



Berry Notes

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UPCOMING MEETINGS

New England Small Fruit Pest Management Guides are available for purchase though supplies are limited. This is the same guide that was available last year, so if you bought one within the year, that is the most current issue. Amendments and additions will be posted via this newsletter and on the UMass Fruitadvisor website soon. Guides may be purchased by check (made out to the New England Vegetable & Berry Growers Association or NEV&BGA) by mailing in order forms to me, Sonia Schloemann, at 22 West Experiment Station/UMass, Amherst, MA 01003. The cost is \$10 plus \$4 for S&H for a total of \$14.

New Supplemental Label for Indar® fungicide for Blueberries: EPA has issued a federal supplemental label for the use of Indar® to control mummyberry in blueberries. You must have a copy of the supplemental label in your possession at the time of application. In addition to mummyberry, the label also includes alternaria, anthracnose, phomopsis, powdery mildew and rusts. Only 4 applications are allowed per year. It has a preharvest interval of 30 days. Please read the label for additional information. Copies of the Label can be obtained at www.umass.edu/fruitadvisor.

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STRAWBERRY

Timing Winter Straw Removal in Strawberries

Jeff Kindhart and Tony Bratsch University of Illinois

A common sign that mulch should be removed is the presence of new growth. Many growers delay mulch removal in an attempt to delay flowering time and avoid frost damage. Unfortunately, this delay has little effect on flowering time and may result in reduced yields.

Let's look at the whole story ...

To be successful with strawberries in the Midwest it is critical to apply straw over strawberry plantings in the late fall. Straw protects plants from winter cold and dessication and guards against excessive frost heaving which can damage the shallow, brittle roots of strawberries. Its other advantages are spring frost protection, weed suppression and soil moisture conservation. Straw also acts as a barrier between ripening berries and the soil, keeping fruit clean and dry during harvest. It has often been a question from growers as to ideal timing to apply and remove mulch. Recent research by Dr. Bob Skirvin and Research Specialist Alan Otterbacher at the University of Illinois has given growers solid guidelines for removal of winter straw.

The best way to gauge the timing of straw removal is by soil temperature monitoring. Because most strawberry roots are found in about an 8 inch zone,

taking soil temperature to a depth of about one half of the root zone (about 4 inches) is recommended. In a University of Illinois study, mulch removal timing was evaluated at 38, 43, 48 and 54 ° F, to determine when soils held steady at these temperatures for at least 3 days. In Champaign, these temperatures were correlated with roughly mid March, late March, mid April and late April removal timings, a range of about five weeks.

Results from this study indicated that the greatest yields were obtained where mulch was removed when the 4- to 5-inch soil temperature was 40 to 43 ° F. They also found that even between the earliest and latest dates of removal, early bloom was separated by only 11 days; and first harvest by only 3 days. Thus advantages of early mulch removal to promote early maturity were minimal. However, production was shown to increase by early removal. Late removal (a delay to 54 °F) actually decreased yields, mainly due to leaf etiolation (elongation under shade conditions) and reduction of leaf area due to sunburning. Crowns were also killed by a delay in straw removal.

Again, the ideal 4- to 5-inch soil temperature for straw removal is 40-43 ° F; in central Illinois, these temperatures were reached by the end of March. This allowed time for leaves to begin growth with little danger of sunburning, and produced the greatest yields. (*Source: Illinois Fruit & Vegetable News, Volume 5, Number 4, March 25, 1999*)

Plasticulture Strawberries: Looking Outside the Box

Nate Nourse, Nourse Farms, South Deerfield, Massachusetts

Plasticulture is the dominant system of producing strawberries throughout the world. Over the last 10 years many growers here in the U.S. have adopted this system to produce most or all of their fresh market strawberries. As we have discussed in previous issues of our newsletter, the advantages far outweigh the disadvantages.

A big advantage of plasticulture is weed control. Hardly a day goes by here at Nourse Farms, where we receive a call from a grower that is looking for a solution to control their weeds. Many growers, who have successfully controlled weeds may not realize how herbicides may be damaging their plantings and reducing yields. I feel that in many situations, the effect of certain herbicides is controlling weeds, but in the end, are reducing yields. Black plastic alleviates herbicide damage.

The greatest hurdle faced with plasticulture is planting by hand. Burt once growers have tackled the hand planting, plasticulture will have a huge payback!

Other advantages of plasticulture include increased yields and harvest efficiency. Whether it's your PYO customer or your berry pickers, both will enjoy bigger berries that are easier to harvest.

While plasticulture has been used to advance ripening times of mid-season varieties, straw mulch can be used to maintain normal season ripening because it covers the plastic, and provides the best winter protection. Here at Nourse Farms all fields are covered with straw mulch. In spring, we remove the mulch from the middle of rows, exposing the black plastic, which warms the soils for ripening 5-7 days earlier.

Many additional side benefits have also been realized. In wet seasons, water damage is greatly reduced, along with disease pressure. My opinion is that with heavy soils

plasticulture practice will reduce root diseases, due to the reduction of excess moisture.

We plan to update our plasticulture guide this fall. Please let us know if we can send you one. We also

encourage you to call us and discuss how we can help you design a plan to fit your specific needs.

For more information, see [Nourse Farms' Plasticulture Guide](#). (*Source: New York Berry News, Vol. 5, No. 11, January 2007*)

Strawberry Plasticulture Nutrition Research Update

Kathy Demchak, Penn State University

From 2003 to 2005, research examining various aspects of plasticulture production was carried out on growers' farms in Pennsylvania and at the PSU Horticulture Research Farm at Rock Springs as part project funded by PDA. Below are some the questions we were trying to answer, and what we found.

• How helpful are ion meters (aka petiole sap testers or Cardy meters) for monitoring nutrient status?

These easy-to-use field-friendly devices can produce a nearly instant determination of plant sap nitrogen and potassium levels, but how reliable are these readings?

