New York Berry News

CORNELL UNIVERSITY

Volume 08, Number 4 April 9, 2009

What's Inside

CURRANT EVENTS

April 16, 2009: *Introduction to Berry Growing Workshop*, Chemung County CCE, Elmira NY. See news brief that follows for details.

April 20, 2009: *Small Fruit IPM Scout Training – Session III*. Green Acres Farm, Rochester, NY. For more information: Lutie Batt, 585-786-2251 or lcb37@cornell.edu.

April 23, 2009: *Introduction to Berry Growing Workshop*, Seneca County CCE, Waterloo NY. For more information: Patti Paine Battley, 315-539-9251, or pap11@cornell.edu.

April 29, 2009: LOFT Berry Field Meeting, Behling Orchards, Oswego, NY. For more information :Kim Hazel, (585) 798-4265 - ext. 26 or krh5@cornell.edu.

May 12, 2009: *Small Fruit IPM Scout Training – Session IV*. Green Acres Farm, Rochester. For more information: Lutie Batt, 585-786-2251 or lcb37@cornell.edu.

Introduction to Berry Growing Thursday, April 16th 6:00 – 8:00 PM

Cornell Cooperative Extension of Chemung County

425 Pennsylvania Ave Elmira, NY 14904

This workshop is intended for the commercial berry grower and larger –scale home gardener. Blueberry and bramble (raspberry & blackberry) production will be covered in detail. If you are currently growing berries or have ever considered it, you shouldn't miss this presentation by Cornell's expert.

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

This workshop will cover the key topics of successful berry production including:

- Marketing and 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 farm/family. To register or for additional information contact Chemung Co. Cooperative Extension at 734-4453.

USHBC SEEKS ASSESSMENT INCREASE

April 7, 2009 - In response to what it called an unprecedented increase in blueberry production, the U.S. Highbush Blueberry Council (USHBC) board voted to recommend a doubling in the assessment growers pay for promotion. Growers currently pay 0.6 cents a pound ($12 a ton) and would pay 1.2 cents a pound if USDA approves the request.

The USHBC is proposing a new market promotion initiative, "BLUEprint 2015 – Building Demand to Meet Future Supply."

In the last three years, North American acreage of highbush blueberries grew 33 percent, from 71,000 acres in 2005 to more than 95,000 in 2007, said Mark Villata, executive director of the council. A record 407 million pounds were produced in 2008, more than twice the level of 10 years earlier. As new acres mature and world production grows, blueberry supply is expected to exceed 1 billion pounds by 2015, he said.

"In spite of a sagging economy, the future looks bright for our industry," Villata said. "Consumers love blueberries and are aware of their health benefits, which has helped increase per capita consumption. But now, with rapidly increasing supply, we will have to make a concerted market promotion effort to double consumption by 2015."

The proposed change will be published in the Federal Register with a 60-day comment period. The USDA makes the decision to approve the increase or not. While growers voted to create the council to fund promotion and research, the assessment rate can be set by USDA.
Assuming the increase is approved, the assessment would be applied to the 2010 crop, and promotion and advertising programs would start in 2011. The new rate would generate about $4 million, Villata said.

Programs will target consumers, foodservice, food manufacturers and export markets. Paid advertising will be part of the plan. There will also be increased support for blueberry health and nutrition research and for expanded grower educational efforts in food safety and good management practices to strengthen consumer confidence.

For more information, visit http://www.blueberry.org, or e-mail mvillata@blueberry.org or call 916-983-0111.

(Source: U.S. Highbush Blueberry Council)

HELPING FRUIT FIGHT BACK

Ann Perry, Public Affairs Specialist, Room 1-2214-B, 5601 Sunnyside Ave., Beltsville, MD 20705-5129, Ann.Perry@ars.usda.gov

April 8, 2009. Studies by Agricultural Research Service scientists (ARS) indicate that cherries, red raspberries and apples share key genetic traits for disease resistance. These findings could help plant breeders develop more robust produce varieties that can better withstand the pathogens that plague them.
ARS computational biologist Angela Baldo conducted genetic surveys of the three fruits to find markers for locating resistance genes that battle diseases and other stresses. Baldo works at the ARS Plant Genetic Resources Unit in Geneva, N.Y.

Cherries, apples and red raspberries are all members of the *Rosaceae* plant family and contain resistance genes found in many other plants. Working with several colleagues, Baldo found 75 markers for resistance genes in red raspberry. The majority of the markers were unique, but they were anywhere from 50 to 87 percent similar to the markers from other *Rosaceae* species.

ARS computational biologist Angela Bald (right) conducted genetic surveys of cherries, red raspberries and apples and found that all three fruits share key genetic traits for disease resistance.

One of the markers was linked genetically to *Phytophthora* root rot resistance. This discovery might someday help plant breeders develop hardier and more marketable varieties of red raspberry.

Baldo also contributed to the identification of 90 resistance gene markers from sweet and sour cherry cultivars with different levels of resistance to cherry leaf spot and powdery mildew. The markers were compared with other *Rosaceous* markers that researchers have already linked with resistance to a range of pathogens.

The preliminary studies suggest there may be similarities between peach resistance gene markers linked to sharka, also known as plum pox, and cherry resistance gene markers linked to powdery mildew. If additional research confirms these findings, they could support more efficient methods for mapping resistance genes.
Baldo and colleagues also helped find three new groups of resistance gene markers in some 300 wild apple accessions. Plans are under way to map these gene markers and assess their links to regions of the apple genome that convey resistance to fire blight, apple scab and powdery mildew.

Read more about this research in the April 2009 issue of Agricultural Research magazine.

ARS is the principal intramural scientific research agency of the U.S. Department of Agriculture.

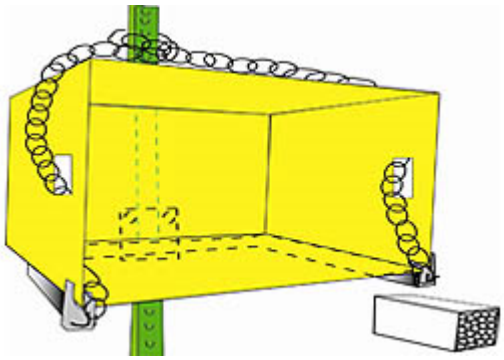
NEED WILD BEES? PLASTIC TOTES MAKE A SUPERB BEE "NURSERY"

Marcia Wood Public Affairs Specialist, Room 1-2214-C, 5601 Sunnyside Ave., Beltsville, MD 20705-5129,

March 20, 2009. Corrugated plastic bins like the kind sold for handling mail and packages can be quickly and easily converted into a durable "nursery" for wild bees, according to an Agricultural Research Service (ARS) research entomologist.

James H. Cane, with the agency's Pollinating Insects Biology, Management and Systematics Research Unit in Logan, Utah, says that female wild bees will readily use a properly placed, suitably furnished tote as a shelter for their nests. Turned on their long side, the totes can be held firmly in place on a wooden or metal post by means of a lightweight steel chain and a customized metal support frame.

Cane came up with the idea of using corrugated plastic totes—available from suppliers of mail and package handling equipment—as nesting shelters, and has tested them during spring and summer in California, Oregon, Wyoming and Utah. His experiments show that the lightweight, rectangular bins, each 23-1/2 inches long by 15-1/2 inches wide by 15-1/2 inches high, serve as a sturdy, inexpensive and reusable shelter for protecting bee nests against wind and rain.



Corrugated plastic totes (right) can be converted into convenient nesting shelters for several wild bee species. Nesting materials encased in milk cartons (lower right) can be stacked in the tote for female bees to use as homes for a new generation of pollinators. (Drawing courtesy of Ellen M. Klomps, ARS.)

