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Berry Notes

Prepared by the University of Massachusetts Fruit Team

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IN THIS ISSUE:

MESSAGE FROM THE EDITOR

STRAWBERRY

- ❖ Day Neutral Strawberries and Emerging Pests: ID and Management Webinar Series Announced

BRAMBLES

- ❖ Blackberry Varieties for Tunnel Production in Northern Areas
- ❖ Berry Disease Snapshot: Crumbly Berry of Raspberry
- ❖ New Crop Management System to Improve Shelf Life of Raspberry Fruit in New Brunswick

BLUEBERRIES

- ❖ Blueberry Pruning and Rejuvenation

GRAPE

- ❖ Cold Injury Assessment and Pruning in Grapes

GENERAL INFORMATION

- ❖ Berry Arthropod Pest Snapshot; Look Who's Coming to Dinner?
- ❖ Currant, Gooseberry, Elderberry, and Aronia- Production, Products, and Marketability

UPCOMING MEETINGS

UP Front FYI:

New England Small Fruit Pest Management Guide available: the 2010-2011 edition of the New England Small Fruit Pest Management Guide is available for \$16 (\$12 plus \$4 s&h) and can be ordered through the UMass Fruit Team Website at <http://www.umass.edu/fruitadvisor/fruitsubscriptions.htm>

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](#). 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.

Some Fact Sheets about Brown Marmorated Stink Bug:



- <http://ento.psu.edu/extension/factsheets/brown-marmorated-stink-bug>
- http://ohioline.osu.edu/hyg-fact/pdf/FS_3824_08.pdf
- <http://njaes.rutgers.edu/stinkbug/identify.asp>

STRAWBERRY

Day Neutral Strawberries and Emerging Pests: ID and Management Webinar Series Announced

North American Strawberry Growers Association and Cornell Cooperative Extension

Register now to participate in this live webinar series! All you need is a home or office computer and high speed internet access, to attend this educational series sponsored by NASGA and co-hosted by Cornell University Dept. of Horticulture and Cornell Cooperative Extension.

Participation is free, but registration is necessary to participate. Registration is on a first-come-first-served basis for the first 100 participants. To register go to:

<http://www.nasga.org/>.

All webinars will begin promptly at 1 PM EST and last approximately 1 hour and 15 minutes.

Registrants will receive an e-mail with instructions and a web link prior to each webinar. Simply click on the link to see the scheduled presentations given live by the speakers from his or her location across the US and Canada. Type questions into the chat box provided for real time Q and A with the speakers after the presentations.

Webinar Schedule

Day Neutral Strawberries

February 18, 2011

- Strawberry Physiology - Dr. Adam Dale, University of Guelph
- Day Neutral Strawberry Varieties - Ms. Pam Fisher, OMAFRA.

February 25, 2011

- Growing systems - Mr. Simon Parent, president, Novafruit.

- Fertility/Fertigation - Dr. John Zandstra, University of Guelph

March 4, 2011

- Diseases - Dr. Frank Louws, North Carolina State University.
- Insect and Mite Management for Day Neutral Strawberries - Dr. David Handley, University of Maine.

Emerging Pests: ID and Management

March 11, 2011

- Brown Marmorated Stinkbug - Dr. Tracy Leskey, USDA ARS Appalachian Fruit Research Station
- Fusarium and Charcoal Crown Rots - Mr. Steven Koike, University of California Cooperative Extension, Monterey County.

March 18, 2011

- Strawberry Viruses - Dr. Robert Martin, USDA ARS, Corvallis Oregon
- Management of the spotted wing drosophila in the small fruits" – Mr. Mark Bolda, University of California Cooperative Extension, Santa Cruz County.

March 25, 2011

- Nematodes and Root Rots - Dr. James LaMondia, The Connecticut Agricultural Experiment Station.
- Advances in Root Weevil Management - Dr. Richard Cowles, The Connecticut Agricultural Experiment Station.

(Source: New York Berry News, January 2011)

RASPBERRY

Blackberry Varieties for Tunnel Production in Northern Areas

Eric Hanson, Rufus Isaacs, and Annemiek Schilder, Michigan State University

The humid summers and cold winters in the Eastern U.S. make production of bramble fruits challenging. The quality of these fruits is particularly affected by rain and humidity that promote fungal diseases. From 2005 to 2009, we grew summer and fall fruiting raspberry varieties under Haygrove high tunnels at the Southwest Michigan Research and Extension Center (SWMREC) in southwest Michigan and found that tunnels improved yields and berry quality sufficiently to pay back the cost of tunnels in two to three years. Tunnels also reduced Japanese beetle and potato leafhopper numbers and leaf spot and anthracnose infections, while two spotted spider mites were more numerous.

In this project, we studied tunnel production of fall fruiting blackberries (2007 planting of PrimeJan,

PrimeJim, four selections from the Arkansas breeding program) and summer fruiting blackberries (Apache, Black Butte, Chester, Kiowa, Ouachita, Triple Crown) planted in 2008.

Primocane-fruited blackberries have yielded very poorly. Yields in 2009 and 2010 (Table 1) were roughly equivalent to 1,000 to 3,000 lb per acre. As illustrated in the figure below, there has been no period of concentrated production. Berries ripened from early August through mid October. These primocane-fruited types fruit on the ends of canes and branches. In order to stimulate lateral branching, we have tipped the canes that reach heights of 2-3 feet in June, and left later growing canes alone. At the end of the season in October, up to half of individual canes and lateral branch ends had not yet produced ripe

fruit. The disease crown gall is also present in these plants and likely contributes to the yields. We also observed that earlier opening flowers often did not set fruit, and suspect that hot tunnel temperatures in August may inhibit pollination and fruit set. Fruit quality of the primocane-fruited types has generally been good, though size has been modest.

