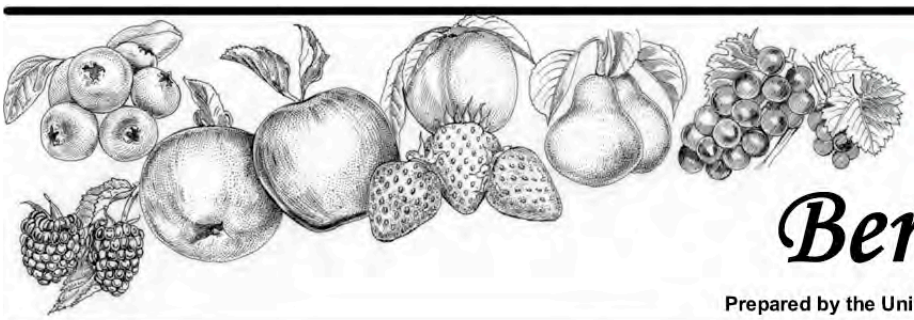

UMassAmherst EXTENSION

Berry Notes

Prepared by the University of Massachusetts Fruit Team

December 2006 Vol. 18, No. 17

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

Massachusetts Berry Notes Underwriters:

NOURSE Growers of the Finest Small Fruit Plants

Berry Notes is edited by Sonia Schloemann with articles written by other contributors with attribution; sources are cited. Publication is funded in part by the UMass Extension Agriculture & Landscape Program, subscription fees and corporate underwriting. Questions can be directed to Sonia Schloemann at 413-545-4347, sgs@umext.umass.edu. Please cite this source if reprinting information that originates here.

IN THIS ISSUE:

Message from the Editor:

Time to renew: Once again we've come to subscription renewal time for Massachusetts Berry Notes. Subscription costs remain at $10 per year thanks to the generous underwriting by Nourse Farms. However, this year we're asking if you might add a contribution in support of UMass Extension's Fruit Program to your annual subscription renewal. A donation to the UMass Extension Fruit Program will support quality research and educational programming. Examples of some current initiatives include:

- research on new opportunities for blackberry production in New England using new fall bearing varieties Prime Jim® and Prime Jan® in high tunnels (demonstration planting planned for UMass Cold Spring Orchard in Belchertown, MA)
- research on the use of growth regulators for runner suppression in strawberries to save labor and increase yields (preliminary research trial at Nourse Farms, Whately MA)
- educational programs to inform growers about new methods for insect and disease management using reduced risk materials (twilight meetings and workshops statewide)
- educational publications to inform growers about recommended best management practices for fruit production in New England (various guides, fact sheets and UMass Fruitadvisor website)

To subscribe to the 2007 volume of Massachusetts Berry Notes and other fruit publications **and** to make program donations, go to www.umass.edu/fruitadvisor and click on the subscriptions link at the top of the page. Please be generous with your donations. Receipts will be provided for tax purposes.

STRAWBERRY

Wendy, A New Early Season Strawberry

Andrew Jamieson - Agri-Food Canada

The Origin of Wendy: Wendy from the cross K96-5 x Evangeline. (Cavendish and Sable are included in the background parentage of K96-5).

Distinctness: Wendy is most similar to its parent Evangeline in plant characteristics but can be readily distinguished by flowers or fruit. The inner calyx is smaller than the outer for Wendy but the same size for Evangeline. The petal length/width ratio is greater for Evangeline. Wendy has a longer truss than Evangeline. The achenes of Evangeline are much more indented than for Wendy and Evangeline fruit are more uniformly conic (Figure 1).

Figure 1: New cultivar "Wendy" has higher yields and larger fruit than "Evangeline"

Yield and fruit size: Compared with early season cultivars Annapolis and Evangeline, Wendy has a similar mean harvest date. The yield and fruit weight of Wendy is generally greater than Evangeline and comparable to Annapolis, the leading early season cultivar in Canada. The most recent harvest data, from the 2006 harvest of plots planted in 2004, is summarized below.

Cultivar	Marketable Yield t/ha	Berry size g/berry	Mean harvest date at Kentville in 2006
Wendy	21.8 a	13.8 a	June 28
Annapolis	15.4 b	12.8 a	June 28
Veestar	15.1 b	8.7 b	June 28
Evangeline	14.0 b	9.8 b	June 28

Fruit characteristics: Primary fruit are wedge-shaped; subsequent fruit are conic. Fruit are larger than for Evangeline with similar color and firmness. Berries of Wendy have excellent fresh flavor and are considered superior to Annapolis by the breeder.

Disease resistance: Plants are vigorous and produce stolons freely to fill matted rows. Plants are moderately resistant to powdery mildew but susceptible to Verticillium wilt. The reaction to red stele root rot has not been defined, however seedling families from crosses involving Wendy contain a higher number of resistant individuals than would be expected if Wendy were fully susceptible.

Availability: Plant Breeders Rights have been granted in Canada (#2467) and a Plant Patent has been filed in the USA. A list of nurseries providing certified plants can be obtained from the author.

Ontario experience: (by Pam Fisher) Wendy was planted in 2005 at 8 grower sites across Ontario. This variety is worth a trial on your farm, especially if you are located in eastern or northern Ontario. Size and quality were less favourable in southern Ontario in 2006, perhaps due to the early frost and subsequent high temperatures during harvest. (***Source**: The Ontario Berry Grower, November 2006*)

RASPBERRY

Rest Completion and Susceptibility of Blackberry Floral Buds to Low Temperature Injury

Michele R. Warmund, University of Missouri

Introduction

Blackberry plants require a period of chilling during dormancy to produce normal shoots, flowers, and fruit. In comparison with other perennial temperate zone fruit crops, blackberries have a short chilling requirement (Westwood, 1993). For example, raspberries require 800 to 1700 hours of chilling temperatures, while some blackberries need as little as 200 to 600 hours of chilling (Chandler et al., 1937; Westwood, 1993). If the chilling requirement is not fulfilled, poor bud break and

growth will occur the following spring. Drake and Clark (2000) recently reported that 'Navaho' blackberry may have a chilling requirement as long as 800 to 900 hours. This relatively long chilling requirement may limit its suitability for planting and productivity in southern climates in the United States.