Growers, professional and hobbyist beekeepers, and backyard gardeners who want wild bees to live near and work in their fields, orchards, vineyards or home gardens can use the totes to house nesting materials, such as five-sixteenths-inch diameter paper drinking straws enclosed in cardboard tubes and stuffed inside empty cardboard milk cartons. Wild female bees such as the blue orchard bee, *Osmia lignaria*, can use the straws as homes for a new generation of pollinators.
Wild bees are needed now, perhaps more than ever, to help with jobs usually handled by America's premier pollinator, the European honey bee, *Apis mellifera*. Many of the nation's honey bee colonies have been decimated by the puzzling colony collapse disorder or weakened by varroa and tracheal mites or the microbes that cause diseases such as chalkbrood and foulbrood.

A single corrugated plastic tote can accommodate as many as 3,000 young, enough to pollinate one-half to one-acre of orchard. And, unlike bulky or stationary shelters, the tote houses can easily be moved from one site to the next.

Corporate collaborator Quiedan Co., of Salinas, Calif., helped design and now sells the support frame and mounting plate unit.

Cane published the shelter research for the first time in a July 2006 article in *American Bee Journal*. The totes are now being used in California and for Cane's own research in Oregon. *ARS is the principal intramural scientific research agency of the U.S. Department of Agriculture.*

APRIL IS SLOW-MOVING VEHICLE SAFETY MONTH

April 8, 2009. Commissioner David J. Swarts of the New York State Department of Motor Vehicles and Chair of the Governor's Traffic Safety Committee (GTSC) along with Department of Agriculture and Markets Commissioner Patrick Hooker, representatives from the Department of Transportation and the State Police as well as safety advocates from the New York Center for Agricultural Medicine and Health (NYCAMH) and the Future Farmers of America today reminded motorists to share the road with slow-moving vehicles with safety and courtesy as well as reminded farmers of several changes to the State Vehicle and Traffic Law regarding slow-moving vehicle (SMV) emblems and lighting. Governor David Paterson has proclaimed April as "Slow Moving Vehicle Safety" month.

Slow-moving vehicles (SMVs) are all vehicles that operate at 25 mph or less, including: tractors; self-propelled farm equipment; road construction and maintenance machinery; and animal-powered vehicles. Motorists will typically encounter more agricultural slow-moving vehicles from April through October, when farmers are more apt to be planting, maintaining and harvesting crops.

When encountering a SMV on the roadway, motorists should slow down immediately, increase traveling distance to create a safety buffer, be alert and watch for turns into fields, drive courteously and pass with care when it is safe and legal to do so. Motorists should also be aware that animal powered vehicles may make unanticipated movements and remember that SMV operators may have poor visibility due to loads and equipment in tow.

New York State Agriculture Commissioner Patrick Hooker said, "Many farmers are eager to get into the fields and that means many will soon be on the road with plows, harrows and planters in tow. The sheer size of these implements, coupled with the slow speed at which they move, can cause sticky situations when approached or followed by an anxious or unaware driver. Instead of getting impatient, motorists should slow down, use caution and appreciate the work our farmers do."

New York State Department of Transportation Commissioner Astrid C. Glynn said, "This expanded use of emblems and lighting will help draw motorists' attention to slow moving vehicles that may be sharing the roadway. With the passage of these three new laws, Governor David Paterson has shown the importance of balancing the needs of motorists, farm workers and all roadway users, while enhancing safety."

NYS law requires vehicles that travel 25 mph or less to have a slow-moving vehicle emblem placed in the middle of the back end and two to six feet above the road. The emblem must be kept clean and be replaced if faded. Each piece of agricultural equipment, whether self propelled or used in combination, shall separately display a slow-moving vehicle emblem. It is illegal to put SMV emblems on stationary objects - such as mailboxes or driveway posts.

For more information regarding slow-moving vehicles, the SMV emblem and tips for sharing the road safely, please visit the Department of Agriculture and Markets web site (www.agmkt.state.ny.us), the NYCAMH web site (www.nycamh.com), the Future Farmers of America web site (www.ffa.org), the DMV's web site (www.nysdmv.com) or the GTSC web site (www.safeny.com).

(For more information contact: Jackie McGinnis, Ken Brown, 518-473-7000.)

WANTED – BLUEBERRY AND SWEET CHERRY GROWERS INTERESTED IN EXTENDING SHELF LIFE & MARKETING WINDOW

Craig Kahlke is looking for large blueberry growers (dealing in pallets of blueberries) and any size sweet cherry growers to test out modified atmosphere packaging (MAP) that can extend blueberry shelf life 6-8 weeks and sweet cherry shelf life up to 4 ½ weeks. This is passive packaging that does not need any gases pumped in. The bags are inexpensive and reusable. If you farm in the counties of Monroe, Orleans, Oswego, Niagara, and Wayne- Craig will be available for on-farm visits to give instructions in use. If you are outside the 5 county Lake Ontario Fruit Program territory, you would need to attend a demonstration in one of these counties. For anyone interested or wanting more information please contact Craig at 585-735-5448 or cjk37@cornell.edu.

NOP ANNOUNCES PLANS FOR EQUIVALENCY AGREEMENT

At the Organic Trade Association's policy conference March 25, 2009, Barbara Robinson, deputy administrator at USDA and Acting Director of the National Organic Program, announced that the US and Canada have agreed to sign a letter of agreement to have an equivalency agreement in place in time for the June 30, 2009 COR implementation date.

Therefore, Canada and the United States are expected to sign a Memorandum of Understanding (MOU) that would act as an equivalency agreement for organic imports and exports between the two countries.
The equivalency agreement will apparently include the following provisions:

1. Organic producers in Canada must be certified under the Canada Organic Regime (COR) and United States organic producers must be certified according to the standards established by the National Organic Program (NOP).
2. US organic products must be produced without the use of Sodium (Chilean) Nitrate in accordance with the COR.
3. Any livestock products produced in Canada must be raised without the use of antibiotics prohibited by the NOP.
4. The USDA and Canadian Organic Logos may be used by BOTH Canadian and United States producers and certified organic products may travel between the two countries as long as they meet all of the requirements established within the equivalency agreement. This means that operations certified to either standard in their own country will be able to utilize either the Canadian or USDA organic seals. However, the Canadian Organic Logo may not be used on ANY product prior to the implementation date of June 30, 2009.

STATE BUDGET NEGOTIATIONS INCLUDE INCREASES IN PESTICIDE FEES

State budget negotiations have targeted significant increases in fees for pesticide applicators and registrations. The first $5 million from these fees will go to the Environmental Protection Fund with additional funds raised from the fees to the Environmental Conservation Special Revenue Fund for regulatory activities.

- Aquatic pesticide application fee is increased to $100.
- Commercial permit for sale of pesticides fee is increased to $600 for each location of sale in the state.
- Application fee for pesticide certification is increased to $100.
- Certification fee is increased to $450 for one category, to $150 for each additional category.
- Certification fee with subcategory 3A ornamentals, shade trees and turf or only subcategory 3-B turf is increased to $200.
- Pesticide business registration fee is increased to $950.
- Product registration is increased to $600 for each proposed product by companies showing $3.5 million or less in gross annual sales. $620 fee for all others.

(Source: CCE Washington County AgReport, April 2009)

NEED HELP?

NY FarmNet 1-800-547-3276

Farm Family Consultants and Farm Business Consultants provide free and confidential on-farm visits to answer questions and help find solutions to concerns. Topics include (but are not limited to) business and family finances, farm changes, farm management, disaster, stress, family communication and conflict.

Sometimes the consultant will only make one visit, but more frequently the consultant will make several visits. In some cases two consultants will make co-visits in order to assure that both farm and family concerns are addressed.

