



Berry Notes

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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](http://www.noursefarms.com). Your subscription fee helps support the production of the newsletter as well as other educational activities. Stay in touch with what is happening and renew your subscription today!

Go to www.umass.edu/fruitadvisor/fruitsubscriptions.htm.

Farmland Preservation: On December 3rd AFT convened over 60 farmers, legislators, representatives from farm and conservation organizations, and state agency officials for a day-long Farmland Protection Forum. The Forum examined the Commonwealth's current farmland protection toolbox and explored potential new land protection and conservation finance tools, including farmer pensions, eco-system service payments, and agricultural districts. Participants also identified other opportunities to advance farmland protection in the state. AFT is currently working with Forum participants and a steering committee to refine and pursue possible new tools.

Participants also received AFT's newly released *Farms for the Future: Massachusetts' Investments in Farmland Conservation*, a report which laid the groundwork for the Forum. Farms for the Future provides a better understanding of the state's agriculture sector and the land on which it relies. The report includes a review of state programs and recommends a number of actions to improve and complement those programs. For more information visit: <http://www.farmland.org/programs/states/ma/events.asp>

STRAWBERRY

Strawberry Leaf Spot

Kerik Cox, Cornell University

What is it? Common leaf spot is a ubiquitous foliar disease of strawberries. The disease is found in almost every New York strawberry planting.

What causes it? The disease is caused by a fungus called *Mycosphaerella fragariae*. This fungus survives in dead infected plant litter as hard black structures called sclerotia or as microscopic spores called conidia.

How do you get it? In the spring, the fungus breaks dormancy just like the strawberry plant, and releases its spores into the environment.

The spores spread about the planting during warm rains. Young tender leaves of strawberries become infected by the fungal spores and eventually produce more of the fungus' spores.

What does it look like? The disease looks like numerous tiny purple spots (1-2/8ths of an inch in diameter) with grayish white centers covering the surface of strawberry leaves. The number of spots per leaf and the severity of the disease throughout the planting depend on the amount of the fungus

(inoculum) in dead planting material at the site. If the infection is too severe, the plants can defoliate.

What will it do to my planting? This disease is fairly harmless and won't impact production unless the spotting is severe. Indeed, the disease reduces photosynthesis, but unless your planting begins to defoliate from the disease, the impact on yield is likely to be negligible.

What do I do about it? Fungi like warm, wet, dark conditions and thrive on dead plant material. Therefore, it's

really important to keep weeds out of the planting and not to crowd strawberry plants by employing tight within-row spacing. Since the fungus survives the winter on dead plant material, it's vital to remove and destroy plant material during renovation.

What do I spray?

You really only need

to make a fungicide application if you had a high level of leaf spot the previous year. If you decide to apply a fungicide, make the application dormant or delayed dormant to reduce the "inoculum" before the emergence of young tissue. (*Source: New York Berry News, Vol. 7, No. 12, Dec. 2008*)



Left: Common leaf spot symptoms on the surface of strawberry foliage. This level of spotting throughout a planting would represent a "severe" level of infection.

Right: Common leaf spot symptoms on the underside of a strawberry leaf.

Strawberry Varieties for Maine

David Handley, University of Maine

The number of strawberry varieties available to small-scale fruit growers has grown in recent years thanks to introductions from both new and established breeding programs. Although many new varieties have desirable characteristics, such as large, glossy fruit and high yields, you'll want to think about other factors before you make a selection.

Ripening season is one factor. Early ripening berries bring high prices but are more susceptible to frost damage, and may not have good yields or high fruit quality. Mid-season berries supply the bulk of the market, but they vary in quality and growth habit. Late-season fruit can be of high quality, but it tends to meet a slower market.

Always start with high-quality planting stock. Poor plant material guarantees a poor planting. Order your plants from a reputable source, and look for nurseries that sell plants from "certified" virus-free stock. Then you can be sure that the plants have been tested by indexing, and found free of common viruses. Virus-free plants have the best growth and productivity. They will also live longer and be more profitable.

Order your plants in the fall or early winter for spring planting to avoid limited supplies. Ask for a shipping date based on the date you plan to plant, usually in May.

Always think about disease resistance when you choose a variety. In New England, red stele (*Phytophthora fragariae*), a root rot fungus, is common in many soils,

especially wet, poor-draining areas. Resistant plants are the best way to combat this disease. Make varieties resistant to red stele a number one choice when you're ordering strawberry plants. Planting only nonresistant varieties could result in total crop failure, especially in a wet year.

The varieties listed in this publication are good choices for Maine. However, individual varieties may perform differently based on soil type, fertilization and renovation practices. Always plant several varieties to stretch out the season and prevent disease and frost problems. Also, test varieties in small plots on new sites before committing to a large planting. Despite glowing reviews from a nursery, a variety may not do well because of the particular qualities of your site (for example, poor drainage, short season, low temperatures). Finally, don't forget your customers. A berry may seem to have everything going for it, but if the customer or your family doesn't like it, it won't be very successful.

Early Season

Earliglow: An early berry of high quality. Fruit is firm with excellent flavor and color. Yields may be low in the Northeast. Fruit size tends to decrease as season progresses. Plants are vigorous runner producers and are resistant to red stele and verticillium wilt.

Mohawk: Very early ripening. High quality fruit with good flavor. Yields may be low in the Northeast. Plants are vigorous and produce many runners. Resistant to red stele and verticillium.

Sable: A recent release from Nova Scotia. Medium to large fruit. Flavor is very good, but fruit are soft. Plants are vigorous, with some resistance to red stele.

Veestar: A popular Canadian introduction. Very productive, good flavor, but fruit tends to be soft. Plants are vigorous but have no known resistance to red stele or verticillium.

Northeaster: Large, firm fruit with strong flavor. Good yields for an early variety. Shy runner producer, but plants are vigorous and perform well on heavy soils. Resistant to red stele and verticillium.