In northern U.S. climates, chilling hours can be accumulated in very early winter. Blackberry tissues may then be injured by freezing temperatures following a warm period in late winter when plants have accumulated sufficient chilling hours to break rest. Warmund et al. (1989) reported that floral primordia and cane tissues of 'Cherokee' blackberry dehardened slowly before rest completion. After rest was completed, the rate of deacclimation of floral primordia and xylem increased. The relationship between rest completion and low temperature injury among a range of blackberry cultivars has not been investigated.

In a recent study, a hydrophobic kaolin clay-based material applied to young tomato transplants prevented ice nucleation (i.e., ice formation) and subsequent low temperature injury (Glenn, unpublished data). The use of this hydrophobic clay may also prevent freezing injury of blackberry buds in late winter after rest completion by keeping buds cooler and delaying bud break. Thus far, the hydrophobic material (unlike hydrophilic kaolin clay, Surround ®) has not been tested on a perennial crop. Because of erratic weather patterns across the U.S., information regarding the chilling requirement is needed to choose suitable blackberry cultivars for that region. Moreover, information is also needed to provide recommendations to growers concerning cold-tolerant blackberry cultivars to prevent cold injury and crop loss.

Objectives

1. To determine the time of rest completion and the percentage of bud break among six Arkansas blackberry cultivars.
2. To determine the relative susceptibility of blackberry cultivars to low temperature injury before and after rest completion.
3. To evaluate hydrophobic kaolin clay and white latex paint for temperature suppression and delayed bud break.

Procedures

Objective 1. A biophenometer was placed within a three-year-old blackberry planting located at the Horticulture and Agroforestry Research Station, New Franklin, Missouri on 16 Nov. 2002 as the first killing frost (-4.4^{o}C) of the season occurred to record the number of chilling hours as they accumulated. However, in late November, the biophenometer malfunctioned. Thus, hourly temperature data were collected from the nearest National Weather Service station located .4 miles from the blackberry planting as an estimate of the number of accumulated chilling hours at each date of sampling. Calculations of accumulated chilling hours from the temperature data collected off-site were nearly the same or within one chilling hour of those recorded by the biophenometer before it malfunctioned. Blackberry tissue samples of 'Apache', 'Arapaho', 'Chickasaw', 'Kiowa', 'Navaho', 'Shawnee', and 'Darrow' were obtained from the field planting on 4 Dec. 2002 and 8 Jan., 5 Feb., and 4 Mar. 2003. 'Darrow' was used as a standard of comparison because of its tolerance to low temperature injury. At each sampling date, ten eight-node sections of wood were removed from the middle portion of lateral canes located 60 cm from the soil surface. Cuttings were then placed in oasis wedges (Smithers Oasis Company, Kent, Ohio) and submerged in a perlite bed in a greenhouse at 21^{o}C. Bottom heat (25^{o}C) was supplied in the perlite bed and cuttings were misted intermittently with water (10 sec every 10 min) from dawn until dusk for 30 days. Bud break was recorded daily for a period of 30 days for each date of collection to determine dates of rest completion. Data analysis was performed on ten replications of each cultivar. An arcsin square root transformation of the proportion of buds per cane that broke bud was performed before data were subjected to an analysis of variance (ANOVA) and means were separated by Fisher's protected LSD test, $P \# 0.05$. The number of days to bud break for each cultivar at each date of collection was also subjected to ANOVA.

Objective 2. Samples of the cultivars listed above were collected simultaneously on 8 Jan. and 4 Feb. 2003 to assess floral bud hardiness before and after rest completion. Thirty-six twonode cuttings of each cultivar were collected from six replications of the field trial as described above. Tissue was then placed in sealed polyethylene bags, packed on ice, and transported to the laboratory. Six two-node cuttings were placed in moist cheesecloth and wrapped in aluminum foil for each of six test temperatures. Additional samples were prepared similarly and were stored at 2EC for use as an unfrozen control. A 30-gauge copper constantan thermocouple was be placed in contact with a bud of a sample enclosed in aluminum foil to monitor tissue temperature.

Thermocouple output was read with a digital thermometer (Omega Engineering, Inc., Stamford, Conn.). Samples were then placed in a programmable freezer at –2EC and held at this temperature for 12 hours to equilibrate the tissue. Thereafter, samples were cooled at 3EC/ h and removed from the freezer at 3EC intervals estimated to result in bud injury. Tissue was thawed at 2EC for 24 hr. After thawing, tissue was incubated at 100% relative humidity at 25EC for 5 days before examination for oxidative browning under a dissecting microscope at #40H. The number of injured and

uninjured floral buds was recorded and the modified Spearman-Karber equation (Bittenbender and Howell, 1974) was used to calculate T_{50} values (temperature at which 50% of the floral primordia exhibited browning) for buds at each sampling date. Data from each date of collection were subjected to ANOVA and means were separated by Fisher's protected LSD test, $P \# 0.05$.

Objective 3. The three treatments in this experiment were: (1) lateral canes of 'Apache' and 'Navaho' plants painted with hydrophobic kaolin clay; (2) canes coated with latex paint; and (3) unpainted control canes. Kaolin clay was applied at 60 gAl^{-1} and latex paint was mixed with water (1:1,v/v). Treatments were applied to ten lateral canes of each cultivar on 14 Jan. 2003, with a second application of treatments on 27 Feb. 2003. All three treatments were applied on the same floricane, with ten replications of each treatment. On 21 Jan. and 3 Mar. 2003, bud temperatures were recorded hourly (144 consecutive hours in January and 197 hours in March) with data loggers (HOBO; Onset Computer Corporation, Bourne, Mass.). Bud temperatures, as well the ambient temperature, were logged on three replications of each treatment. Mean temperatures for each treatment were calculated at the end of data collection period. The date of bud break was recorded for each bud on the treated canes. Bud break data was analyzed as described in objective 1. Mean temperatures for each test period were also calculated.