News from the NYS Berry Growers Association

NYS Berry Growers Seek Funds for Promotion

Dale Ila Riggs, Chair
The Berry Patch, Stephentown NY

As I write this column, it seems like berry season will never arrive. Snowflakes are drifting down, with more in the forecast for the next two days. It is certainly not the harbinger of an early season. But it's a good day to be preparing for the upcoming season with planning work. Like you, the Board of the NYSBGA has been busy planning for the future. We have submitted a proposal to the Ag Enhancement Grants program of the Farm Credit system seeking funds to "kick-start" a promotions and marketing program. If we are fortunate enough to receive one of these competitive grants we will hire a graphic designer to update our logo and to develop poster size point of purchase materials for our members to use in their retail operations. If we are not successful in this grant application, we will seek some other sources to find funds to get this program started. By the time this next column is due, we should know if we've received the grant.

And speaking of planning for the future, have you checked your "Find a Farm" listing on the NYSBGA website? Please check it and let Paul Baker (Executive Secretary of the NYSBGA) at goodberries@roadrunner.com know if any updates need to be made. He will pass along the information to our webmaster. For those of you who are not members, the opportunity to participate in the "Find a Farm" section of our website is worth far more than the membership dues for the Berry Growers Association. *If you are not yet a member, use the membership form following this page and we can get you on our website.* We're the best deal going in agriculture! Please join us **today**.

Still Time to Join and be seen on Line!

Paul Bakers, Executive Secretary
Watertown, NY

As you evaluate the marketing and growing season I want you to consider if there were not some missed opportunities that if you had it to do all over you might have done a little differently. How can I structure 2009 to return my operation higher net returns and reduced growing problems? Am I doing enough to ensure a work force in the new crop season? If any or all of these thoughts are surfacing in your mind than you are not alone.

The New York State Berry Growers Association is perhaps one tool you could take better usage of or support in a different way. Our stated goals are to help the membership increase marketing opportunities, encourage research designed to answer the issues that are challenging you, support variety trials to give you insights into different varieties you might try on your farms and to be your advocate in government to promote legislation to support your needs. Berry operations in New York for the most part are small units of larger farm operations or a passion that is pursed by the part time grower.

In 2008 the Board of Directors stepped up the efforts to initiate changes for our industry. Marketing has always been a need for out membership so we increased our PR program to help promote the season.

In 2007 we issued thee press releases that were sent to 1387 media sites across New York State. These releases ran from June 4 to July 12. In 2008 we decided that we needed to do more. From June 2 to July 25 we released seven different press releases across New York State. For the 2008 season we sent these press releases to 2885 different media outlets. We more than doubled our number of press releases and increased the exposure by greater than two fold.

Join today and be seen by everyone searching for your berries this season!

New York State Berry Growers Association

Chairperson-Dale Riggs-(518)733-6772 Treasurer-Anthony Emmi-(315)638-7679

Executive Secretary-Paul Baker-(716)754-4414 Cell (716)807-6827

goodberries@roadrunner.com

www.nysbga.org

MEMBERSHIP RENEWAL/APPLICATION 2009

Name_____ (Renewal_____ New_____}

Farm or Business Name_____

Address_____

City _____State _____Zip_____

Phone_____Fax_____

E-Mail Address_____ County_____

Crops: Blueberries_____ Raspberries_____ Strawberries_____

Ribes _____ Vegetables_____ Fruit_____

Per cent U-Pick _____Retail _____Wholesale_____

Membership Fee – 1 Year 2009 $50.00 _____

Research Fund $50.00
$100.00
$200.00

_____

TOTAL ENCLOSED _____

Please make check payable to New York State Berry Growers Association

Or NYSBGA and send to:
Paul Baker, Executive Secretary NYS Berry Growers
665 Sara Court, Lewiston, NY 14092

Cancelled check will serve as your receipt, unless otherwise requested

CAYUGA CCE HOSTS ONE OF FIVE REGIONAL BERRY WORKSHOPS

Dan Welch, Agriculture Resource Educator, Cornell Cooperative Extension of Cayuga County, Auburn, NY 13021

Thirty-six participants braved bitterly cold temperatures to attend the first of five 2009 Regional Berry Workshops. Grisamore Farms in Locke, NY were co-hosts of the event. Producers came from across the eastern Finger Lakes to learn the basics of pruning and pest management for blueberries and raspberries.

Dr. Marvin Pritts, professor in the Department of Horticulture, discussed how cultural practices influence plant health and insect/disease management. His talk focused specifically on how pruning can be used to promote plant growth.

Growers took advantage of Dr. Pritts's expertise to ask questions, especially about fall-fruiting raspberries.

Workshop organizer Dan Welch welcomes participants

Laura McDermott talks about pesticide safety

Next, Cathy Heidenreich, Berry Extension Specialist for Western New York, delivered a talk on the most common pest problems affecting blueberries and raspberries in New York State and the effect pruning has on management of each one. Despite the cold temperatures outside, the greenhouse at Grisamore's was very warm and very bright. This made some of the visuals of the pests hard to see. Even without the pictures of the pests it was still a great review of pests and pest management.

Laura McDermott, Berry Extension Specialist for Eastern New York, presented information on sprayer calibration and safety. It was great to have Laura come all the way from Hudson Falls to present at this workshop.

After a break for refreshments, everyone went outside for the hands-on portion of the workshop. The first stop was a review of sprayer calibration on an air-blast sprayer. Participants were able to see how water-sensitive paper could be used to assure proper spray coverage of the canopy.

Dan and Laura check water sensitive paper after sprayer passes

Dr. Pritts demonstrates blueberry pruning

Pruning was next on the agenda. Dr. Pritts showed the attendees how to properly prune blueberry plants. Despite the cold, the workshop was a success, and everyone is looking forward to the next berry extension program. Thanks to Grisamore Farms for hosting this workshop!

PRUNING AND ITS IMPACT ON PEST MANAGEMENT – A SUMMARY

Marvin Pritts, Cathy Heidenreich, and Laura McDermott, Department of Horticulture, Cornell University CALS, Ithaca, NY

During March and early April, a series of pruning workshops were held across New York State. Over 100 berry growers attended these 3 hour presentations in Cayuga, Columbia, Delaware, Jefferson, and Livingston counties. The purpose of the workshops was to encourage growers to revisit their present pruning and sprayer calibration practices and to highlight effects of annual pruning on pest management.

Pruning is a fundamental aspect of berry culture and sprayer calibration is a necessity for good disease management, so reinforcing best management practices will help growers see more consistent yield and increase plant vigor while also promoting better pest management.

PRUNING BLUEBERRIES

(*Marvin Pritts*)

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

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

Selecting canes for removal

When selecting canes for removal, first look for any winter-injured or broken canes, or canes with disease and insect damage. If injury is severe, remove that particular cane. Cankers and scales are common pests that can be partially controlled through pruning. Second, remove any cane that is rubbing against another to prevent canker infections. Third, remove those that are interfering with movement through the alley. Aim for a plant with an upright growth habit, yet with a sufficiently open canopy to allow for light penetration. Mechanically harvested bushes should be trained to a more upright habit and narrower crown than those that are hand harvested. Finally, remove short, branched canes that never receive much light. If these canes produce fruit, it will ripen late and will rarely be harvested.

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

Time of pruning

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

Pruning young bushes

Little pruning is required on young bushes. Remove flower buds for the first two years to promote vegetative growth. This can be achieved by rubbing off the fruit buds, or by pruning the tips of shoots where the flower buds are located. At the beginning of the third year, remove any twisted or low-growing canes to promote new cane production.

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

Mature bushes

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

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

Regularity of pruning

Annual pruning is essential for stable production and high productivity. When bushes are pruned irregularly, young canes are produced in great numbers the year after heavy pruning. These canes will age together, and become unproductive at the same time. If one then wants to prune out the unproductive canes, nearly the entire bush will have to be removed. Also, no young growth is present to make up for the loss of fruiting wood. Therefore, irregular pruning results in erratic yields from year to year, and tall bushes will develop as individual canes elongate to compete for light. Research has shown that annual, moderate pruning produces bushes with the fewest canes, but with the greatest yields.