Evangeline: From Nova Scotia. A very early berry with a long conic shape and good flavor, but yield may be low in northern New England. Early flowering, so quite susceptible to frost injury. Plants are vigorous, but have no resistance to red stele or verticillium wilt.

Early-Midseason

Honeoye: A New York release. Generally early ripening. High yielding. Large, very attractive fruit with firm flesh, but flavor may be tart or flat. Plants are vigorous and produce many runners. Very susceptible to red stele and no known resistance to verticillium.

Annapolis: From Nova Scotia. Large fruit with good flavor and color, but somewhat soft. Very vigorous, free-running plants. Resistant to red stele.

Catskill: Large, bright red fruit with good flavor, but very soft. Plants are vigorous and very hardy, with resistance to verticillium, but no resistance to red stele.

Cavendish: From Nova Scotia. Productive. Large, firm fruit with good flavor, but with an uneven ripening habit. Plants are moderately vigorous. Resistant to red stele and verticillium.

Cornwallis: From Nova Scotia. Very productive. Medium-sized fruit with good flavor and color. Plants are vigorous and produce runners freely. Resistant to red stele.

Mira: A recent release from Nova Scotia. Large, light-red fruit with good quality. Plants have high yield potential and are vigorous with some resistance to red stele root rot and leaf diseases.

Brunswick: From Nova Scotia. Medium to large blocky fruit, attractive, dark red. Somewhat tender, and may be tart if not picked fully ripe. Very high yielding. Plants are vigorous with some resistance to red stele.

L'Amour: A recent release from New York. Large, bright red, firm, conic fruit with a fancy calyx. Good yield and vigorous plants. No known resistance to red stele or verticillium wilt.

Delmarvel: Large, glossy, uniform fruit with a fancy calyx. Plants are large, vigorous and moderately productive. Some resistance to red stele, but susceptible to leaf diseases.

Midseason

Kent: From Nova Scotia. High yielding. Large, attractive fruit with very good flavor. Plants are vigorous and good runner producers, but beds tend to run down after two or three seasons. No known resistance to red stele or verticillium.

Surecrop: Medium-sized, firm fruit of fair quality. Plants have moderate vigor but are resistant to red stele and verticillium wilt.

Guardian: Large berries, rough, and sometimes hollow. Light red to orange color. Fair flavor. Plants runner well and are resistant to red stele and verticillium.

Redchief: Glossy, attractive, medium-sized fruit with firm texture and flavor. Good production. Plants are vigorous but prefer heavier soils. Resistant to red stele and verticillium.

Jewel: From New York. Large, glossy, attractive fruit with firm texture. Productive. Moderate vigor and runner production. No known resistance to red stele or verticillium.

Mid-Late Season

Seneca: From New York. Large, somewhat irregular fruit, very firm and bright red. Flavor is pleasant but mild. Plants

are only moderately vigorous and have no resistance to red stele or verticillium.

Allstar: From the United States Department of Agriculture. Berries are large, conical and light red to orange with mild, sweet flavor. The plants are vigorous and make runners freely. Resistant to red stele and verticillium.

Cabot: From Nova Scotia. Very large fruit, bright red, firm, but with tender skin. Plants need high fertility to maintain high vigor. Plants have some resistance to red stele, but the fruit is susceptible to gray mold.

Sparkle: Excellent flavored fruit, but dark red and somewhat soft. Fruit size tends to decrease as season progresses. Plants are vigorous, copious runner producers with some resistance to red stele.

Glooscap: From Nova Scotia. Medium to large fruit, firm and dark red. Good flavor. Susceptible to green petal disease, red stele and verticillium.

Mic Mac: A Nova Scotia introduction. Good yields. Large, light red fruit, firm. Plants are vigorous and produce many runners. No known resistance to red stele or verticillium.

Mesabi: From Minnesota. Large fruit and good yields. Vigorous plants, resistant to red stele and leaf spot.

Eros: From Great Britain. Large, blocky, bright-red fruit with good firmness. Moderate to good production. Fairly long picking season. Vigorous plants with some resistance to red stele and other diseases.

Late Season

Individual varieties may perform differently based on soil type, fertilization and renovation practices. Always plant several varieties to stretch out the season and prevent disease and frost problems.

Winona: A recent release from Minnesota. Large, firm, light-red fruit. Moderately vigorous plants with

resistance to red stele root rot and tolerant of most leaf diseases.

Lateglow: From the United States Department of Agriculture. Medium to large, bright red, attractive fruit. Firm with good flavor. Plants only moderately vigorous, but resistant to red stele and verticillium. May lack adequate hardiness for northern New England.

Bounty: Uniform fruit with good flavor. Plants show fair vigor and runner production. No resistance to red stele or verticillium.

Clancy: From New York. Large, dark red, round to conic fruit with good firmness. Vigorous, productive plants with some resistance to red stele.

Ovation: From USDA/ARS. Large, bright red to red-orange fruit with good firmness and mild, sweet flavor. Plants are vigorous and very resistant to root rot and some leaf diseases.

Day-Neutral

Day-neutral strawberry plants produce fruit though the late summer and fall; overall yields tend to be low.

Tristar: From USDA/ARS. Medium sized, bright-red fruit with very good quality. Low vigor plants, with fair productivity. Resistant to red stele and verticillium wilt.

Tribute: From USDA/ARS. Medium sized, bright-red fruit with good quality. Small but vigorous plants producing many runners. Fair to good productivity. Resistant to red stele and verticillium wilt.

Everest: From Great Britain. Medium sized, bright-red fruit with good quality. Small plants that do not produce runners. Best suited to high-density plasticulture systems.

Seascape: From California. Large, attractive fruit. Flavor can be poor if not allowed to ripen fully on the plants. Productive plants with few, if any runners. Best suited to high-density plasticulture systems. Hardiness may be poor. (*Source: UMaine Bulletin #2184, last revised 08/12/08*)

An Electric Future for Strawberry Harvesting

British Tech2reality News Release

UK Midlands based engineering design company, Tech2reality Ltd, has taken a fresh look at the commercial harvesting of strawberries and has come up with a brand new solution - a revolutionary electric harvesting rig.

