



Berry Notes

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Prepared by the University of Massachusetts Fruit Team

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Crop Conditions and Pest Summary

Strawberry fields are fairly quiet at this time of year. But, irrigation is still very important at this time of year to ensure good crown expansion, runner production and flower bud initiation for next year. Remember to do leaf tissue analysis on renovated fields once foliage has grown back. See last weeks Berry Notes for more information on leaf tissue analysis.

Highbush blueberry harvest is moving into the late season. Hot weather is accelerating fruit ripening. Some growers report high levels of anthracnose in the late varieties. Yields are reported to be good in most areas despite concerns about freeze damage. Blueberry scorch virus is a key concern in the state. Please contact me if your plants exhibit any of the symptoms described in the factsheets listed at www.geocities.com/martinrr_97330/BISVweb/Pestalert.htm, www.oda.state.or.us/plant/ppd/blueberry_scorch.pdf, or www.agf.gov.bc.ca/croplive/cropprot/blsv.pdf. Call me if you don't have internet access to these publications. **Summer raspberry** harvest is winding down especially with this hot weather. Floricane removal should wait until the winter unless spur blight or cane blight are found. Mites (both two-spotted spider mites and European red mites) are flaring up in some locations. Predator releases will help suppress them without the need for sprays during harvest. Call me for sources (413-545-4347). **Fall raspberries** will be ripening soon. Make sure that you have the support trellis installed to prevent lodging of the canes as the fruit sizes up and gets heavier. **Grapes** veraison (berry coloring) is beginning now. Dry conditions in the vineyards are causing some drought stress, especially on young vines. Since no appreciable rain is predicted for the coming week, supplemental irrigation may be needed on lighter soils. Japanese Beetles and mites are active now. Watch for Black rot and Bitter rot.

ENVIRONMENTAL DATA

This information is intended to be used as a guide for monitoring the developmental stages and planning management strategies of pests in your location. Growing degree day (GDD) and precipitation data was collected for the one-week period, July 11 through July 24, 2002. Soil temperature and phenological indicators were observed on July 24, 2002.

Region/Location	Growing Degree Days		Soil Temp (4" depth)	Accum. Precip
	2 Week Gain	Total		
Cape Cod: Barnstable	277	1295	78° F	0.15"
Eastern: Hanson	282	1383	68° F	1.80"
Waltham	335	1655	69° F	1.21"
Central: Boylston	278	1247	65° F	0.82"
Western: Amherst	284	1414	64° F	2.19"
Great Barrington	275	1253	68° F	2.44"

(Source: UMass Extension Landscape Message #19, July 26, 2002)

Strawberries

Strawberry Anthracnose

Kathy Demchak, PennState University

Anthracnose is a serious disease of strawberry that can affect foliage, runners, crowns and, most importantly,

the fruit. In the Northeast, the disease is caused by the fungal pathogen *Colletotrichum acutatum* and it is most likely

introduced into plantings on infected plants. Anthracnose is considered to be a warm-weather disease with an optimum temperature for disease development near 80 F. Therefore, the disease is generally not a problem in the Northeast unless warmer temperatures and rainfall prevail during fruit set and harvest. The spores of the pathogen require free water on the plant surface to germinate and infect, and splashing water to be dispersed. For these reasons, anthracnose is most commonly observed in day-neutral plantings grown on plastic. Once the disease is established in the field, the fungus overwinters on infected plant debris and mummified fruit. Anthracnose may become a problem in subsequent years if the weather is warm and wet.

Symptoms. The pathogen attacks the fruit, runners, petioles, and (supposedly) the crown of the plant; we have not been able to establish crown infections from greenhouse inoculation with New York isolates. On the petioles and runners, dark elongated lesions develop which often girdle the stem. When petioles or runners become girdled, individual leaves or entire daughter plants may wilt and die. On fruit, symptoms first appear as whitish, water soaked lesions up to 3 mm in diameter. As lesions develop, they turn a light tan to dark brown and eventually become sunken and black with in 2 to 3 days. This is known as black spot. After several days, lesions may be covered with salmon-colored spore masses. Infected fruit eventually dry down to form hard, black, shriveled mummies. Fruit can be infected at any stage of development. Both ripe and unripe fruit can be affected. When crown tissue becomes infected, the entire plant may wilt and die. The internal tissue of infected

crowns will be firm and reddish brown (seen by slicing through the crowns). Crown tissue may be uniformly discolored or streaked with brown, and lesions also may produce salmon-colored masses of spores.

