

Berry Notes

Prepared by the University of Massachusetts Fruit Team

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Message from the Editor

Focus on pruning. This issue of Berry Notes focuses on pruning of berry crops. This is an important practice which should be carried out thoroughly every year. Doing a good job with pruning leads to healthy, balanced and productive plants.

Freeze Damage Assessment: As mentioned last month, a concern each winter in our region is whether or not perennial plants have suffered winter injury, either from severe cold or from drastically fluctuating temperatures. Knowing how to assess winter injury is an important skill and can guide some pruning decisions. This issue of Berry notes contains some information on what the critical temperatures are in some of our berry crops and how to go about determining if damage has occurred. More information on this topic will be in the March issue of Berry Notes.

2006 New England Small Fruit Pest Management Guides are now available for purchase. Guides may be purchased by check (made out to the New England Vegetable & Berry Growers Association or NEV&BGA) by mailing in order forms to me, Sonia Schloemann, at 22 West Experiment Station/UMass, Amherst, MA 01003. The cost is \$10 plus \$4 for S&H for a total of \$14. Guides may be ordered online, by visiting the New England Vegetable & Fruit Conference site at www.nevbc.org.

Meetings: There are still some excellent meetings coming up this winter and spring. Check out the Meetings section of the newsletter to see what might be of interest to you.

Thanks again to Nourse Farms of Whately Massachusetts for their continued support in underwriting Massachusetts Berry Notes. This is an important partnership which makes this newsletter affordable for all growers.

STRAWBERRY

Winter Freeze Injury to Strawberry Crowns

Sonia Schloemann, UMass Extension

Strawberries are susceptible to winter injury in two primary ways. The first is damage to roots from the heaving of soil that can result from cycles of freezing and thawing in the spring. This heaving action can snap roots and lead to problems with root infections in the wounded tissue. The other way in which strawberries can suffer damage in the winter is from freezing of crown tissue.

The strawberry crown is actually a compressed stem structure with layers of vascular tissue that forms a cylinder with vascular tissue running spirally in two directions. (See Fig. 1.) Inside this lignified or woody vascular tissue is a fleshy pith that can easily be injured and turned brown by the formation of ice crystals at low temperatures. The critical temperatures will vary with the variety of strawberry.

Most of our Northern varieties can withstand crown temperatures of between 10 to 14°F. This is why mulching for winter protection is so important for this crop. At these temperatures, not only is the pith damaged, predisposing the tissue to infection by various pathogens, but the vascular function of the outer layer of cambium tissue can prevent normal transport of water and nutrients in the plant.

Freezing injury is easily seen by cutting the crowns length wise and looking for damaged tissue. (Be aware that if left exposed to air for a while, this tissue will oxidize and turn brown like an apple when it is cut open.) Uninjured pith at the center is a creamy white when first cut. With slight injury to the crown, but not measurable in its effect on the plant, browning of the lower part of the pith occurs.

Moderate injury, seen as a deeper browning, will result in noticeable damage to the plant (i.e., general weakening, slow growth, fewer blossoms and reduced yield). Lethal injury, where vascular tissue has been killed, will exhibit deep browning and blackening of the outer cambium and result in plant death.

If you suspect winter damage in your strawberry field, go out and cut some crowns a week or two after the ground has thawed. If a high percentage of crowns show severe injury, it may be necessary to plow the field down and enter into a rotation cycle for a few years. This will help purge the soil of high levels of pathogens that may build up on the decaying strawberry

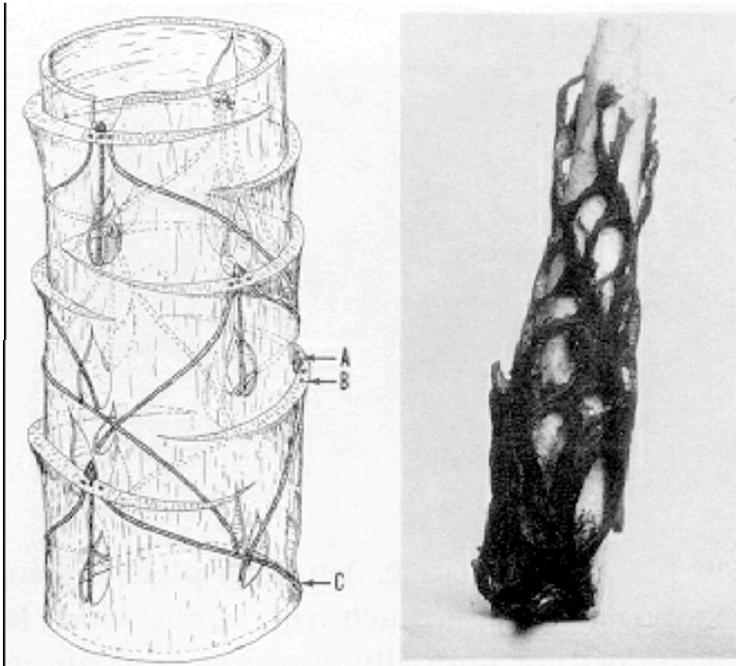


Figure 1. Morphology of the strawberry crown. (from G.M. Darrow, *The Strawberry: History, Breeding and Physiology*; <http://www.nal.usda.gov/pgdic/Strawberry/darpubs.htm>)