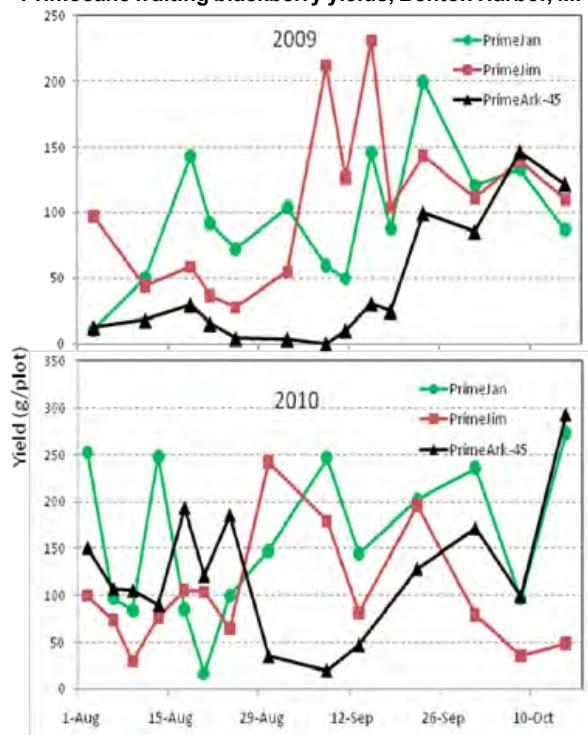
Summer fruiting blackberries were planted in April, 2008. We received poor quality plants of some varieties. Plants of Triple Crown, however, were strong and these plots established well. In 2009, Triple Crown was the only type that yielded significant amounts of fruit (equivalent to about 5,000 lb/acre). All varieties had filled their space in 2010 and yielded well. Triple Crown was again the most productive, followed by Chester and Ouachita. The largest fruited type was Black Butte. Black Butte is a West Coast variety that is very susceptible to cold injury, but because canes trail along the ground rather than grow upright, we included this variety to test whether canes could be protected from cold by covering them with row cover during the winter. We did not learn whether covers protected canes during 2008-09 or 2009- 2010 winters because all plants (covered and not) were protected by snow during the coldest parts of the winter.

This project was one of six projects funded in 2008, 2009, and 2010 by the North American Bramble Growers Research Foundation. For more information about this work contact Eric Hanson at hansone@msu.edu. For more information about the Foundation, visit www.raspberryblackberry.com.

Table 1. Primocane fruiting blackberry yields and berry weights under high tunnels, Benton harbor, Mi.

Variety	Yield (kg/plot)		Berry weight (g)	
	2009	2010	2009	2010
PrimeJim	1.3	1.5	5.3	4.7
PrimeJan	1.4	1.2	6.2	4.2
PrimeArk-45	0.7	1.3	8.7	6.5
AR-40	0.9	1.7	7.2	4.8
AR-41	0.8	1.2	7.4	5.1
AR-46	0.8	2.2	5.8	4.3

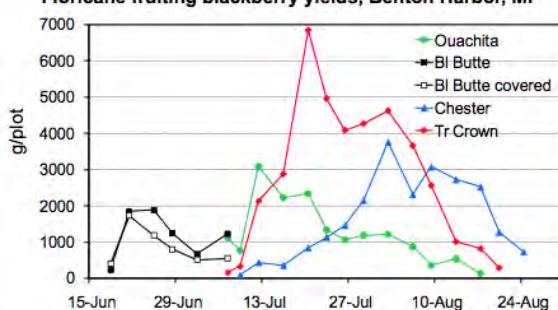
Primocane fruiting blackberry yields, Benton Harbor, MI



Floricane-fruited blackberry yield and berry weights under high tunnels, Benton Harbor, Mi, 2010.

Variety	Kg/plot	lb/acre	g/berry
Bl Butte	7.1	5,100	7.8
Bl Butte covered	5.2	3,700	9.4
Chester	22.7	16,300	4.6
Ouachita	16.0	11,500	6.9
Triple Crown	38.5	27,700	7.8

Floricane fruiting blackberry yields, Benton Harbor, MI



(Source: The Bramble, newsletter of the North American Raspberry & Blackberry Association, Winter 2010-2011)

Berry Disease Snapshot: Crumbly Berry of Raspberry

Kerik Cox Cornell Univ.

Crumbly berry disease is named for a symptom of tomato ringspot virus (ToRSV) infection.

Plants with ToRSV infections may be asymptomatic until virus titers are sufficiently high. In severe cases there may be yellow rings or chlorotic networking patterns on leaves (rare), drupelets may be malformed, and/or mature fruit may crumble under slight pressure when picked.

The virus is vectored by the dagger nematode, a microscopic plant parasitic round-worm. The nematode doesn't move far in heavier or non-sandy soils, but has



**Tomato ringspot virus
(ToRSV) symptoms on**

numerous weed hosts, which is why it's best to remove the infected planting, replant elsewhere with certified virus-free stock, and leave the former planting site fallow (and weed free) for several years.

Bear in mind that crumbly mature fruit is just a physiological consequence of virus infection. Any number of physiological problems due to horticultural concerns including nutrition and toxicity could lead to crumbling fruit at maturity.

However, if you routinely have this problem it may be important to get tested for the virus. (*Source: New York Berry News, January 2011*)

New Crop Management System to Improve Shelf Life of Raspberry Fruit in New Brunswick

Lindsay Russell, Anita LeBlanc, Dr. Jean-Pierre P Agriculture & Agri-Food Canada, and Dr. Gaétan Moreau and Charles Comeau, Université de Moncton

A field trial was conducted during the 2008 and 2009 growing seasons at Agriculture and Agri-Food Canada's Senator Hervé J. Michaud Research Farm in Bouctouche, New Brunswick, in collaboration with researchers from the University of Moncton and the Really Local Harvest Cooperative. The objective of the study is to evaluate the use of polytunnel rain shelters with and without reflective groundcover - a crop management system that is the first of its kind in Canada - and determine whether such a system can benefit commercial raspberry production by improving fruit yield, quality and shelf life. Data collected thus far are pending analysis; preliminary results and observations are reported.