Table 2. Percentage of blackberry buds per cutting that grew at each sampling date in 2003.[z]

Cultivar	8 Jan.	5 Feb.	4 Mar.
'Kiowa'	97.5 a [y]	96.3 a	100.0 a
'Shawnee'	40.0 bc	73.8 b	96.3 abc
'Arapaho'	61.3 b	88.8 ab	88.8 bcd
'Chickasaw'	43.8 b	47.5 c	87.5 cd
'Apache'	25.0 c	80.0 b	97.5 ab
'Navaho'	41.3 bc	97.5 a	98.8 a
'Darrow'	0.0 d	41.3 c	85.0 d

[z] Fifty-five percent of the 'Kiowa' buds and 9% of 'Arapaho' buds broke bud when sampled on 4 Dec.
[y] Mean separation within columns by Fisher's protected LSD test, P # 0.05.

Table 3. Average number of days to bud break for each sampling date in 2003.[z]

Cultivar	8 Jan.	5 Feb.	4 Mar.
'Apache'	13.2 ab [y]	7.6 b	3.9 bc
'Chickasaw'	13.9 a	11.1 a	4.5 b
'Arapaho'	12.0 abc	5.8 bc	4.1 bc
'Navaho'	10.0 c	5.8 bc	3.6 bc
'Shawnee'	1.5 bc	7.5 b	3.4 bc
'Kiowa'	7.2 d	5.0 c	2.9 c
'Darrow'	— [x]	11.9 a	8.8 a

[z] When buds were sampled on 4 Dec., mean days to bud break for 'Arapaho' was 21 and 19 days for 'Kiowa'. None of the buds from other cultivars grew after 30 days in the greenhouse.
[y] Mean separation within columns by Fisher's protected LSD test, P # 0.05.
[x] No bud break observed after 30 days in the greenhouse.

Results

Temperature extremes and mean monthly temperatures were recorded on-site at HARC. In this study, chilling hours were defined as the number of hours between 0 and 7°C. Between 15 Nov. and each sampling date of 4 Dec., 8 Jan., 5 Feb., and 4 Mar., the total number of chilling hours recorded were 187, 590, 725, and 959, respectively.

When samples were collected on 4 Dec. and placed in the greenhouse, 55% of the 'Kiowa' buds and 9% of the 'Arapaho' buds broke. In the previous two years of sampling during the first week of December, none of the cultivars, except for a few 'Kiowa' buds, completed rest at that test date. By 8 Jan., all cultivars had some buds that completed rest except 'Darrow' (Table 2). 'Apache' also had fewer buds break than 'Chickasaw', 'Arapaho', and 'Kiowa'. However, at the two later sampling dates, 'Chickasaw' and 'Darrow' had fewer buds break than 'Kiowa' and 'Navaho'. Moreover, by 5 Feb., nearly 50% more 'Navaho' and 'Kiowa' buds had completed rest than 'Chickasaw' and 'Darrow'. By 4 Mar., 85% of the buds of all cultivars exhibited growth after exposure to warm temperatures in the greenhouse.

While only two cultivars broke bud in December, 'Kiowa' buds exhibited growth in 11 to 30 days (0 = 19) after exposure to warm temperatures. Seven 'Arapaho' buds exhibited growth in 19 to 23 days (0 = 21) after sampling. In January, mean days to bud break was considerably reduced, ranging from from 7 to 14 days for all cultivars except 'Darrow' (Table 3). As chilling hours accumulated, even fewer days in the greenhouse were required to break bud in February and March. By 4 Mar., all cultivars averaged as few as 3 to 9 days to bud break. In January, February, and March, 'Darrow' and 'Chickasaw' averaged more days to bud break than 'Kiowa'.

Other researchers have estimated chilling requirements for some of the Arkansas blackberry cultivars. In an experiment using whole plants placed in cold chambers, Drake and Clark (2000) reported that 'Arapaho' had a chilling requirement of 400 to 500 hours, while 'Navaho' plants required 800 to 900 hours. In a different study using stem cuttings collected from the field, Yazzetti and Clark (2001) reported that 'Kiowa' completed rest after 200 hours of chilling and 'Shawnee' required 400 to 500 hours. They were unable to determine conclusively the chilling requirement for 'Chickasaw', 'Apache', and 'Choctaw'.

Results from the December collection date in our study indicated that 'Arapaho' has a lower chilling requirement

than that of 'Shawnee'. Additionally, 'Navaho' satisfied rest in our study by the time 590 hours of chilling tem- peratures had been recorded. However, it should be noted that in the other studies (John Clark, personal communication), the killing frost temperature was defined as -3.3 ^{o}C whereas chilling hours were counted after a killing frost of -4.4 ^{o}C in our study. Moreover, in Drake and Clark's study conducted in the cold room, temperatures were maintained at a constant temperature (3 ^{o}C), while temperatures dropped below freezing and diurnal fluctuations occurred in the field.

When blackberry cultivars were evaluated for susceptibility to low temperature injury, 'Kiowa' was always less hardy than all other cultivars . Among the Arkansas cultivars, 'Apache' ranked the highest in tolerance for low temperature injury in March. While the Arkansas cultivars attained their maximum hardiness (i.e., lowest T_{50} values) in January, 'Darrow' had the lowest T_{50} value in February. In previous experiments, 'Darrow' always ranked higher in winter hardiness than other Arkansas cultivars (unpublished data).

In experiments evaluating kaolin and latex paint, the mean temperature of the ambient air was always colder than that of treated or untreated buds. The dark color of the buds and canes probably absorbed heat and raised the temperature. Buds treated with latex paint were white, whereas the kaolin treatment was more translucent. In spite of these differences, mean temperatures among treatments during the logging period varied by less than 0.2 ^{o}C. However, the latex paint treatment delayed 'Apache' bud break by an average of 4 days and 'Navaho' bud break by 2 days. It is possible that the thick, viscous latex mixture that coated the bud scales delayed spreading of the scales and retarded leaf emergence. The kaolin-water mixture was considerably less viscous than the latex-water mixture.