Detailed pruning

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

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

Rejuvenation

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

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

Summary
Pruning is an investment in the future productivity of the blueberry planting. Regular annual pruning will spread costs throughout the life of the planting, ensure stable production from year to year, and serve as a useful tool for managing pests, fruit load, and quality.

BRAMBLE PRUNING AND TRELLISING

(Marvin Pritts)

Plant growth can be manipulated by growers to achieve long-term increases in production of quality fruit. Pruning and trellising affect plant growth rate, fruit quantity and size, soluble solids (sugars), disease susceptibility, ease of harvest, and spraying efficiency. Brambles respond significantly to pruning and trellising, but these practices are usually the most expensive and time-consuming part of an operation. Growers must use care when choosing pruning and trellising strategies.

Primocane-Fruiting (fall-bearing) Raspberries

Primocane-fruiting raspberries produce fruit at the top of first-year canes in late summer. If allowed to overwinter, these same canes will produce fruit again in early summer of the second year. However, the quality of this early summer fruit is inferior to both the late summer primocane crop and summer crops of floricane-fruiting types. Also, harvesting the early summer second-year crop is difficult because of interference from new primocanes. Likewise, harvesting the late summer primocane crop is difficult because the primocanes are thinner and taller when the second-year canes are allowed to grow, too. Most growers sacrifice the early summer second-year crop in favor of a smaller, but higher quality late summer primocane crop.

Pruning
The smaller yield of a single late summer primocane crop is offset by the ease of management. To prune primocane-fruiting raspberries for a single late season crop, the canes need only be cut to the ground in early spring. New canes will grow each year and fruit in late summer, the canes will be cut early the following spring, and the cycle continues.

It is important to cut old canes as close to the ground as possible so that buds will break from below the soil surface. If canes are not cut low enough, fruiting laterals may form on any remaining cane portion. These fruiting laterals are not healthy; they are entry sites for insects and disease pathogens. Also, any fruits that form will most likely rot, attracting pathogens and creating a source of inoculum (disease-conducting material) for the late summer crop. All canes that are cut from the planting should be removed from the area and destroyed. In warm climates, the primocane crop can be delayed by mowing the young primocanes a second time when they are approximately 1 foot tall. Pinching the primocanes (removing the growing tip) in July to stimulate growth of laterals will also delay fruiting. This is sometimes done to delay harvest until after the intense heat of July.

The timing of cane cutting is also important. Carbohydrates move from plant leaves into the crown in autumn and from the crown to the buds in early spring. If canes are cut before all the carbohydrates reach the crown in autumn, the new canes may not be as vigorous the following year. Canes can also be cut too late, after carbohydrates have moved into the buds. From December through February, most carbohydrates are in the crown, so this is the ideal time to cut canes.

The advantages of a single cropping system are that (1) cane thinning and detailed pruning and tying are eliminated, (2) cold injury of buds is eliminated, (3) winter damage from rabbits or voles is eliminated, (4) spur blight, anthracnose, cane blight, and several other diseases are reduced, (5) sap beetle problems are reduced and other insect problems are eliminated, and (6) applications of fertilizers and pesticides are made easier.

Yield of primocane-fruiting types is influenced mainly by (1) the number of canes per unit area and (2) the number of berries per lateral. Growers can influence the number of canes produced by plants. Since large numbers of canes do not seem to decrease fruit size in the fall crop of primocane-fruiting raspberries, growers should try to produce as many canes per area as possible. This can be done by planting narrow rows and more rows per acre. Row widths of 12-18 inches are considered ideal for harvesting. The distance between rows should be wide enough to allow available equipment to pass. The other factor influencing yield, the number of berries per lateral, generally depends on the particular cultivar being grown. The grower has little control except to choose productive cultivars.

Floricane-Fruiting (summer-bearing) Raspberries and Blackberries

Floricane-fruiting brambles produce fruit only from buds on second-year canes. Unlike primocane-fruiting raspberries, these canes must remain intact throughout the winter and following growing season, until the completion of harvest. Also, during second-year flowering and fruiting on floricanes, new first-year primocanes are growing. These primocanes interfere with spraying and harvesting, shade the leaves and laterals of floricanes, and compete for water since they share a single root system. This interference must be minimized to obtain a high yield of fruit each year.

Pruning

Five general methods of pruning floricane-fruiting brambles are described below. Each method will produce different results in the growth of primocanes and floricanes of floricane-fruiting crops. Also, with the following methods, row widths should be maintained at no greater than 18 inches.

Conventional: No Mowing or Suppression of Primocanes

This training system is traditionally used by bramble growers in the Northeast. Primocanes emerge and are permitted to grow throughout the season. The following year, they become floricanes, flowering and fruiting as new primocanes. Immediately after fruiting, however, the floricanes are cut at ground level and destroyed. Some carbohydrates are lost by cutting canes in summer. However, this loss is offset by the advantages of reduced disease inoculum and a reduction in dormant season pruning. In early spring, all remaining canes are topped (headed back) to a convenient height for picking, since little vegetative growth occurs in the second season. Canes are thinned to a desired number, usually 3-4 canes per square foot. When thinning, the most vigorous canes should be selected to produce the next crop -- those with good height, a large diameter, and no visible symptoms of disease, insect damage, or winter injury.

Alternate Year Mowing

Primocane interference among floricanes is reduced by alternately mowing half of the planting to the ground each year during the dormant season. In the spring after mowing, primocanes will emerge and grow without interference from fruiting canes. The following year, the floricanes will flower and fruit. Although primocanes will also grow in the fruiting year, all canes will be cut to the ground during the next dormant season. Advantages of this method are that no detailed cane thinning or pruning is required, and spray material costs are reduced approximately 50%. Disadvantages include a reduction in fruit quality, berry size, and yield of approximately 30% for most cultivars, since only half the planting is fruiting in any one year. This system is particularly desirable for thorny blackberries.

Alternate Year Mowing with Primocane Suppression

The reduction in yield caused by alternate year mowing can be recovered over the short-term by removing all primocanes from the plant row during the fruiting year. The elimination of primocanes after they begin growth is called “suppression.” After the first few flushes of growth are removed, primocanes eventually will be allowed to grow.

A system that involves mowing in one year, followed by primocane suppression in the second year, is truly biennial -- primocanes grow without interference from floricanes, and floricanes grow without interference from primocanes. Removing primocanes, however, is not easy. Dinitrophenol products can no longer be used, so growers must find other ways to remove primocanes until new products are developed.

The advantages of this method are the ease of pruning when done in early spring, and a reduction in spray materials cost. Disadvantages are a reduction in yield over the long-term, since only half the planting is fruiting in any one year, and the cost of primocane suppression (labor, materials).

Primocane Suppression without Mowing

The highest long-term yields and largest berry sizes have resulted from a combination of selective floricane thinning followed by suppression of primocanes in late spring. If primocanes are suppressed or removed when 6-8 inches tall, shading on the lower portions of floricanes is reduced. Harvesting is easier because smaller primocanes cause less interference. Primocane suppression has also been reported to increase hardiness.

Since there is less shading and fewer demands for water, fruit size and productivity of lower laterals are increased. Primocanes of vigorous cultivars can still grow to a sufficient height for adequate fruiting the following year.

Primocanes should not be suppressed until the planting is at least three years old. Primocanes contribute large amounts of carbohydrates to the bramble plant, and repeated suppression will reduce carbohydrate levels. Therefore, suppression should be skipped every third or fourth year to allow the planting to recover from the general reduction in vigor. Weak hills or sections of rows should not be suppressed at all.