Traditional hand-picking of strawberries is a tough, back-breaking job. From the grower's point of view, there are lots of issues with it, not least the cost, supply and quality of labour. The team at Tech2reality decided to apply their automotive experience to find a solution. The result is the TEKTU T100.



Its rechargeable batteries enable this machine to run silently and with zero emissions inside poly-tunnels. The battery pack lasts for at least a full shift and multi-shifting simply

involves a quick battery change operation. Everything is aimed at saving labour and making harvesting more efficient.

The TEKTU T100 comes in 4, 5, and 6 bed versions, carrying 8, 10 or 12 pickers. Pickers are comfortably positioned over the crop rows and gather the fruit quickly and efficiently, directly into punnets. Conveyors carry the laden punnets to the load platform, where they are packed into trays and offloaded.

The purpose-designed structure is simple and strong, with a wide track and large wheels, for maximum stability and grip. Terrain can be tough, so 4 wheel drive is available. Headlands can be narrow too. So, 4 wheel steering enables the T100 to neatly crab sideways at the end of a crop row.

Electric drive and control brings a number of benefits. The T100 is fitted with ultrasonic automatic steering which means there is no need for a driver while harvesting. The rig's speed of travel is controlled very precisely and, in 'auto-speed' mode, demand requests from the pickers are processed electronically to set an optimum harvesting speed. Productivity data can be downloaded too, enabling detailed analysis of harvesting efficiency and yield density variations through the crop.

Demanding automotive standards have been applied to all aspects of the design and specification, to ensure trouble-free operation in all weather conditions. In the few weeks that the T100 has been operating in the field, customers are seeing 25-30% improvement in productivity and are expecting payback during the second full season of operation. (*Source: Peerbolt Small Fruit Update 1-12-09*)

RASPBERRY

High Tunnel Production of PrimeJim® and PrimeJan® Blackberries

Sonia Schloemann, UMass

A trial planting of Prime Jim® and Prime Jan® primocane fruiting blackberries were established in 2007 at the UMass Cold Spring Orchard Research and Education Center in Belchertown Massachusetts to evaluate their performance under New England growing conditions and compare their performance when grown with and without protection of a high tunnel. The planting was not designed for statistical analysis, but to provide preliminary information on the suitability of these varieties for planting in New England. Support for this project was provided from the Massachusetts Fruit Growers Association and from the North American Bramble Growers Association.

Objectives of the project were:

- to introduce primocane blackberry cultivars to New England growers



- to evaluate (in general) the differences between high tunnel and open field production of primocane blackberries (not a statistical comparison)
- to determine the best management practices for high tunnel and open field production of primocane blackberries

Procedure:

2007: Tissue culture plugs of primocane blackberries PrimeJim® and PrimeJan® were planted in the spring of 2007. Plants were delivered in mid-June and initially set out in pots in order for them to size up a bit before planting in the field. Field planting occurred on July 25th. Trellis posts were installed during the month of August. Irrigation supply lines were also installed at that time. Varieties were planted as double rows at 5' between rows and 48" between plants in the row in order to fit the dimensions of the tunnel frame. Growth in year 1 from tissue culture plants did not yield fruit so no yield data were collected in the establishment year. Normal weed and pest management practices were applied as needed. Black plastic mulch was



used with drip irrigation beneath was installed to aid in weed management.

2008: A used high tunnel frame was moved to the project site during summer '08. The span and length of the frame determined the dimensions of the planting. The pairs of rows were planted 5' apart in order to fit within the 15' span of the hoop frame. The pairs of rows were planted to allow for 15' between the two tunnels, once constructed. Plant spacing of 4' in the row was used. A 25' buffer space was left unplanted between the high tunnel and the section of the rows that will not be covered so as to eliminate any shading from the tunnel on the uncovered rows. Straw mulch was applied to the soil around the plants and between the rows to suppress weed growth and conserve soil moisture.

Measurable wetting periods were recorded on 42 out of 61 days in July and August in 2008 as compared to 23 days in the same period the previous year. Disease pressure was high and as a result, two applications of Pristine fungicide were made to suppress potential disease inoculum during the bloom period. An infestation of potato leafhopper was observed in June causing significant stunting of canes and cupping of

leaves. A single carbaryl application was made and no further damage observed.

Results:

Primocane emergence began in late April for both varieties. Flowering on some residual short floricanes was seen in late May with fruit ripening in July. Primocanes of both varieties began flowering in late July/early August with fruit ripening in mid September.

While not established in a statistical design, general impressions were of improved yield and fruit quality in the tunnels as compared with rows outside the tunnels (Table 2). Overall yield was somewhat greater from PrimeJim® as compared with PrimeJan® while berry size was somewhat larger in PrimeJan®. Final conclusions cannot be drawn on 2008 data because harvest was cut short in both covered and uncovered plots because of inadequate gable ends on the tunnels and premature freeze damage inside when significant amounts of fruit was still present.

Two meetings were held on site at which this project was highlighted for growers. The first was held in May with 30 participants and the second in July with 80 participants. In addition a small video clip was posted online (<http://www.umass.edu/fruitadvisor/clements/index.html>) to introduce these varieties and this growing technique to interested growers. Data will continue to be collected for another 2 growing seasons or more and results disseminated to growers.