In the Atlantic provinces, the growing season is short and inadequate light can be a limiting factor to the production of a quality, high-yielding crop. There has been a trend towards cool, rainy growing seasons, which can promote the development of fungal diseases (such as anthracnose, blight, botrytis and rust) that can cause yield losses and reductions in fruit shelf life. Excessive soil moisture can also stunt plant growth. This study involved field plots of 'Nova' and 'Killarney' raspberry plants; rain shelters were installed in one half of the plots and of these plots,

another half had white, polymer reflective groundcover (Extenday) on both sides of the plant rows. The rain shelters were constructed of greenhouse-grade clear plastic secured to steel hoops, and can be used with existing trellis systems; they can provide complete plant row coverage and enable harvesting of fruit even when it is raining. The groundcover enhances the canopy light environment by reflecting sunlight to the crop that would otherwise be absorbed by the ground.



Preliminary results indicate that the rain shelter/reflective groundcover system alters the canopy microclimate. The light supplied to the plant canopy by reflection from the groundcover compensates for the reduction in incident light that is observed with use of the rain shelter, to varying degrees. Seasonal levels of soil temperature were observed to be lowest in plots with reflective groundcover. In 2009, seasonal levels of soil moisture were observed

to be lowest in plots in which only the rain shelter was used and greatest in plots with reflective groundcover. Seasonal levels and patterns of canopy air temperature and relative humidity were not observed to differ according to rain shelter/groundcover use. Leaf gas exchange results will reveal whether photosynthetic

activity is impacted by the differences in microclimate associated with use of the system.

Seasonal growth patterns indicate little to no positive effect of the rain shelter and/or reflective groundcover on primocane vigour (height and diameter). Informal field observations suggest that the rain shelter may slow leaf senescence late in the growing season and that the reflective groundcover may extend the fruit ripening period at both ends of the growing season. The incidence and severity of spur blight were reduced in 'Nova' plants grown under rain shelters. The rain shelter/reflective groundcover system appears to have favoured the percentage marketable yield but had no effect on marketable fruit size, firmness, sugar content and total yield. The shelf life of 'Nova' fruit was extended with the use of rain shelters: rate of fruit spoilage was slowed by about a half day to a day.

Identification of the ground beetle species (beneficial insects that predate upon insect pests such as mites, leaf beetles and weevils) collected from the field plots during the growing seasons is currently underway in order to

assess the impact of the rain shelter/reflective groundcover system on beetle population dynamics.

The rain shelter/reflective groundcover management system holds great promise for the commercial production of high-value crops with limited shelf life, particularly in regions prone to an over-abundance of rain during the growing season and/or a high risk of fungal disease. Preliminary results indicate that the system may lead to increased marketable yield and extended shelf life of raspberry fruit, which could translate to greater returns for producers. Interest in the system has thus far been high, and through consultation with growers and crop specialists, adjustments to the design of the rain shelter continue to be made with the aim of improving practicality, performance and production efficiency. Pending funding and producer interest in collaborating on field trials, the plan is to expand the study to a national scale in the upcoming growing season in order to evaluate the system across a range of cultivars and growing conditions. (*Source: The Ontario Berry Grower, January 2010*)

BLUEBERRY

Blueberry Pruning and Rejuvenation

Marvin Pritts, Cornell University

Introduction

Regular pruning is an essential component of blueberry management, yet its importance is often misunderstood because the costs to the neglectful grower are not immediate. Pruning is required to maintain the vigor and productivity of bushes, to aid in disease and insect management, to maintain large fruit size and quality, and to develop an appropriate growth habit for harvesting.

A young blueberry plant will produce many canes for the first several years. Cane production will gradually slow as bushes become tall. Yields will decrease because of the absence of new growth on which flower buds will form. An increasing amount of leaf area will be required to satisfy the respiratory demands of both the fruit and wood. Furthermore, light penetration into the canopy will diminish, resulting in a shift of fruit production to the exterior of the bush, causing a decrease in bearing surface. Appropriate pruning practices can maintain a blueberry bush in an efficient and productive state, without the detrimental changes described.

Selecting canes for removal

When selecting canes for removal, first look for any winter-injured or broken canes, or canes with disease and insect damage. If injury is severe, remove that particular cane. Cankers and scales are common pests that can be partially controlled through pruning. Second, remove any cane that is rubbing against another to prevent canker

infections. Third, remove those that are interfering with movement through the alley. Aim for a plant with an upright growth habit, yet with a sufficiently open canopy to allow for light penetration. Mechanically harvested bushes should be trained to a more upright habit and narrower crown than those that are hand harvested. Finally, remove short, branched canes that never receive much light. If these canes produce fruit, it will ripen late and will rarely be harvested.

Care should be taken to remove canes as close to the crown as possible. Do not leave 6 to 8 inch stubs. These will rot and act as a source of disease inoculum.

Time of pruning

Early spring is the best time to prune blueberries. Although some growers begin pruning immediately after harvest, it is thought that this makes plants more susceptible to winter injury and reduces the long-term productivity of bushes. By pruning in early spring, one can identify winter injured wood and remove it. Carbohydrates produced in autumn will also have had sufficient time to move into the roots and crown for storage.

Pruning young bushes

Little pruning is required on young bushes. Remove flower buds for the first two years to promote vegetative growth. This can be achieved by rubbing off the fruit buds, or by pruning the tips of shoots where the flower

buds are located. At the beginning of the third year, remove any twisted or low-growing canes to promote new cane production.

If more than two new canes were produced the previous year, remove all but the two healthiest at the crown level. In subsequent years, continue light pruning until the plants reach full size, removing all but 2 or 3 of last season's canes. When plants are about 8 years old, they should contain between 10 and 20 canes of many different ages. Some cultivars produce many more canes than others, so the amount of pruning that is required on young bushes will vary with cultivar.

Mature bushes

Eight year old canes start to lose their productivity as more leaves are required to support a given amount of fruit on those canes. In addition, canes have branched considerably, and the most recent growth on which flowers form is usually thin and weak. Removing one or two of the largest canes in a mature bush will promote new cane growth. If bushes contain a mixture of canes of different ages, then annual removal of canes that have reached 8 years of age will allow for a minimal reduction in productivity, as 7-year-old canes grow to replace those that were removed. Regular renewal will allow for consistent long-term productivity.

Canes larger than one inch in diameter are not as productive as younger canes, and eventually should be removed. If one or two of the largest canes in a mature bush are removed annually, and one or two new canes are permitted to grow, then an even age structure among canes can be maintained. In general, up to 20% of the older wood can be removed from a bush without adverse effects on yield. Although berry numbers will be reduced, larger fruit will compensate for this decrease.