There are conditions under which suppression of primocanes is not recommended. If a fruit crop load is particularly heavy, primocane growth may decrease naturally as developing fruit demands all the plant resources. Also, if primocanes are suppressed in regions with short growing seasons, they may be too short at the end of the growing season. Suppression

is not recommended under the above conditions, or whenever the plant is stressed, such as from a lack of moisture or a nutritional imbalance.

Advantages of primocane suppression are: (1) increases in fruit size and quality, (2) increases in production, and (3) reduced cane numbers. Disadvantages are: (1) long-term reductions in stand vigor and (2) expenses involved with primocane suppression or elimination.

Partial Primocane Suppression

Yield and quality may be increased without suppressing all the primocanes in a planting. Removing all but 4 or 5 primocanes per linear foot of row in spring will increase yield and fruit quality in floricanes of some cultivars.

For this method, growers select the primocanes in late spring which will be carried into the following year for fruiting. Rejected primocanes are cut to ground level when 8 inches tall. The raspberry plant uses resources for the current fruiting canes and the remaining primocanes, rather than for many primocanes which would eventually be removed.

Primocane regrowth is ignored until the dormant season when these short canes are removed. Advantages of this system are: (1) selected primocanes grow for an entire season instead of the partial season permitted in complete primocane suppression, (2) rejected primocanes are removed when small, succulent, and easy to handle, as opposed to large and thorny, and (3) fruit size and quantity of current season is increased. The major disadvantages are: (1) primocane selection is difficult when leaves are on the plant, and (2) suppression of undesirable canes requires much labor.

Pruning Details for Floricane-Fruiting Raspberries

Red Raspberries

Productivity in summer-fruiting red raspberries is most closely related to the number of canes. Unlike the situation with primocane-fruiting raspberries, however, fruit size decreases as cane numbers increase. Growers must maintain a high number of canes, but not high enough to greatly reduce fruit quality. In general, 3-5 large canes per linear foot of row is the optimal range with a plant row width of 12-18 inches.

On summer-fruiting raspberries, buds at the top of a cane often winter kill because they are less mature and less hardy than buds lower on the cane. Spring pruning should be delayed until winter injury on canes can be identified, usually by mid-March. Canes should be topped as high as the trellis and harvest operations will permit, but below the point of winter injury. Severe topping will increase fruit size but will greatly reduce yield. To prevent a loss in yield, no more than the top one-fourth of a cane should be removed.

Growers may choose any of the five general pruning methods described for summer-fruiting raspberries. Each method will produce different effects on yield and productivity. After pruning, canes are tied loosely to the trellis wire to prevent wind damage of laterals after bud break. Canes should be spaced evenly along the trellis wire, or equally divided and spread between sides of a V-trellis.

Tipping (pinching off the tips) of red raspberry primocanes during the growing season to promote lateral growth is not recommended in the Northeast. This procedure slows cane development, does not stimulate much branching, and makes the plant susceptible to winter injury.

Primocane-fruiting blackberries

Summer tipping of primocane-fruiting blackberries (prior to flower bud formation when canes are about 3 feet tall) has been found to increase yield by as much a three-fold. However, it also delays harvest slightly. In the Northeast, the growing season is sufficiently short that blackberry fruit may not ripen, and any delay is detrimental. We will be studying ways to manage primocane-fruiting blackberries, including fruiting them under a high tunnel to extend the growing season. At this point we do not have good recommendations for pruning them.

Black Raspberries

In contrast to red raspberries, black raspberries respond well to primocane tipping. Many more fruiting buds are produced on black raspberry lateral branches than on the main cane, so primocanes are pinched back at a height of 28 inches to stimulate lateral branching from the main cane. At least 4 inches of tip should be removed during pinching. Several passes through the field may be required since canes grow at different rates. Ideally, primocanes should be tipped just above a bud so very little dead wood is left between the pruning wound and the bud. Dead wood can be a site for cane blight infection, especially if wet weather follows tipping.

Some growers tip black raspberries mechanically by shortening fruiting canes to a height of 22 inches in early spring. Later in the spring, several passes are made with a sickle bar mower at 24 inches. Although this method is less labor intensive than tipping, primocanes will be more susceptible to cane blight infection since there is little control over wound size or the amount of dead wood between the cut and first bud.

At the end of the first year, black raspberry primocanes are branched with long laterals. These lateral branches should be supported by trellis wires before October since wet snow tends to break them off the main cane. Also, canes are more flexible in early autumn than in late autumn and are less prone to breaking from the crown during trellising.

A large portion of the lateral branches may be killed during the winter since black raspberries generally are not as hardy as red raspberries. Black raspberries could be pinched higher, but shorter laterals would result and the winter damage would be greater. If the whole lateral is permitted to fruit, smaller berry size will result. Laterals are shortened (headed back) in early spring to remove winter damaged wood and to maintain berry size. Some growers shorten laterals to less than 10 inches. The choice of lateral length depends on cultivar vigor and the relationship between crop size and fruit size. The relationships among productivity, fruit size, and lateral length are not well known.

Whatever general pruning method is chosen, leaving 4-6 canes per crown should give most growers acceptable yields of large fruit. Black raspberries will respond well to partial primocane suppression. Full suppression is not recommended because black raspberries produce few primocanes.

Purple Raspberries

Purple raspberries perform best if pruned similarly to red raspberries. Purple raspberry primocanes may be tipped, like black raspberries, but wounds are often an entry site for cane diseases which kill part of the cane.

If a grower chooses not to tip purple raspberries, the canes will grow very tall, and the trellis should be able to support such vigorous growth. Primocane suppression can be used to control this vigor with good results. Some natural branching will occur near the base of primocanes when growing conditions are favorable. These canes may be removed or allowed to fruit.

If primocanes are tipped to keep the plant short and compact, it should be done when primocanes reach a height of 32 inches. At least 4 inches of tip must be removed. Many lateral buds will break near the top of the cane, and fewer near the base. Lateral branches should be shortened below any winter damage in early spring.

Tipped plantings without cane diseases will generally produce higher yields, but berries on the long laterals are more difficult to harvest. Also, long lateral branch or cane length generally results in smaller fruit size. Larger fruit can be obtained by shortening canes or lateral branches in early spring, but at the expense of yield.

Pruning methods that leave 3-4 fruiting canes per linear foot of row produce acceptable yield and quality of fruit. Purple raspberries respond favorably to primocane suppression but do not respond well to mowing.

Thorny Blackberries

Thorny blackberry primocanes are tipped when 3-4 feet high to stiffen canes and cause lateral branching. The laterals are shortened to 12-16 inches in early spring, and canes are thinned to two per linear foot of row. Longer lateral branches will produce more but smaller fruit than will shortened laterals. Growers may choose alternate year mowing methods to avoid the difficult task of pruning the thorny canes.

Thornless Blackberries

For two years after planting, thornless blackberry primocanes tend to grow along the ground, like a vine. Growers may have to move trailing canes in the direction of the row to allow room for cultivation. After two years, however, canes become more erect and are naturally branched. Thornless blackberry canes are thicker and more flexible than raspberry canes.

Because of the poor hardiness of thornless blackberries, northern growers must take special precautions to protect canes during winter. Although canes are somewhat flexible, they will not bend to the ground after the third year to be covered with mulch or straw. Some growers tip thornless blackberry primocanes when they reach a height of 24 inches so that low growing laterals are more easily protected during winter.

In spring, the canes should be tied at least 3 feet above the ground to trellis wires. Fruiting canes are either shortened to the top trellis wire or woven around the wire. Woven canes should overlap no more than two or three feet with an adjacent plant. Lateral branches are shortened to approximately 18 inches, and laterals on the lower two feet of cane are removed. Thinning canes to 6-8 per hill will maintain acceptable production. Partial primocane suppression is recommended for thornless blackberries.

