



New York Berry News

CORNELL UNIVERSITY



Volume 06, Number 1

January 24, 2007

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programs, schedules, registration information and accommodation.

Welcome to our 3 new feature authors this month, Courtney Alexander, Brent Black, and Ingrid Fordham.

CURRENT EVENTS

January 27-28: **NOFA-NY 25th Annual Conference**, "Building the Farm Economy Around Local Foods". For more information: <http://nofany.org/index.html>.

February 9-12: **NASGA/NASS Joint Conference**, Crowne Plaza Ventura Beach Hotel, Ventura, California. For more information: <http://www.nasga.org>.

February 13-15: **Empire State Fruit and Vegetable Expo**, Onondaga Convention Center, Syracuse, NY. Berry session Thursday, February 15 (program in news brief below). For more information: <http://www.nysaes.cornell.edu/hort/expo/>

February 21-22: **The Ontario Fruit and Vegetable Convention**, Brock University, St. Catharines, Ontario, Canada. Berry Session Feb. 22nd. For more information see news brief below.

February 23: **Ontario Berry Growers Association Annual Meeting**, Four Points Sheraton, St. Catharines, Ontario, Canada. For more information contact Kevin Schooley, at 613-258-4587.

February 26-28: **The Hudson Valley Commercial Fruit Growers' School**, Holiday Inn in Kingston, Ulster County. Berry Session Feb. 26th with emphasis on raspberries. For more information: Steven McKay, sam44@cornell.edu.

March 1: **NENY Fruit School** in Lake George. Contact: Kevin Iungerman, kai3@cornell.edu.



New Year's Greetings and welcome to the first issue of NYBN for the 2007 season. We are all fired up and ready to go so look for some great things in the months to come.

One of the most exciting things that will be happening in 2007 is that NYBN will have a new editor. Dr. Kerik Cox has come on board as the new tree fruit and berry pathologist at Cornell-NYSAES, Geneva, and he will be taking over the reins sometime early this year. You can expect all kinds of new and innovative stuff like the web movie featured as part of the blueberry pruning article this month. Who knows, maybe NYBN will take on a whole new look as well! Cathy Heidenreich will continue as a contributing author; you can expect more articles now she will have more time!

In the line up are educational opportunities galore for the winter months including international, national, regional, and state conferences, meetings, and fruit schools. Find information on tap here for meeting

The Empire State Fruit & Vegetable EXPO

Growing
for the Health
of New York



Oncenter Convention Center Syracuse, NY February 13-15, 2007

Sponsored by Cornell Cooperative Extension, New York State Vegetable Growers Association, Inc., Empire State Potato Growers, New York State Berry Growers, the New York State Horticultural Society, and Cornell University

2007 EMPIRE STATE FRUIT AND VEGETABLE EXPO BERRY SESSION

The berry session will be held on Thursday, February 15, from 9:00 AM to 4:00 PM, so mark your calendars now and plan to attend. DEC Pesticide license credits will be available for the middle session (12:40-2:30 PM). Trade show hours will be Wednesday from 8:00 AM and Thursday from 8:00 AM to 3:30 PM. For more information go to:
<http://www.nysaes.cornell.edu/hort/expo/>.

THURSDAY MORNING, FEBRUARY 15

NYS BERRY GROWERS ASSOCIATION ANNUAL EDUCATIONAL MEETING BALLROOM EAST

Sponsored in part by: Dow AgroSciences, Nourse Farms, Valent USA

- 9:00 Welcome and announcements - Craig Michaloski**
- 9:05 Berry pricing strategies and NYSBGA survey results – Marvin Pritts, Cornell**
- 9:30 Pride of New York program benefits for berry growers – Sue Santamarina, Dept of Ag & Markets**
- 9:55 What's new from industry**
- 10:05 Impact of climate change on strawberries in the northeast – Rebecca Harbut, Cornell**
- 10:30 Straw options for New York – William Cox, Cornell**
- 10:45 New York State Berry Growers Association annual business meeting – Craig Michaloski, Chair**
- 11:00 Lunch and visit Trade Show**

THURSDAY AFTERNOON, FEBRUARY 15

NYS BERRY GROWERS ASSOCIATION ANNUAL EDUCATIONAL MEETING BALLROOM EAST

Sponsored in part by: Dow AgroSciences, Nourse Farms, Valent USA

- 12:40 Announcements and DEC credit sign-up – Jim Altemus, Molly Shaw**
- 12:50 Reducing weeds in berry crops - Leslie Huffman, Ontario Ministry of Agriculture**
- 1:15 Fungicides for berry fruit: new and current options - Kerik Cox, NYSAES**
- 1:35 What's new from Industry**
- 1:45 New herbicides for planting year weed control – Chris Benedict, Cornell**
- 2:10 Overview of the biology and management of root weevils – Greg English-Loeb, NYSAES**
- 2:30 Issue DEC credits, break for trade show**
- 3:00 Growing and marketing berries at Brown's Berry Patch – Eric Brown, Brown's Berry patch**
- 3:40 IR-4 Program update for berry crops – Edith Lurvey, NYSAES**
- 4:00 Adjourn**

NEW YORK STRAWBERRY PRODUCTION DECREASES, BLUEBERRY PRODUCTION INCREASES

January 23, 2007. Strawberry production in New York was down 15 percent from 2005 to 4.4 million pounds, according to Stephen Ropel, Director of USDA's National Agricultural Statistics Service, New York office. The value of utilized production is estimated at \$7.48 million, down 7 percent from the \$8.06 million in 2005.

Nationally, the strawberry crop for 2006 was placed at 2.40 billion pounds, up 4 percent from 2005.

New York Fruit Yields			
	2004	2005	2006
Kind	Pounds per acre		
Apples	28,400	22,900	28,400
Peaches	7,060	5,000	8,240
Tart Cherries	5,350	3,750	5,200
Sweet Cherries	2,580	2,280	3,000
Pears	23,600	12,140	22,800
Grapes	9,160	11,480	10,000
Blueberries 1/	2,430	2,000	2,860
Strawberries	4,300	3,500	2,900

1/ Yield based on utilized production

Apple production was up 24 percent to 1.28 billion pounds. Total grape production decreased 13 percent from 2005 to 155,000 tons. Tart cherry production totaled 10.4 million pounds, up 39 percent from the 2005 crop. Pear production was up 88 percent to 16,000 tons, and peach production was up 65 percent to 7,000 tons.

Nationally, in 2006, New York ranked second in apple production, third in grape production, and fourth in pear production and eighth in strawberry production.

Production of blueberries for the Empire State was at 2.20 million pounds. The 2006 crop is valued at \$2.80 million, a 42 percent increase from \$1.96 million in 2005. The U.S. estimate for blueberries is 2.76 million pounds, up 16 percent from the 2.39 million pounds produced in 2005.

The combined value of New York's berry crops totaled \$10.3 million. This compares with the \$10.0 million in 2005.

The 2006 value of New York tree fruit and grape production totaled \$329 million, up 47 percent from the 2005 value. The value of utilized production was above the previous year for all fruits except tart cherries.