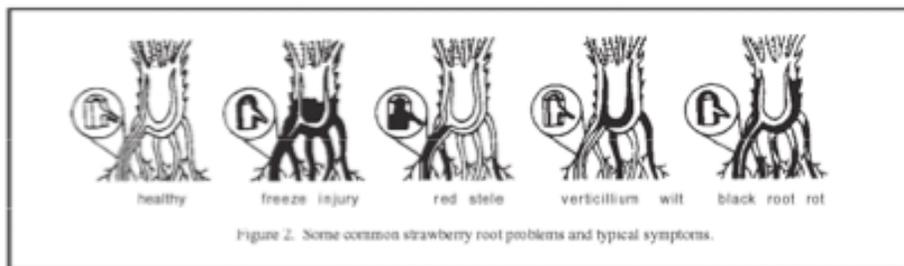


Figure 2. Some common strawberry root problems and typical symptoms.

crowns. Low levels of damage can be nursed through to better health by judicious irrigation, fertilization and other practices to keep plant stress low. See figures 2 and 3 below for help determining if your plants have winter injury or some other type of crown/root damage.

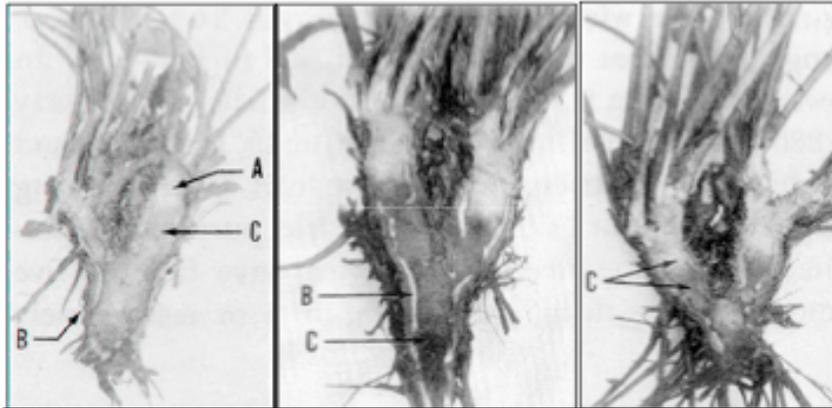


Fig 3. Cold injury to strawberry crowns. Uninjured crowns would have white centers at A. 1. The most serious injury occurs when the cambium that carries sap and food is killed. Slight recovery is shown by new cambium in 1 and 3 at B. Plant 2 would not have recovered. The darkening of the centers of the crowns (C) is caused by the formation of frost crystals that break through the cell walls and oxidation follows, as in the browning of sliced apples. (from G.M. Darrow, *The Strawberry: History, Breeding and Physiology*; <http://www.nal.usda.gov/pgdic/Strawberry/darpubs.htm>)

RASPBERRY

Pruning Summer- and Fall-Bearing Raspberries

Marvin Pritts, Cornell University

Plant growth can be manipulated by growers to achieve long-term increases in production of quality fruit. Pruning affects plant growth rate, fruit quantity and size, soluble solids (sugars), disease susceptibility, ease of harvest, and spraying efficiency. Brambles respond significantly to pruning, but these practices are usually the most expensive and time-consuming part of an operation. Growers must use care when choosing pruning strategies. The following discussion presents different types of pruning methods for primocane fruiting and floricanes fruiting brambles that best promote high yields of high quality fruit.

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 floricanes 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. 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.

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.

Floricanes-Fruiting (summer-bearing) Raspberries and Blackberries

Floricanes-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. Five general methods of pruning floricanes-fruiting brambles are described below. Each method will produce different results in the growth of primocanes and floricanes of floricanes-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.

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. Some growers have reported success with Gramoxone, Scythe and Goal. 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 floricanes thinning and suppression of primocanes in late. If primocanes are suppressed 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) longterm 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 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. (*Source: New York Berry News, Vol. 3, No.2, Feb. 2004*)

Pruning Black, Red and Purple Raspberries and Blackberries

Ray R. Rothenberger, University of Missouri – Columbia

Raspberries produce fruit on 2-year-old canes, which die after the crop has matured. The pruning of black and purple raspberries consists of:

1. Tipping the new canes when they reach a height of 18 to 20 inches, thus forming a branched cane that is capable of producing more fruit than an unbranched cane. Branched canes are also more able to support the crop off the ground than unbranched canes.
2. As the buds break in the spring, the branches on the canes should be shortened to 8 to 12 inches (longer if the plant is supported by stakes or a wire trellis).
3. After the crop is harvested, the old fruiting canes should be removed at the soil line. (The removal of the old canes as soon as the crop is harvested is a good disease control

practice since it removes an important source of infection.)

