New York Berry News

CORNELL UNIVERSITY

Volume 07, Number 4 April 3, 2008

What's Inside

There's the wind-up, and the pitch! Get ready to hit a homerun this growing season with help from NYBN. This issue includes lots of pregame strategies to help get you batting a 1,000 right off the bat! (OK, bad pun...). Seriously, the April issue is packed with last minute educational opportunities, events, news briefs, seasonal reminders, new product information, pest management recommendations, information on new production systems, and more.

We welcome new author Dr. Fumi Takeda, research horticulturalist from the USDA ARS Appalachian Fruit Research Station in Kearneysville, West Virginia. His article is a summary of a talk he gave at the Empire EXPO in Syracuse this February on RCA trellising and training of blackberries. Watch for another article by Dr. Takeda on plasticulture strawberries in the May issue.

CURRANT EVENTS

April 9, 2008. 9am – 12pm, *Berry Brush-Up* Course – Sponsored by Broome, Chenango, Cortland, Tompkins and Tioga Counties, Broome County CCE, Binghamton, NY. 2 DEC recertification credits available for categories 1a, 10, and 22.

April 9, 2008. *Implementing Good Agricultural Practices (GAPS)* – At home from your computer! See news brief below for details.

April 11, 2008. *Introduction to Berry Growing Workshop*. Hamden, NY 9 AM to 12 noon. See news brief below for details.

April 12, 2008. *Introduction to Berry Growing*, 8:30 am to 11:00 am, Cornell Cooperative Extension Center, 480 North Main Street, Canandaigua, NY 14424. Fee: $10.00 per family. To register or for additional information contact Cornell Cooperative Extension at 585-394-3977 x427 or x436.

April 22, 2008. *Small-Scale Small Fruit Growing: an Overview*. 6:00-8:00 pm, Cornell Cooperative Extension of Chenango County Office- 99 N. Broad St. in Norwich. Cost: $10 See news brief below for details.

April 24, 2008. *New Berry Grower Class* , 6:30 -9:00 pm, Warren County CCE office, 377 Schroon River Road, Warrensburg, NY. Contact Laurel Gailor for registration information - 623-3291

May 3, 2008. *Introduction to Berry Growing*, Putnam County CCE, class at Cascade Farms, Patterson, NY. **For more information** see flyer below or contact Diane Olsen, 845-278-6738.

July 14-16, 2008: *The 9th International Vaccinium Symposium* will be held at Oregon State University in Corvallis. In addition, a pre-conference tour is scheduled to tour blueberry, cranberry, and lingonberry production in the area. Although this is a scientific meeting with researchers from all over the world presenting, some industry members may wish to attend. **Early registration ends April 11**. For more information: http://oregonstate.edu/conferences/vaccinium2008/.

June 22-26, 2009: *The 10th International Rubus and Ribes Symposium. Zlatibor, Serbia*. More information to come.

THE NATIONAL GAPS PROGRAM AT CORNELL UNIVERSITY AND ECORNELL

Elizabeth Bihn, GAPs Program Coordinator, Cornell University, Department of Food Science, Ithaca, NY 14853

The National GAPs Program at Cornell University with funding from the *National Integrated Food Safety Initiative*, CSREES, USDA, has joined with eCornell to bring you a three-week online course on Implementing Good Agricultural Practices (GAPs). This course will provide an engaging learning experience through a combination of rigorous and relevant coursework, stimulating discussions with your fellow learners, enriching facilitation by a subject-matter expert, and a flexible course structure that lets you work when and where it is convenient for you. In this online course you will learn important practices for ensuring the safety of fresh produce and the key considerations for implementing Good Agricultural Practices (GAPs). At the end of this course, you will develop a produce safety plan that outlines the activities needed to implement functional GAPs.

The first course begins April 9, 2008. Registration for the course is open now and is limited to 25 people, so don't wait! As a bonus, there will be no fee for taking this course due to grant funding from the USDA National Integrated Food Safety Initiative*. Follow this link to the registration page http://www.ecornell.com/gaps . You will be registering through eCornell, our partner in this course and an experienced online learning company. If you are not able to register for this class, there are several more eclasses to be held in the future.

Contact Elizabeth Bihn (eab38@cornell.edu) and you will be notified when registration for the next class opens.

**National Integrated Food Safety Initiative (Grant # 2006-51110-03632) of the Cooperative State Research, Education, and Extension Service, United States Department of Agriculture.*

INTRODUCTION TO BERRY GROWING

APRIL 11TH WORKSHOP

Friday, April 11, 2008
9am – 12 noon
(Snow Date – April 18th)

Cornell Cooperative Extension of Delaware County will host a morning workshop for beginner berry growers on Friday April 11, 9 a.m. to noon. In the case of bad weather, the workshop will be postponed and held on April 18th. This program is made possible through a grant from the New York State Farm Viability Institute received by Cornell University.

Cornell Berry Extension Support Specialist, Laura McDermott will discuss the keys to successful commercial and non-commercial berry farming including: marketing; startup costs; site selection; site preparation and layout; cultivar selection and planting; crop production; fertilizing; pest management, trellising, irrigation; and labor.

The talk will focus on strawberries, brambles and blueberries but currants, gooseberries and other minor fruits will be included in discussions. Printed materials are included in the presentation and production guides for brambles, highbush blueberries and strawberries will be available to examine for ordering.

This is a great chance to meet Cornell's Berry Specialist for Eastern, New York and learn the latest information on New York berry production. Experienced growers, new growers and home garden berry enthusiasts are encouraged to attend.

Fee: $10 per farm or family for handouts and refreshments. Pre-registration and pre-payment are required by April 4th to assure notification of any change in scheduling. Phone 607-865-6531 for registration, questions or special needs; or e-mail Janet Aldrich: jla14@cornell.edu. Make your check out to "Cornell Cooperative Extension" and mail to: Cornell Cooperative Extension, P.O. Box 184, Hamden, NY 13782.

NASGA 2008 SUMMER TOUR

Mark your calendars!

Steve Polter and his colleagues in Ohio have been working hard to plan this summers summer tour based out of Columbus Ohio. We have secured a hotel for the event and you should be able to call in now and make a reservation. The dates for the summer tour are Wednesday August 20th and Thursday 21st.

HOTEL LOCATION:
Drury Inn & Suites Columbus Convention Center
88 East Nationwide Blvd., Columbus Ohio 43215
TELEPHONE: 614-221-7008

Farms confirmed to date include Champaign Berry Farm, Mutual, OH, The Blueberry Patch, Lexington, OH, Polter's Berry Farm, Fremont, OH and Rothschild Farm, Urbana, OH.

Champaign Berry Farm, Mutual, OH
Champaign Berry Farm has grown from a family-owned farm with only five acres of berries in 1995 to its current acreage of 28 in 2004.

The Pullins family grows 27 acres of raspberries and half an acre of blueberries and half an acre of blackberries. About 60% of raspberry sales are Pick Your Own.

The Blueberry Patch, Lexington, OH
Now in their 26th year of business, and calling themselves "Ohio's Premiere Blueberry Plantation," the Blueberry Patch grows 16 varieties of blueberries, red raspberries, and variety of plants.

They also have an extensive nursery and greenhouse with more than 250 varieties of hostas and shade-loving plants, plus perennials, annuals, and herbs.

There is also an extensive gift shop, featuring jewelry, candles, crafts, handbags, pottery, specialty foods, toys, and much more. Fortunately, travelers can sit and rest with refreshments at Blossom's Cafe, making this a "must stop" in North Central Ohio.