Disease management. Anthracnose fruit rot is very difficult to control when environmental conditions are favorable for infection during harvest. Therefore, control measures must begin early in the season. However, it is very difficult to detect the fungus in planting material because it causes latent (invisible) infections and petiole lesions can be quite inconspicuous. Fungicides are only partially effective once the epidemic has become noticeable in the field. Benomyl and captan are labeled for use on strawberries and have shown efficacy against anthracnose. In commercial operations, pesticides should be applied before an expected rain event and in nursery operations when varieties begin to fruit. The following rates are recommended for disease control: Benomyl @ 1 lb/A + Captan 50WP @ 4-6 lb/A (or Captan 80WP @ 3.75 lb/A). Do not apply in combination with, immediately before, or closely following oil sprays. This includes many oil-based adjuvants that are mixed with common herbicides. Apply all materials in 200 gal water/acre to ensure adequate coverage. (Note: In PA, Quadris is labeled for anthracnose control. See the label for rates, use patterns, and precautions, especially concerning use near apple trees. Switch, labeled for gray mold control in PA, also has activity against anthracnose. (*Source: PennState Fruit Times Vol. 21, No. 11 - July 9, 2002*))

Brambles

What causes white druplet disorder of raspberries?

Ted Gastier, Ohio State University

Extreme heat and solar radiation can cause druplets on red raspberries to be white, instead of red. Except for the absence of color, the druplets are otherwise normal. They may occur in groups, or individually, over the fruit. An insect or disease does not cause the problem, and although they look unusual, affected berries are safe to eat. Certain varieties are more susceptible than others. Titan, Comet, Heritage, Willamette, and Chilcotin are among those often affected.

Berries are increasingly susceptible to injury as they turn from green to white to pink. Research suggests that reducing UV radiation alone, without reducing temperature, is likely to reduce injury. When the problem occurs in the greenhouse, applying a whitewash to the glass has helped. Perhaps shading raspberry plants to reduce UV radiation as the berries ripen would reduce the problem in the field.

In addition, tarnished plant bug damage will appear as white druplets. Malformed berries or failed druplets result from tarnished plant bugs sucking juices from developing fruits. Whitening of the damaged druplet results from plant bug feeding on mature fruit. Injured fruit tend to crumble easily and are generally unmarketable. Other plant bug species and stink bugs can cause similar damage. Midwest Small Fruit Pest Management Handbook, http://ohioline.osu.edu/b861/b861_34.html

References:

www.msue.msu.edu/vanburen/rbprob.htm
(An excellent raspberry resource)
www.gov.on.ca/OMAFRA/english/crops/hort/news/hortmatt/2002/06hrt02.htm HortMatters,
(*Source: Ohio Fruit ICM News, Volume 6, Issue 24, July 25, 2002*)

Blueberries

Cane Death Caused by Phomopsis or Botryosphaeria

Gary Pavlis, Rutgers University

[**Editors Note:** Visits to Massachusetts Blueberry fields in recent weeks have presented many cases of shoot die-back on new growth. This article comes from New Jersey in 2000 and describes similar symptoms to what is being found this year in Massachusetts]

Farm visits over the last couple of days have turned up a number of canes dying from what used to be called winter damage. We now recognize that this wilting and death of individual canes during the summer can also be due to Phomopsis. Under severe disease conditions, several canes may be affected on a single bush. This fungus overwinters in infected twigs and canes, and produces infective spores. The greatest number of spores are released during bloom and petal fall and enter twigs or canes through injury sites, particularly those caused by winter damage, mechanical harvesters or early spring frosts.

Samples have been taken from canes suspected of having Phomopsis at several farms. As expected, Phomopsis was confirmed however stem blight, Botryosphaeria, was also confirmed. Like Phomopsis, this fungus enters the plant through wounds and causes rapid death of

individual canes and entire bushes. This disease is especially severe on 1 and 2 year old plants of susceptible cultivars. In the field, the most obvious symptom is called 'flagging', stems recently killed by the fungus do not drop their leaves. It should be noted that stem blight has recently been found most often in the 'Duke' variety.

