueberries are designed to provide about 0.12 to 0.15 inches of water per hour. This volume protects plants to about 22° F with no wind or 24° to 25° F with a light wind. Most systems cannot easily be changed to deliver

more water and protect to lower temperatures. Increasing the operating pressure is not advisable because the volume is not increased substantially (increase from 60 psi to 80 psi may provide only 15 percent more water). Higher pressure may break lines and also generates considerable mist and may compromise the uniformity of application. Larger nozzles can be installed in some systems, but only if the capacity of the mainlines, well and pump can handle the added volume. For example, 9/64-inch nozzles that deliver 0.12 inches water per hour require 60 gallons per minute per acre of blueberries. Switching to 5/32-inch nozzles would deliver 0.15 inches per hour but require 68 gallons per minute per acre. Even if systems can provide adequate volume to protect from temperatures in the low 20's, breakage from ice accumulation can be considerable.

#### **Soil surface considerations**

Some frost avoidance can be achieved by keeping the soil surface clean of vegetation, moist, and packed. Soils have a large heat capacity, so they can capture and store considerable heat energy during sunny days, and release heat to maintain air temperature during

cold nights. Weeds, sod, and plant residues insulate the soil from the sun and reduce heat capture. In addition, tall grass and weeds raise the effective ground level. This is important since cold air is heavier than warm air, and settles along the ground and in the lowest areas of fields. If fields are covered with foot-tall grass or weeds, flower buds a foot higher in the canopy may be injured during a frosty night.

The other consideration is that wet or moist soils have a higher heat capacity than dry soils, and packed soils are able to absorb more heat than recently cultivated soils. Some growers attempt to irrigate during the day prior to predicted frosts in order to increase the capacity of the soil to absorb heat. This may be of some value if warmer well water is applied, but cold water will also reduce soil temperatures initially. This practice may temporarily raise the humidity in the air surrounding the plants, but it likely has little effect during the following night, particularly if wind is present. The bottom line is that clean, moist, and packed soil surfaces will absorb more radiant energy during the day, and protect from frost by releasing this heat during the night. (*Source: Fruit Crop Advisory Team Alert, Vol. 17, No. 4, April 30, 2002*)

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## **Grapes**

### **Grape Cultural Practices**

*Hans Walter-Peterson, Cornell Univ.*

The warm weather a couple of weeks ago brought us to budbreak sooner than we've ever seen. And as many feared, cold temperatures came back in and hit some vineyards hard last week. In general, those who were further from the lake and higher up the hill were hit the hardest. Growers in the Perrysburg, Brandt, North Collins and Forestville areas appear to have been the heaviest hit in the belt, with some reports of complete loss of primary buds. We'll certainly get a better sense of the damage once we warm up and the shoots start growing again. As a result of the frost, some growers will be relying on the fruit from

secondary buds that will push out now that the primaries are gone.

Several growers have come to us with questions about how to manage blocks or vineyards that got heavy frost damage, now that they're anticipating little or no crop coming from those areas. While it may be tempting to just ignore them this season, think of your management in those areas in terms of growing good wood for next year (in addition to nursing along the fruit you do get) instead. With very little fruit on these vines, more of their energy this year will go into vegetative growth (shoots and leaves) than into reproductive growth (fruit). A potential problem then, is that too much

wood will grow this year. Not only is an overly vigorous vine a pain in the posterior to prune, but it will increase shading of the wood that will be used next year as fruiting canes. If these shoots are shaded, the buds that will produce next year's shoots and crop won't develop properly and fruitfulness will be reduced.

So how do you approach farming these frost-damaged areas this year while keeping the costs down as much as possible, and developing the best wood you can for next year? A few suggestions:

- **Cut back on your fertilizer program this year.**

*Nitrogen* - If you have good growth on your vines during a normal year, you may not need to apply any N at all this year. Applying your regular amount of nitrogen when there's little or no fruit on the vine could lead to excessive shoot growth, shading and poor bud development for next year. If you decide to apply nitrogen, I would recommend applying no more than 50% of your usual rate.

*Potassium(potash)* - Concord grapes require about twice as much potassium as the shoots and leaves during the season. Take soil samples this summer (70 days after bloom) in frost-damaged areas to see if potassium is needed. With less fruit on the vines, potassium uptake will likely be reduced, and thus may reduce or eliminate the need for any application this fall.

- **Increase the effectiveness and efficiency of your spray program.**

Notice I did not say to eliminate your program. You still want to maintain a clean vineyard so pests and diseases don't create problems for next year by negatively impacting this year's shoot growth. In addition, you don't want to lose what fruit you do get this year. The immediate pre-bloom and post-bloom sprays are still vital.

Determine the need for additional sprays by doing more scouting in your vineyards for pests and diseases. Apply what you need when you need it, not just what you did last year.

- **Shoot positioning.**

I know we don't talk about shoot positioning much anymore, but this might be one instance when it may help. Positioning the shoots downward slows their growth, preventing excess wood development and shading. The challenge is finding somebody that still has the equipment to do it . . .