In the spring and early summer of 2003 and 2004, plant nutrient levels were tracked using both ion meters and a complete laboratory analysis for samples collected from six cooperating growers' fields. The bottom line was that the primary value for ion meters appears to be for confirming suspicions that an experienced grower might make based on visual observations of plant color and vigor (i.e, whether nitrogen levels are deficient, adequate, or excessive), or to make this determination for less experienced growers. However, to know the degree to which adjustments should be made to a nutrient program, a complete laboratory nutrient analysis is still needed. When using ion meters, take at least 3 separate readings from a sample consisting of a minimum of 12 petioles from any one field. Then average the readings, as individual readings can be quite variable.

• Is a complete lab analysis of strawberry leaves in the spring useful, and is there a preferred time for taking samples then?

From monitoring the samples as described above, it was found that leaf nutrient levels change rapidly in the spring, but are especially unstable before bloom and after the fruit start to enlarge. The greatest period of stability occurred during the period from early bloom to

full bloom. By taking samples then, you may be able to correct certain nutritional problems in time to minimize impact on the current year's harvest.

During the course of the project, it was found that leaf samples sent in for nutrient analysis typically still had the petioles attached, while the values established for interpretation, and instructions for sampling, are for the blades alone. Extra samples of separate petioles and blades were run to determine whether this discrepancy makes a significant difference in sample results. There was a significant difference in the nutrient concentrations in petioles and leaves. So, when sending in leaf samples to the nutrition lab for a complete analysis, be sure to remove the petioles. If the petiole is included as part of the sample, it would be possible for a misdiagnosis to occur.

• How quickly does fertigation affect plant nutrient levels?

In a controlled experiment at Rock Springs in 2003, nitrogen levels in the leaves increased by 9.8% at 48 hours following fertigation, then fell gradually until nitrogen levels were 4.5% higher than in the control at 7 days. Fertilizer applications should be split into small but frequently applied (once per week) amounts. The quick uptake of nutrients means that growers can potentially correct nutrient problems through fertigation quickly.

Thanks to the following Extension Educators and grower cooperators without whom this project would not have been possible: Tim Elkner, Steve Bogash, George Perry, Scott Guiser, Tom Butzler, Harvey and Grace Sauder, Myron Kressman, Reuben Martin, Tim and Marcia Brown, Brad Eberly, and Seth Ulmer.

This research was supported in part by agricultural research funds administered by The Pennsylvania Department of Agriculture. (*Source: PA Fruit Times, Vol. 26, No. 2, Feb. 2007*)

RASPBERRY

Weather and Winter Hardiness: Raspberries

Richard C. Funt, Ohio State University

Weather is one factor in plant hardiness and cold injury. Cold injury is generally referred to when plants have not entered a stage known as rest (true dormancy). Once brambles receive a specific number of hours of chilling (32 to 45 ° F) and overcome dormancy, they begin to grow again. Bramble cold injury can occur after warm, wet conditions in November before dormancy. Spring thaws (even a January thaw - January, 2002 had 10 days of thaw) and cold March weather can cause serious damage after dormancy.

Ohio growers have reported early and mid-March 2002 low temperatures of +3 °F and +18 °F. At these temperatures some cold injury is expected, especially on black raspberries and blackberries. During December, January, and/or February brambles are in dormancy near the 40 degrees latitude (Columbus, Ohio = 40 degrees or the same as Peoria, Illinois). Depending on type and cultivar, raspberries require 800 to 1700 hours of chilling and blackberries require 350 to 600 hours. While in dormancy, raspberries can survive temperatures of -10 °F to -20 °F. After chilling hours have been met and plants have had warm days and nights of 42 °F or higher, damage may occur below +20 °F.

Over a 45-year period (1951 to 1995) Illinois researchers found that in Peoria, 500 chilling hours never occurred before November 28 nor later than

December 6. Based on this research it can be concluded that plants in Ohio were susceptible to cold temperatures and injury in March. Furthermore, 1,500 hours of chilling would not have been met until April 16th (Peoria data). By January 29, 2002, Wooster, Ohio had 1450 hours of chilling. Therefore, those plants in central Ohio requiring 1,500 chilling hours were probably still dormant on or about February 1, 2002. However, they could have been susceptible to cold injury as temperatures dropped below 10 °F in March, because the 1,500 chilling hours had been met and warm temperatures may have caused plants to grow resulting in injured plants. For some blackberries that require 500 hours of chilling, cold injury could occur as early as December.

For raspberries that require 1500 hours of chilling, cold injury could occur as early as mid-February. The outside of the plant may show discolored laterals and stems when cold injury occurs. The inside of the stem (cut across) will be brown or black on one side or completely across. Healthy plants will be a normal red to reddish brown and green just inside the outer edge. As shoots emerge, some vegetative buds never grow, some grow to several inches and collapse, and some produce flowers but fruits never mature. Some shoots or new canes may grow normally. A complete assessment of cold injury is not generally made until late May or June. (*Source: Ohio Fruit ICM News, Vol. 6, Issue 9, April 11, 2002*)

Bramble Variety Notes

David Handley, Univ. of Maine

Red Raspberries, Summer-bearing

Boyne: From Manitoba. Ripens early, excellent winter hardiness, high yielding. Plants are spiny and produce many suckers. Fruit is small to medium in size, dark and soft, with fair flavor and good freezing quality. Susceptible to anthracnose. Highly recommended for colder sites.

Canby: From Oregon. Ripens midseason, only moderate hardiness. Plants are tall, nearly thornless, and moderately productive. Fruit is medium to large, firm, bright red with excellent flavor. Limited success in cold climates

Encore: Recent release from New York. Ripens late season, with long harvest season. Hardy and free suckering with vigorous, erect, nearly spineless canes. Fruit are medium-large and firm with good flavor. Encore shows a moderate tolerance to Phytophthora root rot.

Haida: From British Columbia. Ripens mid to late season. Hardest of the Pacific Northwest types. Vigorous plants with moderate spines. High yielding. Fruit are medium-sized, with good flavor; berries are firm, sweet, and freeze well.

Hilton: A New York release. Ripens midseason, moderate hardiness. Plants are tall and vigorous, and moderately productive. Fruits are quite large, attractive, dark red, firm, with fair to good flavor. May be difficult to pick unless fully ripe.

K-81-6: From Nova Scotia. Ripens mid-late season, very hardy. Vigorous, tall canes. Medium large, bright red fruit are firm with good flavor.