Thornless blackberries have been grown successfully using a variety of trellising systems which are required to hold canes above the ground. The double curtain V-trellis has been very successful. Fruiting canes are tied to one side of the V and

primocanes to the other. Primocanes and floricanes alternate sides of rows across the field, so each row middle is bordered by canes of the same age. This pattern makes spraying and harvesting easier.

We will be studying a new pruning and trellising technique (rotatable cross-arm trellis) over the next few years that will allow thornless blackberry canes to be laid on the ground during the winter and covered with row cover for protection.

PRUNING AND PESTS – A CLOSER LOOK

(*Cathy Heidenreich*)

Most blueberry and bramble growers will tell you the reason for regular pruning is to improve production. Clearly, plantings that received regular pruning along with other cultural practices designed to promote plant growth provide best yields. There is more to maximizing your bottom line than fruit production however. Regular annual pruning also has a positive effect on pest management.

Impact of pruning on pest management

Regular annual pruning can have direct and indirect impacts on pest management. Disease and insect establishment and spread are favored by closed plant canopies and high humidity. Indirect pruning impacts on berry production focus on maintaining an open canopy and good air and light penetration within the planting. . Pruning maintains proper plant densities and spacings. This in turn speeds up drying of branches, twigs, canes, and foliage within the canopy by improving air circulation and allowing more sunlight to penetrate the canopy. Moreover, an open canopy improves spray coverage, maximizing the effect of pest management applications when needed.

Pruning also directly impacts pest management. Removal of dead tissue reduces potential infection sites, decreases overwintering disease inoculum and in some instances lessens carryover of insect pests.

General pest management strategies

Pruning is only one of many pest management strategies you should have in your berry production arsenal. Remember, pest management should begin before planting! If you poll a crowd, almost everyone has a favorite apple. You would be hard pressed to find more than a handful of people who could tell you their favorite blueberry or raspberry. Most often the response to that question is simply “big!” That means you have much greater scope for choosing what varieties to grow; select resistant cultivars whenever possible.

A key pest management tool is selection of planting material. Blueberries and raspberries are a long-term investment, so it makes sense to begin with clean planting material. Virus indexing is particularly important in this respect. Plant only certified disease-free planting stock from a reputable nursery.

Select planting sites that minimize environmental factors favoring disease and insect development. Sites with good soil and air drainage are preferred.

Consider production methods that improve air movement and light penetration in the canopy to minimize disease development and spread. These include orienting crop rows with prevailing breezes, spacing plants properly at planting, thinning to proper cane density, and in the case of brambles, maintaining narrow rows.

Maintain overall plant health. Avoid high rates of nitrogen; succulent growth encourages disease development.

Reduce overwintering inoculum. Prune out old fruiting canes. Remove dead and dying canes after harvest. Remove and destroy prunings, infected canes, fruit, and debris promptly.

Blueberry fruit diseases

Botrytis Blossom and Twig Blight and Fruit Rot of Blueberry: Botrytis (gray mold) infects young shoots (twigs) and blossoms, leaves, and fruit. Infected twigs turn brown to black and later bleach to tan or gray. Twig infections by this fungus are frequently mistaken as winter injury. Gray mold overwinters in debris or as black sclerotia on twigs. This disease occurs most often after several days of rainy or foggy weather.

Management: Cultural practices that improve air movement in the canopy such as annual pruning and removal of old canes and twiggy wood to increase air circulation. Avoid excessive application of spring nitrogen. Effective fungicides applied during bloom.

Blueberry anthracnose: This fungus overwinters in remnants of old fruiting twigs and infected canes. In spring and summer, fruiting bodies release spores which are dispersed by rain and infect flowers, fruit and other tissues. On twigs, dark brown lesions may originate from infected buds and kill part of the twig. On the leaves, lesions look reddish brown with distinct borders. Flower and green fruit infections may occur at any time, but are often are not apparent until after berries ripen. Anthracnose occurs primarily during warm, wet seasons most often after several days of rainy or foggy weather.

Management: Plant resistant cultivars. Create an open canopy to reduce humidity and increase spray penetration. Prune out old or infected wood. Limit overhead irrigation. Harvest in a timely manner. Cool fruit rapidly after harvest. Apply effective fungicides from pink bud to harvest.

Blueberry cane diseases

Phomopsis canker: New shoots wilt and die back from tip to crown. Wood and pith become discolored. Mature canes suddenly wilt and collapse during summer. Suspect this disease if single canes die while the rest of the plant remains healthy.

Fusicoccum canker: Small, water-soaked lesions develop on green stems in the fall. These expand into sharply delineated, reddish brown cankers during the following spring and summer. Cankers usually center on a leaf scar, are 1 to 10 cm in length, and have a bull's-eye pattern. Most cankers are near ground level, but some occur as high as 3 feet above the ground. Cankers enlarge each year until they girdle and kill the stem. Wilted leaves remain attached. Small, black fruiting bodies of the fungus may be found in cankers.

Botryosphaeria canker: A vascular disease starting from a wound site. Early symptoms are small red lesions on succulent stems. Lesions become swollen and broadly conical in about 6 months. On susceptible cultivars, large, swollen cankers develop, with deep cracks and numerous fruiting bodies, after 2 to 3 years. Stems may be girdled and killed. Flagging of infected stems (do not drop leaves) occurs during warm summer months. Look for light-brown discoloration of stems when cut.

Canker management: Cultural practices are more effective than chemical management for these diseases. These practices include: minimizing winter and early spring frost injury, avoiding mechanical damage, using drip irrigation to minimize drought stress, pruning out and burning cankered twigs and canes as they appear, removing all brown tissue below the canker, managing fertilizer to avoid formation of succulent shoots late in the season. Dormant applications of elemental sulfur or copper may help reduce inoculum.

Crown gall: A soil-borne bacterial disease infecting the plant vascular system. Galls are most commonly found at the base of canes or near the soil line. Infected plants may appear stunted or weak. Foliage may discolor prematurely in summer.

Management: Because this is a systemic disease, pruning out galls will not prevent further spread. Remove and burn infected plants where possible. Minimize wounding. If infected plants are allowed to remain, sterilize pruners (10-20% bleach solution) between pruning cuts to prevent spread between plants.

To prevent disease introduction plant disease-free nursery stock in non-infested soils. Grow grasses or vegetables in infested fields for at least 2 to 3 years before replanting. Dip new plants in a suspension of the biological control product *A. radiobacter* strain K84 before planting in soils with known infestations of this bacterium.

Witches' Broom: Diseased plants have broom-like masses of swollen, spongy shoots with short inter-nodes and small leaves. Young stems on the brooms are initially yellow or reddish, but later become brown and shiny, and, eventually, dry

and cracked. Heavily infected plants produce no fruit. The brooms can persist for many years, producing infected new growth every year.


Management: Because the pathogen is systemic in the blueberry crown, pruning will not eliminate this disease. Remove fir trees within 500 yards (460 m) of planting. Eradicate infected plants with an herbicide. 'Rancocas' is a resistant cultivar.

Blueberry insects

Insect stem gall: A periodically important pest, especially of young plantings. Stem gall wasps cause kidney-shaped or spherical growths (2 to 4 cm in diameter) on blueberry stems. The tiny, flightless wasp overwinters as adults in galls, then craws or hops during or just after bloom to other young stems to lay several eggs in early June. The galls develop around these stems during the year, turning from green to brown.


Management: Adult wasp emergence is protracted; chemical measures are of little use. Hand picking (pruning out) and burning galls when leaves fall after harvest is the most advisable course of action. Repeat during growing season as blighted tips appear.