Polter's Berry Farm, Fremont, Oh
Our host here is past NASGA President Steve Polter and his family, inviting you to see more than 2,000 acres of family farm. While much of the farm is in grain crops, the Polters wholesale red cabbage (120 acres), pumpkins (150 acres), peppers (30 acres), and picking cucumbers (40 acres).

Polter's Berry Farm has 8 acres of strawberries grown using a modified version of matted row culture using eastern adapted varieties, and another 5 acres using a plasticulture system.

For more information: Kevin Schooley, 30 Harmony Way, Kemptville, ON, Canada K0G 1J0, Tel. 613 258-4587, fax 613 258-9129, kconsult@allstream.net, or go to: http://www.nasga.org/.

SMALL-SCALE SMALL FRUIT GROWING: AN OVERVIEW

April 22, 2008
6:00-8:00 PM

Location:
Cornell Cooperative Extension of Chenango County Office
99 N. Broad St.
Norwich, NY 13815

Introduction to growing berries, brambles, and other small fruits on a small scale in Central New York. Soils, management, varieties, and basic pest control.

Presented by:
Cathy Heidenreich
Western New York Berry Extension Support Specialist
Department of Horticulture
Cornell University's College of Agriculture and Life Sciences

Cost: $10. Call 607-334-5841 for more information.

Introduction to Berry Growing

Saturday, April 26, 2008
9:00 am to 12:00 pm

Cornell Cooperative Extension
401 North Main Street
Warsaw, NY 14569

This workshop will be most useful to beginning berry growers and home gardeners.
Strawberries, brambles, blueberries, currants and gooseberries will be included in the discussions.

Presenter: Cathy Heidenreich, Cornell Berry Extension Support Specialist
Department of Horticulture, College of Agriculture and Life Sciences, Cornell University

The workshop will cover keys to successful berry growing:

- Marketing
- Startup costs
- Site selection
- Preparation and layout
- Cultivar selection and planting
- Crop production and management
- Labor and profitability
- Nutrient management
- Weed, insect and disease management
- Trellising
- Irrigation and more

Fee: $10.00 per family.
For additional information, contact: Ag office, Cornell Cooperative Extension at 585-786-2251

Registration Form for Introduction to Berry Growing

Name: _____

Address: _____

City, State, Zip: _____

Phone: _____

Amount enclosed: _____

Make check payable to: Cornell Cooperative Extension
Mail to: Cornell Cooperative Extension
Berry Workshop
401 North Main Street
Warsaw, NY 14569

Want to Grow Berries? Start Here.

A Free Workshop for Growers!

Saturday, May 3, 2008
8:00 am — 1:30 pm
Cascade Farm, Patterson, NY

Learn how to increase your farm's profitability with popular and high-end berries: blueberries, raspberries, currants, elderberries and more.

Agenda

8:00-8:30 **Registration and farm breakfast**

8:30-8:45 **Introduction and welcome**

8:45-11:00 **Marketing, site selection, profitability & berry cultural considerations**
Laura McDermott, Cornell University, Berry Extension Support Specialist

11:10-12:00 **Local experience and the CSA concept**
Educators of Cascade Farm, Patterson NY

12:10-12:30 **Agricultural Regulations & Processes in Putnam County**
Marjorie Thorpe, Chair, Putnam County Agriculture & Farmland Protection Board

12:30-1:00 **Soil considerations, water protection**
Lauri Taylor, Putnam County Soil & Water Conservation District

1:00-1:15 **How to use Cornell Cooperative Extension**
Dianne Olsen, Extension Resource Educator, Horticulture & Natural Resources

Free blueberry seedling to the first 25 participants, provided by the Putnam County Soil & Water Conservation District

More information? See our website at www.cce.cornell.edu/putnam or Call 845-278-6738.

This workshop is sponsored by:

Putnam County Agriculture & Farmland Protection Board

Cornell University Cooperative Extension Putnam County

NEW YORK STATE Integrated Pest Management PROGRAM

Cornell Fruit Resources

We also thank Cascade Farm for its cooperation

And received its funding from:

NYFVI NEW YORK FARM VIABILITY INSTITUTE, INC.

N.Y. State Berry Growers Association

Registration: Send to Cornell Cooperative Extension, 1 Geneva Road, Brewster, NY 10509

Name _____

Farm _____

Address _____

Town _____ State _____ Zip _____

Phone _____ Email _____

Cornell Cooperative Extension provides equal program and employment opportunities

INTRODUCTION TO BERRY GROWING

Cornell Cooperative Extension of Warren County will host an evening workshop for beginner berry growers on Wednesday, April 24th from 6:30 9:00pm at the Warren County CCE Education Center on Schroon River Road in Warrensburg, NY.

The fee for this program is $10 per farm or family for handouts and refreshments.

Pre-registration and pre-payment are required by April 21st. Phone 518-668-4881 for registration, questions, directions, or special needs; or e-mail Laurel Gailor, Extension Educator: lrg6@cornell.edu.

Make your check out to Cornell Cooperative Extension and mail to: Cornell Cooperative Extension of Warren County, 377 Schroon River Road, Warrensburg, NY 12885.

This program is made possible through a grant from the New York State Farm Viability Institute.

TRAC SOFTWARE 2008 NOW AVAILABLE!

In 2008, we will not be sending out CDs of the software. Instead the software is available online. Each year, updated ChemTable information will be posted with instructions for use.

Trac Software is available for downloading at the following website http://www.nysipm.cornell.edu/trac/downloads/

Apple Computer users, be aware that we have found a bug on the SprayData sheet Add More Rows button and are working to solve this ASAP. Notice of this will be posted on the website.

Thank you for your interest in Trac record-keeping software.

For more information contact: Juliet E. Carroll, Ph. D., Fruit IPM Coordinator, New York State IPM Program, Joint Faculty, Dept of Plant Pathology and Plant-Microbe Biology, Cornell Cooperative Extension, Cornell University, New York State Agricultural Experiment Station, 630 W. North St., Geneva, NY 14456, Voice 315-787-2430, Fax 315-787-2360

BERRY PEST MANAGEMENT WORKSHOP GOES ON A ROAD TRIP WITHOUT LEAVING THE FARM

Cathy Heidenreich and Laura McDermott, Department of Horticulture, Cornell University's College of Agriculture and Life Sciences, Ithaca, NY, and Jeff Miller, Extension Issue leader and Agriculture Team leader, Oneida CCE, Oriskany, NY

Tuesday March 25, 2008 constituted one small step for berry growers, and one giant leap for the NY berry industry. The first of a series of berry production workshops was attended simultaneously by 76 NY small fruit growers, extension educators, faculty, and staff at a host site in Geneva, NY and at three CCE locations across the state (Chautauqua, Oneida, and Clinton Counties) using polycom technology.

Thanks to wise heads and thoughtful decision-making at Cornell Cooperative Extension, many CCE locations now have polycom capability. These local polycom sites, coupled with sites at main campus and satellite campuses bring opportunities for educational experiences closer to home for New Yorkers. Polycoms enable educators to reach a larger audience statewide. Both audience and speakers are saved both time and travel.

What is polycom technology anyway? Poly com technology is videoconferencing based in part on speaker phone technology (you talk, they hear; they talk, you hear). Unlike the speaker phone, however, with a polycom audiences and speakers simultaneously see and hear each other, and are able to communicate directly. To make the event even more interesting (challenging), audiences may also be watching an AV presentation on a separate screen at the same time.