Killarney: From Manitoba, sibling of Boyne. Early ripening, slightly behind Boyne. Plants are very hardy, spiny, produce many suckers, and are susceptible to mildew. Plant is short to medium. Fruit is medium-sized, and bright

red. Flavor and freezing quality are good, but berries may soften in warm weather. Susceptible to anthracnose. Highly recommended for colder sites.

Latham: A Minnesota release. Midseason ripening, very hardy. Plants are vigorous with few spines. Small fruit with good color, but crumbly with only fair flavor. Ripens over a long period of time. Less susceptible to viruses than some varieties. Recommended for colder sites.

Lauren: A recent release from Maryland. Mid-late season ripening, only moderate hardiness. Tall, vigorous canes. Fruit are very large and fairly firm with fair flavor.

Newburgh: From New York. Midseason ripening, hardy. Plants tall but not highly vigorous. Some spines. Partially resistant to common cane diseases. Fruits are medium in size, light red with good flavor. May be crumbly, and tends to ripen unevenly.

Nova: From Nova Scotia. Very hardy plants with good vigor and few thorns. Appears to be resistant to most common cane diseases. Fruit ripens midseason, is medium sized, firm, bright red, and somewhat acidic.

Reveille: From Maryland. Early ripening. Hardy. Plants are vigorous, producing many suckers. High yielding. Fruits are medium to large with good flavor, but very soft. Poor shipping and freezing quality.

Taylor: From New York. Late ripening. Moderately hardy. Plants are vigorous with some spines. Very susceptible to mosaic virus, leaf spot and fungal diseases. Fruit is medium to large with excellent flavor, good color and firmness.

Titan: From New York. Mid to late season ripening, only moderate hardiness. Large canes, suckers emerge mostly from the crown, i.e. slow spreading. Extremely productive. Plants have very few spines, but are susceptible to crown gall and Phytophthora root rot. Fruits are extremely large and dull red, with mild flavor. Difficult to pick unless fully ripe.

Red Raspberries, Everbearing (primocane-fruiting)

August Red: From New Hampshire. Earliest ripening of the primocane-fruiting types. Canes are short and spiny, with moderate vigor. Fruit size is medium-sized, somewhat rough, and mildly flavored.

Autumn Bliss: From East Malling, Scotland. Early ripening primocane crop. Moderately vigorous canes with few spines, suckers develop near the crown. Productive. Fruit is large and highly flavorful.

Autumn Britten: East Malling, Scotland, similar to Autumn Bliss. Early ripening primocane crop. Limited cane production, close planting recommended. Medium to large fruit with very good quality.

Caroline: A recent release from Maryland. Mid-early ripening primocane crop. Vigorous with tall canes.

Large, firm fruit. Ripens over a long harvest season. Moderately hardy for florican crop.

Dinkum: From Australia. Similar to Autumn Bliss, early ripening primocane crop on moderately vigorous canes. Large, firm flavorful fruit.

Fall Red: From New Hampshire. Early ripening primocane crop. The medium to short canes are very vigorous, and produce many suckers. Moderately spiny. Fruit size is medium. Good flavor, but soft. Recommended for most sites in northern New England.

Heritage: A New York release. Primocane crop ripens relatively late. Tall, rugged canes with prominent thorns. Very high yielding. Fruit size is medium. A good color and flavor, firm, good freezing quality. Due to the late ripening of the primocane crop, this variety is not recommended for regions with a short growing season, i.e. frost before September 30 or cool summer temperatures.

Jaelyn: A new, early maturing, primocane fruiting variety, slightly later than Polana. Fairly vigorous canes, with large, dark fruit and good flavor.

Polana: Significantly earlier than Heritage (14-20 days), short, vigorous canes with good yield and attractive fruit. Fruit are medium size with fair flavor. Recommended for more northern sites.

Prelude: From New York. Although everbearing, primarily grown for its very early ripening florican (second year) crop. Plants are vigorous and sucker freely. Medium-sized fruit, dark red, good quality. Primocane crop ripens late.

Ruby (Heritage x Titan): New York. Primocane crop ripens slightly ahead of Heritage. Plants moderately vigorous, good productivity. Fruit is large, but flavor is mild. Susceptible to root rot. Suggested for fresh market or shipping in areas with longer, warmer growing seasons.

Yellow Raspberries, Everbearing (primocane fruiting)

Anne: A recent release from Maryland. Mid to late season ripening primocane crop. Vigorous, tall canes. Medium to large light yellow fruit, variable quality.

Fall Gold: From New Hampshire. Primocane crop ripens relatively early. Canes very vigorous, produce many suckers. Fruit is medium-sized, yellow with a pink blush, soft, but with excellent flavor. Poor for freezing or processing.

Kiwi Gold: New Zealand. Another yellow sport of Heritage and similar in ripening season, productivity and growth habit. Good fruit quality, develops pink blush when over-ripe.

Black Raspberries

Black raspberries may winter kill to the snowline if temperatures drop to -10°F in combination with desiccating winds. They are also quite susceptible to virus infections, Verticillium and rust. They are not considered commercially viable for northern New England.

Allen: Early-midseason. Relatively hardy. Plants are vigorous and high-yielding. Fruit ripens uniformly, short harvest period. Fruits are the largest and most attractive of the black types, but flavor is mild.

Blackhawk: From Iowa. Vigorous plants, relatively hardy and productive. Fruit is medium-large, glossy, with good flavor.

Early Sweet: From USDA (Maryland). Vigorous, productive plants. Firm fruit is medium- to large-sized and sweet. Early season. For trial.

Jewel : A New York release. Midseason. Possibly the hardiest black raspberry variety. Plants are vigorous, erect, and productive. Appears to have somewhat more disease resistance than other varieties. Fruit is firm, and glossy with good quality.

Blackberries, Thornless (trailing)

Thornless blackberries have vigorous canes which must be trellised. They are not hardy below -10°F and are not commercially viable for northern New England. They ripen later than most red raspberries.

Chester: From USDA (Maryland). Late season ripening, possibly hardier than other varieties. Resistant

to cane blight. Large, high quality fruit with good shelf life.

Triple Crown: From USDA (Maryland). Vigorous, semi erect type plant, somewhat sturdier than other varieties. Productive, midseason ripening. Large fruit with excellent flavor.