Conclusions

Results from this study revealed that 'Kiowa' had a shorter chilling requirement and was more susceptible to low temperature injury than all other Arkansas cultivars tested. 'Arapaho' had a slightly longer chilling requirement than 'Kiowa', but it was not significantly more hardy than the other Arkansas cultivars. 'Darrow' had a long chilling requirement and acquired maximum hardiness later than the other cultivars. Whereas the Arkansas cultivars deacclimated after rest completion, 'Darrow' acquired maximum hardiness later and subsequently deacclimated. Thus, 'Kiowa', and perhaps 'Arapaho', may be adapted to low-chill climates (i.e., southern U.S.).

While 'Kiowa' has larger fruit size than that of 'Arapaho' and requires fewer chilling hours, it also produces thorny canes. Fruit harvest from 'Arapaho' is slightly earlier than 'Kiowa' and its canes are thornless. In contrast, 'Darrow', with its long chilling requirement and tolerance for low temperatures, is adapted to the northern U.S. limit of blackberry production where cold winter temperatures are problematic. However, its thorny canes and small fruit size limit widespread planting of this cultivar. Hydrophobic kaolin clay and white latex paint treatments did not modify bud temperatures. However, latex paint delayed bud break in the spring by 2 to 4 days, whereas the kaolin treatment had no effect on the date of bud break.!

Literature Cited

Bittenbender, H.C. and G.S. Howell, Jr. 1974. Adaptation of the Spearman-Karber method of estimating the T_{50} of cold stressed flower buds. J. Amer. Soc. Hort. Sci. 99:187-189.

Chandler, W.H., M.H. Kimball, G.L. Philp, W.P. Tufts, and G.P. Weldon. 1937. Chilling requirements for opening of buds on deciduous orchard trees and some other plants in California. California Agric. Expt. Sta. Bul. 611.

Drake, C.A. and J.R. Clark. 2000, Determination of the chilling requirement of Arkansas thornless blackberry cultivars. Student Journal Dale Bumpers College of Agric., Food, and Life Sci. 1:15-19.

Warmund, M.R., M.F. George, M.R. Ellersieck, and J.V. Slater. 1989. Susceptibility of blackberry tissues to freezing injury after exposure to 16C. J. Amer. Soc. Hort. Sci 114(5): 795-800.

Westwood, M.N. 1993. Temperate-zone pomology physiology and culture. Timber Press, Portland, Oregon. p. 386.

Yazzetti, D. and J.R. Clark. 2001. Evaluation of chilling requirements for six Arkansas blackberry cultivars utilizing stem cuttings. Student Journal Dale Bumpers College of Agric., Food, and Life Sci. 2:90-94.

(***Source**: The Bramble Newsletter, Winter 2004-2005*)

BLUEBERRY

Highbush Blueberry Cultivar Trial in Ontario

Adam Dale, University of Guelph, Ontario

A replicated trial of 11 cultivars was planted at Simcoe, Ontario in 1991. Plants were first harvested in 1994. After 8 harvest seasons, "Bluegold" was the highest yielding cultivar, averaging 6.8 t/ha, and 'Toro' had the largest berries, averaging 1.8 grams/berry. 'Bluetta' was the earliest cultivar with on average 50% of its yield picked by July 16, and 'Elliott' was the latest, with on average 50% of its yield picked by August 27.

As a result of this trial, the authors have recommended two cultivars as suitable for Ontario - 'Duke' and 'Nelson'. 'Duke'

is a high yielding early cultivar that are similar in size to 'Bluecrop' and 'Nelson' is slightly later than 'Bluecrop' with superior yield and larger berries. Although 'Bluegold' consistently out-yielded the other cultivars, it was a very twiggy plant. Large numbers of small shoots increased pruning costs.

Table 1: Mean annual yields, individual berry weight, and date of 50% harvest of 11 highbush blueberry cultivars 1994-2001 in Simcoe, Ontario.

Cultivar	Yield (t/ha)	Berry wt (g)	Date of 50% harvest 1=July 1
Bluegold	6.8 a	1.40 cd	31.6 c
Duke	5.7 b	1.37 d	16.6 h
Bluejay	5.2 b	1.26 e	21.9 f
Nelson	5.2 b	1.63 b	33.9 b
Sunrise	4.7 c	1.44 c	17.0 h
Sierra	4.7 c	1.36 d	25.2 e
Toro	4.5 c	1.82 a	25.4 e
Elliott	4.3 c	1.08 f	57.4 a
Bluetta	4.0 d	1.11 f	15.1 i
Bluecrop	4.0 d	1.36 d	29.0 d
Spartan	3.8 d	1.66 b	19.4 g

Different letters within the same column indicate significant differences 99% of the time according to Duncan's Multiple Range Test.

Adapted by Pam Fisher from an article in International Journal of Fruit Science, Volume 5, Number 2, 2005, page 73-76 Reprinted with permission. ©2005, The Haworth Press, Inc.

Note : Nelson has not performed well in some grower plantings[in Ontario], apparently due to winter injury. Plant this variety in small quantities to determine its performance on your farm.

See "Notes on Blueberry Varieties" on the OMAFRA website. It's new.

Related Links

Notes on Blueberry Varieties, OMAFRA website

(***Source**: The Ontario Berry Grower, Nov. 2006*)

GRAPE

Post-Harvest Notes

Mark Chien, Penn State Cooperative Extension of Lancaster County

Harvest is over except for some ice wine grape hanging around. Probably the most important thing to do is to relax for a while and then reflect on the past year. Tony Wolf, viticulturist at VA Tech, summarized the vintage very clearly in his recent "Viticulture Notes" http://www.ext.vt.edu/news/periodicals/viticulture/06septemberoctober/06septemberoctober.html/ I hope growers will pay close attention to his "what helped" and "what hurt" comments. They are very important to us. There is also a fine article by Ashley Myers on grapevine trunk diseases. Before the vines really settle in for the winter there are some chores to be done around the vineyard. Here is a list of some of the things we always did after the harvest:

- pick up all bins left at wineries
- return everything you borrowed
- send out grape invoices
- clean up around the vineyard - lugs, buckets, harvest things
- maintenance work - tractors, sprayers (drain hoses and pumps), lubricate
- nets off and stored, bird scare gadgets collected and stored
- mow one more time if you haven't yet had a hard frost to trim winter annuals
- hill up young grafted vines
- some growers apply copper to help with disease control and help to harden off the wood
- some growers will rip along tire tracks to reduce soil compaction
- weed control - see "timely viticulture" attachment from Dr. Joe Fiola, UMd Cooperative Extension

It is really hard to assess vintage quality so soon after the wines have gone to tank or barrel. In my experience, wines need a resting period in order to show their true potential. I

preferred to wait until spring to assess wine quality with the wine makers. If there were issues about grape quality, it is a good idea to wait until the dust settles around the crush pad and then talk to the wine maker frankly and honestly about the grapes and how they were grown. In the spring, taste the wines and make some judgments about price adjustments (up or down) and figure out what to do in 2007 to make the wine even better. (***Source**: Pennsylvania Wine Grape Info, Nov. 2006*)

Fall Weed Management

Joe Fiola, University of Maryland Cooperative Extension

Many of you are still busy with winemaking but a quick reminder that fall is a critical time for vineyard weed management. It is critical for controlling pesky perennial weeds and pre-emergence for winter annuals. All herbicides have specific weed control strengths; therefore, the first strep in a successful weed control program is properly identifying the weeds present in your vineyard.

There are basically 2 weed types based on plant "families":

Broadleaf weeds
Grasses

These are further divided into 3 main groups based on there annual/perennial cycles of growth:

Annuals - Plants that live for less than one year (time of germination is critical)

- Winter annuals germinate in the late fall and winter and grow and go to seed during the following spring and summer
- Summer annuals germinate in the spring and grow and go to seed during that spring and summer.

Biennials - Plants that live for more than one year, but less than two years

Perennials - Plants that live for more than two (2) years Can be herbaceous or woody

Appropriately, weed control herbicides are generally categorized into three groups:

Broadleaf control – control only broadleaf weeds

Grass control – control only grasses

Broad-spectrum - effectively controlling both broadleaves and grasses.

To insure optimal efficacy of herbicides always remember:

- Use the correct herbicide for the specific weed pest.
- Use the correct herbicide rate for the time and soil type.
- Use the proper application technique.
- Apply at the appropriate time

Sprayer calibration is important with pre-emergence herbicides. If you have been using a 'Roundup only" program and haven't calibrated lately be sure to do so before making the pre-emerge application.

Perennial weeds such as Canada thistle, nutsedge, poison ivy, mulberry, and many perennial grasses are especially susceptible to glyphosate (Roundup) at this time of year.

Fall applications are very effective because these plants are strongly translocating down so they will take the herbicide to underground storage structures which will greatly improve there activity.

Spring applications of glyphosate are less effective on most perennials since movement of stored energy is upward and away from storage structures.

An application after grape leaf drop but while the weed foliage is still intact is ideal. Glyphosate can be absorbed by any green tissue, so waiting until grapevine leaf drop or use of shielded sprayers is important. In any event, avoid contact with grape foliage or green stems or damage may occur. (***Caution**: Glyphosate may also be absorbed by buds on the cordon and trunk, and once in the plant is slowly metabolized leading to stunted growth for a year or longer; thus, great care should be taken to avoid any glyphosate contact to grapes. See labels for complete instructions*.)

This is also the time to include (tank mix) a pre-emergence herbicide with the glyphosate.

A pre-emergence herbicide will control winter annual weeds (e.g. chickweed and henbit)

Residual grass herbicides (and some select broadleaves) include: Devrinol, Gallery, Kerb, Prowl, Sinbar, Solicam, and Surflan.

Gallery and Prowl may be only applied to non-bearing vineyards.

Kerb, Sinbar, and Solicam may be used but only be on vineyards established 3 years.

Kerb and Sinbar may only be applied when vines are dormant.

Residual broadleaf herbicides (and some select grasses) include: Casoron, Goal, Karmex, Princep, and Sinbar.

Karmex, Princep, and Sinbar may be used but only be on vineyards established 3 years.

Goal, Karmex, Princep and Sinbar may only be applied when vines are dormant.

Again, these are only meant as suggestions – always see labels for complete instructions.

Fall 2006 herbicide applications are the first step in a successful 2007 weed management program. You can follow up in early 2007 to control the summer annual weed pressure. (Source: Maryland Timely Viticulture Newsletter, Oct. 2006.)

General

Berry Cultivar Update

Kathy Demchak, Penn State University

There are a number of berry cultivars that have become available in recent years. Not all are new varieties – some are older ones that serve new purposes, or that have not been available to growers until recently. Cultivars marked with an asterisk either have been recently trialed in PA or are currently in field trials in PA. Year of release and origin are given when known, as this information may be useful in judging potential adaptability of a cultivar to a given region.

June-bearing Strawberries (matted-row production)

***Evangeline** - 1999, AAFC – Nova Scotia. Early season. Dark red fruit, with good flavor and uniform size and shape. Resistant to leaf diseases, so caps remain green. However, fruit is very small.

***Itasca** – 2005, Univ. of Minnesota. Early season. Though ripening begins with Earliglow, harvest continues for a longer period of time resulting in high yields. Maintains size better than Earliglow, but berries can be soft and low on flavor. Was trialed at PSU as MNUS 138.

Wendy – 2005, AAFC – Nova Scotia. Early season. Has similar color and firmness to Evangeline, one of its parents. However, in 2006, fruit size in Nova Scotia was about 40% larger than for Evangeline, and yields about 50% higher. Susceptible to Verticillium wilt. Resistance to red stele has not been characterized.

***Bish** – 2002, North Carolina State Univ. Early-mid season. Developed for use in plasticulture, but it produces plenty of runners in the matted-row system. Excellent flavor, but low yields due to many blossoms opening black, an indication that it comes out of dormancy too early in PA.

***Brunswick** - 1999, Nova Scotia. Early-mid season. Yields well, but has average flavor that can be a bit acidic. More likely to perform better in cooler locations. Susceptible to Phytophthora crown rot.