This same technology has been used by the United States National Guard since 2004, effectively connecting all of the organization's 54 locations; enabling them to conduct voice and video calls with multiple participants at multiple locations.

Dr. Beth Gugino talks about plant parasitic nematodes. Note TV screen (left) with the 3 live locations and Beth herself at the Geneva location in the lower right hand corner of the screen.

Laura McDermott, eastern NY berry extension support specialist was the coordinator for the polycom part of the event, which was held at the NY State Agricultural Experiment Station's Jordan Hall auditorium. Coordinating a simultaneous event at 4 locations, with 4 hosts, 8 speakers, and 76 attendees was definitely a challenge. **S**he commented, "Farmers in NYS that are further than a few hours from Geneva or Ithaca have become quite accustomed to the polycom meeting format. There are some challenges with it however. For instance, video or audio quality can be variable; thankfully that was not the case for the Berry Pest Management meeting. The coordinator needs to be pretty strict with the way questions are handled and speakers are forced to be a bit more formal in their presentation. Also, the distance sites need to mute their speakers to prevent a lot of background noise. These are all quite easy to overcome. The biggest impediment is cost... to link more than 4 sites requires a bridge host, which can increase costs by several thousand dollars. Evening or Saturday meeting times would allow us to consider alternative bridge hosts like BOCES."

Dr. Kerik Cox talks about berry diseases. Note AV presentation occurring on big screen as part of the polycom. Remote sites received copies of the presentations before the meeting and local hosts advanced slides on the Geneva speaker's cue.

Cathy Heidenreich, western NY berry extension support specialist, recruited the all star cast of Cornell small fruit faculty and extension personnel to make presentations at the workshop and coordinated local arrangements. Attendees were welcomed by Dr. Marvin Pritts, who is leading the NYFVI berry production efficiency project which sponsored the event in conjunction with the New York Berry Growers Association.

Polycom sites included Oneida CCE in Oriskany, NY, hosted by Jeff Miller, Extension Issue leader and Agriculture Team leader, Chautauqua CCE in Jamestown, NY with host David Munsee, Farm Business Management Resource Educator, and Clinton CCE in Plattsburgh, NY, co-hosted by Kevin Iungerman, Extension Associate, NE NY Commercial Fruit Program, and Amy Ivy, Executive Director and Agricultural Team Leader of Clinton County CCE.

There was a lot of time for discussion during coffee and lunch breaks.

Growers listened to talks on berry insect and disease management, diagnosis, visual assessment and management of plant-parasitic nematodes, IPM elements for berry crops, TRAC Berry software, berry spray application technology, a new prototype sprayer for strawberries, weed management using cultivation tools, and cutting edge berry research taking place at Cornell. Lunch and proceedings accompanied the talks. Licensed pesticide applicators received 5.75 re-certification credit hours for their attendance.

Other workshop features included breakdown of a nematode bioassay and examination of nematode infected roots (*right*), Mike Helms from the Cornell Pesticide Management Education program who was on hand at the Geneva site with the new Cornell pest management guidelines for Berry Crops and other materials. Growers had a chance to view berry research posters that were displayed in the auditorium during the breaks and lunch.

Oneida County CCE Polycom Site

(The workshop at this site was hosted by Jeff Miller, Extension Issue leader and Agriculture Team leader at Oneida CCE. Jeff was kind enough to share this information about the Oneida polycom experience)

"We are located 2-3 miles off the thruway in Central NY. Most of the participants were from Oneida Co., one was from Madison, another from Lewis, a third was from Orange or Ulster..... anyway way down in southern NY.

Ten growers were at our site. A few of the growers were primarily vegetable producers that now have added strawberries, blueberries, and raspberries to their farms. Most of them have years of experience with strawberries and even blueberries but less experience with raspberries. A few who attended have smaller plantings from 1-5 acres. One participant was a master gardener.

I asked their opinion related to the technology used for this program. They all had positive responses and one participant thanked us for saving him the trip to Geneva. I think we all have to become accustomed to the technology, so be able to cue slide changes and repeat questions. You did a great job of always asking for questions from each of the remote locations.

We already talked about shortening the program... there was a plethora of information in a relatively small space of time.

I wasn't as happy about the lack of questions from growers at my site. I think we should have an ice breaker/introductions from all of the participants at all of the locations to increase their comfort level to participate, especially as they don't have opportunity to talk to the speakers individually after their talk at remote sites. We need to experiment a bit more with this technology on how to solicit more participation from the groups.

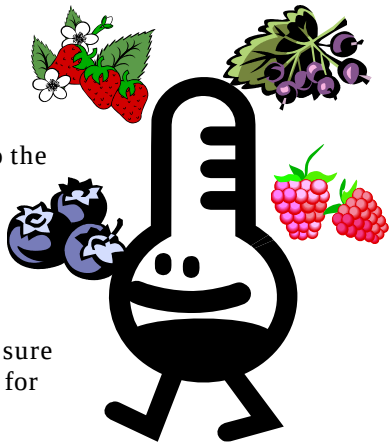
I did a talk for master gardeners after the berry conference and their evaluations pointed to the pace of the instruction. I was trying to jam so much in that it didn't leave enough time for interaction. That is something to think about.

If speakers were willing we could include their email addresses so they could respond to participants questions after the meeting.

"All in all the berry program was very good !!!!!"

APRIL BERRY BAROMETER

Cathy Heidenreich, Western NY Berry Extension Support Specialist, Department of Horticulture, Cornell CALS, Ithaca, NY 14853



The berry season is just beginning to register on our berry barometer, but we expect it will be rapidly rising in the months to come! The berry barometer is a new NYBN feature for the 2008 production season. It will provide a month-by-month review of cultural and pest management considerations for various berry crops to help keep you up to the mark. Management considerations are categorized first by berry crop and then by new or established planting.

ALL BERRY CROPS:

Established plantings:

1. **Weed management** - Spring weed management is the first order of business. Be sure to get your herbicide sprayer ready for action. Perform routine maintenance, check for worn nozzles and replace as needed, do calibrations. Review last year's records for problem weeds and weed locations. Check product labels for efficacy against target weeds. Order products. Follow any special instructions when making applications (gal/acre, psi, shielded application only, etc.). Remember to include any adjuvant(s) listed on the label.
2. **Pest management** – Perform routine sprayer maintenance, check for worn nozzles and replace as needed, do calibrations. Review last year's records for problem pests and pest locations. Were the products used successful? Should you start scouting sooner this year? Or make the first application at a lower threshold? Check product labels for efficacy against target pests. Order products as needed.
3. **Irrigation systems** - Check for problems and/or leaks. Make any adjustments or repairs as needed.
4. **Trellis/fencing** – Purchase needed materials and supplies. Examine existing trellis/fencing for problems; make needed adjustments or repairs.

New plantings:

1. **Plant materials** – Did you remember to order your plants? Check the Cornell nursery guide for sources if you still need to do so (http://www.fruit.cornell.edu/Berries/nurseries/index.html). Verify you indicated a shipping date for plants that will allow you to plant as soon as the soil can normally be worked or danger of frost is past.
2. **Final site preparation** – Hopefully you did your site preparation homework! Depending on the crop this should start 1-3 years in advance of planting for best success. Remember to till under legume cover crops no less than 1 month before planting. Pre-plant herbicide applications are a big help in controlling perennial weeds in new plantings. Roundup is one alternative for this application. Remember Roundup applications need to be made 30 days before planting. Follow label instructions carefully. After weeds die, till to prepare for planting. Amend soil as recommended from your soil test results. Be sure to incorporate amendments to a depth of at least 8" prior to planting. Do a final soil fitting just prior to planting. Purchase seed for sod truck rows or planting borders.
3. **Irrigation systems** -Do you have sufficient irrigation supplies on hand to begin irrigating immediately after planting? This helps to settle soil around roots, reduce transplant shock, and promote establishment.
4. **Trellis/fencing** – Purchase needed materials and supplies. Install new structures for 2007 plantings.