Blackberries, Thorny (erect)

Erect blackberries have tall, rugged canes with prominent thorns. The canes have very limited hardiness. They are not recommended for commercial production in northern New England.

Darrow: From New York. Hardest blackberry variety. Canes are vigorous with large thorns. Good yields with long harvest season. Fruit are large and glossy, excellent quality.

Illini: From Illinois. A hardy, thorny blackberry with good quality fruit. Suggested for trial where Darrow can be grown successfully.

Fort Kent King: From Maine. Newly released selection found growing at a farm in northern Maine that appears to be very hardy. Thorny, medium-size fruit with good quality. Recommended for trial in colder sites.

(*Source: Proceedings 2005 New England Vegetable & Fruit Conference <http://www.newenglandvfc.org/>*)

BLUEBERRY

Winter Acclimation and Cold Hardiness of Blueberry

Bernadine Strik et al, Oregon State University

Blueberry cold hardiness varies tremendously among types and cultivars. Highbush, half-high, and lowbush blueberries are generally hardy to at least -20 F, although some cultivars are more tender. During recent years, blueberry breeding efforts in the northern United States have produced commercial cultivars which are hardy to between -30 and -40 F if snowfall is sufficient.

Winter injury is not usually a problem in western Oregon and Washington. However, if a severe cold spell occurs early, before plants are fully dormant, winter injury may occur. In Idaho, growers should also be concerned with winter minimum temperatures when selecting sites. Cultivars differ in susceptibility to cold injury. Spring frost injury may also be a problem in blueberry production.

Cold injury

Not all of the tissues of a blueberry plant attain the same degree of cold hardiness. In fully dormant plants, the wood is normally somewhat hardier than the buds, and the roots do not develop any great degree of cold hardiness. Mulching with bark or sawdust can help moderate root zone temperatures and minimize root-freezing injuries.

The basal tissue that connects the flower bud to the shoot is the part of the bud that is most easily injured

during the dormant period. Following a freeze, florets in a bud may show no injury even though the basal tissue is injured. The amount of growth of a new shoot or flower cluster depends on the extent of injury at the base of the bud. If injury restricts the flow of nutrients and water, growth of the shoot or flower cluster is slow or stunted, or completely inhibited.

Injury to the basal tissue can be determined by slicing longitudinally through a bud from the tip through the bud base with a sharp razor blade. Freeze-injured tissues will have a brown, water-soaked appearance, while healthy tissues will be green or white. For best results, wrap tissues to be tested in a plastic bag and hold at room temperature for several days before slicing and examining for browning.

Winter injury to the vascular cambium (thin layer of tissue beneath the bark) of the cane or roots interferes with the movement of water and nutrients to the buds and, later, shoots. Depending on which tissues have been injured and the degree of injury, symptoms of "delayed winter injury" may not appear until late spring or early summer. Shoots may bloom, leaf out, and even begin setting fruit before suddenly collapsing and dying over a 1- or 2-day period.

Sudden collapse is usually related to the onset of hot weather, which increases the demand for water by the developing shoots and fruit. Injured vascular tissues are

unable to supply the needed water and nutrients and the shoot collapses. Often, injury to vascular tissue can be determined by scraping away the bark a healthy vascular cambium is bright green, whereas one injured by cold is brown.

Site selection in cold regions

Selecting cultivars that are adapted to a growing site is the most important step in preventing freezing injury. One method of cultivar selection involves using the USDA Plant Hardiness Zone Map, which separates growing regions into hardiness zones, based upon average minimum temperatures.

Because blueberries are long-lived plants, average minimum temperatures are less of a concern than the probability of a killing freeze. For example, although a particular region may be classified as USDA zone 5a (average minimum temperature -15 to -20 F), occasionally it may experience temperatures of -30 F or less. In such a region, blueberries hardy only to zone 5 would be susceptible to freezing injuries during those occasional severely cold winters.

The best method of selecting blueberry cultivars is to determine how often severely cold temperatures are likely to occur in your area and base your selection upon the life expectancy of the blueberry planting and the probability of a killing freeze. If you do use the hardiness zone concept, select cultivars that are classified at least one zone hardier than the planting site.

Acclimation

The degree to which a blueberry bush hardens off in the fall depends upon many factors, including length of the growing season, alternating day/night temperatures, nutrition, pruning, and fluctuating temperatures during the dormant season.

Actively growing tissues are not cold hardy and are injured by temperatures around 28 F. As the daylength shortens and temperatures decrease in fall, blueberry canes cease active growth and begin a very complex process known as acclimation. Optimum cold hardiness develops when day/night temperatures decrease steadily from mid-summer to late fall, followed by several mild frosts. The degree of cold hardiness varies, according to temperatures, throughout the dormant season. A minimum of 850 to 1,000 chilling hours is needed for shoot growth and flowering to occur the following spring.

Maximum cold hardiness occurs after fully acclimated plants have been exposed continuously to several days of non-lethal, sub-freezing temperatures. Hardiness is lost during periods when temperatures rise above freezing. Most freezing injury occurs when

temperatures fluctuate above and below freezing, and is typically associated with sub-freezing temperatures which follow mid-winter thaws. Blueberries in many areas of Oregon and Washington seldom attain maximum cold hardiness due to mild and fluctuating fall and winter temperatures in the coastal areas.

Cultural practices that promote late fall growth can interfere with acclimation and inhibit cold hardiness development. For example, excessive or late fertilization with nitrogen forces late season growth that is susceptible to early fall frosts.

Pruning too early in the fall, before plant dormancy, interferes with cold acclimation by stimulating late, tender growth. Even if no visible growth develops, early pruning can cause cane tissues to de-acclimate. Delay pruning until canes are fully dormant. Pruning during late winter and early spring also allows for identification and removal of injured wood and buds.

Although research indicates that maximum cold hardiness is associated with drought stress in some woody species, blueberry plants should not be allowed to become drought stressed, either during the growing season or after the plants are dormant. In regions with low annual rainfall, irrigate deeply before the ground freezes to provide enough moisture to supply the blueberries during the winter.

Insect damage, disease, other stresses which damage foliage, and overcropping limit the production of food reserves and interfere with acclimation.