Control of Phomopsis and Botryosphaeria depends largely on cultural methods. It is important to discourage late-season growth and promote early hardening off thus late-season fertilization, late-season weed cleanup and late-season irrigation should be avoided. Pruning to remove infected stems is the best method of reducing disease in established fields. Pruning serves two functions: 1) removes infections from bushes, preventing eventual death of the plant, and 2) reduces the number of spores released in the field by removing dead, spore bearing stems. Pruning can be done at any time infected stems are observed, but care should be taken to cut well below the infected area. After a stem is removed, examine the cut end of the remaining stem. If any brown areas are visible in this cross-section, a cut must be made further down the stem until all infected tissue is removed. Cleaning pruning tools between cuts is advised. (*Source: The Blueberry Bulletin, Vol. 16, No. 11, June 15, 2000*)

Grapes

Asian Lady Beetle Problem

Bruce Bordelon, Purdue University

The Multicolored Asian Lady Beetles or 'Lady Bugs' as most of us know them have become an indirect pest of grapes. There is a good article in the May-June issue of Wine East magazine. In the past couple of years, we have found them congregating on certain grapes at or near harvest and they tend to stay in the clusters through the crush and pressing operation, leading to a distinctive "LB" odor and flavor to the wine. While a few tasters have actually preferred this herbaceous odor and flavor, most of us have learned to dislike it considerably. Indiana is not alone with this problem. Ohio has also experienced it and they are coordinating research efforts to address the problem. The problem also exists in the wine regions

of Ontario. We have already done a few small experiments and have several more planned for this year. There are many unanswered questions as to the extent of the problem as well as possible solutions. We need growers and winemakers to be our eyes and ear/noses this year. We would like to know when you notice significant numbers of Asian Lady Beetles showing up in your vineyards, what varieties they seem most attracted to, and at harvest, if they are present in harvested clusters. We'll be calling and visiting as many vineyards as possible late this summer and into fall to gather information about this pest. (*Source: Facts for Fancy Fruit, 02-10 July 24, 2002*)

Botrytis Bunch Rot

Bruce Bordelon, Purdue University

Many grape varieties are now at or approaching veraison, a stage when berries begin to change color, soften, increase in sugar content (in other words "ripen"). This is an important time to apply a fungicide to protect against Botrytis bunch. Botrytis is particularly severe on

tight-clustered French hybrids, such as Vignoles and Seyval, and most vinifera varieties, especially Pinot noir, Riesling, and Chardonnay. Proper timing and thorough spray coverage are essential for good control. Direct the spray toward the fruit zone, and use a minimum of 100 gal/A of water.

Removal of leaves around clusters before bunch closing has been shown to reduce losses caused by Botrytis.

Materials: Three products are registered specifically for control of Botrytis. It is important to realize that these fungicides are effective ONLY against Botrytis. They provide no protection against black rot, bitter rot, the mildews, etc. It is also important to remember that these fungicides are prone to resistance development in the pathogen population, so they should be used carefully. The strobilurins (Abound, Sovran, Flint) have shown some activity against Botrytis, but are not as effective at the true botryocides.

Rovral 50 WP is registered for use at the rate of 1.5 to 2 lb./A. Include a spreader-sticker, especially at the 1.5 lb. rate. Do not apply within 7 days of harvest.

Vanguard 75 WG is registered for use at 10 oz./A when used alone, or at 5 to 10 oz./A when used in a tank mix. No more than 20 oz. of Vanguard can be applied per acre per season and it cannot be applied within 7 days of harvest. Vanguard is a system fungicide that resists wash-off and has shown limited (48 hr) post infection activity against other diseases on other crops. It is classified as a

Grape Bitter Rot

Bruce Bordelon, Purdue University

Bitter rot is a common problem in southern Indiana, especially during wet years. Unlike black rot, which does not infect berries once they are past 5-8% sugar content (veraison), bitter rot attacks only mature berries. Both diseases result in black, shriveled (mummified) fruit, and some growers mistake bitter rot for black rot. A "rule of thumb" is that if a rot resembling black rot develops on mature berries (8% sugar or above), the

'reduced risk' fungicide by EPA due to its favorable environmental and toxicological properties.

Elevate 50 WG may be applied at 1 lb. per acre. No more than 3 lbs. of Elevate may be applied per acre per season. Elevate can be applied up to and including the day of harvest (0 day PHI).