STRAWBERRIES:

Established plantings:

1. **Straw mulch removal** - Late March-early April is typically the time for removing straw mulch depending on your growing region. The past week of warm temperatures (40's) in western and southern NY are a good indication straw should be removed. Areas where temperatures may still fall to the mid to lower 20's with drying winds should wait a bit longer before removing straw.
2. **Leaf spot diseases** – an early season application is recommended in plantings where leaf disease was pressure was high the previous growing season and conditions are favorable for disease development. Control options include Captan, Nova, Cabrio, Pristine, or copper. Check the berry pest management guidelines and product labels for details (http://ipmguidelines.org/BerryCrops/).
3. **Spring weed control** - Check the berry pest management guidelines and product labels for details (http://ipmguidelines.org/BerryCrops/).

New plantings:

1. **Plant materials** –
    a. Check strawberry plants on arrival to be sure they are in good condition; moisten as necessary. Keep dormant runner plants in cold storage (30 to 32°F) in plastic bags if they cannot be planted immediately.
2. **Final site preparation** –
    a. Do final fitting of planting.

b. Build raised beds if desired; 8-10" high x 24" wide.
c. Lay out the field prior to planting day.
d. Stake rows with wire flags.
e. Check your row spacing to allow for easy equipment movement and access later on.

3. **Plant spacing** – In-row spacing for matted rows 18-24"; between-row spacing 48-52 inches, depending on equipment size.
4. **Planting** –
   a. If you use a mechanical planter, have it tuned up and ready to go.
   b. Place roots in water ½ to 1 hour before planting. Keep plants moist during the planting process.
   c. Plants should be set with the center of the crown level with the soil surface.
   d. Check planting depth after planting; firm soil around plants.
   e. Irrigate immediately to settle soil around roots and reduce transplant shock.

BLUEBERRIES:

Established plantings:

1. **Pruning** - Pruning should be well underway or mostly finished by now. Finely chop brush in place or remove and burn it to reduce overwintering disease inoculum.
2. **Spring weed control** – Spring pre-emergent options include Casoron 4G, Devrinol, Surflan, Princep, Sinbar, or Velpar. Post-emergent options include Gramoxone or Scythe. Check the berry pest management guidelines and product labels for details (http://ipmguidelines.org/BerryCrops/).
3. **Canker Diseases** - Take all possible precautions to minimize early spring frost damage. Consider a delayed dormant (as leaf buds begin to break) application of lime sulfur or copper for problem locations. Do not apply sulfur within 2 weeks of an oil spray or when temperatures are above 75°F to avoid phytotoxicity.
4. **Mummyberry** – If mummyberry is a problem in your planting rake or disk soil beneath the blueberry bushes or cover the fallen mummy berries with a 3-4 inch mulch layer before apothecia (very small mushrooms emerging from mummified berries on the soil) appear in the spring.
5. **Scale insects** - Problems with scale insects last season? Apply an oil spray (2-2.5%) during bud swell (after bud scales start to expand, but before first leaf stands out from clusters). Apply in 250-300 gal water/A at 300-400 psi for thorough coverage. Oil may be tank mixed with Esteem (5 oz/A) at delayed dormant.

New plantings:

1. **Plant materials** - Two-year old bare root or potted plants are generally the best buy.
   a. Potted plants are more expensive than bare-rooted plants but many growers find they establish more quickly.
   b. If potted plants are used, check to see if they are pot bound. If so, the root ball should be cut before planting to ensure good root spread and branching. Remove the plant from the pot and lay it's on its side. Cut through the root ball perimeter 4-6 times, rotating the plant between each cut. Firm soil around the plants.
   f. Verify you indicated a shipping date for plants that will allow you to plant as soon as the soil can normally be worked and danger of spring frost is past.
   c. Check blueberry plants on arrival to be sure they are in good condition; moisten as necessary. Keep bare-rooted plants in cold storage (30 to 32°F) in plastic bags if they cannot be planted immediately. Containerized plants may be kept out doors until planting; keep them well watered.
2. **Final site preparation** - Hopefully you did your site preparation homework! This should have started 1-3 years in advance of planting for best success.
   a. Preplant site preparation includes soil testing, pre-plant perennial weed management, soil and pH amendment, cover cropping etc.
   b. Adjusting soil pH with sulfur is a very slow process, taking 6 months to a year or longer.
   c. Do final fitting of planting.
3. **Plant spacing** –
   a. Spacing should be 4-5 feet in-row and 10 ft between rows
   b. PYO rows should be 200 ft or less in length.
4. **Planting** –
   a. Prepare raised beds if desired; 8-12" high and 4 ft wide.
   b. Wait to plant until severe freeze danger has past.
   c. Saturate peat bales and allow them to soak several days before planting.
   d. Layout the planting, flagging plant locations,
   e. Moisten roots ½ to 1 hour before planting.
   f. Planting holes need to be more wide than deep, to allow the roots to be spread out at planting. Incorporate approx 1 gal peat moss into the planting hole soil and back fill with the soil/peat mixture.
   g. Set plants at the same depth they were planted at in the nursery. Fill hole with peat soil mix. Firm soil around plants.
   h. Irrigate immediately after planting (1" water) to settle soil around roots.

i. Mulch with wood chips, sawdust or other materials.
j. Remove at least 1/3 of top growth of newly set plant and rub off any flower buds to promote establishment and reduce transplant shock.
k. Plant sod alleys or clean cultivate between rows.

RASPBERRIES AND BLACKBERRIES:

Established plantings:

1. **Pruning** - Pruning should be well underway or mostly finished by now. Finely chop brush in place or remove and burn it before new canes emerge to help reduce insect and disease pressure this upcoming season.
2. **Spring weed control** - Pre-emergent herbicide options for spring include Devrinol, Solicam, Surflan, Princep, or Sinbar. Post-emergent options for spring include Scythe and Gramoxone. Check the berry pest management guidelines and product labels for details (http://ipmguidelines.org/BerryCrops/).
3. **Cane Diseases** - If cane diseases such as anthracnose, spur or cane blight were a problem last year, a delayed dormant application of lime sulfur or copper may be indicated. Applications should be made on a calm day with sufficient water to soak canes completely. Caution: Sprays applied after ½" green tip may burn leaves, particularly in warm weather. A delayed dormant application is not necessary for fall-bearing raspberries if last year's canes were mowed and removed or thoroughly shredded.