Frost injury

When the flower buds begin swelling in early spring, the florets are the most easily injured part of the bud. Once a flower bud opens, it has lost all of its cold hardiness and will be injured at about 28 F. The tip buds on canes and the tip florets within buds are the first to develop and are the most susceptible to early frost.

To reduce spring frost injury, avoid planting in frost pockets and ensure good drainage of cold air by removing cold air dams formed by trees and brush around blueberry fields. In regions where spring frosts are common, select planting sites on gently sloping hillsides.

Overhead sprinkler systems are effective in reducing spring frost injury if enough water is available. Applying about 0.10 to 0.15 inch of water per hour can protect open blossoms down to a temperature of 25 F. Water must be applied continuously until the air temperature warms above 32 F (wait for ice to melt), or frost injury may occur. (Source: Excerpted from Northwest Berry and Grape Information Network factsheet, <http://berrygrape.oregonstate.edu/fruitgrowing/berrycrops/blueberry/winter.htm>)

Considering Roots

Mark Chien, Penn State Cooperative Extension

We don't think much about the roots of grapevines. We are so busy fussing over the canopy and fruit it's not easy to get our thoughts into the subterranean sphere but it's just as important as what we can see. In fact, when we talk about vine balance, it's all about what's going on belowground.

Rootstocks are a critical part of the formula for achieving vine balance, performance and pest resistance, and own-rooted vines certainly have their own unique characteristics. But it's amazing how little is understood the vine roots and the rhizosphere given all of our viticulture knowledge.

Dr. David Smart from the viticulture and enology department at UC Davis is trying to illuminate root behavior for us by actually taking pictures of root growth (or lack of it) over time and in the field. He works with Dr. David Eissenstat at Penn State University and Dr. Alan Lakso at Cornell. They use a very clever device called mini-rhizotron that is a clear plastic tube inserted into the ground with a special camera that can actually take images of roots at different depths. Over the past few years he has taken hundreds of thousands of images of roots in action, so to speak.

I got to hear Dr. Smart talk at the Maryland Grape Growers Association annual meeting and will try to summarize some of his key points.

Let's be clear that we are talking about roots growing in an arid climate at the Oakville Research Station of the Department of Viticulture and Enology, UC Davis, in Napa Valley under dry conditions and using drip irrigation. Root distribution has been studied but is not well understood. Nelson Shaulis did some extensive root mapping at Cornell with trench wall profiles and found out that soil impediments like a clay pan will have a dramatic effect on a roots ability to go deep but roots have an equally dramatic ability to find their way through or past some obstacles. Whether rootstocks are shallow or deep rooted, Dr. Smart found they have somewhat similar distributions because the physical characteristics of the soil will have the strongest influence on root growth and distribution. Grapes are deeply rooted compared to many other plants and the roots grow in much the same way as the shoots above – like crazy!

One interesting hypothesis Dr. Smart investigated is whether roots actually redistribute water out of the zone of irrigation. During the day when the vine is subject to evapotranspiration (ET) most of the water goes directly up and into the shoots and leaves where it is needed.

But at night when ET slows water is still moving but it will go into roots outside of the wetted area by moving opposite to the upward direction of evapotranspiration! These roots may actually store water for use during the day when demand is high. These exterior roots will move well into the row middles and beyond!

A trial was set up using Merlot on 1103P, a vigorous stock, and 101-14, a less vigorous rootstock. Using three treatments – no water, 40% deficit ET and 100% deficit ET they looked at root growth through the mini-rhizotrons. In June of 2002 they saw no rootlets growing from a main root, then in 2 weeks there were nice rootlets and in another 2 weeks those rootlets had already begun to lignify. It was quite amazing to observe these images. Rootlets are born and die a few weeks later. The main season for root development is in the late spring around the time when soil temperatures are starting to warm and there's enough canopy for plenty of photosynthesis activity (June 1 in Napa). Leading this with a springtime application (May) is a good time to put down fertilizer. Interestingly, there was no difference in the birth rate of rootlets between the wet and dry zones. Dr. Smart believes this is because of the ability of the vine to redistribute water so readily from the drip zone and other water sources – like a high water table.

Dr. Smart and his colleague Dr. David Eissenstat found phylloxera living on both rootstocks evidenced by the characteristic hook shape they create on new rootlets. He wondered what the louse is doing on these resistant stocks? He thinks that one reason 101-14 may be less vigorous than 1103P is because they carry more phylloxera and become slightly weaker as a result. This is actually a favorable characteristic in Napa because it may help to keep the vigor down on varieties like Merlot that can be very vigorous.

Another interesting outcome was the availability of nitrogen between the two rootstocks. 1103P demonstrated better fermentation rates than 101-14 and it appears they have different nitrogen absorption rates. 101-14 has very little arginine present at harvest, a key amino acid implicated in yeast assimilable nitrogen needed for successful fermentation and also a suspect in the atypical aging problem. Nutrition, roots and water are all closely linked and have direct effects on the vines, grapes and wines that come from them.

Rooting depth of these vines was down to a maximum of 1 meter with a bell shaped curve with maximum roots present at 50cm and most roots occupying a zone from 30-80cm.

Here are some of the key points from his research:

- Grapes have deep and aggressive rooting behavior

- Grape roots redistribute their irrigation water extensively
- Water redistribution seems to enhance the survival of roots in dry soils
- Irrigation has less influence on fine root production than does the season.
- Rootstocks differ widely in their ability to absorb and transport nitrogen

Should roots matter to growers? Why and what can growers do about it? Clearly during the critical vine development phase (years 1-5) it is important to balance canopy and crop with the root system. Do not push the

roots past what they are able to supply to the vine. Root distribution, whether own-rooted or rootstock, should be adapted to the soils, expectations for the wine, and if irrigation is used. Phylloxera resistance is paramount for all vines.

I would like to thank the Maryland Wine Association and Maryland Grape Growers Association for inviting me to speak at their annual meeting and Dr. David Smart for sharing his knowledge about roots with us and helping me to proof and edit this article.