Table 2. 2008 harvest data from PrimJim® and PrimeJan® Blackberries with and without tunnels.

date	PrimeJim			PrimeJan			
	yield (g)	# of berries	brrywt (g)	yield (g)	# of berries	brrywt (g)	
15-Sep	410	72	5.69	205	29	7.07	
18-Sep	134	27	4.96	21	4	5.25	
24-Sep	704	120	5.87	344	53	6.49	
1-Oct	590	103	5.73	499	82	6.09	
10-Oct	499	89	5.61	408	61	6.69	
15-Oct	1,625	307	5.29	1,160	163	7.12	
20-Oct	0	0	0.00	0	0	0.00	
total yield	3,962	mean berry wt.	5.53	total yield	2,637	mean berry wt.	6.45

date	PrimeJim			PrimeJan			
	tunnel			tunnel			
	yield (g)	# of berries	brrywt (g)	yield (g)	# of berries	brrywt (g)	
15-Sep	958	140	6.84	474	55	8.62	
18-Sep	195	28	6.96	187	20	9.35	
24-Sep	1,238	179	6.92	663	83	7.99	
1-Oct	1,506	225	6.69	1,153	140	8.24	
10-Oct	998	145	6.88	1,088	121	8.99	
15-Oct	1,776	275	6.46	1,857	214	8.68	
20-Oct	1,393	199	7.00	950	112	8.48	
total yield	8,064	mean berry wt.	6.82	total yield	6,372	mean berry wt.	8.62

High Tunnel Bramble Production

Eric Hanson , Rufus Isaacs and Annemiek Schilder Michigan State Univ.

High tunnels are relatively inexpensive hoop houses that can be covered with plastic except during the winter. These structures exclude rain and modify temperature, wind speed and humidity. We have been studying raspberry production under Haygrove high tunnels at the Southwest Michigan Research and Extension Center (SWMREC) in Benton Harbor for three years. Funding was provided by Haygrove Tunnels (cost-sharing for structures) the Michigan State Horticulture Society Trust Fund, Project GREEN, and SWMREC. The plastic has been placed on the tunnels in late June, 2005, early May, 2006, and mid April, 2007, and removed in early November each year.

Fall-fruiting and summer-fruiting raspberries have performed very well under tunnels. Fall-fruiting varieties (Autumn Britten, Chinook, Caroline, Heritage) fruit on one year-old canes in the late summer and fall. Summer-bearers (Canby, Encore, Heritage, Nova) fruit on two year-old canes in July. Fallfruiting types can be pruned to produce in the summer and fall. The summer-fruiting variety Nova produces a small additional crop in the late fall.

Summer and fall fruiting raspberries in tunnels began fruiting a few days earlier than field plants, and continue a little later as well. Nova was the highest yielding summer-bearer in the tunnels and field, whereas Caroline has been highest producing fall-bearer. Yields have been two to three times higher in tunnels than in the field. Overall berry size has been 20-40 % higher in the tunnels than in the field.

Overall, tunnel berries also have had a fraction of the rot seen in the field (although no fungicides have been applied). Fall-fruiting variety evaluation will conclude in 2007. Summer-fruiting varieties will be picked for the last time in 2008.

Heritage and Caroline were most susceptible to potato leafhopper damage, while Chinook had severe feeding damage from Japanese beetle in the tunnel and field. Beetle and leafhopper abundance and damage were dramatically lower under the tunnels than in the field. There was evidence the two spotted spider mite populations have been building in the tunnels over the first few years, but this was not quantified. Honeybees were much less common inside the tunnels than outside. Bumblebee colonies brought into the tunnel to aid in pollination survived well through the summer heat and provided good pollination of the summer and fall raspberries. They were also observed visiting other crops grown in the same tunnel experiment (tomato etc.) and were found to roam across the SWMREC farm to other crops such as blueberry when those crops were in bloom. Leaf spot and anthracnose infections were prevalent on field plants, but nearly absent in the tunnel.

Overall, raspberries appear to be an excellent crop for high tunnels. Yields are double or triple those in the field and berry quality is greatly improved. More needs to be learned to optimize production practices, but raspberries clearly can pay for tunnels in relatively little time. We have also begun studies with tunnelgrown blackberries. Our first emphasis will be on primocane-fruiting (fall-bearing) blackberries. The two current varieties (PrimJan, PrimeJim) and several advanced selections were planted in 2007.

Table 1. Yield (1000 lb/acre) of summer-fruiting raspberries in the field and tunnel, SWMREC.

Variety	Tunnel		Field	
	2006	2007	2006	2007
Canby	3	20	1	4
Encore	2	15	1	4
Heritage	1	4	0	2
Nova	4	20	3	10
AVERAGE	3	15	1	5

Table 2. Yield (1000 lb/acre) of fall-fruiting raspberries in the field and tunnel, SWMREC.

Variety	Tunnel			Field		
	2005	2006	2007	2005	2006	2007
Autumn Britten	1	15	11	1	5	5
Caroline	3	21	25	1	8	11
Chinook	1	13	13	0	4	3
Heritage - mowed	2	16	22	1	4	11
Heritage – pruned for summer	3	17	19	0	4	9
Nova	0	4	3	0	1	2
AVERAGE	1.7	14.0	15.5	0.5	4.4	6.8

Table 3. Summer-fruiting raspberry size and appearance and rot incidence after a short storage period, tunnel and field grown plants, SWMREC, (data are means of 2006 and 2007).

Variety	Tunnel			Field		
	Size (g)	Visual rating z	Rot (%)	Size (g)	Visual rating	Rot (%)
Canby	2.4	3.2	0.4	2.1	2.7	2.1
Encore	4.4	3.6	0.1	3.3	2.7	11.0
Heritage	2.1	4.0	0.2	1.7	2.4	3.3
Nova	3.6	4.1	0.3	2.8	3.5	5.4
AVERAGE	3.2	3.7	0.3	2.5	2.8	5.5

z rating scale from 1 (very unappealing) to 5 (excellent, no defects).

Table 3. Fall raspberry yield, berry size and rot incidence after storage, tunnel and field grown plants, SWMREC, 2006.