NOTE: Growers in Europe and Canada have experienced loss of disease control due to the development of fungicide resistance when more than 3 sprays/year of Rovral were applied over a period of 3-5 years. Vanguard and Elevate are also at risk for fungicide resistance development. It is therefore strongly recommended that Rovral, Elevate, and Vanguard use be limited to a maximum of 3 applications per year to reduce the probability of developing strains of Botrytis that are resistant to these materials. In addition, growers should consider alternating applications of Rovral, Elevate, and Vanguard during the growing season (*Source: Facts for Fancy Fruit, 02-10 July 24, 2002*)

cause is probably not black rot. This late season rot is likely to be bitter rot. The new systemic fungicides (Nova, Bayleton, and Rubigan) are NOT effective against bitter rot. If bitter rot is a problem, pre-harvest applications of Captan may be beneficial. However, infection likely starts at or near bloom, so good coverage in the pre-bloom and 1st postbloom spray is critical. (*Source: Facts for Fancy Fruit, 02-10 July 24, 2002*)

General

BAD BUG SMACKDOWN

Art Agnello, Cornell University

There are many insects present in apple orchards that provide a benefit to growers by feeding on pest species. It is important that growers and orchard managers be able to recognize these natural enemies, so that they are not mistaken for pests. The best way to conserve beneficial insects is to spray only when necessary, and to use materials that are less toxic to them (see Tables 5 and 12 of the Recommends). This brief review, taken from IPM Tree-Fruit Fact Sheet No. 18, covers the major beneficial insects that are likely to be seen in N.Y. orchards, concentrating on the most commonly seen life stages. Factsheet No. 23, "Predatory Mites", reviews mites that are important predators of leaf-feeding mites.

CECIDOMYIID LARVAE (*Aphidoletes aphidimyza*)

This fly (Family Cecidomyiidae) is an aphid predator, and overwinters as a larva or pupa in a cocoon. Adults emerge from this cocoon, mate, and females lay eggs among aphid colonies. The adults are delicate, resembling mosquitoes, and are not likely to be seen. The eggs are very small (about 0.3 mm or 1/85 in. long) and orange. They hatch into small, brightly colored, orange larvae that can be found eating aphids on the leaf surface. These predacious larvae are present from mid-June throughout the summer. There are 3-6 generations per year. In addition to aphids, they also feed on soft-bodied scales and mealybugs.

SYRPHID FLY LARVAE (Family *Syrphidae*)

The Family Syrphidae contains the "hover flies", so named because of the adults' flying behavior. They are brightly colored with yellow and black stripes, resembling bees. Syrphids overwinter as pupae in the soil. In the spring, the adults emerge, mate, and lay single, long whitish eggs on foliage or bark, from early spring through mid-summer, usually among aphid colonies. One female lays several eggs. After hatching, the larvae feed on aphids by piercing their bodies and sucking the fluids, leaving shriveled, blackened aphid cadavers. These predacious larvae are shaped cylindrically and taper toward the head. There are 5-7 generations per year. Syrphid larvae feed on aphids, and may also feed on scales and caterpillars.

LADYBIRD BEETLES (Family *Coccinellidae*)

- *Stethorus punctum*: This ladybird beetle is an important predator of European red mite in parts of the northeast, particularly in Pennsylvania, and has been observed intermittently in the Hudson Valley of N.Y., and occasionally in western N.Y. *Stethorus* overwinters as an adult in the "litter" and ground cover under trees, or in nearby protected places. The adults are rounded, oval, uniformly shiny black, and are about 1.3-1.5 mm (1/16 in.) long. Eggs are laid mostly on the undersides of the leaves, near the primary veins, at a density of 1-10 per leaf. They are small and pale white, and about 0.3-0.4 mm (1/85 in.) long. Eggs turn black just prior to hatching. The larva is gray to blackish with numerous hairs, but becomes reddish as it matures, starting on the edges and completing the change just prior to pupation. There are 3 generations per year in south-central Pennsylvania, with peak periods of larval activity in mid-May, mid-June and mid-August. The pupa is uniformly black, small and flattened, and is attached to the leaf.