(Source: Wine Grape Info for Pennsylvania and the Region, Feb 2007)

Assessing Bud Injury

Tim Weigle, Cornell University

With temperatures hitting below zero numerous times this season there has been some concern expressed as to how badly the buds have been injured. One comment I have heard is that the best defense is a good offense and more buds will be left up to combat winter injury and to guard against another spring frost. I will leave the discussion of how you need to look at the whole picture and be prepared to thin during the growing season and the effects of over cropping on the vines carbohydrate storage to Terry Bates and Hans Walter-Peterson. I would like to direct your attention to some of the pest management problems that can be caused by leaving up more buds than you need.

Number 1 - While not specifically a pest management issue, it is an issue of common sense. Most everyone has complained about the job an unsupervised migrant crew does, leaving up too many buds, not leaving up the best buds, etc., leaving you with a mess that requires additional input of man hours in future years to get back to a training system you recognize. Why would you do on purpose what you have tried to avoid over the years?

Number 2 - Along the same lines as minimal pruning, or hedging (but hopefully not as drastic) will be the number of smaller shoots that come out in the spring quickly filling in the canopy. Take the problem with getting coverage in the interior of the canopy (the fruiting zone) during late season sprays for grape berry moth and move it up earlier in the season due to a quicker closing in of a denser canopy.

Number 3 - One of my favorites, the law of limiting factors. As you push a vine toward maximum yield you will eventually run into a factor required for getting that crop ripe, while maintaining a healthy vine, that will become limiting. Powdery mildew is an excellent example of this. When the vines are hanging a moderate to high yield per acre, some powdery mildew on the foliage is not considered to be worth treating, the vine can ripen the crop while building carbohydrate reserves. However, with an excessive crop, management of late season powdery mildew becomes much more important and will require much more time and effort devoted to it than a vineyard with an appropriate sized crop.

The Take Home Message is: do a little detective work to see what you have in the vineyard to get the information necessary to make a good decision. Take the time to check each vineyard block, each variety within a block, and check areas separately if you know they have a tendency to be cold spots.

A guide to checking bud for cold injury can be found at: <http://www.nysaes.cornell.edu/hort/faculty/pool/budcoldinjury/Assessingbudcoldinjury.html>

If the pictures are a bit small for you try clicking on the picture, it should enlarge the pictures for you. As always, I welcome any questions on vineyard pest management. Just send an e-mail timweigl@netsync.net, call me at (716) 672-6830 or drop by the office at 412 E. Main St in Fredonia NY. *(Source: Lake Erie Regional Grape Program Update, March 5, 2003)*

General Information

High Tunnel Small Fruit Research Update

Kathy Demchak, Penn State University

Research on small fruit crops in high tunnels was continued in 2006 at “Tunnel Town” at the Horticulture Research Farm at Rock Springs, PA. Most of the work this year was on strawberries, though there were a few interesting observations on other crops as well.

Strawberry plants were planted in the fall of 2005 and were harvested in the spring and early summer of 2006. Cultivars tested were the spring-bearers ‘Chandler’, ‘Ventana’, ‘Araza’ (it was supposed to be ‘Albion’, a day-neutral), and ‘Carmine’, and day-neutrals ‘Seascape’, NC 3-5 and NC 3-8. In a nutshell, we found that ‘Chandler’ was still the best June-bearer under these conditions, producing about 0.8 lb/plant. This was a relatively low yield for ‘Chandler’, but the plants got off to a bad start in the fall. I think the problem was due to high soluble salt levels at 3.85 mmhos/cm (not everyone’s agreeing with me on this one). The good part was that we found that we could flush the salts to the area between the rows using about 10 days (2-3 days per week) of 8-hour per day trickle irrigation. The salt eventually appeared on the soil surface between the rows of plastic, and new leaves stopped having burned edges. From this point on, plants appeared to be very healthy, and yields were adjusted to a per-plant basis, since some plants had died or had been removed if very low in vigor. ‘Ventana’ produced about half the yield of ‘Chandler’, though berries were slightly larger. ‘Ventana’s harvest season ran about 5 days earlier than for ‘Chandler’. ‘Araza’ and ‘Carmine’ had very low yields at 1/3 pound per plant or less, and both also produced smaller berries than either ‘Chandler’ or ‘Ventana’.

The day-neutrals were harvested only for the spring crop, since the hot temperatures in the high tunnels

would have likely brought them to a halt for a couple of months, and we didn’t want to occupy an entire commercial-sized tunnel for a dozen small plots. All performed very well. The most pleasant discovery of the year was the performance of the day-neutral selections NC 3-5 and NC 3-8, which are from Jim Ballington’s breeding program at NC State. Both produced nearly 1.5 pounds of fruit per plant, which lasted about a month longer into the summer than for the June-bearers. Yield of ‘Seascape’ was slightly lower, at 0.8 lb/plant. Fruit size on all of the day-neutrals was the same or slightly larger than for ‘Chandler’ (given for comparison purposes), and color, size, and flavor were excellent for all three of them.

The worst discovery in the high tunnel work this year was that sowbugs and earwigs apparently like strawberry fruit very well. It’s likely that the mild winter temperatures in high tunnels are allowing their populations to survive the winters more easily than in the field.

The ‘Autumn Britten’ and ‘Heritage’ raspberries and ‘Triple Crown’ blackberries that were planted in 2000 are continuing to grow and produce, though we didn’t collect yield data from them in 2006. We actually tried to dig out the blackberries in 2005. They had become infested with crown borers, and it seemed that the only way to get rid of the crown borers at that point was to dig out the crowns of the blackberry plants. So the crown borers are now gone, but the plants came back with a vengeance from the remaining root pieces, which now have formed a thick hedgerow. This is making me happy that ‘Triple Crown’ is a USDA cultivar, since if it had been patented, I suppose I could have been illegally propagating them by digging them out. You just never know...(*Source: PA Fruit Times, Vol. 26, No. 2, Feb. 2007*)

Year-Round Marketing of the Seasonal Agricultural Enterprise – Tips and Techniques

Bob Weybright, and Wen-fei Uva, Cornell University

Well, here we are in the midst of the crazy midwinter conference season. Driving from one conference to another, you can spend a considerable amount of windshield time (a phrase meaning non-productive time in the world of sales) during this time of the year, and depending on your cell phone coverage and roads driven to meetings, you may have some time that you can’t be in the barn, in the field or on the phone. You can make those miles productive and work to your advantage by taking the time to discuss and brainstorm ideas with your business partners. As a follow-up to the

January 2006 Smart Marketing article, the focus of this article is around some specific year round marketing techniques, strategies and ideas for your farm that you can consider.