***L'Amour** – 2003, NYSAES, Geneva, NY. Early-mid season. Excellent all-around performer. Good foliar disease resistance. Nicely-shaped fruit with good size, medium-red color and above-average flavor.

***Clancy** – 2003, NYSAES, Geneva, NY. Mid-season in central PA, though it produced fruit later in NY. Deep red color with good size, but yields were low in PA trial where it produced few runners. May fare better in more Northern locations in the state, as it appears to be performing better in states to the North of PA.

***Darselect** – 1995, Darbonne nursery, France. Mid-season. Nice size, shape, and flavor. Yields are typically not astronomical as expected, but are still above average. Susceptible to anthracnose fruit rot and leaf scorch.

***Cabot** – 1998, AAFC, Nova Scotia. Mid-late season. Huge fruit, high yields. Produces few runners. Primary berries are oddly-shaped. Good flavor, but fruit center may be hollow. Probably better-suited to U-pick operations.

Canoga - 1979, NYSAES, Geneva, NY. Mid-late season. Older cultivar that has been resurrected mainly for use in plasticulture due to low runnering. Grower reports indicate that size, flavor and yields are acceptable in matted-row production and plasticulture.

***Winona** - 1996, Univ. of Minnesota. Mid-late season. Berries may color unevenly, and have short pedicels, so fruit is in close contact with the ground and is prone to various fruit rots.

***Ovation** – 2003, USDA-Beltsville. Late season. Nicely-shaped berries with medium-red color. Good flavor. Yields are low for the amount of foliage, and not as high as expected. This seems to be happening in a number of locations.

88-74-1 – Italy. Late season. Hasn't been trialed in PA. Yields have been variable in trials in various locations, though there does appear to be the potential for high yields. Average to large size fruit.

June-bearing Strawberries (plasticulture production)

***Bish** – 2003, NC State Univ. See matted-row cultivar info above.

Canoga – See description above under matted-row production.

***Carmine** – 2004, University of Florida. Deep red fruit, with good quality, but yields were less than half that of Chandler in PA trial in high tunnels and berries were small. Performance has been better in other locations.

***Ovation** - 2003, USDA – Beltsville. See description above for matted-row production. Growers also report that yields are not sufficiently high in the plasticulture system.

***Ventana** – 2003, University of California. Fruit quality, size, and color was good, but yields were only about half that of Chandler in PA.

Day-neutral Strawberries

Albion – 2006, University of California. Fruit is reported to be very large and sweet in original trials. Said to be resistant to Verticillium wilt, Phytophthora crown rot, and anthracnose crown rot. 2006 was the first year that material could be allowed outside of California for testing. If anyone has an opportunity to try this one and has results to share, let me know.

***Everest** - from Edward Vinson, Ltd. U.K. breeding program. Soft fruit with mild flavor. Watch rotations due to Verticillium wilt susceptibility.

Evie-2 – also from Edward Vinson, Ltd. U.K. breeding program. Though Evie-2 has some good qualities, there are later cultivars from this same program that are expected to have improved characteristics.

***Seascape** - 1992, University of California. Excellent flavor, size, color, and productivity in PA trials. However, it tended to be a bit soft and split easily with rain.

Summer-bearing Red Raspberries

Lauren – 1997, MD-NJ-WI-VA breeding program. Early season. Large fruit, long harvest season, and as with all cultivars from this breeding program, excellent flavor. Subject to winter injury, so plant in protected mild locations. Also susceptible to phytophthora root rot.

***Prelude** – 1998, NYSAES, Geneva, NY. Early season. Actually a primocane-fruiter, but it was expected to fruit so late that most of its crop would be produced as an early summer-bearer. In central PA, although it fruited well in the summer, it also produced a fair amount of fruit in the fall. Fruit is medium-sized and has good flavor.

Moutere – from New Zealand. Early-mid season. Very little trialing has been done in the U.S. Medium to large fruit size.

Encore – 1998, NYSAES, Geneva, NY. Late season. Good flavor. Nearly spineless canes.

K81-6 – AAFC, Nova Scotia. Late season. Large fruit, good flavor, productive. Winter hardy, but susceptible to fluctuating temperatures. Susceptible to Phytophthora crown rot and fire blight.

Primocane-bearing Red Raspberries

Jaclyn – 2004, MD-NJ-WI-VA breeding program. Very early fruit on primocanes. Large uniform dark fruit on long receptacles. Can be soft in high temperatures.

Joan J - from Kent, England. Thornless canes, large dark red fruit with good flavor. Has been very productive in most trials.

***Josephine** – 2001, MD-NJ-WI-VA breeding program. Josephine is a productive late-season cultivar with large flavorful berries. However, due to a problem with propagation, this cultivar is not available at this time.

Black raspberries

***Mac Black** – Yields have varied among sites, and there have been some reports of problems with winter hardiness – though not to aany greater extent than with other cultivars. However, size is good, and the best part is that it extends the black raspberry harvest season, since it ripens 7-10 days later than other cultivars.

Blackberries - Thorny

***Chickasaw** - 1999, University of Arkansas. Very good flavor, and very large fruit. Had some trouble with plant establishment in PA, which was probably due to low quality of plants received.

***Fort Kent King** – Selection from Maine. Could be very winter hardy, but I'm not sure it matters. Produces numerous canes, and a lot of vegetation, so it's difficult to find its many small, flat-flavored fruit. May be OK for processing, however - will try that later.

***Kiowa** -1996, University of Arkansas. Very large fruit, relatively long harvest season. Winter hardiness uncertain.

Blackberries - Thornless

***Apache** - 1999, Univ. of Arkansas. Large fruit with good flavor. Very erect plants.

***Ouachita** – 2005, University of Arkansas. Fruit not quite as large as for some other cultivars, but productive and firm. Not yet tested for winter-hardiness.

***Triple Crown** - 1996, USDA Beltsville. Very good flavor and high-yielding, but for milder areas of state, or high tunnels. Semi-trailing, so a trellis will be needed.

Blackberries – Primocane-bearers

Because canes are cut to the ground, winter hardiness is not the limiting factor to yields, though lateness of harvest season might be.