- **Ponnax**

Ponnax is a plant growth regulator that has been shown to increase fruit set and yield. We presented a couple of articles last year on this material from both Andy Muza (June 7, 2001 Crop Update) and Dr. Bob Pool (May 18, 2001 'Lake Erie Vineyard Notes'), which I'm posting again for you to take a look at. Ponnax was discussed last year as a way to compensate for the lower than average bud fruitfulness that we experienced. This year, Ponnax may be something for those who experienced frost damage to help boost their yields a bit. As always, give strong consideration to the cost of the material and its application versus the expected benefit.

Feel free to give us a call or drop an **e-mail** ([hcw5@cornell.edu](mailto:hcw5@cornell.edu)) if you have more questions on managing these frost-damaged vineyards. In addition, we will be discussing these and other early season issues at our coffee pot meetings next month, if you'd like to ask us any questions face to face. Check the Upcoming Events calendar for May to see where and when we'll be having these meetings. (*Source: Lake Erie Regional Grape Program Crop Update, April 30, 2002*)

## Grape Pest Management

*Alice Wise, Cornell University of Suffolk County*

With the season so early, we need to be thinking about this stuff now.

- Phomopsis cane and leaf spot pops up on shoots and rachises (cluster stems), sometimes leaves and fruit. In many trials, grape pathologist Dr. Wayne

Wilcox has found that captan does provide a slight edge in control over mancozeb but not a significant one. Phomopsis spores reside on the wood of the vine (trunks, canes, cordons-get those old stubs pruned out) and apparently do not migrate far. If prunings with phomopsis lesions are on the ground, these spores will not migrate up into the vine. Spores are also not spread by pruning shears because spores only germinate in rain. In a study on Concord grapes, Wilcox found that two early sprays, applied before the immediate prebloom spray, provided most of the control. When he waited until the immediate prebloom spray to treat, there was virtually no control of the disease. At the research vineyard, phomopsis occasionally shows up on spur-pruned Cabernet and rarely on other vines. Although unsightly, there is no shoot breakage (thanks to 3 sets of wires). Theoretically, if spray coverage is not maintained, these spores could easily infect young fruit. Not really an issue though. When the various cluster rots are a problem, yes, there is phomopsis but there are also all kinds of sour rot organisms as well as Botrytis. Bottom line: sometimes people get too worked up over phomopsis. Having a little bit should not be a problem in an otherwise well managed vineyard.

- Black rot affects both leaves and fruit. Fruit infections are probably the number one home grapegrower disease problem. Wilcox has done extensive work on the period of susceptibility of berries. In the vast majority of seasons, berries are resistant to infection 4 weeks after bloom; in some seasons, it may be as long as 6 weeks after bloom. Assuming bloom is June 20, this means black rot is no longer a threat by early August. The thing to keep in mind however is that as the season progresses, infections take longer to show up. For example, if berries suddenly start to shrivel in mid-August, it is probably from a black rot infection that occurred in mid-July.

- Powdery mildew (PM) infection is a season long threat due to our temperate climate. Powdery mildew severity is worse in higher humidity. In very hot weather, disease pressure is lower

because the fungus is inactivated. Wilcox found a very significant correlation between the amount of disease at the end of the season and the disease pressure in the vineyard the next season. Serious PM on fruit mostly occurs bloom to several weeks later. Berries don't completely lose susceptibility at veraison but susceptibility is greatly reduced. If PM shows up, the number one option for eradicating existing infections and protecting clean foliage and fruit is JMS Stylet Oil (with good coverage). Applying sterol inhibitors (Nova, Elite, Procure, Rubigan) or strobilurins (Abound, Sovran, Flint) on existing infections is the recipe for creating resistance. There are a number of organically acceptable options for PM control including potassium bicarbonate products, Serenade (a new biological material), sulfur, the organic formulation of Stylet Oil and others.

- Downy mildew (DM) is a hard disease to predict. In wet years, it's a battle; in dry years, it hardly shows up. Primary infections can start as early as 2-3 weeks before bloom. It only takes 4-5 days after infections for symptoms to appear so scouting plays an important role in controlling this disease. In wet years, DM does seem to appear just before or around bloom. The good news is that after the first postbloom spray, primary inoculum is pretty well shot and the need for additional treatment is based on whether the disease is established in the vineyard and weather. Not only rainy weather but also warm nights and dewy mornings are ideal for downy development. A number of products control DM - mancozeb, Abound, captan, the Ridomils. The one organically acceptable material - copper - must be used with great caution. There are a number of dry and liquid copper products. Copper is incompatible with many materials so always check labels before tank mixing. Copper can be phytotoxic under slow drying conditions. And copper should not be overused. In some of the acid soil areas of Europe, copper has been banned because overuse has contaminated soils. (Source: *Long Island Fruit & Vegetable Update, No 7, April 26*.)



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## General

### Proper Timing and Placement of Nitrogen Fertilizer

*Eric Hanson, Michigan State Univ.*

Nearly all fruit plantings in Michigan require annual nitrogen (N) applications for optimum production. Inefficient fertilization practices increase fertilizer bills and the potential for N movement into water resources. Here are a few tips for using N efficiently.