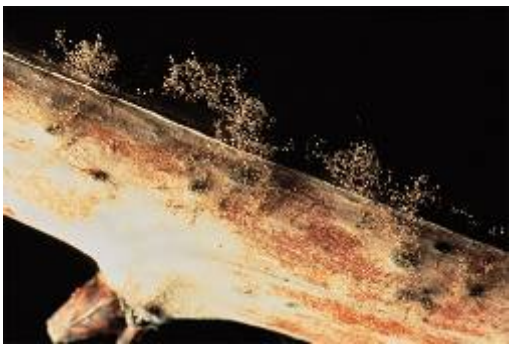
Scale insects: A number of species of scale insects, including Oystershell and European lecanium scale, feed on twigs, reducing plant vigor. Scale infestation can cause loss of bush vigor, sooty mold, and blemished fruit. Look for hard-covered female insects on small branches in spring.


Management: Scales typically occur in older fields on old wood, so regular pruning is the most effective control. Make dormant oil applications during bud swell, before the first leaf stands out from clusters. Thorough coverage is essential for good results.

Raspberry fruit diseases

Botrytis (gray mold): This fungus causes blossom blight, preharvest rot, postharvest rot, and cane infections. On raspberry, it overwinters as sclerotia on canes and mycelia in dead leaves and mummified fruit. Initial infections of flowers are latent; the fungus is dormant until fruit ripens. Fruit rot is usually more prevalent in wet weather. Conidia can infect mature or senescent leaves, resulting in primocane infections through petioles. Cane infections appear as tan to brown lesions often encompassing more than one node. Cane lesions exhibit typical concentric "watermark" patterns from fall through late winter. Sclerotia may be visible on canes as shiny, black, blister-like structures.





Management: Practices that improve air circulation, increase light penetration, and speed drying of plant surfaces after irrigation and rain help reduce incidence of gray mold. These include creating an open plant canopy, using a double top wire training system, annual pruning, avoiding excessive nitrogen fertilization, and controlling weeds and early season primocanes.

Pick fruit in the coolest part of the day. Keep harvested fruit in shade while in the field, then move to cold storage as soon as possible.

Switch from overhead to drip/trickle irrigation wherever possible. If overhead irrigation is used, irrigate during early morning just before the sun rises so plants dry quickly.

Protectant sprays should be applied first at 5% bloom and then again 7 to 10 days later when risk of infection is present. More applications during the growing season aid control during wet weather. Thorough coverage and canopy penetration are essential.

Raspberry cane diseases

Raspberry anthracnose: Appears in the spring on young shoots as small, purplish, slightly raised or sunken spots. Later, spots enlarge and become ash gray in the center with slightly raised purple margins. Spots are often so close together on black and purple raspberries that they form large irregular areas (cankers). Cankers may encircle the cane, causing the death of the cane beyond the canker. Bark in badly cankered areas often splits. Late season infections result in superficial gray oval spots with definite margins, but are not sunken. These may become so numerous that they blend together, covering large portions of the cane. This is the characteristic “gray bark” symptom which is common on red raspberry. Anthracnose sometimes attacks the leaves and can cause some leaf drop. Small spots, about 1/16 inch in diameter, with light gray centers and purple margins appear on the leaves. Lesion centers later fall out, leaving a shot hole effect. Fruit may also be infected, causing deformed, pitted, slow-ripening drupelets.



Spur blight: The symptoms first appear on young first-year primocanes in late spring or early summer. Purple to brown lesions appear just below the leaf or bud, usually on the lower portion of the stem. These lesions expand, sometimes covering all the area between two leaves. In late summer or early fall, bark in the affected area splits lengthwise and small

black pycnidia appear in the lesions. Leaflets sometimes become infected and show brown, wedge-shaped diseased areas, with the widest portion of the wedge toward the tip of the leaf. Infected leaflets may fall off, leaving only petioles attached to the cane. When diseased canes become fruiting floricanes, side branches growing from diseased buds are often weak and withered.



Cane blight: On first-year canes (primocanes) dark brown-to-purplish cankers form near the end of the season where pruning, insect, and other wounds are present. Cankers enlarge and extend down the cane or encircle it, causing lateral shoots above the diseased area to wilt and eventually die. Pycnidia (blackspecks) develop in the brown cankered bark. In wet weather, large numbers of microscopic spores ooze out of these structures. This ooze gives the bark a dark-gray, smudgy appearance. During winter, infected canes commonly become cracked, brittle, and snap off easily. On infected second-year canes (floricanes), the side branches may suddenly wilt and die, usually between blossoming and fruit ripening. Upon close examination, the presence of dark brown or purplish cankers can be observed on the main cane or branches below the wilted area.

Cane disease management: Prune out and burn infected canes. Pruning for black raspberries should be done during a period of dry weather to force lateral growth so wounds will dry. Prune canes out at ground level; these fungi overwinter on cane stubs. Switch to drip/trickle irrigation where possible. Where overhead irrigation is in use minimize or adjust irrigation so plants are not wet long. Irrigate in the early morning to minimize the period that plants remain wet. Other cane disease management options include early-season primocane control for raspberries and use of an alternate-year fruiting system for blackberries.

Raspberry insects

Raspberry crown borer: The first indication of injury is wilting and dying foliage on the affected cane. Several canes of a bush can be weakened by the activity of a single larva in the crown, and the entire bush may be killed. The adult insects appear in early August and are present during most of September.


Management: Eradicate wild brambles in the area, because they may harbor the pest. During the growing season, prune out and dying canes and those showing evidence of infestation.

Raspberry cane borers/girdlers: look for symmetrical swellings in the cane, from 1 to 3 inches long and usually a few inches, but as much as 4 feet, above the ground. Some canes may wither and die. In other cases, the affected area is broken off or severed in the region of the swelling. With other borer species, no swelling is evident but the tips of new canes may wilt and blacken (cane girdler).



Management: As a preventive measure, canes with swellings should be pruned out burned during the dormant season. Canes showing withered tips during the season should be clipped several inches below the affected portion and the damaged tissue destroyed. 'Heritage' is a very susceptible cultivar.

Snowy tree cricket: Adults and nymphs resemble field crickets but are pale whitish green to green. In late summer, adults often lay eggs in the canes, leaving long rows of punctures and greatly weakening the cane above.


Management: Prune out and burn infested canes. Eliminate wild brambles from the immediate area.

SPRAYER CALIBRATION

(*Laura McDermott*)

The importance of nozzle selection and sprayer calibration cannot be overstated. There are many studies that show that hundreds, if not thousands of dollars a season can be saved with attention to spray equipment and spray application. Additionally, according to Dr. Andrew Landers, pesticide application technology specialist at Cornell University, drift from pesticide applications can be reduced by as much as 50% by correctly selecting nozzles. Perhaps most importantly, weed, insect, and disease control will be more effective if growers follow a few simple guidelines to improving their sprayer performance.

First, pesticide sprayers should be calibrated routinely. If your farm includes fields with varying terrain, the sprayer should be calibrated for terrain type. Even backpack sprayers, which are often used by small berry growers, should be calibrated routinely. Backpack sprayers should always be calibrated by the person that is doing the spraying.

When calibrating the sprayer, make sure to mimic the actual application as close as possible. Fill the spray tank half full of water and drive at the normal rate in your normal gear. Repeat the process at least 3 times and take the average. If you are moving up and down a hill, make sure that you time the tractor travel in both directions. The purpose of sprayer calibration is to reduce error, so try hard to reduce possibilities of error while calibrating.

Secondly, before you calibrate your sprayer, make sure that your nozzles and your spray equipment are appropriate for the task. There are many nozzles on the market today, all with different functions. If you haven't recently thought about what your nozzles are doing for you, it's time to re-evaluate them. Make sure that spray patterns from the nozzles are what you expect. Inspect the hoses and filters, making sure the nozzles are not clogged. Non-uniform spray patterns caused by worn or clogged nozzles, or different angles or uneven boom height are the most common cause of poor applications. Also, check the calibration of your spray tank by using a hose-end meter.

Pay attention to your spray pressure. Make sure that you are operating the sprayer under the pressure recommended for your nozzle type. Keep the spray pressure consistent. Faulty spray pressure will cause your spray patterns to break down resulting in untreated areas in the field.