***Prime-Jan** – 2004, University of Arkansas. Thorny. Flavor is decent. Canes less stocky than for Prime-Jim.

***Prime-Jim** – 2004, University of Arkansas. Thorny. Flavor is acceptable. Stocky canes.

Blueberries

Notes on fruiting characteristics are based on trials in other states, as PA blueberry cultivar trials have not been fruited yet.

***Reka** - 1989, New Zealand. Early season. Limited availability in U.S. until recently. Medium-sized fruit, high

yielding where tried in other states. Thought to be adaptable to a wider range of soil types than other cultivars.

***Draper** - 2003, Michigan State University. Early-mid season. Uniform berry size, medium-large fruit. Excellent flavor.

***Bluegold** – 1988, USDA – Beltsville. Mid-season. Though this cultivar has been around for a while, it hasn't received much attention until recently. Very productive with a concentrated harvest season. Cold hardy. Bushy growth habit. One problem trait is that the stem tends to remain on the fruit, or tears the skin when removed.

***Legacy** – 1993, USDA – New Jersey and Rutgers University. Mid-season. High yields during a long harvest season. However, it tends to hold its leaves during the winter. Good flavor. For trial in milder sites in PA.

***Chandler** – 1994, USDA - New Jersey. Mid-late season. Large fruit, high yields, though winter hardiness hasn't been well-tested. Ripens over a relatively long period.

***Aurora** - 2003, Michigan State University. Late season (begins ripening after Elliott). Medium-large fruit. Good flavor.

***Liberty**. 2003, Michigan State University. Late season. Very good flavor.

So, the most promising cultivars to try…

- June-bearer matted-row strawberries – *L'Amour and Darselect.*
- Plasticulture June-bearers – there's still nothing better than *Chandler*.
- Day-neutral strawberries: *Seascape*
- Summer-bearing red raspberries – nothing new that I'm ready to recommend yet.
- Primocane-bearing raspberries – *Josephine*, when plants become available, in areas of the state with a longer growing season, or in a high tunnel. *Fallgold* is interesting also.
- Black raspberries – *Mac Black* has potential.
- Blackberries – *Apache* and *Triple Crown* are at the top of the list for warmer areas of the state.
- Blueberries – should have more info next year, but for now, *Bluegold* looks good.

(***Source**: Fruit Times, Vol. 25, No. 11, November 28, 2006*)

The Organic Way – Using Tissue Analysis Recommendations on Organic Farms

Elsa Sánchez, Penn State University

Tissue testing is a common practice, especially in fruit production. Results can be used to monitor and modify nutrient management practices. Tissue analysis recommendations have not generally been developed for organic growers; however, with a little interpretation, they can be an important tool for nutrient management.

Many of the products to correct micronutrient deficiencies are restricted, meaning they can only be used with documented soil deficiency. Tissue testing is acceptable to document deficiency according to Pennsylvania Certified Organic. However, as when applying any product to your fields, include your certifying agency in your decision to avoid the risk of compromising your organic certification.

National Organic Standards states that "Soil deficiency must be documented by soil testing". Tissue testing levels can be categorized as deficient, low, normal, above normal and excessive. The category low is intended to indicate a level below optimal and as such is a deficiency. Check with your certifying agency to verify this interpretation; Pennsylvania Certified Organic indicated that a low status would be considered a deficiency.

Below are products recommended by the Penn State Agricultural Analytical Services Laboratory for correcting below normal nutrient levels along with some other alternatives. Also indicated is whether or not they are prohibited, restricted or allowed in organic production according to the Organic Materials Review Institute's (OMRI) Generic Materials List.

Nitrogen. Specific nitrogen products are not recommended for some crops. Instead a suggestion for increasing the rate of nitrogen application by 10 percent for each 0.1 percent that the sample is below normal is included. Ammonium nitrate, ammonium sulfate and urea are sometimes recommended – these are all prohibited in organic production. Compost that meets the requirements of the National Organic Standards can be used as well as a host of other organic fertility products that can be purchased.

Phosphorus. Superphosphate is often recommended to correct below normal phosphorus levels in tissue test analysis. It is prohibited in organic production. Compost that meets the requirements of the National Organic Standards can be used as well as a host of other organic fertility products that can be purchased.

Potassium. Sulfate of potash-magnesia (Sul-Po-Mag) is recommended if magnesium levels are also below normal. Sul-Po-Mag is allowed in organic production. Potassium sulfate is allowed if it is from a nonsynthetic source. Synthetic potassium sulfate products are prohibited.

Calcium. Lime in the form of limestone or calcium sulfate (gypsum) is allowable to increase calcium levels. Burned, hydrated and slaked lime are prohibited for use as a fertilizer.

Magnesium. Sulfate of potash-magnesia (Sul-Po-Mag) is allowed in organic production. Magnesium sulfate (Epsom salts) is allowed only with a documented deficiency.

Manganese. Manganese sulfate and manganese chelate are allowed only with a documented deficiency.

Iron. Ferrous sulfate and iron chelate are allowed only with a documented deficiency.

Copper. Copper chelate is allowed only with a documented deficiency.

Boron. Solubor is recommended on tissue test analyses for correcting below normal boron levels. It is allowed only with a documented deficiency. Borax and sodium borate are also allowed only with a documented deficiency.

Zinc. Zinc chelate and zinc sulfate are allowed only with a documented deficiency.

Different brands can have different ingredients accompanying the active ingredient and those ingredients may not be in compliance with the National Organic Standards. In those cases, the product would be prohibited. As an example, some chelates could be prohibited depending on the chelating agent. So always check with your certifying agency before applying a product. (***Source**: The Vegetable and Small Fruit Gazette, Vol. 10, No. 10, October 28, 2006*)

Aquaculture Research and Outreach by University of Massachusetts Extension

Craig Hollingsworth, UMass Extension

The University of Massachusetts Extension Aquaculture Team promotes the development of the finfish aquaculture industry in Massachusetts by facilitating industry expansion and by educating the public about the opportunities and benefits of aquaculture. The project provides resources to assist industry representatives, backyard hobbyists, educators, and individuals looking for information on the industry or seeking establish an aquaculture system.