Fruit Production and Value 2004-2006

	Production Unit					
	Season	Acres of bearing age	Total Million	Utilized pounds	Price Dollars	Value of utilized production, 1,000 dol.
Apples	2004	45,000	1,280	1,280	0.151	193,560
	2005	45,000	1,030	1,020	0.163	167,400
	2006	45,000	1,280	1,260	0.21	264,900
Tart Cherries	2004	2,000	10.7	10.7	0.409	4,381
	2005	2,000	7.5	7.5	0.432	3,243
	2006	2,000	10.4	10.4	0.311	3,236
Tons						
Sweet Cherries	2004	700	900	890	1,400	1,245
	2005	700	800	740	1,710	1,267
	2006	700	960	860	2,290	1,973
Pears	2004	1,400	16,500	13,900	386	5,370
	2005	1,400	8,500	8,200	499	4,088
	2006	1,400	16,000	15,600	429	6,685
Grapes	2004	31,000	142,000	142,000	226	32,124
	2005	31,000	178,000	178,000	193	34,290
	2006	31,000	155,000	153,000	242	36,972
Peaches	2004	1,700	6,000	5,900	0.717	4,232
	2005	1,700	4,250	4,100	0.69	2,828
	2006	1,700	7,000	6,730	0.667	4,489

Fruit Production and Value 2004-2006

Production Unit						
Season	Acres of bearing age	Total Million	Utilized pounds	Price Dollars	Value of utilized production, 1,000 dol.	
1,000 lbs						
Blueberries	2004	700	2,000	1,700	1.36	2,315
	2005	700	1,500	1,400	1.4	1,963
	2006	700	2,200	2,000	1.4	2,796
1,000 cwt						
Strawberries	2004	1,500	65	65	160	10,400
	2005	1,500	52	52	155	8,060
	2006	1,500	44	44	170	7,480
Total Fruit and Berries	2004	84,000				253,627
	2005	84,000				223,139
	2006	84,000				328,531

The information in this release is available by free email subscription by subscribing to New York reports at www.nass.usda.gov/ny or by e-mailing nass-ny@nass.usda.gov.

HUDSON VALLEY FRUIT SCHOOL BERRY MEETING FEBRUARY 26th, HOLIDAY INN, KINGSTON

Presented by: Cornell Cooperative Extension Hudson Valley Regional Fruit Program of Columbia, Dutchess, Orange, Rensselaer and Ulster Counties.

Walk-in registration is \$30 per day. You save \$\$ by pre-registering this year!

To pre-register, complete and mail the form below with your check to Cornell Cooperative Extension, 10 Westbrook Lane, Kingston, NY 12401.

This form must reach us no later than February 23, 2007 in order to receive the pre-registration discount price.

Please register at the event if your payment will not reach us by February 23rd.

Contact: Jenny at (845) 340-3990 for further information.

PRE-REGISTRATION FORM 2007 Hudson Valley Commercial Fruit Growers School.

Please indicate number of people attending each session:

Monday, February 26, 2007: - Berry Session

_____ attending X \$25.00 (includes lunch, \$30 if purchased at door) \$ _____

_____ attending X \$20.00 (no lunch, \$25 if purchased at door) \$ _____

(Makes check payable to CCE Ulster County) Total Enclosed \$ _____

NAME: _____

BUSINESS NAME: _____

ADDRESS: _____

TELEPHONE: _____

E-MAIL: _____

The Holiday Inn is offering a special room rate of \$83.00 to participants of this conference. Reservations must be made by February 20, 2007 to obtain this rate. Call 845-338-0400 for reservations and mention Cornell Cooperative Extension Commercial Fruit Growers School.

PROGRAM:

9:00-9:15 Registration

- 9:15- 9:30 Overview: Where are we at with berry production in the Hudson Valley and New York State - *Jim Altemus, Secretary, NYS Berry Growers Association and Steven McKay, Extension Educator, Cornell Cooperative Extension (CCE)*
- 9:30- 10:10 The economics and market demand of brambles: red and black raspberries, blackberries, purple raspberries - *Steve Hadcock, Extension Educator, (CCE), and Steven McKay, Extension Educator, (CCE)*
- 10:10-10:40 Health benefits of brambles: A summary of what is known and talking points for marketing. - *Courtney Weber, Associate Professor, Horticultural Sciences, NYSAES Cornell University*
- 10:40- 11:00 Value-added products using raspberries. - *Steven McKay, Extension Educator, (CCE)*
- 11:00-12:00 Season extension for brambles. - *Marvin Pritts, Professor and Chair, Horticulture, Cornell University*
- 12:00- 1:30 Lunch and Networking.
- 1:30-2:15 Variety recommendations for brambles. - *Courtney Weber, Associate Professor, Horticultural Sciences, NYSAES Cornell University*
- 2:15- 3:15 General cultivation practices: site selection and preparation, planting, pruning, trellising , weed control. *Marvin Pritts, Professor and Chair, Horticulture, Cornell University*
- 3:15- 4:00 Insect and disease control - *Greg English Loeb, Associate Professor of Entomology, and Kerik Cox, Assistant Professor of Plant Pathology, NYSAES Cornell University*
- 4:00- 4:15 "Out of the Box": CA storage of berries, season extension, value added products, new packaging concepts,- *Panel Discussion: Mike Biltonen, President, Blue Marble Farms, Steven McKay, Extension Educator, (CCE), Others*

*** DEC Credits Pending *** (probably about 2 Credits)

CELEBRATING THE PAST, SHAPING THE PRESENT, INSPIRING THE FUTURE: THE NYS AGRICULTURAL EXPERIMENT STATION IN GENEVA TURNS 125 IN 2007

Linda McCandless, Director of Communications, Cornell University's College of Agriculture & Life Science, Ithaca, NY 14853s.

GENEVA, N.Y. - The New York State Agricultural Experiment Station (NYSAES) turns 125-years-old in 2007. It will launch a year-long celebration of this milestone event with a reception on January 10, 2007, from 6:30-9:00 p.m. before the annual meeting of the New York State Agricultural Society in Syracuse, N.Y.

"The Geneva Experiment Station officially opened its doors in 1882," said Station director Thomas J. Burr. "We were established by an act of the state legislature to promote agriculture in New York through scientific investigation, and have been working to promote food and agriculture in New York ever since."

The NYSAES's milestone anniversary coincides with two other auspicious events: the 175th anniversary of the establishment of the New York State Agricultural Society, in 1832; and the 200th birthday of Ezra Cornell, one of the two New York Berry News, Vol. 5, No. 11



College of Agriculture and Life Sciences
Cornell University



founders of Cornell University, who was born on January 11, 1807. This coincidence will be celebrated with a 200th birthday party reception and cake cutting on January 11, 2007, at 5:00 p.m., also during the NYS Ag Society meeting. The reception will honor Ezra and the contributions he made to New York State agriculture, and will be hosted by Susan A. Henry, dean of Cornell's College of Agriculture and Life Sciences, and the current Ezra Cornell (the great-great-great grandson of Ezra Cornell [1807-1874]).

The other major 125th celebration for the NYSAES will be a two-day Open House in Geneva on September 14 and 15, 2007. Over 1000 local high school students from the area will tour the Station on Sept. 14, from 10 a.m.-3 p.m., to gain some hands-on appreciation for careers in science. On September 15, the public will be invited to a day-long celebration that will include activities in the Station's labs, greenhouses, pilot plants, and tours of field activities.

"We're already well into the planning stages, said Burr. "We expect from 4,000-10,000 people to attend."

Other participants in the NYSAES Open House will include partners like the USDA-ARS Plant Genetics Resources Unit, the Cornell Agriculture and Food Technology Park, NYS Ag & Markets, the NY Farm Bureau, the NYS Seed Laboratory, the NYS wine industry, the Strong Museum, and various entrepreneurs associated with the Food Venture Center.

Other events in 2007 at which the NYSAES 125th will have a major presence include:

- NY Farm Viability Institute Annual meeting, Feb. 1, Syracuse, N.Y.
- Viticulture 2007, Feb. 7-9, Rochester, N.Y.
- NYS Fruit and Vegetable Expo, Feb. 14-15, 2007, Syracuse, N.Y.
- Cornell University Enology & Viticulture Gala, March 15, NYC.
- Empire Farm Days, Aug. 7-9, Seneca Falls, N.Y.
- Fun on the Farm, Sept 22, location TBD.