Pruning red raspberries

Red raspberries should be allowed to produce long, unbranched canes rather than branched canes like the black and purple varieties. The new canes are, therefore, unpruned during their first season's growth. At the start of the second

season, they are topped to a height that will permit them to support themselves and keep the fruit off the ground. If the plants are supported by stakes or a wire trellis, they can be pruned to permit more fruiting wood. The old canes die after the crop is matured and they should be removed as early as possible in order to remove sources of disease.

Pruning upright blackberries

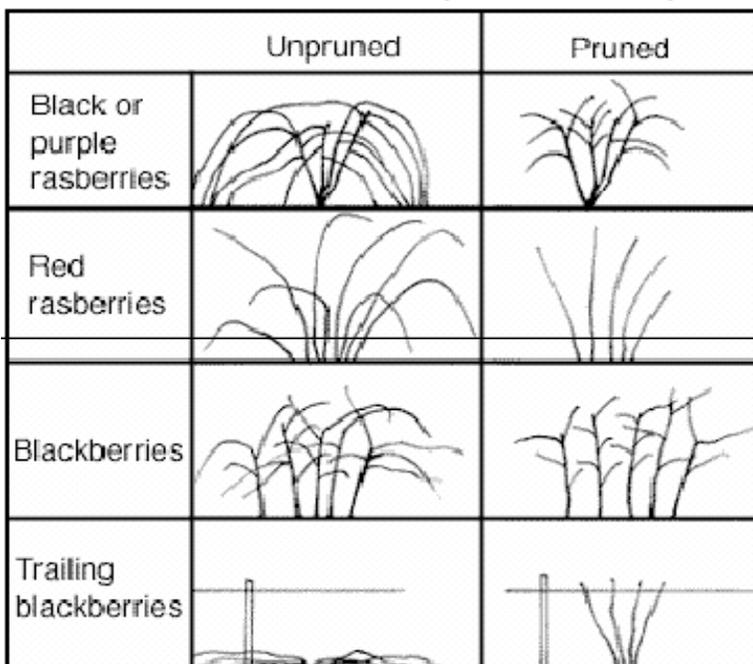


Figure 1. Pruned and unpruned raspberries and blackberries

Standard American varieties of blackberries are usually able to support themselves without stakes or a trellis. Pruning is similar to that of black and purple raspberries except the canes grow taller. It consists therefore of:

1. Tipping the new canes at a height of 24 to 30 inches to form branched canes.
2. As growth starts, remove all dead and weak canes or branches and head the branches back to a length of 12 to 15 inches or to the degree that the canes can support the expected crop.
3. After the crop is harvested, remove the 2-year-old wood to stimulate the new canes and remove sources of diseases.

Pruning trailing blackberries (Dewberries, Boysenberries, etc.)

Trailing blackberries are not grown extensively in Missouri because of a lack of hardiness and their susceptibility to bramble diseases. Like other brambles, they bear fruit primarily on 2-year-old wood. The one-year wood is usually allowed to grow on the ground where it can be mulched for winter protection. As growth starts in the spring, these canes can be lifted up and tied to a trellis or stakes for fruiting. Weak canes should be removed as well as all dead wood and the stronger canes shortened to fit the trellis or stakes (usually 36 to 40 inches high). After the crop is harvested, the old fruiting wood is removed while the new wood is permitted to remain on the ground until the next spring (see Figure 1).

Additional suggestions

1. In tipping the new growth of black and purple raspberries and upright blackberries, each cane should have the growing tip pinched out as it reaches the desired height. If several inches of the cane are removed, the side branches are severely stunted.
2. Trailing blackberries and red raspberries should be supported by stakes or a wire trellis to produce maximum crops. The same is true of black and purple raspberries, especially for the first crop (2-year-old plants). These will support themselves fairly satisfactorily after the second year.
3. All brambles in Missouri are subject to several serious plant diseases that are difficult to control. As a result, the plantings are usually short-lived and require frequent replacement.
4. Upright blackberries are frequently affected with a sterility condition in which the plant blossoms normally but produces no fruit. There is no control for this condition and such plantings should be removed.
5. A thorough spray program will assist in producing satisfactory crops of both raspberries and blackberries. (Source: University of Missouri Ag. publication G6000, <http://muextension.missouri.edu/xplor/agguides/hort/g6000.htm>)

BLUEBERRY

Blueberry Pruning and Rejuvenation

Marvin Pritts, Cornell University

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 (Figure 1). 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 lowgrowing 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.