Variety	Tunnel			Field		
	Yield (1000 lb/a)	Size (g)	Rot (%)	Yield (1000 lb/a)	Size (g)	Rot (%)
Autumn Britten 1	1	2.8	0.6	4	2.3	8.1
Caroline	16	2.6	0.0	6	2.0	2.9
Chinook	10	2.3	1.1	3	1.9	12.6
Heritage - mowed	12	2.3	0.3	4	1.5	6.2
Heritage-pruned for summer	12	2.3	--	3	1.6	--
Nova	3	3.3	0.0	1	2.3	16.8
AVERAGE	10.7	2.6	0.6	3.5	1.9	10.0

(Source: 2007 Great Lakes Fruit, Vegetable & Farm Market EXPO Proceedings)

BLUEBERRY

Storage Life and Flavor of Blueberry Varieties

Jim Hancock, Pete Callow, Randy Beaudry and Eric Hanson, Michigan State University

We have been studying four factors that could influence the long term storage of blueberries: 1) storage atmosphere, 2) nutrition, 3) stage of bush development and fruit ripeness, and 4) variety.

We tested the effects of atmosphere on long term storage from 1999 - 2001, by storing ripe fruit from eight cultivars under ambient O₂ and CO₂ or 2 % O₂ and 8 % CO₂, and evaluating it at 4, 5 and 6 weeks. There was little difference observed between the two

treatments for soluble solids, acidity, firmness, % bruising and % decay in any cultivar.

We tested the effect of N and Ca levels on the keeping quality of blueberries, by collecting and storing fruit in 1999 and 2000 from Jersey bushes whose leaves had N levels ranged from 1.7 to 2.1 % and Bluecrop bushes whose leaves had Ca levels ranging from 0.43 to 0.47 %. Little difference was observed in the storage quality of fruit from any of these treatments.

To measure the effect of bush ripeness on long term storage, 100 % blue fruit were picked from ‘Elliott’ bushes in 1999 and 2000 when the bushes were 30 %, 60 % and 80% ripe and sorted into three classes - fully blue, 75 – 100 % blue and 50 - 100 % blue. The storage quality of the earlier harvested fruit was significantly better than that picked later; however, there was no significant difference in the storage quality of fruit that was 50, 75 and 100 % ripe. We also compared the storability of fruit from the first and second harvests of four cultivars in 2001 and found that fruit from the first harvest had superior storage quality to that of the second.

To contrast the long term storability of some of the newer cultivar releases, ripe fruit were collected from Nelson, Bluegold, Bluecrop, Jersey, Legacy, Brigitta and Little Giant from 1999 – 2001 and stored in ambient air at 0 C. Overall, Bluegold, Brigitta and Legacy performed the best, storing well for an average of 4 - 7 weeks. Elliott, Nelson, Jersey and Little Giant remained salable for no better than two weeks.

In a broader survey from 2002 -2004, we compared the long term storage and disease resistance of thirty northern highbush varieties. Resistance to fruit decay was analyzed by holding the fruit at room temperature for 10 days after harvest and then visually examining them for presence of decay. The most resistant varieties to *Alternaria* were Aurora, Draper, Brigitta and Elliott with 3 – 7 % of their fruit decayed after 10 days. The most resistant varieties to *Colletroticum* were Duke, Elliott, Brigitta, Bluejay, Toro, Aurora and Nelson (7 – 17 % decay). Bluecrop was the most susceptible cultivar to both diseases (> 50 % decay).

Storability was measured by holding pints of fruit in ambient air at 0 C and examining it weekly until more than 50 % of the berries felt soft to the touch. The varieties with the longest storage life were Brigitta, Aurora and Draper which averaged 7 to 8 weeks, followed by Liberty, Nelson, Toro and Elliott which averaged 5 to 6 weeks. When these varieties were evaluated by a taste panel, Liberty, Brigitta and Draper were rated among the highest for flavor, Toro and Nelson were intermediate, and Aurora and Elliott were ranked lowest. (*Source: 2007 Great Lakes Vegetable & Fruit Expo Proceedings*)

For more information on high tunnel production of raspberries and blackberries go to <http://www.hort.cornell.edu/extension/commercial/fruit/Berries/bramblepdf/hightunnels rasp.pdf>.

Blueberry Varieties for New Hampshire Growers

Becky Grube, University of New Hampshire

This fact sheet was developed to help growers select among the many highbush blueberry varieties available. Growers in Northern areas should prioritize winter hardiness. We have indicated varieties that have been used widely for commercial plantings in New Hampshire, those that should be grown on a trial basis,

and those best suited for home production. Information is not available for all varieties, particularly newer releases. Remember that flavor and preferences vary, and for any new planting, multiple varieties should be selected to increase the likelihood of success in your specific location.

	Varieties	Yield	Flavor	Disease Tolerances/Susceptibility	PROS	CONS
EARLY	^a Bluetta	3	2	M, P -	Early, hardy, good flavor	Small dark berries, large scar
	^a Duke	3	2	M -	Productive, attractive firm fruit	Flavor, bush vigor
	^b Hannah's Choice	2	3	--	Flavor	New release (2000), hardiness?
	Earliblue	2	1	- P	Early, upright	Productivity, flavor
EARLY-MID	^c Bluejay	2	3	M -	Quality fruit, nice landscape plant	Less productive
	^a Blueray	3	3	- B	Hardy, productive, flavor, large	Spreading bush
	Meador	2	2	- -	NH release, flavor, quality	
	^a Patriot	2	3	RR -	Early, productive, flavor	
	^c Spartan	3	4	M -	Large, firm, flavor, nice fall	Needs cross-pollination