There are 46 Cornell University faculty located in four departments at the NYSAES: horticultural sciences, entomology, plant pathology, and food science and technology. Together, they make the NYSAES a world leader in advancing sustainable agriculture and food systems through innovative research, education, and extension.

Since becoming part of Cornell in 1923, NYSAES has gained national preeminence as a center for research focused on the production, protection, and utilization of fruit and vegetable crops, working closely with agricultural, food, and bio-based industries. Over the years, the partnership has generated many billions of dollars for the New York state economy.

"We are looking forward to a great year," said Burr. "Our 125th gives us the chance to get out in front of many consumers and stakeholders to remind them about the important work we do in support of New York State agriculture, and our impact-today and in the future-for turning challenges into opportunities."

For more information on the 125th anniversary celebration, visit: <http://www.nysaes.cornell.edu/hp/125years/>

PHOSMET FINAL DECISION RELEASED

(Editor's Note: Phosmet is an alternative to the organophosphate pesticide azinphos-methyl on several major crops including apples, blueberries, and pears. Azinphos methyl is being phased out over a six-year period due to occupational and ecological concerns.)

January 19, 2007. EPA is issuing its final decision on the restricted-entry intervals for nine uses of the organophosphate pesticide phosmet. Consistent with EPA's June 2006 proposal, most restricted entry intervals will be lengthened and additional mitigation will be implemented to protect workers and bystanders. This risk mitigation will be included on labels of phosmet products sold or distributed by the registrant *after June 2008*. The nine uses include: apples (including crabapples), apricots, *highbush blueberries*, grapes, nectarines, peaches, pears, plums, and prunes.

Additional mitigation includes lower seasonal maximum application rates, prohibition of phosmet application until after certain high-exposure activities have occurred, a 25-foot buffer zone around occupied dwellings for ground applications, a 50-foot buffer zone around occupied dwellings for aerial applications, and health protective entry restrictions for pick-your-own operations. Additional biomonitoring or other data is also required to address remaining uncertainties in the existing database.

After evaluating the risks and benefits of phosmet use, EPA found in its 2001 Phosmet Interim Reregistration Eligibility Decision (IRED) that 36 uses were eligible for reregistration, three uses would be canceled, and nine uses would be available on a time-limited basis for a period of five years, contingent on the submission of biomonitoring and other data by Gowan Company, the sole technical registrant. EPA announced in the IRED that it would reevaluate these uses in 2006 and today's decision completes that process.

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EPA's phosmet decision document and other information about this pesticide are available on the Agency's website at <http://www.epa.gov/opsrrd1/op/phosmet.htm>. Additional information may be found in phosmet docket number EPA-HQ-OPP-2002-0354 at <http://www.regulations.gov> Phosmet Final Decision Released

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PLASTICULTURE STRAWBERRIES: LOOKING OUTSIDE THE BOX

Nate Nourse, Sales Director, Nourse Farms, South Deerfield, Massachusetts

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

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

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

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

While plasticulture has been used to advance ripening times of mid-season varieties, straw mulch can be used to maintain normal season ripening because it covers the plastic, and provides the best winter protection. Here at Nourse Farms all

fields are covered with straw mulch. In spring, we remove the mulch from the middle of rows, exposing the black plastic, which warms the soils for ripening 5-7 days earlier.

Many additional side benefits have also been realized. In wet seasons, water damage is greatly reduced, along with disease pressure. My opinion is that with heavy soils plasticulture practice will reduce root diseases, due to the reduction of excess moisture.

We plan to update our plasticulture guide this fall. Please let us know if we can send you one. We also encourage you to call us and discuss how we can help you design a plan to fit your specific needs.

(Editor's note: The [Nourse Farms Plasticulture Guide](#) is currently being updated as of this printing and the newest version will be available next week. Article reprinted with permission from: Nourse Farms Commercial Newsletter, Vol. XVI, Fall 2006.)

STRAWBERRY PLASTICULTURE NUTRITION RESEARCH UPDATE

[Kathy Demchak](#), Department of Horticulture, Pennsylvania State University

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

1) How helpful are ion meters (aka petiole sap testers or Cardy meters) for monitoring nutrient status? These easy-to-use field-friendly devices can produce a nearly instant determination of plant sap nitrogen and potassium levels, but how reliable are these readings?

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

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

From monitoring the samples as described above, it was found that leaf nutrient levels change rapidly in the spring, but are especially unstable before bloom and after the fruit start to enlarge. The greatest period of stability occurred during the period from early bloom to full bloom. By taking samples then, you may be able to correct certain nutritional problems in time to minimize impact on the current year's harvest.

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

3) How quickly does fertigation affect plant nutrient levels?

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

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

This research was supported in part by agricultural research funds administered by The Pennsylvania Department of Agriculture.



DATES: Wednesday, February 21, 2007, 8:00 am - 6:00 pm
Thursday, February 22, 2007, 8:00 am - 6:00 pm

LOCATION: Brock University - St. Catharines, 500 Glenridge Avenue, St. Catharines, Ontario, L2S 3A1 (905) 688-5550, www.brocku.ca

Entrance to the Convention is through the Walker Complex, main entrance.

Registrations are now being accepted to Canada's premier horticultural event featuring informative sessions, workshops and trade show with close to 150 exhibitors!

DEADLINE FOR REGISTRATIONS IS FEBRUARY 14, 2007.

Pre-register for a chance to win an overnight stay plus dinner for two at the Delta Chelsea Hotel, Downtown Toronto!

BONUS OFFER! Pre-register by February 14, 2007, and receive complimentary lunch and admission to the Taste of Niagara Food & Wine evening reception (February 21).

TO REGISTER BY MAIL

1. Download the Registration Form ([click here to download](#))
2. Complete form and mail with cheque (made payable to: NPF & VGA) to:

NPF & VGA c/o Farmers' Market Ontario
54 Bayshore Rd.
Brighton, ON K0K 1H0

3. Your badge will be available for pickup on site at the Registration Desk.

TO REGISTER BY FAX

1. Download the Registration Form ([click here to download](#))
2. Complete form and (including credit card information) and fax back to: 613-475-2913
3. Your badge will be available for pickup on site at the Registration Desk.

COSTS

Wednesday, February 21, 2007 \$65 (G.S.T. included)	Thursday, Feb. 22, 2007 \$65 (G.S.T. included)	Both Wed. & Thurs. \$95 (G.S.T. included)
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Visa, MasterCard and American Express Accepted.

REGISTRATION INQUIRIES

Please call 1-800-387-3276 or 1-613-475-4769 (Note: 1-800 is only available in Canada)

Berry Session Program Thursday, February 22 - Room 204

Session Coordinators: Pam Fisher, OMAFRA and Kevin Schooley, Ontario Berry Growers Association

The berry crop session is Thursday, February 22, followed by the Ontario Berry Growers Association Annual Meeting Friday, February 23, both in St. Catharines.

The berry program reflects issues on grower's minds after the 2006 season. These issues include marketing, marketing, and marketing. Somehow selling berries at a profit has become a bigger challenge than production and pest management. This year's presentations are sure to stimulate thought, discussion and actions that can improve this situation. Stay on the leading edge of consumer demand by learning about food safety audits, communicating a positive message, and tapping the demand for fresh local flavour.

The Ontario Berry Growers Association is a strong supporter of research in Ontario and several presentations feature the results of such work. By attending this meeting you will be the first to hear results from projects on tarnished plant bugs and day neutral strawberry production. Guest speakers from New York and Michigan will share their expertise on new fungicides and advances in sprayer technology.

The berry program was developed by the Ontario Berry Growers Association education committee and OMAFRA, for strawberry, raspberry and other small fruit growers. Plan to attend the entire program, February 22-23, 2007.