Regularity of pruning

Annual pruning is essential for stable production and high productivity. When bushes are pruned irregularly, young canes are produced in great numbers the year after heavy pruning. These canes will age together, and become unproductive at the same time. If one then wants to prune out the unproductive canes, nearly the entire bush will have to be removed. Also, no young growth is present to make up for the loss of fruiting wood. Therefore, irregular

pruning results in erratic yields from year to year, and tall bushes will develop as individual canes elongate to compete for light. Research has shown that annual, moderate pruning produces bushes with the fewest canes, but with the greatest yields.

Detailed pruning

Removing injured wood should be the primary objective of detailed branch pruning in the tops of the canes. Branch pruning can result in higher fruit quality because berry numbers are reduced. Also, branch pruning can help relieve drought stress in hot climates where plantings are unirrigated. However, if one has done a good job removing whole canes, then little detailed pruning will be required.

Weak bushes require more pruning than vigorous bushes because pruning stimulates vegetative growth. Also, special consideration must be given varieties with spreading habits. Sprawling canes should be removed, but care should be taken to leave sufficient canes for fruiting.

Rejuvenation

When rejuvenating an old planting, remove one or two old canes for every five or six younger canes. In following years, remove up to 20% of the wood until new cane growth occurs. Keep only 2 or 3 new canes and continue to remove up to 20% of the oldest canes. Eventually, the bush will become more productive, cane numbers will decrease, and bush stature will decline.

In old, poorly maintained plantings, some growers have had success cutting all the canes to ground level; harvesting begins 3 years later. However, for this system to be most effective, canes must be thinned to the most vigorous 6 - 10. Others find that summer hedging immediately after harvest, coupled with selective dormant cane removal, works well.

Summary

Pruning is an investment in the future productivity of the blueberry planting. Regular annual pruning will spread costs throughout the life of the planting, ensure stable production from year to year, and serve as a useful tool for managing pests, fruit load, and quality. (*Source: Cornell Blueberry Production Factsheets*)

GRAPE

Cold Injury Assessment and Pruning in Grapes

Bruce Bordelon, Purdue University

March is the most common month for pruning grapes. The threat of extremely cold weather has passed and we can evaluate any winter injury to vines that may have occurred. By April buds will begin to swell so it is important that pruning is complete prior to bud swell to avoid damage to the tender buds. Growers should assess

bud damage prior to pruning so that adjustments can be made in the amount of bud retained. Bud damage is assessed by collecting canes from positions that would normally be left at pruning, bringing those canes indoors to warm up for 48 hours or more, then cutting through the buds with a razor blade to evaluate bud health. Live buds

will be bright green while cold injured buds will be black or brown. A very good description of this procedure with pictures is available at the Cornell University Grape Pages website at: <http://www.nysaes.cornell.edu/hort/faculty/pool/GrapePagesIndex.html> Typically, if less than 25% of the buds are damaged you can prune normally. If 25-40% of the buds are damaged then you'll want to adjust the number of buds retained accordingly. For example, if 40% of the buds are damaged then 60% are alive. If you need 40 buds per vine for the proper crop load, then you'll have to leave 68 buds to end up with 40 primary shoots. To determine how to adjust the bud number multiply the inverse of the percent live buds ($1/.60$) times the desired number of buds ($1/.60=1.7$; $1.7 \times 40 = 68$ buds). If more than 40% of the buds are damaged then you'll probably want to do minimal pruning now and wait until after budbreak to determine where live buds occur in order to have an adequate number for balancing the vines.

We have cut a few buds from our vines in Lafayette this week and find that all varieties have 85% or higher bud survival. Our low temperature so far this winter has been -6°F, which is not normally damaging.

Spring freeze damage can also be a significant economic problem for Midwest grape growers. Widespread damage occurred in 2007 from the warm March followed by the

Easter freeze. Over the past few years frost damage in Indiana has been sporadic. A technique called long pruning or double pruning helps avoid spring frost and freeze damage, especially on varieties that tend to bud out early. This type of pruning is only applicable to spur or no-tie training systems. The procedure utilizes the apical dominance of buds on a cane. The first buds to begin growing are those on the tip of a cane, while buds closer to the base begin growth later. To perform long pruning, select canes to be used for fruiting spurs during the normal pruning practice, but leave those canes long, with 10-15 more buds than desired. Spurs are normally pruned to 3 to 4 nodes for fruiting, but if they are not cut back, then the extra buds will help delay the development of the desired basal 3 to 4 buds, which helps avoid frost injury. After the date of the last probable spring freeze has passed, the canes are shortened to the desired length to properly adjust the bud number for the vine. Growth of the basal buds can be delayed as much as two weeks if weather conditions are favorable. While this procedure requires an extra trip through the vineyard, it can mean the difference between a full crop and little or no crop. (Source: *Facts for Fancy Fruit, February 15, 2010 Volume 10 • Issue 1*)

GENERAL INFORMATION

Berry Arthropod Pest Snapshot; Look Who's Coming to Dinner?

Greg Loeb, Cornell University

The one constant of farming (maybe life in general) ironically is that it never stays exactly the same. Change is good, right? There is change coming to New York with respect to the invasion of two new insect pests of fruit crops: the Brown Marmorated Stink Bug, which is already present at low numbers, and the Spotted Wing Drosophila, which has not been reported yet, but getting close. Both these insects have the potential to change pest management practices for small fruit growers and I thought I would use this space to introduce them to you. In this issue I will focus on Brown Marmorated Stink Bug (BMSB).