Keep in mind that good ideas do not necessarily have to be new. Very few true NEW ideas surface each year. Often a modification, improvement in delivery, or a little personalization of a strategy already in place can make it more effective for your particular business. The fact that these thoughts are discussed in this article means there could

be more than one farm evaluating the same idea at the same time.

So, let's begin with some ideas for:

Promotional Materials

- Select a format for your direct mailing or print materials so that they will be read. Regardless of method, technique, strategy or message chosen, take the time to personalize it and tie it to your business. For example, if you send a personalized greeting card during the winter holiday season, it will more likely be opened and not thrown out with the junk mail.
- Design the delivery schedule and promotional materials to be appropriate and timely. This means knowing when it is vacation season, shopping season, tax season. Think back to the exercise equipment flyers that you received right around the first of the year to help you work off those extra holiday pounds. During this time of year, consumers are tired of the cold and dreary winter so many sale ads are featuring spring merchandise to appeal to our emotional needs.
- Consider varying slightly the look of the marketing materials you use to avoid looking the same and being screened as repeats and thrown away. However, be careful with this technique as you don't want to confuse your image and message in your customers mind.
- Utilize true greeting cards and have them mean something to your customer. You can send an anniversary card to your best customers on the date of their first encounter with your business and use your database to personalize it with the number of years they have been a customer. They will be surprised and delighted that you care enough about them to know these details.
- Remember that many of your customers shop your business for other than buying something. Share your agricultural life with them. You can send out postcards showing the life you take for granted on your farm, such as beautiful orchard blooms, or you or your employees working hard plowing, pruning, planting, weeding, preparing for harvest, or cleaning up after the season. A dairy farm can show cows walking in fresh show, new baby cows, or a truck picking up milk for the processor. Don't forget to make it human. You can also show customers how they can enjoy your product just before your season starts as a means by which you invite them back for the year. It reminds them of the great times they had and gives them something to look forward to.

Off-Season Promotion

- Develop a portfolio of value-added products that your customer can use throughout the year. This will extend your season and get your name in front of your customers more often.

- Participate in activities in your community during the off-season, such as county/regional tourism meetings, spring home shows, events at malls during Valentines Day, St. Patrick's Day, etc.

- Find ways to use your space during off-season. Maybe someone will want to rent it for parties, corn roasts, etc. If you have a particularly scenic setting, consider hosting weddings and events.

- Collaborate with your neighbors. Organize a county-wide local food tasting involving farms throughout your county or region. This could be in partnership with the tourism agency that supports your region.

- Become a speaker for social organizations, such as boy/girl scout meetings, fraternal organizations (Lions, Rotary, etc.) and garden clubs. These groups meet regularly and want new topics. Once in the talk show circuit, you will become famous, and they will find you.

Creating Excitement and Teachable Moments

- Start a serial newsletter detailing stories of your operation, the history of the farm and family, and information about your products.

- Do educational events such as apple, strawberry or cheese tasting, and yes, you can do it with vegetables such as broccoli, carrots and lettuce. You know there are different varieties with different tastes but your customers may not. It doesn't have to be exotic, maybe just a forgotten fruit or vegetable, such as rutabagas, turnips, etc.

- Look for free or relatively low-cost press opportunities. In my home town region of Michigan, we always looked forward to an annual auction of the first flat of strawberries for the year (it meant summer was here) by local farmers. The first fruit event doesn't have to end in an auction. It could include presenting the flat or fruit to the oldest person living in the county, to the county executive, a government official, etc. you get the idea.

- There are always the tried and true school tours and educational events. If you have camps close by, they might be interested in having an agricultural component in their offerings. Experience has shown it could be very rewarding when you help to turn on the light for a young farmer to be!! Moreover, can anyone with kids say that they haven't been heavily influenced by their kids when making some purchase decisions?

- Start a sign campaign by your fields explaining to those passing by what is happening in the fields during the growing season. Lots of people love the idea of farming, and you can help them tie themselves to agriculture. If you are using interesting harvest equipment, you might consider doing an event around it so customers can come and watch. Combining, potato digging and hay bailing can be very exiting for non-farm customers. Step outside yourself to see what others see and to see what you take for granted.

- Plant new or experimental crops/varieties and offer free tastings, or invite customers to stop in and monitor their progress with you.
- Cross-merchandise and market at other venues such as dig-your-own potatoes at pumpkin picking, u-pick fruit with spring lawn and garden sales, or Christmas tree operations with corn chowder tasting. This can be particularly effective if you have a neighbor who complements your operation. You both win.
- Participate in regional and statewide awareness programs that relate to your industry. One of the most successful exhibits at the Iowa State Fair included a pig birthing exhibit with a webcam that allowed the public to check in on the status of the mother-to-be and her piglets any time, day or night. Our local county fair has a cow birthing exhibit that has people running to see the magic event when word spreads around the grounds that the calf will make its appearance at any moment.
- Contests always seem to stir up excitement with customers, especially if they become personal and include their expertise such as a recipe contest where you can have customers take your product, make the recipe and bring it back for judging. Other fun events we have seen include cherry pit and watermelon seed spitting, pumpkin carving, corn shucking, and zucchini cannon ball.

Regardless of what you choose to try, there are some critical details to attend to; otherwise, your time, effort and money will be less effective. You need to keep your database up-to-date and accurate, and monitor and use the database regularly. Also, it is helpful to keep an historical database. Only sending material to last year's customers means you are missing a significant number of customers from prior years. You can survey past customers who don't come again to find out why they didn't return. Maybe there is something you are missing when evaluating your business operations that could be improved upon.

Above all, try to look for individuals, other producers, small businesses or organizations with whom to collaborate as many of these activities as possible to avoid burning yourself out. And finally, it is more effective to be creative and not necessarily expensive. If you can use your marketing resources (time as well as money) well, you can spend more resources on fewer efforts to do them right, rather than developing a lot of less effective efforts.