Berry Session Schedule

- 9:30 am **Tarnished Plant Bugs, Up Close and Personal**
Cynthia Rougoor, M.Sc. student, University of Guelph
- Find out about the habits of this pest and how it is affected by management practices. Recent TPB research in both raspberries and day neutral strawberries will be discussed.
- 10:00 am **What Fungicide Do I Choose? Making Sense Of Fungicides For Strawberries And Raspberries**
Dr. Annemiek Schilder, Extension Small Fruit Pathologist, Michigan State University
- Several new fungicides are now registered on berry crops. Effectiveness, resistance management and economics are some of the factors when choosing a fungicide. Learn the strengths of these new products and how to choose the best one for strawberries and raspberries.
- 10:30 am **Learning From Produce Outbreaks: Creating a Culture of Food Safety in the Berry Industry**
Ben Chapman, Ph.D student, Food Safety Network, University of Guelph
- Several recent food-borne outbreaks of illness have captured the attention of media and consumers. How do you avoid negative attention and focus on the positive during a series of unfortunate events?
- 11:00 am **What We Learned from the Berry Food Safety Pilot Project and Food Safety Audits**
Katija Morley, On-Farm Food Safety Technical Specialist, Canadian Horticultural Council (CHC)
- Canadian Horticultural Council The CHC has developed guidelines for food safety in strawberries, and the major buyers are very interested! Learn about grower experiences when the guidelines left the drawing board and were implemented on berry farms.
- 11:30 am **Are you hitting your target? Spraying Strategies That Work for Strawberries and Raspberries**
Dr. Andrew Landers, Pesticide Application Technology Specialist, Cornell University
- If you think sprayer technology hasn't changed in years, this presentation will change your mind. If you think the subject is boring, this speaker will change your mind! Learn how spraying efficiencies can save money and prevent off target damage.
- 12:00 pm **Lunch and Trade Show**

2:00 pm **Local Flavour Plus: Tapping into Consumer Demands for Locally Grown Produce**
Lori Stahlbrand, President, Local Flavour Plus

Local Flavour Plus (LFP) is a non-profit organization that brings farmers and consumers to the table to share in the benefits of environmentally and socially responsible food production. Can growers compete with imports by increasing sales locally?

2:30 pm **Using High Tunnels to Extend the Raspberry Season in to Late Fall**
Mary Catherine Heidenreich, Extension Support Specialist, Cornell University

Researchers at Cornell are studying raspberries, a very promising crop for high tunnels and trying to push the limits of season extension.

3:00 pm **Day Neutral Strawberry Research Review: Results of OBGA Funded Research**
Variety Trials at 3 Locations
Becky Hughes, Manager, Spud Unit, Northern Horticulture, New Liskeard
Agricultural Research Station, University of Guelph

Planting Date and High Tunnel Interactions
John Zandstra, University of Guelph

Day neutral strawberry production could help growers extend their season. These University of Guelph researchers are studying day neutral varieties and management systems with economics in mind.

3:30 pm **Production and Marketing of Day Neutral Strawberries**
Grower Panel

Day neutral strawberries were trendy 20 years ago, but varieties did not meet market demands. Are day neutral strawberries making a comeback? Hear what three growers have to say about the ups and downs of day-neutral production.

Join the Ontario Berry Growers Association (OBGA) on Friday, February 23, at the Four Points Sheraton, St. Catharines, for research updates, marketing initiatives, round table discussions and

BERRIES AS SYMBOLS AND IN FOLKLORE

Courtney Alexander, Department of Horticulture, Cornell University's College of Agriculture and Life Sciences, Ithaca, NY, 14853

Berries often are used to symbolize many different things in literature, art, mythology, and everyday life. It has been thought that the red color of many berries symbolizes life or the blood of mythical creatures. Some of these symbols are positive and uplifting while others are downright scary. What's the folklore and symbolism behind the berries you grow? You might be shocked, intrigued, or have known all along. Go ahead, test your knowledge.

Blackberries have multiple meanings across religious, ethnic and mythological realms. They have been used in Christian art to symbolize spiritual neglect or ignorance. Mid-Mediterranean folklore claims that Christ's Crown of Thorns was made of blackberry runners. The deep color of the berries represents Christ's blood. A legend also exists where the blackberry was once beautiful, but was cursed by Lucifer when he fell into the bush when forced out of heaven. Every September 30th, with the ripening and darkening of the berries, he is thought to re-enter them.

Some folklore associates the blackberry with bad omens. European stories have claimed they are death fruits with ties to Wicca. They can also symbolize sorrow. In an old proverb they signify haste. A man is so excited to pick the berries that he jumps into the bush and the thorns cause him to lose his eyesight. He regains it, however, upon jumping back out of the bush. Greek mythology contains a legend similar to this. When Bellerophon, a mortal, tries to ride Pegasus to Olympus, he falls and becomes blind and injured upon landing in a thorny bush. This is his punishment for trying to take the power of the gods. Therefore, the fruit also symbolizes arrogance.

Elderberries can also be associated with bad omens. Pagan mythology states that all trees have spirits. Those of the elderberry happen to be extremely mean. The destruction of an elder tree would anger the spirits. Burning the elderwood caused evil to come and sleeping under an elder tree would cause dreams of death.

In Victorian flower language, however, an elderberry branch signifies remorse and the blossom: sorrow or zeal. The Christian belief coincides with this theme of sorrow and remorse. It is believed that Judas hung himself from an elder tree. Also, Central Europeans believe that the cross was made of elderwood.

Cranberries also have folklore surrounding them. There are two possible reasons for the common naming of cranberries. Some believe that the name came from folklore that claimed cranes liked them. Others link this naming to the pilgrims of Massachusetts because they believed the blossoms of the berries were shaped like the head of a crane.



Figure 1 Floating Cranberries waiting to be harvested.

Although there is no record that cranberries were eaten at the first Thanksgiving, they are often associated with this holiday and symbolize the “earth’s abundance.” It would have been interesting had these berries been shared at the first thanksgiving, however, because in Victorian flower language, the cranberry blossom signifies that the receiver extend kindness to the giver. The cranberry is also seen as a democratic. In England wealthy people pair it with delectable Venison, but poorer people are also able to enjoy it.

Gooseberries are also associated with a wide range of meanings. Often, when British children ask where babies come from, they are told that they can be found “under a gooseberry bush.” This agrees with the Victorian flower meaning of the blossom: anticipation.

Many phrases have developed over the years which mention gooseberries. In the newspaper business the phrase “great gooseberry season” is used to describe a period where there isn’t much headline news so tales such as the largest gooseberry are published instead. The phrase “playing gooseberry” signifies the third person and possible chaperone of a group where the other two people are dating. The phrase “going gooseberrying” involves stealing clothes that are hanging to dry.



Figure 2 Gooseberries

Currant flowers suggest that the receiver pleased the giver. They were also thought to have health benefits because quinsy was cured with black currants.

The discovery of raspberries is tied to Greek legend. According to this myth, raspberries were discovered while the Olympian gods were searching for berries on Mount Ida. This agrees with their Latin name *Rubus idaeus* which means “bramble bush (of) Ida.”

Raspberries are seen as a symbol of kindness in Christian art. The red juice is thought of as blood which runs through the heart, which is also believed to be the place where kindness originates. Their delicate state in transport has led them to symbolize fragility as well. A tribe in the Philippines also believes that raspberry canes, when hung outside a house, protect the family inside from any souls that try to enter by catching them.

Figure 3 Raspberries



Raspberries are also thought to have many medicinal benefits. Many of these are associated around childbirth and pregnancy. The berries and leaves contain many minerals such as iron, phosphorus, potassium, and magnesium which help enrich the blood by carrying iron from parts of the body such as the liver, spleen, and bone marrow to reproductive organs. English herbalists believed that pregnant women that drank raspberry tea would not experience problems during. Cherokee women drank raspberry juice during labor believing the same thing. Native Americans also believed that it would help with nausea felt during pregnancy. Gargling with the juice was believed to help relieve sore throats. Also, rubbing joints with the canes of the fruit is thought to ease pain.