New plantings:

1. **Plant materials** – Check plants on arrival to be sure they are in good condition; moisten as necessary. Keep dormant canes at 35°F in plastic bags if canes cannot be planted immediately.
2. **Final site preparation** - Hopefully you have been doing your site preparation homework! This should start one year before planting for best success.
    a. Preplant site preparation includes soil testing, pre-plant perennial weed management, soil amendment, improving drainage, cover cropping etc.
    b. Layout planting; flag rows. Plow a very shallow furrow setting dormant canes, root cuttings or plug plants into.
    c. Do final fitting of planting.
    d. Prepare raised beds if desired; 10-12" high x 4-6' wide at the base.
3. **Plant spacing –**
    a. Red raspberries – 2-3' in-row spacing, 9-10ft between-row spacing. Cultivars that sucker vigorously should be set at the 3 ft spacing; those that produce fewer suckers should be set at the 2 ft spacing.
    b. Black raspberries - 3-4 ft in-row spacing, 9-10ft between-row spacing.
    c. Purple raspberries - 3-5' in-row spacing, 9-10ft between-row spacing.
    d. Thorny blackberries - 3-4' in-row spacing, 9-10ft between-row spacing.
    e. Thornless blackberries - 4-5' in-row spacing in a hill system, 9-10ft between-row spacing.
4. **Planting** -
    a. *Dormant canes:* Do not allow roots to dry out before planting. Hold Plant by hand or machine to the same depth as canes were set in the nursery. Be sure plants are set vertically and not at an angle for best growth. Prune back to a height of 5" immediately. Prune back to soil level after new shoots emerge from soil.
    b. *Tissue culture plug plants*: Delay planting of tissue culture plug plants until all danger of spring frost is over. Apply water to transplant holes. Cover the top of the root ball with field soil to a depth of ¾ ".Firm soil around plug plant. Avoid herbicide applications or soil disturbances.
    c. *Root cuttings*: Raspberry root cuttings should be of variable length and 1/10" or larger in diameter. Plant root cuttings about 3" deep with approx. 2 oz of root per hill or 3 ft of hedgerow. Blackberry root cuttings should be 3/8 to 5/8" in diameter and 6" in length.
    d. After planting, a light layer of straw mulch will help reduce weeds and retain moisture. *Remember this mulch is applied the planting year only*.
    e. Irrigate immediately after planting.
    f. Plant sod alleys or clean cultivate between rows.

CURRANTS AND GOOSEBERRIES:

Established plantings:

1. **Pruning** - Pruning should be well under way or mostly finished by now. Finely chop brush in place or remove and burn it.
2. **Spring weed control** - Product options include Surflan, Gramoxone, or Scythe. Check the berry pest management guidelines and product labels for details (http://ipmguidelines.org/BerryCrops/).
3. **Powdery mildew** – Powdery mildew overwinters on currant and gooseberry twigs. Initially, white powdery patches of mycelium and spores appear on the leaves and shoots in early spring. In plantings where disease historically occurs, apply the first spray before disease onset. Control options include Nova, Cabrio and JMS Stylet oil. Check the berry pest management guidelines and product labels for details (http://ipmguidelines.org/BerryCrops/). JMS Stylet oil (organic formulation) is OMRI approved.

4. **Scale Insects** – If scale were a problem last season, the recommendation is a dormant crop oil spray (4 gal) in 10 gal water applied before the buds swell and burst in the spring.
5. **Currant stem girdler** - Currant stem girdler is a sawfly that emerges in late April or early May. Adult sawflies lay eggs in young, succulent shoot tips, then girdle tips below the eggs. Shoot tips die, reducing cane length. Sanitation is currently the only control strategy available for this insect pest in NY. Cut off affected tips below evidence of insect activity and destroy prunings.

New plantings:

1. **Plant materials** –
    a. Vigorous 1 year old plants are generally easier to transplant and less expensive to purchase.
    b. Bare-rooted plants may be preferable as containerized plants become root bound very quickly.
    c. Cut through circling roots of pot bound plants with a sharp knife before planting.
    d. For bare root plants, prune out dead or diseased roots and thick, wood roots that are kinked, twisted or point inward toward root collar. Shorten roots to fit planting holes.
2. **Final site preparation** - Hopefully you have been doing your site preparation homework! This should start one year before planting for best success.
    a. Preplant site preparation includes soil testing, pre-plant perennial weed management, soil amendment, improving drainage, addition of organic matter, cover cropping etc.
    b. Do final fitting of planting.
    c. Prepare raised beds if desired (18" w x 12" h); cover with landscape fabric or black plastic mulch.
3. **Plant spacing** –
    a. Red and white currants, and gooseberries
        i. Fresh fruit spacing 3-4 feet in row, 10 ft between-row.
    b. Black currants
        i. Fresh fruit spacing 4-5 ft in row, 10 ft between-row.
        ii. Mechanically harvest fruit spacing 2.5 -3 ft in –row, 10 ft between-row.
4. **Planting** -
    a.
    b. Dig planting holes 12" deep and 18" in diameter. Make a shallow cone of soil in center (8' high). Spread roots over cone.
    c. Set plants slightly more shallowly than grown in the nursery. Firm soil around plants. *Do not add amendments to the planting hole.*
    d. For larger plantings, plow a 12" deep furrow centered on the plant row and set plants into the furrow. Spread roots along furrows and firm soil around plants.
    e. Shorten canes to 1-2 buds above ground.
    f. Irrigate immediately.
    g. Mulch if desired.

PRUNING AND TRELLISING SUMMER BEARING (FLORICANE) RASPBERRIES

Laura McDermott, Berry Extension Support Specialist, Eastern NY, Cornell University's College of Agriculture and Life Sciences, Department of Horticulture, based at Washington County CCE, Hudson Falls, NY

Summer bearing raspberries produce their fruit on floricanes, the botanical term for second-year canes. These canes overwinter then flower and fruit in early summer of the second season. The problem for summer bearing raspberry plants is that the first-year canes, called primocanes, compete with the fruiting floricanes for sun, water and nutrients. They also interfere with pest control and can make harvesting difficult.

How to best reduce the impact from the primocanes without also reducing your future crop? There are several different options available for growers but for those of us in the Northeast, using a selective pruning system seems to work best.

Mastering the selective pruning system relies on having a good understanding of the plant biology. Primocanes emerge and are permitted to grow throughout the season. These canes mature into floricanes during late fall and early spring. Cool temperatures combined with short fall days and then cool temperatures combined with longer days in the spring trigger bud differentiation – when vegetative buds change into fruiting buds.
During the second season of growth, floricanes grow mostly from axillary buds. These axillary shoots or fruiting laterals are important to the overall harvest. To encourage the axillary growth, floricanes should be headed back to a convenient height for picking in the early spring. This height will vary between growers, but usually it would be about 4'. At the same time a thinning of the existing canes will help push all plant reserves into the healthiest most productive canes. This selective pruning in the spring is important because cane vigor – defined as height, diameter of cane, erect growth – is directly correlated with number of flower buds and size of individual fruit. Canes should be thinned to 3-4 canes per

square foot. Pruners should also remove canes that show symptoms of disease or insect damage or have been injured during the winter.

After harvest, floricanes become senescent so they contribute very little to the overall vigor of the raspberry plant and are an impediment to the growth of the primocanes. Removing these spent floricanes by cutting them down at ground level immediately after the summer harvest will reduce competition, remove a source of disease inoculum, and require less dormant season pruning by the grower.

There are several other approaches to pruning summer bearing raspberries. As you can see, the floricane has a biennial growth habit on a perennial plant crown. One method of pruning that may work for your farm is alternate year mowing. This means that the grower reduces primocane interference by mowing half of the planting to the ground each year during the dormant season. This method eliminates selective pruning costs, but also reduces fruit quality, berry size and yield.

A more promising approach to the problem of reducing competition from emerging primocanes without compromising yield lies in primocane suppression. If primocanes are removed when they are 6-8" tall this reduces the problem of shading on the lower portions of the floricane immediately prior to fruiting. The primocanes are allowed to regrow as the floricanes complete their life cycle. Primocane suppression may also increase hardiness.