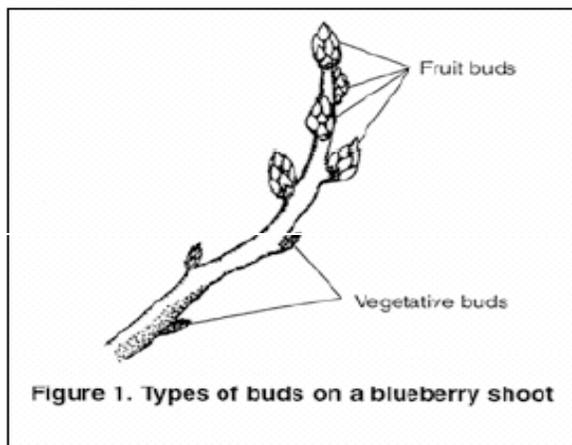
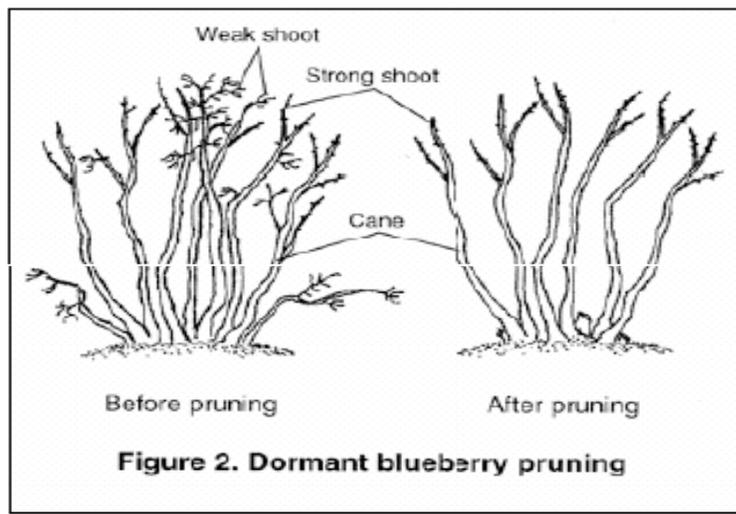


Figure 1. Types of buds on a blueberry shoot



Detailed pruning

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

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

Rejuvenation

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

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

Summary

Pruning is an investment in the future productivity of the blueberry planting. Regular annual pruning will spread costs throughout the life of the planting, ensure stable production from year to year, and serve as a useful tool for managing pests, fruit load, and quality. (*Source: New York Berry News, Vol. 3, No.2 - 4, Feb. 2004*)

GRAPE

Balance Pruning Grapevines

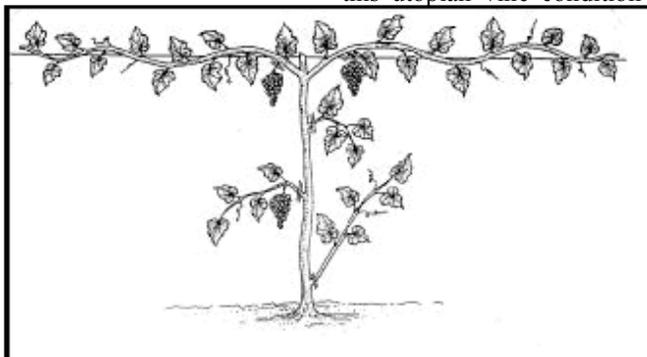
Mark Chien, PennState Cooperative Extension

Pruning is not instinctive. When I look at a rose bush or an apple tree in my yard, I panic. We all know that there is a “right” and a “wrong” way to prune a plant – and most of us are pretty sure we will do it wrong. Pruning your vines is something worth learning how to do correctly. While vines are very forgiving, over time, if pruned incorrectly, their shape can be lost and they will become more disease prone and less productive. Its not rocket science, but does require intelligence, creativity and practice. Every vine is different, and you need to know how to shape and mold each vine to its ideal form. Pruning is the act and art of making cuts to remove living vine parts. But pruning is also an important cultural practice in the long-term maintenance of your vineyard. Some would argue that it is the single most important part of the annual vineyard cycle. Its almost impossible to explain how to prune a vine without actually demonstrating how to do it. Therefore, I’ll focus on balanced pruning as a viticultural concept and hope that those who need pruning lessons will attend a workshop.

I would urge every grower to balance prune at least a few vines for every acre of vineyard, if nothing else, just to get an idea of the general vigor of your vines. This information, along with petiole and soil tests, and you own astute observations, can help you plan an effective strategy for managing your vineyard. It will

also help you to make critical decisions regarding any future planting you may do.

The objective of balance pruning is to make the major step towards achieving a balanced vine in the coming growing year. A vine in balance is one whose vegetative and reproductive functions are in equilibrium. If you can achieve this utopian vine condition – you will likely harvest ripe fruit and have a healthy vine that will age gracefully and survive the winter. A vine’s size is determined by the sum of all its contributing parts – roots, shoots, and permanent wood. As a matter of convenience, only the new growth can be measured, so the number of nodes left after pruning is correlated to the amount of



wood that is removed. For an excellent explanation of vine balance please read Stan Howell’s treatise on this subject titled “Grapevine Crop Control” in the Sept/Oct, 2000 issue of Wine East magazine.