					foliage	
	^b Reka	3	-	--	Tolerant of wetter ground	New release
MID	^a Bluecrop	3	3	M -	Yields, quality, widely adapted	Can't tolerate poor drainage
	^a Nelson	3	4	--	Productive, quality	
	Rubel	2	2	F -		Flavor, small fruit
	^b Little Giant	-	4	--	Anthocyanins, lowbush flavor	Very small fruit, new (1996)
	Sierra	-	-	- M	Productive, large, firm	Less hardy
	^b Toro	-	-	--	Productive, large fruit	Upright, thick canes
	^b Caras Choice	-	-	--	Fruit quality	New release (2000), hardiness?
	Herbert	-	-	--	Fruit quality	Inconsistent in colder climates
	^a Chandler	-	-	--	Good for PYO	Long harvest window
	Bluegold	3	3	- M	Quality	Twiggy bush, mummyberry
MID-LATE	Coville	2	3	M, FM	Large, tart fruit	Yields
	Elizabeth	2	4	--		Quality, hardiness, productivity
	Berkeley	3	-	--	Productive, large firm fruit	Hardiness, large scar
	^a Bonus	-	-	--	Huge fruit	
	Legacy	-	4	--	High quality fruit	Hardiness, slow to produce
	^a Jersey	3	2	M -	Productive, flavor	Shelf life
	Lateblue	3	3	M -	May ripen too late	
LATE	^a Elliot	4	2	M, P -	Productive, large firm fruit	Flavor
	^b Aurora	-	3	--	Latest variety, flavor	New release, needs pollination
	Brigitta	2	3	--	Productive, large fruit	Hardiness
	^b Liberty	3	3	--	Late, firm attractive fruit, flavor	New release, needs pollination
Half-High Varieties (highbush x lowbush)						
EARLY-MID	Polaris	2	4	—		
	^c St. Cloud	3	4	—		
	^a Northblue	3	3	- M		
	^a North Country	2	3	--	Hardy	Med-small fruit, short bush
	^a Northland	4	3	- G	Hardy, productive	Pruning, soft berries, Gibbera
MID	^a Friendship	2	4	—	Hardy	Quality
	Northsky	1	4	--	Hardy	Med-small fruit, short bush
	Chippewa	2	3	--		
^a Suitable for commercial growers		Diseases: (M) Mummyberry; (RR) Phytophthora, (B) Botrytis,				
^b Suitable for trial		(F) Fusicoccum, (P) Phomopsis, (G) Gibbera blight				
^c Suitable for home gardeners		Yield (1-4, low-high); Flavor (1-4, weak-very good), "-" info not available				

(Source: *New Hampshire Vegetable, Berry & Tree Fruit Newsletter, January 2007*)

GRAPE

Vine Balance Parameters

Glenn McGourty, UC Extension Mendocino Cty

How do you know if your soil is low to moderate vigor or if your vine is in balance? These are some handy but general vine balance parameters. They are based in California wine growing conditions but can be applied carefully to high quality hybrids and vinifera wines in the East. If you are outside of these ranges further investigation and corrections may be necessary.

Effect of Soil on Vigor: relationship of saturation percentage to soil texture, CEC and available water (field capacity to permanent wilting point) based on 4' of rooting depth with no chemical or physical rooting limitations. From: Daniel Roberts and Bill Peacock.

Saturation	Soil texture (soil)	CEC (meq/100g)	Available water	Potential vine vigor
<20%	sandy or sandy loam	2-7	<0.6	very low
20-35%	sandy loam	7-15	0.6-1.0	low to moderate
35-50%	loam or silt loam	15-30	1.1-1.4	moderate to high
50-65%	clay loam	30-40	1.5-2.0	high to very high
>65%	clay or peat	>40	>2.0	very high to extremely high

Assessing vine vigor (general parameters, not absolute)

- Ideal shoot length is normally about 36", with 16-18 leaves per shoot
- By veraison, shoots are beginning to lignify
- Few lateral shoots
- Leaves are healthy green color (turning light green after veraison)
- Canopy should appear open and well ventilated
- The vine utilizes all of its allotted space in the trellis system (but not more)
- Shade beneath the canopy should be dappled with sunlight and not solid shade
- Two clusters of fruit are present on all shoots (may be less if clusters are large)
- Basal leaves should be green and functional, not yellow and dry
- Ripening fruit has uniform color from cluster to cluster and vine to vine

Fruit:shoot relationships from R. Smart

Mean cane weight	Ratio of fruit:pruning	Vine vigor
>60g	<3:1	Vines are overly vigorous. Too much wood, not enough fruit. Wines often have "veggie" flavors, shading of fruit zone may cause poor flower initiation and fruit set
20-40g	4:1-6:1	Vines are balanced, especially at 5:1. Wines have good balance of alcohol, acidity, tannins and color
<10g	>7:1	Vines are over cropped, not vigorous. More canopy is needed to properly ripen fruit. Wines tend to be light in color, low tannins, high pH, low in acidity

(Source: PA WineGrape Newsletter, 12/16/08)

GENERAL INFORMATION

Plan Ahead For A Small Fruit Planting

Becky Grube, University of New Hampshire

As we sort through seed catalogs and plan for the next growing season, now is the time that many people start to think about what a good idea it would be to put in a new planting of blueberries or brambles (raspberries or blackberries). The demand for berries is at an all-time high, and with attention to marketing, they can be a profitable addition to a diversified operation.

Even though it is tempting to order plants now and plant them into that piece of sod or old pasture that you



plow up early in the spring, taking the time to prepare your site will pay off in the long run.

pH. The single most important factor in growing healthy blueberry bushes is pH. Their optimal pH is 4.5-4.8, which is typical of New Hampshire woodlands. This is not typical for old pastures, corn fields, or vegetable gardens! Blueberry bushes are not able to take up nutrients if the pH is too high, regardless of whether the nutrients are present in the soil. Planting in high pH soil delays fruit production, stunts bushes, and causes micronutrient deficiencies. To lower the pH, finely ground sulfur is added to the soil. This takes time to work – 6 months or longer, depending on the initial pH. Transplanting itself is a stress for bushes; adding



pH shock on top of it can delay their growth by over a year. It is worth taking the extra year to test the pH and prepare the soil before putting the bushes in! Unlike with vegetable crops, for perennial fruits, your one chance to

incorporate amendments deeply into the soil is at planting time. While brambles (raspberries & blackberries) require a more typical garden pH (5.6-6.2), they also suffer setbacks when planted into soils that have not already been adjusted.