- Other Ladybird Beetles: Ladybird beetles are very efficient predators of aphids, scales and mites. Adults are generally hemisphere-shaped, and brightly colored or black, ranging in size from 0.8 to over 8 mm (0.03-0.3 in.). They overwinter in sheltered places and become active in the spring. Eggs are laid on the undersides of leaves, usually near aphid colonies, and are typically yellow, spindle-shaped, and stand on end. Females may lay hundreds of eggs. The larvae have well-developed legs and resemble miniature alligators, and are brightly colored, usually black with yellow. The pupal case can often be seen attached to a leaf or branch. There are usually 1-2 generations per year. One notable species that is evident now is *Coccinella septempunctata*, the seven-spotted lady beetle, often referred to as C-7. This insect, which is large and reddish-orange with seven distinct black spots, was intentionally released into N.Y. state beginning in 1977, and has become established as an efficient predator in most parts of the state.

LACEWINGS (Family *Chrysopidae*)

Adult lacewings are green or brown insects with net-like, delicate wings, long antennae, and prominent eyes. The

larvae are narrowly oval with two sickle-shaped mouthparts, which are used to pierce the prey and extract fluids. Often the larvae are covered with "trash", which is actually the bodies of their prey and other debris. Lacewings overwinter as larvae in cocoons, inside bark cracks or in leaves on the ground. In the spring, adults become active and lay eggs on the trunks and branches. These whitish eggs are laid singly and can be seen connected to the leaf by a long, threadlike "stem". Lacewings feed on aphids, leafhoppers, scales, mites, and eggs of Lepidoptera (butterflies and moths).

TRUE BUGS (Order Hemiptera)

There are many species of "true bugs" (Order Hemiptera) such as tarnished plant bug, that feed on plants, but a number of them are also predators of pest species. The ones most likely to be seen are "assassin bugs" or reduviids (Family Reduviidae), and "damselfly bugs" or nabids (Family Nabidae). These types of predators typically have front legs that are efficient at grasping and holding their prey.

PARASITOIDS

Parasitoids are insects that feed on or in the tissue of other insects, consuming all or most of their host and eventually killing it. They are typically small wasps (Order Hymenoptera), or flies (Order Diptera). Although the adult flies or wasps may be seen occasionally in an orchard, it is much more common to observe the eggs, larvae, or pupae in or on the parasitized pest insect. Eggs may be laid directly on a host such as the obliquebanded leafroller, or near the host, such as in the mine of a spotted tentiform leafminer. After the parasitoid consumes the pest, it is not unusual to find the parasitized larvae or eggs of a moth host, or aphids that have been parasitized ("mummies"). Exit holes can be seen where the parasitoid adult has emerged from the aphid mummy.

GENERALIST PREDATORS

There is a diversity of other beneficial species to be found in apple orchards, most of which are rarely seen, but whose feeding habits make them valuable additions to any crop system. The use of more selective pesticides helps to maintain their numbers and contributes to the level of natural control attainable in commercial fruit plantings. Among these beneficials are:

- Spiders (Order Araneae): All spiders are predaceous and feed mainly on insects. The prey is usually killed by the poison injected into it by the spider's bite. Different spiders capture their prey in different ways; wolf spiders and jumping spiders forage for and pounce on their prey, the crab spiders lie in wait for their prey on flowers, and the majority of spiders capture their prey in nets or webs.

- Ants (Family Formicidae): The feeding habits of ants are rather varied. Some are carnivorous, feeding on other animals or insects (living or dead), some feed on plants, some on fungi, and many feed on sap, nectar, honeydew, and similar substances. Recent research done in Washington has shown certain species (*Formica* spp.) of ants to be effective predators of pear psylla.

• Earwigs (Family Forficulidae): Although these insects may sometimes attack fruit and vegetable crops, those found in apple orchards are probably more likely to be

scavengers that feed on a variety of small insects. (Source: *Scaffolds Fruit Journal*, July 15, 2001)

Demand Increasing for Aronia and Elderberry in North America

Steven A. McKay, Cornell Cooperative Extension

Elderberry and Aronia (chokeberry) are common in different parts of Europe, but seldom seen in the US. This situation is changing as products from these berries begin to appear in shops and superstores. In spite of the high price of the fruit and its primary processed products, very little crop is actually produced in the US. There is only one US Aronia producer, located in Oregon. Several small-scale scattered elderberry growers produce mainly for local consumption. The recent rise in popularity for Aronia is due to a line of juice blends introduced by Wildland brand a few years ago. The juice is doing very well in Costco Wholesale Corporation, Seattle, WA. Elderberry is appearing more and more as it replaces Echinaceae 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.