#### **Use appropriate N rates**

Usual N rates are 40-80 lb N per acre on apples and pears, 60-80 lb on stone fruit, 50-100 lb on grapes, 50-70 lb on blueberries, and 50-80 lb on raspberries. Efficiency (percent of N used by the plants) declines as rates increase above these ranges. Generally, the highest rates are needed on sandier soils lower in organic matter. These soils are more prone to leaching and less able to supply N from organic reserves.

#### **Choose appropriate N sources**

Fertilizers supplying all or part of the N as ammonium (urea, ammonium nitrate) are good choices early in the season because the ammonium adheres to soil particles and does not leach. As soils warm and plant demand increases, ammonium is converted by soil microbes to the mobile nitrate form. Fertilizers containing nitrate (calcium and potassium nitrate) or ammonium are suitable later in the season. Although nitrate is easily leached by rain or irrigation water, it can be applied efficiently when the crop demand is high. Ammonium sources are also suitable for later applications since ammonium is quickly converted to nitrate once soils warm. Be aware that if urea granules remain on the soil surface during warm weather, significant amounts of N may be lost to the atmosphere. Avoid losses by applying urea before rain or irrigation. Also consider the cost per lb of N when choosing fertilizers. The cheapest sources of N are high analysis fertilizers such as urea (46% N) and ammonium

nitrate (32% N). Ammonium sulfate and urea are the best materials for blueberries.

#### **Match application timing with crop demand**

Before budbreak, grapevines, tree fruit and blueberries have little demand for or ability to absorb N. Plants begin absorbing significant amounts of N only after leaves begin emerging, and the demand for N remains high through the period of active growth. With these crops in Michigan, the demand is high from June through most of August. One approach to maintaining sufficient available N in the root system throughout this extended period is multiple N applications. Greater efficiency can be achieved by splitting the annual fertilizer needs into two applications; one a couple weeks after budbreak, and one a month later. Split applications help assure sufficient N is in the root zone throughout the two to three months when the crop demand is high. Split applications are most important on sandier soils where N leaches most readily. Splitting N applications also provides the option of adjusting rates according to cropping levels. The second application can be reduced or skipped if fruit set is poor due to frost, poor pollination, or lack of bloom.

#### **Apply fertilizer where the roots are**

Place fertilizer so it is accessible to the crop. In orchards, efficiency is improved by spreading fertilizer in a broad band beneath the dripline of trees. Banding may provide some benefits in vineyards or blueberry plantings, but this has not been tested. Growers irrigating with trickle systems should consider fertigation. Fertigation places N where most roots are located, and multiple applications can easily be applied so that N supply matches the demand of the crop. Research indicates that N rates can be cut in half due to the efficiency of fertigation programs. (**Source:** *Fruit Crop Advisory Team Report, Vol. 17, No. 2, April 9, 2002*)

## Reducing Fertilizer Costs Following Frost Damage

*Eric Hanson, Michigan State University*

*Jim Nugent, Northwest Michigan Horticultural Research Station*

Fruit trees, grapevines and blueberry bushes require a certain amount of nitrogen (N) and potassium (K) to support vegetative growth and fruit production. If the fruit are lost to frost damage, the nutrient needs are also reduced. Here are some thoughts on fertilizing following frost damage.

The amount of nutrients that accumulate in the fruit of these crops is one estimate of how much fertilizer can be reduced if the crop is frosted out (Table 1). The N content of the fruit ranges from 8 lb per acre (blueberries, cherries) to as high as 50 lb per acre (15 ton per acre peach crop). The K contents range from 8 to 80 lb per acre. In the event of a crop failure, fertilizer rates can be reduced by at least these amounts. Since these plants obtain only part of their nutrients from added fertilizer (the rest from soil reserves), fertilizer rates can be reduced even more in some cases.

**Table 1.** Nitrogen and potassium removed from fruit plantings in harvested fruit (lb per acre).

Crop	N	K	References
Apples	18-20	30-80	1,5,8
Blueberries	8	8	4,6
Cherries	8	16	9
Grapes	28	40	2,3
Peaches	50	80	7

If the fruit of apples or grapes is lost to frost, N rates can be reduced by 50 percent (on lighter, sandier soils) to 100 percent (heavier, fertile soils) of typical applications. If the

entire crop of cherries, peaches or blueberries were lost, N rates can safely be reduced by a third on sandier soils, to as much as a half on heavier soils. Reduce rates proportionately in the case of partial crop failures.

The effect of crop loss on K requirements is difficult to estimate. Fruit are strong sinks for K, so the K demand is clearly reduced when no crop is produced. Frost-damaged plantings on heavier soils likely will not benefit from K additions this year. Plantings on sandy soils with a low K reserve or where tissue analysis has indicated a need for K, may benefit from K, but will require lower rates, perhaps half of the typical application. Applications of K could be discontinued this year where K levels in the soil are moderate to high, and an annual maintenance application of K is typically applied.

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