Weeds. Weeds around the base of brambles and blueberries compete for water and nutrients, create habitats for voles and mice, decrease airflow (which increases fungal diseases), and make picking more difficult. Without the use of herbicides, any perennial weeds that aren't killed prior to planting will remain a battle throughout the life of the planting. Plowing up sod will not kill perennial grasses – a good reason to wait one growing season before planting your field. If you start a year in advance, you can turn under the sod in the spring and plant competitive summer cover crops (sudan grass is ideal, followed by late August planting of oats) to suppress weeds and add organic matter at the same time. If you wait until the fall before you plant, you could kill the sod by using a broadspectrum herbicide like glyphosate, or by using a black plastic or weed barrier cloth for smaller areas.

Eliminate wild relatives. It also pays to remove wild relatives of your crop to help manage diseases. For brambles, it is best to remove all wild raspberries and blackberries within 600 feet of your planting. For blueberries, true firs in the vicinity (*Abies* spp.) also pose a threat, since firs are the alternate host for witches' broom. You may not be able to remove all of these wild hosts of diseases, but any reduction in inoculum helps.

Site selection. Whether you plan to plant right away or wait a year or two, this is an ideal time to determine whether the site you have chosen is a good one. Winterkill is more common in windy and exposed sites – if the snow is consistently blown clear of the area you are looking at, more tender varieties will likely have a hard time in those sites. Low-lying areas are often places where frost can settle. Placing a highlow thermometer in the site is a good way to find out if you have accidentally chosen a cold pocket. Another reason

to avoid low-lying areas is that these sites are more likely to have problems with root rots including Phytophthora.

Choose varieties. Long-term success depends on having varieties that are adapted to your site. Pay attention to disease resistance and cold hardiness that is appropriate for your location. Here again, it pays to plan ahead. Popular varieties tend to sell out fast at commercial nurseries – winter is often too late to place an order for the upcoming spring.

If you are considering putting in a blueberry or bramble planting, here is a tentative timeline that maximizes chances of success:

SPRING BEFORE PLANTING:

- Soil test to determine pH, phosphorus and potassium levels.

EARLY SUMMER - JUNE:

- Turn under sod. Incorporate lime or sulfur as needed, as well as phosphorus and potassium according to the soil test and nitrogen to feed a competitive cover crop.
- Plant a cover crop. If you have suitable equipment to till in a large crop, sorghum/sudan grass is a good choice. With smaller scale equipment, buckwheat may be better.
- Starting selecting varieties. Visit farms and compare varieties that you are considering.

Some resources you may find helpful:

NRAES Publication 55 – Highbush Blueberry Production Guide, Available online at <http://www.nraes.org/>. Limited quantities are also available by contacting your local county extension educator or Becky Grube.

NRAES Publication 35 – Bramble Production Guide, Available online at <http://www.nraes.org/>. Limited quantities are also available by contacting your local county extension educator or Becky Grube. A new edition of this excellent resource is scheduled for publication in spring 2008.

The New England Small Fruit Pest Management Guide is issued every other year. The 08-09 version is available. To purchase a copy of the guide, contact Sonia Schloemann at 413-545-4347 or [email sgs@umext.umass.edu](mailto:sgs@umext.umass.edu).

Two new fact sheets, **Raspberry & Blackberry Varieties for New Hampshire Growers and Blueberry Varieties for New Hampshire Growers** are now available online at <http://extension.unh.edu/Agric/AGFVC.htm>. You can also get them by emailing becky.grube@unh.edu or by calling Suzanne Hebert at 603-862-3200. (*Source: NH Veg, Berry & Tree Fruit Newsletter, Vol 4.1, January 2008*)

Five Essential Steps for Marketing Your Business

John Berry, Penn State Cooperative Extension

"I know this business inside out," Laura told me the week she started her new business. "I just don't have the foggiest idea of how to market it!" It's a problem that many business managers face. If you don't know how to get the word out - how to market your product or service - it can be a struggle to get the customers needed to grow a business.

Here are five considerations some believe support great marketing.

- 1) **What is your market?** Decide who your main customers are or will be. As a group, how old are they? Where do they live? How much money do they make? What kinds of jobs do they have and what are their interests? The better you can sketch a detailed profile of the kinds of people, who will be your main customers, the better you'll fare in the next four steps.
- 2) **What kinds of media do your main customers use?** Each type of media has its own target audience. Each radio station, newspaper, magazine, or TV program tries to interest a specific segment of the population. The trick is to match your main customers with the kinds of media they use. Effective media can be anything that conveys your message. Media choices range from million dollar commercials in the Super Bowl to a few free pens with your name on them.
- 3) **Limit the media you use to what you can afford to use consistently.** The key to effective marketing is consistency. You have to hit the audience with your message again, and again, and again. Marketers use the Rule of Seven. Prospects must see or hear your message seven times before they consider buying.
- 4) **Sell the main benefit of your product or service.** Make your marketing clientcentered. How does your product or service improve your customer's life? Talk to your customer from their own perspective. Does your product or service save them time? Make them healthier? Make them more attractive?
- 5) **And finally, don't miss out on FREE publicity.** Radio, TV, newspapers, newsletters, and magazines regularly lookout for good stories. Is there something about you or your business that would interest other people? Is there something about your business that is newsworthy? Maybe you have useful information to share with others. Last, but certainly not least, remember to promote your business on-line. The internet is open to everyone. It's the only "big" media that allows the small business person to get their message out at very low cost.

These are the five essential steps to effective marketing. Keep them in mind as you decide how to spend your marketing budget. These steps represent the most significant reasons why some marketing efforts fails while others bring in loads of sales. (*Source: The Vegetable & Small Fruit Gazette January 2009 Volume 13, No. 1*)

Customer Service Defined

John Berry, Penn State Cooperative Extension

While customer service has no single widely used definition, customer service is often viewed in three principal ways.