Do not begin primocane suppression until the planting is at least 3 years old and refrain from suppressing primocanes in plantings that show poor vigor or may be stressed from a heavy fruit harvest the previous year. Primocanes contribute a large amount of carbohydrate to the plant crown and while under stress the plant needs all the reserves it can get. Areas with short growing seasons, including colder regions of NY, will not have enough regrowth from the primocanes resulting in very short floricanes and a reduced yield.

Adaptations of primocane suppression can result in increases in fruit size and quality, increases in yield and fewer cane numbers resulting in less time spent with pruning. Problems with suppressing primocanes center around the log term health of the planting and actual costs involved with this pruning approach.

Proper trellising will also help growers manage raspberries. Staking or a one wire system called an I-trellis is not recommended despite the lower cost of the trellis system because the dense canopy results in shading and problems with disease. Systems using a V-trellis or a T-trellis allow more light and better air circulation into the planting and helps reduce cane interference.

In a V-trellis, wires are strung along posts that are placed in the ground at a 20-30 degree angle along the outer margins of each plant row. The bases of these posts are about 18" apart and the top are 31/2' apart. The posts should be sunk several feet in the ground with 4' remaining. The pairs of angled posts should be placed every 30' along the row. The wire should be strung from an anchor post at each end of the row.

Fruiting canes are tied to the wires on the outside of the V, while primocanes are allowed to grow in the center of the V. The primocanes in the center force fruiting laterals toward the outside, making picking easier.

There are many variations to the V-trellis. It may be less expensive to use a T shaped post and only one wire. There are also some interesting trellis systems being developed by commercial companies that could reduce installation costs and provide more flexibility in a trellis system.

For more detailed information about pruning and trellising brambles, please refer to the Bramble Production Guide (NRAES-35) available through NRAES or your local Cooperative Extension office.

Above left –I trellis system; lower left – Four wire T-trellis with 2 cross arms. Right – V-trellis. Photos M. Pritts, Cornell.

SPRING STRAWBERRY HERBICIDE UPDATES

Chris Benedict and Robin Bellinder, Department of Horticulture, Cornell University, Plant Science Bldg., Ithaca, NY 14853

This spring will be the first year that we will see Prowl H_2O registered for use in strawberries. This short article will focus on the use of this new herbicide along with information on an alternative use of Sinbar at planting.

Prowl H_2O is a new formulation of Prowl 3.3 EC both of which have the active ingredient pendimethalin. Only Prowl H_2O is registered in strawberries. The new formulation is more effective under drier application conditions and does not need to be incorporated. Prowl H_2O is classified as a mitosis inhibitor and causes plant growth to cease. This herbicide is a pre-emergence herbicide that controls most annual grasses and selective broadleaves as they germinate. The strengths that Prowl H_2O offers at transplanting includes control of common purslane, mustard species, grasses and suppression of Pennsylvania smartweed, velvetleaf, shepherds purse, and common chickweed. The use rate and use pattern is included below.

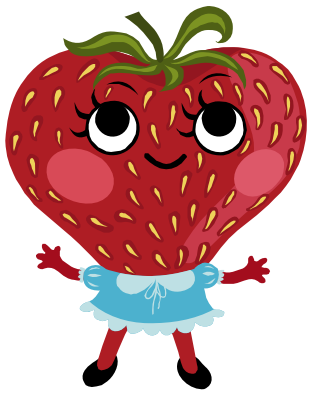
Recently, some growers have asked about the use of Sinbar at transplanting. The current label states to apply 2-3 oz/A after transplanting but before new runners begin to root. The application must be followed by 0.5-1 inch of irrigation if new foliage is present. This can be difficult for many growers and deter usage. Research from New Jersey has determined a new use pattern for this product at transplanting. They determined that by applying 1 oz of Sinbar without the irrigation, that at this lower rate the risk of crop injury is reduced. Additionally, the application of 1 oz/A should be repeated every 3 weeks until 3-4 oz (total) is applied, depending on soil texture and organic matter. Also researchers recommend marking and double spraying the same small area across all the varieties in the field and on the lightest soil in the field at each application. This acts as an indicator for upcoming applications. These berries may exhibit slight temporary chlorosis about a week after treatment, but recover in less than 3 weeks. If/when they do not recover within 3 weeks and it is time to make another application, cancel the next application. Sinbar can be used on soils with more than

0.5% organic matter. Varietal sensitivity has been observed and is not recommended for use on 'Guardian', 'Darrow', 'Micmac', 'Tribute', or 'Tristar'. Some growers have reported sensitivity in 'Honeoye'.

Registration Update: By late last year there was discussion that New York strawberry growers would see the registration of Chateau 51 WDG for use by the spring of 2008. It appears at this point that the product will not be available for use this year, though may be available for early-winter dormant applications.

Prowl H_2O
Use Pattern (Max. 6 pt per year, 35 D PHI)
Pre-transplant – Use before transplanting strawberries at a rate of 1.5-3 pts/A (coarse to fine soils). *Cannot be applied if plastic mulch will be used*. One day should pass between application and transplanting to avoid worker exposure issues unless protective equipment is utilized (coveralls, chemical-resistant gloves, shoes plus socks).
Banded Between-Row – Can be used as banded application between-rows. The product should not be concentrated, but should follow normal application rates. Rates are identical to the pre-transplant application. Herbicide should not contact plants.

ON THE LIGHTER SIDE



Q. What did one raspberry say to the other raspberry?
A. If you weren't so fresh we wouldn't be in this jam!

A farmer was driving along the road with a load of fertilizer. A little boy, playing in front of his house, saw him and called, "What've you got in your truck?"
"Fertilizer," the farmer replied.
"What are you going to do with it?" asked the little boy.
"Put it on strawberries," answered the farmer.
"You ought to live here," the little boy advised him. "We put sugar and cream on ours."

HOW PLANTS PROTECT US - UNMASKING THE SECRET POWER OF PHYTOCHEMICALS

Marcia Wood, *Agricultural Research Service Information Staff, ARS News Service*

Rosemary, the fragrant herb that enlivens roast chicken and other favorites, and turmeric, the mainstay spice of curry dishes, contain powerful natural compounds that, in test tubes, can kill cells of a childhood cancer. What's more, grapes, strawberries, and other familiar fruits—and some vegetables—also have chemicals that can destroy the cells of this cancer, known as "acute lymphoblastic leukemia."

Susan Zunino and David Storms, molecular biologists at the ARS Western Human Nutrition Research Center, Davis, California, are using fluorescence-activated cell sorting to analyze apoptosis (programmed cell death) in leukemia cells after exposure to different antioxidant phytochemicals. Their research has shown that certain phytochemicals can kill these leukemia cells. ***(D1055-1)***

Susan J. Zunino, an Agricultural Research Service molecular biologist, leads the nutrition-focused research that has resulted in these first-ever findings. She's investigating the health-imparting effects of plant chemicals, or phytochemicals, using laboratory cultures of both healthy human blood cells and cancerous ones as her models.

Zunino is based at the agency's Western Human Nutrition Research Center in Davis, California, about an hour's drive northeast of San Francisco. She's collaborating in the investigations with molecular biologist David Storms, at the Davis center; Jonathan Ducore, at the University of California-Davis Cancer Center; and Navindra Seeram, at the University of California-Los Angeles.