Reprinted from: [Smart Marketing](#), February 2006. "Smart Marketing" is a monthly marketing newsletter for extension publication in local newsletters and for placement in local media. It reviews the elements critical to successful marketing in the food and agricultural industry. Articles are written by faculty members in the Department of Applied Economics and Management at Cornell University.

(*Source: New York Berry News, Vol. 5, No. 2, February 2006*)

Transferring the Farm I: An Introductory Workshop on Farm Business Succession

Sarah Kelly, Southeastern Mass Ag Partnership (SEMAP)

Wednesday, March 14, 8:45-3:00 pm, Carver Public Library, Carver MA

Registration \$20 per person if postmarked before March 5; \$30 per person after March 5. To register, download the attached brochure and mail back the registration form and check as instructed.

A key to keeping our family farms in New England is the successful transfer of the farm to the next generation. For many farm families, however, transferring the farm can seem overwhelming given the legal, tax, financial and family considerations involved. A series of workshops to be offered throughout New England in March 2007 has been developed to help farmers address these issues in their farm transfer planning.

"Transferring the Farm I: An Introductory Workshop on Farm Business Succession," is the first of the series. The workshop gives an overview of issues farmers may think about as they navigate the farm transition process. Topics covered include: elements to consider when transferring the farm to the next generation--whether they be related or not; communicating for success; goal setting with the family and farm in mind; keys to estate and retirement planning; tools to transfer labor, management and farm assets; and the roles that farm link programs and land trusts can play in farm transfers. The program will also include a panel of farmers who will share their personal experiences with farm transfers. Speakers include extension specialists, attorneys, farmers, and other professionals.

Transferring the Farm I will be offered in two locations: March 13 at Bryant University in Smithfield, Rhode Island; and March 14 at the Carver Public Library in Carver, Massachusetts. Each workshop is scheduled from 8:45 a.m. to 3:00 p.m, with registration starting at 8 a.m. The workshop fee, which includes registration, a workshop packet and lunch, is \$20 per person if postmarked before March 5. After that date, the fee is \$30 per person

"Transferring the Farm II—Moving Your Farm Transfer Forward: Medicaid / Health Care Planning and Business Agreements," is offered as a follow-up to the introductory workshop. This day-long workshop will feature speakers Jesse Richardson, Jr., a professor at Virginia Tech who has worked on estate planning with Virginia Farm Bureau and has conducted farm transfer workshops across 12 states; and Joseph Bonelli with University of Connecticut Cooperative

Extension who has extensive experience working on farm transfer planning with farm families. Topics covered include: Medicaid and health care planning and how they play roles in farm transfer and estate planning; a review of the elements needed for a successful farm business transition; selecting business entities—including LLCs, trusts, etc.—to transfer and protect assets; and ingredients of a business agreement.

Registration will begin at 8:00 a.m. Transferring the Farm II will be offered in three locations: March 27 at South Kingston Land Trust's Weeden Farm in South Kingston, Rhode Island; March 28 at Makris Lobster and Steakhouse in Concord, New Hampshire; and March 29 at the Best Western in Waterbury, Vermont. Each workshop will run from 9:00 a.m. to 3:00 p.m. with registration starting at 8 a.m. The workshop fee, which includes registration, a workshop packet and lunch, is \$20 per person if postmarked before March 19. After that date, the fee is \$30 per person.

For a brochure, please visit the web at www.uvm.edu/landlinkvt or contact the Center for Sustainable Agriculture at (802) 656-0233 or (802) 656-5459. Checks should be made payable to "UVM" and mailed to: Transferring the Farm Workshops, UVM Center for Sustainable Agriculture, 63 Carrigan Drive, Burlington, VT 05405. Anyone requiring special accommodations or scholarship help to attend, should call (802) 656-0233.

The workshops -- made possible by a grant from the Northeast Center for Risk Management Education -- are being offered by a partnership of Cooperative Extension at University of Vermont, University of Connecticut, University of Maine, University of New Hampshire, and University of Rhode Island; Land Link Vermont at the University of Vermont Center for Sustainable Agriculture; Land for Good, Inc.; Maine Farm Link; Southeastern Massachusetts Agricultural Partnership (SEMAP), and the Carver Agricultural Commission.

Upcoming Meetings:

March 10, 2007 - Cultivating an Organic Connecticut Conference

8:30AM - 4:45PM

Windsor High School, Windsor, CT

More info at: <http://www.ctnofa.org/events/CaOC.php>

New Hampshire Vegetable and Berry Growers' Association Meeting

9am-4:15pm.

Boscawen, NH. **Contact:** Chip Hardy, 603-645-2241.

March 14, 2007 - New England Greenhouse Tomato School

DoubleTree Hotel, Burlington, Vermont.

for more information **contact** Vern Grubinger at (802) 257-7967 ext.13, vernon.grubinger@uvm.edu

Transferring the Farm I

8:45-3:00 pm, Carver Public Library, Carver MA

More information web at www.uvm.edu/landlinkvt

March 21-22, 2007- Maine Vegetable Growers' School.

Springvale (3/21) and Waterville (3/22), ME. **Contact:** Mark Hutchinson, 800-244-2104

March 22-23, 2007 - New Hampshire Fruit Grower

s' Association Meeting

9am-4 pm.

Boscawen, NH. **Contact** Herb Cooper, 603-323-7558 or George Hamilton, 603-641-6060

March 24, 2007 - Apple and Blueberry Pruning Demo

9am-1pm

Deer Cap Orchard, Ossipee, NH.. **Contact:** Tina Savage, (603) 539-3331

April 9, 2007 - Peach Pruning Demo.

5-7pm

Carter Hill Orchards, Concord, NH.. **Contact** Sadie Puglisi, (603) 225-5505

Massachusetts Berry Notes is a publication of the University of Massachusetts Extension Fruit Program, which provides research based information on integrated management of soils, crops, pests and marketing on Massachusetts Farms. No product endorsements of products mentioned in this newsletter over like products are intended or implied. UMass Extension is an equal opportunity provider and employer, United States Department of Agriculture cooperating. Contact your local Extension office for information on disability accommodations or the UMass Extension Director if you have complaints related to discrimination, 413-545-4800.