- 1) **Customer service as an activity.** This level treats customer service as a particular task that a firm must accomplish to satisfy the customer's needs. Order processing, billing and invoicing, product returns, and claims handling are all typical examples of this level of customer service. Customer service departments, which basically handle customer problems and complaints, also represent this level of customer service.
- 2) **Customer service as performance measures.** This level emphasizes customer service in terms of specific performance measures, such as the percentage of orders delivered on time and complete and the number of orders processed within acceptable time limits. Although this level enhances the first one, a firm might want to look beyond the performance measures themselves to ensure that its service efforts achieve actual customer satisfaction.
- 3) **Customer service as a philosophy.** This level elevates customer service to a firm-wide commitment to providing customer satisfaction through superior customer service. Rather than narrowly viewing customer service as an activity or as a set of performance measures, this interpretation involves a dedication to customer service that pervades the entire firm and all of its activities.

The least important level of involvement for most companies would be viewing customer service simply as an activity. From this perspective, customer service activities in logistics are at the transaction level. For example, accepting product returns from customers in a retail store adds no value to product: it is merely a transaction to appease the customers. With the possible exception of making it

extremely convenient for customers to return products, this level of customer service typically offers limited opportunities to add value for the customers. The focus upon performance measures for customer service is very important because it provides a method of evaluating how well the logistics system is functioning. Over time, such measures provide benchmarks to gauge improvement, which is especially important when a firm is trying to implement a continuous improvement program. But this level of involvement is not sufficient in the marketplace.

The final level, customer service as a philosophy, broadens the role of customer service in the firm. However, this still may not be sufficient unless the value-added dimension is included as the goal of our customer service philosophy. Customer service can be a process for providing competitive advantage and adding benefits to the supply chain in order to maximize the total value to the ultimate customer. (*Source: The Vegetable & Small Fruit Gazette January 2009 Volume 13, No. 1*)

UPCOMING MEETINGS:

Jan 15, 2009 Highbush Blueberry School. Augusta ME. For more information go to:

<http://www.uvm.edu/vtvegandberry/meetings/Highbush%20BlueberrySchoolMaine09.pdf>

Jan. 15, 2009. Massachusetts Fruit Growers' Association Annual Meeting and UMass Extension Winter Fruit Program

<http://www.massfruitgrowers.org/2009/mfga011509announcement.pdf> 9AM to 3PM. UMass Cold Spring Orchard, Belchertown, MA. 2.0 pesticide re-certification credits will be offered. Pre-registration by Friday, January 9 – MFGA Member: \$40 per person (lunch included), Non-MFGA Member: \$50 per person (lunch included). After January 9 or at the door – \$60 per person (lunch included). Pre-register at <http://www.massfruitgrowers.org>

January 16, 2009 10am - 1 pm. Discussion on Needs of Organic Farmers and Beginning Farmers Brigham Hill Community Farm, Grafton, MA Please let us know if you plan to come by calling Ruth Hazzard at 545-3696, or email rhazzard@umext.umass.edu. Email if you have questions.

Jan 17, 2009 NOFA-MA Winter Conference. Worcester MA. For more information go to:

<http://www.nofamass.org/conferences/w2009/index.php>

Jan. 17 2009 9:00 - 11:30, Introduction to Berry Growing, Cornell Cooperative Extension Cayuga County, 248 Grant Avenue,

Auburn, NY 13021 To register or for additional information, contact Cornell Cooperative Extension at 315.255.1183 or go to [http://www.hort.cornell.edu/extension/commercial/fruit/Berries/calendarpdf/Intro to Berry Growing09.pdf](http://www.hort.cornell.edu/extension/commercial/fruit/Berries/calendarpdf/Intro%20to%20Berry%20Growing09.pdf)

Jan. 19-21 2009, North American Strawberry Growers Annual Meeting, New Orleans, LA For complete program and registration information go to <http://www.nasga.org/>.

Jan. 22, 2009 CT Vegetable and Berry Growers Meeting. Vernon CT. For more information and directions go to:

<http://www.hort.uconn.edu/ipm/veg/htms/2009vegconf.htm>

Jan. 23-25, 2009 NOFA-NY Conference. Rochester NY. For more information go to: [http://www.events.org/nofany-](http://www.events.org/nofany-conference/cpage.aspx?e=16387)

[conference/cpage.aspx?e=16387](http://www.events.org/nofany-conference/cpage.aspx?e=16387)

Feb. 3-5, 2009. 2009 Mid-Atlantic Fruit and Vegetable Convention, Hershey Lodge and Convention Center, Hershey, PA. For more information contact William Troxell at 717-694- 3596 or visit www.mafvc.org.

Feb. 6-7, 2009 NH Farm and Forest Expo. Manchester NH. For more information go to: www.nhfarmandforestexpo.org/

Feb. 7, 2009. NEV&BGA and Extension All Day Winter Meeting, Waltham, MA. For program and registration information contact John Howell at howell@umext.umass.edu.

Feb. 9, 2009 VT Vegetable and Berry Growers Annual Meeting. Montpelier VT. For more information and directions go to:

<http://www.uvm.edu/vtvegandberry/meetings/09%20Montpelier.pdf>

Feb 10-12, 2009 NY Fruit and Vegetable Expo. Syracuse NY. <http://www.nysaes.cornell.edu/hort/expo/>

Feb. 11-13 2009, New York State Fruit and Vegetable Expo and Becker Forum Syracuse, NY. For complete program and registration information, go to <http://www.nysaes.cornell.edu/hort/expo/>

Feb. 14-15, 2009 NOFA-VT Winter Conference. Randolph Center VT. For more information go to [http://www.nofavt.org/annual-](http://www.nofavt.org/annual-events/winter-conference)

[events/winter-conference](http://www.nofavt.org/annual-events/winter-conference)

Feb. 24-26, 2009 Harvest New England Agricultural Marketing Conference. Sturbridge MA. For more information go to

<http://www.regonline.com/builder/site/Default.aspx?eventid=652438>

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