Zunino's pioneering studies, published in *Cancer Research* and *Cancer Letters*, reveal the previously unknown ability of about a half-dozen phytochemicals to stop growth of this type of leukemia. The findings are of interest to cancer researchers and to nutrition researchers exploring the health benefits of compounds in the world's edible fruits, vegetables, herbs, and spices.

Death of Leukemia Cells: How Do Phytochemicals Triumph?

Strawberries and other familiar fruits—and some vegetables—contain natural phytochemicals that can destroy leukemia cells. ***(K9189-1)***

For the most part, scientists don't yet have all the details about how phytochemicals bolster healthy cells and battle harmful ones. That's true even for better-known phytochemicals such as the resveratrol in red grapes, blueberries, and some other fruits.

Zunino's investigations provide some new clues about how phytochemicals attack cancer cells. She has studied carnosol from rosemary, curcumin from turmeric, resveratrol from grapes, and ellagic acid, kaempferol, and quercetin in strawberries. The work demonstrated the ability of these phytochemicals to kill the acute lymphoblastic leukemia cells and also suggested ways in which the compounds might do that.

For example, Zunino and colleagues showed that the phytochemicals interfere with the orderly operations of mitochondria, the miniature energy-producing power plants inside cells. Without energy, cells die.

Mitochondria exposed to resveratrol and the other phytochemicals became inoperative. But more work is needed to fully understand how the phytochemicals achieved that. And the team wants to know more about the phytochemicals' other modes of action that resulted in the cancer-cell death.

Scientists at ARS's Western Human Nutrition Research Center have determined that some component of table grapes can prevent progression of type 1 diabetes in mice and increase their survival. ***(D456-1)***

Can Phytochemicals Help Prevent Diabetes?

In related research, Zunino, working with Storms and Charles Stephensen, a physiologist at the Davis research center, determined for the first time that some component of table grapes prevented the progression of type 1 diabetes in mice and increased their survival. That was in contrast to diabetic mice that were not fed grapes.

Scientists provided the fruit in the form of a freeze-dried powder made from table grapes, the kind sold fresh in the produce section of supermarkets. The powder, provided by the California Table Grape Commission, made up 1 percent of the chow fed to some of the mice. That's the human equivalent of about six servings of grapes per day.

Zunino's experiment apparently is the first to show a link between eating grapes and preventing progression of type 1 diabetes. If the results from this study of 30 laboratory mice hold true for humans, the research could offer new options for protection against this chronic autoimmune disease.

According to the National Institutes of Health, an estimated 1 in every 400-600 children and adolescents in the U.S. population has type 1 diabetes.

Right now, the researchers don't know which grape compounds provided the protective effect. Similarly, the exact sequence of steps that led to the protection is also not yet proven. But the scientists think that the grape phytochemicals may have prevented unwanted entry of immune cells into the pancreas.

Mice fed the grape powder had fewer immune cells in the pancreas than did the other mice in the experiment. But what's the relation between immune cells in the pancreas and type 1 diabetes?

Immune cells in the pancreas can mistakenly attack specialized cells known as "beta cells." Beta cells produce insulin, which is needed to help regulate the amount of sugar in the bloodstream. If immune cells in the pancreas attack and kill beta cells, the pancreas can run out of beta cells. When that happens, type 1 diabetes can result.

People with type 1 diabetes have to carefully monitor the amounts of sugar-containing foods they eat, including sweet, fresh table grapes. How ironic that this luscious fruit might actually hold a key to preventing the progression of type 1 diabetes. This may be a perplexing riddle of Nature—perhaps one that Zunino's team will soon solve.

This research is part of Human Nutrition, an ARS national program (#107) described on the World Wide Web at www.nps.ars.usda.gov.

ROTATING CROSS ARM TRELLIS AND CANE TRAINING FOR BRAMBLES

Fumiomi Takeda, Research Horticulturalist, USDA-ARS, Appalachian Fruit Research Station, Kearneysville, WV 25430

Blackberry fruit are delicate and too fragile for long distance transport and their production is still low in areas where low winter temperatures cause injuries to canes and buds. It may be possible to overcome the lack of cold hardiness with minimal winter protection and thus meet the local demand for fresh blackberries. Interest in growing blackberries is especially high among small and part-time farmers looking for crops with a market niche and the potential for high returns on investment.

For Commercial blackberries to thrive in northern states, the following criteria need to be met: 1) new varieties with greater winter hardiness and chill requirement, or early-season primocane fruiting habit, 2) protected cultivation under glass or using a pot production system; 3) a simple, low cost technique for modifying the micro-environment to protect blackberry canes to some extent from winter temperatures; and 4) a trellis design and cane training techniques to improve harvest efficiency and be compatible with the winter protection strategy. In short, the goal is to have systems decrease environmental stress or mitigate conditions that are extraordinarily unfavorable for growth. This strategy will involve crop improvement through breeding and biotechnology to adapt the plant to environmental limitations and physically modifying the crop environment to reduce weather stress. Although it is understood that a new approach will need economic and technological analyses, my presentation here is limited to the potential use of a specific trellis and cane training techniques for protection of blackberry plants through modification of the aerial environment.

A new trellis system called the “rotating cross arm” (RCA) trellis and cane training technique was developed to facilitate mechanical harvesting of fresh market quality with the USDA bramble harvester (Takeda and Peterson, 1999). The RCA trellis system is a modified “Y” trellis, similar to variations of shift trellis designs described by Stiles (1999) at Virginia Tech. Our RCA trellis system allows floricanes and primocanes to be trained on opposite sides of the trellis. The new trellis design positions more than 95% of the fruit underneath the cross arm and increases hand harvest efficiency by 30% or more (Takeda et al., 2003a, b).

Blackberries have low chilling requirements (200-600 hrs below 45^{o}F) and can have their rest requirements met most years by mid-December in New England. After rest completion blackberries de-acclimate rapidly and can resume growth with exposure to warm temperatures. De-acclimated buds are far more susceptible to low temperature injury. At “rest”, cultivars can withstand temperatures as low as -9.5^{o}F. Breeders must develop cultivars such as ‘Illini Hardy’ which needs more days of warm temperatures (growing degree hours) to break bud, combined with high chilling requirements (~1700 hours) of red raspberries, with low temperature tolerance and thornlessness.

In the absence of suitable, winter hardy, high-chill requirement blackberry varieties, one may modify the aerial environment to decrease winter injury and improve potential of sustained crop production. Western trailing and eastern erect thornless blackberries are adapted to canopy manipulation of the RCA trellis. Based on recent research on trellis technology, we hypothesized that RCA trellis and cane training system could provide a practical technique for growing and protecting blackberries through severe winter conditions. A protection system must prevent temperatures of the buds from falling below - 10^{o}F during mid-winter and, once the buds are de-acclimated in late winter; reduce exposure of canes and buds to high temperatures with low labor input. During the fruiting phase, the cross arms of the trellis can be rotated to angle the floricanes into a position that makes the fruit easily accessible for harvesting. The same cross arms can be rotated to reposition or lower primocanes in the fall close to the ground so that exposure to winter conditions would be decreased. When the canes are positioned near the ground, much of the planting could be protected by snow or by applying a protective cover over the plants as their height would be decreased from over 6 ft to less than 2 ½ ft.

The results of our study show that ‘Apache’ and ‘Triple Crown’ did not benefit from winter protection covers. Covered and unprotected plants showed little bud damage and produced the same amount. The minimum daily temperatures remained above 0^{o}F from December 2004 to March 2005. Normally these erect cultivars do not show winter damage until temperatures drop below -4^{o}F (Warmund et al., 1992). In January and February 2005, the daily minimum temperatures under floating row cover (FRC) + plastic sheet (PE) cover treatment were about 6^{o}F higher that in the open. The FRC and FRC + PE covers may also have protected canes against wind and desiccation.