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, but planting two or more varieties within 60 feet of one another is beneficial. It is assumed that any pair of cultivars will function as mutual pollenizers.

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 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.

Propagation

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, and, of course, seeds that have been stratified.

Elderberry can be propagated from softwood cuttings in June and 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 seed propagation, can also be used for propagation.

Cultural Practices

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 negative effect. Since Aronia is in the Rosaceae family, fire blight is a potential problem, but has not been reported.

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- 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 per plant are kept to fruit the following year. Flowering takes place in mid- June in New York. Following fruiting in the fall, spent and excess canes are removed. This way, canes are never more than a year old, and plants remain five to seven-foot

bushes. 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 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 onto the ground.

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.

Products and Uses

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 - Both flowers and fruits are used to produce cordials, beverages, soft spreads, wine, tea, and nutraceutical products. It can also be used as a natural food coloring. Flowers and fruits are both marketed fresh in New York and elsewhere. Fresh flowers are used to make fritters, in fruit salad (delightful starshaped petals), and baked goods. Many folks say that elderberry will replace Echinaceae as a top cold and flu remedy.

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 be mechanically cultivated and harvested. There are a number of processors looking for growers interested in contract production. Global prices are high, and demand is expected to continue to grow. (*Source: New York Fruit Quarterly, Vol. 9, No. 3, 2001*)

Weather and Ohio Berry Production

Richard C. Funt, The Ohio State University

Winter and spring temperatures have affected Ohio berry production. The record warm temperatures of November and December 2001 and January 2002 were of little concern for Ohio berry growers. However, long term records for thornless blackberry production indicate that early warm winter 2002 temperatures could have resulted in one of the best yields in as many as 40 years. March temperatures dropped below 5 0F and are believed to have caused cold damage to red and black raspberries. Summer type red raspberries were most affected, while fall type red raspberries are normal.

In April, a week of unusually warm temperatures and advanced plant growth was observed, particularly in raspberry, strawberry, and blackberry. Early May brought advanced blooms. On May 22, record low temperatures froze 80% of the exposed strawberry and some raspberry and thorny blackberry blooms. However, developing fruit were not damaged. Frozen black raspberry blossoms were observed for the very first time in over 50 years. However, this was less than one percent of all flowers in Columbus. The frozen blossoms were due to the warm April temperatures and then the May 22 freeze.

In July thornless blackberries have more fruit ready for harvest than ever observed in Ohio. These berries bloomed after May 22 and now have more berries than leaf surface. Some growers indicate less sweetness than last year. Sugars are improved with a balance of fruit to

leaf ratios, full sunlight, and cool morning temperatures 3 to 5 days before harvest. Some blackberry fruit need an extra 1 or 2 days after turning black to achieve full flavor. Therefore, to detect a difference in fruit sweetness one needs to compare an equal level of fruit maturity.

Ohio strawberries were severely affected by the May 22 freeze. It is projected that 2002 yields will be 50% below those of 2001. Many growers did not expect temperatures to reach 270 F and did not protect blooms with overhead irrigation. The low temperature was a 100-year record.

Ohio black raspberry plants were affected early in March, and yields were lower in some cultivars due to cold temperature damage after the plants came out of dormancy. Both black raspberry and strawberry plants have recovered and should grow normally. However, with the recent drought from Route I-70 north, plants need irrigation to produce a full crop for 2003. Many water sources are now stretched beyond their capacity to irrigate without considerable rainfall on a weekly basis.

All berry plants that were set in 2001 and 2002 suffered from being planted late or sitting in water-soaked soils in May of 2001 and May of 2002. Root growth was severely restricted, due to low soil oxygen. In both years, the weather turned hot and dry and root growth was again affected if no irrigation was available. Therefore, some fields will be abandoned in 2002, particularly where irrigation was not available or an insufficient amount of stored water was not on hand.