Most of us have wrestled with over-vigorous vines. The reasons why these vines often do not produce high quality fruit are well documented. Fortunately, contemporary viticulture technology in the form of rootstocks, divided trellis systems, deficit irrigation and many other practices allow growers to bring vines into balance in awkward sites. Each winter a vine sheds up to 90 percent of its previous year’s wood. The quality and quantity of what remains is of critical concern to both the vine and the grower. The number of buds that a pruner leaves will directly influence crop load

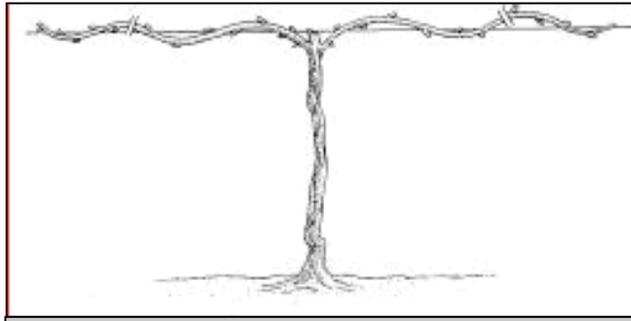
and vine vigor in the coming year. – and thus the quality and quantity of fruit, bud fruitfulness, disease incidence and more. To balance prune a vine is to make an attempt to equate the number of nodes retained at pruning with vine capacity, the goal being to maintain a balance between vegetative growth and fruit production. This idea was first proposed by Nelson Shaulis at Cornell in the n1940's, and has persisted to this day as a key concept in the production of high quality wine and juice grapes. The idea has since be refined by disciples of Dr. Shaulis, most notably Richard Smart from Australia. Brian Freeman does a good job of describing balanced pruning as a way of quantifying the intuitive process of an experienced pruner. When standing in front of a big vine, it makes sense to leave more buds to allow the growth of that vine to spread out. Conversely, a wimpy vine will have to be pruned “harder”, i.e., to fewer nodes, in order to stimulate the growth of those shoots. In the classic balanced pruning formula, a set of recommendations is given for specific varieties – but these can be adjusted over time for your vines. For example, for Concord the formula is 30 plus 10. That means for the first pound of pruning weight – the measured amount of one-year old wood you remove from your vine – you should leave 30 nodes/ The “plus 10” refers to the number of nodes you should leave for each additional pound of pruning weights. Numbers are given for many varieties on a 20 + 20 basis. Lider et al recommends 10 + 10 for Chardonnay based on California growing conditions. Because of their relative delicacy, it is suggested that vinifera vines be double pruned – leaving twice the number of necessary nodes on the first pass, and fine tuning once the threat of winter injury and/or frost damage has passed. It's important that only count be used for pruning decisions.

Spurs typically have basal buds that can produce additional, often non-fruitful shoots. Native and vinifera varieties usually don't produce many adventitious buds, but some hybrid varieties, like Seyval, are notorious for overproducing. Many growers regularly shoot thin extra shoots between budbreak and bloom.

Richard Smart has formulated his own Golden Rules that provide a guide to achieving a balanced vine. Rule #1 recommends 12 – 16 buds per pound of pruning weight. The second rule is to have four to five shoots from count bud positions per foot of canopy. If you

have more than this, you need to thin out excess shoots. He notes that these two formulas can be in conflict with each other. The trick is to figure out how to get the node number in rule 1 into the space allocated in rule 2. In a vigorous vine situation, this often means dividing the canopy or removing vines to increase the linear part of the equation.

You may wonder what good balance pruning will do for you



*Illustrations from Washington State University;
Spokane County website <http://spokanecounty.wsu.edu/>*

once your linear vine spacing is already established once the trellis is in the ground. Good questions. If you are getting node numbers far beyond what your trellis can accommodate (approx. 0.4 lbs/ft), it may be time to consider splitting the canopy, if possible – at the least, take measure to devigorate your vines. If the numbers are low, then you should consider ways to invigorate your vines,

or perhaps interplanting. Again, the goal is to achieve balance between the vegetative and reproductive needs of the plant.

There are other important indicators of vine capacity you may wish to use to determine your pruning level. Cane weight and length can be instructive. Smart and Coombe estimate a cane weight for a moderately vigorous vine at 0.75 – 1.5 ounce per cane. Average length would be 15 to 20 nodes. I suppose a person could spend the entire winter taking measurements from vines and a) never find the prefect vine and b) never get around to actually pruning the vines. All of these numbers are pertinent and useful guidelines as you gain you own feeling about the capacity of your vines. In the vineyard I managed we had distinctive areas of similar vine size and would measure vines in each zone and prune accordingly. We might balance prune five vines in an acre just to get an idea if our bud counts were in the ballpark, Please buy a reliable pocket hand scale - you can find one by looking under hanging scales in your favorite search engine (go to fishing scales), a 2 – 3 pound maximum scale is fine, as long as it reads in ounces.