The strawberry is a berry that is attached to many positive things through symbolism and folklore. The flowers and berries together symbolize righteousness and spiritual merit in Christian art. The structure of the leaves, being trifoliate, represents the trinity. Pagan tradition echoes this in that the three leaves are thought to represent the three-fold Earth or

Mother Goddess. In Victorian flower language, the berry symbolizes perfection and “sweetness in life and character.” It also represents modesty because the berries are often found under the leaves.



F
Figure 4 Strawberries under snow

This description of strawberries agrees with that presented in a Slovakian version of the Cinderella story called “Strawberries in Winter.” In this story a beautiful girl whose father dies is left to live with her step-mother and step-sister and do all of the housework. Meanwhile, her step-sister just has to meet with prospective husbands. The sheer beauty of the “Cinderella”, however, is enough to distract them. The step-sister and mother realize this and begin sending her on what seem to be impossible missions. She is asked to gather violets, strawberries, and apples in the middle of the winter. They do this in hopes that she will freeze outside and not come home. Each time she becomes extremely cold she happens upon the council of the seasons and asks if she can warm herself by their fire. They consent and help her to gather whatever she needs to return home. On the third outing she comes home with only two apples. The step-mother and step-sister devour them. Wanting more, they decide to go out and search for some. They too run into the council of seasons, but warm themselves in the fire without permission and are rude to the members of the council. Knowing who these individuals must be, January sends out a storm of snow and ice, and they never return. This shows that it is better to be like the beautiful sister and the strawberries: modest and “sweet in life and character.”

In mythology, Strawberries are connected to the Norse goddess of love, Freyja. Also, a Norse legend exists where the spirits of children enter the afterlife by hiding in strawberries that are taken to heaven by Frigga, Oden’s wife. This may be related to the Native American view that wild berries are “a special gift of Creation” to children and women. Many Native



Figure 5 Pink Panda Strawberry

Americans believe that during menstruation and pregnancy a woman’s body becomes very toxic. Since they view strawberries and their leaves as blood purifiers and builders, laxatives, diuretics, and astringents, they can be used to cleanse the woman’s body during menstruation and after childbirth.

Berries in folklore and throughout history have had many different meanings. Some are positive and some are not. Now, hopefully you have a bit more knowledge of the possible symbolism behind the berries you grow. If not, at least you can pick the perfect blossom to tell a loved one just how you feel in Victorian flower language.

References

1. Buszek, Beatrice Ross. *The Cranberry Connection: Cranberry Cookery with flavour, fact and folklore, from memories, libraries and kitchens of old and new friends- and strangers.* Granville Centre: Cranberry Cottage, 1977.
2. Haudenosaunee Environmental Task Force. *Words that come before all Else: Environmental Philosophies of the Haudenosaunee.* Native North American Travelling College, 1992.
3. Keding, Dan. *Stories of Hope and Spirit: Folktales from Eastern Europe.* Little Rock: August House Publishers, Inc., 2004.
4. Reed, Mary. *Fruits and Nuts in Symbolism and Celebration.* San Jose: Resource Publications, Inc., 1992.
5. Vitacost. "Berries." 2006. Vitacost. 30 Oct. 2006.
<http://www.vitacost.com/science/hn/Food_Guide/Berries.htm>

(Images courtesy of Dr. Marvin P. Pritts. Some have been altered using Photoshop.)

BIOLOGY AND MANAGEMENT OF STRAWBERRY SAP BEETLE

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The strawberry sap beetle (SSB), *Stelidota geminata*, is a significant insect pest in strawberry and a few other fruit crops in the North East and Great Lakes regions. In strawberries, they have the greatest potential for causing damage where the berries are grown as a perennial in matted rows. The small, brown adults are approximately 1/16 inch in length and appear in strawberry fields as the berries ripen. The adult beetle feeds on the underside of berries creating holes. Beetles prefer to feed on over-ripe fruit but will also damage marketable berries. Of more significant concern, larvae contaminate harvestable fruit leading to consumer complaints and the need to prematurely close fields at great cost to the grower. Current recommendations for control include insecticides (mainly pyrethroids) and field sanitation. Neither approach is working very well. For example, we assessed effectiveness of the pyrethroid fenpropathrin [Danitol 2.4 E.C.] when applied at different timings. Figure 1 shows that for fruit touching the ground, which is where most of the damage occurs, larval contamination was unacceptably high even for plots treated twice during the fruiting period. In another trial, conducted by Harry Humphries at ACDS Research, Inc., even three applications of Danitol, using 200 gallons per acre, did significantly reduce larval or adult populations. The beetles are not resistant to pyrethroids but rather tend to feed underneath fruit where they are unlikely to be contacted by insecticide. Keeping strawberry fields clean of overripe and damaged fruit would probably help reduce SSB problems, but this is difficult to achieve, especially for U-Pick operations. In this article we summarize the results of three years of research to better understand the ecology of SSB and test alternative approaches for management.

Overwintering habitat

SSB spends the winter as an adult. When we started our research, we were not sure where they overwintered, however. In particular, we wanted to know if they overwintered in the strawberry fields. In the early spring of both 2004 and 2005 we took leaf and soil samples from several different habitats on farms with a history of SSB problems. A total of 5 adult SSB were found in the 220 soil cores collected from wooded areas in spring 2004, while no SSB were present in the 480 samples taken from fields of other crops during the same time period. All beetles in the samples came from wooded areas at one farm known to have high densities of SSB. More beetles were found in 2005 after increasing the area sampled from 0.16 m² (wooded area) or 0.26 m² (crops) in 2004 to 2.03 m² in 2005. Beetles were found in both of the two wooded areas sampled, in blueberry, and in

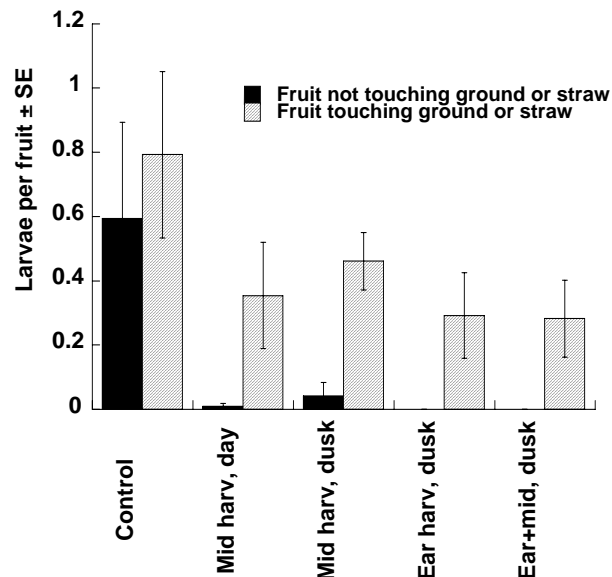


Figure 1. Results of insecticide trial conducted in 2001. Danitol applied at different times during the harvest period and at different times of the day. Larvae were counted for fruit not touching the ground and fruit touching the ground.

raspberry for samples collected before fruiting occurred in the late winter/early spring and after fruit residue was present during the field season (Table 1). No SSB were found in any of the three strawberry fields for the overwintering sample, but beetles were found in samples collected when fruit began to ripen in the field. The absence of SSB from early season samples in strawberry confirms that most, if not all, beetles move into berry fields as fruit ripens. This has important management implications. First, it makes no sense to apply insecticides for controlling SSB before fruit ripening. Second, we may be able to exploit this colonization pattern by intercepting the beetles before they enter the field using traps baited with an attractive lure and an insecticide (see below).

Table 1. Mean total SSB \pm standard error and range for adult SSB collected over the total area (2.8 m²) sampled in each crop or wooded area in 2005.