BMSB originates from Asia. It was accidentally introduced into Pennsylvania about 15 years ago and has been spreading through the USA ever since, reaching NY a few years ago. This insect is a plant feeder, using its soda straw like mouthparts to suck out plant juices. It is known to feed on a wide range of plant species, including a number of fruit, vegetable, and



Brown Marmorated Stinkbug Adult
(photo courtesy Steven Jacobs, Penn State University)

field crops where it can cause serious damage. Pome fruit seem to be particularly vulnerable. Several small fruit crops are vulnerable as well, with perhaps **blueberries** and **raspberries** the most at risk. When it feeds on developing fruit, you may only observe small blemishes or slight to moderate deformations on the surface, but underneath you will find corky, necrotic tissue. In addition to its feeding habits, BMSB is also a nuisance pest. It over-winters as an adult, often in homes, barns and parked vehicles like RVs, etc. They can be very numerous and although they do not bite, they can release an unpleasant odor (hence the name stink bug). Incidentally, the stink bug odor has caused some problems for the wine industry. Adults congregate in vineyards in the fall and can get accidentally harvested with grapes. In the process they release their alarm odors, which can result in unpleasant aromas in wine. A good fact sheet on BMSB, with

photographs of adults, eggs and immatures and damage, has been produced by Penn State University <http://ento.psu.edu/extension/factsheets/brown-marmorated-stink-bug>

BMSB has caused serious economic damage to fruit, vegetable, and field crops in the Mid-Atlantic States. Time will tell to what extent BMSB will be a problem for NY berry growers and to what extent pest management practices will need to change to accommodate them. I recommend learning how to recognize BMSB and monitor for its presence in your fields. University and USDA scientists are working hard to learn more about the

biology of BMSB and effective ways to control it. Right now NY has one insecticide labeled for use against BMSB (Danitol [fenpropathrin] has a 2ee exemption for use on blueberries, grapes, and strawberries, but unfortunately not brambles). However, over time additional insecticides will be added and hopefully some innovative alternatives will also be developed. So I guess change is not always good, but probably unavoidable. We will need to learn how to manage BMSB and minimize its economic and environmental impacts. (*Source: New York Berry News, Jan 2011*)

Currant, Gooseberry, Elderberry, and Aronia- Production, Products, and Marketability

Steven McKay, Cornell University

The group of berries presented here has great potential for new crop development in the US. All can be produced with mechanization, which is important considering the need to reduce input costs such as labor. They have documented health benefits, and an excellent range of value-added products that can be marketed. The publicity for black currants has helped to raise customer awareness domestically, but much more remains to be done to bring these crops to their full potential for marketing.

RIBES: CURRENTS AND GOOSEBERRIES

Introduction: Ribes is the genus name of currants, gooseberries, and crosses of the two. Currants and gooseberries were once grown extensively on a commercial basis in the US. At the beginning of the century, the largest collection of currants and gooseberries in the country was in Geneva, NY, and the state ranked number one in red currant production in the 1930's. There are over 150 species of gooseberries in the world, and hundreds of currants and selected and hybridized cultivars. One British nurseryman told me in 1999 that he refers to a variety publication from earlier this century that lists over 1,500 varieties of gooseberries alone, and some researchers state that about 4,000 have been reported over the years (possibly a number are duplicates). Many cultivars have been lost, or are very rare, and there is an international effort to save as many of these as possible in various collections.

Even though currants and gooseberries are in the same family, they appear quite different. The crosses may look like either parent; some like currants and others like gooseberries. The variety in shapes, colors, texture, and flavor make Ribes a good candidate for development in gourmet and specialty markets. Fresh fruit can decorate plates, salads, and desserts. Cooked or processed fruit makes delicious sauces, pastry, wine, vinegar, and



preserves. The juices have great flavor and health benefits that make them appropriate for popularizing as common breakfast or snack drinks. A comprehensive cookbook is currently available on CD for Ribes, and recipes can be found in old cookbooks, cooking magazines.

Gooseberries (*Ribes grossularia var. uva crispa L.*) grow on a bush approximately 3 to 6 feet tall and about 3 to 4 feet wide. Most gooseberries have spines or thorns at each of the leaf nodes. The spines may be single, double, or triple, and they may be large, (10 to 15 mm) to small (1 to 5 mm). The habit of the plant may vary from low

spreading to upright and tall. Berry color may vary from green to yellow/green, to yellow; or white, to pink, to red, to dark red or purple. The size of the berries varies from about 1.5 grams to more than 12 grams. The average is about 3 to 6 grams. The berries are usually borne in ones, twos, or threes, and hang under the branches. The taste ranges from very tart to very sweet. In the

US, gooseberries ripen starting about mid-June and the latest are ripe about mid-August. The seasons may vary a week or more either way, depending on the weather and your location.

Gooseberries are generally classified as dessert berries, those that are used raw, and culinary, or >cookers= that are used primarily for processing or cooking. There are some that fall into both categories depending on the stage of ripeness when picked. Generally the dessert berries are larger and used when completely ripe. The culinary berries are generally smaller, very tart and used before they are fully ripe. Some growers use some of the dessert type berries while still unripe as cookers and as a means of thinning and using the crop. The remaining berries become larger and are used as they ripen. Please see New York Fruit Quarterly, Fall, 2006 for an article on gooseberries.

Some of the cultivars used as dessert berries in North America are: 'Achilles', 'Captivator', 'Early Sulphur', 'Hoenings Earliest', 'Invicta', 'Hinnomaki Red', 'Hinnomaki Yellow', 'Jeanne', 'Jahn's Prairie', and 'Whinham's Industry'.

Some of the culinary cultivars are: 'Careless' (dual use), 'Oregon Champion', 'Poorman', and 'Red Jacket', ('Pixwell' less recommended).

There are many other cultivars available in varying supplies that could be used in plantings for berries for sale at farmer's markets or roadside markets. The Corvallis Oregon germplasm repository has plants that could be brought into commercial production also.

Currents grow on a bush that is generally larger than a gooseberry bush with thicker wood. There are no thorns or spines, and bushes can be spreading or upright. There are two major different types of currants, black currants (*R. nigrum*) and red currants (*R. rubrum*). The red currants also include the pink, white, and yellow currants, which are color phases of the red.

Almost all **black currants** are processed into juice or other products such as syrup, jam, jelly, tea, yogurt, pie fillings, candy, nutraceuticals, and wine. There has been an increase in consumption of black currant flavored beverages, and fresh consumption is growing, although demand remains relatively low because berries have a strong pungent flavor. The flavor is great for those who are accustomed to it, either fresh, or for cooking.