Finally, the inevitable disclaimer. It is impossible to absolutely quantify viticulture into a simple set of numbers and formulas. Your accumulated experience wit your vineyard is more valuable than anything you may read here or anywhere else. Use your intuition as a guide. Do not be afraid to experiment with pruning levels, trellis systems, training systems, canopy management techniques and whatever other tools or concepts are available to the modern grape grower that will enable you to produce the best quality wine grapes possible from your vines. That's the challenge, and the fun part of growing wine. For printed pruning instructions and more details about balanced

pruning, please refer to the following excellent reference resources:

1. **Viticulture. Volume 2: Practices.** 1992. B. G. Coombe and P. R. Dry. Winetitles. Adelaide, Australia. ISBN 1875130012

2. **Mid Atlantic Wine Grape Growers Guide.** T. Wolfe and B. Poling. <http://www.ces.ncsu.edu/resources/winegrape/>
3. **Sunlight Into Wine.** 1991. Richard Smart. Winetitles. Adelaide, Australia. ISBN 1875130101
(*Source: PennState Grapevine Newsletter, Fall 2001*)

Ribes

Pruning Gooseberries and Currants

B. C. Strik and A.D. Bratsch, Oregon State University

Prune when the plants are dormant in late winter. Red currants and gooseberries fruit in a different way from black currants, so you should prune them differently.

Red currants and gooseberries

These produce most of their fruit on spurs that are located on 2- and 3-year-old wood. Canes (stems arising from the base of the plant) that are 4 or more years old are no longer productive; remove them when you prune. After pruning, a healthy bush should have 9 to 12 main canes--3 to 4 each of 1-, 2-, and 3-year-old canes. Remove all canes older than 3 years and canes that are damaged or diseased. Prune to form an open center and remove canes that are low to the ground. After planting, a yearly pruning schedule would look like this:

Year 1. At the end of the planting year, remove all but 6 to 8 of the most vigorous canes during the dormant period. Make your pruning cuts as close to the ground as possible.

Year 2. At the end of the second season, leave 4 or 5 new 1-year-old canes, and keep 3 or 4 of the 2-year-old canes.

Year 3. Keep 3 to 4 canes each from 1-, 2-, and 3- year old growth.

Year 4. At the end of the fourth and following years, remove the oldest canes and keep 3 to 4 new 1-year-old canes to replace the older canes you removed.

Black currants

Black currants produce best on 1-year-old wood. Strong 1-year-old shoots and 2- or 3-year-old canes that have an abundance of strong 1-year-old shoots are the most productive.

When you prune, keep a total of 10 to 12 canes per mature bush -about half should be 1-year-old shoots. You can leave a few more shoots if the plant vigor is very high. Remove all shoots that are more than 3 years old. Make your pruning cuts close to the ground.

Because black currants bear most of their fruit on 1-year-old wood, you can prune them to produce on alternate years. In this system, prune plants to the ground during the dormant period. This causes the plant to produce many new shoots; no fruit will be produced the season after pruning. Don't prune the plants in the next dormant period, other than removing diseased wood or weak growth.

The following year, they fruit on the 1-year-old wood. Prune your plants to the ground again the following dormant period, repeating the cycle. In this system you get fruit produced every other year on a particular plant. To get fruit each year, you can have half your plants fruiting in one year and the other half the next.

If you're growing black currants in a hedgerow, it's simplest to follow the alternate-year pruning method. Training to a trellis. Currants and gooseberries can be grown as a fanshaped bush on a trellis. Plants trained this way look attractive and produce a good crop of well colored fruit. To train to this system, plant rooted cuttings along a trellis with 3 to 5 wires. Space single plants at 3 to 4 feet. Tie side branches to the wires as they develop. To develop a narrow fruiting wall, use the pruning techniques mentioned for the type of currant or gooseberry you're growing. This system requires a lot of labor and patience—only gardeners with a lot of experience should try it! (*Source: Oregon State University Home Horticulture Publication EC 1361, online at <http://eesc.orst.edu/agcomwebfile/edmat/html/ec/ec1361/ec1361.html>*)

General Information

Year-Round Marketing of the Seasonal Agricultural Enterprise- *should I or shouldn't I?*

Bob Weybright and Wen-fei Uva, Cornell University

The summer and fall growing/selling season is done, the holiday sales season is but a memory as well. So now it is time to tuck away the tools and stress from a hard season and take that well earned rest. Right or **WRONG?** Ultimately this is a personal and business specific decision that you will determine for yourself. But to give you something to think about during your downtime, we would like to offer some thoughts to consider as you look towards the next business cycle.

First, many if not all farm and agriculture related enterprises would classify their sales activities as having some type of seasonality. Of course, there may be a variation in the length and time of the season, but, nonetheless, all are faced with finding ways to entice their customers back to them year after year. It becomes more complicated since during the off-season, the customer has been given sufficient time to become accustomed to making his/her purchases elsewhere.