Crop/Habitat	N	Mean Total SSB ^a (before frt)	Range (before frt)	Mean Total SSB ^a (fruit)	Range (fruit)
Blueberry	3	2.3 (1.2)	0-3	223 (52)	131-312
Raspberry (summer)	2	0.5	0-1	908	566-1251
Raspberry (fall)	1	1.0		194	
Strawberry	3	0.0 (0.0)		178 (149)	25-475
Wooded areas	2	21.5	5-38	NA ^b	NA ^b

^aStandard error of the mean shown only for crops with >2 fields sampled

^bLate season samples were collected only from crops and not wooded areas

SSB alternate food use

The summer generation of adult SSB emerging from strawberry fields may 1) stay in the strawberry field to overwinter, 2) return to woods to overwinter, or 3) search for other sources of food. Beetles emerging from strawberry fields could produce a second generation of beetles if they are able to find an adequate food source. SSB is not considered to be an economically important pest in crops such as apples, raspberries, blackberries, blueberries, cherries, pumpkins, melons, and various vegetables, however SSB adults and sometimes larvae have been reported in these crops. Two studies were conducted to better understand whether SSB reproduction in late season crops contributes to SSB damage in strawberry the following spring: 1) a laboratory assay to evaluate SSB reproduction on potential alternate food crops and 2) a field study to quantify the number of SSB adults per unit area in various crops.

In the laboratory assay, 20 adult SSB were provided with one of the following food sources continuously: apple, blueberry, corn, cherry, raspberry, or strawberry. The larvae, pupae, and adults in each cage were counted after 5 weeks. Although reproduction was much lower on apple and corn, the beetles reproduced on all food sources (Figure 2). The up to 70 fold increase in mean number of SSB in no-choice cages indicates that considerable reproduction can occur on blueberry, cherry, raspberry, and strawberry. Sampling of crops with ripe fruit, including summer-bearing raspberry, peach, blueberry, and cherry, confirms that the beetles are present, often in high densities (up to 109 SSB per m²), in commercial fields during fruiting (see Table 1). In summary, the beetles are able to feed, complete development, and overwinter in habitats other than strawberry. An effective integrated pest management program to control SSB will need to consider the type of habitat surrounding strawberry fields.

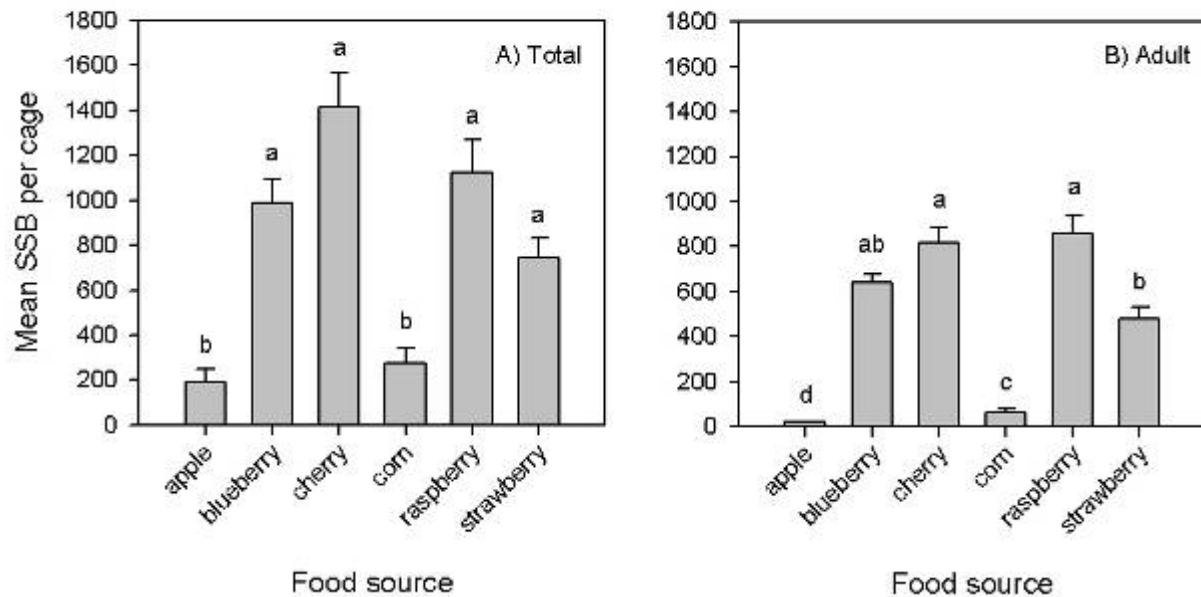


Figure 2. Mean \pm standard error of the mean for A) Total and B) Adult strawberry sap beetles in a no-choice feeding assay. Bars with the same letter are not significantly different at $P < 0.05$.

Time of strawberry plot renovation

A manipulative experiment was used to investigate the effect of time of renovation on the number of SSB emerging from strawberry with the idea that rototilling may kill or wound SSB larvae and pupae before they have time to complete development and leave the field. Plots within a strawberry planting at NYSAES were randomly assigned to either rototilling immediately after mowing (prompt renovation) or rototilling 7 to 10 days after mowing (delayed renovation). Emergence cages were placed in both treatments on the same day and the cages in the delayed rototilling removed briefly on the day tilling was done. Emerging adults were captured with attractive baits in the cages and the total number of adult beetles emerged over five weeks was determined.

Year was the primary factor contributing to variation in the total number of SSB adults emerging, while time of renovation had no statistically significant effect. Peak emergence occurred from late July to early August 2004, while emergence in 2005 resulted in much less of a peak with a smaller number of beetles overall. In contrast to data from Maryland (Dr. Galen Dively, University of Maryland) that showed significantly fewer beetles emerging from plots renovated promptly following harvest, this study suggests that prompt renovation does not consistently reduce the number of emerging SSB, at least in New York. Although prompt renovation does not appear to reduce the number of beetles in the next generation, current recommendations to renovate promptly still have value given other benefits such as improved weed control.

Development of trap-and-kill technique

The finding that SSB does not overwinter in strawberry offers an alternative approach to SSB management. Sap beetles have a male-produced aggregation pheromone that could be included in a trap along with a food odor and insecticide. These traps should be attractive to male and female beetles and would be placed near fields in spring to capture and kill SSB before they enter strawberry fields. In laboratory flight tunnel assays, female SSB are more attracted to whole wheat bread dough when male SSB are present with the dough. We have also had some female response in the flight tunnel of female beetles to volatiles collected from male SSB feeding on bread dough. We are currently working to collect enough of the attractive material to be able to identify the chemical components of the SSB specific aggregation pheromone and to begin testing blends of synthetic pheromone in our flight tunnel. The research summarized here will be used to guide placement of attract-and-kill stations to maximize the impact of traps in reducing the SSB population and fruit damage, while minimizing the cost of using the traps for controlling the beetle.

Acknowledgements

The research summarized in this article was supported, in part, by grants from the New York Berry Grower's Association, USDA CREES Northeast Regional IPM Program (#2004-34103-14379) and Federal Formula Funds provided by USDA and distributed by Cornell's College of Agriculture and Life Sciences. We are appreciative of the assistance of a number of technicians, summer employees, the NYSAES Farm Crew and colleagues at Cornell, Pennsylvania State University, and University of Massachusetts as well as cooperating fruit growers in New York, Pennsylvania and Massachusetts.

Rebecca Loughner is completing her Ph.D. in Entomology at Cornell University and Greg Loeb is research and extension professor of entomology at Cornell's Geneva Experiment Station.

Editor's Note: reprinted with permission from: 2006. English-Loeb, G. and Loughner, R. *Biology and Management of Strawberry Sap Beetle*. Proceedings handout at the 2006 Great Lakes Fruit and Vegetable Expo. 5 December 2006, Grand Rapids, MI. Also available as pdf at <http://www.glexpo.com/abstracts/2006abstracts/Berries2006.pdf>, pg 5-8.