Some available black currant cultivars that may be used: 'Ben Sarek', 'Ben Lomond', 'Ben Alder', 'Titania', ('Ben Nevis', 'Consort'....available but less recommended). Watch for two new Polish varieties soon to be released in North America.

Red currants are used both fresh and processed. They grow in bunches similar to grapes called strigs and may have from 10 to 35 berries. Fruits are often made into juice which can be consumed as a beverage, or used for preserves or other products. Currant jelly is an ingredient in many recipes to produce a tart flavor or to glaze. Red currants are used in sauces for meats, poultry or fish as well as a dessert topping on ice cream, cake, puddings, and creams.

Some currant cultivars that may be used:

Red Currants: 'Red Lake', 'Jonker Van Tets', 'Redstart' (mechanical harvested only), 'Rovada', and 'Tatran'.

White Currants: 'Primus', 'Blanka', 'White Imperial', 'Pink Champagne', and 'White Versailles'.

There are **other hybrids** and species of *Ribes* that don't fit into the above classifications. One of these is 'Crandall'. It is often grouped with black currants, but is actually another species, *R. odoratum*, and looks like a black currant, but has a milder flavor and is often eaten as fresh, raw fruit. It is quite large, and late for a black currant.

Josta berries (*Ribes nidigrolaria*), and selections called ORUS are actually hybrids of gooseberry and black currant. They often produce light crops of fruit.

Deciding Whether to Grow Ribes: *Ribes* crops definitely have a place in a grower's diversification formula. Local consumption by gourmet enthusiasts, small scale processors, and ethnic markets should be one's first target. Know what your market is before planting. Remember that larger scale production is more risky. As an example, the production of red currants as of 2010 has grown so much that it is a challenge to sell them all during the season. However, CA storage could be considered as a way to extend season and increase prices. Please see an article in New York Fruit Quarterly, Spring, 2006 edition for information on CA storage.

One should be conscious of any regulations that restrict *Ribes* production in the local area. Consider proximity to white pines, and the information about white pine blister rust. Labor or proximity to a harvester is also a critical factor.

Considerations in Choosing a Variety: As with other crops, no ideal varieties of *Ribes* crops have been developed. Certain varieties are better suited to selected geographical locations. Fruit quality on a given variety might be excellent, while lack of disease resistance or poor plant growth habit could be a flaw. When you consider varieties for commercial production, consider the following factors: availability of plant material, ease of propagation, plant patents, local laws, market audience final use of fruit, yield, ease of picking (length of strig), fruit color, size and quality, plant: thorns, growth habit/size, disease resistance.

Culture: Spacing - Planting rates for gooseberries and currants that are being used in pick-your-own operations should be about 3-4 feet in the row and in rows about 6-8 feet apart, depending on your training system and equipment. It is very important to know about the growth habit of your selected varieties and the space requirements of equipment, especially if you plan to mechanically harvest. Field spacing can be planned according to the defined parameters. For example, the black currant Ben Lomond would be planted a little closer in row, while 'Titania' could be spaced wider, due to size differences of plants. Mechanically harvested plants are spaced closer in the row, at about 18", with alleys spaced wider so that equipment can pass. One grower in England advocates planting at 12" in-row spacing, insisting that a tight hedgerow is critical for success in mechanical harvesting.

Mechanical harvesting is also possible for gooseberries (and red currants). Gooseberries that are planted for processing are planted closer in row, and are 'stripped' of berries while still fairly green (unripe) and hard. Gooseberries picked for fresh market are often planted about 3.5 feet in the row unless trained to vertical cordons

which are spaced at eighteen inches. Fresh market berries are generally hand-picked.

Both red currants and gooseberries are most efficiently trained to cordons if they are to be used for fresh fruit production. Please New York Fruit Quarterly, Summer, 2005 edition for a detailed article on this training system.

Soil and Water - Ribes are best grown in good soil with at least 3-5% organic matter content and a pH of about 6.5, (however they can tolerate lower readings). High nitrogen should be avoided as this produces too much vegetative growth and may predispose plants to more mildew problems. A British rule of thumb is to add 50 kg per hectare each of N and K (actual) for crops producing 10 metric tons per hectare. (A 10 m t/h crop will extract the following kg of actual nutrient per hectare: N 20, P 5, K 44, Ca 8, Mg 3, S 4.) Ribes need about 0.6-1 inch of water per week during the fruiting season. Drip irrigation and mulching with wood chips, straw, or plastic is beneficial.

Pruning and Training - The best fruit is borne on 2 and 3 year old wood; wood should be pruned out after 4 years. Many training systems have been developed over the years, and continue to be developed. One alternative for black currant is to prune plants to the ground every other year, and to harvest alternate years. The crop is essentially grown as a "field crop" with as little as 15 hours of labor per year per acre. The Dutch have developed a mechanical pruning system that removes 1/3 of the bush per year on rotation. Systems will vary by use of fruit, harvest method, and other factors.

Pest Control - The lack of registered chemicals has been a problem from time to time for Ribes producers. (Check with your local extension office for the latest recommendations.)

1. Mildew tends to be the major disease problem, but trials are showing that it can be controlled by stylet oil. Gooseberry fruits are blemished and deformed by the disease. Shoot tips are deformed. The disease was once the limiting factor preventing success with European cultivars in North America.
2. Leaf spot has been a serious a problem on all Ribes crops. Leaf yellowing and premature defoliation weakens the plant and affects yield. Copper sprays and weed control help to control the disease.
3. White pine blister rust has been the cause of Ribes restrictions in the Northeast which are being reconsidered for modification. Immune cultivars are advisable especially near white pine stands. Gooseberry and red currant are resistant to the disease.
4. The British are controlling cane borers with pheromone mating disruption. They are sometimes a problem in the Northeast.
5. Aphids sometimes cause a red deformation on red currant leaves.

6. Reversion virus is common in black currant in Europe, but not found in the US. It can reduce the useful life of a black currant planting to as few as eight years. Quarantine has kept the disease out so far. The disease is spread by big bud mites.

7. Currant Cane Blight, a fungus disease that was a problem in the past (when ribes were previously cultivated in large acreage), has become a problem again. It is caused by *Botryosphaeria ribis*, and causes branches to yellow, wilt, and die. See New York Fruit Quarterly, Fall, 2008 edition for a related article.