To address this dilemma, there are generally two basic strategies employed in the agriculture sector. The first, used by many large agriculture producers in the major growing regions of the US, is to find a way to provide year round products from a range of growing regions or conditions. This can be in the form of protected production (i.e. hot house or greenhouse), or a more common approach, establishing a presence in other growing regions (i.e. the south, west, or overseas). In the case of very large producers, this is economically feasible and desirable due to efficiencies in modern large scale production and relatively low cost of transportation (although that card has been dealt a significant blow this past fall with the increase in fuel costs).

For smaller growers or growers who for not afford to pursue the last strategy, their techniques to bring the customer back each fairly common approach employed by a to be passive about any marketing efforts harvest or the selling season. While this all signs indicate that the growing number results in a selling environment where for errands and shopping. This comes at a competition for consumer dollars from a Consumers often do not have time to plan the seasonal schedule, or do not want to go these factors, we see that customers will be done?



whatever reason do not care to or can option is to look for methods and year when products become available. A significant number of small growers is until just prior to the start of the next approach may have worked in the past, of dual career families in the future people have less and less time available time where there is increased variety of industries each year. ahead and adjust their shopping habit to through the trouble. Combining all of more difficult to come by. So what can

Industry statistics indicate that to retain efficient use of time, effort and marketing establish a new customer base each year. Admittedly, this is easy to say, yet difficult to do when a business is not open, or does not have products to sell during part of the year.

To begin working towards resolving this dilemma the first step is to take stock of the resources a business has to work with. We would offer that a solid first step is to realize that a primary reason many people shop at smaller businesses is due to emotional, social, and environmental attributes not found at larger big boxtype outlets. These consumers are buying based on VALUE (see the August 2004 Smart Marketing article for insights into determining value). To keep the demand for your closed business means that you must keep your business name and value proposition front and center in the consumers mind. You will know you have succeeded when the customer sees or thinks of your business during the off season and pines for the next season when they can utilize your services again.

Some means to accomplish this would include generating creative and innovative points of contact during the off selling season. What might this look like in real life? It can be simply summarized as any effort that focuses on the unique personality and characteristic of each specific business. A fruit grower might send a post card with a picture of their orchard being pruned in the late winter. A vegetable grower might send a similar card showing the fields being plowed or tilled in the late fall or early spring. Essentially creating some point of contact that provides a visual and ultimately mental connection to the agriculture operation that maintains the emotional bond enjoyed by the customer and keeps them looking forward to the experience again.

Regardless of the method or message chosen, the key is to determine what it is that makes your business special and memorable. Keep your presence in your customer's thoughts and plans. Give them a story to tell. Your assignment this month is to determine how you want to spend your marketing efforts and dollars. In part 2 of this article, we will look in more detail at some techniques to consider if it makes sense for you to market your business all the year around.

(Source: *New York Berry News*, Vol. 5, No. 1 January 2006. Reprinted from: *Smart Marketing*, January 2006.)

Predicting and Diagnosing Winter Injury in Berry Crops

Pam Fisher - Berry Crop Specialist/Ontario Ministry of Agriculture and Food

Predicting winter injury is difficult because it is complicated by many factors. Diagnosing winter injury however, is important because crop management practices should be adjusted when significant winter injury occurs.

Winter injury is more correctly called low temperature injury, or cold injury. Factors that affect this type of damage include how cold it was, how long the cold spell lasted, and the environmental conditions before the cold occurred. Healthy plants in a fully dormant state can tolerate colder temperatures than plants that have not yet entered dormancy, or plants that are coming out of dormancy. Sharp drops in temperature before plants are fully dormant are especially harmful to strawberries. We suspect that many of our common raspberry varieties suffer more from fluctuating temperatures in January-March than from absolute cold. Other important factors that affect cold temperature injury include the variety, and snow cover and field topography.

Expect cultivars developed in Florida, California, or the Pacific Northwest to show more injury than varieties developed in the northeast. Snow is a great insulator, and is important for protecting roots and strawberry crowns from severe cold. Snow cover was minimal this past winter in much of the mid-west and we expect to hear reports of severe winter injury from these areas. Cold air flows like water across a field. Look for winter injury in low or protected areas where cold air would settle. (*Source: Ontario HortMatters, Volume #3, Issue #6, April 2003*)

Table 1. Critical temperatures and symptoms of cold injury for berry crops.