Ohio berry growers should consider irrigation for all berry types, and particularly where raised beds are used. Secondly, growers need to design a system that can be irrigated over a period of several weeks. July and August have been the two most important months for berry plant development and fruit size over the past 10 years. Ponds

should have enough water to irrigate berry crops for at least 28 days without significant rainfall (recharge the supply). In recent years, more than 35 days have been needed between sufficient rainfall to recharge ponds. (*Source: Ohio Fruit ICM News, Volume 6, Issue 25, August 1, 2002*)

Upcoming Meetings

In-State

Wednesday August 7, 5:00 – 7:30. at New England Small Farms Institute (NESFI) in Belchertown, MA. This meeting will feature information on organic vegetable production. For more information visit the UMass Extension Vegetable Team's website at <http://www.umassvegetable.org/> (follow the links to twilight meetings) or contact: Robert Wick, (413) 545-1045.

Wednesday, August 28 from 5 to 7:30 p.m. at Keown Orchards located at 9 McClellan Road, in Sutton, MA. Features of the tour will include Jane Oliver and Artie Keown's 78-year-old Farm Stand, Farmers' Market and Wholesale operation. Their farm focuses on vegetables and tree fruit, fresh cut flowers, pick-your-own, school tours and special events. Some production techniques include, high density trellised apple orchards, plastic mulch and drip irrigation, and greenhouse season extension. There will be a tour of the farm looking at the greenhouses, orchards and field grown vegetables. For more information visit the UMass Extension Vegetable Team's website at <http://www.umassvegetable.org/> (follow the links to twilight meetings) or contact: Jonathan Bates, (413) 529-9100 for more information.

August 8-11, 2002 Northeast Organic Farming Association (NOFA) Annual Summer Conference at Hampshire College in Amherst, Mass. This year's conference has added a day and features over 150 workshops on a wide range of topics, including basic and advanced organic farming and gardening, animal husbandry, homesteading, herbs and flowers, practical skills, sustainable building, land care, food safety and politics, organic activism, nutrition and health care, spirituality and more. For more information, contact Julie Rawson at (978) 355-2853 or jackkitt@aol.com or visit <http://ma.nofa.org/conferences/summer.html>.

Out-of-State

Tuesday August 13, 2002 Multi-row Sprayer tour to Niagara Peninsula

Andrew Landers is organizing a day-long visit to see 4 different types of multi-row (2-4 row sprayers) at work on 4 vineyards. Meet the owners of these high output sprayers, discuss output/day, spraying regimes, kick the tires, talk to the operators and see how well they have performed this season. We will meet in the parking lot of

the Fredonia Lab at 7:15 AM and carpool to Canada, returning the same day. Please preregister with us by calling 716-672-2191 or e-mail me at hcw5@cornell.edu. There is no limit to registration, but we would like to have firm numbers to plan for lunch and carpooling. Please reply by August 10th. Photo ID required for crossing the border. Andrew Landers has also provided directions to Lakeview Harvesters for those who want to drive up on their own (please preregister with Hans even if you plan on driving up on your own). lenewa.netsync.net/public/events08.htm.

Monday, August 19, 1:00 - 4:00 PM. Geneva Grape Breeding Program Tour and Industry Tasting

Join us at Geneva for a tour of the Geneva Grape Breeding Program vineyards and industry tasting of wines made from varieties soon to be released by the program and advanced selections. Bruce Reisch will start with a guided tour of experiment station vineyards from 1-2:30; Thomas Henick-Kling and Bruce will then host a tasting of wines from the breeding program from 2:30-4:00 in the Food Science and Technology conference room at the Food Science building on the corner of North St and Pre-Emption road. Preregistration is necessary so that we know how many tasting stations to set up. Please preregister by calling our office at 315-536-5134 or by email at tem2@cornell.edu.

Thursday, August 22, 2002 9:00 am - 2:30 pm What Can Precision Agriculture Do For Me?

Sponsored by the Southern Tier West Regional Planning & Development Board

New information technologies can be used to make better decisions about many aspects of crop production. Precision agriculture involves looking at the increased efficiencies that can be realized by understanding and dealing with the natural variability found within a field. The goal is not to obtain the same yield everywhere, but rather to manage and distribute inputs on a site-specific basis to maximize long-term cost/benefit. Applying the same inputs across the entire field may no longer be the best choice.

Location: Center for Regional Excellence, 4039 Route 219, Suite 200, Salamanca, NY

Cost: \$10 (includes lunch)

Registration Contact: bschranz@southerntierwest.org

Massachusetts Berry Notes is a publication of the University of Massachusetts Extension Fruit Program which provides research based information on integrated management of soils, crops, pests and marketing on Massachusetts Farms. No product endorsements over like products are intended or implied.