8. Imported currant worm, is a green larva that can defoliate a plant in a matter of days. They are easily controlled with insecticide, but control measures must be taken quickly, because they can defoliate a plant in a couple of days.

Recommendations for pest control can be found in the Cornell Small Fruit Crop Pest Management Recommendations or other local extension publications.

Harvest/Postharvest: As with all berries, harvest and post harvest care of fruit can extend the shelf life of fruit. Some varieties hang longer on the plant than others. Generally speaking, red and black currants will sweeten as they hang, and fresh eating quality improves. Most people have a tendency to pick these fruits on the green side. Gooseberries will ripen off the plant. They ripen slowly in cold storage. Gooseberries lose their distinct veination as they ripen and become overripe. They develop a stronger, mustier flavor, lose acid, and can become mealy. Gooseberries and red currants can be kept a number of months (up to seven) with palletized CA storage.

Hand Harvesting: At harvest, one should avoid pricking gooseberries on thorns, and leave the blossom and stem end of the berry intact. Avoid bruising fruit. Red currants are left on strigs, and should be picked carefully to avoid smashing berries closest to the plant. Cultivars with long strigs, not heavily clustered are easier to hand pick. Black currants would follow the same generalizations as the red currants. Often harvest of black currants is best started as the first ripe berries in the top of the plant are beginning to fall off. In all Ribes, free moisture should be avoided, and berries should be shaded in the field and chilled as rapidly as possible. Fruit of all three types can be held at 36-40 F for two to three weeks. I have held fruit at 33F for as long as six weeks. CA storage methods are being developed for these fruits.

Machine Harvest: Proper adjustment of shakers is critical so that a thorough job of harvesting is done and the bushes are not badly beaten. Some machines are gentle enough to harvest gooseberry and black currant fruit suitable for fresh market. Red currants are more desirable intact on strigs for fresh market, and this is not possible with machine.

Useful Resource: Currants, Gooseberries, And Jostaberries: A Guide For Growers, Marketers, And Researchers In North America by Danny L., Ph.D. Barney and Kim E. Hummer. Find the New York Fruit Quarterly articles on www.fruit.cornell.edu.

ARONIA AND ELDERBERRY

Elderberry and Aronia (chokeberry) are common in different parts of Europe, and are gaining a foothold in the US. The products from these berries are beginning to appear in specialty and natural

food shops, and even superstores. In spite of the high price of the fresh fruit and its primary processed products on the domestic market, very little crop is actually produced in the US.

Aronia publicity has sparked a few plantings around the US, and several small-scale elderberry growers are found around the country producing mainly for wine and local fresh consumption. Aronia became popular and known on the West Coast a number of years ago due to a line of juice blends introduced by Wildland. The juice was sold in Costco, but has since been discontinued. Superberries.com is a web-based business that is currently selling Aronia based on its nutraceutical benefits.

Elderberry is appearing more and more as it replaces Echinacea as a popular cold and flu nutraceutical. Syrup and pulp are imported from abroad. Both are used as food coloring because of their deep purple pigment. Many businesses are now present on the web with related products.

Botanical Classification

Aronia~ The genus name Aronia has been replacing the rather unpleasant sounding common name, black chokeberry. Aronia is a member of the Rosaceae family, and the cultivars used for fruit production are from the species *Aronia melanocarpa*. The plant originated in North America, and cultivar selection was done in Europe. Cultivars are self-fertile.

Elderberry~ Elderberry is a member of the family Caprifoliaceae with 13 species native to North America. Commercially, we are interested in *Sambucus nigra* L. ssp. *canadensis* (North American, formerly classified as a separate species), and *Sambucus nigra* L. which is native to Europe. The fruit clusters (cymes) of the *S. nigra* cultivars are larger than those of *S. n. canadensis*. In



addition, some of the *S. nigra* cultivars have superior growth habits. Elderberries are only partially self-fruitful, and planting of two or more varieties within 60 feet of one another is beneficial. It is assumed that any pair of cultivars will function as mutual pollinizers.

Cultivars

Aronia~ >Viking= and >Nero= are cultivars that are commonly available in North American plant catalogs.

DNA fingerprinting research done in Sweden by Niklas Jeppsson has shown very little difference between available cultivars. In fact, the cultivars perform about the same commercially, and Niklas stated in an interview that it doesn't really matter which cultivar one uses. Seeds of the cultivars can even be planted, and the plants will be much like their parents, quite suitable for commercial production.

Elderberry~ In the *S. nigra* species, >Samdal= and >Samyl= are the most highly recommended for yield and desirable growth habit (produce new suckers annually). Two North American nurseries have germplasm and are propagating these in tissue culture. In the *S. n. canadensis* species, >York=, >Nova=, >Johns=, and the >Adams= series are available. York and Nova are touted as the heavier yielders. These cultivars are products of breeding work that ended in 1960. Renewed interest in the Midwest is sparking more work with new cultivars and cultural practices such as mechanical maintenance and harvest.

Propagation

Aronia~ Aronia is very easy to propagate. Softwood or semi-softwood cuttings can be propagated with mist in July. Divisions from established plants can be made at a

rate of as many as 25 per two year old plant. Stool beds are often used, as are seeds that have been stratified. Seeds are no longer recommended for propagation in Europe since plants have different rates of growth and coming into production. Even though seedlings reach the same size as cuttings, they may take longer to come into production.

Elderberry~ Elderberry can be propagated from softwood from tissue culture. Hardwood cuttings taken in early spring have about a 50% rooting rate, and are susceptible to damage in overly wet media. Divisions and even seeds can also be used for propagation.

Cultural Practices

Aronia~ Aronia is adaptable to a wide variety of neutral to slightly acid soils. Less fertile soils are desirable to keep plants smaller in size. It is suggested that plants be placed 0.8-1.0 meters apart and mulched with plastic to prevent weed growth. Plastic can be removed after two to three years as plants sucker and fill in the hedgerow. Plant growth is usually so dense after three to four years, that further weed control within the row is unnecessary. At five to seven years, selective pruning is done to remove the oldest, thickest branches, and keep the center open. Frost protection is not necessary since plants bloom so late, mid May in New York. Aphids on shoot tips, and leaf-eating beetles are possible pests, but plants are so vigorous, that pest damage that slows them down will not have much of a negative effect. Since Aronia is in the Rosaceae family, fire blight is a potential problem, but has not been reported as such.