AUTUMN OLIVE: WEED OR NEW CASH CROP?

Dr. Brent Black, Utah State University, and Ingrid Fordham, USDA-ARS Fruit Laboratory, Beltsville, MD 20705

Autumn olive (scientific name: *Elaeagnus umbellata*) is a large shrub growing 10 to 15 feet tall and up to 20 feet across. Plants are readily identifiable by the distinct silvery color of the leaves, particularly on the underside, the small pale-yellow fragrant flowers that emerge in April, and the red berries that ripen in autumn (Figure 1). Other common names for the plant include: autumn elaeagnus, asiatic oleaster, umbellate oleaster, aki-gumi and Japanese silverberry. Native to China, Korea and Japan, the plant was originally brought to North America in 1830. The plants are relatively fast growing, tolerant of drought, saline soils, and of soil pH ranging from alkaline to acid. The roots also form a nitrogen-fixing symbiotic relationship with Frankia bacteria, similar to the relationship between legume plants and Rhizobia. These characteristics make autumn olive particularly adapted to low-fertility loamy and sandy soils. As a result, the plants were distributed by the U.S. Soil Conservation Service and planted widely for windbreaks, and to attract wildlife. Mature shrubs can produce large numbers of small (0.3 inch diameter) red fruits that ripen in September and October. The fruit have a unique sweet-tart flavor when ripe, but human consumption in the U.S. is limited. Birds are attracted by the ripe fruit and subsequently scatter the seeds. As a result, wild plants are found growing throughout the Eastern U.S. In the mid-Atlantic region the shrubs are commonly found along roadsides and fencerows.



Figure 1. Autumnberry with ripe fruit.



It was recently discovered that the fruit contain high amounts of lycopene, a carotenoid pigment most commonly associated with tomato. Lycopene content of autumn olive fruit averages about 40 to 50 mg/100g, compared to 3 mg/100g for fresh raw tomato and 10 mg/100g for canned whole tomato (Figure 2). Lycopene is considered an important phytonutrient, and is thought to prevent or fight cancer of the prostate, mouth, throat and skin, and to reduce the risk of cardiovascular disease. Because of the high lycopene levels in autumn olive fruit, and the potential health benefits of this phytonutrient, there has been increased interest in commercial fruit production.

There are varieties available commercially that were selected for fruit quality and are sold for edible landscaping (Hidden Springs Nursery, Cookeville, TN). The USDA-ARS Fruit Laboratory has also accumulated a collection of clones that may have superior properties for commercial fruit production. In a low-input planting at Beltsville, Maryland, commercial varieties and USDA selections have produced a substantial crop of fruit in the third year. Management inputs included irrigation during initial establishment, mowing row middles, and some pruning to facilitate harvest. Except for spot-applications of herbicide for weed control, no pesticides or fertilizers have been used in the planting. Except for some mid-summer Japanese beetle feeding, and 17-year cicada damage, there has not been any notable disease or insect problems. Among the

better varieties and selections, annual yields in the 3rd to the 5th year have ranged from 9 to 35 pounds per plant (machine-harvested). With spacing of 360 plants per acre (12' between rows by 10' within row), this equates to 3,600 to 12,600 pounds per acre. These yields are despite damage from a tornado, a tropical storm and a seventeen-year cicada hatch.



We have successfully machine-harvested these plants for the past three years. A commercial blueberry-harvester (Korvan model 930) efficiently defruited properly pruned plants when set to a vigorous shake. Some pruning was required for shrubs to pass through the harvester. The fruit can also be efficiently harvested on a small scale using a bat or club to beat the branches, and catch frames or tarps to collect the falling fruit.



Unripe fruit is very astringent due to high tannin content. The deep red color often develops before the fruit is fully ripe. During ripening, tannins and acids decrease and the sugar content increases. The best method for determining fruit ripeness is taste testing, or watching for bird feeding in the upper branches. Ripe fruit can be processed into a number of products including salsa, steak sauce, meat glaze, pie filling, ice cream topping, jams and preserves. Each fruit contains a single seed or pit that constitutes about 10% of the total weight of the fruit. For best results, the seed should be removed from the pulp during processing. We have had success separating the seeds by cooking the fruit and pressing the pulp through a screen designed for home processing of grape. Lycopene is soluble in oil, but not water or alcohol and therefore stays in the pulp and does not come out in juice or wine.

Marketing of fruit products will require some consumer education as the fruit is not a part of the traditional diet of most ethnic groups in the U.S., although it is consumed somewhat in China, Japan and Korea, where it is valued for its perceived health benefits. Further, none of the currently used common names connote a fruity flavor. The name 'Autumnberry' has been suggested as a more palatable alternative.

Plants do not spread by root suckering, but can be quite persistent once established, growing back from the roots when cut down or mowed off. Due to this persistent nature, seed dispersal by wildlife, and the ability to thrive in poor soils, some states have now listed autumn olive as an 'alien invasive' species. Therefore, we do not recommend planting autumn olive on your farm if it isn't already established in your area. However, if it is established in your area, you might consider autumn olive as a source for organically produced ingredients of healthy, flavorful products, and therefore a potential source of cash.

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(Reprinted with permission from: Black, B.L. and I. Fordham. 2005. Autumn olive: Weed or new cash crop? Proceedings of the Mid-Atlantic Fruit and Vegetable Convention. 2:15-16.)

Editor's Note: Dr. Fordham is now retired from her position at USDA. A more detailed article on Autumnberry production and its potential as a cash crop is available from the same authors in the Journal of the American Pomological Society Vol. 59(3): 125-134. 2005.

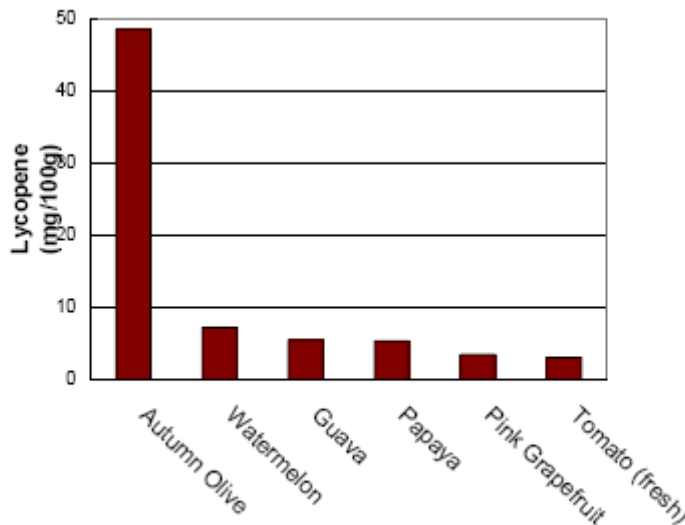


Figure 2. Sources of dietary lycopene.

BLUEBERRY PRUNING BRUSH-UP - NO PUN INTENDED!

Cathy Heidenreich, Department of Horticulture, Cornell University's College of Agriculture and Life Sciences, Ithaca, NY 14853

Pruning is one of the few small fruit chores commonly occurring at this time of year. It is also the most "hands-on" task associated with blueberry production, other than harvesting or planting. How to get the most bang for your buck in terms of pruning? Take a minute to review key concepts below before you prune. Fine tune your pruning strategy accordingly to maximize efficiency and minimize cost expenditures both now and later in the season.

Why Prune?