This year we are completing studies at the Berkshire Hatchery on different pond cage configurations and on a number of predator deterrence techniques. We are working with farmers in Northfield who are developing a largemouth bass rearing facility and we are developing a small-scale rotifer rearing system to assist farmers who raise fish from eggs. At the USFWS Cronin Salmon Station in Sunderland, we are working with US Geological Survey fish pathologist Rocco Cipriano conducting research concerning the management of furunculusis, a disease common to salmonids.

Outreach activities include presentations on aquaculture for entry-level farmers, summer twilight meetings to highlight aquacultural enterprises and the team website (www.umass.edu/aquaculture). In Berkshire County, Tara Johnson is promoting the Atlantic Salmon Egg Rearing Program (ASERP) and connecting the school program with the salmon rearing activities at the Berkshire Fish Hatchery.

The activities of the UMass Extension Aquaculture Team are funded by a grant from the Massachusetts Department of Agricultural Resources. (***Source**: The Hook, Fall 2006 Edition*)

Update on Azinphos-Methyl

Greg Krawczyk, Penn State Univ.

The following article is reprinted from: EPA Pesticide Program *Updates from EPA's Office of Pesticide Programs 11/17/06* http://www.epa.gov/pesticides

Achieving another important human health and environmental protection milestone, EPA has issued its decision to phase-out the remaining uses of the organophosphate (OP) insecticide azinphos-methyl (AZM) over the next several years. This action will increase protections for agricultural workers and the environment. This phase-out will encourage and facilitate transition to safer alternatives and reduce risks to farm workers, pesticide applicators, and aquatic ecosystems. Under the agreement,

* Brussels sprouts and nursery stock will be phased out by September 30, 2007;

* Almonds, pistachios and walnuts by October 30, 2009;

* Apples, blueberries, cherries, parsley, and pears by September 30, 2012.

All other uses of AZM have been voluntarily cancelled by the registrants. EPA consulted extensively with stakeholders and carefully considered both the risks and benefits of AZM in developing this plan. During the phase-out, additional use restrictions will help minimize risks. For example, reduced annual application rates will be phased in, buffers for water bodies will be increased, and buffers for occupied dwellings will be added. The Agency expects growers to successfully adapt and make the transition to available safer alternative pesticides, including acetamiprid, lambda-cyhalothrin,

methoxyfenozide, novaluron, tebufenozide, thiacloprid, and thiamethoxam.

The registrants will develop training materials in both English and Spanish that are designed to educate workers regarding (1) work practices that can reduce exposure to AZM; (2) the recognition of symptoms associated with cholinesterase inhibition; and (3) how to seek medical attention in the event that workers experience such symptoms. These materials will include a description of how, and by whom, the training will be conducted.

To facilitate the transition to safer alternatives, growers, registrants, and other stakeholders will meet with EPA periodically during the phase out to discuss alternatives to AZM, as well as newer pesticides in the pipeline to replace AZM. This workgroup will be headed by EPA and USDA, and will be discussed at a future Pesticide Program Dialogue Committee (PPDC) meeting.

AZM is a member of the organophosphate class of pesticides that has undergone EPA reevaluation through the pesticide reregistration and tolerance reassessment programs. These efforts ensure that safe and effective pesticides are available in this country to support the production of an abundant, healthy food supply and to safely meet other pest control needs.

For additional information: about the AZM phaseout:

http://www.epa.gov/oppsrrd1/op/azm/phaseout_fs.htm

http://www.epa.gov/oppsrrd1/op/azm.htm

http://www.regulations.gov -- AZM docket number EPA-HQ-OPP-2005-0061.

More detailed information related to this azinphos-methyl phase-out process will be provided during our winter IPM county/regional meetings (***Source**: Fruit Times, Vol. 25, No. 11, November 28, 2006*).

Upcoming Meetings:

Vegetable Production: From Greenhouse to Market
December 11, 12 & 13, 2006
A Three-Day Farmer-to-Farmer Workshop for Vegetable Farmers
For more information contact: arnold3@capital.net

NEV&BGA January Winter Meeting
January 5, 2007
Days Inn 450 Memorial Drive, Chicopee, MA
For more information contact: John Howell at Howell@umext.umass.edu

Wisconsin Fresh Fruit and Vegetable Conference
January 7-9, 2007
Olympia Resort and Conference Center, Oconomowoc, WI. For more information to to: www.wisconsinfreshproduce.org

National Bramble Conference
January 15-17, 2007
The annual conference of the North American Bramble Growers Association will be in Columbus, Ohio, this year, in association with the Ohio Fruit and Vegetable Congress. Sessions include an intensive "Bramble ABCs" workshop for novice growers. For more information, email nabga@mindspring.com .

Ohio Fruit and Vegetable Growers Congress, Ohio Direct Agricultural Marketing Conference, Mid American Human Resource Conference and National Bramble Conference
January 15-17, 2007
Greater Columbus Convention Center. Columbus Ohio. For more information email klutz@ofbf.org

Mid-Atlantic Fruit & Vegetable Convention
January 30-February 1,2007
Hershey Lodge &. Convention Center, Hershey PA. For more information and registration go to:
http://gloucester.rcre.rutgers.edu/midatlantic/

NEV&BGA February Winter Meeting
February 3, 2007
Eastern Massachusetts Extension Center, 240 Beaver St. Waltham, MA
For more information contact: John Howell at Howell@umext.umass.edu

North American Strawberry Growers Association Strawberry Symposium
February 9-12, 2007. Crowne Plaza Hotel, Ventura, California. For more information http://www.nasga.org/ .

2007 Empire State Fruit and Vegetable Expo
February 14-15, 2007
Onodaga Convention Center, Syracuse, NY.
For more information go to: http://www.nysaes.cornell.edu/hort/expo/

North American Farmers' Direct Marketing Conference and Trade Show
February 16-17,2007. Hyatt Regency Hotel, Calgary, Alberta, Canada. For more information http://www.nafdma.com .

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