Thirdly, simplify your life by keeping your calibration equipment together. You will be much more likely to calibrate your sprayer if you assemble your "kit" ahead of time. Keep calibration directions, records of prior calibrations, tape measure, stop-watch, pencils, calculators, calibration jug, distance markers, and plastic gloves in a tote. Keep extra nozzles, washers, and other spare parts along with simple tools in a tool kit to carry on your tractor.

Fourth, spray when the least possible drift will result. Consider low-drift nozzles, and drift reduction strategies like keeping the boom close to the target, using drift retardant adjuvants and spraying when wind is low will help you reduce losing your spray material to an undesirable target.

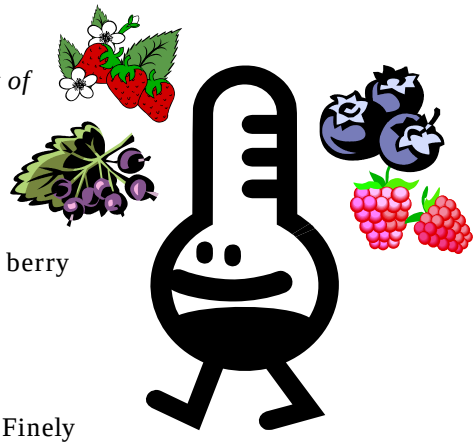
Lastly, be safe. Make sure to wear the Personal Protective Equipment (PPE) listed on the pesticide label. Be sure you have the proper type of gloves, respirator and footwear that are required.

For directions and more information on calibrating your sprayer, see http://www.nysaes.cornell.edu/ent/faculty/landers/pestapp/.

Acknowledgements: *We would like to thank the Cornell Cooperative Extension Associations in the host counties and also the host farms: Grisamore Farms in Locke, NY; Love Apple Farm in Hudson, NY; and Handsome Brook Farm in Franklin, NY. The workshops were supported by a grant from the New York Farm Viability Institute.*

APRIL BERRY BAROMETER 2009

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



The berry barometer is a returning NYBN feature which made its debut during the 2008 production season. It provides 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. **Pruning** - Pruning should be mostly finished by now for all berry crops. Finely chop brush in place or remove and burn it.
2. **Changes in pest management products for 2009** – *Gramoxone Max* no longer for use on berries as of 12/31/2008; *Gramoxone Inteon* may be used in its place. *Guthion* and *Kelthane* are no longer legal for use on berries (12/31/08). *Vendex* no longer legal for use on berries (3/31/08); *Dupont Vendex 50WP* (EPA No. 352-658) may be used in its place. *Prozap Agribrand Snail and Slug* - registration expected to expire 12/31/08. Check the berry pest management guidelines and product labels for details.
3. **New weed management products for 2009** – *Prowl H2O* (strawberries), *Chateau SW*, *Chateau WDG* (strawberries, blueberries), *Rage* (blueberries, currants and gooseberries, brambles), *Callisto* (blueberries), *Aim EC*, *Aim EW* (strawberries, blueberries). Check the berry pest management guidelines and product labels for details.

4. **New disease management products for 2009** – *Orbit* (blueberries, caneberries, currants and gooseberries, strawberries), *Tilt* (blueberries, caneberries, currants and gooseberries, strawberries), *Champion* (caneberries, currants and gooseberries, strawberries), *Serenade Max* (blueberries, caneberries, strawberries). Check the berry pest management guidelines and product labels for details.
5. **New insect management products for 2009** – New conventional products include *Assail* (blueberries, bushberries, strawberries) and *Delegate* (bushberries and caneberries). New organic options include *Pyganic* (small fruits and berries) and *Entrust* (bushberries, strawberries). Check the berry pest management guidelines and product labels for details.
6. **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.
7. **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.
8. **Irrigation systems** - Check for problems and/or leaks. Make any adjustments or repairs as needed.
9. **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. Straw is off in western and southern NY. Areas where temperatures may still fall to the mid to lower 20's with drying winds may want to wait a bit longer before removing straw.
2. **Spring weed control** –*Chateau SW*, *Chateau WDG* may be applied pre-emergence to dormant strawberries.
3. **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 *Cabrio, Captan, copper, Pristine, Rally, and Topsin M*.

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. **Preplant weed management** – *Chateau, Goal 2XL*, or *Round* up 30 days before planting. *Prowl H2O* 24 hrs prior to planting.
3. **Final site preparation** –
    a. Do final fitting of planting. If planting into killed sod, do not till.
    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.
4. **Plant spacing** – In-row spacing for matted rows 18-24"; between-row spacing 48-52 inches, depending on equipment size.
5. **Planting** –

a. If using biodegradable mulch, lay 1-2 days prior to planting. Apply at slightly looser tension than conventional plastics. Do not apply at temperatures above 80°F.
b. If you use a mechanical planter, have it tuned up and ready to go.
c. Place roots in water ½ to 1 hour before planting. Keep plants moist during the planting process.
d. Plants should be set with the center of the crown level with the soil surface.
e. Check planting depth after planting; firm soil around plants.
f. Irrigate immediately to settle soil around roots and reduce transplant shock.
g. *Aim EC, Aim EW* for weed management within 24 hrs after planting.

BLUEBERRIES:

Established plantings:

1. **Spring weed control** – Spring pre-emergent options include A*im, Callisto, Casoron, Devrinol, Sinbar, Surflan, Princep,* or *Velpar*. Post-emergent options include *Gramoxone Inteon* or *Scythe* which should be used before new cane emergence.
2. **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.
3. **Botrytis Blossom and Twig Blight** – Growers in southwestern NY experienced problems with this disease last season. Plantings with a history of the disease should have a first protective application as buds swell or have loose scales. Options include *captan product*s and *Ziram*. Note: *Ziram* as a stand alone product will not provide sufficient control.
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. Plantings with a history of mummyberry should be protected beginning at green tip if weather conditions are favorable for disease development. Conventional products include: *Abound, Bravo, Captan, Captevate, Indar, Orbit, Switch, Tilt* or *Ziram*. Organic options include *Serenade Max*.
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.
    h. 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. **Preplant weed management** –*Round* up 30 days before planting.
3. **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.
4. **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.
5. **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 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. **Spring weed control** - Pre-emergent herbicide options for spring include *Devrinol, Princep, Rage, Sinbar, Solicam*, or *Surflan*. Post-emergent options for spring include *Aim*, *Scythe* and *Gramoxone Inteon* applied before cane emergence.
2. **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. **Preplant weed management** –*Round* up 30 days before planting.
3. **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; do not till if planting into killed sod.
    d. Prepare raised beds if desired; 10-12" high x 4-6' wide at the base.
4. **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.
5. **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 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. **Spring weed control** - Product options include *Aim, Devrinol, Rage, Surflan, Gramoxone Inteon*, or *Scythe*.
2. **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. Conventional control options include *Rally, Cabrio, JMS Stylet Oil* or *Sulfur*. Organic options include *Organic JMS Stylet Oil*.

3. **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.
4. **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. **Preplant weed management** –*Round* up 30 days before planting.
3. **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.
4. **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.
5. **Planting** -
    a. Dig planting holes 12" deep and 18" in diameter. Make a shallow cone of soil in center (8' high). Spread roots over cone.
    b. Set plants slightly more shallowly than grown in the nursery. Firm soil around plants. *Do not add amendments to the planting hole.*
    c. 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.
    d. Shorten canes to 1-2 buds above ground. Irrigate immediately. Mulch if desired.

Questions or Comments about the New York Berry News?

Ms. Cathy Heidenreich
New York State Agricultural Experiment Station
630 W. North Street
Geneva, NY 14456
Phone: 315-787-2367
Email: mcm4@cornell.edu

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