Is pruning just another item on your production schedule to be checked off, or do you really take time to consider what you hope to achieve by pruning? This season, re-focus on the reasons why we prune blueberries. Pruning dollars have direct and indirect impacts on fruit dollars for the current season, and over the life of the planting. Below are some of the benefits of pruning:

1. Maintains bush productivity and vigor through elimination of older, less productive canes and rejuvenation of new cane growth.
2. Facilitates harvest by developing appropriate growth habit.
3. Increases air circulation, reducing conditions favorable for disease development.
4. Reduces fruit numbers and opens canopy to sunlight, improving sweetness and fruit size.
5. Removes winter-injured, damaged, insect-infested, or diseased plant parts.



Before You Prune

Get your equipment assembled and ready to go. Sharpen all blades. If you are using pruning guns, be sure equipment is fully operational and carry out any routine maintenance that may be needed.



Decide on a pruning schedule, based on your particular planting(s). What variety or planting will you do first? Does this particular variety need special pruning? Pruning stimulates vegetative growth. It follows, then, that weaker bushes will benefit from more pruning than vigorous bushes; they may also require detail pruning as opposed to complete cane removal. Special consideration is needed for varieties with spreading habits. In this case you may be tempted to remove all those canes sprawling into alley ways; care must be taken to leave sufficient canes for fruiting.

Is this a young planting you are pruning for training purposes? Is it an older planting that needs to be rejuvenated? How many canes should be removed from each plant? Are there insect or disease issues that maybe re-dressed through detail pruning? How

will brush from prunings be dealt with?

On to the Main Event

In general, prune to an upright growth habit with an open canopy allowing good light penetration. Do this in four easy steps. First, remove any damaged canes, i.e. winter injury, insect or disease damage, or breaks. Second, remove canes that rub against another cane, to prevent spread of canker diseases. Third, remove older canes and those canes obstructing movement through the alleys. Fourth, remove any short, branched canes within the canopy; fruit on these interior canes generally ripens too late to be harvested. Cut canes to be removed as close to the crown as possible. Avoid leaving stubs which become ideal homes for canker-causing fungi. When branches are removed, make cuts as close as possible to the main cane; avoid leaving short, stubby branches for the same reason.

Plant Stage	Pruning suggestions
1-2 year old plantings	Little pruning required. Promote vegetative growth by rubbing off flower buds in March or April. Alternatively prune off shoot tips where flower buds are located.
3 year old plantings	IF more than 2 new canes were produced previous year, leave the 2 healthiest new canes; remove the remaining new canes.
3-8 year old plantings	Continue light pruning, leaving the 2-3 best new canes from previous season, until plants reach full size. Eight year old plants should have 10-20 canes of various ages.
> 8 year old plantings	Annual removal of 8 year old canes. In general, 20% of older wood (1 out of every 6 canes) may be removed without reducing yield. Berry numbers may be lower but fruit will be larger in compensation.
Plantings needing rejuvenation	Strategy 1: Remove old, unproductive canes, leaving 2 or 3 older canes and all younger canes. IN successive years, remove up to 20% older wood until new cane growth occurs. Keep 2-3 new canes and continue to remove 20% oldest canes. Strategy 2: Cut all canes to ground level (delays harvest 3 years). Thin new canes to most vigorous 6-10 canes. Strategy 3: Summer hedge immediately after harvest; selectively remove dormant canes.

Pruning to reduce disease and insect pressure

One of the benefits of pruning referred to above is reducing disease and insect pressure. Disease pressure reduction in blueberries is a one-two punch, when it comes to pruning. Two of the most common blueberry canker diseases, *Fusicoccum* (Figure 1) and *Phomopsis* (Figure 2), overwinter in cankered wood. These fungi are also particularly adept at colonizing dead wood, particularly pruning stubs. Removal of cankered canes and avoiding cane or branch stubs during pruning will reduce the number of new infections occurring during the season. Prune out and burn diseased canes and branches, taking care to remove all infected (brown) tissue below the cankers. Cultural practices (maintaining plant health, minimizing winter injury and early spring frost damage) and pruning out dead wood are more important in controlling canker diseases than sprays, so now is your chance! Canker disease severity and spread may be further minimized if new cankers are pruned out as they appear during the growing season.

Pruning further reduces disease development by maintaining an appropriate growth habit and opening the canopy. Cane, leaf, and fruit surfaces dry more quickly when good air circulation occurs throughout the canopy/planting, minimizing conditions favorable for disease development. This is true not only for canker diseases, but other blueberry diseases as well.



Figure 6. *Fusicoccum* cankers on cane.



Figure 7. *Phomopsis* canker, sometimes mistaken for winter injury. Inset: Close-up of fungal spore-producing structures on cane surface.

A report of another, less common blueberry disease also surfaced this past season, blueberry crown gall (Figures 3 and 4). This disease is a sporadic problem and is not frequently seen in New York plantings. It is caused by the bacterium, *Agrobacterium tumefaciens*, and may occur in propagation beds and young plantings. It is sometimes found in older plantings as well. If you happen to have this disease in your planting, take some of these precautions during pruning: 1) Prune bushes during dry weather, 2) Frequently disinfect pruning equipment. A 10% bleach solution or 70% ethyl alcohol (shellac thinner) solution works for this purpose, and 3) Remove and destroy diseased tissue.



Figure 3. Bush infected with blueberry crown gall.



Figure 4. Close up of gall on cane. (Pictures courtesy W. Bertram)

Insect pressure may also be reduced through good pruning practices. Scale insect infestations are more frequently found in poorly maintained bushes. Good pruning practices go a long way toward reducing scale insect problems. Keep an eye out for the hard -covered female insects on small twigs and branches while pruning (Figures 5 and 6). If scales are present, schedule a dormant oil spray for early spring during bud swell.



Figure 5. Scale insects on blueberry cane.
(Pictures courtesy G. Loeb, NYSAES-Cornell)



Figure 6. Scale on young twig.

Insect stem galls were particularly prevalent on blueberries during the 2006 growing season and several growers reported problems with this insect pest (Figure 7). The tiny wasps overwinter as larvae in the galls (Figure 8). Adult wasps emerge in early June and lay eggs on twigs, causing new galls. Currently there are no products available for control of this insect. Your only recourse in this instance is to prune out and burn the galls now to reduce your insect stem galls next season. Watch during mid to late June and July for new galls. Prune out and destroy them as they appear. (See a movie on this pest at <http://www.nysaes.cornell.edu/pp/extension/tfabp/movies.htm>.)



Figure 7. Older stem gall with emergence holes; younger galls to the left and below.
(Picture courtesy K. Cox, Cornell-NYASES)



Figure 8. Insect stem gall with overwintering larvae.
(Picture courtesy J. Burth, Oswego County CCE)

Final considerations

Brush removal is an important part of the pruning process. Several options are available depending on the layout of your plantings and available equipment. One method is to chop brush in place using PTO driven equipment such as Bush Hog or a flail mower. Another option may be to push brush out of alleyways and burn, chop, or chip it off site.

Is the job done? Not quite. What remains is to take time next fall and winter to evaluate how well your pruning strategies for the 2007 worked, and determine what needs to be done in 2008 to keep those pruning dollars yielding better blueberries, and returns on your investment.

References:

1. Pritts, M.P. and Hancock, J.F. (eds.) 1992. Highbush Blueberry Production Guide. Northeast regional Agricultural Engineering Service, Ithaca, NY.
2. Caruso, F. and Ramsdell, D.C. (eds.) 1995. Compendium of Blueberry and Cranberry Diseases. APS Press, St. Paul Minnesota.
3. Pscheidt, J.W. 1996. Blueberry Crown Gall. <http://plant-disease.ippc.orst.edu/disease.cfm?RecordID=179>.
4. Schilder, A. and Cline, W. 2003. Michigan Blueberry Facts - Crown Gall. <http://www.blueberries.msu.edu/crowngall.htm>.

Check out the NYSAES Tree Fruit and Berry Pathology web site at:
www.nysaes.cornell.edu/pp/extension/tfabp

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