Elderberry~ Elderberry prefers a sandy to heavy loam soil with a pH of 5.5-6.5. It is recommended that plants be set out at a 0.75 to 1.0 meter spacing, and that every other plant be removed after three to four years. This will improve chances of getting an economic return faster. The 'Samdal' and 'Samyl' cultivars have a nice growth habit where they throw canes from the base every year in good numbers. Six to eight canes are maintained per plant to fruit the following year. Flowering takes place in mid June in New York. In the fall after fruiting, the spent canes are removed, and a rotation is maintained. This way, canes are never left for more than a year, and plants are maintained as a five to seven foot bush. Aphids, leaf wrinkling mites, birds, cane borers, mildew, and botrytis blossom blight can be pest problems. Tomato ringspot virus has been a problem in the past with *S. n. canadensis* cultivars, but is less of a problem with *S. nigra*.

Harvest

Aronia~ Aronia is mechanically harvested between August and September. Five to ten tons per hectare can be expected in about five years, once plants have matured. Some yield can be expected in the first years, but plants often have weak branches that fall over in the ground.

Elderberry~ Elderberry is picked by hand in the US, although mechanical harvesting is a possibility. Twenty tons per acre are produced in Denmark, while four to twelve tons per acre are recorded in New York. The *S. nigra* cultivars are higher yielding, especially when grown as hedge-rowed bushes. Fruits are picked as whole cymes and frozen until ready to use. A premium is paid for

stemless frozen berries. Harvest takes place from August through September. Flowers can also be harvested around June 15 and sold fresh, or processed. Varieties 'Samyl' and 'Samdal' seem to have expected fragrances for elderflower products.

Products and Uses

Aronia~ Aronia is used to produce syrup, juice, soft spreads, and tea. The tea is usually a blend with other more flavorful ingredients including black currant. The berries are also used to make food coloring.

Elderberry~ Elderberry is also used for food coloring. Both flowers and fruits are used to produce cordials, beverages, soft spreads, wine, tea, and nutraceutical products. Flowers and fruits both have a fresh market in New York and elsewhere. Fresh flowers are used to make fritters, in fruit salad (delightful star-shaped petals), and baked goods. Many folks are saying that elderberry will replace Echinaceae as a top cold and flu remedy.

In summary, both elderberry and Aronia are gaining popularity in the US for their health benefits and quality processed products. Both plants are easy to grow, have few pests, and can have mechanical cultivation practices employed. A number of processors are looking for potential growers to make contracts. Global prices vary, but demand is expected to continue growing as the health benefits of these berries are discovered.

About the Author: Steven McKay is Fruit Extension Educator with the Hudson Valley Fruit Program. He covers a five county area in the Hudson Valley and is located at the Cornell Cooperative Extension office in Columbia County, Hudson, NY. Steven specializes in berry crops and grapes. He is a world-renowned expert on Ribes.

Steven has a B.S. in entomology from U.C. Davis and a M.S. in pomology. He was founder and served as first president of the International Ribes Association.

Steve is owner of *Micosta* a specialty fruit nursery located in Hudson, NY.

He teaches extensively about fruit production for both the industry and homeowners.

For an illustrated version of this article, go to:
<http://www.fruit.cornell.edu/nybn/newslettpdfs/2011/nybn1001.pdf>

(Source: New York Berry News, January 2011)

UPCOMING MEETINGS:

January 29, 2011. *Winter Vegetable & Berry Meetings.* Waltham Field Station, Waltham, MA. The January 29 program will include a half day on soil and nutrient management, reduced tillage including deep zone tillage, and cover crops. Programs run from 10 am to 4 pm. To register and for more information contact John Howell at 413-665-3501, howell@umext.umass.edu, or Ruth Hazzard at 413-545-3696, umassvegetable@umext.umass.edu, or see www.umassvegetable.org.

January 31 – February 3, 2011. *Mid-Atlantic Fruit and Vegetable Convention* at the Hershey Lodge in Hershey, PA. For more information visit www.mafvc.org.

January 31, 2011. *Vermont Vegetable and Berry Growers Assoc. Annual Meeting.* Capital Plaza Hotel, 100 State St. Montpelier VT. For mor info call 802-223-5252 or go to www.capitolplaza.com.

February 8-11, 2011. *7th North American Strawberry Symposium and joint North American Strawberry Growers Association Meeting.* Tampa, Florida. Details available soon.

February 15-18, 2011. Hudson Valley Commercial Fruit Growers' School. Kingston Holiday Inn, 503 Washington Ave. Kingston NY, <http://hudsonvf.cce.cornell.edu/calendar.html#fruitschool>.

February 23-24, 2011 - Ontario Fruit and Vegetable Convention. Brock University, St. Catharines, Ontario For more details visit: <http://www.ofvc.ca/>

March 1-3, 2011. *Harvest New England Agricultural Marketing Conference and Trade Show.* Sturbridge Host Hotel and Conf. Center 366 Main St. Sturbridge MA. For more information and to register go to <https://regonline.activeglobal.com/builder/site/tab3.aspx?EventID=890416>.

March 5, 2011. *Planting, Cultivating, and Marketing Juneberries in the Great Lakes Region.* NYS Agricultural Experiment Station, Geneva, NY. More information available soon.

April 2, 2011. Growing Berries in Tunnels and Greenhouses, Cornell Cooperative Extension Office, 480 North Main St., Canandaigua NY 14424. More info at Nancy Anderson (585) 394-3977 x427 or e-mail nea8@cornell.edu.

June 22-26, 2011. *10th International Rubus and Ribes Symposium, Zlatibor, Serbia.* For more information contact: Prof. Dr. Mihailo Nikolic, Faculty of Agriculture, University of Belgr, Belgrade, Serbia. Phone: (381)63 801 99 23. Or contact Brankica Tanovic, Pesticide & Environment Research Inst., Belgrade, Serbia. Phone: (381) 11-31-61-773.

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