Crop	Temperatures of concern	What to look for	Symptoms of winter injury
Strawberries	-10 to -12°C (10 to 14°F) (<i>unmulched, crown temps</i>)	Slice crowns lengthwise and look for browning in the normally creamy white crown tissue. In plants with mild injury, browning develops at the base of this area, more seriously injured plants will have browning just below the tip of the crown. The vascular tissue around the edge of the crown is less susceptible to damage, and if it is not destroyed, plants can recover to varying degrees.	Symptoms of sub-lethal winter injury include: <ul style="list-style-type: none"> • weakened plants • late leaf emergence • narrow or deformed leaves • early runner production • fewer blossoms and <ul style="list-style-type: none"> • lower yield.
Raspberries	-29°C (-20°F) (hardy reds)	The raspberry plant parts most sensitive to cold are, in order, the pith in the basal part of the buds (most sensitive) the pith of the cane the vascular tissue at the base of the buds, and the immature flower tissue (flower primordia). These parts will appear brown or dried up. Tissue at the base of the buds is more sensitive than the buds themselves.	Symptoms include: <ul style="list-style-type: none"> • bud death or • production of short, weak lateral shoots or • shoots develop normally at first, but then die under the stress of warm weather or cropping. The injury shows up at the tips of the canes and extends down the cane in proportion to severity.
	-23°C (-9°F) (purples)		
Blackberries	-20°C (-4°F) (black raspberries)		
	-18°C (-0.5°F) (erect blackberries)		
	-13 to -11°C (8 to 12°F) (trailing blackberries)		
Highbush Blueberries	-29°C (-20°F)	Slice flower buds with sharp knife or blade. Look for browning in the center of the bud (flower primordia). Buds at the tip of a shoot are more sensitive than buds at the base.	Cold temperatures damage stems and buds. Usually all the flowers in a bud are killed, but some damaged buds may produce 1-2 blooms, instead of 8-12. Very cold temperatures may also damage the cambium at the base of plant stems. Shoots on these stems will leaf out, then die back.
Currants and Gooseberries	-35°C (-31°F)		Currants and gooseberries are very hardy compared to other berry crops. They bloom early, so spring frosts are a bigger problem than winter cold.



Figure 1: Winter injury on strawberry crowns. Slice crowns lengthwise and look for browning in last years growth. Browning at the base of the crown indicates moderate injury. Browning at the top of the crown is more serious. Ignore the old, woody parts of two or three year old crowns. The degree of injury shown here is moderate rather than severe.



Figure 2: Winter injury in blueberry buds. Slice fruit buds crosswise and look for browning in the center. Sometimes, only some of the flowers inside a bud are brown, as shown here. Typically, highbush blueberries sustain some damage each year.

Upcoming Meetings

February 7, 2006 *Vermont Vegetable and Berry Growers Association 2006 Annual Meeting*, Capital Plaza Hotel and Conference Center, 100 State Street, Montpelier (802) 223-5252 www.capitolplaza.com

February 8, 9 & 10, 2006, *Soils & Weeds: A 3-Day Advanced Farmer-to-Farmer*, Workshop for Vegetable Farmers. At the United Methodist Church. <http://www.farmandfood.org/programs/workshops.html>
Corner Henning & 5th Avenue, Saratoga Springs, NY.

February 11, 2006, *NOFA-VT's Annual Winter Conference*, Vermont Technical College, Randolph, VT. Contact: Kim Cleary, Phone: 802-434-4122, info@nofavt.org, <http://www.nofavt.org/annual-events/winter-conference.php>

February 13-16, 2006 *Empire State Fruit and Vegetable Expo*, Onondage Convention Center, Syracuse NY. North American Bramble Growers Association meeting included. For more information on the Expo, contact: Lindy Kubecka, 315-687-5734, email nysvga@twenvy.rr.com.

February 15-16, 2006 *Ontario Fruit & Vegetable Convention* at Brock University campus in St. Catharines, Ontario. For more information, call 1-800-387-3276

February 23, 2006 *Small Fruit School: Berry and Grape Day*. Two concurrent sessions will be running, so producers can select the crops they are interested in. Preregistration is preferred so that we can better plan for seating. For that reason, a \$5 discount will be given for all those who pre-register. Cost: \$30 including buffet lunch. Pesticide Credits: pending. **To pre-register, complete and mail the form below with your check to Cornell Cooperative Extension, 10 Westbrook Lane, Kingston, NY 12401.** This form must reach us no later than February 16, 2006 in order to receive the pre-registration discount price. Please register at the event if your payment will not reach us by February 16. Contact: Jenny at (845) 340-3990 for further information.

February 22-25, 2006 *Mid Atlantic Direct Marketing Conference*. This year's 4 day event is being hosted near Reading, PA. For those interested - additional info can be found at www.madmc.com

March 29, 2006, 9:00am - 4:00pm, *Maine Vegetable & Fruit School*, American Legion Hall, Alfred, Maine. an Extension workshop on topics such as growing small fruits, pest identification, growing techniques, composting; guest speakers from UMass, UNH Cooperative Extension and MOFGA; \$20 per person and includes lunch. Contact Mark Hutchinson E-Mail: markh@umext.maine.edu Phone #: 800-244-2104. Preregistration required.

April 3, 2006, 9AM – 1PM. *MA Practical Skills Workshop: Growing Organic Apples*, Contact: Tom Szekely (781) 894-4370, seedpotato@yahoo.com, <http://www.nofamass.org/programs/skills.php>

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