Figures 1 and 2: 'Siskiyou' trailing blackberry in early June: Unprotected plants (left) and plants protected by FRC+PE cover (right). Photos courtesy of Dr. Fumi Takeda.

In trailing blackberries, tissue damage in plants protected with FRC + PE cover was significantly less than for unprotected plants. In 'Siskiyou' blackberry, more than 90% of the axillary buds on the lateral canes were killed in unprotected plants compared to only 20% in plants protected with FRC + PE. 'Siskiyou' plants that were not protected produced less than 3 lbs fruit per plants compared to about 10 lbs. in plants that were covered with FRC alone or in combination with PE. More fruit were harvested from 'Boysenberry' blackberries that were protected compared to plants in the open. The fruit of 'Boysenberry' blackberry has poor drupe development especially among those at the distal end. Harvesting of 'Siskiyou' fruit started on June 20 during red raspberry harvest season or 2 or 3 weeks earlier than that for 'Triple Crown' eastern blackberry.

The RCA trellis (*photo, left*) which allows the placement of canes close to the ground in winter and installation of FRC over the canes during winter has potential for reducing low-temperature stress or to mitigate conditions that are unfavorable for growth. In using the RCA trellis for winter protection, the pivot point of the rotatable cross arm should be about 24 inches above the ground. After harvest is finished and spent floricanes are removed from the trellis, the lateral canes can be tied to the wires on the cross arm. In early winter, the cross arm can be rotated away from the harvest position to tie the remaining laterals that have grown to the other side of the row, and rotate the cross arms so that the tip of the cross arm touches the ground. The sequence of cane tying and cross-arm rotation positions all canes at the height of the pivot point or close to the ground. For winter protection, straw mulch can be deposited on top of the horizontally oriented lateral canes and around the base of the main canes. The straw can be covered with winterizing row covers. Snow cover can provide added insulation. Once such a production system is installed, it helps with the re-positioning of the canes without sacrificing the production capacity of the plant and can position nearly all the fruit on one side of the row.

Will these production modifications allow blackberries to be grown successfully in northern states? Higher investment capital on the trellis material can offset labor needs and raise crop productivity. We have shown that the RCA trellis system can be used to manipulate the canes with little can breakage and position fruit to improve harvest efficiency.

Whether incorporating this trellis system for blackberry production in northern states will be successful depends on its profitability. For example, the price of blackberries in New Hampshire is more than $3.00 per pint (William Lord, personal communication). Field trials will be started in Maine, New Hampshire and Utah to evaluate alternative cultural techniques for improving sustainability of blackberry production at sites with adverse winter conditions.

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CURRANT AND GOOSEBERRY PRODUCTION

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Introduction

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

Even though currants and gooseberries are in the same family, they appear quite different. The crosses may look like either parent, some like currants and others like gooseberries. The variety in shapes, colors, texture, and flavor make *Ribes* a good candidate for development in gourmet and specialty markets. Fresh fruit can decorate plates, salads, and desserts. Cooked or processed fruit makes delicious sauces, pastry, wine, vinegar, and preserves. The juices have great flavor and health benefits that make them appropriate for popularizing as common breakfast or snack drinks. A comprehensive cookbook is currently available for *Ribes*, and recipes can be found in old cookbooks, cooking magazines.

Description

Gooseberries grow on a bush approximately 3 to 6 feet tall and about 3 to 4 feet wide. Most gooseberries have spines or thorns at each of the leaf nodes. The spines may be single, double, or triple, and they may be large, (10 to 15 mm) to small (l to 5 mm). The habit of the plant may vary from low spreading to upright and tall. Berry color may vary from green to yellow/green, to yellow; or white, to pink, to red, to dark red or purple. The size of the berries varies from about 1.5 grams to more than 12 grams. The average is about 3 to 6 grams. The berries are usually borne in ones, twos, or threes, and hang under the branches. The taste ranges from very tart to very sweet. In the US, gooseberries ripen starting about mid-June and the latest are ripe about mid-August. The seasons may vary a week or more either way, depending on the weather and your location.

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

Some of the Cultivars Used As Dessert Berries in North America
Achilles, Captivator, Early Sulphur, Hoenings Earliest, Invicta, Hinnomaki Red, Hinnomaki Yellow, and Whinham's Industry.

Some of the Culinary Cultivars
Careless (dual use), Oregon Champion, Poorman, and Red Jacket, (Pixwell less recommended).

There are many other cultivars available in varying supplies that could be used in plantings for berries for sale at farmer's markets or roadside markets.

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

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

Some Available Black Currant Cultivars
Black Currants: Ben Sarek, Ben Lomond, Ben Alder, Titania, (Ben Nevis, Consort....less recommended).

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

Some Red and White Currant Cultivars
Red Currants: Red Lake, Jonkeer Van Tets, Redstart, Rovada, and Tatran.
White Currants: Primus, Blanka, White Imperial, Pink Champagne, and White Versailles.

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

Deciding Whether to Grow Ribes

Ribes crops definitely have a place in a grower's diversification formula. Local consumption by gourmet enthusiasts, small scale processors, and ethnic markets should be one's first target. Know what your market is before planting. Remember that larger scale production is more risky. One should be conscious of any regulations that restrict production of *Ribes* in the local area. Consider proximity to white pines and the information about White pine blister rust. Labor or proximity to a harvester is also a critical factor.

Considerations in Choosing a Variety

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

Culture: Spacing

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

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

Both red currants and gooseberries are most efficiently trained to cordons if they are to be used for fresh fruit production. Please contact my office for a detailed article on this training system.

Soil and Water

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

Pruning and Training

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

Pest Control

The lack of registered chemicals has been a problem from time to time for *Ribes* producers.

1. Mildew tends to be the major disease problem, but trials are showing that it can be controlled by Stylet oil. Gooseberry fruits are blemished and deformed by the disease. Shoot tips are deformed. The disease was once the limiting factor preventing success with European cultivars in North America.
2. Leaf spot has been a serious a problem on all *Ribes* crops. Leaf yellowing and premature defoliation weakens the plant and affects yield. Copper sprays and weed control help to control the disease.
3. White pine blister rust has been the cause of *Ribes* restrictions in the Northeast which are being reconsidered for modification. Immune cultivars are advisable especially near white pine stands. Gooseberry and red currant are resistant to the disease.
4. The British are controlling cane borers with pheromone mating disruption. They are sometimes a problem in the Northeast.
5. Aphids sometimes cause a red deformation on red currant leaves.
6. Reversion virus is common in black currant in Europe, but not found in the US. It can reduce the useful life of a black currant planting to as few as eight years. Quarantine has kept the disease out so far. The disease is spread by big bud mites.
7. Currant Cane Blight, a fungus disease that was a problem in the past (when ribes were previously cultivated in large acreage), has become a problem again. It is caused by *Botryosphaeria ribis*, and causes branches to yellow, wilt, and die.

Recommendations for pest control can be found in the Cornell Pest Management Guidelines for Berry Crops or other local extension publications.

Harvest/Postharvest

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

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

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

Useful Resource

Currants, Gooseberries, and Jostaberries: A Guide for Growers, Marketers, and Researchers in North America by Danny L., Barney and Kim E. Hummer Ph.D.

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